

FTS PIPELINE ON LAND BETWEEN LINSTOCK AND LOW CROSBY, CUMBRIA



WATCHING BRIEF REPORT

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Quality Assurance

This report covers works as outlined in the brief for the above-named project as issued by the relevant authority, and as outlined in the agreed programme of works. Any deviation to the programme of works has been agreed by all parties. The works have been carried out according to the guidelines set out in the Institute for Archaeologists (IfA) Standards, Policy Statements and Codes of Conduct. The report has been prepared in keeping with the guidance set out by WA Archaeology Ltd on the preparation of reports.

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SUMMARY

Wardell Armstrong Archaeology Ltd were commissioned by United Utilities, to undertake an archaeological watching brief on groundworks relating to the FTS Pipeline between the villages of Linstock and Low Crosby, Cumbria (NGR NY 415578-444592). WA Archaeology Ltd (formerly NP Archaeology Ltd) undertook a desk-based assessment during November 2010 in order to establish the scope of the archaeological work required to fulfil the archaeological conditions of the planning decision. The report identified a number of historic structures and features within the immediate vicinity of the pipeline easement which were likely to be impacted upon by the groundworks, most notably the Vallum and the associated Hadrian's Wall World Heritage Site. The pipeline easement passes through the archaeologically rich Eden Valley. As a result of consultation between Michael Collins (Hadrian's Wall Archaeologist) and Jeremy Parsons of Cumbria County Council Historic Environment Service, planning consent for the development was granted on the condition that an archaeological watching brief be undertaken during all groundworks that did not follow existing roadways.

The archaeological watching brief and excavation work was undertaken over 38 non-consecutive days between the 9th December 2011 and 25th May 2012. The watching brief monitored topsoil stripping and the excavation of the service trench along with shafts associated with connecting stations and sub surface borings. Topsoil stripping, within a 20m easement, took place along the majority of the 3.5 kilometre route as did the service trench. Shafts and trenches for sub surface boring were excavated on the east and west sides of the M6 motorway and the Brunstock Beck. Post-medieval narrow ridge and furrow was identified in three fields associated with the easement. The base of a post-medieval tile manufacturing kiln along with associated tile and brick debris were also located. At the western end of the pipeline the position of a possible Iron Age or Roman boundary ditch, previously observed in aerial photographs, was confirmed. Several post-medieval field boundary ditches were also located throughout the easement.

On the southern edge of Low Crosby village, adjacent to the River Eden, a series of pits, Romano-British ditches and a significant kiln were uncovered. It is probable that the majority of these features were associated with the eastern edge of a Romano-British farmstead with a possible associated corn-drying kiln, although a medieval provenance cannot be ruled out for this feature.

Due to the significant archaeological remains revealed during the watching brief, it is recommended that the results of the work be considered for publication within the Transactions of the Cumberland and Westmorland Antiquarian and Archaeological Society (CWAAS). Given the high archaeological potential of the area, it is also

recommended that any future invasive work within the area be subject to a programme of archaeological investigation.

It is also recommended, based upon the environmental results that material from several samples obtained during the watching brief at Low Crosby should be sent for further analysis to better understand the history and use of the site.

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Wardell Armstrong Archaeology Ltd would like to thank Richard Sykes of United Utilities, for commissioning the project and for all assistance throughout the work. WA Archaeology would also like to thank Michael Collins (Hadrian's Wall Archaeologist) and Jeremy Parsons of Cumbria County Council Historic Environment Service, for all their assistance throughout the project.

WA Archaeology Ltd extends its gratitude to Paul Davidson of Balfour Beatty Utilities, Stuart Waugh and the staff of Waiting's Pipeline Contractors, and Nigel Armstrong and the staff of Cubby Construction. All were forthcoming with help during this project. Thanks are also due to Alan James for his hard work during the project.

The archaeological watching brief was undertaken by Sue Thompson, Fiona Wooler, Chris Muirhead and Kevin Mounsey, with the aid of David Jackson, Angus Clark, Alan James and Thomas Whitbread. The report was written by Kevin Mounsey and David Jackson and the drawings were produced by Adrian Bailey. The project was managed by Frank Giocco, Technical Director for WAA Ltd, who also edited the report.

1 INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 In November 2010, Wardell Armstrong Archaeology were invited by Richard Sykes of United Utilities to maintain an archaeological watching brief on land between Low Crosby and Linstock, Cumbria (NGR NY415578-444592; Figure 1), during groundworks associated with the FTS Pipeline. The proposed works lie within the archaeologically rich Eden valley and to the immediate south of the *Vallum* and associated Hadrian's Wall World Heritage Site. A previous desk-based assessment was produced by NP Archaeology Ltd (Wooler 2010), which identified a number of historic structures and features within the development area that were likely to be impacted by the proposed development. As a result, Michael Collins (Hadrian's Wall Archaeologist) And Jeremy Parsons of Cumbria County Council Historic Environment Service requested that all ground reduction, not following existing roadways be subject to a programme of archaeological observation and investigation. This is in line with government advice as set out in PPS5, Planning for the Historic Environment (DCLG 2010).
- 1.1.2 All groundworks associated with the laying of the FTS pipeline had to be excavated under full archaeological supervision and all stages of the archaeological work were undertaken following approved statutory guidelines (IfA 2002), and were consistent with the specification provided by WA Archaeology Ltd (Giecco 2010).
- 1.1.3 This report outlines the monitoring works undertaken on-site, the subsequent programme of post-fieldwork analysis, and the results of this scheme of archaeological works.

2 METHODOLOGY

2.1 PROJECT DESIGN

2.1.1 A project design was submitted by WA Archaeology Ltd (formerly NP Archaeology Ltd) in response to a request by United Utilities, for an archaeological watching brief of the study area. Following acceptance of the project design by Michael Collins (Hadrian's Wall Archaeologist) and Jeremy Parsons of Cumbria County Council Historic Environment Service, WA Archaeology Ltd was commissioned by the client to undertake the work. The project design was adhered to in full, and the work was consistent with the relevant standards and procedures of the Institute for Archaeologists (IfA), and generally accepted best practice.

2.2 THE WATCHING BRIEF

2.2.1 The works involved a structured watching brief to observe, record and excavate any archaeological deposits revealed during groundworks along the pipeline route. A watching brief is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons, on a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed (IfA 2008).

2.2.2 The aims and principal methodology of the watching brief can be summarised as follows:

- to establish the presence/absence, nature, extent and state of preservation of archaeological remains and to record them;
- to carry out further excavation and recording work in adequate time, if intact archaeological remains are uncovered during the project;
- to accurately tie the area watched by the archaeologist into the National Grid at an appropriate scale, with any archaeological deposits and features adequately levelled;
- to sample environmental deposits encountered as required, in line with English Heritage (2002) guidelines;
- to produce a photographic record of all contexts using colour digital and 35mm monochrome formats as applicable, each photograph including a graduated metric scale;
- to recover artefactual material, especially that useful of dating purposes;

- to produce a site archive in accordance with MAP2 (English Heritage 1991) and MoRPHE standards (English Heritage 2006).

2.2.3 A pipeline route, approximately 3.7 kilometres long with an average easement measuring 20m in width (an approximate area of 7 hectares), was stripped of topsoil, which was heaped along the length for later restoration purposes. The pipeline trench was excavated along the whole 3.7m kilometre route except for those locations where it was necessary to carry out horizontal boring operations. These required shafts or trenches at each end of the bore and were carried out under the M6 motorway embankment and the Brunstock Beck. Archaeological monitoring and supervision of groundworks associated with the stripping commenced on 9th December 2011. A summary of the findings of the watching brief is included within this report.

2.3 THE ARCHIVE

2.3.1 A full professional archive has been compiled in accordance with the specification, and in line with current UKIC (1990) and English Heritage Guidelines (1991) and according to the Archaeological Archives Forum recommendations (Brown 2007). The archive will be deposited within Tullie House Museum Carlisle and can be accessed under the unique project identifier **WAA11, LCP-A, CP/10132/11**.

2.3.2 WA Archaeology, and Cumbria County Council, support the **Online Access to the Index of Archaeological Investigations (OASIS)** project. This project aims to provide an on-line index and access to the extensive and expanding body of grey literature, created as a result of developer-funded archaeological work. As a result, details of the results of this project will be made available by North Pennines Archaeology, as a part of this national project.

3 BACKGROUND

3.1 LOCATION AND GEOLOGICAL CONTEXT

- 3.1.1 The villages of Linstock and Low Crosby are located approximately 4 and 6 kilometres respectively to the north-east of the city of Carlisle, on the north side of the River Eden and to the east of the M6 motorway (Figure 1).
- 3.1.2 The line of the proposed pipeline route commences to the east of the city of Carlisle, close to Whiteclosegate, and heads in a north-easterly direction across the line of the M6 motorway, to the north side of Linstock and Park Broom, and crosses fields to the south of Eden Grove, terminating at the southern end of Low Crosby village (Figure 2).
- 3.1.3 The Countryside Commission places this part of Cumbria in a character area referred to as the 'Solway Basin', an area which stretches from the Scottish border to the north, Brampton to the east and as far west as Allonby and Maryport. This area is characterised as a broad, lowland plain landscape fringed by the low, rugged, relatively remote coastline of the Solway Firth and Irish Sea. The soft horizontal form of this intensively managed, predominantly pastoral landscape contrasts markedly with the Cumbria High Fells. The field pattern is rectilinear and fields are fairly large in scale, bounded by hedges or fences with some hedgerow trees (Countryside Commission 1998, 19).
- 3.1.4 The Solway Basin is underlain mainly by mudstones and sandstones of Permo-Triassic age ('New Red Sandstone'). Erosion of the comparatively weak Permo-Triassic and Jurassic rocks reduced much of the Solway Basin to an area of low relief prior to the onset of the last glaciations. During this period thick ice-sheets crossed the area from Scotland and the Lake District. These carried with them vast quantities of rock debris which was deposited as boulder clay (till), both beneath the ice and from within it as it melted. The surface of the boulder clay is locally moulded into drumlins (*ibid*, 20).

3.2 HISTORICAL CONTEXT

- 3.2.1 *Introduction:* the historical background is compiled mostly from secondary sources. In this report only those sites believed to be the most pertinent, with regard to the pipeline route, have been included and only in summary form. A more detailed account of historical developments was provided in the previous rapid desk based assessment carried out by NP Archaeology in 2010 (Wooler 2010).
- 3.2.2 The historical background is compiled mostly from the county Historic Environment Record (HER), a database of known historical and

archaeological sites in Cumbria (excluding the Lake District National Park) and historical mapping.

3.2.3 **Roman (c.71/72-410AD):** the HER records the following sites which date to the Roman period:

- *HER No. 491, Hadrian's Wall Milecastle 64:* the east face of the west wall of Milecastle 64 was located in 1962, 104m west of Brunstock Beck on the line of Hadrian's Wall as marked on OS survey. Its walls were found to have been extensively robbed but part of the north wall survived as far as the first course of facing stones. The north gateway, which was 3m wide, had been blocked at some stage. A cobbled road 5m wide ran through the centre of the Milecastle, and outside the west wall was a cobbled area. The remains of Milecastle 64 survive below the turf cover as buried remains (Scheduled Ancient Monument No. 28478)
- *HER No. 5782, Hadrian's Wall and Vallum:* the group number for Hadrian's Wall and Vallum (Scheduled Ancient Monument No's 26121 and 28473, and Listed Building No. 78076).
- *HER No. 10118, Low Crosby Road:* site of a length of road which has now gone, but has been suggested may have formed part of the Stanegate Roman road.
- *HER No. 19508, Spindle-Whorl Find, Whiteclosegate:* a spindle-whorl found by metal detector. Has similar decoration of examples of Roman and medieval date, however given its find spot it has been suggested this object dates to the Roman period.
- *HER No. 19509, Sling-Slot Find, Whiteclosegate:* an acorn shaped sling-shot was found with a metal detector at Whiteclosegate.
- *HER No. 19517, Coin Find, Whiteclosegate:* an AR denarius of Trajan dated c.112-114 found by metal detector near Drawdykes.
- *HER No. 43170, Linstock Road:* a dotted line labelled 'Ancient Road (Site of)' on the First Edition OS map.

3.2.4 **Medieval (c.410 to 1540AD):** The HER records the following site which dates to this period:

- *HER No. 3807, Drawdykes Castle:* farmhouse, formerly tower house. Probably 14th century in date, converted to house 1676 by WM Thackeray from John Aglionby.

3.2.5 **Post-medieval (c.1540-present):** the HER records the following sites which date to this period:

- *HER No. 3807, Drawdykes Castle: Former tower house of probable 14th century date converted into a house 1676 by Wm Thackeray for John Aglionby. The property is believed to have one of the earliest Classical Revival facades in the area.*
- *HER No. 43169, Tile Kiln Field, Linstock: a field named Tile Kiln Field on the Linstock Tithe Map of 1840.*

3.3 HADRIAN'S WALL NATIONAL MAPPING PROGRAMME (HWNMP)

3.3.1 The HER contains information on features noted from aerial photographs by English Heritage which have been recorded along the length of Hadrian's Wall. Several features are located along the proposed pipeline route:

- *Post-medieval narrow ridge and furrow noted in the large field immediately to the west of Low Crosby, noted on aerial photographs dating to 1946 (ID No. 1376337).*
- *Post-Medieval narrow ridge and furrow noted in the fields north of Linstock, noted on aerial photographs dating to 1946 and 1988 (ID No. 1376337).*
- *Post-Medieval narrow ridge and furrow noted in the fields immediately to the south-west of Drawdykes Castle, noted on aerial photographs dating to 1991 (ID No. 1376337).*
- *An Iron Age or Roman boundary ditch was seen as cropmarks on aerial photographs located at the extreme western end of the proposed pipeline route. The ditch is curving and runs towards the Vallum. It may form part of a field system which possibly pre-dates the Vallum. However, the cropmark stops before the line of the Vallum so the relationship between the two features is uncertain (ID No. 1384779).*

3.4 PREVIOUS WORK

3.4.1 The following schemes of archaeological work have been undertaken within 1km of the pipeline route. Information on these schemes of work has been derived from the Historic Environment Record.

3.4.2 ***Tarraby B6264: Archaeological Watching Brief, Central Excavation Unit, 1976:*** an archaeological watching brief was undertaken during the excavation of a trench crossing the B6264, slightly to the east of the Near Boot Inn, Whiteclosegate. This was the point where the Vallum crosses from the south to the north side of the road. Observation within the trench showed a grey brown soil which contrasted with the undisturbed red boulder clay at the north end of the trench; this may have indicated the Vallum ditch (HER Report Ref: 1/76/503).

- 3.4.3 *Low Crosby, Carlisle: Archaeological Evaluation, Carlisle Archaeological Unit, 1994:* an archaeological evaluation was undertaken in advance of a residential development of a former field to the north side of Low Crosby, east of the Village Hall. Most of the field proved to be devoid of archaeological remains, but features were recorded towards the north-east corner of the field. Limited excavation revealed evidence for several curvilinear gullies cutting the natural subsoil, which appeared to represent the remains of a circular or sub-circular timber structure. Although a complete ground plan could not be obtained, and no artefactual material was recovered, the building was tentatively identified as a round house or pre-Roman or early Roman date.
- 3.4.4 Following on from this evaluation, an archaeological excavation was undertaken by Carlisle Archaeological Unit in 1997. A roughly rectangular area of approximately 300sqm was mechanically stripped to the surface of the natural subsoil. Three phases of a roughly D-shaped building were revealed, with a double timber wall and defined by a pair of concentric gullies. No surviving floors, occupation deposits or external surfaces were associated with these gullies. The building measured 6.5m north to south by 1.6m east to west externally, and 4.05m by 2.8m internally. A narrow entrance was located on the west side. A slight polygonal appearance to the gullies indicated that the walls were probably of wattle panels constructed on sill beams. The lack of artefacts from the site meant that the date and function of the building remained uncertain, although it may have been prehistoric, Romano-British, medieval or later in date, and the double wall suggested it served as a dwelling rather than an animal pen (Zant 1998, 299-303).
- 3.4.5 *The Nurseries, Linstock, Carlisle (Phase 1): An Archaeological Evaluation, Carlisle Archaeological Unit, 1994:* an archaeological evaluation was undertaken (Phase 1) prior to a residential development in the centre of Linstock. Eight trenches were excavated and revealed a series of ditches, perhaps for an enclosure, shallow pits, and clay and cobble foundations for buildings, although the relationship between these features could not be ascertained, and no date could be ascribed except to suggest they may be later prehistoric, Roman or medieval. A small collection of medieval and modern pottery was also collected from the topsoil (HER Report Ref: 1/91/101).
- 3.4.6 *The Nurseries, Linstock, Carlisle: An Archaeological Evaluation (Phases 2 and 3), Carlisle Archaeological Unit, 1995:* following on from the work undertaken in 1994, 13 evaluation trenches were excavated in 1995 in a programme of further investigation at The Nurseries. The continuation of a ditch initially found in 1994 was almost certainly seen, forming three sides

of a sub-rectangular enclosure measuring approximately 40m by 30m. Additional areas of cobbling were identified, but these were again difficult to interpret except that they overlay a soil layer containing an iron horse shoe, and so thought to be medieval or later in date. Sections of at least two other ditches, perhaps from a second enclosure, and a number of pits, were also recorded (HER Report Ref: 1/95/124).

- 3.4.7 *An Excavation at the Former Nurseries, Linstock, Carlisle: Carlisle Archaeological Unit, 1997*: an excavation was conducted following the evidence revealed in the evaluations undertaken in 1994 and 1995. Further remains of the undated square enclosure were excavated, together with a number of undated field boundary ditches, and two north to south parallel ditches, resembling a track way or drove road of possible Iron Age or Roman date (HER Report Ref: 1/98/499).
- 3.4.8 *Stile Farm, Linstock: Archaeological Watching Brief, The Archaeological Practice, 2002*: a watching brief was maintained during the cutting of foundation trenches for a new-build bungalow at Stile Farm. The watching brief was requested due to the proximity of the site to Linstock Castle. No archaeological remains or artefactual material was located during the watching brief (HER Report Ref: 1/02/415).
- 3.4.9 *Archaeological Evaluation Report: Ashgrove, Brampton Old Road, Carlisle: Gerry Martin Associates, 2007*: four evaluation trenches were excavated prior to an extension to the existing house. The evaluation identified that deposits at a depth of 0.65m possibly represented fills within Hadrian's Wall Vallum. The sides of the Vallum were not encountered and no artefacts were retrieved (HER Report Ref: 1/07/1756).
- 3.4.10 *Archaeological Evaluation on land at the Old Clydesdale Stud, Tarraby, Carlisle, NPA Ltd, 2008*: six evaluation trenches were excavated down to the natural geology in advance of new service trenches within the Scheduled area of Hadrian's Wall (SAM No. 28482). No features were found, and there were no finds predating the post-medieval period (HER Report Ref: 1/08/2242).
- 3.4.11 *24 Houghton Road, Carlisle: Report on an Archaeological Watching Brief, Jan Walker, 2008*: a watching brief was maintained during groundworks to a maximum depth of 0.80m for an extension to the existing property. The site is located between Hadrian's Wall and the Vallum. No archaeological features or significant finds were noted (HER Report Ref: 1/08/1952).
- 3.4.12 *Crosby on Eden Waste Water Treatment Works Pipeline: Rapid Desk-Based Assessment and Walkover Survey, Oxford Archaeology North, 2008*: a rapid desk-based assessment and walkover survey was undertaken in advance of proposals by United Utilities for the construction of a waste water pipeline

from the north of Linstock to Low Crosby [this work covered the eastern section of the present study]. A total of 19 sites of archaeological interest were identified within the study area of which 12 had previously been recorded in the Cumbria HER and National Monuments Record (NMR). The work concluded that there was some potential for archaeological remains along the proposed route of the pipeline. The proximity of Hadrian's Wall to the west end was noted to heighten the potential for previously unidentified Roman period remains to be disturbed during the groundworks. In addition, the Stanegate Roman road ran to the south of Hadrian's Wall across the study area, and a stretch of which has been identified at High Crosby. Within the study area there are two putative stretches of the road (HER Report Ref: 1/08/1927).

- 3.4.13 *Crosby on Eden Waste Water Treatment Works Pipeline, Supplementary Report: Topographic Survey, Oxford Archaeology North, 2009*: a topographic survey of linear earthworks identified in a previous desk-based assessment was undertaken prior to the construction of a new utilities pipeline from Linstock to Low Crosby. The earthworks measured 10m and 60m in length. No definitive pattern or function could be ascertained, though some may have been field boundaries, others were perhaps related to flood defences from the adjacent Willow Beck (HER Report Ref: 1/09/2133).
- 3.4.14 *Low Crosby Flood Alleviation Scheme: Geophysical Survey, Archaeological Services WYAS, 2009*: four areas around the village of Low Crosby were surveyed using a magnetic gradiometer to inform a flood defence alleviation scheme. Several anomalies were interpreted as geological and agricultural in nature, together with two large possible building platforms to the east of the church [no reference in made to the Stanegate Roman road which is thought to have passed through the village] (HER Report Ref: 1/09/2039).
- 3.4.15 *Low Crosby, Cumbria: Archaeological Watching Brief, Oxford Archaeology North, 2009*: a watching brief was maintained during the excavation of nine test pits at various points around the village to inform a flood defence alleviation scheme. The pits measured 0.30m square and 1.2m deep. No evidence of the Stanegate Roman road was found, which is thought to have passed through the village, or any other archaeological features or finds (HER Report Ref: 1/09/2040).
- 3.4.16 Although located just outside the study area defined as a 1km buffer zone along the route of the pipeline, archaeological work undertaken by Carlisle Archaeological Unit at Crosby on Eden will be referred to here. An archaeological excavation was conducted in advance of road construction at High Crosby in 1993. This work revealed a palimpsest of features,

provisionally dated by reference to artefacts and radiocarbon determinations to the Neolithic and Bronze Age. In 1994 a subsequent evaluation provided stratigraphic and artefactual material suggestive of at least two occupational phases. Structural elements included ditches and gullies as well as slots, post holes and pits. Two trenches yielded shallow curving gullies or slots which raised the possibility that one or both may have represented round houses.

3.4.17 It was not possible to define the nature of the occupation of either phase, however. Although no features diagnostically funerary, military or ritual were discovered, they could not be ruled out. The simplest hypothesis was the suggestion was of a domestic/agricultural context with structural elements including ditches, walls and/or fences, as shown by the presence of a slot and post holes, and shallow pits. The dating of the phases is problematic; a prehistoric element seemed likely for the earliest phase. Lithics and fire-cracked stones were a feature of the 1993 evaluation on the line of the Crosby by-pass where settlement attributed to the Neolithic/Bronze Age was discovered. The later phase may have been Roman in date on the evidence of the pottery (HER Report Ref: 1/97/1139).

3.4.18 *Linstock FTS, Carlisle, Cumbria: Rapid Desk Based Assessment, NP Archaeology, 2010*: a rapid desk based assessment in respect of the FTS pipeline route was carried out by NP Archaeology in 2010. The desk-based assessment concluded that there was a high probability for significant archaeological remains to be disturbed during the present works. These included potential remains dating from the Iron Age through to the post-medieval period (Wooler 2010), including the tile kiln revealed during the present watching brief.

4 ARCHAEOLOGICAL WATCHING BRIEF

4.1 INTRODUCTION

4.1.1 The watching brief monitoring was undertaken in two key phases. The first phase consisted of removal of the topsoil by mechanical excavator. This took place within the 20m easement, along the majority of the 3.7km pipeline route and along the roads constructed for plant access. The second phase consisted of excavation of the pipeline trench within the easement. During this second phase archaeological monitoring was carried out on selected areas only. The areas selected were those deemed most likely to contain sub-surface archaeological features or deposits. Included in this phase was the excavation of pits/trenches associated with pipe boring operations. Excavations at Low Crosby are dealt with in a separate sub-section due to the quantity of archaeology revealed in this area. The route of the pipeline in this report has been divided up into 13 areas, roughly corresponding to separate field areas, in order to aid description and location (Figure 2).

4.2 PHASE 1: TOPSOIL STRIP

4.2.1 The topsoil stripping was carried out within the 20m wide easement by a variety of tracked mechanical excavators using ditching buckets. Although not always carried out geographically in sequence; from the point of view of this report the topsoil strip will be described moving from west to east along the pipeline route (see Figure 2 for locations).

4.2.2 *Area 1, the western end of the pipeline:* Silty, brown topsoil (100) was removed to an average depth of 0.30m and an average width of 11m, revealing an orangy/brown, silty/sandy natural substrate (101). A rectangular area measuring 20m in length and 15m in width at the western end of the easement was stripped in order to facilitate connection to the existing sewer (Plate 1). A series of modern ceramic land drains were observed within the natural substrate at the eastern end of Area 1. No archaeological features were observed in this area.

4.2.3 *Area 2, west of the Brunstock Beck:* Silty, brown topsoil (100) was removed to an average depth of 0.30m and an average width of 13m revealing an orangy/brown, sandy/clay natural substrate (101). At the northern end of this area, west of the Brunstock Beck the pipeline easement was observed to pass through an area of post medieval narrow ridge and furrow strips (Plate 2).



Plate 1: Area 1, topsoil stripped area at the western end of the pipeline (facing west)



Plate 2: Area 2, pipeline easement cutting narrow ridge and furrow at the northern end of the field (facing west)

- 4.2.4 **Area 3, west of the M6 motorway:** Silty, brown topsoil (100) was removed to an average depth of 0.25m and a width of 20m revealing an orangy/brown, sandy/clay natural substrate (101). No archaeological features were observed in this area.



Plate 3: Area 3 topsoil stripped easement (facing east towards M6 Motorway)

- 4.2.4 **Area 4, east of the M6 motorway:** Dark brown, silty topsoil (100) measuring 0.10m in depth and medium brown, silty/clay subsoil (102) measuring 0.20m in depth were removed revealing a mottled orange/grey natural substrate (103). The area of topsoil stripping measured 21m in width immediately adjacent the M6 motorway, narrowing to 13m at a distance of 50m east of the motorway. No archaeological features were observed in this area.
- 4.2.5 **Area 5, east of Edenlin Farm and west of the Linstock road:** Dark brown, silty topsoil (100) was removed to a depth of 0.20m revealing an orangy/brown, sandy/clay natural substrate (101). The width of the topsoil strip was 9.50m wide east of Edenlin Farm increasing in width to 13m along the southern boundary of the old tip. Fragments of ceramic land drain were observed within the natural substrate (101). No archaeological features were observed in this area.
- 4.2.6 **Area 6, east of the Linstock road and referred to as 'Tile Kiln Field' on the Linstock Tithe Map of 1840:** The topsoil stripping occurred along the east-west pipeline easement which was roughly located across the centre of the field. The 1868, 1901, 1926 and 1946 6 inch to 1 mile Ordnance Survey Maps

all show this single field, as it exists now, being divided into two halves approximately along the line of the easement.

- 4.2.7 Dark brown, silty topsoil (100) measuring 0.25m in depth was removed revealing a post-medieval deposit, predominantly of broken, red roof and land tiles with some red bricks and small amounts of coal (104) (Plates 4 and 5). This deposit covered the western half of the field across the 13m wide stripped area. The deposit was consistent with a tile kiln having been in the close vicinity. The eastern side of the field was inundated with water.



Plate 4: Area 6 (Tile Kiln Field) after topsoil stripping showing (104) (facing east)



Plate 5: Area 6 (Tile Kiln Field) close-up of red tile fragments (facing north)

- 4.2.8 **Area 7, situated east of 'Tile Kiln Field' and west of Park Broom:** Dark brown, silty topsoil (100) was removed to a depth of 0.30m revealing an orangy/yellow, sandy/clay natural substrate (101). The width of the topsoil strip was 12m in this area. The field contained the heavily eroded remains of post medieval, narrow ridge and furrow strips c.4m in width.
- 4.2.9 **Area 8, situated between the Linstock and Park Broom roads:** Dark brown, silty topsoil (100) was removed to a depth of 0.30m revealing an orangy/yellow, sandy/clay natural substrate (101). The width of the topsoil strip was 13m in this area. The field contained the heavily eroded remains of post medieval, narrow ridge and furrow strips c.4m wide (Plate 6).



Plate 6: Area 8, narrow ridge and furrow strips (facing south)

- 4.2.10 **Area 9, situated immediately west of the Park Broom road:** Dark brown, silty topsoil (100) was removed to a depth of between 0.30m and 0.40m revealing an orangy/yellow, sandy/clay natural substrate (101). The width of the topsoil strip was 12m in this area. No archaeological features were observed in this area.
- 4.2.11 **Area 10, situated immediately to the east of the Park Broom road:** Dark brown, silty topsoil (100) was removed to a depth of 0.30m revealing an orangy/yellow, sandy/clay natural substrate (101). The width of the topsoil strip was 12m in this area. A small amount of red brick fragments were observed on the south side of the easement opposite the property known as Laitholme. This was attributed to a modern redbrick building, immediately

adjacent to the easement, within the grounds of Laitholme, which had been demolished. The lower courses could still be observed within the undergrowth.



Plate 7: Area 10, topsoil stripping within the pipeline easement (facing east)

- 4.2.12 *Area 11, situated to the south-west of Eden Grove House:* Dark brown, silty topsoil (100) was removed to a depth of 0.25m. The natural substrate was not observed in this area due to remaining topsoil deposits. The width of the topsoil strip was 13m and no archaeological features were observed.
- 4.2.13 *Area 12, situated at the eastern end of the pipeline with Low Crosby village to its immediate north-east:* Dark brown, silty topsoil (100) was stripped to a depth of 0.10m only in this area due to the presence of Himalayan Balsam in the vicinity. The natural substrate was not observed and there was no visible evidence of any archaeological features.
- 4.2.13 *Access Roads:* these were constructed in order to provide access to the pipeline easement for heavy excavating and boring plant. Five access roads were constructed in total (Figure 2). These were all excavated to a depth of between 0.20m and 0.30m and a width ranging between 3.8m and 4m. Only the topsoil (100) was removed in all cases. No archaeological features were observed. However at the eastern end of Area 12, adjacent to Low Crosby village, there was some evidence of modern rubbish deposits including redbrick fragments (Plate 8).



Plate 8: Area 12, modern rubble observed during access road excavation, adjacent to Low Crosby Village (facing north)

4.3 PHASE 2: PIPELINE TRENCH AND BORE SHAFTS

- 4.3.1 A pipeline trench was excavated along the whole of the 3.5 kilometre easement except where horizontal bores were carried out under the M6 motorway and the Brunstock Beck. Archaeological monitoring was carried out on selected areas only (Figure 2.) The areas selected were those deemed most likely to contain sub-surface archaeological features or deposits. Again from the point of view of this report the excavation of the pipeline trench will be described moving from west to east along the route. All trenching was mechanically excavated.
- 4.3.2 *Area 1, the western end of the pipeline:* The trench measured 0.50m in width and was excavated to a depth of 0.80m at the existing sewer manhole in the field to a maximum depth of 2m at the eastern corner of the field. The trench was excavated through the orange, sandy/clay natural substrate (**101**) only.
- 4.3.3 At a distance 25m east of the manhole, a ditch [**110**] running north-south was observed in section cutting the orange, sandy clay, natural substrate (**101**) (Figure 2, Plate 9). The ditch measured 2.2m in width and had a depth of 1m. The single fill of the ditch consisted of a loose mid grey silty sand (**111**) and contained no dating evidence.
- 4.3.4 The rapid desk based assessment for the Linstock FTS (Wooler 2010) provides the following information obtained from the Hadrian's Wall National Mapping Programme (HWNMP), '*An Iron Age or Roman boundary ditch was seen as cropmarks on aerial photographs located at the extreme western*

end of the proposed pipeline route. The ditch is curving and runs towards the Vallum. It may form part of a field system which possibly pre-dates the Vallum. However, the cropmark stops before the line of the Vallum so the relationship between the two features is uncertain (ID No. 1384779)' (Wooler 2010, 22). Ditch [110] is situated in exactly the right position and orientated in the correct direction to be the same feature.

- 4.3.5 At a distance of 7m to the east of ditch [110] a second ditch [112] was observed in section (Figure 2 Plate 10). Smaller in size, this ditch measured 1.30m in width and 0.60m in depth and was orientated north-west to south-east. Containing a loose, mid grey/brown, silty/sand fill (113), this ditch was again cut into the natural substrate (101).
- 4.3.6 It is currently not possible to say whether or not the two ditches are associated with each other. The rapid desk based assessment for the Linstock FTS (Wooler 2010) does not show in the map regression work any former north-west to south-east field boundary in this area. However the Hadrian's Wall National Mapping Programme (HWNMP) taken from aerial photographic evidence, does. It is very possible ditch [112] is this field boundary.



Plate 9: Area 1, Ditch [110], (111) in the Pipeline Trench Section (facing south)



Plate 10: Area 1, Ditch [112], (113) in the Pipeline Trench Section (facing south)

- 4.3.7 **Area 2:** At a distance of 7.7m west of the fence line immediately to the west of the Brunstock Beck, a square shaft was excavated in order to facilitate horizontal boring under it. Measuring 3.8m square it was excavated to a depth of 4.5m through the orange clay, natural substrate **(101)** (Figure 2).
- 4.3.8 **Area 3, west of the M6 motorway:** A similar shaft to that excavated in Area 2 was excavated in Area 3. At a distance of 6m east of the fence line, immediately to the east of the Brunstock Beck, it measured 3.5m east to west and 2.7m north to south. Excavation took place through the orange clay, natural substrate **(101)** to a depth of 3.5m (Figure 2, Plate 11).
- 4.3.9 At a distance of 56.6m west of the fence, at the base of the bank for the northbound M6 motorway carriageway, a small trench was excavated to accommodate directional drilling equipment. This was aimed eastwards in order to bore under the M6 Motorway, curving upwards and out on the eastern side of the M6 in Area 4. The T-shaped trench measured 1.5m wide at the eastern end, 4m wide at the western end and had a length of 7m. It was excavated through the orange clay, natural substrate **(101)** only (Figure 2, Plate 12). No archaeological features were observed in any of the excavations in Area 3.



Plate 11: Area 3, horizontal bore shaft through natural substrate (101) on the eastern side of the Brunstock Beck (facing east)



Plate 12: Area 3, horizontal boring trench on the western side of the M6 motorway (facing north-east)

- 4.3.10 *Area 6, east of the Linstock road and referred to as 'Tile Kiln Field' on the Linstock Tithe Map of 1840:* The ground level in this field was notably lower than that of the field to the immediate east (Area 7) and the Linstock road to the immediate west. This was possibly due to the extraction of clay in the field for use in a kiln located within it (Local farmer *pers. comm.*)
- 4.3.11 Excavation of the pipeline trench commenced 9m east of the centre line of the field western boundary hedge. The mechanical excavator used a specialized flat bottomed bucket with sloping sides in order to prevent the trench sides from falling back in. Trenching commenced on the western side of the field, moving eastwards and through the eastern hedge boundary. At its western end the trench measured 2m in depth with a width of 0.70m at the base and 3m wide at the top. Trench depth decreased the further west it was excavated to a depth of 1.20m at the eastern hedge boundary.
- 4.3.12 The post-medieval deposit (**104**) of predominantly broken, red roof and land tiles with some red bricks and small amounts of coal, observed during the topsoil (**100**) removal, was now seen to cross the whole width of the field. This layer of material undulated across the field measuring between 0.40m and 0.80m in depth (Plate 13). This deposit lay on top of the orange clay natural substrate (**101**) which was observed down to the trench base.



Plate 13: Area 6, Layer of red tile and brick (104) crossing Tile Kiln Field (facing north-west)



Plate 14: Area 6, Kiln Base observed in the pipeline Trench South Facing Section (facing north-west)

- 4.3.13 At a distance of 26.8m east of the centre of the western hedge boundary the remains of a kiln base were observed in both the north and south facing sections of the pipeline trench. It measured 5.5m in length and was at least 2.8m in width (the width of the trench at this point) (Figure 2 and 3, Plate 14).
- 4.3.14 The reciprocated form of the kiln in both sections suggests a rectangular structure rather than a circular one. Heat from the kiln had baked hard the natural orange clay substrate (101) on which it was constructed, turning it bright orange. The baked clay (105) measured 5.5m in length, at least 2.8m in width and 0.22m in depth. Cutting into the burnt clay (105) were five, equally spaced linear depressions [106]. Measuring at least 2.8m in length (width of the pipeline trench) they had an average width of 0.35m and depth of 0.10m. Each of the linear features [106] contained a very hard grey fill (107) comprising of burnt clay. On the western edge of the kiln was a rectangular cut [108] measuring 0.50m in width and 0.10m in depth. This contained a fill (109) of mainly red brick fragments mixed with some orange clay and may have been the remains of the kiln western wall. Over the kiln lay the layer of red tile and brick waste (104), observed in the topsoil strip, to an average depth of c.0.20m. This deposit was sealed by a dark brown, silty topsoil (100) measuring 0.25m in depth.
- 4.3.15 The Directory of Cumberland 1847, interestingly, states under the heading of Linstock Township, 'and here is a drain tile manufactory belonging to Jno. Poole of Carlisle' (Mannix and Whellan 1847, 209). However by 1861, the

Commercial Directory and Gazetteer of the County of Cumberland (Morris, Harrison and Co. 1861) makes no reference to any tile manufactory, perhaps suggesting that by this date it had gone out of use.

- 4.3.16 *Area 7, situated east of 'Tile Kiln Field' and west of Park Broom:* Excavation of the pipeline trench continued in a west to east direction across this field (Plate 15). The trench depth was 1.2m deep at the western boundary, gradually becoming shallower as it moved eastwards in order to create a falling gradient. Width of the trench varied according to depth. The pipeline trench was excavated through the orangy/yellow, sandy/clay natural substrate **(101)** only.



Plate 15: Area 7, Pipeline Trench Crossing Area 7 into Area 8 (facing east)

- 4.3.17 *Area 8, situated between the Linstock and Park Broom roads:* Excavation of the pipeline trench continued in an eastern direction across this field. Trench width again varied with depth. The trench was excavated to depth of 0.50m close to the eastern boundary of Area 8, with a falling gradient westwards. The stripped dark brown, silty topsoil **(100)** which had been removed to a depth of 0.30m was observed to have covered 0.90m of excavated orangy/yellow, sandy/clay natural substrate **(101)**.
- 4.3.18 At a distance of c.50m west of the eastern boundary hedge a ditch **[162]** was observed in both the north and south facing sections of the trench (Figure 2, Plate 16). Measuring 0.50m in width and 0.50m in depth it contained a single

fill of dark grey, silty clay **(163)**. The exact function or date of the ditch was unknown but its dimensions may suggest an old field boundary ditch.

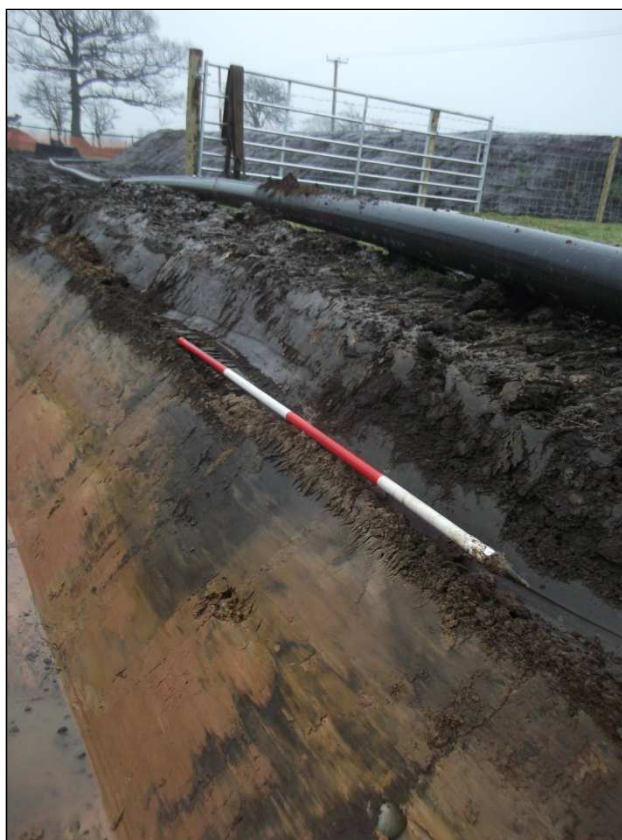


Plate 16: Area 8, Oblique View of Ditch [162], (163) in the North Facing Section of the Pipeline Trench (facing south-east)

4.3.19 During excavation of the pipeline trench through the eastern boundary hedge of Area 8, two ditches were observed in section, cut into the orangy/yellow, sandy/clay natural substrate **(101)** (Figure 2, Plate 17). Both ran north-south, adjacent and parallel to the hedge line. Both were field boundary ditches associated with the hedge line and can be ascribed a post-medieval date. The eastern ditch **[164]** had a maximum width of 1.2m and a depth of 0.90m and contained a single dark brown/black silty fill **(165)**. The western ditch **[166]** in Area 9 had a maximum width of 2m and a depth of 0.90m. Along its base a ceramic land drain had been inserted. This ditch contained a single dark brown/black silty fill **(167)** very similar to **(165)**.



Plate 17: Area 8/9, hedge boundary. Oblique view of ditches [164], (165) and [166], (167) in the north facing section of the pipeline trench (facing south-east)

- 4.3.20 **Area 9, situated immediately west of the Park Broom road:** Excavation of the pipeline trench in this area was carried out moving from east to west. At the eastern side of the area, within a passing place on the western side of the Park Broom road, an initial connecting pit measuring 3m north to south and 2m east to west was excavated to a maximum depth of 1.2m (Figure 2). The natural, orange clay, substrate **(101)** was revealed to an excavated depth of 0.80m and was overlain by 0.40m of dark brown, silty topsoil **(100)**.
- 4.3.21 To the west of this connecting pit the pipeline trench was excavated to a depth of 1.1m into the natural sandy/clay substrate **(101)**. On reaching the western field boundary of Area 9 the trench was excavated into the natural substrate **(101)** to a depth of 0.90m. No significant archaeological features were observed in this area other than the field western boundary ditch **[166], (167)**.

4.4 LOW CROSBY

- 4.4.1 Archaeological monitoring at Low Crosby took place at the south-east corner of the village adjacent to the north bank of the River Eden (Figure 2, Area 13). The pipeline route went south-east from the pumping station, located on the western roadside of Green Lane, down a footpath lane into a field bordered on its southern edge by the River Eden. On entering the field the pipeline turned south and joined up with an existing sewage pipe close to the river bank.

- 4.4.2 Adjacent to the north-east side of the pumping station on Green Lane 0.30m of dark brown topsoil (122) was removed by mechanical excavator. The area measured c.8m in length, south-west to north-east and c.7m in width, north-west to south-east. This area revealed several modern concrete features.
- 4.4.3 Excavation of the pipeline trench continued in a south easterly direction, down the footpath lane, revealing an orange sandy natural substrate (132) at a depth of 0.70m. Above this was a layer of re-deposited brown silty sand (124), which measured 0.40m in depth which in turn, was sealed beneath a deposit of grey/yellow hardcore (123) which measured 0.30m in depth and formed the lane surface. On entering the field at the south-east end of the lane, a deposit of rubble was revealed which consisted of broken post-medieval brick and sandstone fragments (168) (Plate 18). Two adjoining fragments of worked sandstone with the numbers and letter 17R carved on them were retained from this deposit.



Plate 18: Area 13, post-medieval rubble deposit (168) at the south-east end of the footpath lane (facing south-east)

- 4.4.4 In the field adjacent to the River Eden, a topsoil strip was carried out by mechanical excavator along the route of the pipeline easement. This area measured c.50m in length and c.15m in width and revealed two clusters of archaeological features cut into the natural substrate, both at the northern end and the southern end of the excavated area.
- 4.4.5 At the northern end of the easement near the south-east end of the footpath lane, a series of sub-rectangular pits and a ditch with associated features were uncovered (Figure 5). The ditch [126], which measured 1.80m in width and 0.30m in depth and ran north to south before curving to the south-west

at its southern end, was cut into the natural orange, sandy gravel, natural substrate (132). The gently curving ditch contained a uniform medium brown silty fill (127) (Figure 7, Plates 19 and 20). Charred cereal remains were recovered in low quantities from this sample, as well as high number of brambleberry seeds. In this respect the remains here were analogous with those from <5> (131), a sample from a linear deposit which overlies this feature. The environmental samples point to a similar formation process for both these features; either they were closely contemporary, or were both heavily overgrown during the period when they were infilled.



Plate 19: Area 13, slot through ditch [126], (127) (facing north)



Plate 20: Area 13, ditch [126], (127) below deposit (131) (facing south)

4.4.7 Overlying the fill of the ditch [126] was a north-east to south-west aligned linear deposit (131), which measured over 3.30m, 1.40m in width and had a maximum depth of 0.14m. This deposit (131) appeared to be bound along both edges by linear deposits of orange/yellow clay (128) and (129) (Figure 5, Plate 20). These two clay deposits had an average width of c.0.20m and depth of c.0.10m. Immediately north of the clay linear (129) was an eroded clay deposit (130) containing one large piece of red sandstone. This measured 3.30m in length, had a maximum width of 0.92m and measured 0.10m in depth (Figure 5, Plate 20). It is possible that this deposit represents the remains of a surface. Contexts (128), (129), (130) and (131) all lay on the natural orange, sandy/gravel substrate (132). No dating evidence was recovered from any of the features on this part of the site. A soil sample from (131), <5>, produced low number of poorly preserved charred cereal grains, as well as generally low numbers of desiccated plant remains; as discussed in relation to <6> (127), above. Of note, however, was the relatively high proportion of brambleberry and raspberry seeds. These were found in low numbers in several contexts but over 100 seeds were recovered from this sample. This is further discussed in the environmental report below.



Plate 21: Pits [120] (foreground) and [118] (facing north)

4.4.8 At a distance of c.5.5m to the east of the ditch [126] was a northwest to southeast alignment of three sub-rectangular pits [118], [120] and [133], which spanned an area of approximately 4.7m (Figure 5, Plate 21). Both the northernmost pit [118] and the southernmost pit [133] were similar in both form and dimensions, measuring 1.67m in length, c.1m and c.0.1m in depth, and 1.70m in length, c.0.9m in width and 0.16m in depth respectively, whilst

the central pit [120] measured 1.95m in length, 1.25m in width and 0.32m in depth (Plate 22). The central pit also retained an additional short linear extending southwest from the southwest corner, which measured c.0.8m in length, although it did not appear to have any functional significance and probably represented an animal burrow (Figure 5, Plate 22). All three pits retained steep sides and a flat base and had been filled by very similar deposits of uniform medium brown silty sand (119), (121), (134) (Figure 7). Furthermore, the fill of all three pits contained sherds of medieval pottery which has been provisionally dated to the 12th to 14th centuries. Three environmental samples were taken, one from each pit; <2> (119), <3> (121) and <4> (134). These samples were all quite rich, producing over 250 identifiable charred grains, and a range of charred corn-field weeds, in particular corn-spurry and knotgrass. Seeds of a *Chenopodiaceae* species (possibly fat-hen) were found in high proportions, suggesting a well manured soil regime, consistent with what would be expected from a medieval arable field. However, no evidence was retrieved to suggest what the pits were intended for. The archaeobotanical significance of these features is discussed further in the environmental section below.



Plate 22: Southwest facing section of pit [120]

4.4.9 The cluster of archaeological features toward the southern end of the excavation was located approximately 20m southwest of the northern area of activity and revealed a series of ditches, pits, post-holes and a substantial kiln (Figure 6, Plate 23).



Plate 23: Overview of southern area of archaeological activity (facing south)

4.4.10 The earliest identified feature was a curvilinear ditch which extended for over 12m in length, forming a north to south/east to west aligned arc which terminated at its northern extent (Figure 6). The ditch [141] had an average width of 0.70m and had a maximum depth of 0.60m, and retained a U-shaped profile which had been filled by a uniform deposit of dark brown silty sand/clay (142), (146), (153), (156), (161) (Figures 7 & 8, Plate 24). No finds were retrieved from the ditch, though three environmental samples <9> (146), <11> (153) and <12> (156) all produced moderately rich charred cereal assemblages. These remains mainly consisted of charred oats with moderate quantities of charred sedge nutlets and corn-spurry seeds. This is discussed in more detail in the environmental section of this report.



Plate 24: North facing section of curvilinear ditch [141] (156)

- 4.4.11 The northern extent of the ditch [141] was sealed by a spread of dark brown silty sand (139), which covered an area of approximately 120m² and had an average depth of 0.25m, and contained several sherds of Romano-British pottery. The central area of the spread retained a deposit of loosely compacted, moderately sized river-worn cobbles (Figure 6), although they did not appear to form any sort of substantial surface and probably represent an episode of dumping.
- 4.4.12 The exposed western extent of the curvilinear ditch [141] had been truncated by a more substantial north-northwest to south-southeast aligned linear ditch [143], which appeared to turn northwest at its northern extent (Figure 6). The ditch measured over 8.5m in length, over 1.5m in width and had a maximum depth of 0.30m, and although only half of the width of the ditch was exposed due to the limits of the excavated area, it is likely to have retained a maximum width of almost 3m. The linear ditch retained a gently sloping profile with a flat base and was filled by a single uniform deposit of dark brown silty sand (144), which retained several sherds of Romano-British pottery (Figure 8, Plate 25). A soil sample <8> (144) taken from this feature produced over 200 charred oat grains, as well as frequent preserved charred oat chaff (awns), as low numbers of charred sedge nutlets. The significance of these remains in relation to the site as a whole is discussed further in the environmental section below.



Plate 25: Overview of linear ditch [143] (facing north-northwest)



Plate 26: View of possible gully [151] (facing northwest)

4.4.13 Four smaller cut features were also revealed within this area, immediately north and west of the linear ditch [143] and the curvilinear ditch [141] (Figure 6). The most northerly of these features was the possible southern terminus of a shallow gully, located approximately 1.50m north of the linear ditch [143]. The possible gully [151] measured over 1.20m in length, c.0.40m in width and 0.12m in depth, and retained a steeply sloping profile with a rounded base which had been filled by a uniform deposit of dark brown silty sand/clay (152) (Figure 8, Plate 26). At a distance of approximately 1.05m to the south of the possible gully [151], a circular post-hole was revealed which measured 0.23m in diameter and had a maximum depth of 0.18m. The post-hole [157] retained a sharp V-shaped profile which had been filled by a deposit of dark brown silty sand (158) (Figure 8). Although the soil sample produced no preserved plant remains, it did produce a small quantity of charcoal fragments.

4.4.14 A further circular post-hole [149] was located approximately 2.4m further east which measured 0.28m in diameter and had a maximum depth of 0.06m. The post-hole [149] retained sloping sides with a relatively flat base which had been filled by a deposit of dark brown silty clay (150). At approximately 0.50m to the south-southwest of the post-hole [149], a circular pit was revealed which measured 0.53m in diameter and had a maximum depth of 0.44m. The pit [147] retained a near-vertical sided profile with a

flattish base which had been filled by a single uniform deposit of dark brown silty sand (148) (Figure 8). This feature produced over 600 charred oat grains, as well as frequent oat chaff (amns), charred sedge nutlets and charred seeds of corn-spurry, a weed indicative of cornfields. This sample is discussed further in the environmental report. No finds were retrieved from any of the four small cut features.



Plate 27: Southwest facing section of pit [147]

- 4.4.15 The most interesting feature revealed within this area was a well constructed kiln, which was located approximately 1m east of the curvilinear ditch [141] (Figure 6). The kiln comprised a bowl-shaped foundation cut [116] dug into the natural substrate (132), which measured approximately 1.8m in diameter and 0.36m in depth. The kiln had then been filled with a 0.08m thick deposit of mid-brown silty sand/clay (117), before being packed around the periphery with a 0.07m deposit of grey/orange clay (136) (Figure 7, Plate 28). A c.0.10m deposit of dark brown/black silty clay (137) was situated directly above the clay lining of the kiln and probably represents material associated with the use of the feature (Figure 7, Plate 29).
- 4.4.16 Following the abandonment of the kiln, the structure had been backfilled with a deposit of mid-light brown silty clay (138), which contained numerous fragments of daub (Plate 29). Interestingly, the fragments of daub retained semi-circular linear impressions suggesting that the material had been encased around an elaborate wooden framework. Furthermore, many of the fragments displayed signs of scorching. This strongly suggests that the material recovered from the backfill deposit (138) once formed part of a wattle and daub roof or covering over the kiln.



Plate 28: Southeast facing section of kiln [116]

- 4.4.17 The environmental samples retrieved from the kiln produced c.600 charred oat grains, common finds of charred oat awns, charred sedges, corn-spurry and low numbers of charred vetch seeds. Low numbers of desiccated brambleberry seeds and goosefoot seeds were also recovered. Given these results, it is probable that the kiln was used to dry corn; and more specifically, to the cultivation of oats.
- 4.4.18 Corn-drying kilns were a common feature on small farmsteads from the Romano-British period onwards. These structures were often quite elaborate, but usually comprised a simple bowl shaped drying chamber sunk into the ground with a covered flue and external fire-pit. However, whilst no evidence of a flue or fire-pit was identified during the investigation, the relatively shallow depth of the kiln bowl suggests that the area has been severely truncated in the past, possibly destroying any such evidence of the associated kiln features.
- 4.4.19 Unfortunately, no dateable finds were recovered from the kiln. However, whilst the kiln is likely to be Roman in date due to its proximity to several Romano-British features, a later provenance for the structure cannot be ruled out due to the presence of several sherds of medieval pottery within the immediate vicinity and medieval features further north.



Plate 29: View of kiln after partial deconstruction showing daub fragments above deposit (136)

4.4.20 The results obtained during the watching brief at Low Crosby (Area 13) suggest that the area has been occupied since at least the Romano-British period. It is probable that the cluster of archaeological features to the south of the area represents the remains of a Romano-British farmstead, possibly with an associated corn-drying kiln, although a later provenance cannot be ruled out for this feature at present. The cluster of archaeological activity at the north end of the area is more difficult to interpret as several of the features failed to provide dating evidence and the three pits, which have been confidently dated to the medieval period, failed to provide evidence of functionality. As very little significant archaeology was observed on the eastern side of the excavated area, it is likely that the excavation only exposed the eastern extent of intensive activity, indicating that most of this activity is situated towards the houses fronting Green Lane to the west.

5 FINDS

5.1 INTRODUCTION

- 5.1.1 A total of 881 artefacts, weighing a total of 77.7kg, were recovered from 15 contexts (See Appendix 2: Finds Concordance). Six Small Finds were recovered, five from topsoil **(100)** and one from **(139)**.
- 5.1.2 Artefact types recovered consisted of Roman to modern pottery types, ceramic building material, fired clay, clay tobacco pipes, glass, worked stone and metalwork. The small finds consisted of three coins, one button, one incomplete lead weight and the remains of a machine pressed copper alloy sheet.
- 5.1.3 All finds were dealt with according to the recommendations made by Watkinson & Neal (1998) and to the Institute for Archaeologists (IfA) Standard & Guidance for the collection, documentation, conservation and research of archaeological materials. Metalwork has been stored according to material type, in a sealed dry box with silica gel. All artefacts have been boxed up, according to material type and conforming to the deposition guidelines recommended by Tullie House Museum and Art Gallery.
- 5.1.4 The material archive has been assessed for its local, regional and national potential and further work has been recommended on the potential for the material archive to contribute to the relevant research frameworks.

5.2 MODERN POTTERY

- 5.2.1 A total of 32 sherds of modern pottery types, weighing 405 grams, dating from 18th to 20th Centuries AD. Pottery types present consisted of hand painted china, transfer printed china, Mocha ware, English stoneware, pearlware, mottled brown glazed ware. A variety of different forms were present including plates, cups, mugs, jars and lids.

5.3 POST MEDIEVAL POTTERY

- 5.3.1 A total of 13 sherds of Post Medieval pottery types, weighing 298 grams, dating from 16th to 18th Centuries AD, were recovered from three contexts. Pottery types represented included mottled brown glazed ware, black glazed ware, and local (unsourced) glazed wares. Vessels present consist of large open storage bowls and cups.
- 5.3.2 Of note is a fragment of an Award Plaque, recovered from the topsoil **(100)** at the south end of the the lane. Partial inscriptions are present on both sides. The front reads in three lines: []sman / []tsman / []T.O. and the back reads 2nd Has [] / 3rd Co [].

5.3.3 All post medieval pottery sherds are residual in nature, being present alongside later modern pottery types.

5.4 MEDIEVAL POTTERY

5.4.1 A total of 21 sherds of medieval pottery, weighing 159 grams were recovered from seven contexts. Fabric types present consist of Red Gritty ware, partially reduced greyware and a local (unsourced) jug fabric. The majority of Medieval sherds exhibited signs of abrasion.

5.4.2 Apart from layer **(139)**, medieval pottery was present amongst the roman pottery, and should be considering intrusive.

5.5 ROMAN POTTERY

5.5.1 A total of 31 sherds, weighing 513 grams, were recovered from three contexts. Fabric types present consist of Black Burnished ware, a whiteware mortarium fabric, local (unsourced) greywares, local (unsourced) oxidised wares, an unsourced amphora fabric and samian. The sherd of samian was heavily abraded, and therefore residual amongst later fabric types. Both the amphora and the samian ware are indicative of a roman lifestyle and trade outside the region.

5.6 CERAMIC BUILDING MATERIAL

5.6.1 A total of 38 pieces of ceramic building material, weighing 28 kilograms, was recovered from four contexts.

5.6.2 The majority of the ceramic building material was retrieved from context **(104)**, comprising 33 fragments, weighing 27.7 kg. The material comprised predominately horseshoe tile drainage pipe, along with fragments of roof tile and handmade bricks.

5.6.3 Seven fragments, weighing 6.2 kilograms, were of the horseshoe tile type. Horseshoe tiles were the first style of drainage tile manufactured in Cumberland during the 19th Century. They were formed by shaping a flat thin clay sheet over a mould, and tended to measure 13 inches long (Davis 2002, 261). Some of these drainage pipe fragments displayed an incuse stamp on the upper surface, reading 'DRAIN'. This is likely to be a reference to the Brick Tax introduced by William Pitt the Younger in 1784. Bricks and tiles were subject to taxation, whereas drainage pipes were not. The tax on roof tiles was lifted in 1833 and in 1851 for Bricks.

5.6.4 Tile manufacturing was a major business in Cumberland from the 1820s until the early 20th Centuries AD. Thirty six tile kilns are recorded as being

operational by the late 1830s. Works were established in Carlisle, Bowness, Langrigg and Wigton amongst others (Davis 2002, 261).

- 5.6.5 A total of seven fragments of plain roof tile, weighing 1.05 kilograms were recovered from deposit **(104)**. Some still exhibit a couple of nibs at the top, to enable them to be hung on laths, as opposed to being nailed in place. This change in style of roofing construction occurred following a patent granted in 1836, and became general practice during the late 19th Century AD.
- 5.6.6 Fourteen pieces of handmade brick, weighing 16.6 kilograms, were present from deposit **(104)**. One was complete, measuring 8³/₄" in length, 4¹/₂" wide and 2³/₄" thick. These measurements are slightly larger but similar than the measurements stated in a Statute issued by George I in 1725, which states that place bricks and stock bricks should measure no less than 9" x 4 ¹/₄" x 2 ¹/₂" and 9" x 4 ¹/₄" x 2 ⁵/₈" (Hume 1969, 81). Therefore it is reasonable to assume that this brick is of Late 18th Century AD dating onwards. Two fragments were a buff / yellow colour, which was in architectural favour during the 17th Century AD and later.
- 5.6.7 Several fragments, both horseshoe tiles and handmade bricks fragments, exhibited signs of being fired at an extreme temperate as they had a warped shape and they were part vitrified. This alteration could indicate that they were either wasters (in the case of the warped horseshoe tiles) or part of the kiln structure (in the case of the vitrified bricks).

5.7 FIRED CLAY

- 5.7.1 A total of 652 fragments of fired clay, weighing 38.0kg, was retrieved from five contexts. The majority of the assemblage comprised 575 fragments of daub (37.2 kg) from **(138)**. A range of different firing conditions are present from within the daub assemblage. Some are highly oxidised, others are reduced. Some are internal fragments, exhibiting two sides with semi circular voids for timber, with the voids going in different directions, indicating a complex structure. However due to the highly fragmented nature of the fired clay assemblage, it is hard to determine the original shape of the structure. It is possible that the fired clay is the remnants of a roof structure, which is likely to have formed a dome and chimney over the kiln.
- 5.7.2 The remaining fragments of fired clay were non-diagnostic to original form and function.

5.8 CLAY TOBACCO PIPE

- 5.8.1 A total of 14 pieces of clay tobacco pipe, weighing 49 grams, were recovered from six contexts. Of note was an almost complete spurred bowl from

topsoil (100). It is of Oswald type 14, dated to c.1820-40 (Oswald 1975, 38). The bowl exhibits moulded decoration consisting of a thistle on one side and a rose on the other. A dated parallel to this bowl decoration has not been found at time of report writing. The remaining pieces of clay tobacco pipe consisted of unmarked, undiagnostic stem fragments.

5.9 POST MEDIEVAL GLASS

5.9.1 A total of seven fragments of glass, weighing 101 grams, were recovered from two contexts. The fragments predominately consist of bottle glass, apart from a pedestal base from a wine glass and a piece of window glass, both from topsoil (100). All fragments are consistent with 18th to 20th Centuries AD dating.

5.10 METALWORK

5.10.1 A total of 54 items of metalwork including six Small finds, weighing 1.75 kilograms, were recovered from three contexts. The majority of metalwork was recovered with the use of a metal detector.

5.10.2 *Coins*: three coins (SF 1-2, 4) were recovered, all from topsoil (100). SF 1 was an almost illegible halfpenny of George IV (1820-30), minted between 1825 and 1827 AD. SF 2 is another halfpenny, this time of Elizabeth II (1952 to present) minted in 1971 AD. SF 4 was a halfpenny of George V (1910 to 1936), minted in 1936 AD.

5.10.3 *Copper Alloy*: all 28 copper alloy finds were from topsoil (100). SF 3 consisted of a heavily worn tombac button, typically of 18th to 19th Centuries dating. SF 5 comprised 26 fragments of machine pressed sheet metal, folded in place, weighing 51 grams. No original form could be determined. Being machine manufactured, it is of 19th to 20th Centuries dating. The final copper alloy find was a gun cartridge, of 20th Century dating.

5.10.4 *Iron*: a total of 17 artefacts, weighing 1.41 kilograms, were recovered from two contexts. Of note was an almost complete horseshoe from deposit (104). The horseshoe is of Hume type 8 (Hume 1969, 238), typically dated to the late 19th Century and would have belonged to a large carthorse, probably a Shire or Clydesdale type. The remaining iron artefacts consist of 6 square sectioned nails, chain links and part of a hinge from topsoil (100) and are modern in dating.

5.10.5 *Steel*: two incomplete items of stainless steel cutlery, a fork and a spoon were recovered from topsoil (100). Both are modern (19th to 20th Centuries AD) in dating.

- 5.10.6 **Lead:** an incomplete net or line weight (SF 6) was recovered from context (139). It consists of a piece of lead, tightly rolled up. One end is damaged. The weight is likely to date from the Medieval period onwards but it could be of earlier dating. An incomplete sheet of lead, along with a smaller fragment were recovered from an unstratified context. Lead sheeting has been used for a variety of purposes, most notably as waterproofing on roofs.
- 5.10.7 **Industrial Residue:** twelve pieces of industrial residue (clinker, slag, fuel ash and vitrified clay), weighing 144 grams, were recovered from three deposits (104), (121) and (148).

5.11 WORKED STONE

- 5.11.1 Three pieces of worked stone, all unstratified, were retrieved. A probable whetstone fragment was recovered from the topsoil at the North West end of the strip. The probable whetstone consists of a fragment of fine grained mudstone, with a couple of smoothed areas, probably created from the sharpening of bladed implements.
- 5.11.2 The final two pieces of worked stone, consisted of two joining fragments of red sandstone with 17R incised on the upper face. This is likely to be a field or grid square marker. An exact parallel has not yet been located.

5.12 STATEMENT OF POTENTIAL

- 5.12.1 The Roman and medieval pottery is indicative of Roman and medieval occupation in the vicinity of the site.
- 5.12.2 The large assemblage of daub fragments from the backfill (138) within the kiln is of archaeological significance. Due to burnt features being present in the lower, related layers, it is probable that these fragments are associated, probably consisting of the superstructure for a kiln or an oven. It is most likely Roman in dating, but due to a couple of intrusive medieval pottery sherds, this dating is tentative.
- 5.12.3 The large assemblage of post medieval brick, tile and drainage pipe is of archaeological interest, especially as some fragments demonstrate signs of being fired at extreme temperatures. These fragments are likely to be wasters and / or part of the kiln structure.
- 5.12.4 The use of drainage tiles dramatically improved the fertility of a field, therefore following the conception of ceramic drainage pipe, multiple tile kilns were set up throughout Cumberland as a response to the demand. Therefore the ceramic building material assemblage is of regional interest. In particular as parish records record a Thomas Patrick operating as tile maker in the parish of Linstock in 1829 (Parson & White 1984, 445).

6 ENVIRONMENTAL ANALYSIS

6.1 INTRODUCTION

- 6.1.1 During the course of the archaeological watching brief, 16 samples were taken. Based on a post-excavation assessment of the archaeological significance of these samples 15 were put forward for archaeobotanical analysis. Samples were taken to extract material that may aid the understanding of the depositional history of these contexts. This could include evidence of human activity that may have left preserved archaeological material during the prehistoric or historic periods. As well as anthropogenic evidence the remains of wild plants may allow inferences to be made regarding the local environment. In particular, due to the artefactual assemblage collected from this area, evidence of activity during the Roman and medieval periods was considered possible in the soil samples processed.
- 6.1.2 The methodology employed required that the whole earth samples be broken down and split into their various different components: the flot, the residue, the clay-silt and the sand-silt. The sample was manually floated and sieved through a 'Siraf' style flotation tank. In this case the residue and the flot are retained while the sand-silt-clay components are filtered out. The sample was floated over a 0.5mm plastic mesh, into which the residue was collected, then air-dried and sorted by eye for any material that may aid our understanding of the deposit. This included charred plant remains, bones, pottery, burnt clay and charcoal. Charcoal fragments larger than 1cm x 1cm was retained for later analysis or for use in radiometric dating. The residue samples were also scanned with a hand magnet to retrieve forms of magnetic material. This was done to retrieve residues of metallurgical activity, in particular hammer scale, spheroid hammer scale, fuel-ash slag and vitrified material which might be indicative of other high temperature non-metallurgical processes. Processing procedures and nomenclature follows the conventions set out by the Archaeological Datasheets of the Historical Metallurgical Society (1995) and the English Heritage Centre for Archaeological Guidelines publication (2001). The wash-over (the flot), was collected in a 250-micron geological sieve, and then air dried before analysis. A decision was made to re-flot all of the heavy residues in order to maximize the retrieval of this material as it was felt eye-sorting alone would be time consuming and may not allow an accurate retrieval of the smaller, more delicate charred remains. The importance of this procedure is discussed in the discussion section below.
- 6.1.3 The washover (flot) was dried slowly and scanned at x40 magnification for charred and uncharred botanical remains. Identification of these was undertaken by comparison with reference material held in the Environmental

Laboratory at Wardell-Armstrong Archaeology and by reference to relevant literature (Cappers et al. 2010, Berggren 1981, Jacomet 2006). Plant taxonomic nomenclature follows Stace (2010).

- 6.1.4 Favourable preservation conditions can lead to the retrieval of organic remains that may produce a valuable suite of information, in respect of the depositional environment of the material, thus enabling assessment of anthropogenic activity, seasonality and climate and elements of the economy associated with the features from which the samples are removed. In this case the sandy, well-drained, nature of the soil would be suitable for the preservation of charred plant remains, but not desiccated or waterlogged material.
- 6.1.5 Sample numbers appear in brackets thus < >, whilst context numbers appear in brackets thus () for all analysis and discussion below. For material from the residue the relative abundance is based on a scale from 1 (infrequently found) to 3 (dominates the sample). Cereals are counted in terms of the number of individuals counted. The other plant remains are recorded on a scale from A-E: A:1-2, B:2-10, C:11-30, D:31-100, E:c.100+. Due to the secondary floting of the heavy residues, and the rich remains this produced it was decided to tabulate the difference between the material recovered from both flots. This is achieved by placing a semi-colon to designate the presence of material from the secondary flot. Where the semi-colon is present this donates the number to its left quantified material which came from the primary flot, and the number right that which came from the secondary flot. Thus '10:15' would signify that 10 grains came from the primary flot and 15 from the secondary. Likewise 'A:A' would represent the primary and secondary flot distributions in relation to the relative scales discussed above.
- 6.1.6 For the purposes of clarity the references to 'seeds' identified here refer to the seed or fruit structures unless otherwise stated; that is to say the propagule or disseminule structures. Cereal grain was recovered in a charred condition and where mentioned refers to the charred caryopsis. Chaff fragments are specified in the text as being either rachis, paleas, lemmas, glumes, awns or culms and culm nodes. Carex nutlets are classed as either lenticular or trigonus, though further identification was not undertaken. As these plants did not occur with particularly high frequency, and as they generally indicated wet environments it was not thought that a more detailed examination would improve our knowledge of the context in which these remains occur.

6.2 DISCUSSION OF THE PLANT REMAINS

- 6.2.1 Cereal grains were found in thirteen of the fifteen samples. In total the assemblage produced almost 2000 individual charred cereal grains, along with low numbers of barley rachis fragment and oat awn fragments. Grains of a barley variety were recovered from 11 samples, accounting for *c.*100 charred grains. Of these samples (119) <2>, (121) <3>, (134) <4> and (146) <9> all produced grains that were identified as 6-row hulled barley grain based on the morphology of the ventral groove and dorsal surface. Wheat varieties were not identified clearly in any of the samples though possible grains were recovered from (148) <10>, (153) <11> and (137) <16>. Three possible rye grains were recovered from (119) <2>, (127) <6> and (144) <8>. Indeterminate cereal grains were found in eight samples and represent 71 grains. Many of these were of a form consistent with the oat or barley grains recovered from these samples, but due to excessive charring they could not be identified based on gross morphology alone. Oat grains were found in 13 contexts and represent 1726 individual grains. In many cases it was not possible to distinguish definitively whether these were wild or cultivated types due to the absence of chaff remains, though in some cases enough of the floret bases were preserved to suggest the presence of cultivated oats, *Avena sativa*. In many of the larger assemblages, *c.*50% of the grains recovered were over 5mm in length. Though relatively small compared to modern cultivated oats this size is not incompatible with the sizes of cultivated oats.
- 6.2.2 Though charred cereal grains were recovered across most samples there are a number of clear concentrations, such as ditch [141], pit feature [133], pit [147] and from within the structure of the possible corn-drying kiln to the south-east of the site. Six samples produced less than ten grains, while five produced more than one-hundred grains.
- 6.2.3 Samples <2> (119), <3> (121) and <3> (134) came from three rectangular pits dated as being from the medieval period. Combined, this sample produced an assemblage of *c.*280 grains. Of particular note in this case of the presence of barley grains (82) and oat grains (163). These constituted the bulk of the sample. This may be evidence of mixed cropping, as will be discussed below. The wild plant remains from this sample include many which are known weeds of cereal crops. In particular the finds of charred corn-spurry are noted from other medieval remains from the region (Huntley 2000). Finds of *Chenopodiaceae* species were very common from this sample and would be consistent with an environment of well fertilised agricultural land. Other preserved cornfield weeds included corn-spurry, nipplewort and various charred knotgrass species. Thus, from within this sample may be evidence of medieval cropping practices and field ecology from a region

previously poorly represented with such evidence. The samples do not reveal the function of these features however. It is possible they represent the remains of an area where corn was air-dried, the charring perhaps representing the remains of periodically burnt material. Their shallow nature does not suggest subsurface grain storage and their regular size does not suggest casual dumping of waste. Therefore until further research, the reason for the dumping of this material in these contexts is as yet unclear.

- 6.2.4 The remains from the three pits **(119) <2>**, **(121) <3>**, **(134) <4>** may be evidence of a mixed crop known as a dredge in the medieval period (Moffett 2006, 50). Mixed cropping in the medieval period was undertaken in order to guard against total crop failures. Two species were planted together so in the event one failed there was still the possibility a subsistence crop could be produced from the second. In this case it is likely that oats were the secondary crop. Though mentioned in medieval text this type of mixed cropping is difficult to identify archaeobotanically (Veen 1995). Though the evidence is far from clear in this case, it is suggested that there may be evidence for this practice from this assemblage.
- 6.2.5 Sample **<5> (131)** and **<6> (127)**; these samples were taken two linear features; **(131)** overlying **(126)**. They produced very low numbers of charred cereal grains but produced *c.*100 brambleberry/gooseberry seeds each. This suggests either they were laid down during a consistent period of deposition i.e. they are contemporary; the infilling of one followed by the infilling of the other over a consistent period, or were infilled while surrounded by similar overgrown ruderal type vegetation, also suggested by the finds of nettle and goosefoot seeds. Thus their infilling could have occurred at periods widely spaced from each other, merely with a similar surrounding vegetation. Consideration should also be given to the possibility that this material possibly derived from human faecal material, in which case these ditches may have acted as drains, or collection areas for human faecal waste.
- 6.2.6 Towards the southern end of the site a series of Roman features, including pits, linears and a possible corn-drying kiln, all produced large assemblages of charred grains, in this case mainly charred oats.
- 6.2.7 Samples **<8> (144)**, **<9> (146)**, **<11> (153)** and **<12> (156)** all derive from two ditch features, one curvilinear to the north-west of the possible corn dryer and the other a linear entering the excavated area from its southern end and running roughly north-south. These samples produced over 415 grains, of which 375 are oat grains, and *c.*20 are indeterminate grains. It is suggested that these samples, coupled with samples from **<10> (148)** and **<16> (137)** provide evidence that the oat remains recovered here were grown as a crop in their own right, and were not merely present as wild oat weeds. Finds of

weed seeds were less diverse than from other samples where a sizable assemblage of grain was recovered (in particular the limited presence of knotweed, though the common corn-field weed corn-spurry was recovered). Sedge nutlets were common in these samples, as well as those from <10> (148) and <16> (137). This may conform to Hall's suggestion (2003) that charred sedge remains should be considered in light of the use of turves as a construction material. Though many weeds of cultivated ground were recovered from this sample it is notable that a high frequency of charred sedge nutlets were recovered from this feature directly associated with the drying kiln superstructure. As has been discussed elsewhere for corn-dryer construction (Gibson 1989), the use of turves as a construction material has been noted from some excavated corn-dryers. In this case the presence of charred sedge nutlets being indicative of an element of the corn-dryer being constructed from cut turves. The presence of the site so near to a river may suggest that *Carex* species could have colonised much of the wetter parts of the region.

6.2.8 Samples <10> (148) and <16> (137) derived from different features but are both very consistent in the types of remains produced (though sample <16> was 6 times larger than sample <10>). Both produced c.600 charred oat grains, common finds of charred oat awns, charred sedges, corn-spurry and low numbers of charred vetch seeds. Low numbers of desiccated brambleberry seeds and goosefoot seeds were also recovered. Based on the information from the investigation it is possible that pit (148) received waste from the cleaning out of corn-dryer (137), some of which also ended up in the ditch features lying between (148) and (137). The information from this portion of the excavated site strongly points to oat cultivation. Currently this appears to be dated to the Roman period, though it is strongly recommended that radiocarbon dates be undertaken to confirm this suggestion.

6.2.9 Weed plants: many of the non-cereal plant remains recovered from this site could be considered plants endemic to cultivated land during the medieval period. Plants such as corn spurry are commonly found in medieval grain assemblage due to their endemic nature in cultivated fields. Other plants such as the goosefoots probably benefited from the adding of manure to the soil which created the nitrogen rich environment favoured by this plant. It is notable that samples which produced relatively high numbers of charred cereal grains also produced higher proportions of assemblages dominated by goosefoots and corn-spurry; plants which benefit from the manuring and tilling of agricultural land.

6.2.10 Low numbers of bramble-berry seeds were also recovered across the site, though in two cases this may have derived from consumption; <5> (131) and

<6> (127). A single fig seed was recovered from sample <9> (146), presumably being derived from a dried fig. Should this feature be identified as of a Romano-British date then this find is notable as finds of Roman imported food are rare from rural Cumbrian sites.

6.2.11 The plant remains recovered strongly point to an open, and regularly manured farming landscape with some limited areas of open ruderal land.

6.3 DISCUSSION OF THE HEAVY RESIDUES

6.3.1 *Magnetic Residues*: The procedure for examining magnetic residues follows from standard methods (English Heritage 2001). The material collected was derived from naturally occurring magnetic minerals. All samples produced samples of magnetic material of less than 1gram. This suggests ironworking activity did not take place in the immediate vicinity of this area.

6.4 SECONDARY FLOTTING

6.4.1 One feature of the processing of samples from this site is the process of re-flotting the heavy residues to retrieve plant remains which may not have floated during the initial processing. Taking cereals as an example; from the three medieval pits (119) <2>, (121) <3>, (134) <4> c.100 grains were recovered via the secondary flotting, as well as numerous weeds seeds. In other cases the secondary flotting produced material which was commonly recovered in the primary flot, but by reprocessing these samples a more rounded representation of some of the weed seeds was achieved, particularly in the recovery of corn-spurry and knotgrass in some of the samples.

6.4.2 It is also interesting that (apart from three barley rachis fragments and limited numbers of oat awn fragments) little chaff was recovered, even though material such as awns were specifically looked for when so many oat grains were being recovered. It can be quite confidently stated that after double flotting these samples that this material was indeed present in low quantities. This suggests that the purpose of the corn-dryer was probably not to dry the cereals before threshing, but to dry them before milling. This has important implications for the purpose of this structure and its importance in the agricultural economy of the agricultural regimes on the site.

6.5 CONCLUSIONS

6.5.1 The archaeobotanical remains recovered from this site have produced evidence of agricultural practice in this region during the Roman and medieval periods, the ecology of cereal fields in the region, as well as

possible evidence for turf construction methods in the building of the corn-drying kiln.

- 6.5.2 The evidence for agricultural practice is represented by the finds of cereal grains which suggest the cultivation of oats and 6-row hulled barley during the Roman and medieval periods, but not interestingly of wheat cultivation. It is suggested here that evidence for dredge mix cropping during the medieval period is present at this site, particularly from samples (119) <2>, (121) <3> and (134) <4>. As such this represents an important regional discovery as it gives an insight into the cropping decisions made during the medieval period in this area and compliments other work recently completed in the area (Jackson 2012).
- 6.5.3 Weed seeds suggest a rich soil, particularly from the finds of *Chenopodium* species seeds and from *Polygonum/Persicaria* seeds. Finds of sedge nutlets are not interpreted as directly relating to cultivation and are instead possible evidence of a turve roof construction as part of the corn-dryer.
- 6.5.4 Evidence for non-cereal food plants are limited to finds of brambleberry and goosefoot seeds, though as discussed above the brambleberry seeds may also be from naturally shed seeds. The find of a fig seed is notable, though is of little interpretative value as it occurs as a single seed.
- 6.5.5 It is suggested that based on the absence of chaff remains that the main purpose of the kiln was to dry grain before milling. The absence of clear evidence of germinating grain suggested that the grain was used for flour making, rather than being part of the malt production phase of brewing.

6.6 RECOMMENDATIONS

- 6.6.1 It is recommended that some of the charcoal recovered from the samples be sent forward to species identification as this would allow a determination to be made on what type of fuel was being used for the fire. Some fragments of possible heather were noted from the samples, but this should be confirmed by subsequent analysis.
- 6.6.2 It is recommended that some of the unidentified material be shown to the regional science advisor for English Heritage (Jacqui Huntley), as she may be able to identify this material. This would further increase the information on the local vegetation gathered from this site.
- 6.6.3 Due to the sparse nature of both medieval archaeobotanical deposits from Cumbria, and from non-military Roman contexts within the area, it is strongly recommended that the information from this site be put forward for publication in order to disseminate the information gathered from this site.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

- 7.1.1 **Phase 1:** the 3.7m long, 20m wide pipeline easement was stripped of topsoil along with all newly created plant access roads. This was all carried out under archaeological supervision. No archaeological features were observed during excavation of the access roads. During excavation of the pipeline easement the route passed through three fields containing the eroded remains of post-medieval, narrow ridge and furrow, created as a result of ploughing.
- 7.1.2 Removal of the topsoil in Tile Kiln Field revealed a large post-medieval deposit of broken redbrick and red land and roof tiles.
- 7.1.3 **Phase 2:** the excavation of selected areas only of the pipeline trench, those thought most likely to contain archaeological features or deposits, was carried out under archaeological supervision. At the western end of the pipeline the location of a possible Iron Age or Roman boundary ditch was confirmed along with a possible relict field boundary ditch. Three more field boundary ditches were uncovered in Areas 8 and 9 and all believed to be post-medieval in date. In area 6, under a layer of post-medieval red tile and brick the base of what is believed to be a tile kiln of the same period was observed in the trench section.
- 7.1.4 **Low Crosby:** the excavation within the village of Low Crosby (Area 13) revealed significant evidence of archaeological activity dating from at least the Romano-British period. This area appears to have exposed the eastern extent of a Romano-British farmstead with later medieval activity further north. One of the most significant features revealed within this area was a probable corn-drying kiln, which provided potential evidence of a wattle and daub roof or covering. However, whilst this structure is likely to be associated with the probable Romano-British farmstead, a later provenance cannot be ruled out due to the lack of any dateable evidence from the feature.

7.2 RECOMMENDATIONS

- 7.2.1 Based upon the significant archaeological remains revealed during the watching brief, it is recommended that the findings be submitted to the CWAAS for publication. Given the site's location in relation to the Hadrian's Wall World Heritage site, particularly the Vallum, and the significant archaeological remains revealed at Low Crosby, it is also recommended that any invasive work conducted in the future be subject to a similar

programme of archaeological investigation. This is particularly relevant to the rear of the houses fronting the eastern side of Green Lane, as significant below ground archaeological remains relating to the Romano-British and medieval periods are highly likely to survive within this area.

- 7.2.2 It has also been strongly recommended, based upon the environmental results that material from several samples obtained during the watching brief at Low Crosby should be sent for further analysis to better understand the history and use of the site. In particular, the date of the corn-drying kiln needs to be established through scientific dating of associated deposits.

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APPENDIX 1: CONTEXT TABLE

Context Number	Context Type	Description
100	Deposit	Topsoil
101	Geology	Natural Substrate
102	Deposit	Sub-Soil
103	Geology	Natural Substrate
104	Deposit	Industrial Spread of Red Tile, Red Brick and Coal
105	Deposit	Orange Burnt Clay
106	Cuts	For Five Slots Associated with Kiln Base
107	Fills	Fill of Five Slots
108	Cut	For Kiln Western Redbrick Wall
109	Structure	Possible Western Redbrick Wall of Kiln
110	Cut	North-South Ditch
111	Fill	Of [110]
112	Cut	North-West, South-East Ditch
113	Fill	Of [112]
114	Cut	Possible Shallow Post-Hole
115	Fill	Of [114]
116	Cut	Cut of Kiln
117	Fill	Primary Soil Fill of Kiln
118	Cut	Northern Sub-Rectangular Pit
119	Fill	Of [118]
120	Cut	Central Sub-Rectangular Pit
121	Fill	Of [120]
122	Deposit	Topsoil
123	Deposit	Modern, Grey/Yellow Hardcore
124	Deposit	Re-deposited Natural Substrate
125	VOID	VOID
126	Cut	North-West, South-East Ditch
127	Fill	Of [126]
128	Structure	North-West Clay Edge
129	Structure	South-East Clay Edge
130	Deposit	North-West Clay Area
131	Deposit	Brown, Silty Fill
132	Geology	Sandy/Gravel Natural Substrate
133	Cut	Southern Sub-Rectangular Pit
134	Fill	Of [133]
135	Deposit	Mixed Rubble
136	Structure	Clay Lining of Kiln
137	Deposit	Burnt Deposit Within Kiln
138	Deposit	Fill of Kiln
139	Deposit	Roman Spread
140	Deposit	Medieval Spread
141	Primary Cut	Curvilinear Ditch
142	Primary Fill	Of [141]
143	Cut	North-South Roman Ditch
144	Fill	Of [143]
145	Cut	Possible East-West Ditch
146	Fill	Fill of [141]
147	Cut	Circular Pit
148	Fill	Of [147]
149	Cut	Post Pad

150	Fill	Of [149]
151	Cut	Small Linear
152	Fill	Of [151]
153	Fill	Of [141]
154	VOID	VOID
155	VOID	VOID
156	Fill	Of [141]
157	Cut	Post Hole
158	Fill	Of [157]
159	Cut	Natural Feature
160	Fill	Of [159]
161	Fill	Fill of [141]
162	Cut	North-South Ditch
163	Fill	Fill of [162]
164	Cut	North-South Ditch
165	Fill	Fill of [164]
166	Cut	North-South Ditch
167	Fill	Fill of [166]

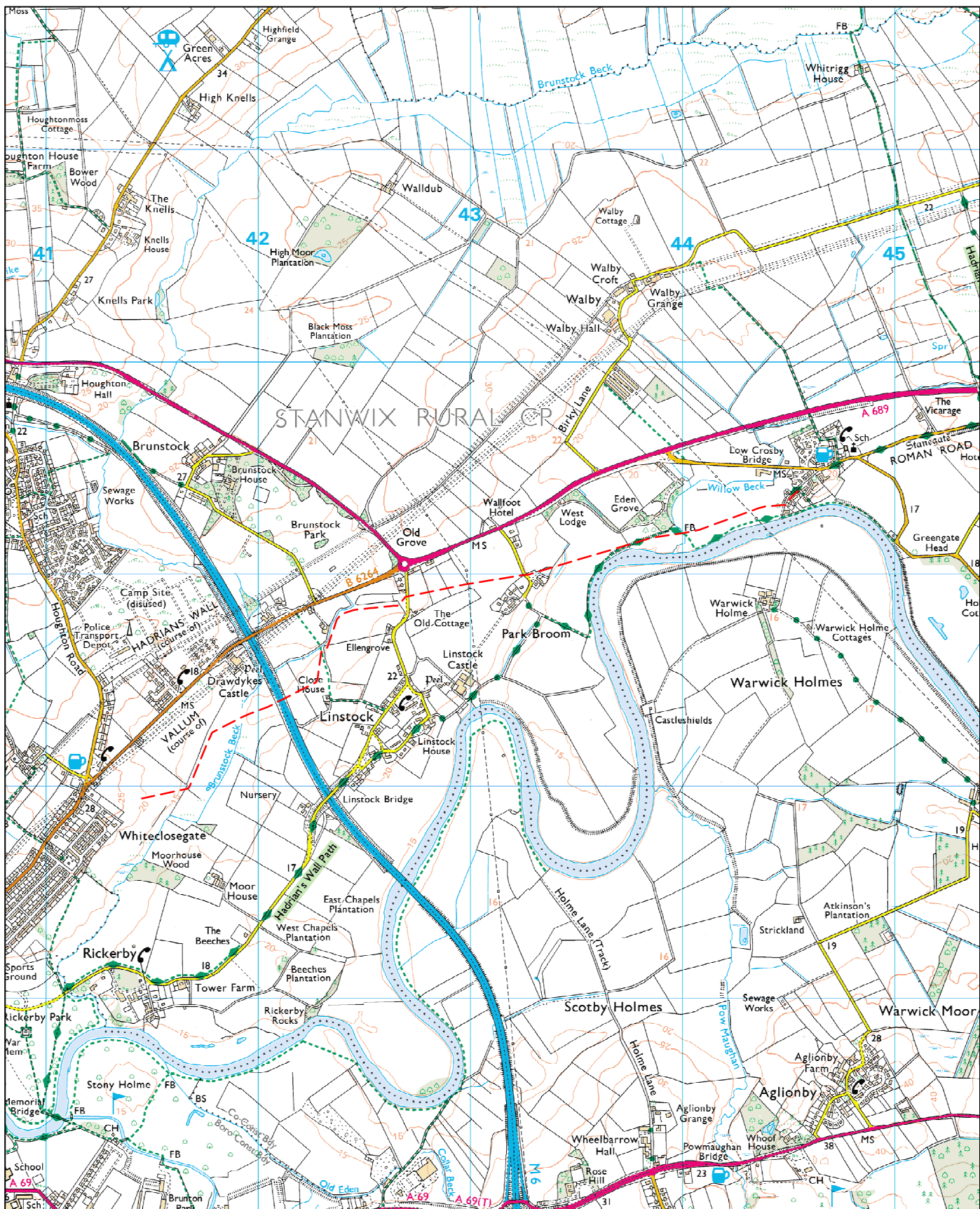
Table 2: List of Contexts issued during Watching Brief

APPENDIX 2: FINDS CONCORDANCE

Context	Material	Count	Weight (g)	Spot-date
Total		881	77742.2	
u/s	Medieval pottery: Jug handle Worked stone: Whetstone, marker stone Lead: Sheet Iron: Nails, chain	1 3 3 6	48 8108 154 180	MC12-MC13
100	Modern pottery: China; English stone, mottled brown glazed ware; mocha ware; pearlware Post Medieval pottery: Black glazed ware; local glazed earthenware; Award plaque Medieval pottery: Partially reduced grey ware; local (unsourced) jug Clay tobacco pipe: Moulded bowl, stems Post medieval glass: bottle; window; wine glass Modern glass: window Post Medieval ceramic building material: roof tile Copper alloy: cartridge Iron: Hinge; nails Steel: Cutlery	29 12 5 9 6 1 1 7 2	378 293 29 43 96 119 236 12 195 67	C19-C20
100 SF1	Coin: George IV (1820-30) halfpenny	1	8	1825-1827
100 SF2	Coin: Elizabeth I (1952-present) Halfpenny	1	1	1971
100 SF3	Button: tombac	1	3	C18-C19
100 SF4	Coin: George V (1910-36) halfpenny	1	6	1936
100 SF5	Copper alloy: machine pressed folded sheet	26	51	MOD
104	Modern pottery: China; stoneware Post medieval pottery: Black glazed ware Clay tobacco pipe: stem Post medieval glass: bottle Ceramic building material: Horseshoe field drain; brick; roof tile Industrial residue: clinker; vitrified clay Fired clay: miscellaneous Iron: horseshoe	3 1 4 1 33 4 30 3	27 5 6 5 27712 63 457 1036	C19-C20
115	Fired clay: miscellaneous	1	2	-
117	Fired clay: miscellaneous	2	15	-
119	Medieval pottery: local (unsourced) jug	3	51	MC13-MC14
121	Medieval pottery: Red Gritty ware Ceramic building material: miscellaneous Industrial residue: slag; fuel ash; clinker	1 2 4	1 9 76	MC12-MC13
134	Medieval pottery: Red Gritty ware; local (unsourced) jug	4	19	MC13-MC14
135	Medieval pottery: local (unsourced) jug Roman pottery: local (unsourced) oxidised; amphora	1 4	2 82	MC13-MC14
137	Fired clay: miscellaneous	42	291	-
137 <7>	Fired clay: miscellaneous	1	0.9	-
137 <16>	Fired clay: daub	1	6.3	-
138	Fired clay: daub	575	37261	-
139	Roman pottery: Black Burnished; Amphora; whiteware mortarium, local (unsourced) greywares Ceramic building material: roof tile	23 1	381 70	C2-C4
139 SF6	Lead: Weight	1	25	MED +
140	Medieval pottery: Partially reduced grey ware; Red gritty ware; local (unsourced) jug	5	31	MC13-MC14
142	Medieval pottery: local (unsourced) jug	2	5	MC13-MC14

Context	Material	Count	Weight (g)	Spot-date
144	Medieval pottery: Red Gritty ware; partially reduced grey ware	3	7	MC13-MC14
	Roman pottery: local (unsourced) grey ware; Samian	4	50	
	Ceramic building material: brick	1	2	
	Iron: Nail	1	8	
148	Industrial residue: clinker	4	2	-

APPENDIX 3: FIGURES





wardell
armstrong
archaeology

WA Archaeology Ltd
2012

PROJECT: FTS Pipeline on Land Between Linstock and Low Crosby, Cumbria
 SCALE: 1:25,000 at A4
 REPORT No: CP 10132/12
 CLIENT: United Utilities
 DRAWN BY: AB
 DATE: June 2012
 FIGURE: 1

KEY:
 --- Route of pipeline



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Figure 1: Site location






FTS Pipeline on Land Between
Linstock and Low Crosby,
Cumbria

CLIENT:
United Utilities

SCALE: 1:12,500 at A3

DRAWN BY: AB

DATE: June 2012

- KEY:
-  Route of pipeline
 -  Access roads
 -  Monitored trenching
 -  Feature numbers
 -  Areas of monitoring



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REPORT No:
CP10132/12

FIGURE:
2



Figure 2: Areas of archaeological monitoring.



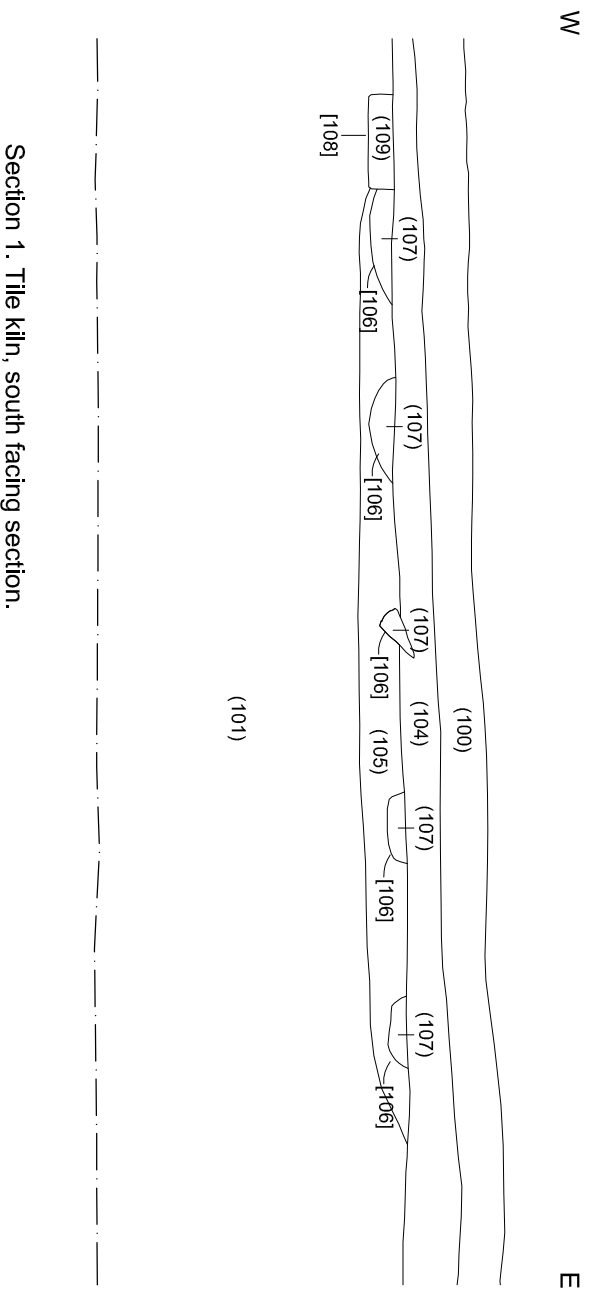
W A Archaeology Ltd
2012

FTS Pipeline on Land Between
Linstock and Low Crosby,
Cumbria

CLIENT:
United Utilities

SCALE:
1:40 at A4

DRAWN BY: AB
DATE: June 2012

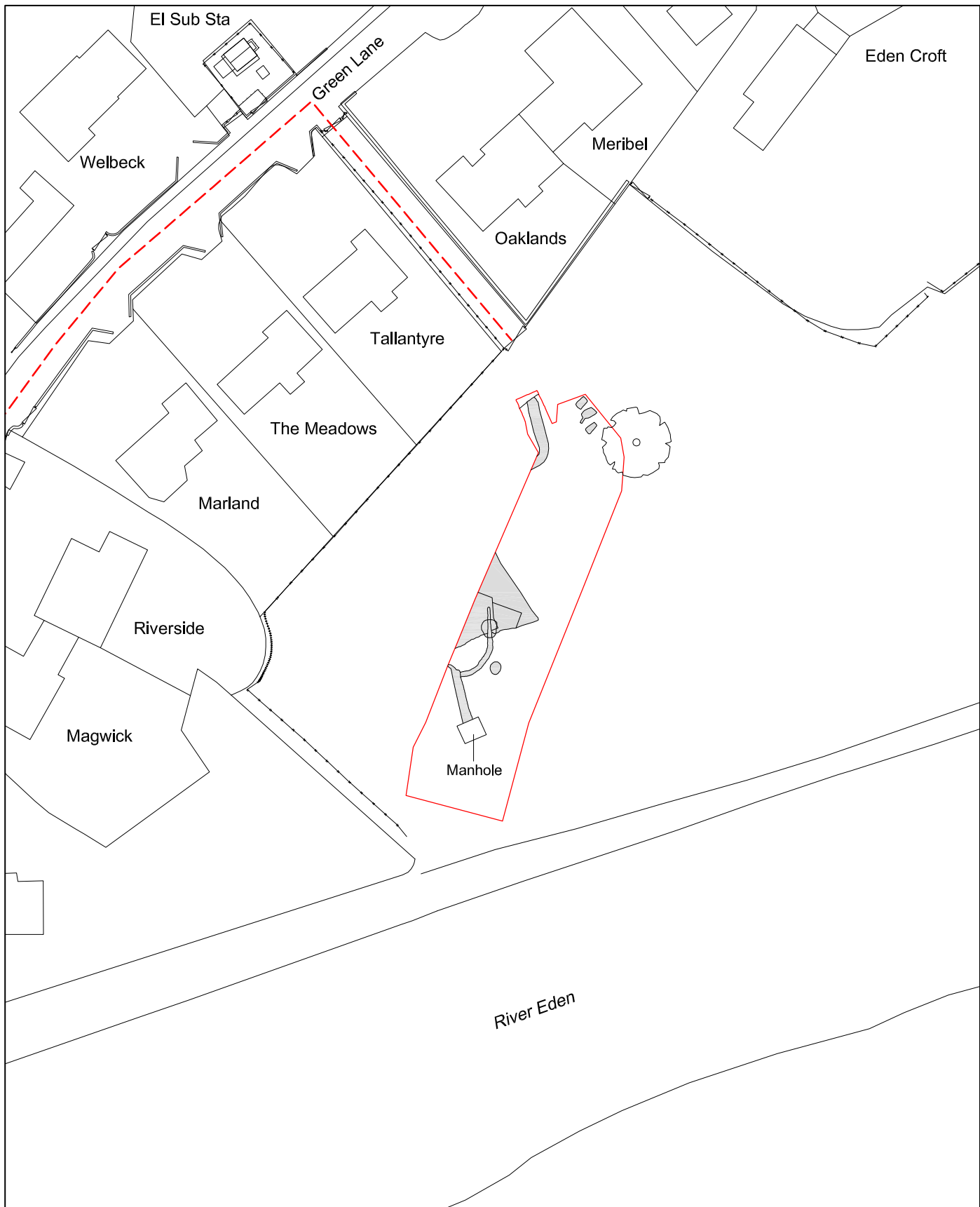


Section 1. Tile kiln, south facing section.

REPORT No:
CP10132/12

FIGURE:
3

Figure 3. Tile kiln, section.





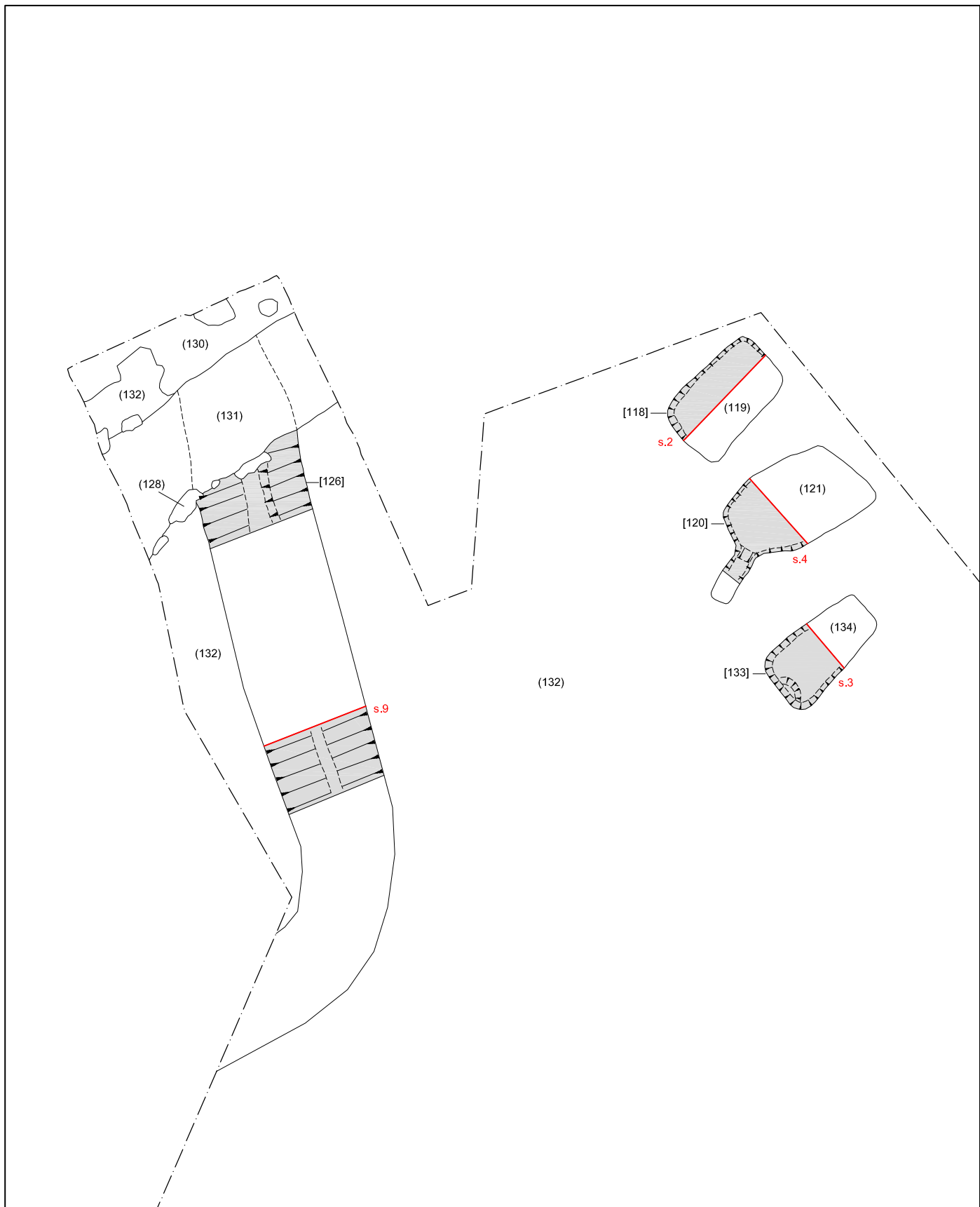
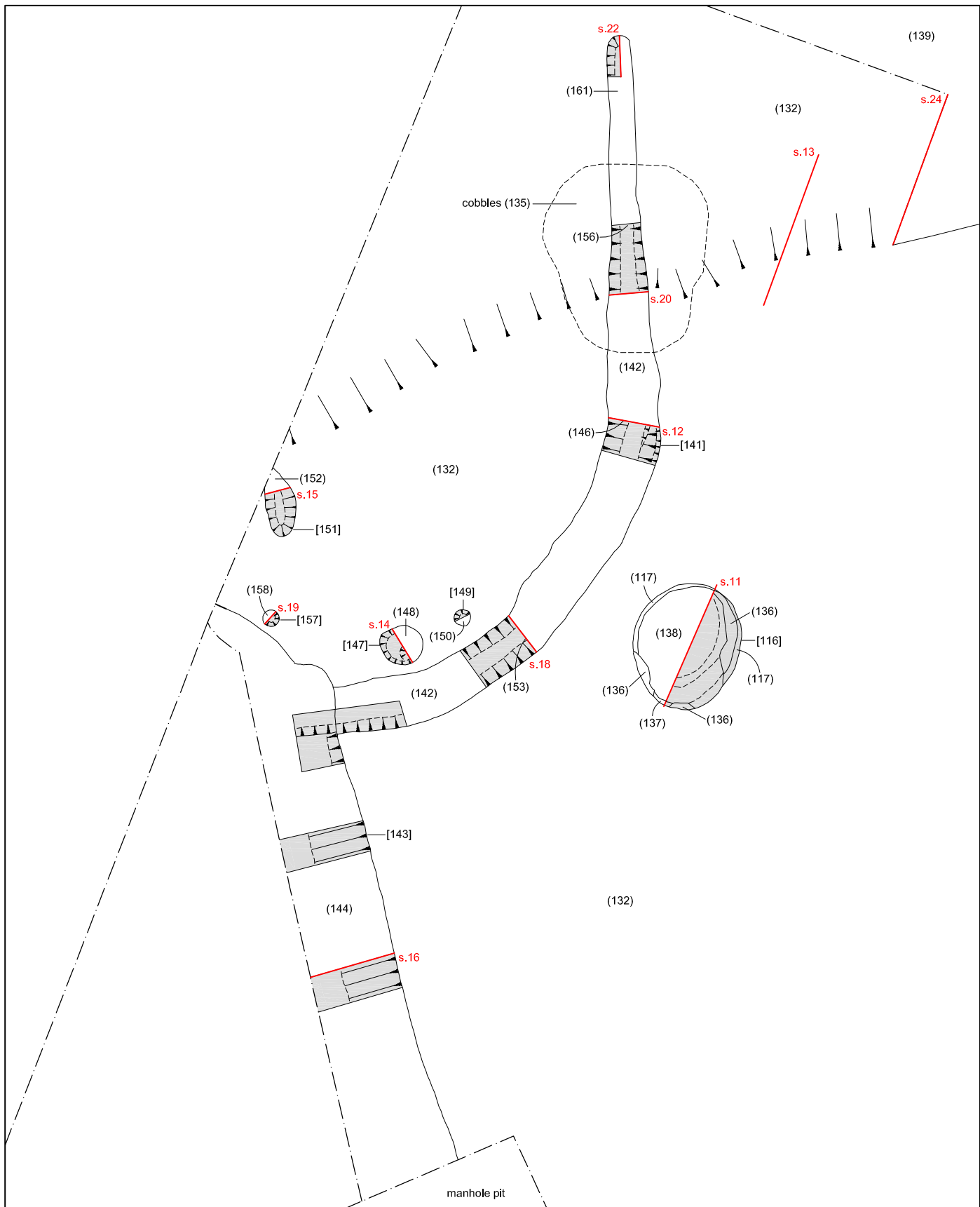
 <p>WA Archaeology Ltd 2012</p>	<p>PROJECT: FTS Pipeline on Land Between Linstock and Low Crosby, Cumbria</p> <p>SCALE: 1:750 at A4</p> <p>REPORT No: CP10132/12</p> <p>CLIENT: United Utilities</p> <p>DRAWN BY: AB</p> <p>DATE: June 2012</p> <p>FIGURE: 4</p>	<p>KEY:</p> <ul style="list-style-type: none"> ----- Route of pipeline Limit of open area excavation Archaeological features 	 <p style="font-size: small; text-align: center;">Reproduced by permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright. All rights reserved. Licence number 100019512</p>
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Figure 4: Open area of monitoring at Low Crosby



	<p>PROJECT: FTS Pipeline on Land Between Linstock and Low Crosby, Cumbria</p> <p>SCALE: 1:75 at A4</p> <p>REPORT No: CP10132/12</p> <p>CLIENT: United Utilities</p> <p>DRAWN BY: AB</p> <p>DATE: June 2012</p> <p>FIGURE: 5</p>	<p>KEY:</p> <p>(101) Context number</p> <p>Section location</p> <p>Limit of excavation</p> <p>Excavated portion</p>	
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Figure 5: Archaeological features; northern part of open area



WA Archaeology Ltd
2012

PROJECT: FTS Pipeline on Land Between Linstock and Low Crosby, Cumbria
 SCALE: 1:75 at A4
 REPORT No: CP10132/12
 CLIENT: United Utilities
 DRAWN BY: AB
 DATE: June 2012
 FIGURE: 6

KEY:

- (101) Context number
- Section location
- Limit of excavation
- Excavated portion



Figure 6: Archaeological features; southern part of open area

FTS Pipeline on Land Between
Linstock and Low Crosby,
Cumbria

CLIENT:

United Utilities

SCALE:

1:25 at A3




DRAWN BY:

AB

DATE:

June 2012

KEY:

-  Height mAOD
-  Context number
-  Limit of excavation

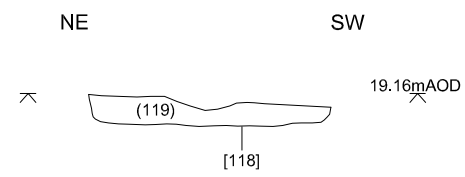


REPORT No:

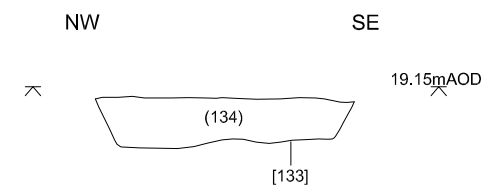
CP10132/12

FIGURE:

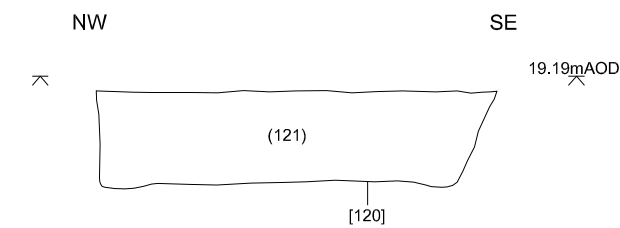
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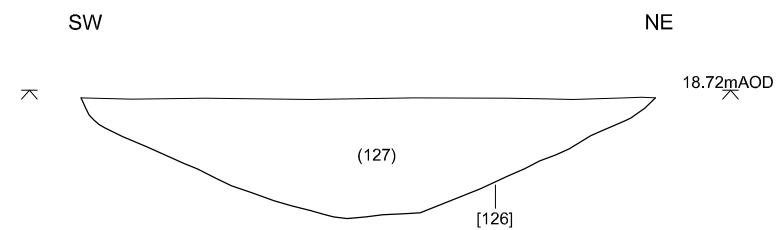
Section 2. North-west facing section across pit [118].



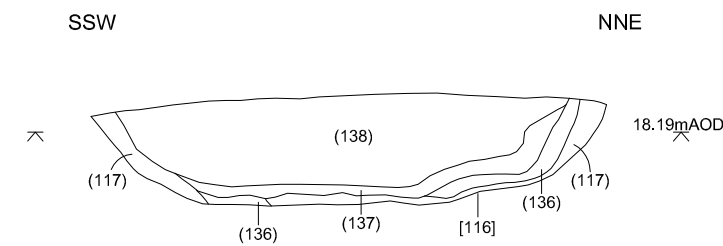
Section 3. South-west facing section across pit [133].



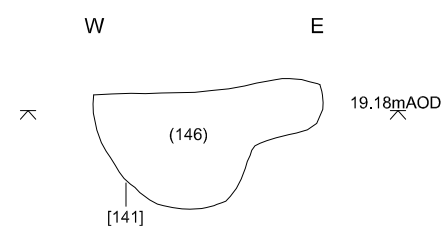
Section 4. South-west facing section across pit [120].



Section 9. South-east facing section across linear [126].



Section 11. SSE facing section across kiln [116].



Section 12. South facing section across curvilinear [141].



Section 13. North-west facing section across (139).

Figure 7: Sections through features in open area of monitoring (1)

CLIENT:

United Utilities

SCALE:

1:25 at A3




DRAWN BY:

AB

DATE:

June 2012

KEY:

 Height mAOD
 Context number
 Limit of excavation

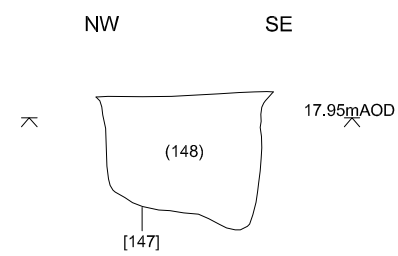


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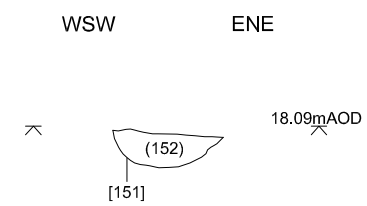
CP10132/12

FIGURE:

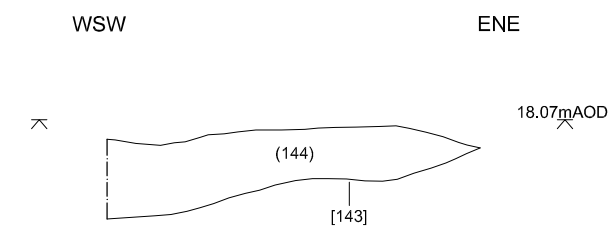
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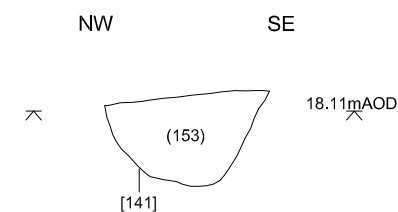
Section 14. South-west facing section across pit [147].



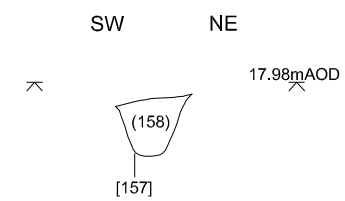
Section 15. SSE facing section across [152].



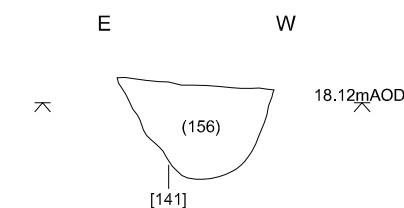
Section 16. SSE facing section across ditch [143].



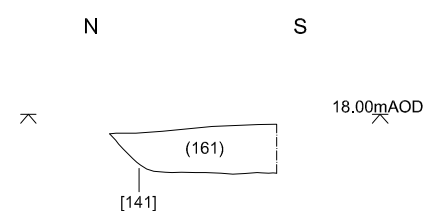
Section 18. South-west facing section across curvilinear [141].



Section 19. South-east facing section across pit [157].



Section 20. North facing section across curvilinear [141].



Section 22. West facing section at terminus of curvilinear [141].



Section 24. North-west facing section across (139).