Excavations at Whirlow Hall Farm, Sheffield

Volunteers excavating the Roman layers in Trench 1.

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THE TIME TRAVELLERS

Excavation at Whirlow Hall Farm, Sheffield

ARS Ltd Report 2017/54

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EXECUTIVE SUMMARY

Project Name: Excavation at Whirlow Hall Farm, Sheffield
Site Code: WHIR'11, WHIR'16
Superficial Geology: Carboniferous Rough Rock Sandstone
NGR: SK 31500 82950
Dates of Fieldwork: July-August 2011, June-July 2016
Date of this Report: April 2017

An exploratory excavation took place over a large late Iron Age – Roman period rectilinear enclosure identified by geophysical survey at Whirlow Hall Farm during July-August 2011, with a second phase of excavations in June-July 2016. Two trenches were excavated in 2011; Trench 1 was located over the west entrance of the rectilinear enclosure and Trench 2 was located over the parallel flanking ditches of a trackway leading to the east entrance of the enclosure. The 2016 excavation expanded Trench 1 and completed its excavation and also opened Trench 3 within the north-west edge of the enclosure and Trench 4 on a geophysical anomaly beyond the enclosure on its north side. A further exploratory excavation took place higher up on the Whirlow Hall Farm estate on an area of plateau on top of Bole Hill where Trench 5 targeted a square double ditch-defined site identified by geophysical survey, and which on the basis of the work reported here is interpreted as the remains of a Roman signal station.

Residual Mesolithic flints were recovered from the topsoil and Iron Age and Roman features within Trenches 1, 3 and 5, evidently resulting from an earlier phase of activity on the site.

The Iron Age phase is represented by the construction of the first phase of the enclosure perimeter ditch and possibly some internal pit features, although the latter remain undated by scientific means. A radiocarbon date from the primary fill of the enclosure ditch indicated occupation sometime between 358 – 94 cal BC (95.4% probability).

The enclosure was remodelled during the early Roman period shortly after the Cerialan advance into Brigantia in the late 1st or early 2nd Century AD. This was evidenced by the remains of a sealed pit containing early Romano-British shell-tempered ware pottery with in situ burning that was dated to 55 – 219 cal AD (95.4% probability), and probably 67 – 136 cal AD (68.2% probability). During this same period the perimeter ditch appears to have been remodelled after an attempt had been made, but then abandoned, to dig a new ditch on the western side of the enclosure that would have made the enclosure slightly smaller. After encountering bedrock close to the surface this ditch was abandoned and the original perimeter ditch was utilised and remodelled instead, with a drystone wall lining its inner side and extending above ground level for what can be estimated as around 0.5m. The abandoned ditch was infilled with earth and upcast and this fill contained occasional Roman pottery sherds. A rectangular stone-founded building was then constructed over the infilled abandoned ditch and the entrance area of the enclosure leading up to the building and the ground abutting the

new perimeter stone wall were covered with rammed stone chippings to create a metalled surface. This hardstanding also contained occasional fragments of Roman ceramics throughout. It had been patched and probably resurfaced on several occasions. A stone packed post hole was set in the centre of the entrance behind the construction slot with the metalling have been laid up to it and this feature must have functioned as part of the timber gateway arrangement.

Earlier pits cut into the sandstone brash were identified below the metalled surface and these could therefore be of late Iron Age or early Roman date. It is notable that what appears to be a circular stone support block was found in the upper fill of the perimeter ditch suggesting Roman-looking buildings with perhaps timber or stone porticos. A single cubed piece of possible tessera hints at the possibility of a mosaic having been present, but more fragments are required before this can be certain. The structural form of the Roman phase enclosure reveals a clear desire by its inhabitants to remove any trace of Iron Age structural forms and to reconstruct this site in an overtly Roman form. This demonstrates not just the intentional stamping of Roman authority on a former large Brigantian enclosure, but also that the inhabitants were 'being' Roman and being seen to 'be' Roman. This would have served to 1) deliver a statement of dominance, 2) provide familiarity and reassurance to its new occupants, 3) parade Roman culture in full view of the Brigantian population, and perhaps most importantly 4) remove frontier enclosures from Brigantian control and utilise them in the supply of the Roman military.

The occupants of the Roman phase enclosure had access to a wide range of Roman ceramics as well as glass, and they also appear to have been undertaking some metalworking on the site. Evidence for industrial activity within the area of the enclosure is represented by in-situ burning within two shallow ditches. Clinker and furnace waste material was recovered in addition to slag from the perimeter ditch fill.

Two further radiocarbon dates, one from a posthole within the enclosure and one from a pit feature with evidence of burning and metalworking situated a few metres beyond the enclosure, produced virtually identical dates with spans from the late 3rd into the 4th century AD. There is no overlap between the earliest Roman period date and these later dates hinting at either two phases of occupation during the Roman period, or more likely, broadly continuous occupation but with more dates needed that would otherwise fill in the intervening years. A further date was associated with the entrance causeway construction slot, believed to have held a rectangular timber sleeper beam, but was backfilled after the timber had been extracted and filled with earth and a considerable quantity of broken ceramic debris. This fill produced a date of 225-385 cal AD (95.4% probability) and probably 247 – 332 cal AD (68.2% probability), suggesting the site was abandoned probably in the late 3rd or early 4th century AD when the site was systematically levelled and the timbers extracted and the ditches infilled.

Located c.950m northwest of the enclosure in a more elevated location at 309m OD on an area of plateau known as 'Bole Hill', a small square double 'ditched' feature was identified by the 2016 geophysical survey. Evaluation excavation over the eastern side of the enclosure revealed two construction trenches, both of which contained central

slots and stone packing indicating that they had held timber uprights. Indicative of a small 'box rampart' samples from one of the construction slots provided two radiocarbon dates on single entity charred hazel wood, both of which were statistically consistent, dating the site to the late 1st – early 2nd century cal AD. A subsequent geophysical survey of the site has revealed what appear to be several large postholes set in a square filling up much of the interior of the enclosure, and these are considered to represent the presence of a timber tower. This evidence, together with its position in the landscape with huge vistas, including a direct view towards Templeborough Roman fortand being on the line of the recently identified Roman road (Inglis pers comm.) are consistent with this feature being a Roman signal station built during, or shortly after, the Roman advance into Brigantia. With both the signal station and the Romanised enclosure being of post-Cerialan date and being located on the immediate north side of the steeply sloping Limb Valley ('limb' being Anglo-Saxon for 'limit' and this being widely recognised as part of the boundary between Northumbria and Mercia, albeit one subject to some flux), they are considered likely to have been situated along the north side of what had been the boundary between the Roman Empire and Brigantia and which may have continued as an internal frontier within the empire. This potential frontier also, quite evidently, formed a firtified and monitored cross-Pennine route linking Templeborough and the Humber in the east with Chester in the west with Whirlow providing evidence for surveillance on the route out of the Peak District orefield towards teh river Don at Templeborough. Consequently, these sites are important for throwing some light on one of Britain's forgotten frontiers and the impact on that frontier once the Roman invasion of Brigantia was underway. Both these sites are located in proximal to the Roman road (its precise course is still debated but a new discovery by David Inglis of Sheffield University of what appears to be a section of Roman road suggests it runs right by the signal station) that linked Templeborough with Navio, and as such can be seen to form part of an early Roman cross-Pennine system that included forts, signal stations, roads and supply bases.

The 2011 excavation was directed by Archaeological Research Services Ltd (ARS Ltd) on behalf of the Whirlow Hall Farm Trust and the 2016 excavation was directed by ARS Ltd on behalf of The Time Travellers. Together, the excavations involved over 175 volunteers and over 250 primary school children.

1. INTRODUCTION

1.1 Excavations at Whirlow Hall Farm were undertaken as part of a programme of community archaeology investigations into the history of Whirlow Hall Farm. The original 2011 excavations were funded by a Heritage Lottery Grant awarded to the Whirlow Hall Farm Trust. Subsequent excavations in 2016 were funded by a further Heritage Lottery Grant awarded to The Time Travellers. The project comprised a professionally-led programme of training, participation, investigation, learning activities and public engagement. The Whirlow Hall Farm Trust and The Time Travellers invited local schools, community groups, volunteers and visitors to participate in a range of activities to help record the buildings, undertake fieldwalking, geophysical survey, archival research and excavations to discover and record the history of Whirlow Hall Farm. This report provides an integrated account of the excavations from 2011 and 2016.

1.2 The geophysical survey undertaken in April 2011 revealed the truncated and buried remains of a large rectilinear enclosure in 'Hall' field south of the farm buildings. A targeted excavation encompassing the enclosure's west entrance and the outlying double ditched linear feature was undertaken over a three week period in June-August 2011 to gain an understanding of their date and function (Waddington 2012). Subsequent excavations in 2016 expanded the investigation of the enclosure's west entrance (Trench 1) and completed the excavation of this area. In addition Trench 3 was excavated within the north-west edge of the enclosure and Trench 4 was excavated over a geophysical anomaly beyond the enclosure on its north side. A further evaluation trench (Trench 5) was excavated higher up on top of Bole Hill targeting a square double ditch-defined site identified by geophysical survey in 2016 and which is belived to be the remains of a Roman signal station.

Site location

1.3 Whirlow Hall Farm is situated on the edge of Sheffield, South Yorkshire, approximately 8km to the south-west of the city centre (NGR SK 31233 83177) (Figure 1) towards the head of the Sheaf valley and extends to some 55ha. The farm is situated on sloping ground which generally falls from west to east and also from north to south.

1.4 The main enclosure in Hall Field is situated on moderately sloping ground that slopes down from west to east with the lowest point being in the south-east corner of the field. A stream course used to run north-south to this lowest corner of the field from where the current car park is located. In recent years this stream has been culverted and now runs underground. The proximity of this water course was no doubt important in determining the position of the enclosure. Being located on sloping ground the enclosure occupies a dry and free draining position and is sheltered from the prevailing south westerly wind by the lip of the Limb Valley to the west of the enclosure. The slope on which the enclosure sits is south-east facing and enjoys direct sunlight throughout most of the day. Despite being located at 235-240m above Ordnance Datum (OD) the site occupies a locale attractive for settlement and agricultural activity. Although now screened by trees to the east and west and with

views to the north obscured by Whirlow Farm buildings and to the south by a modern housing development, the site would have originally commanded extensive views south over the head of the Sheaf Valley and south-east down the length of the Sheaf Valley towards what is now Sheffield City centre. To the west views would have been limited by undulating and rising ground and to the north the view would have extended for around 500m uphill to the shoulder of the hillside.

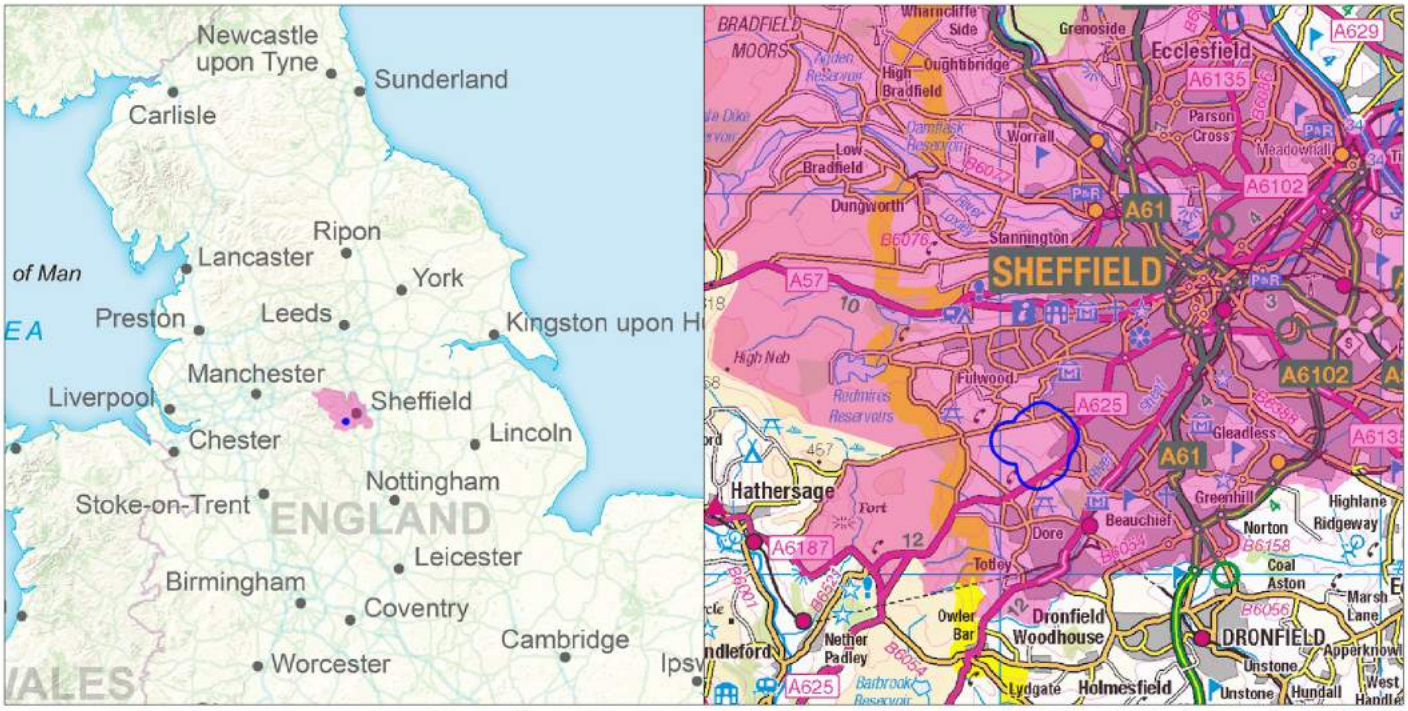
1.5 The second site that was investigated is situated on Bole Hill, just under 1 km north-west of the main enclosure and at a higher altitude of 309m OD (Figures 1 and 2). The site is located on a defined area of plateau with a steep scarp edge that plunges down 50m into the Limb Valley on its south side and which enjoys commanding vistas in all directions, particularly down the Sheaf Valley into what is now Sheffield City Centre and beyond to Meadowhall and then Rotherham where Templeborough Roman fort is located.

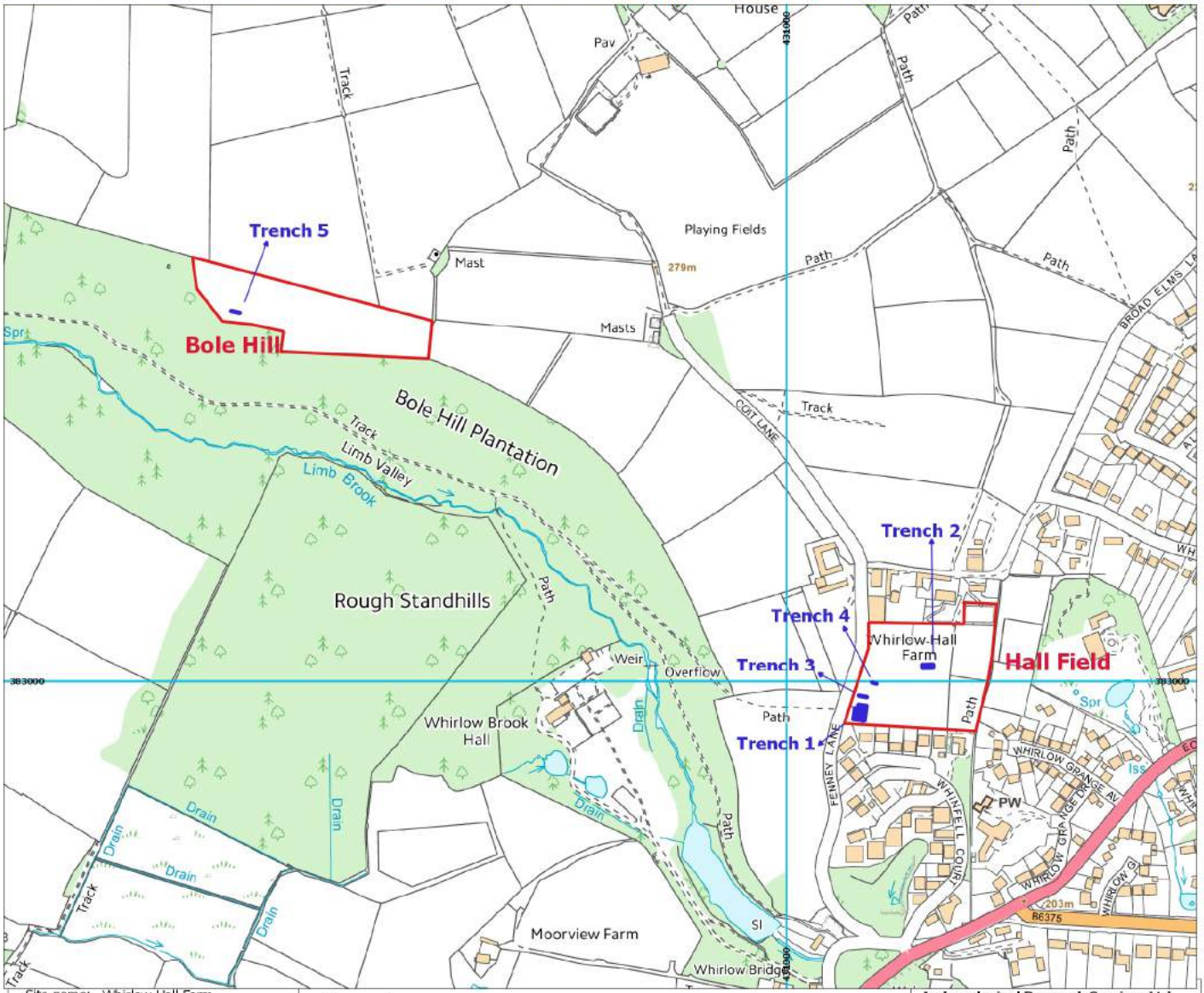
Landform Geology and Soils

1.6 The underlying geology of Hall field and Bole Hill is Carboniferous Rough Rock Sandstone of the Pennine Lower Coal Measures formation. Small fragments of coal were observed during excavations of the archaeological and natural deposits on both excavation sites.

Background

1.7 Prior to the excavations taking place a desk-based assessment (Sheppy 2011a), historic building survey (Eadie 2011), fieldwalking (Sheppy 2011b; Waddington 2016) and geophysical survey (Taylor 2011; Durkin 2016) had been undertaken to help understand the development of the farm and the landscape through time, and to identify areas of archaeological potential and buried archaeological remians.





Site name: Whirlow Hall Farm Date: February 2017 Drawn by: MB Scale: Varies	**Figure 1:** **Site location**	**Archaeological Research Services Ltd** Angel House Portland Square Bakewell Derbyshire DE45 1HB Tel: 01629 814540 www.archaeologicalresearchservices.com
This drawing: © ARS Ltd Contains Ordnance Survey data. © Crown copyright and database right 2015	Field Boundary · Trenches · Sheffield District	

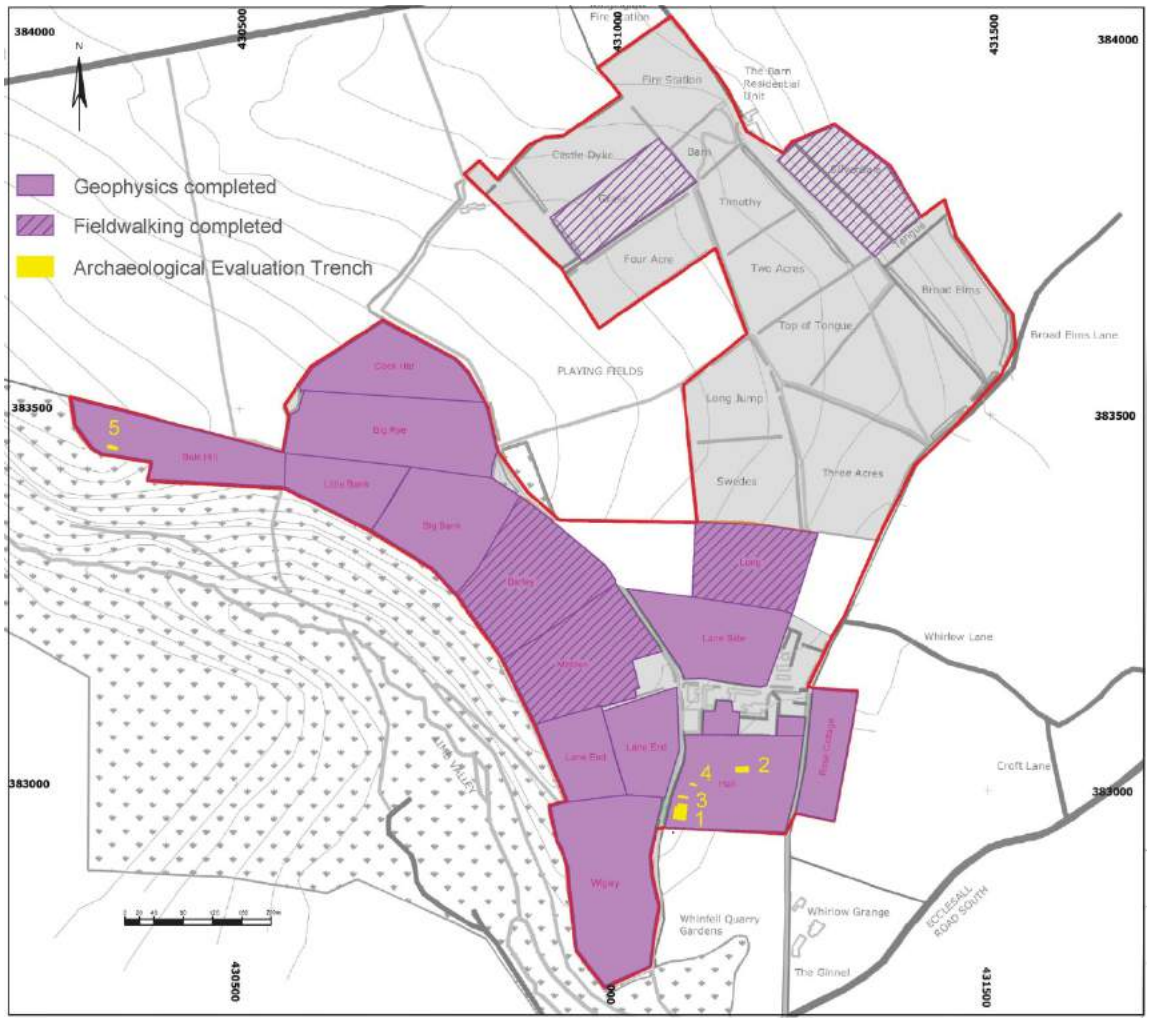


Figure 2. Whirlow Hall Farm estate showing areas surveyed by geophysics, areas fieldwalked and the location of the excavation trenches.

2. METHODS

2.1 Topsoil in Trench 1 during the initial excavation in 2011 was all removed by hand, as was that in Trench 5, whereas in all of the other excavation trenches (Trench 1 extension and Trenches 2, 3 and 4) topsoil was removed using a tracked excavator equipped with a toothless ditching bucket under continuous archaeological supervision. All other excavation was undertaken with hand tools.

2.2 Each identified feature was subject to full or sample excavation and recording, including the collection of artefacts, samples suitable for radiocarbon dating and environmental sampling. All features were recoded using pro-forma record sheets and were photographed using digital, black and white film and colour slide photography. All features were drawn at either 1:10 or 1:20 in section and 1:20 or 1:50 in plan. The full methodology is set out in the Written Scheme of Investigation (see Appendix I).

3. EXCAVATION

3.1 Excavations took place in two fields, Hall field and Bole Hill (Figure 2). The main enclosure was located in the south western corner of Hall field with outlying features stretching towards the centre of the field. The enclosure was only partly revealed during the geophysical survey as the perimeter ditch was found to continue south of the field into a housing estate and land not belonging to Whirlow Hall Farm Trust. The buried remains of the enclosure in this area are likely to have been at least partly disturbed during the construction of these houses, but it is likely that pockets of preserved remains survive, particularly in the garden areas.

3.2 Four trenches were excavated in Hall field. Trench 1 was located to target the entrance on the western side of the enclosure and Trench 2 was positioned so as to investigate the double ditched feature that ran in a northerly direction from the north east corner of the enclosure. Trench 3 was positioned further north along the western perimeter ditch and Trench 4 was positioned just outside the north-west corner of the perimeter ditch to target an anomaly identified in the geophysical survey.

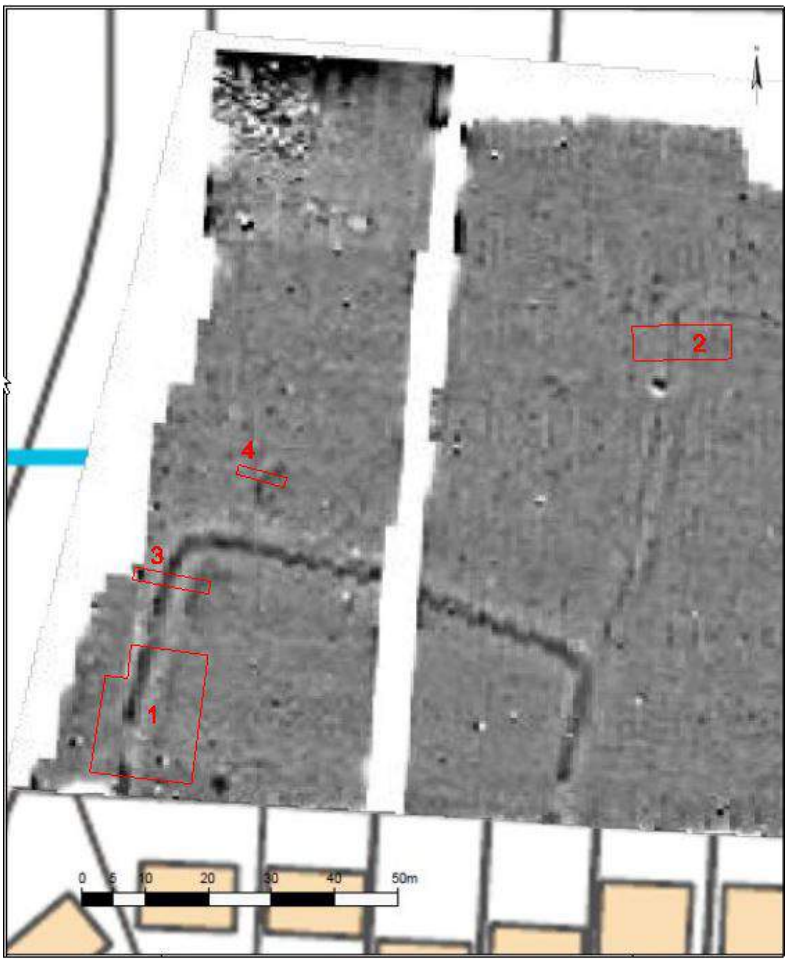


Figure 3.Plan showing the results of the geophysical survey for Hall field and the location of Trenches 1-4. The white band running through the centre of the field and the enclosure is an area of 'no data' due to the presence of a wire fence at the time the field was surveyed.

Earlier Prehistoric Activity (Trenches 1, 3 and 5)

3.3 Although the majority of the activity identified in the main enclosure was Iron Age and Roman in date, some residual material was present from earlier periods in the form of chipped stone tools. A total of 19 lithics were recovered during the excavations, which are described in full in the Lithic section below. The various chipped lithics were primarily of Mesolithic date, in keeping with the significant evidence for Mesolithic activity identified during the fieldwalking survey elsewhere around the farm. Although some were unstratified, many of the lithics were recovered from Iron Age and Roman features where they represent residual material belonging to an earlier phase of activity on the site that had become incorporated into the later deposits as a consequence of the ditch-digging and disturbance to the ground that took place when the Iron Age and Roman settlement was occupied.

Enclosure (Trenches 1 and 3)

3.4 Trench 1 originally measured 15m by 15m, and was extended further to the north in 2016 so that its final dimensions were 15m by 20m. It was located over the west entrance area and took in part of the internal area of the enclosure immediately inside this entrance. The turf and topsoil (001) averaged 0.15m in depth across the site, although in some places it was deeper and comprised a very dark brown sandy silt which contained pieces of coal, slag and occasional sandstone. Below the topsoil a compacted subsoil (002) survived across much of the site that was a dark brown sandy silt and ranged from 0.11m to 0.16m in thickness. Both of these layers contained fragments of metalworking debris in the form of coal, slag and a variety of lead, copper alloy and iron objects found by metal detectoring, together with abundant broken clay pipe, glass and post-medieval pottery. With the exception of the metalworking debris, the rest of the unstratified material is interpreted primarily as having arrived on the site as part of post-medieval farming and midden spreading on the field to improve drainage and fertility and to dispose of waste material.

3.5 Trench 3 measured 14m by 2.25m and was positioned along the western perimeter ditch to investigate the ditch and an anomaly on the geophysical survey just inside the perimeter ditch. The topsoil (001) and subsoil (002) had the same thicknesses as Trench 1, and contained similar fragments of broken clay pipe and post-medieval pottery.

Late Iron Age (Figure 10)

3.5 The enclosure appears to have been constructed in the late Iron Age comprising the digging of the perimeter ditch together with internal features, all sealed below the Roman layers. The Late Iron Age remains consist specifically of the original perimeter ditch cut and its primary fill and possibly some of the pit features (e.g. F048; F045), as yet undated, located beneath the Roman metalled surface within the enclosure.

3.6 Two sections were initially excavated across the enclosure ditch: one was placed over the northern ditch segment and one was placed over the southern ditch segment.

The section over the northern ditch segment initially measured 2m wide and extended over the full width of the ditch which averaged 3.1m wide in this area at the start of the archaeological horizon. The ditch had a maximum depth of 1m from the top of the archaeological horizon and was cut through the natural sandstone brash layer and into the solid bedrock at its base. This section revealed two phases of ditch use, a primary Iron Age phase followed by a Roman phase. The original Iron Age ditch, which was the ditch at its largest, had a wide v-shaped profile with a narrow flat base. The primary ditch silt (021) consisted of a shallow layer of damp sandy silt, dark yellow brown in colour, with small angular shattered sandstone inclusions. This fill is likely to date closely with the initial construction of the enclosure. A single entity fragment of the short-lived species hazel from this basal fill was submitted for radiocarbon dating and this produced a date of 2155±30 BP (SUERC-36826), which calibrates to 358 – 94 cal BC (95.4% probability) and probably 350 – 121 cal BC (68.2% probability) (see also Radiocarbon Dating section below). It is possible that this sample is from residual material that was already old when it became incorporated into the fill of the ditch. However, it is considered more likely that this date does relate to the initial phase of the ditch as not only was this layer sealed, but it was remarkable in that it did not contain any Roman ceramics whilst the upper fill contained Roman pottery in abundance. The perimeter ditch was clearly remodelled in the Roman period with the addition of a stone wall along the inner side of the ditch, the base of which sat directly on part of the earlier, primary fill. Therefore, there is clear stratigraphic evidence for the primary fill pre-dating the Roman occupation of the enclosure. Together with the radiocarbon determination this suggests that the original enclosure was of Late Iron Age date. The Late Iron Age date means the determination falls on a calibration 'plateau' which explains why it has such a large date range.

Figure 4. Excavation of the initial section across the northern segment of the enclosure ditch showing the original cut for the first phase ditch (scale = 0.5m graduations).

3.7 The southern perimeter ditch segment (F003) contained traces of an earlier primary fill but it was not as distinct as in the northern ditch segment, with this fill being particularly stony and disturbed from where the Roman period stone wall had been inserted along the inner edge and up to the ditch terminus before being pushed or tumbled and mixed with the soil fill (Figure 5). This fill contained Roman pottery similar to that in the upper fill of the northern ditch segment together with metalworking debris.

Figure 5. North facing section of ditch (F009), looking south (scale = 0.5m graduations).

Figure 6. Post-excavation view of irregular pit F045 with stone packing (scale = 0.5m graduations).

3.8 Irregular pit F045, identified 0.3m north-west of pit F045 measured 0.74m long by 0.38m wide, and 0.16m in depth and was filled by a mid-brown (5YR 4/6) sandy silt (Figure 6). The pit was packed around the edges with flat sandstone slabs. No finds were recovered from the pit, however three cereal grains were recovered from a bulk soil sample which evidences the presence of cereal crops on the site, though there is insufficient to suggest the pit might have been some kind of grain storage pit. It is not clear whether this pit is of Late Iron Age or Roman date and could therefore belong to either phase. It was, however, sealed below the upper payer of metalling which suggests that even if it is of Roman date then it is more likely to be early Roman and of similar date to pit (018).

Figure 7. Half-section view of steep-sided pit F048 (scale = 0.5m graduations).

Figure 8. View of pit F048 after full excavation showing the horizontal sandstone slab positioned in the centre of the pit at its base (scale = 0.25m).

3.9 A vertical-sided, flat-bottomed sub-circular pit (F048) measuring 1m long, by

0.9m wide and 0.31m in depth was situated south of pit (F045) and 0.2m south-west of oval pit F018 (Figures 7 and 8). The pit was cut into the natural sandstone brash and filled by a mid-dark brown silty sand. A large flat slab of sandstone was found within the pit, laid horizontally at the base of the pit at its centre, although no other finds were recovered. This pit was sealed by the upper layer of Roman metalling (005), and was located on the eastern side of the entrance causeway in close proximity to pits F018 and F045 and is likely to be of similar date.

3.10 On the eastern side of the causeway, north of the cluster of three pits was a shallow, oval pit feature (F053) which was also located below and near the northern edge of the Roman metalled surface (005) (Figure 10). This pit measured 1.43 long, by 0.87m wide and 0.2m in depth, and was filled by small pieces of angular sandstone set in a mid-brown clayey sand. The pit was shallow with an irregular base cut into the natural sandstone brash. The pit produced no finds, but given its stratigraphic position and location near the other pits, this feature is also considered likely to date to the Late Iron Age or early Roman period.

Figure 9. Half-section view of shallow irregular pit feature (F053) (scale = 0.5m graduations).

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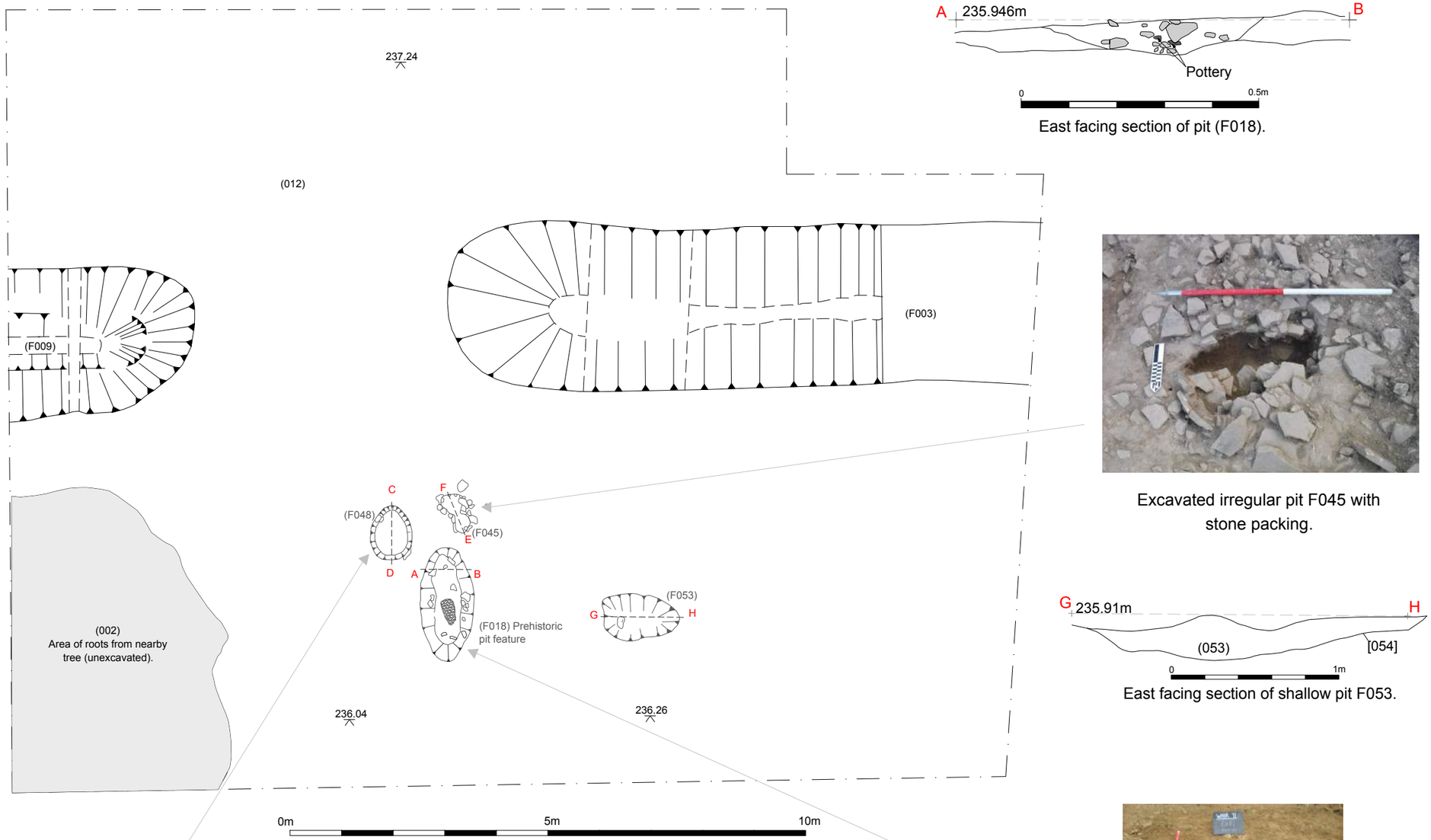
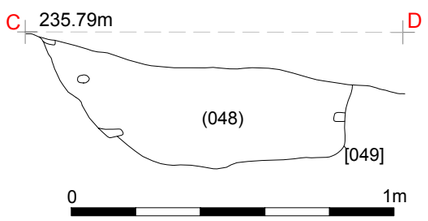


East facing section of pit (F018).

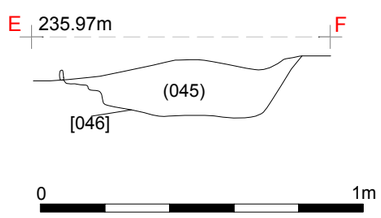
Excavated irregular pit F045 with stone packing.

East facing section of shallow pit F053.

Excavated pit (048).



South facing section of pit F048.



North facing section of stone lined posthole F045.

Excavated pit F018 (scale = 0.5m graduations).

Figure 10. Trench 1 plan showing Iron Age and possible Iron Age period features

Key:

Late Iron Age or early Roman feature

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Roman Phase (Figures 11 – 30)

3.11 The Roman phase of the enclosure consisted of markedly different structural features than the Iron Age remains below with abundant Roman pottery present in all features. The Roman metalling (F005) sealed Iron Age features below it and the second-phase of the perimeter ditch was quite marked as a drystone wall (F011) had been inserted along the inner edge of the ditch. The stone-founded building (F006) had Roman pottery within its floor area (023) and the Roman metalling respected it (Figure 14). An attempt at a new line of perimeter ditch (F057) was started at the beginning of the Roman phase, then abandoned and filled in and the stone-founded building built on top of it. Roman pottery sherds were present in the fill of the abandoned perimeter ditch in both of Trenches 1 and 3. Other Roman features included a construction slot (F026) cut across the entrance causeway and linking the two perimeter ditch terminals, a stone-packed post hole (F007) in the centre of the entrance area together with other pit features and a posthole. The Roman features were encountered immediately below subsoil layer (002) or cut from the top of the metalled surface, or from a lower level in the metalled surface, prior to later additions of metalling. There are clear stratigraphic phases of Roman occupation surviving in places as noted by the early attempt at a new perimeter ditch that was backfilled and a stone-founded Roman building built over it. There is an early Roman pit (018) with in situ burning that was sealed by the Roman metalling, indicating that the yard inside the enclosure was patched and levelled on multiple occasions with metalling material, which included over earlier Roman features. This sense of long-lived Roman occupation is also borne out by the spread of the radiocarbon dates (see below).

3.12 A shallow ditch (F057) was located beneath the floor (058) of the stone-founded Roman building (023) and below the Roman metalling layer (F005) (Figures 11 and 12). This ditch averaged 2.2m wide and 0.15m in depth where it occurred in Trench 1, and was aligned parallel with the west side of the original Iron Age perimeter ditch. Sections were excavated across it in Trenches 1 and 3 and in both cases it was seen to be shallow and unfinished probably due to encountering solid bedrock at shallow depth here (Figures 11 - 13). Roman ceramics were found in both fills indicating its Roman date and it is interpreted as an attempt to realign the ditch of the enclosure on its west and, possibly north, sides, possibly to reduce the size of the enclosure, but after encountering bedrock at shallow depth a decision was made to fill it back in and remodel the existing Iron Age ditch instead. The geophysics shows that this is a localised length of shallow ditch that does not continue beyond the north-west side of the enclosure. This line of ditch runs north-south paralleling the main enclosure ditch which lies 3.89m to its west. The western side of this shallow ditch attempt (F057) was steep, with a wide flat base and a very gradual eastern side. The ditch had an indistinct southern terminus in Trench 1 broadly in line with the enclosure entrance, and continued beyond the northern edge of Trench 1 into Trench 3 confirming the results from the geophysical survey. The feature was encountered in Trench 3 (where it was initially given a different context number - 044), continuing further to the north parallel with the perimeter ditch. The ditch was better preserved in Trench 3 as it had not been truncated by an overlying stone-founded building. In Trench 3 (Figure 12) the ditch had broadened to become 4.8m in width, although this is probably because here the ditch was intended to turn a corner and track east, but it was never extended far in this

direction before abandonment and backfilling. It measured up to 0.38m in depth with a steep-sided western edge and more gradual eastern edge. The ditch was filled by a mid-grey brown sandy clay with charcoal inclusions. A lens of in situ burnt soil and charcoal (050) was located against the western edge of the ditch in Trench 3, indicating in situ burning, possibly associated with breaking up the bedrock or perhaps even some kind of industrial activity (Figure 12).

Figure 11. Section across shallow ditch (F057) in Trench 1, underlying the stone-founded building (scale = 0.5m graduations).

Figure 12. Section across shallow ditch (F057) in Trench 3 showing lens of burnt soil and charcoal (050) overlying the sandstone bedrock which is also encountered at shallow depth here (scale = 0.5m graduations).

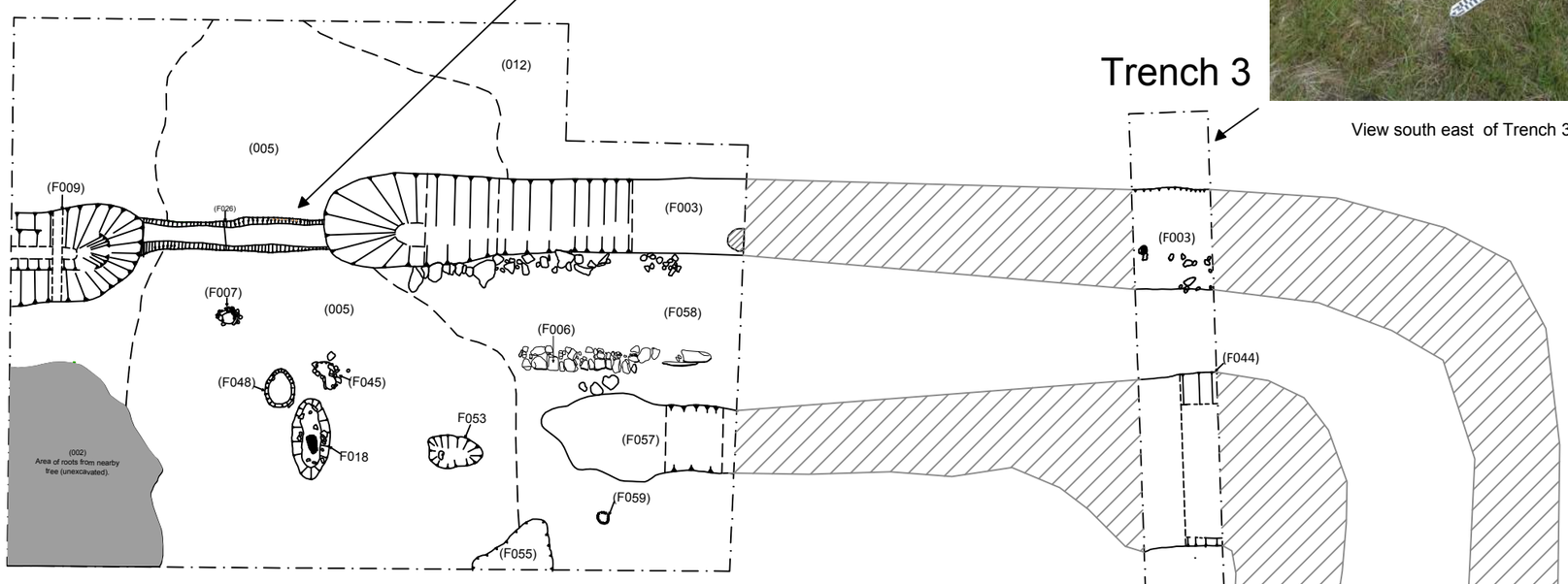
N

Excavated construction slot (026) looking south.

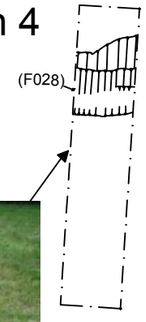
View south east of Trench 3.

Trench 1

Trench 3



Trench 4



View west of Trench 4.

Aerial View of Trench 1.

0m 5m 10m

Figure 13. Plan of Trenches 1, 3, and 4 Scale: 1:170

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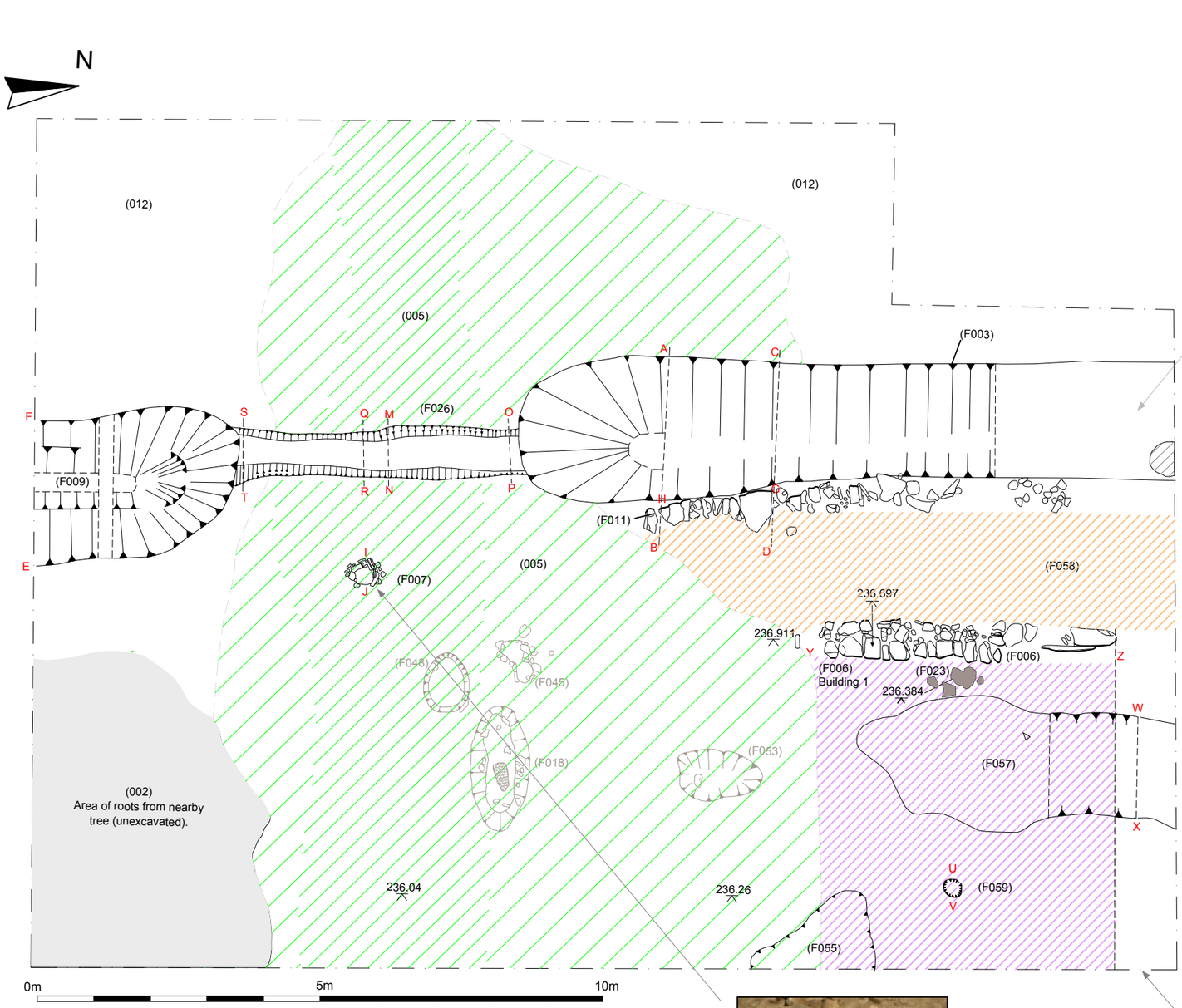
Figure 14. Trench 1 Roman period features
Scale: As shown



View southwest of wall F011

South west view of beathen earth floor surface (023)

Estimated eastern limit of building.

Excavated posthole F007showing flat stone packing

Key:

- Charcoal spread
- Metalled surface (005)
- Heavily compacted metalled surface (005)
- Internal floor surface (023)
- Metalled surface (058)
- Surviving floor surface
- Possible Iron Age features or early Roman below metalled surface

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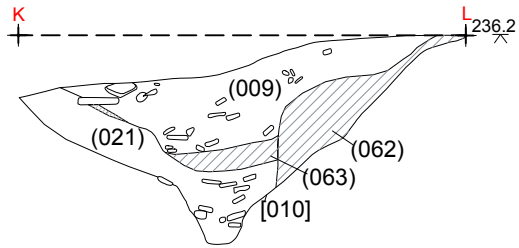
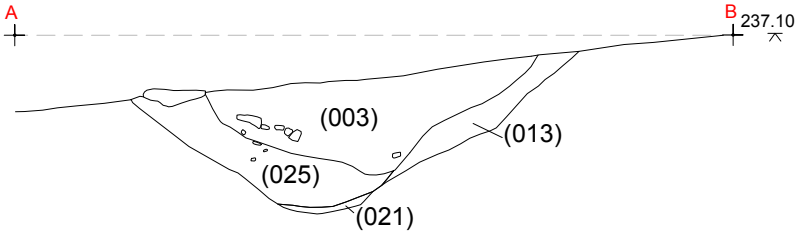
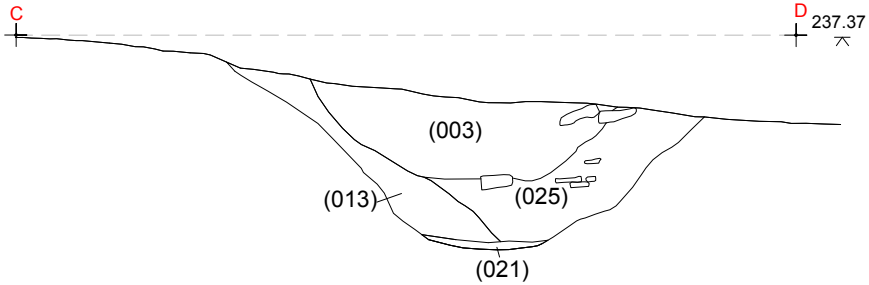


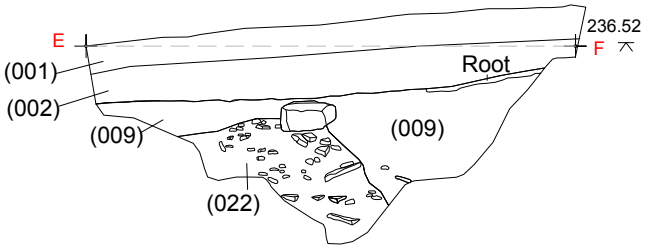
North facing section of perimeter ditch F009.



North facing section of perimeter ditch F003



South facing section of outer perimeter ditch F003



South facing section of perimeter ditch F009.

West facing section of inner revetment wall (011) in perimeter ditch F003.

East facing section of Building 1 F006

Figure 15. Trench 1 Roman feature sections.
Scale: As shown

Use in reference with Figure 14

Key:

Height aOD (m)

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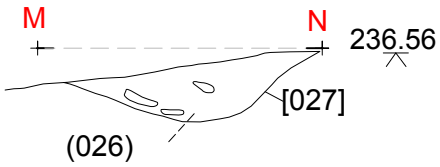
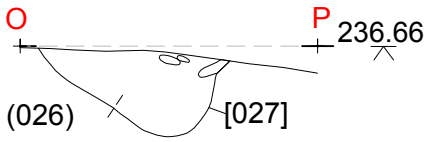
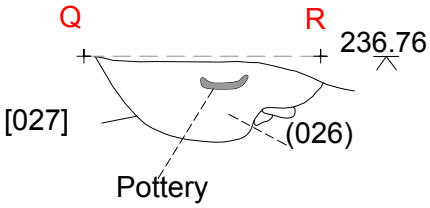


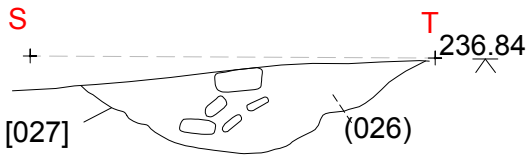
North facing section of construction slot F026 (slot 2)



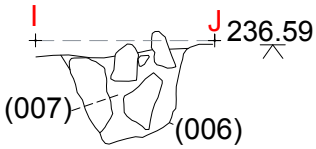
South facing section of construction slot F026 (slot 2)



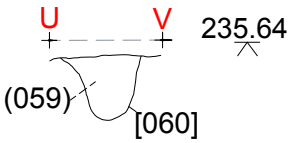
South facing section of construction slot F026 (slot 1)



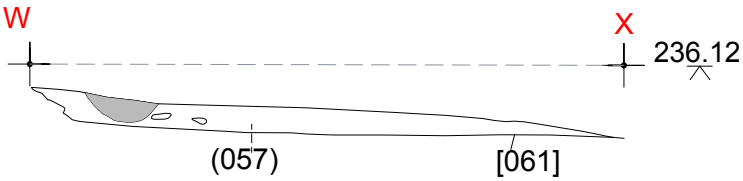
North facing section of construction slot F026 (slot 1)



South facing section of posthole (F007)



North facing section of posthole F059



South facing section of shallow ditch (F057)

Figure 16. Trench 1 Roman feature sections.
Scale: As shown.

Use in reference to Figure 14.

Key:

Height aOD (m)

Charcoal

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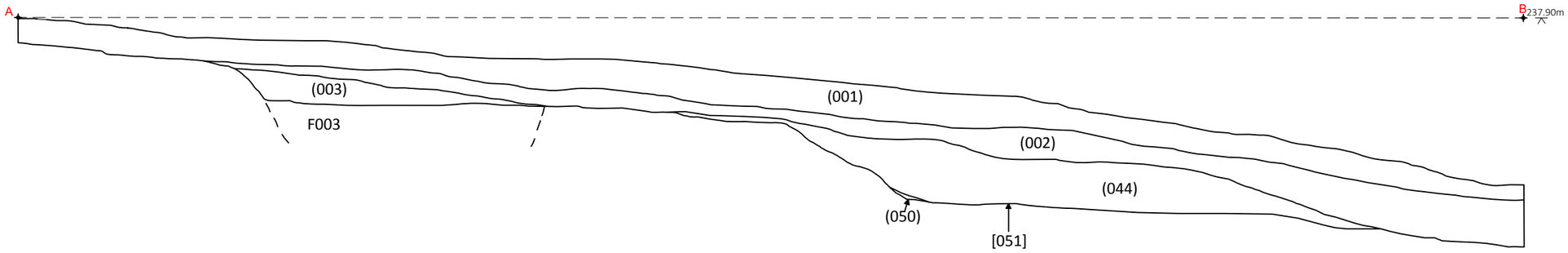
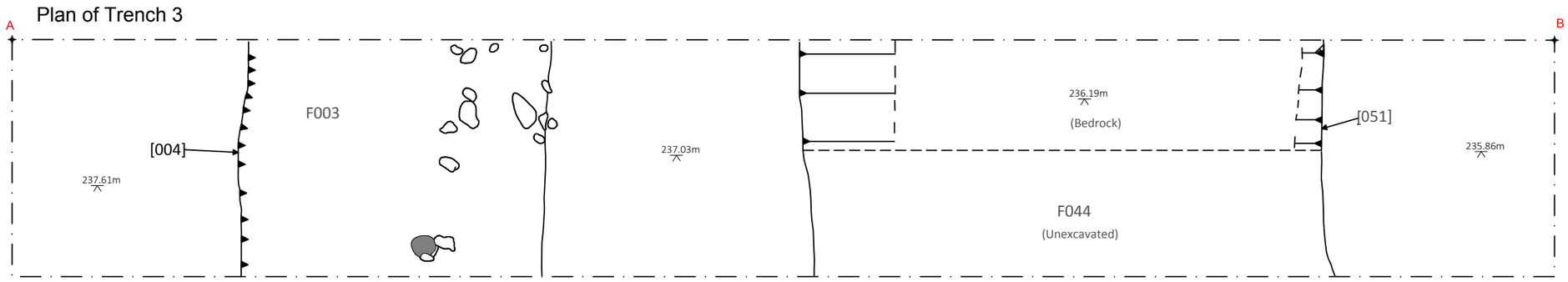
Figure 17. Roman phase in Trench 3
Scale: As shown

South facing section of Trench 3



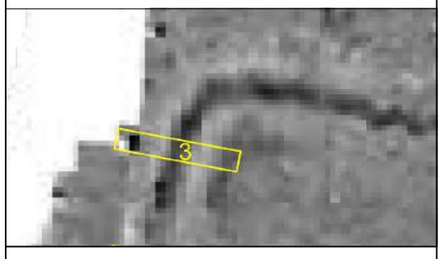
Plan of Trench 3



Key:

Height aOD (m)

Quern stone



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3.13 Within Trench 1 the causeway across the perimeter ditch was defined by the pre-existing northern (F003) and southern (F009) terminals of the perimeter ditch although. During the Roman period, the entrance appears to have been modified by the insertion of a rectangular-sectioned construction slot cut across the centre-line of the causeway (F026) so as to run from one ditch terminal to the other (Figure 19). The construction slot (F026) (Figure 18) was steep-sided and flat-bottomed, measuring 4.5m in length by 0.6-0.9m wide and with a depth of 0.2-0.3m. It is thought to have held a timber sleeper beam buried below ground level which would have had upright timbers attached to it. The sleeper beam is likely to have been shaped and morticed so as to tie into each of the timber uprights to help give them stability and tie the whole gateway arrangement together. Further angled supporting timbers are likely to have given the timber uprights lateral stability but the evidence for such timbers has long since perished. It is not clear from the stratigraphy when the construction slot was built but the associated radiocarbon date of 225-385 cal AD (95.4% probability) and probably 247-332 cal AD (68.2% probability) (SUERC-70711) indicates that it may have formed a later rebuilding of the gateway. The ditch terminals also produced evidence for having held timber uprights at some point but whether these date to the Iron Age phase of the enclosure or to an earlier Roman phase it is not possible to establish.

Figure 18. Section excavated across the construction slot (F026). A roman pot sherd base is visible in the section (scales = 0.5m graduations).

Figure 19. Aerial photograph showing the construction slot (F026) and perimeter ditch termini after excavation (west is towards the top of the picture).

3.14 A substantial stone-packed post hole (F007) was built in the approximate centre of the entranceway set behind the construction slot and its spatial position indicates it is associated with the gateway arrangement (Figures 19 and 20). The space for the post measured 0.2m by 0.34m with a depth of 0.4m from the start of the archaeological horizon. The packing stones that defined the edge of the feature were flat sandstone slabs that had been arranged vertically. The fill (007) consisted of a compacted, fine sandy silt which was dark yellowish brown in colour and was found to contain fragments of coal and sandstone. The base of the post hole had been carefully made with two flat stones and maybe this post formed a central upright. When the sleeper beam was extracted from the construction slot (F026) when the site was abandoned the void was backfilled with soil and, particularly in the central and southern part of the slot, with significant quantities of broken Roman pottery.

Figure 20. Pre- and post-excavation views of post hole (007).

3.15 A low drystone wall (F011) was built on top of the basal silts of the Iron Age ditch on the inner side of the perimeter ditch during the Roman period. This wall averaged 0.6m wide and in places survived up to 5 courses, although given the quantity of stone that had been pushed into the upper ditch fill when the site was abandoned this suggests the stone wall was originally perhaps a metre high above ground adding to the depth of the ditch, which at this time would have been *c*.1m deep. When viewed from the outside this would give the appearance of a wall not much less than 2m in height, giving a sense of status to the site as well as making an effective barrier to livestock. The stone used for the wall was mostly thin, rough blocks of local sandstone with minimal dressing. The stone revetment wall was observed to run continuously along the inner side of the ditch and could be traced all across Trench 1 as well as in Trench 3. Although the walling had collapsed in the small section of ditch excavated at the southern ditch terminal in Trench 1, the large quantity of rough sandstone blocks found within the fill (Figure 22), indicates that the stone revetment wall was also present here. The wall was narrow and evidently not of any great height. The function of this wall is not likely to be for defensive purposes, but is rather best conceived of as an effective and practical wall which would have provided a visually impressive façade to the enclosure and an effective barrier to livestock gaining access, but it would have also served to physically demarcate the edge of the ditch within the enclosure, and thereby stop people/animals falling in. The scale of both the ditch and the wall indicate that the enclosure perimeter was never intended to be defensive. Instead it seems to have served as a settlement boundary, yet one sufficient to prevent unwanted access by livestock and perhaps other animals.

Figure 21. Excavation of the initial section across the northern segment of the enclosure ditch showing the phase 2 fill, and the top of the sandstone walling (011) on the inner edge (right hand side) of the ditch (scale = 0.5m graduations).

3.16 The upper ditch fill (003) of the northern ditch segment in Trench 1 comprised loosely compacted fine silt that was a rich dark reddish brown colour with small angular sandstone inclusions. The fill abutted and overlay the low revetment wall (F011) and also directly overlay the earlier fills (025) and (013) (Figures 21-23). Within this upper fill on its eastern side were tumbled flat sandstone slabs which had come from the upper courses of the revetment wall. Their presence suggests that the wall could have been deliberately pushed in as part of the intentional levelling of the site. It remains inconclusive whether the site was intentionally levelled on abandonment but the single and homogenous final fill of the ditch with what appears to be pushed-in wall material suggests this could have been the case. Roman pottery recovered from the upper fill (grey ware, black burnished ware, Derbyshire ware, shell-tempered ware and possible Mancetter-Hartshill fabric), some of which has been dated to the late 2nd – 3rd century AD, and the Derbyshire ware that was in use from the late 2nd to mid 4th centuries (see Pottery section below) suggests that the ditch was not finally backfilled until sometime in the later Roman period, probably in the late 3rd – early 4th century AD. Thus, the ceramic dating of the ditch infilling, together with the radiocarbon date from the backfill of the entrance causeway construction slot, both date to the later 3rd – early 4th century cal AD (see below), and indicate that the enclosure was abandoned at some point during this time.

Figure 22.Tumbled sandstone slabs within the upper ditch fill of the northern terminus (003) exposed during excavation (scale = 0.5m graduations).

Figure 23. The northern ditch section (F003) in Trench 1 under excavation showing the lower Iron Age fill (020) and upper Roman fill (003). The stone revetment wall is shown to the right, with tumble from the wall visible in the Roman fill of the ditch. The continuation of the stone revetment wall and tumbled stone can be seen in the background (scale = 0.5m graduations).

3.17 The section excavated at the southern terminus of the perimeter ditch (F009) in Trench 1 was positioned against the south baulk of the trench (Figure 24). It was excavated across the full width of the ditch and that, like the northern ditch section, measured 3m across. The ditch had a maximum depth of 1.11m from the start of the archaeological horizon, suggesting that when cut from the original ground surface the ditch would have been in the order of 1.5m deep. The base of the ditch was reached and a very stony fill was noted in the centre and east (inner) edge of the ditch providing evidence for a tumbled section of wall similar to that identified in the northern terminus. The stony material consisted of slabs of local sandstone throughout the ditch fills (022 and 009). The sediment of the lower ditch fill (022) comprised a brown sandy silt that had a maximum thickness of 0.8m. Above this earlier fill was the upper ditch fill (009). The upper ditch fill was almost identical to the upper ditch fill in the northern perimeter ditch terminus comprising a brown, medium textured sandy silt. Again, as with the upper ditch fill in the northern terminus, this fill contained Roman pottery that included oxidised fabric and shell-tempered ware (see Pottery section below).

Figure 24. North-facing section of ditch (F009), looking south.

3.18 A cluster of three pits (F018, F045 and F048) was identified sealed below the Roman metalling layer (F005) positioned within the enclosure and set back a few metres from the west entrance causeway (Figure 14). Pits F045 and F048 have been discussed earlier as it is possible they could relate equally to the Iron Age phase of the enclosure or the Roman period, but without recourse to radiocarbon dating this will not be able to be established. F018, however, was an elongated pit measuring 2.25m long by 1.1m wide and 0.2m deep (Figures 25 and 26). It was largely filled with small sandstone slabs set within a brown sandy silt. Many of the stones in the centre of the pit were fire-reddened and the sides and base of some of the pit also showed evidence of having been burnt. This indicates that either *in situ* burning took place or that very hot stones had been placed in the pit. The pit fill also contained a substantial assemblage of shell-tempered ware pottery (see Pottery section below). Small fragments of charcoal were recovered from the pit fill which included small fragments of hazel, oak and *prunus* (cherry tree family) charcoal (see also Palaeoenvironmental Analysis section below). A single entity fragment of the short-lived specie hazel was submitted for radiocarbon dating and this produced a date of 1890± 30 BP (SUERC-36830), which calibrates to AD 55 - 219 (95.4% probability), and probably AD 67 – 136 (68.2% probability) (see also Radiocarbon Dating section below), placing it in the early Roman period shortly after the Roman advance north into Brigantia.

Figure 25. View of the stone-filled pit (F018) with pink (burnt) stones in its fill emerging below the metalling layer (012), looking west

Figure 26. Post-excavation view of pit (F018) looking west

3.19 Part of an irregular shaped pit (F055) was located below the metalling surface (005) on the eastern edge of the trench extending beyond the limit of excavation in an easterly direction (Figure 27). The gradually sloping flat based shallow depression measured 1.38m in length (east-west) before running into the baulk, by 2.19m wide with a depth of 0.03m. Three sherds of fine oxidised fabric pottery were recovered from the fill suggesting an early 2nd century AD date for this feature.

Figure 27. Half-section view of shallow pit feature (F055).

3.20 A small posthole (F059) was located beneath the Roman metalled surface in the north-east corner of Trench 1 (Figure 28). Measuring 0.28m in length, by 0.31 wide and was 0.22m in depth. It was filled by a mid-brown silty sand which contained two small sherds of Derbyshire ware. The function of this posthole was unclear given its small size and isolation, although it could relate to a building which lies mostly beyond the limit of excavation. A single entity fragment of charred hazel was recovered from the fill and this produced a radiocarbon date of 238-385 cal AD (95.4% probability), and probably 251-339 cal AD (68.2% probability) (SUERC-70718), placing this feature in the late Roman period.

Figure 28. Post-excavation view of posthole F059 looking west (scale = 0.25m).

3.21 A stone-founded building (F006) was constructed during the Roman phase of the site, although it was constructed later than the early Roman attempt to re-model the perimeter ditch alignment as it was placed directly over this infilled ditch (F057) (Figures 29 - 30). Being on sloping ground, the ground had been dug back into the hillside to create a level terrace for the stone foundation wall to be laid. The outer edge was ragged as it had been built up against the natural sandstone brash into which the terrace for the wall had been cut, but the edge of the wall facing into the building had been constructed with a neat, straight edge. The wall was of dry stone construction and had been carefully made. Its solid construction of predominantly local sandstone represents a considerable investment of labour. Some of the stone was partially dressed and the wall averaged 0.57m wide and had stood to a height of 0.29m, averaging two - three courses depending on the size of the stone blocks, and the surviving length of the wall was 4.54m. It had been constructed to provide a flat top upon which a timber building would have been constructed. The wall is likely to have carried a sill beam upon which the timber uprights of the building would have been attached. The end of the building was identified at the northern end of the wall but its limit at the southern end could not be identified with certainty due to truncation from ploughing, however it had clearly not extended into the entranceway. This being the case the north-south axis of this building can be estimated as being between 5 and 7m. Its east-west length remains unknown. A small area of internal floor paving (Figure 30) survived and fragments of Roman pottery (Finds no 48, 49, 53 -56) were encountered during the excavation of the floor area (023) (Figure 29). These comprised a handful of sherds of different types including grey ware, Derbyshire ware, gritty oxidised ware and shell-tempered ware. The building had been positioned so as to respect both the alignment of the west perimeter ditch (F003), which it paralleled, as well as the entranceway. This indicates an ordered layout of buildings within the enclosure during the Roman period. The function of this building remains unknown due to its

fragmentary survival and lack of sufficient finds to indicate its use, however its position close to the entrance could suggest its use as either stabling, storage or as a workshop. It is worth noting that the wall of this building and the wall in the perimeter ditch could not have formed the stone facing for a rampart as the walling of the building was short and defined and this would make any such rampart discontinuous, and in addition the paved flooring demonstrates the building had an interior. Furthermore, the wall within the perimeter ditch was neither robust enough nor stable enough to have functioned as a rampart facing. Such an interpretation is not consistent with the observed remains and therefore the wall base is confidently understood to be a wall base for a timber building with an internal floor area to its east.

3.21 The discovery of a stone support block or post pad (see Coarse Stone section below) from perimeter ditch fill (003) in Trench 3 indicates that one or more buildings had wood, or possibly stone, columns. It is therefore possible that the stone-founded building could have had wooden uprights flanking its entrance, or alternatively stone columns, perhaps reserved for only the highest status building/s on site. It is also worth noting the discovery of a possible piece of tessera (see Pottery section below) from shallow ditch fill (057) comprising a 9mm square cube with a grey core and oxidised red surfaces on three sides. Although it resembles a tessera this may be fortuitous and more would have to be found to prove the former presence of a mosaic at Whirlow, but it raises the interesting possibility of one or more higher status buildings on the site, and particularly in combination with the stone support block.

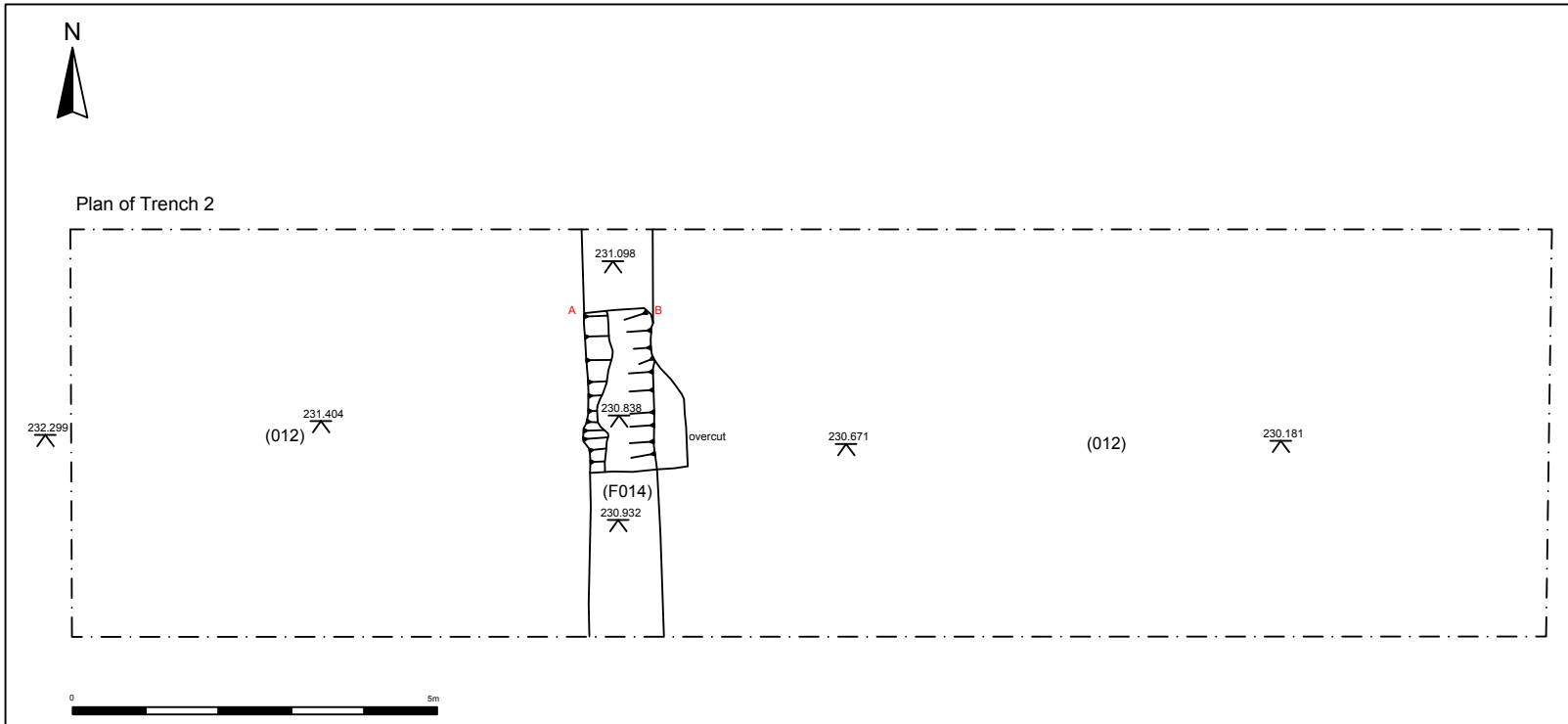
Figure 29.View south-west across internal floor surface (023) with three surviving in situ sandstone flags at its northern edge next to the foundation wall (scale = 0.5m graduations).

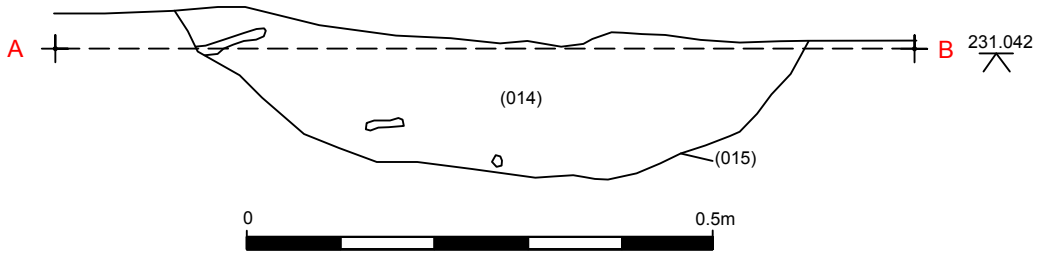
Figure 30. Roman foundation wall (F006) and in situ sandstone flags set into a beaten earth surface (F023).

3.22 Across the west entrance causeway area and extending both within and outside the enclosure, was a metalled surface (F005) (Figures 31 -32). This rammed stone surfacing had been partially truncated by ploughing but survived well in places. Within the interstices of the metalling fragments of broken Roman pottery were discovered including pieces of Derbyshire ware, grey ware and samian. The metalling was highly compacted and for the most part comprised pieces of the local sandstone bedrock with larger pieces set flat and smaller pieces rammed fast at whatever angle they had been driven in and compacted. Much of the material was angular indicating that it had been laid shortly after being quarried. Larger pieces typically ranged from 40-100mm across, although most of the material was small angular sandstone chips. The metalling had been laid as a track leading into the enclosure but also as surfacing across the full width of the entrance causeway and into the entrance area of the enclosure. It had been laid so that it butted up to the stone-founded building on the north side of the entranceway and it could also be observed running along the walkway that was apparent between the west edge of the stone-founded building and the perimeter ditch. It also butted up to and around the stone-lined posthole (F007).

Figure 31. View of the metalled surface (F005) emerging after initial excavation looking across the entrance causeway with the northern ditch section during excavation on the left.

Figure 32. View of the surviving area of metalled surface (058) between the wall of the stone-founded building (F006) to the left and the perimeter ditch revetment wall (F011) to the right (scale = 0.5m graduations).





South facing section of ditch (014)

Figure 33. Plan of Trench 2 Scale: As shown

Key:

Height aOD (m)

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Trackway (Trench 2) (Figures 33 - 35)

3.23 Trench 2 was targeted over the parallel flanking ditches of a suspected trackway leading north from the eastern entrance of the enclosure. The trench measured 10m x 5m and was located approximately 50m north of the north-east corner of the enclosure. The trench was positioned so as to encompass the two parallel linear ditches as identified on the geophysical survey. The topsoil (001) was measured between 0.3m and 0.34m below the turf and comprised a dark brown sandy silt which contained pieces of coal, slag and occasional sandstone. Below the topsoil a compacted subsoil (002) was encountered that was a lighter brown sandy silt and which ranged from 0.2m to 0.3m in thickness and which in turn overlay the natural sandstone brash. The layer contained metalworking debris throughout in the form of coal and slag, together with broken clay pipe, glass and post-medieval pottery.

Figure 34. Pre-excavation photograph of Trench 2 looking east showing the shallow western linear ditch (F014) running across the centre of the trench immediately beyond the ranging poles (scales = 0.5m graduations). Note the vague darker stain, parallel with F014, about 4m beyond which is all that survived of the eastern linear ditch.

3.24 The shallow linear ditch (F014) was located 6.4m from the western end of the trench and ran across the width of the trench on a north to south alignment. The second, eastern ditch did not survive as a defined feature due to having been almost completely truncated by later ploughing. The only indication of this feature was a vague linear band of slightly darker soil that could be seen running parallel to the western ditch approximately 4m away. Linear ditch F014 had a maximum width of 0.7m at the start of the archaeological horizon and was 0.2m - 0.24m in depth with a regular concave cut. It contained a single uniform fill of silty sand, dark brown in colour and contained angular sandstone fragments and flecks of charcoal. This linear ditch, and its parallel, albeit heavily truncated, counterpart to the east, are interpreted as drainage

ditches flanking a trackway. Although the trackway appears to have a right-angled corner, based on the geophysical results, the line of the trackway can be seen to contour along the higher ground in this area, presumably to avoid the wetter ground to the south and east that was occupied by the stream course that has now been routed underground. The western drainage ditch of the trackway (F014) (Figure 35) follows precisely the same alignment and line of the eastern side of the Roman enclosure where its eastern entrance is located. Only two pieces of identifiable charcoal were retrieved from the ditch fill (014), these being fragments of oak and hazel respectively. Only the hazel is suitable for future radiocarbon dating, being a short-lived specie.

Figure 35. Section across linear ditch F014 looking north (scale = 0.5m graduations). The material removed from the right hand side is where the ditch was overcut in an attempt to establish the presence of an earlier ditch cut, which was not found.

Arcing Ditch Feature Outside Enclosure (Trench 4) (Figures 36-38)

3.25 Trench 4 measured 8m by 2.25m and was positioned 30.4m from the north-east corner of the enclosure's perimeter ditch to target a curved ditch/pit anomaly identified by the geophysical survey. A shallow, slightly curving, ditch (F028) was identified 0.75m from the western edge of the trench consistent with the geophysical results. This shallow ditch contained three fills (Figure 37). The basal fill was a yellow-orange sand (032) representing re-deposited natural sand at the base of the feature. Above this was an orange – mid brown sandy silt secondary fill (031). This fill (031) was burnt in situ and contained abundant charcoal inclusions and clinker/furnace waste fragments, suggesting the ditch was used for some sort of industrial activity associated with metalworking. A single entity sample of charred hazel from (031) produced a radiocarbon date of 247-391 cal AD (95.4% probability), and probably 258-381 cal AD (68.2% probability) (SUERC-70712). The upper fill of the ditch consisted of a similar orange – mid brown sandy silt with frequent charcoal inclusions, but without signs of in situ burning. Roman pottery fragments of samian and Derbyshire ware were recovered

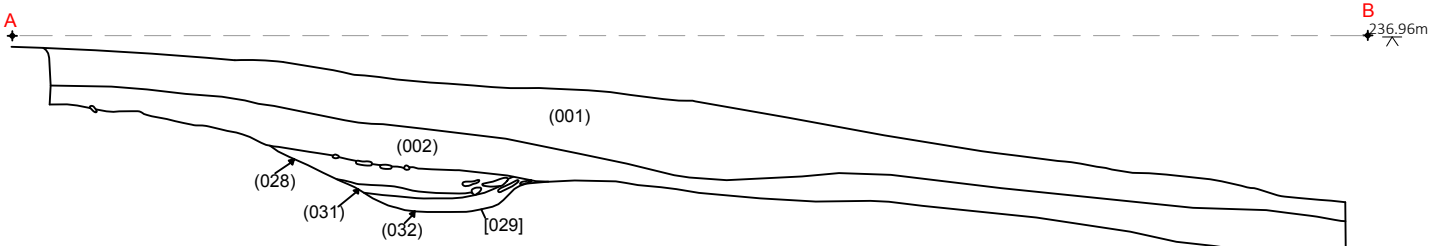
from the upper fill (028), and together with the date from (031) they evidence the contemporaneity of this feature with the Roman occupation of the enclosure.

Figure 36. Post-excavation view of F028 in Trench 4, to the left of the ranging pole (scale = 0.5m graduations).

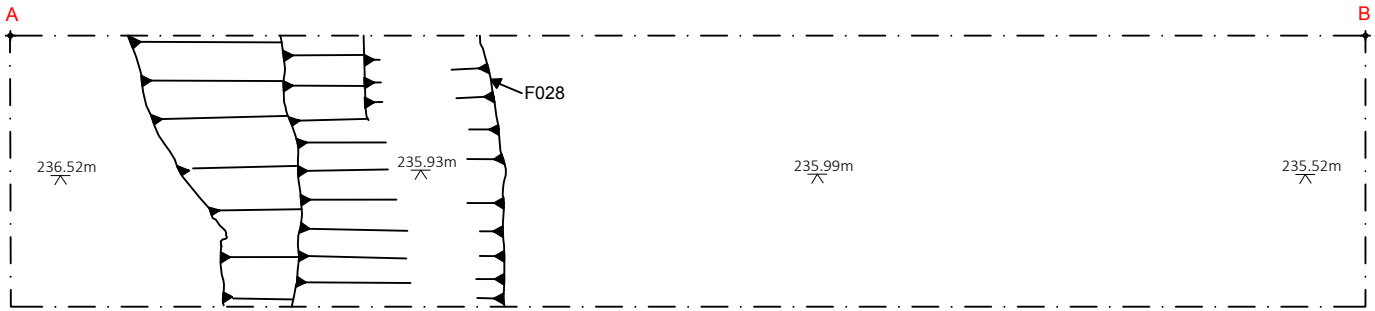
Figure 37. Post excavation view of south-west facing section of F028 (scale = 0.5m graduations).

Figure 38. Plan of Trench 4
Scale: As shown

South west facing section of Trench 4 showing F028.



Plan of Trench 4



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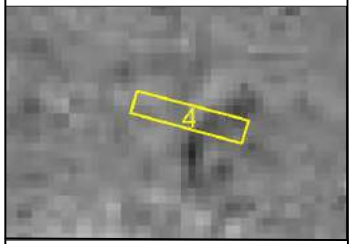

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Signal Station on Bole Hill (Trench 5) (Figures 39-42)

3.26 Trench 5 was targeted so as to encompass the perimeter of a small square enclosure close to a suspected eastern entrance, thought to be the site of a possible signal station identified by geophysical survey (Durkin 2016). The monument is located at 309m OD and has internal measurements of 17.5m east-west by 19m north-south and external dimensions of 27m east-west by 26m north-south. No upstanding remains of the structure were visible on the surface. The visibility of the construction slot segments exposed in the excavation trench was initially vague and difficult to detect, but as trowelling proceeded and their fills started to be excavated they became more clearly defined. The site comprises a small area of plateau with a very steep scarp on its south side, which falls away over 60m to the floor of the Limb Valley below. The trench measured 12.5m east-west by 2.1m north-south (Figure 2). The topsoil (034), a dark greyish brown sandy silt averaging 0.27m in depth, contained post-medieval pottery, broken clay pipe, modern glass fragments and fragments of modern ferrous metal objects. Beneath the topsoil two construction trenches (F037 and F038) were encountered cut into the natural sandstone brash substratum (036), corresponding to the double slots observed on the geophysical survey.

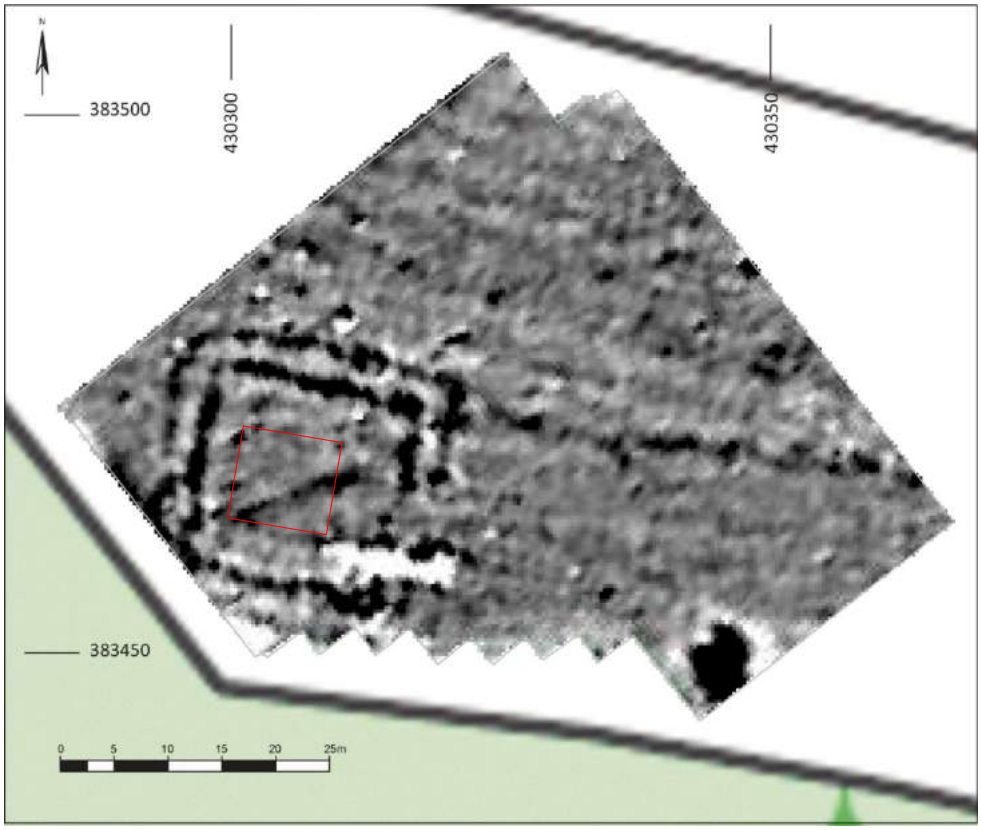
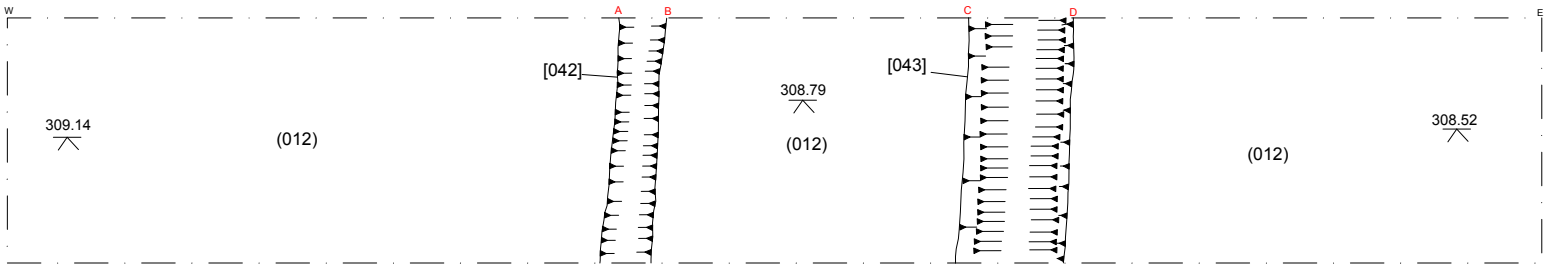
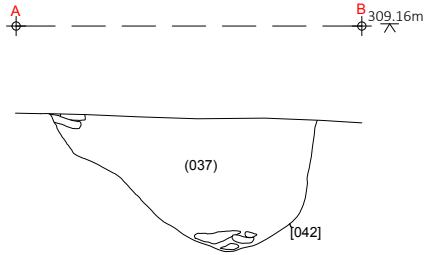


Figure 39. Additional geophysical plot (undertaken after the first geophysical survey reported in Durkin 2016) showing the signal station site after the evaluation had taken place (Trench 5 is the east-west tracking white stripe) showing small circular anomalies set in a square shape (see red outline) inside the enclosed area that could possibly be large postholes for supporting the uprights of a wooden tower. The entrance is positioned in the centre of its east side. The linear anomaly that passes diagonally through the monument and then heads east is probably a ditch relating to earlier land allotment and is similar to other boundaries detected further down the slope on the Whirlow estate.

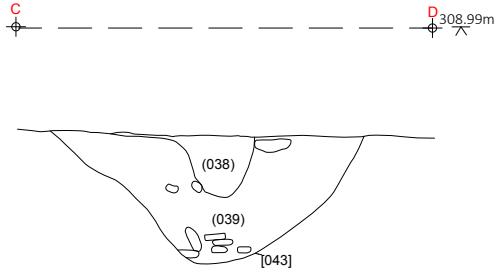
Figure 40. Plan of trench 5
Scale: As shown



South facing section of F037



South facing section of F038



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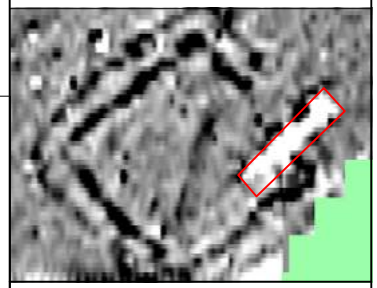

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Figure 41. View of Trench 5 after excavation of the construction slot fills looking west (scales = 0.5m graduations).

3.27 The inner (western) construction slot measured 0.8m in width and 0.3m in depth from the start of the archaeological horizon, and was filled by a single dark brown silty sand fill (037) (Figure 42). The base of the construction slot was flat and averaged 0.2m in width. In section the slot had a wider upper section with a narrow slot running along its base together with much angular sandstone packing material (Figure 38) indicating that it had once held timbers. Two separate single entity samples of charred hazel wood recovered from the fill of this construction slot returned dates of 28 – 216 cal AD (95.4% probability) and probably 61 -133 cal AD (68.2% probability), and 64-229 cal AD (95.4% probability) and probably 76 - 210 cal AD (68.2% probability). Both of these samples were from the lower fill of the construction slot and were therefore considered unlikely to be residual, and could potentially have derived from the upright timbers, or possibly hurdles, used to stabilise them. To further guard against dating residual material two samples were submitted with the view that should they be consistent then their likelihood of being on residual material is considered low. The fact that the dates obtained are statistically consistent, they were from a sealed fill and being fragments of charred timber could be functionally related to the use of the feature (ie. a construction slot for holding timbers), means they are considered a reliable indicator of the date of this feature.

3.28 The outer (eastern) construction slot was slightly larger in section, measuring 0.95m in width at the start of the archaeological horizon and 0.38m in depth (Figure 42) from the start of the archaeological horizon. This construction slot was similar in shape to the inner slot, with a wider upper section and narrow central slot with a flat base averaging 0.2m in width. The base of the outer construction slot was filled with dark yellow-brown silty sand (038) and contained abundant angular sandstone blocks up to

0.2m across forming stone packing. The central fill of the ditch consisted of a dark brown silty sand (039) filling a narrow central slot 0.17m in width. This narrow slot is understood to be a construction slot that once held wooden uprights. No suitable material for radiocarbon dating was obtained from this feature.

Figure 42. View north across the excavated construction slots with the Fulwood area of Sheffield in the middle distance. The inner construction slot (037) is on the left and the outer construction slot (038) is on the right (scale = 0.5m graduations).

An alternative interpretation is that the enclosure could have served as a fortlet, but it would be unusually small, and so this seems unlikely. The absence of a ditch around the perimeter of the box rampart/double palisade is noteworthy. The drop to the foot of the deep-sided gorge of the Limb valley forms a natural defence on its south side and so here a ditch would not be necessary. It is also possible that if this monument was very shortlived, it may have been abandoned before a ditch was ever cut. The internal features noted on the second geophysical survey are suggestive of an internal square-shaped timber structure, the positions of the possible post holes suggesting something around 10m by 10m in dimensions. This would make an unusually large tower, as most previously recorded timber towers are 3-5m square. Relatively few of these structures have been recorded and fully excavated and so the true extent of their size and variety is yet to be established with certainty. Further excavation might help to resolve the matter of the dimensions of any surviving internal structural features. There are no native British sites known in this region that a site such as this could equate to. Rather, its regular form and its date are consistent with it being Roman. Despite not having a surrounding ditch the site is on the line of what is thought to be the Roman road that runs over Burbage Moor and links the Roman forts at Templeborough and Brough. Furthermore its very careful location on the highest point of a ridge that commands far-reaching views of this road as well as to the Roman fort at Templeborough mean that a signal station is currently the most plausible interpretation, despite the absence of a ditch.

4. RADIOCARBON DATING

4.1 A total of nine samples were submitted for radiocarbon dating to the Scottish Universities Environmental Research Centre (SUERC). The samples were measured by AMS as described by Zondervan and Sparks (1997). The laboratory maintains a continual programme of quality assurance procedures and takes part in all international inter-calibration studies. The calibrated age ranges were determined using the Oxford University Radiocarbon Accelerator Unit calibration program OxCal4.2.

4.2 The scientific dating programme aimed to establish the date of various features, including the date of what was at the time thought to be possibly the signal station. Due to resource limitations the samples from the enclosure were carefully selected in order to obtain a date associated with: the levelling and abandonment of the site (026), the feature outside the enclosure associated with metalworking (031), a structural feature inside the enclosure (059), the Roman attempt at realigning the perimeter ditch and one of the pits sealed by the metalling in the entrance area.

4.3 The radiocarbon dating results are given in Table 1 and are quoted in accordance with the international standard known as the Trondheim convention (Stuiver and Kra 1986). They are conventional radiocarbon ages (Stuiver and Polach 1977).

Context	Material	Lab No	$\delta^{13}C$ (‰)	Radiocarbon Age (BP)	Calibrated date range (68.2% confidence)	Calibrated date range (95.4% confidence)
Enclosure						
(020) Primary ditch silt	Charcoal: hazel	SUERC-36826 (GU-25353)	-26.8	2155 ±30	350-121 cal BC	358-94 cal BC
(018) Pit sealed by Roman metalling	Charcoal: hazel	SUERC-36830 (GU-25354)	-27.2	1890 ±30	67-136 cal AD	55-219 cal AD
(026) Fill of construction slot	Roundwood charcoal: hazel	SUERC- 70711 (GU-42487)	-25.7	1748±30	247-332 cal AD	225-385 cal AD
(059) post hole fill	Roundwood charcoal: Hazel/alder	SUERC- 70718 (GU-42491)	-26.9	1738±30	251-339 cal AD	238-385 cal AD
(031) burning layer forming basal pit fill from feature beyond the enclosure	Charcoal: hazel	SUERC- 70712 (GU-42488)	-28.8	1721±30	258-381 cal AD	247-391 cal AD
Signal Station						
(037) Primary fill of inner construction slot (Bole Hill)	Charcoal: hazel	SUERC-69244 (GU-41769)	-24.9	1899±34	61-133cal AD	28-216 cal AD
(037) Primary fill of inner construction slot (Bole Hill)	Charcoal: hazel	SUERC-69243 (GU-41768)	-24.7	1877±34	76-210 cal AD	64-229 cal AD
Other						
(045) Fill of pit below metalling	Charred cereal grain: *Triticum*	SUERC-70713 (GU-42489)	-23.3	166±30	1668-1950 cal AD	1661-modern cal AD

surface (005)						
(050) Burnt layer within Roman attempt at new perimeter ditch but later abandoned and sealed by Roman building	Charred cereal grain: Indet.	SUERC-70714 (GU-42490)	-23.1	>50000	Background result	

Table 1. Radiocarbon dating results (calibrated using OxCal v4.2.4 (Bronk Ramsey 2013); r:5; IntCal13 atmospheric curve (Reimer et al. 2013).

4.4 The calibrations of the results, relating the radiocarbon measurements directly to calendar dates, are given in Table 1. All have been calculated using the calibration curve IntCal 13 (Reimer *et al.* 2013) and the computer programme OxCal v4.2 (Bronk Ramsey 1995; 1998; 2001; Bronk Ramsey and Lee 2013). The calibrated date ranges are quoted in the form recommended by Mook (1986) with the end points rounded outwards to 1 year.

4.5 The date from the primary ditch silt (SUERC-36826) has the potential to be residual material from earlier activity on the site but which has subsequently become incorporated into the ditch fill. This fill was sealed by the Roman fill above and the fill must therefore either be very early Roman or earlier in date. Despite more than 8 linear metres of this fill being excavated it produced not one piece of Roman ceramic or indeed any other Roman artefacts. This is significant given the frequent finds of Roman pottery from the overlying ditch fill. It is almost inconceivable that no Roman material would be found if this ditch if it had been in use during Roman times, as all the other ditch fills of Roman date had plentiful finds. It is therefore considered most likely to be directly associated with the initial infilling of the ditch, and thus the date at which the first phase ditch was in use. Therefore, although the date for this primary fill has the potential to be from residual material, the stratigraphy of the site suggests this is unlikely and that the measurement does indeed date the first phase of use of this feature.

4.6 The earliest date associated with Roman activity on the enclosure site is that from pit (018) sealed below the metalling layer and is from a pit where *in situ* burning took place, and therefore the sample can be considered to be stratigraphically sealed and functionally related to the event that it is being used to date. This pit also contained a large assemblage of Romano-British shell-tempered ware ceramics. The date (SUERC-36830) indicates that the first Roman activity on the site took place in the late 1st or early 2nd century AD and is statistically indistinguishable from the dates from the signal station.

4.7 The date from the construction slot across the entrance causeway was from the infill (026) that had been deposited within the slot after what is thought to have been a timber sleeper beam was extracted. This meant that the gate could no longer function and therefore this fill, like the upper fill of the perimeter ditch, is reliably interpreted as being co-eval with the levelling and abandonment of the site. The date of 225-385 cal AD (95.4% probability), and probably 247-332 cal AD (68.2% probability), places the abandonment of the site in the late 3rd or early 4th century AD. This date is consistent

with the dating of the ceramic assemblage from this same context as well the ceramics from the upper fill of the perimeter ditch (003 and 009).

4.8 The date (SUERC- 70712) from the ditch fill (031) sealed by floor surface (023) is from the basal fill. Like the abandonment deposit in the entrance causeway construction slot this sample dates to the late 3rd – 4th century AD and is therefore considered to be intrusive material from the latter stages of Roman occupation on the site that had become worked into this earlier ditch fill.

4.9 The date (SUERC- 70718) from the post hole fill (059), which may post-date the stone-founded building, dates to the late 3rd – 4th century AD and is statistically consistent with the dates from the abandonment deposit (026) and the ditch fill (031) respectively. These three dates testify to occupation of the site into the later Roman period, and its abandonment by the mid-4th century cal AD at the latest.

4.10 The two dates (SUERC-69244 and SUERC-69243) from the primary fill of the inner construction slot (037) from the Bole Hill enclosure are statistically consistent and testify to construction of this feature in the late 1st or early 2nd century AD. These dates support the interpretation of this feature as a Roman signal station. It should be noted that the first phase of Roman activity at both the main enclosure and the signal station are co-eval, suggesting they occurred at the same time. Furthermore, these early dates show that Roman occupation of these sites on the north side of the Brigantian-Roman frontier did not occur until the Flavian advance or shortly afterwards.

4.11 Two samples (SUERC-70713 and SUERC-70714) submitted for analysis gave irrelevant dates. The first of these provided a modern date on an unidentifiable cereal grain from from one of the pits (045) sealed by the metalling (005). This grain is evidently intrusive material and could have been translocated into the pit as a result of bioturbation, particularly given that there was a lot of worm and root activity on this part of the site. The second sample (SUERC-70714) from the burnt layer in contact with the brash and bedrock at the base of the fill from the abandoned attempt at realigning the perimeter ditch gave a date of over 50000 years ago suggests this sample was contaminated with particles of coal. Given that coal fragments are naturally abundant in both the brash and soil layers, as it occurs naturally in this geology, it is most likely that this has affected the carbon measurement in this sample. Both of these dates are of no use archaeologically and they are not considered further.

5. FINDS

Pottery
Pauline Beswick

5.1 The 893 sherds found weigh 7101g in total and comprise nine ware groups, seven of which are Roman. The groups are described below in alphabetical order and their contexts are listed in Table 2 and a detailed catalogue is provided in Table 3.

Black-burnished ware (BB)
5.2 A group of mainly BB1 sherds came from the upper perimeter ditch fill (003 and 009) and construction slot (026) in Trench 1. Many are abraded and small (av. 3-4cm or less, *c.*2g), although a number of rim sherds from slot (026) join along old breaks and some burnishing survives. The handmade, quartz dominated fabric ranges in colour from dark grey to reddish-brown. Thin sectioning, however, is needed to determine where this material was made; if at Rossington Bridge, near Doncaster, for instance, or the major production centre in Dorset (Tomber and Dore 1998, 202).

5.3 Black-burnished ware is common on all types of sites throughout Roman Britain from the second to fourth century AD and can be dated broadly by changes in the rim angle and body shape. Leary (2011) suggested that the splayed everted rim sherd from a BB1 jar, found in the upper fill of the south ditch (009 no. 34; Figure 44.1), is in a form dating to the later third or early fourth century (Gillam 1976 no. 10) and that this example probably dates to the later third century. A second BB1 jar rim sherd from construction slot (026) (Figure 44.2) is more upright in form with a beaded rim and is probably earlier, dating from the late second or early third century.

5.4 The one certain BB2 sherd is also from construction slot (026) and is from an everted flat-rimmed dish (Figure 44.3) probably of mid second century date. BB2 wares were wheel-thrown and this example is uniformly black with a finer, smoother textured fabric than BB1.

Figure 43.Sherds of black-burnished ware from entrance causeway construction slot (026). Top row BB1, bottom row BB2 (scale = 1cm graduations).

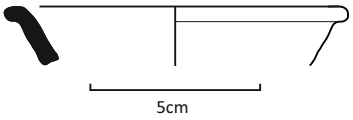


Figure 44.1. Splayed rim(009) (no.34)

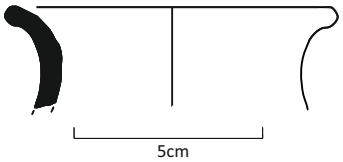


Figure 44.2. Black-burnished ware everted rim (026)

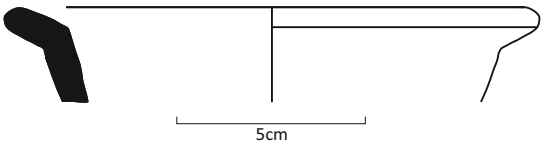


Figure 44.3. Black-burnished ware everted flat rim (026).

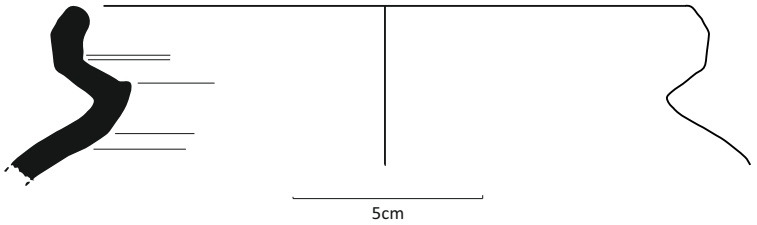


Figure 44.4. Derbyshire ware cupped rim (026).

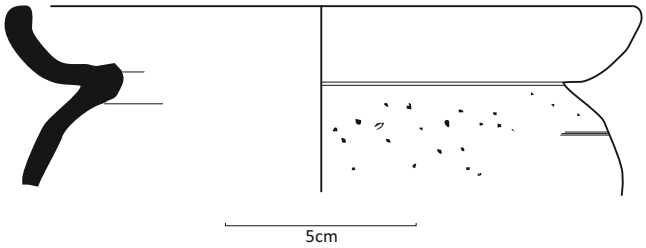


Figure 44.5. Derbyshire ware cupped rim (026)

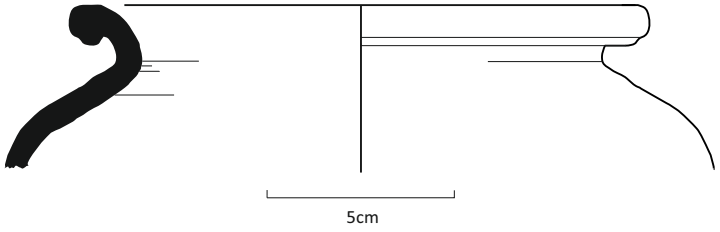


Figure 44.6. Derbyshire ware cupped rim (026)

Figure 44.Selected sherds of Black Burnished ware and Derbyshire ware labelled with finds number and context

Derbyshire ware (DBY)

5.5 This ware is Leary's equivalent of DER CO in the National Roman fabric collection (Leary 2003, 73; Tomber and Dore 1998, 125) and was aptly referred to by Gillam (1939) as "petrified gooseflesh". It is very hard and comes in a wide range of colours including the grey and purplish grey dominant in the Whirlow finds. Because of its hardness it survives well in the archaeological record with little evidence for abrasion. At Whirlow it was the second most commonly found pottery type and occurred in Trenches 1 and 4, particularly in the upper fills of both ditch sections (003 and 009) but mainly in construction slot (026). Sherds from the latter included parts of cupped rims from two jars (Figures 44.4 and 44.5), some joining, plus a hooked rim with bifid tip (Figure 44.6), along with parts of two bases and many body sherds (av. *c.*4-5cm, *c.*10-20g). Single DBY cupped rim sherds from other contexts include one from the metalled surface (005) smaller than the two illustrated; another larger one from Trench 4 (028 – upper fill of F003); and a third unstratified and incomplete but close in profile and colour to Figure 44.5, implying a least five jars of DBY.

5.6 Detailed study of finds from kilns at Lumb Brook, near Belper, Derbyshire, led Leary to conclude that production of this type of Derbyshire ware dated from the mid to late second century into the mid fourth century (Leary 2003). Parallels were found there for both the cupped and hooked rim forms from Whirlow (Leary 2003*.,* e.g. figure 10.9 and figures 11.14, 13.38).

Figure 45. Sherds of Derbyshire ware from entrance causeway construction slot (026) (scale = 1cm graduations).

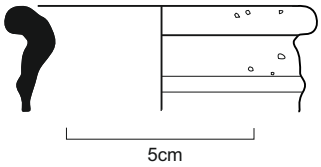


Figure 46.1. Mercia Mudstone fabric.
Everted hooked rim (009 no.48).

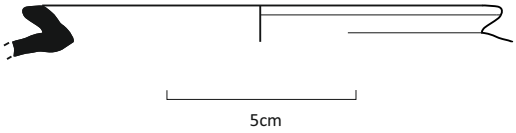


Figure 46.2. Oxidised fabric.
Drooping rim (057 no.60).

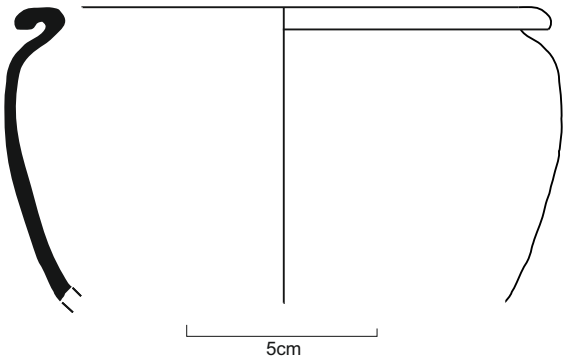


Figure 46.3 Grey ware short hooked rim (003 no.39).

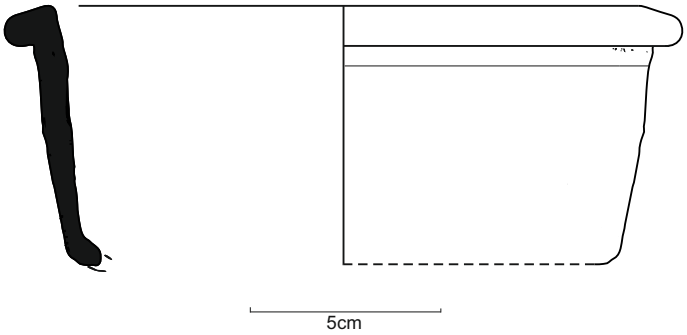


Figure 46.4 Grey ware short everted rim (009 no.48).

Figure 46.5 Grey ware rounded bead rim jar
(009 no.38 and 026).

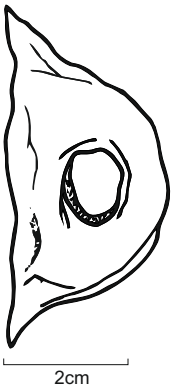


Figure 46.6. Grey ware lugged sherd (unstratified).

Figure 46. Selected sherds of Mercia Mudstone fabric, Oxidised fabric and Reduced wares labelled with finds number and context).

Mancetter-Hartshill fabrics (MAH WH)

5.7 Five sherds found at Whirlow in Trenches 1 and 3 are probably from this kiln site in the West Midlands where the main production was mortaria (Tomber and Dore 1998, 188-9). The two mortaria sherds from Trench 1 are of different dates. One from the metalled surface (005) (Table 3: MAH WHb) is in a soft pinkish, coarse fabric with mixed tituration grits on the inner surface consisting of angular and surrounded quartz and different coloured stones which means it is likely to have been made before the period *c.* AD 140/50 (*ibid.,* 188). The other, from a shallow 'ditch' fill (057) (Table 3: MAH WHa), is a rim sherd with a part lip, in a harder smooth grey-white fabric made after *c.* AD 140 (*ibid.,* 189). The other sherds, all in a similar pinkish coarse fabric to the early mortarium, include a ridged body sherd from Trench 3 (003), possibly from the same or another mortarium; and a second sherd from Trench 3 (001), thin (5mm), angled and possibly from the upper body of a small bowl or mortarium.

Figure 47. Sherds of Mancetta-Hartshill fabric from metalling (005) (left) and topsoil (001) (right) (scale = 1cm graduations).

Mercia Mudstone fabric (MM)

5.8 A single rim sherd found in the upper fill of the south ditch (009, no.48) is the earliest piece identified. The external surface is smooth and reddish-brown, with small vesicles (*c.* 1mm) where calcite type inclusions have leached out, and forms a thin 'skin' both inside and outside the pot. The clay body is a fine-grained grey clay with rounded grog or mudstone and rare ferruginous inclusions; and appears to resemble so-called 'Trent Valley ware' (Leary 2001, 100) of the late pre-Roman Iron Age or very early Roman period in the East Midlands. A wheel may have been used in making the vessel but the sherd is too small and abraded to be certain. In shape (Figure 46.1), however, the jar's hooked rim and thin shoulder cordon would be in keeping with the above dating (Leary 2011) and parallels can be found in some of the Gallo-Belgic influenced

Iron Age pottery found at sites such as Dragonby in Lincolnshire (e.g. May 1996, fig. 19.29, 176).

Medieval/post-Medieval/modern (med/pm/mod)

5.9 Half of the post-Roman sherds were unstratified and of the eight found stratified five were modern. These comprised two fragments of probable modern brick (Trench1, 003; Trench 5, 038), a probable 19th or 20th century flower pot sherd (Trench 1, 009/026) and two white glazed potsherds (Trench 1, 023; Trench 3, 044). Post-Medieval finds included a yellow-glazed pancheon sherd from Trench 1 (005 no.30) and a piece of handmade ?brick also from Trench 1 (057 no.48). One probable medieval sherd in a gritty fabric with a greenish glaze was also found in Trench 1 (023) inside 'floor' surface within the building defined by wall F006; and another with a brownish glaze on a pink fine ware body (?medieval or early post medieval) found in 2011 in the metalling surface (005, no. 40).

Oxidised fabrics (OA)

5.10 These occurred in all Trenches except Trench 5, and for the most part were found in small quantities and as small, plain abraded body sherds. The most numerous sub-group, however, of fine OA sherds in Trench 1 from shallow 'ditch' fill (057), included several larger (5 sherds, totalling 54g) and less abraded examples than those found in other contexts in the same trench (005 – 11, 20g; 009/026 – 1, 2g [base]; 055 – 3, 1g), all of which may be from the same jar, given the distinctive fabric; brick red on the exterior half and solid black on the internal half, with a consistent thickness of around 5 to 8mm. Smooth, wheel-made and of medium hardness, the fabric is fine-grained with voids of >1mm and occasional ferruginous inclusions. The voids suggest original calcite inclusions, possibly as finely ground shell, and an origin probably east of the River Trent, but an original source has not been identified.

5.11 Included within this OA group are two finely quartz-tempered pieces from shallow 'ditch' fill (057) possibly in Swanpool type fabrics (Tomber and Dore 1998, 163), a large industry with production centres between Lincoln and the Humber; or in fabrics from Rossington Bridge, near Doncaster (*ibid.,* 203). One (no. 60), with an out-turned drooping rim (Fig. 46.2) in grey fabric with a red slipped external surface, compares in form with a grey ware bowl from early second to mid third century contexts at Dragonby (May 1996, fig. 20.10, 927); the second, a 9mm square cube with a grey core and oxidised red surfaces on three sides, resembles a tessera but this may be fortuitous and more would have to be found to prove the former presence of a mosaic at Whirlow.

5.12 A second sub-group OA1, represents soft, quartz gritted fabrics with oxidised outer surfaces. Ten of these appear to be equivalent to a soft, early DBY type ware, OAB/C, dateable to the early second to early third century (Leary 2011; 2013, 142). Two sherds came from Trench 1 in context 005; seven sherds from Trench 3 comprised of three sherds from context 002, one from 033 and three from 044; and one was found in context 001 in Trench 4.

5.13 The third sub-group OA2, represents a hard type of early DBY ware ('pre-Derbyshire' fabric, Leary 2013a, 142) with a similar date range to OA1 and with production probably overlapping with that of DBY, the true Derbyshire ware (Leary 2011). One sherd from 2011, Trench 1 (023 no. 46), was described as 'found inside floor surface within building defined by wall F006'; a second sherd (no. 55) was recovered from the same context in 2016.

Figure 48. Sherds of oxidised fabric ceramics from ditch infill (057) of the abandoned attempt at remodelling the perimeter ditch sealed below stone-founded building (006) (scale = 1cm graduations).

Reduced wares (GR)

5.14 More common than oxidised wares, grey wares were found principally in Trench 1, none in Trench 5 and only single sherds were retrieved from Trenches 3 and 4. The soft, fine fabric GR sub-group is represented by two very abraded, undiagnostic body sherds from Trench 1; one from the upper fill of the north ditch (003 no. 39) found in 2011, the other from the metalled surface (005 no. 52) in 2016.

5.1.15 Most of the grey ware sherds are in coarser fabrics which feel sandier or gritty to the touch, GR1, and probably incorporate material from kilns active in the region, especially around the Doncaster area (Buckland *et al.* 1980) during the second to mid third century and into the fourth. Grey ware types found at Whirlow in 2011 included sherds from two small jars with short everted rims, comparable with the common Flavian-Trajanic jar form (Gillam 1970 nos 101-5; Leary 2011) and suggestive of activity in the late first or early second century; one with a hooked rim was found amongst pottery from the upper fill of the north ditch (003 no. 39; Figure 46.3; a similar sherd probably from the same vessel was found unstratified in 2016) and the second in the upper fill of the south ditch (009, no. 48; Figure 46.4). Other grey ware sherds from the same ditch fill contexts date to the second and early third century AD, and include a bowl with a heavy rounded bead rim (009, no. 48) comparable with BB2 vessels of the

late second or earlier third century (Gillam 1970 no. 225; Leary 2011). Sherds probably from the same bowl were also found in the upper fill of construction slot (026) in 2016 (Figure 44.15). An unstratified sherd from a lugged jar, found in 2011, is most likely to be third century in date (Leary 2011; Figure 44.16). Another grey ware piece worth noting was part of the base of a large jar found in 2016 from the upper fill of the north ditch (003), *c.*15cm diameter, with evidence for wheel turning both internally and externally and wall sides 10mm thick.

Figure 49. Sherds of grey ware from the upper fill of the perimeter ditch (003) (scale = 1cm graduations).

Samian

5.15 Abraded sherds in soft, fine, reddish fabric with traces of a red gloss are most probably samian ware. They occurred particularly in Trenches 1 and 4 and as a fragment in Trench 3. The best-preserved piece, a body sherd from the metalled surface (005 no. 40), Trench 1, is thought to be of Central Gaulish Samian *c.*AD 120-200 (Leary 2011). Two flakes found in 2016, also from (005), could be from the same production source, as could a large (36g) damaged (?burnt - dark brown) foot-ring sherd from the upper fill of F003 (028) in Trench 4. The latter was most likely from a bowl of Form 37 type. Three small pieces from Trench 4 (002) included a beaded rim fragment from a bowl and another beaded rim sherd came from shallow 'ditch' fill (057) in Trench 1. A further rim sherd from the same fill (057) in Trench 1 appears to be from a cup of Form 35 type. The two largest pieces, both found in the upper fill of F003 (028) in Trench 4, comprise the damaged foot-ring described above and a large rim and body sherd (15g) from a Form 36 dish *c.* 18cm in diameter. The latter is too heavily abraded to determine if the rim was decorated but the clay is cleaner than that thought to be Central Gaulish in origin, which probably indicates a different source; a samian specialist could perhaps accurately identify an origin. Samian forms such as dish 36 and cup 35 date from the first and second centuries AD.

Figure 50. Sherds of Samian ceramics from ditch infill (057) of the abandoned attempt at remodelling the perimeter ditch sealed below stone-founded building (006) (scale = 1cm graduations).

Shell-tempered wares (SH)

5.16 A coarse shell-tempered, oxidised fabric found in all trenches except 5, was most numerous in Trench 1, chiefly in the upper fills of the south ditch and construction slot (009/026; 026) and a truncated pit (018). It represents the largest group of pottery found on the site. Handmade, the vessels, seemingly all jars, appear to have been coil built and bonfire fired. On less abraded pieces, however, fine parallel horizontal lines visible below rims suggest careful finishing on a turntable or wheel. The fabric is soft, powdery and reddish brown on the exterior and in the core; internal surfaces are often dark brown or black from use and occasionally with burnt residues (e.g. glass-like residues on sherds from construction slot 026). The iron rich, fine to medium sandy clay has distinctive plate-like voids up to 2mm in size with occasional soft, whitish fragments. This whitish material is soluble in acid and most likely, given the void shapes, represents decayed fragments of shell. Shell was not available locally but similar fabrics, incorporating fossil shell, are well known and common in Lincolnshire and the East Midlands west of the Trent from both prehistoric and Roman contexts (e.g. Loughlin 1977; May 1996).

5.17 Sherds from Whirlow range in body thickness from 4mm to 12mm and average around 7mm. Rim are flared with pointed tips and a distinctive internal, lipped bevel; diameters are around 20cm. Variations in shape details, thickness and depth of neck indicate different sized jars (e.g. Figures 52.1– 50.3); as do surviving base sherds which range from 5mm (Figure 50.4: 009/026), *c.* 8mm (Figure 52.5 : 009/026) to 15mm (018) in thickness. Joining rim sherds were found within contexts but none was recognised across contexts. In each of the principal deposits (pit 018), construction slot (026), south ditch (009) and construction slot (026), there appear to be remains of at least two jars, totalling around six. All such jars, as with those in DBY ware, are generally thought to have been used for storage and cooking but the poorer quality fabric and distinctive rim shapes has led to speculation that perhaps Dales type jars were used for transporting special commodities (Loughlin 1977, 88). Glass-like residues on a jar from slot (026), referred to above, could repay analysis as could some lipid work.

5.18 When first found at Whirlow in 2011, this pottery was thought to be Iron Age or at the latest very early Roman in date (Beswick 2011; Leary 2011). Subsequent radiocarbon dating from in situ burnt material sealed in pit 018, and associated with only shell-tempered pottery, however produced a date of 55-219 cal AD (95.4% probability), or probably 67-136 cal AD (SUERC 36830), indicating a Roman late 1st or 2nd second century AD date rather than an Iron Age date.

5.19 In the 2016 excavations, considerably more of this pottery was found in Trench 1 than had been available previously, including one full rim and upper body profile (Figure 52.1) from the upper fill of the south ditch (009) and the construction slot (026). Previously only the distinctive pointed, bevelled and internally lipped rim had been available. Evidence for a constricted neck and start of a rounded shoulder was evident only as non-joining separate body sherds, which could have been from another vessel type, such as sherds from pit 018 (Figure 52.2).

5.20 In 2011 parallels were sought chiefly for the rims and striking analogies found for both the fabric and rim style in a pair of shell-tempered, straight-sided jars excavated from below the timbers of a prehistoric trackway at Fiskerton in Lincolnshire, dated by dendrochronology to sometime in the fourth century BC (Elsdon and Knight 2003). Knight suggested that the distinctive rims were perhaps for securing organic lids (2002, 127). Whatever the reason, this type of rim either survived into, or was revived in, the Roman period and flourished in the late third and fourth centuries AD in classic Dales Ware (Gillam 1951). Dales Ware proper is described in the National Roman fabric collection (DAL SH: Tomber and Dore 1998, 157) as a shell-tempered ware but with hard, black and harsh surfaces, unlike the Whirlow material. From the technical viewpoint, however, both groups were handmade and a wheel of some type was used in forming the rim (Loughlin 1977, 87). The Whirlow material, given the radiocarbon results from pit (018), could fall into a category called Proto-Dales Ware at Dragonby (May 1996, 517), where similar pottery was found in contexts of early second to early third century date; classic Dales Ware appearing separately later in the third century.

5.21 At Dragonby it was not possible to identify a continuous native tradition for Proto-Dales Ware from the Iron Age into the Roman period, but it was thought perhaps to have developed from local native wares such as Trent Valley ware (e.g. Swan 1978, 26; see also MM group above). Interestingly, an example of a complete jar with the distinctive rim was excavated from a late first century AD context in Chesterfield during 1974-78 (Ellis 1989, 108 fig. 19.4) and the fabric was identified as Trent Valley ware (*ibid.,* 106 Fabric 47). A wide chronological gap, however, remains, between the shell-tempered finds from Fiskerton and the Chesterfield jar and issues around the 'problematic shell-tempered fabrics of Lincolnshire and south Nottinghamshire' continue well into the Roman period (Knight *et al.,* 2012, 72: Research Objective 5A). Similar issues over the origin and dating of shell-tempered Dales type material from Iron Age and Romano-British sites are present also in Yorkshire, for example with pottery from settlements amongst the brick-planned field systems (Cumberpatch 2013; Leary 2013b, 121-2) which extend southwards into north Nottinghamshire and Derbyshire.

5.22 A final shell-tempered piece is an abraded, everted, flattened rim sherd (SH1, Figure 52.6) in a dark reddish brown fabric, blackened in parts, containing white flecks, voids and a visible shell imprint. It may be from a pre-Roman Iron Age ?bowl or ?lid (*cf.* e.g. Dragonby, May 1996, fig. 19.20, 5: Ceramic Stage 1) or contemporary with the SH Dales type ware. Found inside the 'floor surface' in the building defined by wall F006 (023), no other pieces in the same fabric were recognised on site.

Figure 51. Sherds of shell-tempered ware from pit (018) (scale = 1cm graduations).

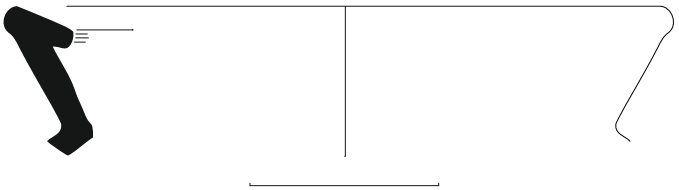


Figure 52.1. Everted rim and neck (009/026).

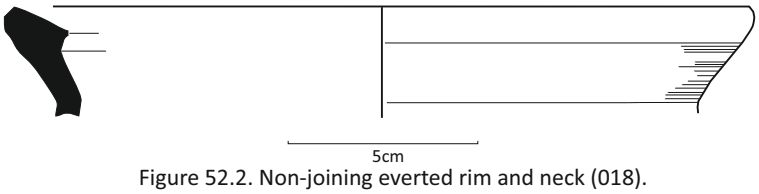


Figure 52.2. Non-joining everted rim and neck (018).

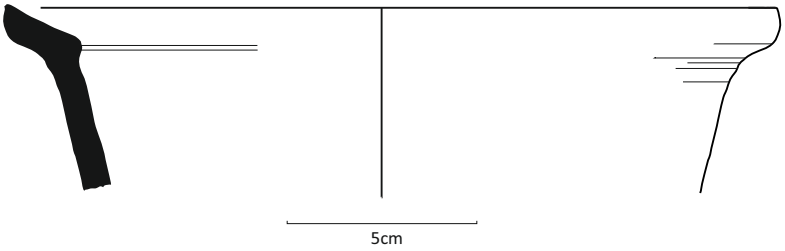


Figure 52.3. Everted rim (026).

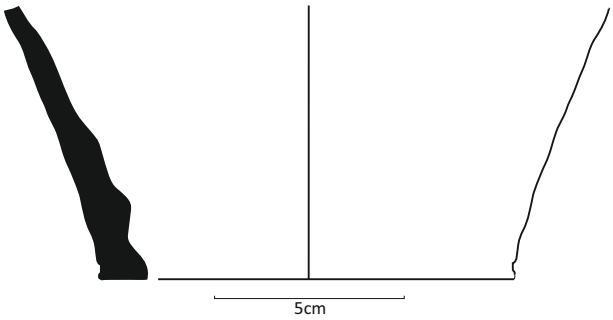


Figure 52.4. Partial base and body (009/026).

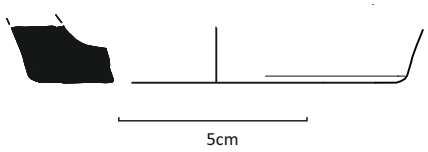


Figure 52.5. Partial base and body (009/026).

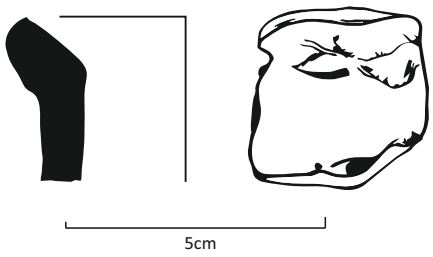


Figure 52.6. Everted flat rim (023).

Figure 52. Selected sherds of shell- tempered ware labelled with finds number and context.

Ware group	**Fabric**	**Count**	**Weight**
Black Burnished ware 1	BB1	44	181g
Black Burnished ware type 2	BB2	1	14g
	?BB2	2	12g
Derbyshire ware	DBY	187	2549g
Mancetter-Hartshill mortaria: post AD140	MAH WHa	1	30g
Pre AD140	MAH WHb	1	59g
	?MAH WHb	3	14g
Mercia Mudstone group	MM	1	6g
Medieval/post-med/modern (stratified)	med/pm/mod	10	30g
Oxidised wares - fine fabric	OA	22	80g
- soft, gritty fabric	OA1	10	39g
- hard, gritty fabric	OA2	2	3g
Reduced wares - fine	GRA	2	6g
- gritty	GRA1	45	750g
Samian	samian	12	55g
	?samian	3	40g
Shell-tempered ware - coarse	SH	538	3055g
- fine	SH1	1	7g
Totals		**893**	**7101g**

Table 2. Pottery Groups from 2011 and 2016 excavations

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Condit.	Part	Form	Comment
001	4		grey w. GR1	RB	1	6	7-8	v	body		
001	4		gritty ox. w. (soft) OA1	RB	1	5	6	a	body		
001	4		DBY	RB	1	4	7	u	body		
001	3		?MAH WH	RB	1	6	5	v	?rim+ angle		pale pink w. quartz and ferrous inclus. cf. mortarium 005.1A
002	4		SH	RB2-3	1	7	7	a	body		
002	4		SH	RB2-3	1	1		v	fg		
002	4		?samian	RB2	1+fgs	2	>3	v	body flakes		?burnt
002	4		samian	RB2	1	1	5	v	rim		beaded rim
002	4		samian	RB2	1	1	4	v	?rim		
002	3		SH	RB2-3	1	4		v	rim		int. bevel
002	3		SH	RB2-3	2	1		v	fgs		
002	3		gritty ox. w. (soft) OA1	RB	1	18	8-10	v	body		
002	3		gritty ox. w. (soft) OA1	RB	2	3	6	v	body		
002	3		samian	RB2	1	<1		a	fg		trace of red gloss
003	1A		grey w. gritty GR1	RB	3	32	3-4	a	body		
003	1A		grey w. GR1	RB	1	1	3	a	shoulder		
003	1A		grey w.GR1	RB	1	30	5	a	body		incised horiz. line
003	1A		grey w. GR1	RB	1	235	10	a	base	jar	c. 40% diam. 15cm, turning marks int. & ext.

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Con dit.	Part	Form	Comment
003	1A		DBY	RB140+	3	58	7-8	u	body		
003	1A		DBY	RB140+	1	3	5-10	u	?rim		incomplete
003	1A		BB2?	RB	1	8	6	a	base	?bowl	Int. burnished & black w. circular lines
003	1A		SH	RB2-3	5	18	5-7	v	body		
003	1A			mod	1	4	>16	u	fg		?brick fg.
003	1A		natural		2						sandstone
003	1A		natural		2						shale rock
003	1		BB1	RB	1	42	8-9	a	base*	jar	diam.c.10cm
003	1		grey w. GR1	RB	1	<1	3	v	fg		
003	3		?MAH WH	RB	1	6	5	v	body		ext. ridges, fabric cf. 001.3 & 005.3
005	?1		DBY	RB140+	1	10	5	u	body		
005	?1			med	1	2	6	v	body		cf. 001.3 abv.
005	?1		gritty ox. w. (soft) OA1	RB	1	<1			fg		fired
005	?1A	19	fine ox. OA natural	RB	4 1	3	7	v	body + 3 fgs		black int., ox ext. Fine-grained, laminated fabric with voids >1mm & ferrous inclus.; smooth surfaces gritstone
005	?1A	20	fine ox. OA	RB	1	3	8	a	base		black int., ox ext. Burnt residue int.
005	1A	21	DBY	RB140+	1	31	7-9	u	body		
005	1A	22	fine ox. OA	RB	1	2	8	a	body		cf. 19 & 20 abv.
005	1A	23	fine ox. OA	RB	3	2	5-8	v	body+fg		cf. 19 & 20 abv.
005	1A	24	BB1	RB	1	5	7	a	rim		incomplete, everted
005	1A	25	fine ox. OA	RB	1	2		a	?rim/base		Int. surf. missing
005	1A	26	fine ox. OA	RB	1	5	6	a	body		black int. cf. 19 & 20 abv.

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Con dit.	Part	Form	Comment
005	1A	34	samian	RB2	2	20	6	a	body - flakes		trace of red slip on one ?CG
005	1A	35	grey w. GR1	RB	1	20	6	a	body + start of base		
005	1A	36	gritty ox. w. (soft) OA1	RB	1	4	6	v	base		
005	1A	37	grey w. GR1	RB	1	10	4	a	body		
005	1A	39	DBY	RB140+	7	41	6-7	u	body		
005	1A	40	DBY	RB140+	1	5	7	u	body		
005	1A	41	DBY	RB140+	1	3	6	u	body		
005	1A	42	grey w. GR1	RB	1	4	6	a	?neck		
005	1A	43	DBY	RB140+	1	11	6-8	u	rim		cupped rim - dark grey & smaller than rims in 026
005	1A	52	grey w. fine GR	RB	1	1	3	v	body		
005	1A	54	MAH WH	RB pre 140/50	1	59	7-8	v	body, lower	mortarium	int. tituration, mixed materials[‘}}
009 (026)	1		SH	RB2-3	226	1154	6,8, 12	a	rims**, body, neck & bases**	jars – 2	rims c. 20cm (c.43%) & c.20cm diam. (c.15%) 2 different neck sherds 2 different base sherds (Illust. nos 14, 17,18)
009 (026)	1			mod	1	2	3	u	body		flower pot type fabric. Ext. incised horizontal line
009 (026)	1		fine ox. OA	RB	1	2	6	a	base		cf. 19 et al. abv.

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Con dit.	Part	Form	Comment
023	1		DBY	RB140+	1	4	6	u	body		
023	1A		grey w. GR1 grey w. GR1	RB RB	3 1	17 3	4-6 2-3	v v	body body		
023	1A		SH1	?PRIA	1	7		a	rim*		everted & flat; brown, laminated and voided fabric w. shell impression
023	1A			mod	2	1	3-5	a	body		19C white glaze
023	1A		natural etc		3						?slag, daub, ?pot fgs.
023	1/1A	55	gritty ox. w. (hard) OA2	RB2+	1	1	4	a	body		cf. find 46 from WHIR 2011 (023)
026	1		SH	RB2-3	8	75	8-10	a	body		
026	1		BB1	RB	17	48	4-6	a	?rim incomplete + body		rim fg. burnished
026	1		SH	RB2-3	5	95	8-9	a	rims**	jars - 2	2 rims join – old breaks ; 2 vessels (Illust. no. 16)
026	1		BB1 + 2	RB	8	65 (BB2-14g incl.)	5-7	a	rims 3** (1 incomplete) + body	jars 2 dish 1	3 pots, 2 w. burnish; everted, beaded rim BB1 and everted flat rim BB2, drawn. (Illust. nos 2,3)
026	1		grey w. GR1	RB	7	86	6-7	a + v	rim, body, base *	dish	one pot; probably same pot as find 2011/009/48 - diam. c. 17cm, c.45% (Illust. no. 12)

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Con dit.	Part	Form	Comment
026	1	" "	SH	RB2-3	83	568	7-10	a	rim* + body	jar	glassy int. residues NB sherds >4cm in size
			burnt mat.		1						2cm
			natural		1						gritstone 2mm
026	1	" "	DBY	RB140+	65	1541	7-12	u	rim, cupped* +body +base	jar	*c.*18cm diam. 80% of rim body purplish (Illust. no. 4)
					1	155	15	u	base	jar	8cm diam. 90% of rim grey
026	1	" "	DBY	RB140+	2	10	9	U	body		grey ?join
					5	115	5	U	rim+*	jar	cupped rim *c.*16cm diam. *c.*13% of rim; cf. (009) no. 48 rim WHIR (2011) (Illust. no. 5)
					1	88	5	U	rim+*	jar	hooked rim *c.*18cm diam. 20%. cf. DAJ 123, 19 no. 14 (Illust. no. 6)
					76	104	5-7	u	body		various
028	4		SH	RB2-3	1	34	12	a	body + part of base	jar	similar dimensions to heavy base from 009/026 drawn; diam. c. 10cm
			samian	RB2	1	15	5	v	rim and body	dish - Form 36	outcurving, trace red gloss under; diam. c. 18cm, c.15%
			?samian	RB2	1	36	7	v	base	dish or bowl ? Form 36 or 37	footring, ?CG diam. 8cm, c. 35%
			DBY	RB140+	1	35	10	u	rim	jar	cupped, grey

Context	Trench	Find no.+	Fabric	Date	Count	Wgt g	Body mm	Con dit.	Part	Form	Comment
038	5	signal stat.		?mod	1	3					?brick- ox., hackly, v. hard
044	3		gritty ox. w. (soft) OA1	RB	3	3	7	v	body+2 crumbs		
			SH	RB2-3	1	7	7	v	body		
			grey w. GR1	RB	1	10	5	a	body		
				mod	1	1	2	v	body		white glaze
			natural		1						burnt shale rock
055	1	53	fine ox. OA	RB	3	1			crumbs		black ?int.
057	1	48		post-med	1	2		v			?brick - handmade
057	1	49	samian	RB2	1	5	8	v	body		red gloss ext.
057	1	56	ox. OA	RB	1	1	9	a	?complete	?tessera	9mm sq. ox. 2 opposed surfaces, 1?worn, grey core; fabric fine quartz and mica flecks; cf. e.g. Swanpool or Rossington Bridge
057	1	59	?BB2	RB	1	4	>9	v	?base		int. surface ?burnished
057	1	60	ox. OA	RB	1	5	5	v	rim*		Out-turned and hanging rim; thin red ext. coating, grey core; fabric quartz and dark materials + ? mica flecks; cf. ?Cantley material (Illust. no. 9)
057	1		MAH WH	RB L2-E3	1	30		a	rim & start of lip*	mortarium	fabric hard & pinkish grey/white; hammer-head rim (Illust. no. 7)
			samian	RB2	1	3		v	rim	?Form 35 – cup	outer ledge, red gloss int. & ext.

			samian	RB2	1	2	5	v	rim	?Form 37 - bowl	bead, red gloss int. & ext.
			samian	RB2	1	4	4	a	body		red gloss int. & ext.
			samian	RB	1	1		v	flake		
			grey w. GR1	RB	1	6	4	a	body		
			fine ox. OA	RB	4	31	5	u/a	body		black int., ox. ext.; larger sherds than before, hard, smooth surfaces – wheel-turned
			fine ox. OA	RB	1	23	7	a	body		black int., ox. ext.. as above
			clay		2						fired
			natural		3						chert-1 burnt
058	1A	61	DBY	RB140+	1	3	7	u	body		grey
059	1A		DBY	RB140+	2	16	6	u	body		grey
unstrat			grey w. GR1	RB	1	5	3	a	rim	jar	hooked rim – probably same pot as WHIR 11 003.39*, diam. c. 14cm (Illust. no. 10)
				med	1	10	5	v	rim		round, ext. traces brown/yellow glaze, gritty ox. w.
				mod	1	12	4	u			flower pot like – v. hard, ox.

Table 3. Pottery Catalogue.
KEY: * Drawn or to be drawn, u Unabraded, a Abraded, v Very abraded

Discussion

5.23 There are hints in the pottery assemblage of possible late pre-Roman Iron Age or very early Roman activity on the site. These comprise the single find of MM ware plus possibly the shell-tempered SH1 rim and two early GR grey ware rim sherds. By the early second century there was at least one pre-AD 140 mortarium (MAH WH) on site and some early pre-Derbyshire ware vessels in OA fabrics, along possibly with some samian. It is notable that this early material is present in small quantities and largely as small, abraded sherds re-deposited with mid to later second and third century products, which form the bulk of the finds. These include SH shell-tempered jars made somewhere east of the River Trent, DBY Derbyshire ware jars from kilns in south Derbyshire, GR grey ware jars and bowls probably from kilns in South Yorkshire and BB1 Burnished ware jars and a BB2 bowl possibly from Rossington, South Yorkshire or Dorset.

5.24 Some types such as DBY and BB wares continued in production into the fourth century and some activity into that century could be implied by radiocarbon dates from charcoal in the fills of construction slot (026) and posthole (059). Fill of construction slot (026), lying across the site's entrance, probably represents the site's abandonment sometime between 225-385 cal AD (95.4% probability), or probably 247-332 cal AD (68.2% probability) (SUERC-70711). The fill of posthole (059) produced a similar date of 238-385 cal AD (95.4% probability), or probably 251-339 cal AD (68.2% probability) (SUERC-70718). Pottery in the upper fill of (026), free of contamination from later material, comprised large quantities of DBY from three jars, lesser quantities of SH and BB1 jars and parts of a GR dish (Table 2). Posthole (059) contained only DBY sherds as did floor surface (058). Given the earlier radiocarbon date from pit (018) containing only SH sherds (see above), it is possible that DBY jars were the later arrivals on the site. The radiocarbon date from pit (018) is important for the debate over the origins and development of Dales type wares discussed above, in that it offers a rare fixed time scale amongst issues which range in date from the Iron Age into the late Roman period and over a wide geographical area of the East Midlands and north-eastern England. It provides proof that not all Dales type wares date from the later third and fourth centuries AD, an assumption often made.

5.25 Worth noting also is the site's access to both shell-tempered Dales type ware and Derbyshire ware, two wares with virtually exclusive distributions which may preserve Iron Age cultural boundaries between the Corieltauvi and Brigantian tribes (May 1996, 518). Alternatively, or perhaps additionally, this could represent the result of market forces and successful competition from wheel-thrown Derbyshire ware products from west of the River Trent (Loughlin 1977, 87). Apart from forts such as Doncaster, Templeborough and Brough on Noe, the two wares have only been found together in a few rural sites in north Nottinghamshire, north-east Derbyshire and South Yorkshire (Loughlin 1977, 116, 136-7, fig. 7; Buckland *et al.* 1980, 159). Such sites in the Sheffield region include Fulwood, Whaley, Smarson Wood, South Anston together with Snape Close and Scarcliffe Park. Several have a produced a similar range of pottery to that from Whirlow (Radley 1967; Radley and Plant 1969a and 1969b; material deposited in Museums Sheffield).

5.26 This assemblage is domestic in character and dominated by storage and cooking jars (at least 17 in different sizes and fabrics) but also includes some table wares such as a dish, bowl and cup in samian and dishes in BB2 and GR ware. Mortaria pieces suggest food preparation and some degree of a Romanised lifestyle. The low quantity and poor condition of the samian is characteristic of other Romano-British rural settlements regionally e.g. Lodge House, Smalley (11 sherds out of 1865 sherds: Leary 2013a, 130-3) and Ockbrook, near Derby (2-3%: Leary 2011, table 5). In general, the assemblage does not reflect a high status site and there is little evidence for long distance trade in fine wares, but it appears to have had access to local markets for regionally produced coarse wares.

Coarse Stone
John Cruse and Clive Waddington

5.27 The coarse stone assemblage from the Whirlow excavations all comes from Trench 1. It consists of four flat circular sandstone objects, one quernstone and two pieces of semi-dressed stone.

Quern Stone (Figure 53)
5.28 An unstratified beehive quern rough-out fragment from context (003) was recovered from Trench 1. The fragment consisted of 65-70% of the original rough-out, the remaining section had been removed by a choidal fracture. The absence of a secure stratigraphic position or sealed context makes it impossible to determine whether this block was fractured due to an accident in the finishing process or due to deliberate breakage before its working features were completed. The intended grinding surface has started to be prepared, with *c.*50% of the central area being flattened and dressed smooth, but the outer area was only roughly dressed (+/-5mm unevenness). It has two areas of minor damage to its edge. No central perforation was present. The basal area was roughly dressed and hemispherical, but lacked any of the normal peck-dressing to its visible upper sides.

5.29 The lithology of the fragment is medium grained sandstone of the Millstone Grit type. It measures *c.*300mm in diameter with a maximum height of 115m and a weight of 6.6kg, and would likely have weighed approximately 10kg while intact. The reconstructed width of 300mm is well within the typical beehive range of 180-340mm.

5.30 From the Heslop (2008) corpus of beehive quern stones, 69% of his North Yorkshire and County Durham examples are within 130-200mm high, with 92% within 100-240mm high. As these querns are often worn, one might expect that most rough-outs would be >150mm high to have a reasonable use-life. The thinnest rough-outs in Heslop (2008) were 140mm. In comparison, this beehive quern is surprisingly modest. Such thin querns are found at sites, such as those on the Wolds, where supplies of good quality stone are limited, but this explanation is unlikely to apply in the Sheffield area.

5.31 Typical unworn upper stones have weights in the range of 20-25kg and querns are usually worn-out before they reduce as far as 10kg. As a result this rough-out is likely a lower stone, which doesn't have a minimum effective weight.

5.32 Quern stones of this type were used from the Late Iron Age until well into the Roman period.

Figure 53. Beehive quern rough-out fragment from upper ditch fill (003) (scale = 0.1m graduations).

Possible Support Block (Figure 54)

5.33 An unstratified irregularly rounded block, with a flattened top and an uneven base was recovered from the upper fill of the perimeter ditch (003) in Trench 3. The lithology of the block is medium grained sandstone of Millstone Grit type. The block measures between 360-410mm in diameter and 110-120mm in height, weighing 30kg.

5.34 Two opposed faces around its edges are parallel to each other (360mm apart) and apparently unworked, suggesting that this was the original width of the slab, which was >410mm long. The upper surface has been roughly worked flat, with a slight central ridge and depressions of 5-15mm either side. Its upper edges have been dressed into a *c.*360mm circle to a depth of *c.*25mm, where it shelves out along a 25mm ledge to a wider *c.*410mm diameter for its lower portion (except where limited by the natural surfaces). Three of four impacts have affected *c.*40% of the edges, including one major fracture which removed *c.*10% of the basal area. Otherwise the base has its original broad, irregular faces with no evidence of the rough hammer dressing which is normally found.

5.35 A possible interpretation of this block is that an attempt was made to dress a 360mm side slab into a 360mm disc hand quern, but was abandoned after only preparing the upper surface. This explanation is not very convincing as Roman disc querns usually have a minimum diameter of 380mm and the ledge below the dressed

area appears to have been a deliberate feature, not completed working. The casual treatment of the basal area is also untypical of Roman disc querns.

5.36 A more likely interpretation of this block is that it is a completed support block. If set into the ground with only the upper 25mm circular area protruding, this block would serve as an architectural support for a wooden post or a stone column, or for some other object that needed a substantial foundation. This interpretation explains why only the upper area needed to be neatly dressed and the basal areas were neglected.

Figure 54. Possible Support Block from Trench 3 (003) (scale = 0.1m graduations).

5.37 No aspect of these dressed features has any obvious chronological significance.

Dressed stone block (Figure 55)

5.38 A squared block of medium-grained quartzitic sandstone broken across one of its main axes was recovered from the fill of the Roman phase construction slot across the west entrance causeway (026). It measures 240mm along its intact longest axis by 95mm at its thickest. Its other axis is of unknown length because of the break. It may have been deliberately chamfered at one of its narrow ends. It is likely to be a building stone used in a stone-walled building. It is a grittier sandstone and less 'platey' than the sandstone available on site which is a finer-grained sandstone with less quartz content and that fractures in thin plates. Although this medium-grain sandstone is still available in the nearby local geology, this material is a much better building stone than the on-site sandstone and has clearly been selected for its properties and then quarried and brought to the site. This indicates intentional targeting of stone resources and its movement across the wider area, as well as implying the presence of stone building/s on the site during the Roman phase of occupation.

Figure 55. Dressed stone block recovered from Roman construction slot (026) across the western entrance causeway.

Sandstone disc (Figure 56)

5.39 A large roughly circular sandstone disc made from the local fine-grained sandstone available on site averaging 90mm in diameter and 17mm thick. It has been roughly shaped and is otherwise unremarkable. It is likely to be a cooking pot lid of a crude type common on the military sites of northern England. It was recovered from the Roman phase enclosure ditch fill (003) within the Trench 1.

Figure 56. Sandstone disc recovered from the upper fill of the enclosure ditch (003).

Sandstone disc (Figure 57)

5.40 A large roughly circular sandstone disc made from the local fine-grained sandstone available on site averaging 39 mm in diameter and 15 mm thick. It has been very roughly shaped and is otherwise unremarkable. Although very similar in form to sandstone disc 4 its small size would be unusual for a cooking pot lid. It is too large for a gaming piece and therefore, on balance, it is considered most likely to be a pot lid for a small cooking or boiling vessel. It was recovered from the Roman phase enclosure ditch fill (003) within the Trench 1 extension area (ie. north side) close to sandstone disc 4.

Sandstone disc (Figure 57)

5.41 A large roughly circular sandstone disc made from the local fine-grained sandstone available on site averaging 40 mm in diameter and 14 mm thick. It has been roughly shaped and is otherwise unremarkable. Although very similar in form to sandstone disc 4 its small size would be unusual for a cooking pot lid. It is too large for a gaming piece and therefore, on balance, it is considered most likely to be a pot lid for a small cooking or boiling vessel. It was recovered from Roman phase enclosure ditch fill (009) in the terminus area of the ditch to the south of the entrance causeway within Trench 1.

Sandstone disc (Figure 57)

5.42 A large roughly circular sandstone disc made from the local fine-grained sandstone available on site averaging 44 mm in diameter and 10 mm thick. It has been roughly shaped and is otherwise unremarkable. Although very similar in form to sandstone disc 4 its small size would be unusual for a cooking pot lid. It is too large for a gaming piece and therefore, on balance, it is considered most likely to be a pot lid for a small cooking or boiling vessel. It was recovered from the Roman phase interior floor area (023) of the stone-founded building (F026) in Trench 1.

Figure 57. Sandstone discs recovered from Trench 1. Left to right: upper ditch fills (003), (009) and floor surface (023).

Chipped Lithics
Clive Waddington

Introduction
5.43 A total of 19 chipped lithics were retrieved from Trenches 1, 3 and 5 of which six were retrieved from the unstratified topsoil (001) and one from the unstratified subsoil (002) in Trench 1, nine from stratified deposits within Trench 1, two from the shallow ditch fill (033) in Trench 3 and one from the construction fill (037) in Trench 5. The pieces from stratified deposits are considered to be residual from earlier activity on the site and therefore represent material that has become incorporated into the Late Iron Age and Roman deposits on the two sites. All finds were located according to the context in which they were found and each find was bagged and given a unique find number. Measurements are given for complete pieces only in accordance with lithic recording conventions (Saville 1980). A full catalogue with details of each individual lithic was produced (Table 4). Table 5 below shows the breakdown of lithic types by context. Although the assemblage of lithic material is small, those that can be ascribed to a period are all typical of the Mesolithic period.

Chronology
5.44 Most of the assemblage sits comfortably in the later Mesolithic lithic tradition (*c*.8400-4000 cal BC), as evidenced by the concern for blade production, many with triangular sections and being small and narrow, and the occurrence of three microliths and a typical small end scraper made on a blade. Clearly this material dates to a far earlier phase of activity on the site than that belonging to the Late Iron Age and Roman periods.

Distribution
5.45 The inclusion of flint artefacts in a range of deposits, including the unstratified topsoil, reveals little other than lithic material becoming incorporated into later deposits when the ground was disturbed to construct the Late Iron Age and Roman features on the site.

SF No	Context	Material	Colour	Provenance	Type: General	Specific	Core RS	Period	L (mm)	W (mm)	T (mm)	Notes
62	1	flint	dark grey	nodular	flake		Prim	neo?	40	58	18	
63	1	flint	dark grey		flake				22	16.5	2	
64	1	flint	light grey		blade		Sec	mes?	41	12.5	7	
65	1	flint	light grey		flake				20.5	14.5	1.5	
66	1	flint	light grey		utilised blade		Ter	mes				utilised micro blade with broken tip
67	1	flint	med grey		flake		Sec					broken chip
68	3	flint	brown	glacial?	utilised blade		Ter	mes?				broken or snapped segment form a utilised blade
69	3	flint	med grey		flake							broken chip
70	5	flint	light grey		retouched flake		Sec		22	23	13	
71	13	flint	light grey		microlith		Ter	mes	26	9	3	narrow blade microlith approximating to a crescentic type
72	13	flint	light grey		retouched blade		Ter	mes?				broken
73	13	flint	med grey		scraper	end	Ter	mes	30	15.5	7	
74	2	flint	light grey	glacial	retouched flake		Ter	mes?	19	15	4	
75	3	flint			flake		Sec					broken and heavily burnt
76	33	flint	med grey		flake	rejuvenation	Sec	mes	10.5	11	4	
77	5	flint	med grey	glacial	flake		Sec		22	9	8	
78	5	flint			flake		Sec					broken and heavily burnt
79	33	flint	light grey	glacial	microlith		Ter	mes	28	14	3.5	bladelet with unifacial retouch at distal tip with hinge fracture at tip suggesting tip-end broken off after impact
80	37	flint	light grey		flake				21	12	3	abraded and rounded flint flake

Table 4. Full catalogue of lithics.

Raw Material

5.46 All the lithic raw material recovered during the excavation is flint, of which one large flake is from a nodular source (chalk bearing strata), and four are probably from a glacial, or secondary, source, the rest of the material having no, or insufficient, cortex remaining to indicate their provenance. The nearest nodular source is the Lincolnshire Wolds which lie 55km distant from the site at their nearest point. The nearest sources of secondary flint probably lie in the tills and sand and gravel deposits of the Trent Valley. Any flint found on the site has, therefore, to have been imported and this indicates that material was being brought to the site over a considerable distance during the Mesolithic. It should be noted that the nodular flake (small find 62) is not attributable to any period, but given its larger size it might suggest that this piece is of later date than the Mesolithic material, and therefore there may have been a different pattern of flint acquisition obtaining in later periods.

5.47 There are nine light grey, five medium grey, two dark grey and one brown coloured flints. The range of colours is likely to reflect a variety of different sources, although there can be much variation in flint colour, even within a single nodule. Much of the flint is of high purity with very few pieces being speckled. Those pieces not attributed a colour were too heavily burnt for their colour to be identified.

Flaking and Manufacture

5.48 The assemblage displays evidence for the use of both hard and soft hammer working, with most of the edge-trimming and retouch being unifacial. The manufacturing tradition for Mesolithic material relies on a blade-based technology that includes slender blades where possible, but also thicker stubby blades when the raw material dictates. The blades typically have a triangular section and the production and use of microblades is featured within the assemblage. The rejuvenation flake from shallow ditch fill (033) (small find 76) indicates flint chipping on the site and the need to carefully curate cores so that they can be re-used until they are exhausted. This indicates the intentional and careful husbanding of this raw material so as to maximise its use. Given the distance to source for this raw material the need to maximise use and recycle pieces until they are no longer usable is not surprising.

Types

5.49 A range of tool types is present in the lithic assemblage and these are summarised in Table 5 below.

5.50 The presence of processing tools, such as the various retouched and utilised pieces and the scraper, indicate a wide range of processing activities, which are usually taken as an indicator of settlement sites (Schofield 1991, 1994). The presence of the scraper might imply that hide-working was an important activity. The presence of two microliths, and a third possible microlith (utilised blade 30), indicates that the use and maintenance of hunting weapons took place on the site, suggesting that hunting, and perhaps fishing, might have been an important activity in the areas around the site.

`	Trench 1 Unstrat. (001)	Trench 1 Unstrat. (002)	Trench 1 Upper ditch fill (003)	Trench 1 Lower ditch fill (013)	Trench 3 Shallow ditch fill (033)	Trench 1 Metalling (005)	Trench 5 construction slot (037)	Total
Flakes	3		2			1	1	7
Rejuvenation flake					1			1
Core						1		1
Utilised blades	2		1					3
Retouched blade				1				1
Retouched flake		1				1		2
Scraper				1				1
Microliths	1			1	1			3
Total	6	1	3	3	2	3	1	19

Table 5. Summary of lithic types by context.

Discussion

5.51 The area around Whirlow Hall Farm has evidently formed a focus for Mesolithic activity, as evidenced by the Mesolithic material recovered by the fieldwalking survey as well as by the finds from these excavations. The main Mesolithic lithic scatters identified by the fieldwalking included two fields to the north-west of the excavation trench on rising ground close to the eastern lip of the Limb Valley. The valley provides a natural routeway for both animals and humans and gives access from the head of the Sheaf valley on to the high moorlands above. Trench 1 was located in a similar setting, although in this case it is set back from the edge of the valley side by approximately 140m. By being located over the lip of the eastern valley side groups would have been sheltered from the prevailing westerly winds while also being strategically located to monitor and control human and animal access up and down the valley. This would have afforded many opportunities to take a variety of animals, such as red and roe deer, wild pig and so forth, as well as to trap fish in the Limb Brook and take nesting birds form the rich woodland that would have mantled much of this area. The Limb Brook itself would have provided freshwater, whilst the area chosen for the settlement-type activities evidenced by the flint assemblages would have been relatively free-draining. The abundance of foodstuffs available in this general location must have been an important draw. Animals will have been attracted to water in the Limb Brook, whilst fish, fowl and birdlife could also have been easily taken. Furthermore, the plant foods and vegetation within and above the Limb Valley would have provided important sources of food, building materials and possibly clothing.

Figure 58. Selection of Mesolithic flint tools recovered from Trench 1. Left to right: 1-3 microliths, 4 utilised blade, 5 end scraper.

Copper Alloy
Jennifer Jones

5.52 Three copper alloy (CuA) objects from the excavation of the enclosure were submitted to Durham University for a conservation assessment and X-radiography. The objects (SF3, SF16, SF18) were X-radiographed on the same plate (XR 6287) using a range of different exposures, to try to recover maximum detail. The plates were processed and examined using an illuminated X-ray viewer. The objects were also examined under x16 microscopy to assess their condition and the potential for further conservation work.

5.53 SF3: A flat, circular CuA object 16mm diameter and 1.5mm thick, with the remains of a shank on one side. The X-radiograph revealed no decoration or other surface detail. This is possibly a small button or stud. X16 microscopy detected traces of gilding on the underside of the object, below the soil cover. The object is highly corroded but stable.

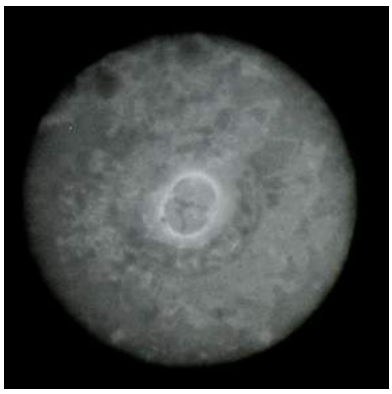


Figure 59. X radiograph of SF3.

5.54 SF16: An originally circular object c21mm diameter, varying in thickness from 0.6-1.25mm. The piece has been sharply bent and its edges are damaged, torn and fragile. X-radiography revealed no surface detail to identify this as a coin, and the variability in its thickness would perhaps suggest that it is not. Highly corroded and fragile but stable.

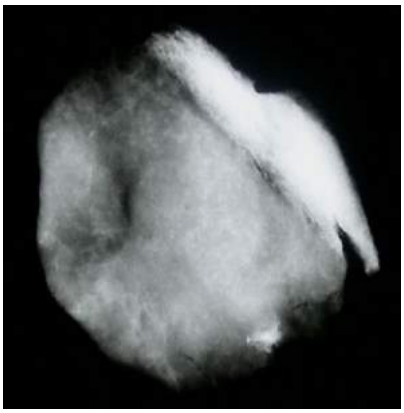


Figure 60. X radiograph of SF16.

5.55 SF18: Complete circular coin or token 26mm diameter and 1.5mm thick. The surfaces are covered by gritty soil which overlies a powdery corrosion surface. X-radiography revealed surface detail/legend, but the object does not appear to be a Roman coin. It may be a later coin, though no head could be discerned and the (indecipherable) legend appears to be set out in several short horizontal lines. The object is highly corroded but stable.

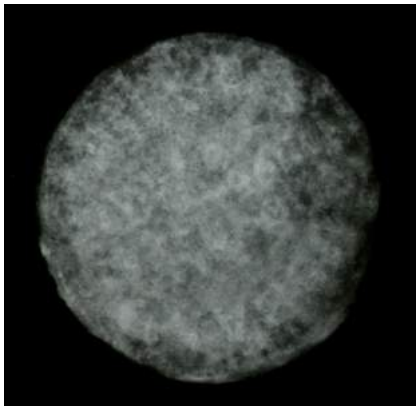


Figure 61. X radiograph of SF18.

5.56 If SF3 is archaeologically significant. It could be surface cleaned to reveal the extent of the gilding. No further conservation work is recommended for SF16. SF18 could be surface cleaned to reveal any surviving details of surface decoration or legend.

Furnace Materials, ferrous metal and glass
Louis Olivier Lortie and Roger Doonan

5.57 The assemblage comprised 18 objects which could be categorised into three different groups. Group1 comprised seven iron objects identified as six nails and one unidentified iron fragment. Group 2 contained two glass fragments; a bead and an unidentified fragment. Group 3 was composed of 9 fragments of metallurgical slag and/or cinder. The assemblage suggests that secondary iron working (smithing) took place in the vicinity of the area excavated.

Object	**Context**	**Quantity**
Iron nail	005, 023, 057	6
Unidentified piece	005	1
Non-diagnostic slag	001	2
Smithing hearth bottom	009	1
Blast furnace slag	001	2
Cinder	009, 023	3
Charcoal	001	1
Glass bead	001	1
Glass fragment	023	1
Total		**18**

Table 6. Summary of assemblage by context and quantity.

5.58 The hand examination and initial identification of material was undertaken in line with Historic England guidelines (Dungworth *et al*. 2015) aided by standard equipment where necessary. Slag and related materials were characterised and identified by assessing their porosity, colour, density, size, weight and their magnetism; as recommended (Dungworth *et al.* 2015, 13). Samples were recorded individually or as groups (within single context and material type category) in a standardised file-maker database used for the recording of archaeometallurgical assemblages.

5.59 Only those elements of the assemblage that came from stratified contexts were selected for microstructural analysis under a binocular reflective microscope. The selected samples were prepared by embedding them in UV stable conservation grade epoxy resin to facilitate surface preparation. Once mounted, each sample was ground to 1200 grit and then polished with diamond cloths. Diamond polishing to 1 micron revealed the microstructural detail of the samples. The polished sample was then observed under a binocular microscope to identify and characterise microstructures. Identification of key phases can help to identify specific processes and also reveals the conditions under which the slag formed and provides insight into furnace environment and other technological choices made by metalworkers (Bachmann 1982, 14-16; Dungworth 2011, 235).

5.60 The macroscopical investigation of this assemblage identified six nails, one piece of metal, 5 slags, 4 pieces of cinder and coal and two pieces of glass (Table 6). Of the six nails (Figure 64.1), one comes from a metalled surface (005), one other from the identified building floor (023) and four from a ditch (057) that is situated under context (023). The unidentified metal piece was found in context (005) which was interpreted as a metalled surface. Two of the slags found are modern in origin (Figure 64.2) and can be associated with the blast furnace process. These were found in the topsoil. The three other slags can be associated with a different process. Of these, two are non-diagnostic and were found in the topsoil. The last one can be identified as a fragment of a smithing hearth bottom (Figure 64.3) and was found in the enclosure ditch fill (009). Three pieces of cinder (Figure 64.4) were identified from different contexts (one from 009 and two from building floor 023), along with one piece of coal from the topsoil. Two pieces of glass were recovered; one perforated bead fragment from the topsoil (001) and one globular piece of blown glass (Figure 64.5) from the building floor (023).

Figure 62. Blown glass fragment from the floor area (023) of the stone-founded Roman building, possibly from a vessel of some sort.

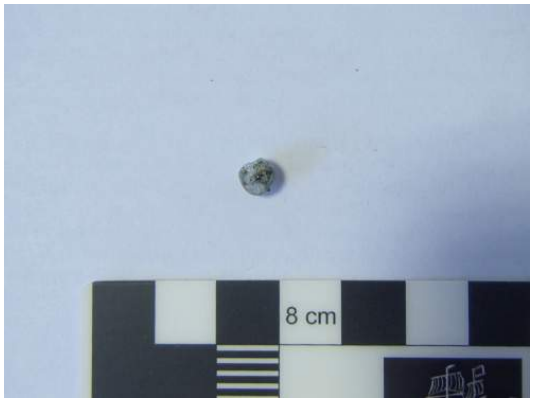
Figure 63.Blown glass perforated bead fragment from the topsoil (001) above the enclosure.

(1) Nail from metalled surface (005)

(2) Blast furnace slag

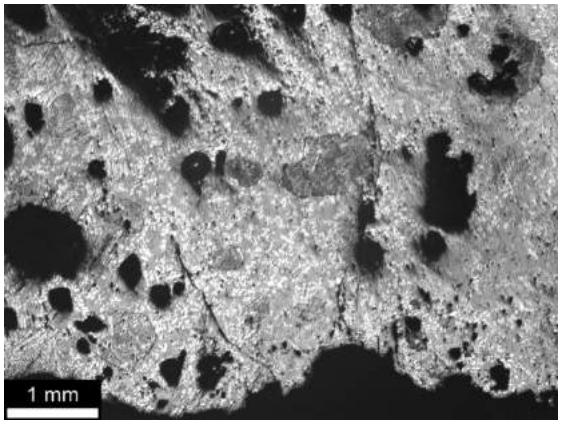
(3) Fragment of slag identified as a smithing hearth bottom

(4) Cinder

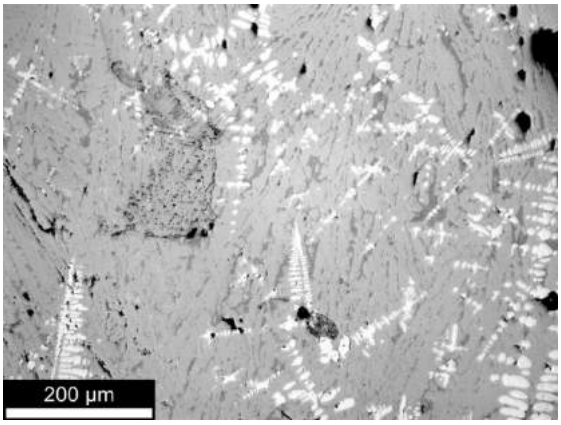


(5) Brown glass globular from building floor (023)

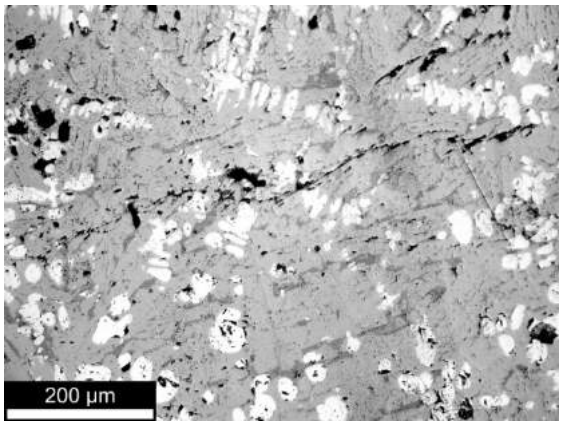
Figure 64. Furnace Materials, ferrous metal and glass



(1) View of Sample 9 (x5).

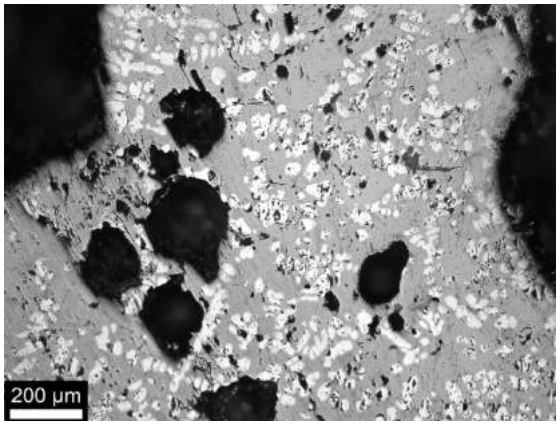


(2) Fine lath-like Favalite (x200).



(3) Isolated Wüstite dendrites, globular iron oxides and instances of magnetite spinels (x100).

(4) Wüstite with globular iron oxides (x100).



(5) Well-developed Fayalite crystals (x200).

Figure 65. The microstructural analysis of the assemblage

5.61 The microstructural analysis of the assemblage concentrated on one piece of slag that was selected for its context and its diagnostic nature: the smithing hearth bottom (Figure 65.1). The analysis revealed that the major phase of the sample is lath-like fayalite (Figure 65.2) which extended over the entire sample, but with isolated regions of well-developed fayalite (Figure 65.3) which tended towards an equi-axed structure in places. There was some correlation with fayalite form and Wüstite. In some areas, large networks of dendritic wüstite (Figure 65.4) could be noted whereas elsewhere isolated dendrites of Wüstite was present alongside globular iron oxides (Figure 65.5) and discrete concentrations of magnetite spinels.

5.62 This variation in iron oxide forms and, especially the co-presence of Wüstite and magnetite, illustrate that furnace conditions were variable, even across relative short distances. The formation of smithing hearth bottoms can take place over a considerable time, hours to days, and this variation can also indicate variation over time. The variety observed here indicates variable furnace conditions as would be expected for a smithing hearth, where hearth conditions no doubt ranged from mildly oxidising favouring the presence of magnetite to quite reducing favouring the presence of Wüstite (Figure 65.4). This must be considered typical for a low hearth that was blown by bellows and then left for short periods of dormancy and correlates well with what might be envisaged for a smithing hearth.

5.63 Overall, it should be noted that the assemblage was not large and that only a small part of the enclosure site has been excavated. The nails are likely to have derived from decayed timber structures. What material does derive from metallurgical activities is small in scale and for the most part non-diagnostic. One specimen (SF9) is most likely a fragment of smithing hearth bottom and points to iron smithing taking place in the vicinity of the enclosure. Limited microstructural analysis identified mineral suites which were considered quite typical for a smithing hearth bottom slag and can be seen to support the identification of this find as being derived from iron smithing.

5.64 Quantities of smithing slags are not unusual on Iron Age or Roman settlements (Bayley *et al*. 2008). While small-scale smithing was likely to have been undertaken routinely at such sites to address local needs it is also possible that smithing events also accompanied the foundation and construction of buildings. It is not yet clear what the smithing evidence at Whirlow relates to, but as the material came from a backfilling/abandonment deposit it is more likely to have been associated with routine day to day smithing activity.

Metal finds from the rectilinear enclosure recovered by metal detecting
Roger Doonan

5.65 The local geology is predominantly coarse-grained feldspathic sandstone and whilst there are no geological sources of relevance to metallurgical practice on site there are significant iron ore deposits in the nearby Limb valley associated with coal measure deposits. These outcrops have been exploited for iron production in presumably the late medieval period and again in the post–medieval period for Copperas for use as a fulling agent. Lead deposits are widespread in the nearby limestone geology to the west and the lead is known to have been exploited in the Peak District from at least the Roman period onwards.

5.66 Most finds reported here were recovered as part of a volunteer metal detector survey, although two are from the excavation, over the site of the rectilinear enclosure. The assemblage was examined and recorded according to English Heritage guidelines (Bayley *et. al*. 2001) and where appropriate material compared with reference material from TUSARC, 'The University of Sheffield Archaeometallurgical Reference Collection'. Metal objects were photographed, weighed and during examination assessed for active corrosion. In addition to routine examination a number of finds were examined using a NITON XLT3 XRF to determine bulk composition. Analyses were performed with a dedicated alloy calibration which has been shown to be effective for copper alloys and ferrous objects. Lead objects were analysed in standard alloy mode and electronic mode. No significant differences were found with these calibrations. All results are reported from standard alloy mode (see Table 7).

The assemblage
5.67 The assemblage could be divided in three main classes, lead artefacts, copper alloy artefacts and ferrous objects. Lead objects were the most common type encountered with some clear examples of made objects, but the majority seemed to derive from lead working.

Figure 66.SF13. Mis-cast spindle whorl/ weight (Scale = 5cm).

5.68 SF13 (Figure 66) is a truncated cone with a central hole presumably to facilitate attachment. The object is incomplete, most likely as a result of poor casting. The object weighs 56.5g. Compositional analysis by XRF indicates that the object is made of lead (see Table 7). Corrosion state: stable.

Figure 67. SF14. Lead fragment (scale = 5cm).

5.69 SF14 is a fragment of serrated lead bar (Figure 67). It is trapezoidal in cross-section. The object weighs 37.1g. Corrosion state: stable.

Figure 68. SF1. Plano-convex lead waste (scale = 9cm).

5.70 SF1 appears to be derived from metalworking (Figure 68). It is plano-convex in form suggesting that it has solidified within a hearth or similar portable vessel. It weighs 173g. Compositional analysis by XRF indicates that this object is a lead-tin pewter with a lead content of 75% (see Table 7 and discussion below). Corrosion state: stable.

Figure 69. SF12. Plano-convex lead waste (scale = 9cm).

5.71 SF12 is also derived from metalworking (Figure 69). It is plano-convex in form suggesting that it has solidified within a hearth or similar portable vessel. It weighs 249g making it the most significant of similar finds. Compositional analysis by XRF indicates that this object is a lead-tin pewter with a lead content of 45% (see Table 7). Corrosion state: stable.

Figure 70. SF2 Plano-convex lead waste (scale = 5cm).

5.72 SF2 is also derived from metalworking (Figure 70). It is plano-convex in form suggesting that it has solidified within a hearth or similar portable vessel. It weighs 18.5g and is small when compared to other examples. Corrosion state: stable.

Figure 71. SF9 Plano-convex lead waste (scale = 5cm).

5.73 SF9 is also derived from metalworking (Figure 71). It is plano-convex in form suggesting that it has solidified within a hearth or similar portable vessel. It weighs 68.9.5g. This sample was not subjected to XRF analysis but the corrosion products suggest that this is pewter. Corrosion state: stable.

Figure 72. SF10 Nodular lead waste (scale = 3cm).

5.74 SF10 is most likely derived from metalworking (Figure 72). It is a nodular fragment and probably represents discard at some stage in the working of lead or pewter. It weighs 34.6g. This sample was not subjected to XRF analysis. Corrosion state: stable.

Figure 73. SF11 lead Sheet with impressions (scale = 7cm).

5.75 SF11 is a fragment of lead sheet (Figure 73). It has been folded and retains the annular impressions. These are most likely the settings for some kind of fixing and suggests the sheet had been used as a patching material in some form of repair. The sheet fragment weighs 131g. Compositional analysis by XRF indicates that this object is lead (Table 7). Corrosion state: stable.

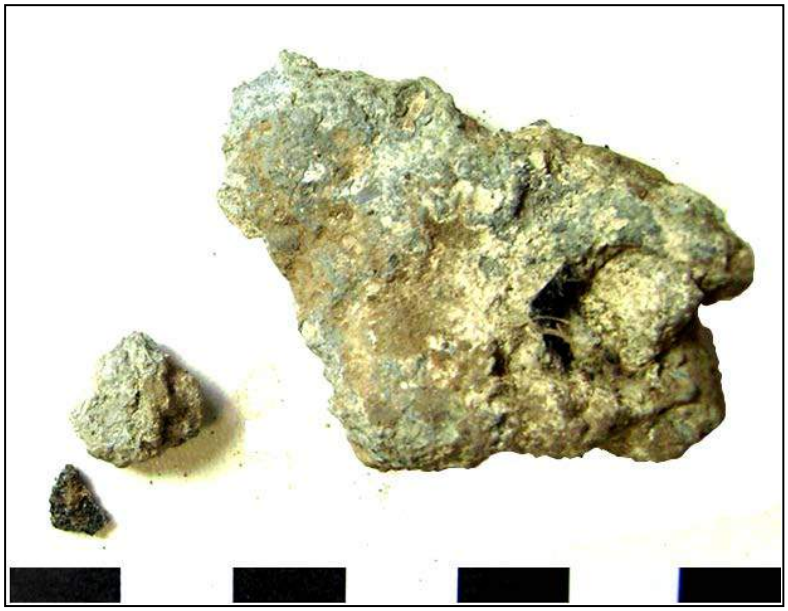


Figure 74. SF19 Fragments of lead dross (scale = 7cm).

5.76 SF19 includes three fragments of dense vitrified material identified as lead dross (Figure 74). This would be derived from lead working practices and complements the previous finds. The fragments weigh 42g. These finds were not subjected to XRF analysis but are identified as a priority for future analysis. Corrosion state: stable.

Copper alloy Objects

Figure 75. SF7 Copper alloy fitting (scale = 5cm).

5.77 SF7 is a copper alloy fitting comprising a central annulus flanked by two flattened spurs diametrically opposed (Figure 75). There are decorative incisions on the spurs suggesting that the piece is to be used in a context where its visual appeal is important. The artefact weighs 6.2g. Corrosion state: stable.

Figure 76. SF4 Copper alloy fitting. (scale = 3cm).

5.78 SF4 is a fragment of an annular copper alloy fitting with a short spur on one side (Figure 76). The artefact weighs 1.2g. Corrosion state: stable.

Figure 77. SF8 Copper alloy fastening (scale = 5cm).

5.79 SF8 is a copper alloy fastening most likely derived from some article of dress (Figure 77). One side terminates in an upset flare whilst the opposing terminal finishes in a pronounced boss. The shaft of the fitting tapers prior to the pronounced boss. The artefact weighs 8.7g. Compositional analysis by XRF determined that this was a quaternary alloy commonly referred to as leaded gun metal containing Cu, Pb, Sn and Zn. Corrosion state: stable.

Figure 78. SF5 Copper alloy bead (scale = 3cm).

5.80 SF5 is a copper alloy bead originally identified as possible buckshot (Figure 78). This identification is unlikely in light of the composition as most examples are lead or related alloys. The object weighs 2.0g. It was not subjected to compositional analysis using XRF. Corrosion state: stable.

Figure 79. SF33 Copper alloy token (Scale = 3cm).

5.81 SF33 is a copper alloy token which is retained in two halves (Figure 79). One side depicts a long-necked quadruped with background of tessellated, unistippled hexagons. Originally identified as a coin, it is more likely that this object is some form of token. It is perhaps premature to speculate too freely but a possible interpretation may identify the quadruped as a dog, perhaps Cerberus, and the tessellated hexagons as honeycomb. If correct then this might suggest that this token has a funerary association with Cerberus as the guardian of the underworld and honeycomb being used by Prince Aeneas and Psyche to pacify the guardian to facilitate their passage in the underworld. Alternatively it may be a post-medieval trade token. The object weighs a total of 2.3g. It was not subjected to analysis by XRF. Corrosion state: Active corrosion noted, suggest treatment with BTA and appropriate storage.

Ferrous Objects

Figure 80. SF6 Iron nail (scale = 5cm).

5.82 SF6 is identified as an iron nail with a square cross-section and forged head (Figure 80). It is difficult to ascribe a date based on morphology as it is consistent with a wide range of forms that occur over an extended period. The nail weighs 48.1g. This object was not subjected to analysis by XRF. Corrosion state: Active corrosion noted, suggest appropriate storage.

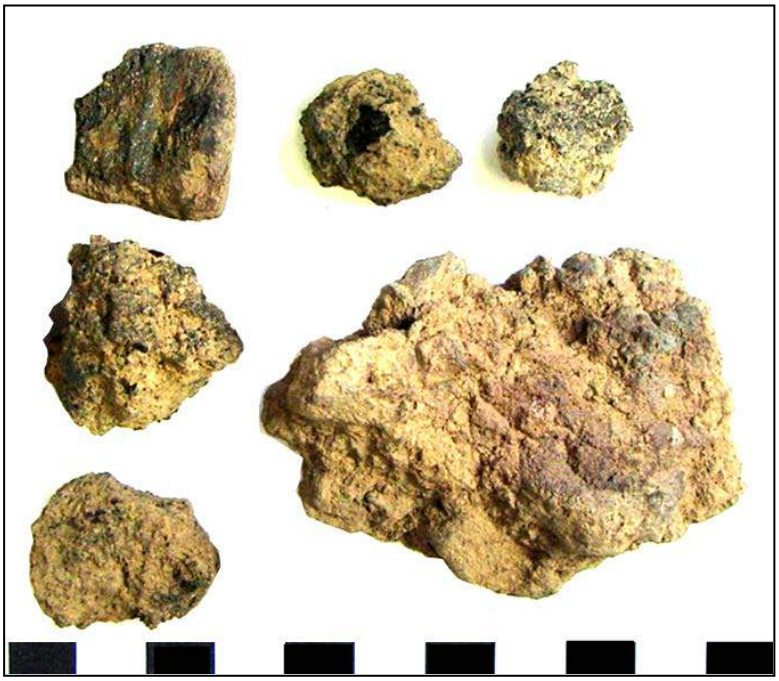


Figure 81. SF41 Vitreous material (scale = 11cm).

5.83 SF41 comprises six pieces of citreous material (Figure 81). The material is of medium density with pronounced porosity. It is possibly derived from metalworking although it is classed as a non-diagnostic type. The fragments weigh a total of 72g. No determination was made by XRF. Corrosion state: stable

Figure 82. SF42 Ferrous fragments (scale = 9cm).

5.84 SF42 comprises three fragments of ferrous strip (Figure 82). The material is heavily corroded and associated with soil conglomerate which hinders further

identification. In total the find weighs 26.8g. No analysis was performed by XRF. Corrosion state: active, recommend appropriate storage.

Sample	Pb	Sn	Fe	Ti	Sb	Cu	Zn	Bi	Ag
SFN12	44.85	45.3	8.57	0.9	nd	nd	nd	nd	nd
SFN 1	75.64	18.44	4.75	0.28	0.76	nd	nd	nd	nd
SFN13	97.36	0.65	1.99	nd	nd	nd	nd	nd	nd
SFN11	96.53	nd	3.84	nd	nd	nd	nd	nd	nd
SFN 8	13.7	3.9	11.2	nd	0.31	64.7	4.4	1.07	0.36

Table 7. XRF results showing compositional analysis of the finds (all values % nd=not detected).

SFNo	CNTX	Material	Ffinder	co-ords	Original ID	weight (g)
1	unstratified	lead	metal detector	surveyed by TST	lead slag/waste found by metal detector . Surveyed as FD1	173
2	unstratified	lead	metal detector	surveyed by TST	lead slag/waste found by metal detector . Surveyed as FD2	18.5
4	unstratified	copper alloy	metal detector	surveyed by TST	unknown metal item. Surveyed as FD4	1.2
5	unstratified	copper alloy	metal detector	surveyed by TST	Cu alloy bead. Surveyed as FD5	2
6	unstratified	metal	metal detector	surveyed by TST	Iron nail. Surveyed as FD6	48.1
7	unstratified	copper alloy	metal detector	surveyed by TST	small fastening. Surveyed as FD7	6.2
8	unstratified	copper alloy	metal detector	surveyed by TST	metal fastening. Surveyed as FD8	8.7
9	unstratified	lead	metal detector	surveyed by TST	lead waste material . Surveyed as FD9	68.9
10	unstratified	lead	metal detector	surveyed by TST	lead waste material . Surveyed as FD10	36.4
11	unstratified	lead	metal detector	surveyed by TST	folded lead sheet. Surveyed as FD11	131
12	unstratified	lead	metal detector	surveyed by TST	lead waste material. Surveyed as FD12	249
13	unstratified	lead	metal detector	surveyed by TST	Spindle whorl	56.5
14	unstratified		metal detector	surveyed by TST	Serrated lead bar	37.1
19	unstratified	lead	metal detector	surveyed by TST	lead dross	42
33	unstratified	copper alloy	metal detector	surveyed by TST	Metal token (funerary?)	2.3
41	005	ferrous			Vitreous material	72

42	005	ferrous			Iron strip	26.8

Table 8. The metal detecting metalwork assemblage from the rectilinear enclosure site.

5.85 The assemblage contains three categories of material including lead, copper alloy and ferrous. The presence of ferrous material in a stratified archaeological context (005), the same context from which the smithing hearth bottom material was recovered (see above), adds weight to iron smithing taking place during the Roman phase of the site. As this fill is a backfill/abandonment deposit it seems most likely that this metalworking debris has resulted from day to day smithing on the site and not from the construction phase only of buildings on the site.

5.86 The copper alloy material is also limited in scope. Most pieces seem to relate to fittings and fastening. Whilst the assemblage was not completely analysed compositionally, analyses do indicate that the alloy used was leaded gunmetal. This is a quaternary alloy of copper, tin, lead and zinc and is normally considered to be an alloy that is the result of recycling and the mixing of other alloys such as tin bronze, brass and leaded alloys. It is an alloy that is common from the Roman period onwards, although it is encountered in the later Iron Age at sites which have contact with the Roman world (Dungworth 1997).

5.87 An intriguing aspect of the Whirlow Hall Farm metal detecting assemblage is the group of lead alloy artefacts and specifically the plano-convex waste pieces which are pewter. Compositions at Whirlow vary from 50% lead to 75% lead and this seems to be within the range of noted recipes for Roman tableware (Beagrie 1989). SF12 was a tin-lead alloy of 50:50 which has been referred to as Argentarium (composition 50% tin, 50% lead - Beagrie 1989). SF1 was also a pewter but with a recipe approximating 25% tin and 75% lead, and this must be considered low for Roman pewter and is outside of Beagrie's groupings (see Figure 83). At the time of writing Beagrie reported on 400 pewter vessels and noted compositions ranging from pure unalloyed tin through to lead alloys with less than 50% tin. Since the publication of Beagrie's important work other finds have been noted namely the pewter "hoard" from Ickham in Kent (Sutton 1998) where 39kg of tableware and casting debris comprising over 500 pieces were recovered. Sutton noted similar groupings to Beagrie but also drew attention to high lead - low tin alloys which would fit better with the Whirlow results.

5.88 It is clear that the lead-tin alloy/ pewter finds from Whirlow represent the working of material on site. This material is derived from an activity other than simple lead working. It is suggested that the remaining lead waste is fully analysed and reported. Future work should consider the presence of pewter working and where possible seek to establish the precise contexts of production. If securely dated to Roman occupation then these finds are significant and they may indicate the exploitation of Peak District lead deposits. That pewter is an alloy of lead and tin also points towards long distance exchange, unsurprising in the Roman world, but still an

important observation for connecting life at Whirlow with wider spheres of production and exchange.

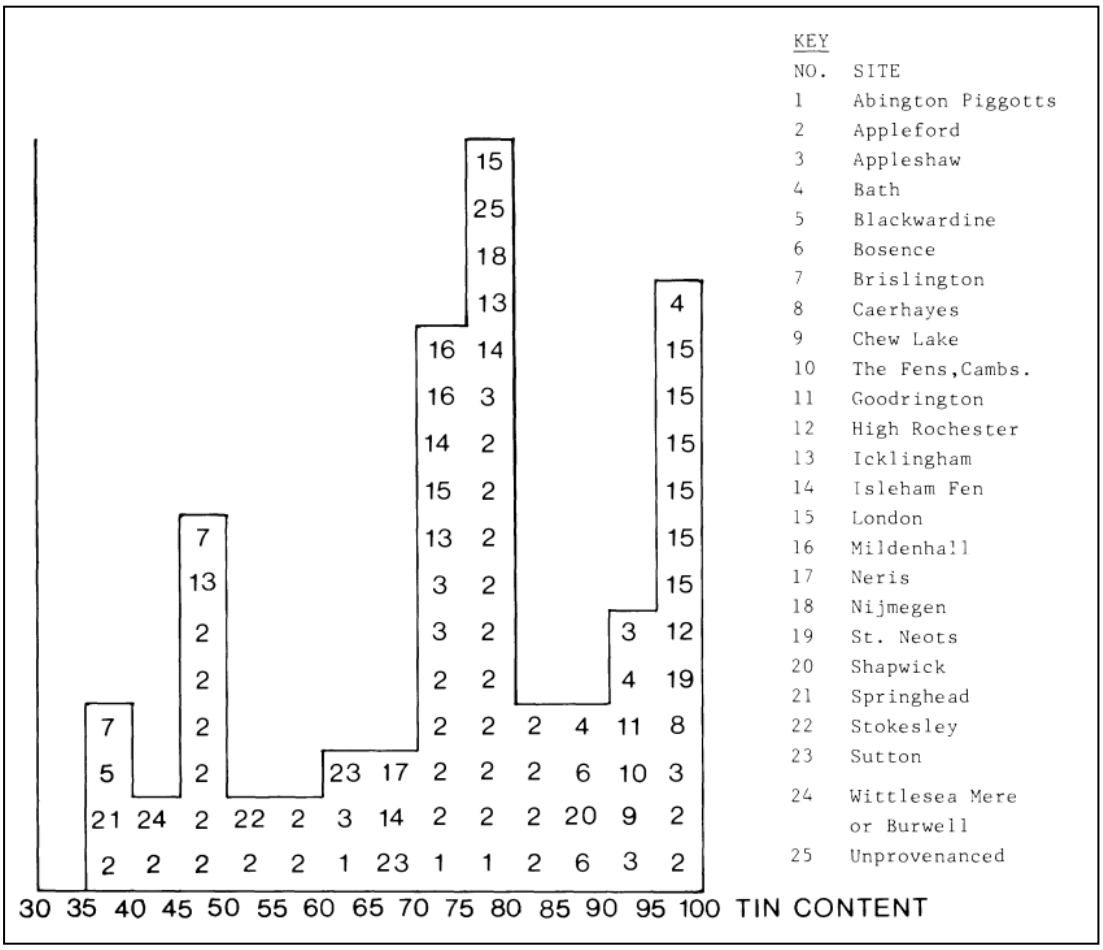


Figure 83. Tin content of Roman pewter vessels (after Beagrie 1989).

5.89 The metalwork assemblage form Whirlow Hall Farm is small but significant. Ferrous and copper alloy finds indicate further potential but at present are of limited value. Lead and tin alloy finds (pewter), especially the plano-convex waste, indicate the working of pewter on site. This is most likely related to the production of tableware.

6. GEOCHEMICAL SURVEY

Roger Doonan and Jessica Slater

Rectilinear enclosure

6.1 A geochemical survey was undertaken across the rectilinear enclosure and an area to its immediate north to gain further insight into the range of activities that might have taken place at this site. In situ XRF analysis is a novel technique for the rapid analysis of archaeological soils. It is capable of undertaking multi-element analyses rapidly and detecting many elements at levels of just a few part per million (ppm). For the survey reported here a Niton XLT3 portable X-Ray fluorescence Spectrometer was used. The survey area is shown in Figure 84.

6.2 Samples were recovered using a 4 cm auger with the analysis made at the interface of the A and B horizons where discernible (~8cm below surface). The survey area was sampled systematically on a grid at 4m resolution. A total of 17 elements were determined, Cu, Zn, Pb, Mo, Zr, Sr, U, Rb, Th, Se, As, Hg, W, Ni, Co, Fe, Mn. Although 17 elements were analysed a smaller suite of elements is usually considered indicative of human activity as represented in soil matrices. The elements anticipated as significant include Cu, Pb, Zn, Sr, Fe (Wilson *et al.* 2008).

Figure 84. The survey area of the geochemical study over the area of the rectilinear enclosure.

6.3 Analysis was conducted in soil mode which employs a fundamental parameter calibration and corrects for matrix variation using the Compton scatter peak. The duration of the analysis was 35 seconds with a total of 422 analyses undertaken across

the survey area. The results of analysis were processed in Niton NDT software and plotted as raw and mean adjusted bubble plots in MS Excel. No data interpolation was used, preference being given to unprocessed distribution plots.

6.4 The geochemical survey successfully detected the following elements in over 50% of soil samples, Cu, Pb, Zn, Zr, Fe, Rb, As, and Mn. The following elements were below detection limits in over 90% of samples Ni, Co, Hg, W, Th, U Sr, and Mo. The distribution of single elements across the survey area is discussed below.

Copper

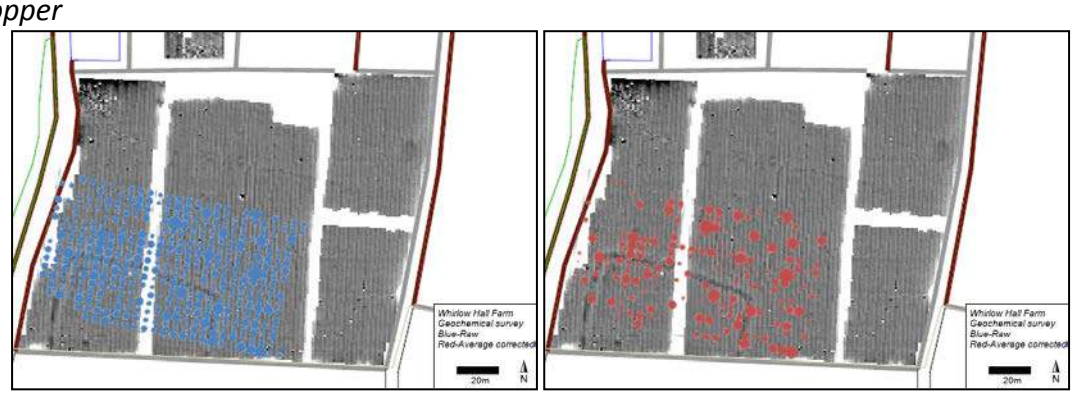


Figure 85. Raw data (blue) and mean adjusted (red) results for copper overlaid on magnetometry.

6.5 Elevated copper is generally thought to be indicative of human activity and when found at significant concentrations >200ppm may indicate metalworking activities. The highest level encountered for copper across the survey area was 100ppm with an average across the site of 45ppm. Whilst these levels can be considered to be enhanced they are not of a magnitude that would usually be encountered in contexts that had witnessed non-ferrous metallurgy. The distribution of copper is not particularly structured across the survey area although there are some instances of defined anomalies, specifically in the area referred to as F in the geophysics report (Taylor 2011). Copper is generally higher outside of the enclosed area which might indicate disposal or other activities taking place outside the enclosure.

Zinc

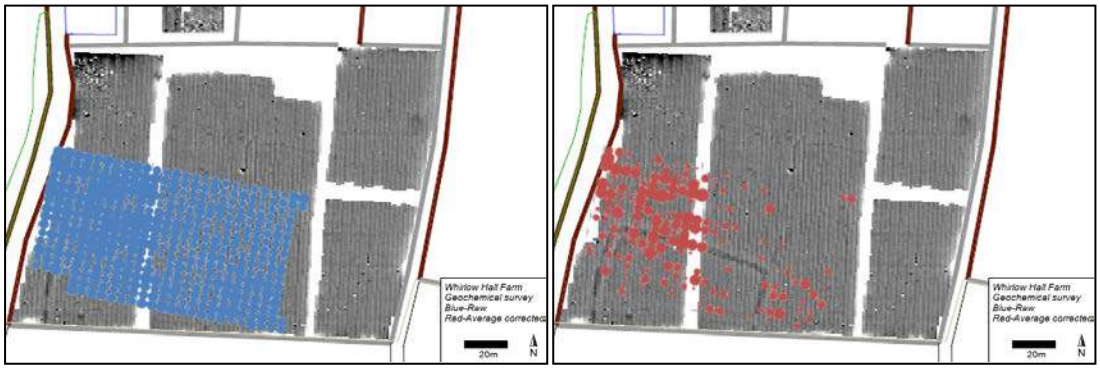


Figure 86. Raw data (blue) and mean adjusted (red) results for zinc overlaid on magnetometry.

6.6 Like copper, elevated zinc levels in soil are generally considered to be indicative of human activity, specifically the disposal of human and domestic animal waste. The highest levels encountered for zinc across the survey area was 127ppm with an average across the site of 87ppm. The variation of zinc across the site was not great as can be seen from the raw data plot. However, mean adjusted data shows a distinct anomaly in the north west of the survey area. It is apparent that the greatest concentration of zinc occurs on the outside of the enclosure to the north-west. Again Area F (Taylor 2011) seems to be the most significant anomaly suggesting that whatever the activities were which centred on this area, they resulted in elevated levels of heavy metals.

Lead

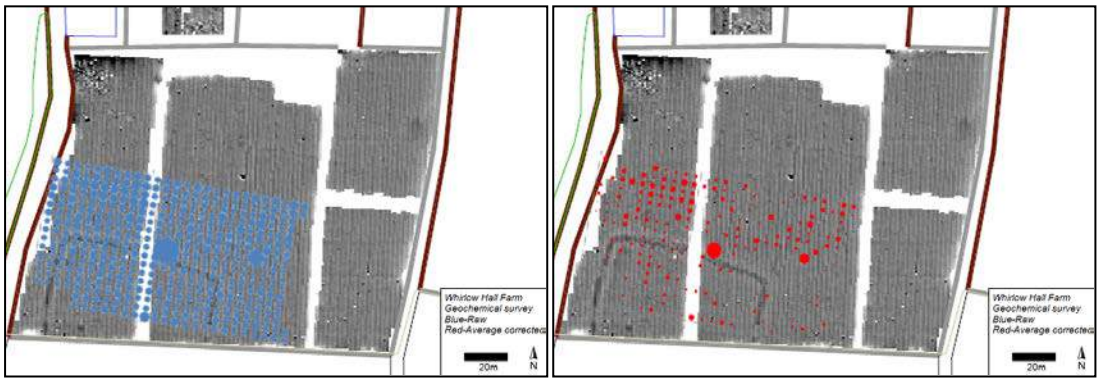


Figure 87. Raw data (blue) and mean adjusted (red) results for lead overlaid on magnetometry.

6.7 Lead accumulation in archaeological soils is also seen as indicative of human activities, especially the disposal of manure and human waste. Notable peaks of lead were noted across the survey area with the most profound occurring in the central area. This reading had a value of 634ppm which is significant and over three times the average (169ppm). The peak reading does not appear to be part of a structured anomaly and whilst it might be a data spike such values could well relate to lead working. In light of the metal finds from Whirlow such hypotheses should be given serious consideration.

6.8 More interesting is the structured anomaly that occurs in the north-west of the survey area targeted by excavation Trench 4, again centring on Area F (Taylor 2011), this is most clear in the mean adjusted plot. There is a clear differentiation between lead values within and outside the enclosure.

Zirconium

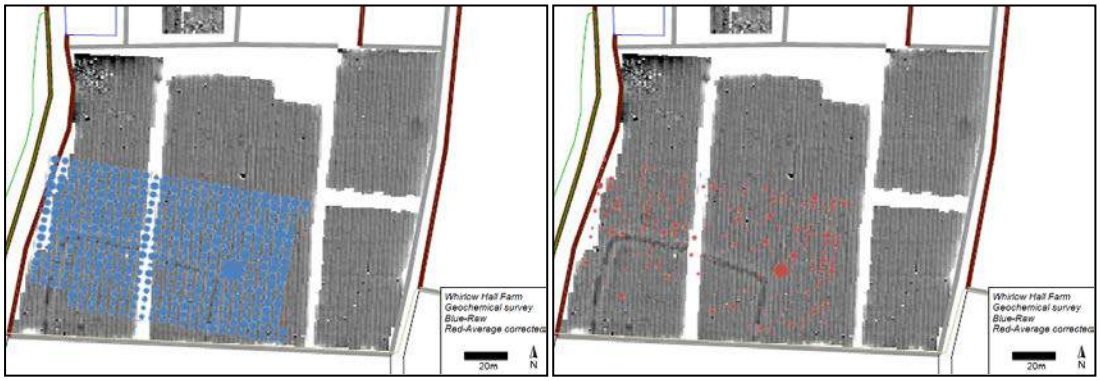


Figure 88. Raw data (blue) and mean adjusted (red) results for zirconium overlaid on magnetometry.

6.9 The behaviour of zirconium in soils is poorly understood and it is generally thought to be present in fine soil fractions as zircon (Gulamova 2010, 149). Whilst its presence is unlikely to be the result of biological processes associated with human habitation, zircon is present in a range of geological resources and, as such, their manipulation and transport can result in enhanced Zr in specific contexts. Zr enhancement can therefore, in some instances, be considered the result of human physical processes although it is necessary to review local geology to identify and understand the various sources from which Zr can be input. It is apparent from the survey that Zr is notably absent from within the enclosure area but appears enhanced outside. Whilst this confirms the differential use of space it is not, at present, possible to associate this pattern with specific practices.

Iron

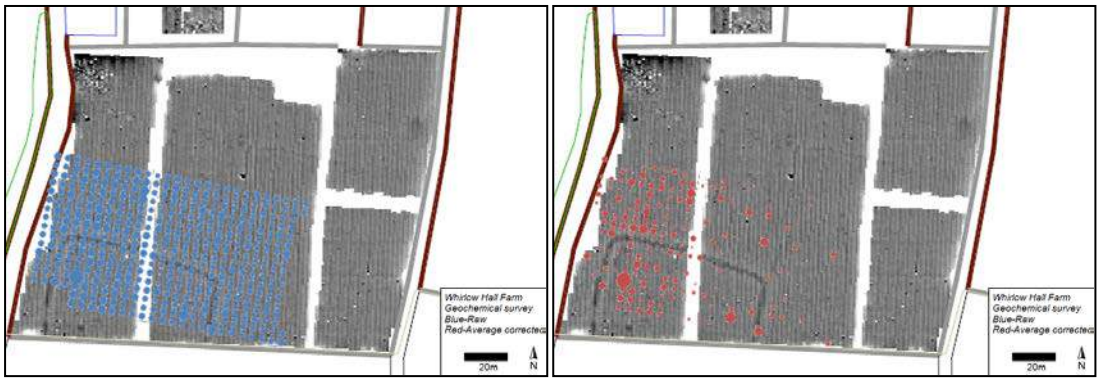


Figure 89. Raw data (blue) and mean adjusted (red) results for iron overlaid on magnetometry.

6.10 Iron is naturally present in most UK soils and is an example of an element type that can, in some instances, be cycled rapidly in plant systems. However, it is also enhanced through a variety of human activities and can often be deposited in forms that do not readily enter metabolic processes. The variation in iron across the survey area is not great (see raw data plot) although mean adjusted data shows a concentration to the west of the survey area. Again the zone around Area F (Taylor 2011) seems to be enhanced as is the western aspect of the enclosure. The presence of

nearby iron deposits in the Limb valley highlight the potential for iron resources to be used on site. Whilst the results of magnetometry has not yet indicated the presence of hearths or furnaces that may be associated with iron metallurgy, iron minerals can be used in a variety of processes as pigments or textile modifiers.

Manganese

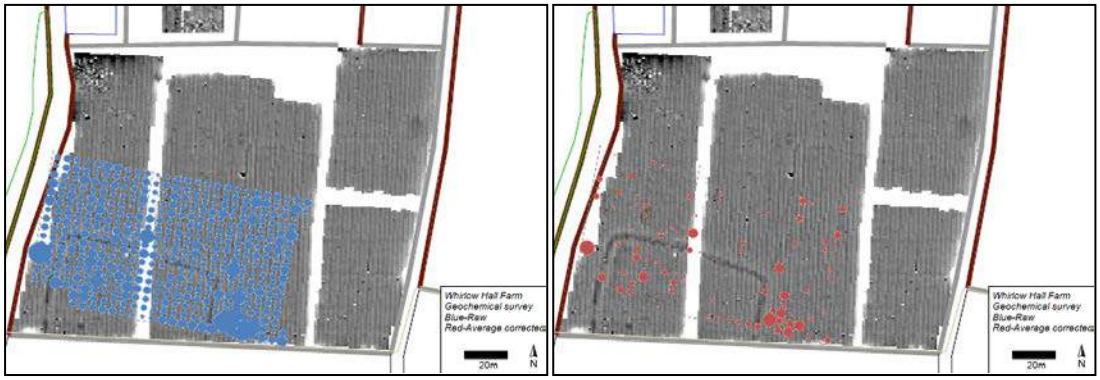


Figure 90.Raw data (blue) and mean adjusted (red) results for manganese overlaid on magnetometry.

6.11 Manganese is normally present in soils as an oxide and is a normal constituent of UK soils. It is often correlated with iron as it is associated in shared chemical exchange processes. However, for the survey at Whirlow Hall Farm it is clear that manganese shows a distinct patterning which is unrelated to the distribution of iron. The variation across the survey area is for the most part not profound, although there is a slight structured enhancement in the western aspect of the enclosure. Much more notable is the discrete anomaly on the eastern extent of the survey area outside of the enclosed area. It is difficult to tie this anomaly to a specific set of activities, and therefore it is most sensible to consider this anomaly as indicating a different use of space in this area.

6.12 In situ multi-element geochemical survey has succeeding in characterising the variation in soil chemistry across the survey area. For several elements (see above) structured anomalies (i.e. elevated values which extend beyond a single data point) have been noted across the survey area with a concentration in the zone around Area F on the north and western side of the enclosure (Taylor 2011). The consistently high readings around Area F demonstrate that this area contrasts strongly with the wider survey area and that this may represent an area of middening or associated dumping, perhaps, of craft production debris. More informed interpretation may well be possible when the local bedrock and surrounding geology has been more thoroughly characterised so as to demonstrate associations between soil chemistry and geological variation.

6.13 The absolute concentration of heavy metals (Cu and Pb) do not generally support the idea of widespread metallurgical practice, although a single high lead reading (see above) might indicate limited practice, based on the part of the enclosure and its surrounds that was able to be surveyed.

6.14 The results suggest that the soils at Whirlow Hall Farm do respond to geochemical survey with existing and future results being capable of informing any future excavation. In light of the largely positive results it is considered worthwhile exploring the potential for future analyses, especially phosphorus determination, and extending the survey over a wider area.

Signal station site (Bole Hill)
Roger Doonan

6.15 The use of geochemical survey to identify and delineate activity areas on archaeological sites is well established in archaeology (Oonk *et al*. 2009, Wilson *et al*. 2008, and references therein), yet its use remains infrequent in routine fieldwork and especially in commercial practice. This is due to a number of factors including time and cost but the uncertainty that surrounds the meaning of geochemical variation is also an important issue to acknowledge in explaining its absence in most work. The processes and mechanisms by which soil is modified by human action is still poorly understood (Wilson *et al*. 2008, Entwistle *et al*. 1998, Middleton and Price 1996) yet geochemical patterning has been recognised as providing valuable insights into how past communities have spatially organised a range of activities (Haslam and Tibbett 2004). Interpretive challenges are not restricted to soil ecology but include basic understandings of how specific human practices imprint themselves on open soil contexts.

6.16 Conventional geochemical analysis operates with restricted sample numbers due to limitations of sampling time and costs of analysis. For these reasons it has rarely been employed to identify spatial patterning at a level of resolution commensurate with human practice, instead being used for broadly descriptive programmes of soil characterisation. The ability of HHpXRF to undertake rapid analysis in a cost efficient manner means that such technology, when used within an appropriate method and research framework, can present new datasets for the archaeologist, especially in the domains of research and cultural resource management.

6.17 Several scholars have noted that chemical elements vary in their interpretive value (i.e. Wilson *et al*. 2008, Aston *et al*. 1998) with most agreeing that the elements with the greatest potential to aid archaeological studies are: P, K, Ca, Cu, Zn and Pb. Although acknowledging the utility of these elements is an important first step, there remains an interpretive gulf in how their enhancement might relate to practice beyond broad categories of human activity. For instance, the work of Wilson *et al*. (Wilson *et al*. 2008) has done much work with ethnohistorical sites to demonstrate the relation between types of practice and soil chemistry, yet in archaeological contexts soil chemistry is most frequently used to highlight increased human activity or simply the presence of ‘archaeology’ (Bintliff *et al*. 1992).

6.18 A notable exception to such activities is non-ferrous metalworking (i.e Cu, Pb) and agricultural/disposal/fire-related processes which have enhanced phosphorus (P). Whereas the wide range of human activities might enhance heavy metal concentrations by small amounts, the practice of metallurgy has the potential to enhance soil copper and lead (and other elements) significantly, and certainly well beyond crustal or background levels. The characterisation of working areas has been accomplished through systematic soil sampling and laboratory based analysis (Grattan *et al*. 2007; Andrews and Doonan 2003, 42-44; Derhan *et al*. 2013). This is especially powereful when used in combination with geophysical survey (Doonan *et al*. 2003).

6.19 New generation HHpXRFs offer the advantage of easy portability with rapid sampling of multiple samples either in-situ or ex-situ. The advantages of the HHpXRF are its ability to undertake rapid sampling of multiple specimens and to provide data in real time to inform survey, excavation and wider field strategy, something not permitted by processes that involve the export of samples and subsequent laboratory processing (Frahm and Doonan 2013).

6.20 The survey reported here is centred on Bole Hill field across the area of plateau occupied by the Roman signal station (see above). Apart from the obvious indication for lead metallurgy from the toponym, the presence of northerly aligned dipoles on the geophysical survey and the earthwork remains for what appear to be smelting pits within the woodland fringing the field on its south side, together with the exposed nature of the hilltop, suggest that lead metallurgy or bole smelting may have been practiced at this location. To test this hypothesis, a campaign of in-situ geochemical analysis was undertaken using a NITON XL3T HHpXRF (50kV X-ray tube, and an Ag anode with a silicon positive intrinsic negative (Si PiN) detector). Survey involved a program of shallow coring (4cm Ø x 10cm) with cores being cleaned and extracted for subsequent analysis. In situ analysis was conducted on the B horizon using the 'Main' filter for 32 seconds in soil mode. Standard certified reference materials were used as a check on accuracy and precision. The following elements were determined Mo, Zr, Sr, Rb, Pb, As, Hg, Zn, Cu, Ni, Co, Fe, Mn, Sb, Sn, Cd, Pd, Ag, Nb, and Bi.

6.21 Prior to undertaking field analyses a number of certified reference soils were analysed to determine the accuracy of the instrument under ideal conditions. The performance of HHpXRF is now well established for most heavy metals (Macrona forthcoming; Doonan *et al*. forthcoming) and the correlation graph shown in Figure 88 shows the results of a recent study on P. All samples were analysed in situ with an interval of ~10m.

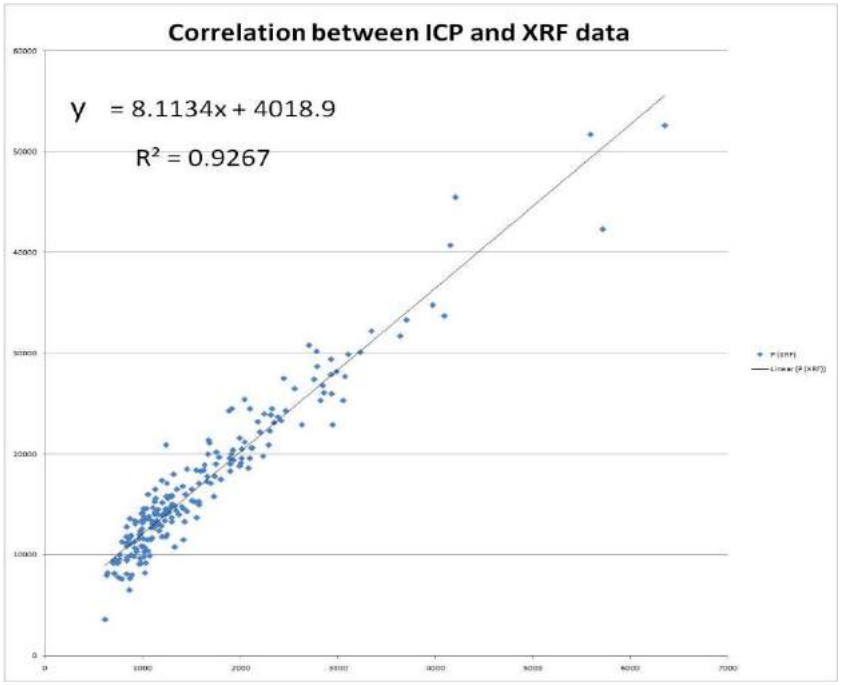


Figure 91. Correlation between ICP and HHpXRF data for P in soil.

6.22 Results for soil chemistry are reported in ppm and associated with a spatial coordinate as determined by HH-GPS. In producing representations of the distribution of soil chemistry no interpolation was employed, instead point data was plotted as a means to best represent the raw data. The study reported here only returns values for lead (Pb). Enhanced lead is usually associated with anthropogenic activities and may range from 30ppm to 800ppm for routine activities associated with settlement. The range of results from Bolehill are very high with results ranging from 181ppm to 3700ppm. These upper ranges are exceptionally high and can conclusively be associated with the deposition of lead metal, mineral and are indicative of lead metallurgy in the vicinity. Of specific interest is the structure of the lead anomaly. Instead of random high readings it is noted that the high concentrations are restricted to the SW of the site and that there is a steady rise and fall across the anomaly. This is consistent with the location of earthwork remains of Q-pits in the immediately adjacent woodland.

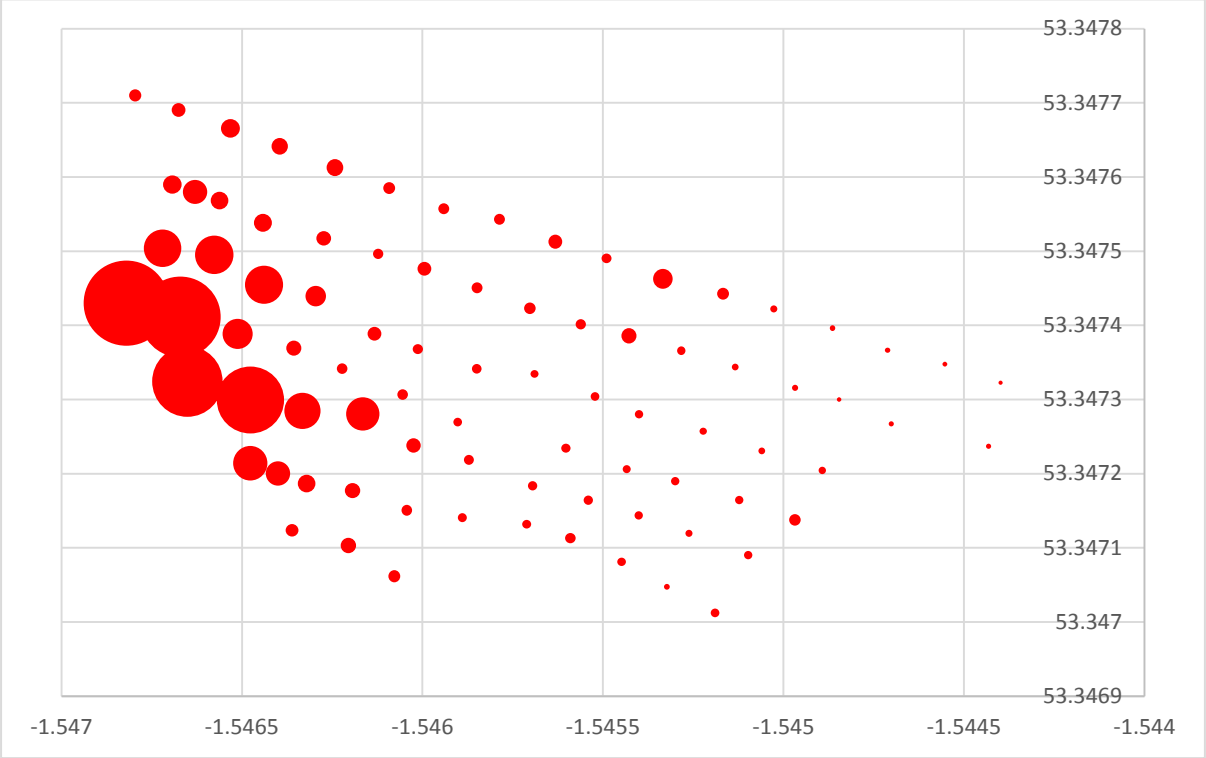


Figure 92. Spatial plot of Pb values across Bolehill

Figure 93. Results of geochemical analysis (Pb) superimposed and georeferenced on Aerial photo.

6.23 In conclusion, it can be established that the variability encountered across the site is of a magnitude that suggests significant anthropogenic metalworking activity in the immediate locality. Preliminary review of a range of elements suggests that Cu, Zn and Pb are enhanced with lead being enhanced at very high levels. Pb is enhanced to the extent where it is consistent with the presence of metal processing.

7. PALAEOENVIRONMENTAL ANALYSIS AND CONSERVATION ASSESSMENT

Elise McLellan

7.1 A total of 19 bulk soil samples and 52 additional hand-collected charcoal samples were obtained for analysis from the excavations at Whirlow Hall Farm. These samples were obtained from ditches, construction slots, surfaces, pits and postholes associated with the Late Iron Age and Roman phase features of the rectilinear enclosure and the signal station.

7.2 Environmental samples were taken from all contexts exhibiting visual signs of charcoal or plant macrofossils, as well as a representative sample of all other contexts encountered. Where possible 40L -60L samples were taken, or 100% of the context if its volume was less than 40L, and for large feature fills up to 100L was taken. Environmental samples were processed via flotation through graduated sieves, the smallest being a 300µm mesh. Flots were allowed to air dry. Heavy residue was visually inspected for charred remains and cultural material, and then subsequently discarded.

7.3 Analysis of the 2011 environmental material (1 bulk soil sample, 46 hand-collected charcoal samples) was completed by Lorne Elliot of Durham University, Archaeological Services. The flot was examined at up to x60 magnification for charred botanical remains using a Leica MZ7.5 stereomicroscope. Identification of these was undertaken by comparison with modern reference material held in the Environmental Laboratory at Archaeological Services Durham University. Habitat classification follows Preston *et al*. (2002).

7.4 Where possible, fragments of charcoal were identified from the samples. The transverse, radial and tangential sections were examined at up to x600 magnifications using a Leica DMLM microscope. Identifications were assisted by modern reference material held in the Environmental Laboratory at Archaeological Services Durham University. Material recommended for dating was cleaned of adhering roots and other organic material, wrapped in foil and put in labelled bags.

7.5 Analysis of the 2016 environmental material (18 bulk soil samples, 6 hand-collected charcoal samples) was completed by Elise McLellan of ARS Ltd. All flots were 100% scanned using a low power binocular microscope (up to x40). Plant macrofossils identification was completed with plates and guides from Martin and Barkley (2000) and Cappers *et al.* (2006).

7.6 Charcoal fragments >2mm were fractured to obtain clean sections and identified using a high power Leica GXML3030 binocular microscope (up to x600). All plant taxonomic nomenclature follows Stace (1997). Charcoal identification was completed following plates and guides from Schweingruber (1990) and Hather (2000). In instances where charcoal was plentiful, 15 fragments were chosen for identification, selected from a range of identifiable fragment sizes. Material suitable for radiocarbon

dating was cleaned of adhering roots and other organic material and wrapped in aluminium foil.

Late Iron Age – Early Roman Features

7.7 Six bulk soil samples were processed from Iron Age or early Roman features stratified below the Roman metalling and associated layers in Trench 1 from the rectilinear enclosure. A small assemblage of environmental remains was recovered. A total of 40 charcoal fragments was identified consisting mainly of oak (55%) with some hazel (20%), birch (10%), and alder (5%), with isolated instances of pine, blackthorn, poplar/willow and holly. Three cereal grains were recovered from a pit or posthole feature (045), of which two were indeterminate and one was identified as an indeterminate wheat species.

Iron Age Features Trench 1 (Hall Field)								
Feature Type	**Perimeter Ditch**		**Pits/Postholes below Roman metalling**					
Context	**(020)**	**(013)**	**(018)**	**(045)**	**(048)**	**(053)**	**(055)**	**(059)**
Material for Radiocarbon Dating	Yes	Yes	Yes	Yes	Yes	No	No	Yes
Sample Volume	5L	80L	n/a	40L	40L	40L	30L	20L
Charcoal (total no. of fragments)	**3**	**19**	**6**	**1**	**1**	**0**	**0**	**10**
Quercus (oak)	1	10	1	1				9
Corylus (hazel)	1	2	4					1
Betula (birch)	1	3						
Prunus (blackthorn)			1					
Pinus (pine)		1						
Alnus (alder)		2						
Populus/Salix (poplar/willow)					1			
Ilex (holly)		1						
Charred remains (cultivars and wild foods)								
Triticum sp. indeterminate wheat grain				1				
Cerealia indeterminate grain				2				
Charred remains (weeds)								
Caryophyllaceae undifferentiated (pink family) seed	1							
Flot components*								
Modern rootlets		+++		++	+	++	+	+
Furnace waste/clinker		+		+			++	

Table 9. Summary of Iron Age – Early Roman feature environmental remains.
* indicator of abundance +=0-10, ++=11-25, +++=26-50, ++++=>51 elements.

Roman

7.8 The majority of environmental material recovered from the Roman contexts consisted of large concentrations of charcoal from the fills of ditch features within the enclosure totalling 134 charcoal fragments. The charcoal species were dominated by oak (38%) and hazel (34%) with smaller amounts of ash (10%) and birch (9%) and isolated occurrences of alder, pine, blackthorn and poplar/willow. The oak charcoal

generally displayed little curvature and was mostly from mature wood, however the other species, particularly hazel and birch, had high occurrences of small diameter twig and branch wood.

7.9 Two of the features which produced high quantities of charcoal (F057 and F028) displayed evidence for in situ burning. The two features were both shallow ditches. F057 was located within the enclosure parallel to the northern perimeter ditch segment, and partially located below a roman floor surface (023). The second shallow ditch was located immediately outside the north-western corner of the large enclosure perimeter ditch. These areas of in situ burning were accompanied in both cases by lenses of charcoal which survived as a highly charcoal-rich soil layer above the scorched rock brash below. The charcoal assemblage from these lenses contained many large charcoal fragments (30-40mm) including many complete segments of small diameter wood. These features also displayed the strongest dominance of oak and hazel charcoal, still with largely mature oak wood and smaller twig and branch wood from hazel and birch.

7.10 A small number of cereal grains were recovered from F044. Five barley grains and two spelt grains were identified, along with three additional indeterminate cereal grains. Barley and spelt are common on Romano-British sites, and are almost always found in similar trace amounts on occupation sites (Hall and Huntley 2007, 242). The small amount of cereal grain recovered indicates it is unlikely that much processing or storage took place in this part of the enclosure.

7.11 A small number of charred wild seeds were identified. These seeds were generally from species indicative of open meadow or pasture environments such as buttercup and burnet.

Roman Features Trenches 1, 2, 3 and 4 (Hall Field)													
Feature Type	**Perimeter Ditch**		**Ditch F057**			**Construction Slot**	**Post Hole**	**Ditch F028**			**Surfaces**		**Ditch F014**
Context	**(003)**	**(009)**	**(044)**	**(050)**	**(057)**	**(026)**	**(007)**	**(028)**	**(031)**	**(040)**	**(005)**	**(023)**	**(014)**
Material for Radiocarbon Dating	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes
Sample Volume	60L	40L	60L	40L	60L	60L	n/a	100L	10L	10L	n/a	n/a	n/a
Charcoal (total no. of fragments)	**14**	**23**	**15**	**12**	**15**	**15**	**1**	**15**	**5**	**0**	**6**	**5**	**8**
Quercus (oak)	4	7	6	1	15		1	7	4			4	2
Corylus (hazel)	5	6	6	5		9		8	1		2	1	3
Fraxinus (ash)	1		3			5					4		
Betula (birch)	2	4		5		1							
Pinus (pine)	1	2											
Alnus (alder)	1	2											
Prunus (blackthorn)		1											
Populus/Salix (poplar/willow)		1		1									
Charred remains (cultivars and wild foods)													
Hordeum vulgare (barley)			2		3								
Triticum spelta (spelt) grain					2								
Cerealia indeterminate grain			2	1									
Indeterminate vetch seed						3							
Charred remains (weeds)													
Ranunculus sp. (buttercup) seed		1											
Carex sp. (sedge) seed								1					++
Sanguisorba sp. (burnet) seed								1					
Hyacinthoides non-scripta (bluebell) seed									1				
Indeterminate weed seed													
Flot components*													
Modern rootlets	+	+++	+	++	+	+++		+	+	+	n/a	n/a	
Furnace waste/clinker	+	++	++					+			++		

Table 10. Summary of Roman period environmental remains from the rectilinear enclosure.
* indicator of abundance +=0-10, ++=11-25, +++=26-50, ++++=>51 elements

7.12 Three bulk soil samples were processed from the construction slots at the Bole Hill signal station site. Very few environmental remains were recovered. A total of three charcoal fragments were identified from the inner construction slot (F037) comprising two hazel fragments and a single oak fragment.

Roman Features Trench 5 (Bole Hill)			
Feature Type	**Ditch F037**		**Ditch F038**
Context	**037**	**039**	**038**
Material for Radiocarbon Dating	Yes	No	No
Sample Volume	40L	40L	40L
Charcoal (total no. of fragments)	**2**		**0**
Quercus (oak)		1	
Corylus (hazel)	2		
Charred remains (cultivars and wild foods)			
Charred remains (weeds)			
Persicaria sp. (water-pepper) seed		1	
Flot components*			
Modern rootlets	+	+++	++
Furnace waste/clinker			

Table 11. Summary of Roman environmental remains from the signal station (Bole Hill).
* indicator of abundance +=0-10, ++=11-25, +++=26-50, ++++=>51 elements

Comment

7.13 The paucity of material from Bole Hill does not allow conclusions to be drawn regarding environmental conditions at the site, although the survival of a small quantity of charcoal is important for the scientific dating of the site.

7.14 The rectilinear enclosure and associated features produced a useful assemblage of environmental remains. These remains relate primarily to the industrial activities undertaken in the western portion of the enclosure. Only further excavation will result in a more complete understanding of environmental conditions on and around the site and the presence/absence of certain activities and their zonation across the enclosure. Only a small number of features associated with the Late Iron Age – early Roman phase of occupation have been excavated. Together they show evidence for cereal agriculture including indeterminate wheat species, as well as charcoal from a variety of mixed woodland species including oak, hazel, ash, birch, pine, alder, blackthorn, willow).

7.15 The evidence from the Roman phase of the enclosure includes a trace amount of barley and spelt cereal grains recovered from bulk soil samples from shallow ditch (F057). The presence of cereal grain indicates agricultural activity on the site, however the low abundance recovered suggests primary agricultural processing and storage activities occurred elsewhere in the enclosure. The presence of a beehive quern fragment recovered from Trench 1 lends support to this enclosure being involved with cereal agriculture and processing of foodstuffs. The presence of meadow/pasture indicators (ie. buttercup and burnet) are indicative of livestock rearing, and together

with the evidence for cereals, are suggestive of mixed farming activity in and around the site.

7.16 There was evidence of *in situ* burning and large charcoal concentrations in two ditch features. There were also frequent inclusions of a furnace waste/clinker-like material in flots from Roman-phase features. This is potentially indicative of some form of industrial activity taking place in this area of the site, an interpretation supported by several fragments of slag recovered from the Roman perimeter ditch fill (009) and construction slot (023). There is a heavy bias towards mature oak wood and hazel branch wood from the charcoal assemblage from the Roman-phase features and it is therefore possible that this pattern is related to wood selection for controlled firing as part of industrial activities. The hazel branch wood may have been selected for kindling and the mature oak for stoking the fires to a high and consistent temperature, both of which would be consistent with the needs of smelting and metalworking which is evidenced by the metalworking remains recovered from the site.

8. DISCUSSION

8.1 The investigations undertaken at Whirlow Hall Farm have produced remarkable results. Prior to this study there was no known evidence for Stone Age, Iron Age or Roman activity in this area. Not only is the time depth considerable, but the degree of preservation, particularly on the site of the enclosure, was unexpected. The key finding, however, has been the discovery of elements of what may have been the Brigantian-Roman frontier and cross-Pennine route and evidence for how some existing large Brigantian enclosures were treated after the Roman invasion. This is likely an ancient frontier, albeit one that experienced some fluidity on account of short-term exigencies, and is one that broadly speaking continued throughout the early medieval period and ultimately through to the present. It appears to have been the boundary between Northumbria and Mercia for much of the early medieval period and today marks the start of 'the North', much as it always has going back into prehistory, and as this area still does today. The discoveries at Whirlow should hopefully renew interest in the study of this multi-period cross-Pennine route/frontier and other elements along its course, such as the 'Roman Rigg', various enclosure and hillfort sites such as Ecclesall Woods and Wincobank Hill, the Roman forts at Melandra, Brough, Buxton, Templeborough, Doncaster and Rossington Bridge, and the identification of signal station sites and Roman road sections, is a priority.

8.2 The level of preservation on the site was notable. The enclosure site not only preserves upstanding structural features, in the form of the building foundation wall and the lower courses of the wall along the inner edge of the ditch, but the conditions of preservation appear good with well-preserved ceramics, metalwork and environmental residues. Furthermore, the Roman enclosure deposits seal late Iron Age archaeological remains and there is quite clearly layers of intact stratigraphy still extant across the site. Where the Roman surface has been removed this has revealed the truncated remains of several sealed pits and post-holes, and one (018) where *in situ* heating had taken place. Despite being in a field that has been ploughed, the ploughing appears to have never been deep, and this has meant that the archaeological remains are relatively well-preserved. It is important that deep ploughing does not take place on this field.

8.3 The sites at Whirlow lie at the extreme south-western margin of South Yorkshire in a transitional upland-lowland location above the gorge that is the Limb valley. The Limb Brook is one of the two origins for the river Sheaf and the Whirlow sites are located near its headwaters and the signal station is very close to the head of the valley. The landscape position of the rectilinear enclosure, the signal station, and the nearby section of newly discovered road that heads directly towards the signal station (see Inglis 2016) is key to understanding these sites. The landscape encompassed by the modern extent of Sheffield is highly complex and fragmented as it is spread over marked geological and topographical boundaries. In the east it extends over a low lying alluvial river basin surrounded to north, west and south by uplands, being fed by the dominant water course of the Don and its tributaries, of which the Sheaf is one. To the west the ground ascends steeply to the sandstone moors which are punctured by clefts and valleys, many with side valleys, some with protruding ridges and frequent rock

outcrops. Woodland was, and in many parts of the western area still is, common, and this frequently thick vegetation cover helps to break the landscape up even more. The land falls away in height south and east of this region and to the west and north it retains its height and more in places. It lies on one of the marked interfaces between Britain's upland and lowland zones. Given these marked contrasts in the landscape over which Sheffield straddles it is not surprising that this is frontier country and one that has comprised a frontier for human groups for over two thousand years and probably much longer. The complexity of this landscape provides only limited options for how a frontier could be defined over this area, and certainly when being used to define a boundary from coast to coast between what is now northern and southern England, this could explain why broadly the same frontier seems to have obtained over such a long period. The broad course of this frontier is briefly described below.

8.4 The evidence for Mesolithic activity on the excavated sites at Whirlow occurs in the form of struck flint and chert artefacts and, although of interest, were found as residual material within the late Iron Age and Roman deposits. They fit well with the material discovered by the fieldwalking and their significance can be considered best in supporting the wider picture derived from the fieldwalking study, making the notable addition of some microliths. Consequently they are not discussed further here and the reader is directed to the fieldwalking report (see Waddington 2016).

8.5 The structural remains discovered during the excavations at Whirlow date to the late Iron Age and Roman periods. The earliest dated feature is the perimeter ditch of the enclosure. The radiocarbon measurement from its lower fill (020) lies on the well-known late 1st millennium cal BC 'plateau' and so has a broad span, although it probably dates to 350 – 121 cal BC (68.2% probability). It is clearly a late Iron Age date and indicates that the enclosure was constructed during this period. It is a substantial enclosure defined by a rock-cut ditch and represents a significant investment of labour as well as a substantial settlement that was much more than just a farmstead for a family group. These large enclosures can perhaps be considered as farming settlements at the upper end of the late pre-Roman Iron Age social hierarchy. There are some internal pits sealed below the Roman metalling layer that could belong to the Iron Age phase of the enclosure, but without recourse to further radiocarbon dating this cannot be certain. This means that, at present, little more can be said with certainty about the late Iron Age, or 'Brigantian', phase of the enclosure. It can be reasonably assumed to have served as a large farming settlement, based on the well-documented information known for these enclosures, but it is not clear to what extent metalworking or other activities might have been important to this site.

8.6 The next phase of activity that is documented by the excavations is in the early Roman period, during or shortly after the Roman advance into Brigantian territory. It is surely no co-incidence that the radiocarbon dates for the signal station are virtually identical with the date for the earliest Roman activity on the enclosure and are all statistically indistinguishable. The measurements for the signal station are 1899±34 BP and 1877±34 BP and the one from pit (018) is 1890±30 BP. These dates indicate activity

in the period 60 – 130 cal AD (at 68.2% probability) which could tie these sites in with the Flavian conquest of Brigantia or the post-Flavain consolidation of control over the region. This date for early Roman activity is also supported by the presence of early ceramic fabrics within the pottery assemblage, although it is notable that no datable Roman activity on the site is necessarily earlier than the Hadrianic period, the time when many late Iron Age sites in the north begin to use significant quantities of Roman material for the first time.

8.7 Occupation of the probable signal station is probably shortlived as it appears to be a single-phase structure, and one made of timber. This structure may have been in use for just a few years, or decades, before being abandoned. The enclosure, on the other hand, appears to have experienced some longevity with occupation continuing throughout the Romano-British period, although it had certainly come to an end by the mid-4th century according to the currently available ceramic evidence. Phases of rebuild and construction are evidenced, such as the patching of the metalling and the stone-founded building overlying earlier phases of Roman activity and so forth. No evidence for a hiatus in the Roman occupation was noted and there was no burning layer indicating the destruction of buildings at any time. Although it remains unproven, it seems most likely that occupation during the Roman phase remained continuous. The suite of later Radiocarbon dates, including that from the abandonment deposit within construction slot (026), together with the dating of the ceramic assemblages from the infilling of the upper ditch, indicate abandonment of the site in the late 3rd – early 4th century AD, the latter part of this span being considered the most likely on account of the ceramics. This correlates with a period of much instability within the Roman Empire, including specifically within Britain, until the accession of Constantine in 324 AD. The specific reasons for the abandonment of the Whirlow enclosure remain unknown, but the possibility that it may have become uneconomic or high risk due to political and military reasons, perhaps associated with re-organisation of the Roman administration, should not be discounted.

8.8 Rectilinear enclosed settlements are relatively common throughout England, being particularly numerous in lowland agricultural settings where they appear as cropmarks. In South Yorkshire the majority of rectilinear enclosures are found in the east of the county on the Coal Measures, Magnesian Limestone, sand and gravel and alluvial deposits. They appear to have been less numerous in the uplands to the west. In these areas occasional Romano-British rural settlement enclosures still survive as upstanding remains with stone banks, although some can be curvilinear in form. Their remains have been found in the upper Don Valley and those of the Upper Derwent, Noe and Wye (Beswick and Merrills 1983). The Whirlow study has been notable in this respect as the excavated sites were not upstanding and were only discovered by geophysical survey, and without the geophysics, none of the remains reported here would have been discovered. This indicates that there are probably many more buried rectilinear enclosures in the uplands of the region than has been thought, and as the discovery of Roman Derbyshire ware, other coarseware ceramics and the masonry remains of a building in the nearby Porter Valley at the junction of School Green lane

and Brooklands Avenue has long suggested (South Yorkshire HER: entry SK 298853). Perhaps the most notable of the local upstanding sites is the group of sites on and around Wharncliffe Crags where excavation at one site, Whitley, revealed a Romano-British building with double orthostat walls and a rubble core (Butcher 1970; Makepeace 1985). There were remnants of a cobbled surface outside its entrance and in patches inside. Roman ceramics comprising grey ware, Derbyshire ware, Samian and mortaria was found and ascribed a mid 2nd – 3rd century date (Butcher 1970; Makepeace 1985), mirroring the character of the assemblage found at Whirlow. Other than this there has been little excavation of upland rectilinear sites in recent years and so little is yet known of their chronology, form and function in South Yorkshire, West Yorkshire or the Peak District.

8.9 The Whirlow enclosure measures 71m in length and probably has a similar width, although because of the modern houses that encroach on the south side of the enclosure it can only currently be traced for 43m in this direction. It would therefore seem reasonable to estimate that the enclosure defined a space close to 0.5ha. This size places the enclosure very much in the larger category for rectilinear enclosures. Other rectilinear and sub-rectangular enclosures that have been examined in South Yorkshire tend to encompass considerably smaller areas, as at Barnsdale Bar (0.08 ha), Balby Carr (0.01 ha), Hazel Lane Quarry (0.23 ha), Roebuck Hill (0.05 ha), Topham Farm (0.33 ha) and Billingley Drive enclosure D, Thurnscoe (0.1 ha) (see Hodgson 2012 for site summaries) and most recently at Holme Hall Quarry (<0.1 ha) (Mora-Ottomano 2016). The site that probably provides the best comparanda for the Whirlow enclosure is the rectilinear enclosure at Oldfield Hill, Meltham, West Yorkshire, which is defined by a single upstanding bank and outer ditch, and which is of similar size and shape and is at a similar altitude (270m in the case of Oldfield Hill and 240m in the case of Whirlow) and overlooks a small tributary valley. Further afield the rectilinear enclosure at Ingram South, excavated as part of the Ingram Valley Project in Northumberland (Frodsham and Waddington 2004, 182-4), has revealed a substantial multi-phase enclosure with a stone revetment wall on the inner side of the main enclosure ditch built during the Roman phase of this site, echoing the discovery at Whirlow, and which has produced a suite of Roman period radiocarbon dates together with Roman ceramics and evidence for agricultural production. Compared to these other sites it is evident that the large enclosure at Whirlow was a substantial centre and not merely a small enclosed farmstead like most of the Romano-British farmsteads that have been investigated in the eastern, lowland part of South Yorkshire. In area it is about half the size of a typical Roman fort and could have contained numerous buildings and housed a population far in excess of an extended family unit.

8.10 The status of the site during its Roman phase is not known with certainty, as only a small part of the site has been examined (ie. about 4% of the enclsoure). What can be surmised, however, is that given the clear stratigraphic hiatus between the native Iron Age and Roman layers and the apparent total switch to Roman material culture and construction forms, this enclosure was taken over by Roman control and was not a site where an existing Brigantian population gradually

adopted Roman ways and material culture. As the only Romanised people in the region in the late 1st– early 2nd centuries was the Roman military, the site must have been occupied by, and functionally related to, Roman or Romanised people directly associated with the military. One of the key findings resulting from this investigation is that the occupants of the enclosure during its Roman phase clearly pursued a Romanised way of life from the very start and they surrounded themselves with the structures and material culture of the Roman world in a highly visible way. They removed all the traces of the preceding Iron Age settlement and remodelled the perimeter ditch so that there were no visible traces of its previous users or its origins. This reveals an intentionality on behalf of the Roman period occupants to stamp an entirely new way of life on the site and to signal this to the local populace.

8.11 Although the site does not appear to have had fine, high status structures and material culture, the presence of the stone stone-founded rectangular building, the stone support block that is likely to have served as a post pad, or possibly even a column base, and the single piece of tessera, are indicative of buildings constructed in the Roman style and intended as permanent. Therefore, although the enclosure does not appear to have contained a grand villa, it is possible to equate this site to a villa estate on the basis of its size and hinterland, but being located in a frontier area, and probably under the sway of the military in some way, it is not surprisingly less grandiose and more functional. The destruction of the Iron Age elements and the re-organisation and Romanisation of the site raises the intriguing possibility that the site may have been requisitioned from the Brigantes as part of the conquest of Brigantia. When the site was taken from Brigantian control the Roman administration would have needed to place it in reliable hands capable of interacting with, and understanding, military needs. Could sites such as this have been used, in their early decades at least, to supply the Roman military? The location of the Whirlow enclosure close to the road that linked the Roman forts at Brough and Templeborough would appear to bear this out. The western entrance of the Whirlow site leads immediately on to an ancient hollow way that runs up the north side of the Limb gorge towards the signal station where it must have linked with the line of the Roman road that can be traced here as it traverses the moorlands over Burbage Moor (Inglis 2016). This road is thought to equate to Margary's Roman road number (710b) (Margary 1973, 361) which links the Roman forts at Navio (Brough) in the Hope Valley with the fort at Templeborough to the east of Sheffield.

Figure 94. Excavation of flanking ditches of the suspected Roman road at Sheephill Farm with the head of the Limb Valley in the middle ground and the location of the signal station marked with a red square.

Figure 95. Looking north along the hollow way which runs immediately outside the west entrance into the enclosure.

8.12 The discovery of the 'Stannington Diploma' in 1761 (Hunter 1819), 5km to the north in the Rivelin Valley, reveals that retired Roman auxiliaries were given grants of land/money in the Sheffield area. The Stannington Diploma, is of course not a diploma, but a grant of citizenship on copper plates (Figure 94) by Hadrian in AD 124 to the son of Albanus of the Sunuci tribe (from the area that is modern day Belgium between Cologne and Liege). He was a foot soldier in the 1st cohort of the Sunuci and had served at least 25 campaigns which entitled him to a discharge and a grant of land or sum of money. This important find lends credibility to the idea that Brigantian estates, such as that at Whirlow, may have been taken from the Brigantes and handed over to Roman veterans. This could have served the dual purpose of rewarding the veterans from the spoils of war, and minimising cost to the Roman state, while at the same time

destroying the Brigantian power base, their hold over resources and securing them instead for the Roman military. By placing these centres into the hands of ex-soldiers a secure supply network could be quickly and reliably established, and particularly if they were located along the routes of the Roman road network close to garrisoned forts. Could the Whirlow enclosure have been handed over to a veteran in this way? Quite how the population of the enclosure was constituted during the Roman period and how it changed through time remains unknown but it is possible that a mixture of Romans and Brigantes resided at the site. The possibility that some Brigantes may have been forced to work on the site in a slave capacity, at least in its early years, should be considered.

Figure 96. Photograph of the 'Stannington Diploma' reproduced from the British Museum web page: www.britishmuseum.org/research/collection_online/collection_object_details.aspx?objectId=810659&partId=1&object=33809&page=1

8.13 The stone-founded building discovered during the excavations had been constructed close to, and parallel with, the outer ditch. The enclosure is large and by deliberately positioning this building hard-up by the perimeter this could suggest that buildings may have been quite tightly packed into the enclosure. If this was the case then the enclosure could have contained a considerable number of buildings and supported a significant population. The presence of a stone-founded building represents a relatively rare discovery on a rectilinear enclosure site. Only a few stone-founded Roman buildings are known from rural sites in the region, the best known comparanda being some distance away in Derbyshire at Roystone Grange (Hodges and Wildgoose 1981), Carsington (Ling and Courtney 1981; Ling *et al*. 1990) and Ockbrook (Palfreyman 2001). A rectangular building is known to exist within the rectilinear cropmark enclosure at South Muskham, Nottinghamshire, but this building is positioned diagonally across the rectangular orientation of this enclosure suggesting that it either pre- or post- dates the enclosure. Therefore, the discovery of a Roman

stone-founded building within a rectilinear enclosure would seem significant as such associations have been rarely documented before, and not within South Yorkshire. The purpose of the Whirlow building is not known but being located adjacent to the west entrance means that it could have been used for a variety of purposes such as stabling, storage for produce, a workshop or possibly accommodation. If more of the interior of the site was able to be excavated then the site layout, building density, zonation of activities and the function of the overall site would be able to be better understood.

8.14 Traces of agricultural activity were identified in the enclosure deposits, with spelt and barley and an indeterminate pulse, probably pea or vetch, from the Roman deposits sealed below the floor of the stone-founded building and wheat from pit (045) sealed below the metalling layer, and other indeterminate cereal grains from the ditch fill (009) and the entrance causeway construction slot (026). The find of a beehive quern roughout fragment also points to the production of querns on site and the milling of grain. The presence of buttercup and burnet grains suggest that areas of pasture or meadow lay in the vicinity of the site. Together, this meagre record of past land-use, suggests that mixed farming took place around the site. Added to this is the Roman design of the ditch perimeter which took the form of a ditch with a drystone wall rising up from its base on its inner side and extending above ground for about a metre in height. This would have appeared as a roughly 2m high wall when viewed from outside the enclosure and it would have formed an effective barrier to livestock, although it would certainly not have sufficed as a defensive wall.

8.15 In situ burning was observed in two shallow ditch features, one outside the north-west corner of the enclosure (within the base of the ditch that formed the geophysical anomaly investigated by Trench 4), and one beneath a later Roman surface near the western entrance. Clinker and furnace waste material was recovered from these two features, and in trace amounts from the fills of several other Roman features along with a large assemblage of charcoal. Hearth bottom slag derived from iron smithing was recovered from the perimeter ditch fill (009). The charcoal assemblage was dominated by mature oak wood and small diameter hazel twigs and branches. This pattern of fuel procurement may reflect the selection of hazel twigs as kindling and mature oak wood as fuel for industrial activity. Vitreous material (ie. hearth slag) was recovered from the fill of the perimeter ditch, and unstratified iron, lead and copper alloy objects were recovered from the area of the enclosure via a metal detector survey (see above). The geochemical survey showed that for several elements (see above) structured anomalies (i.e. elevated values which extend beyond a single data point) were noted across the enclosure with a concentration in the zone around the north and western side of the enclosure. The consistently high readings around this area demonstrate that this area contrasts strongly with the wider survey area and that this may represent an area of middening or associated dumping, perhaps, of craft production debris. This evidence is consistent with some metalworking activity occurring on or near to the site, although the exact location of the smithing was not identified. As much of the evidence was found in stratified Roman deposits it indicates that the smithing evidence noted on the site is related to the Roman phase occupation of the site.

8.16 The unexpected discovery of what is thought to be a signal station to the north-west of the enclosure on Bole Hill, also on the north side of the Limb gorge, together with the timely discovery of the course of what is thought to be the Roman road linking Brough and Templeborough and which heads directly to the signal station site (Inglis 2016; pers comm., Figure 94), supports the view that these remains lie along a routeway that broadly follows the course of what had been the Brigantian-Roman frontier (sometimes referred to as the 'Gallus frontier' – see Webster 1981, 92 - 95) or what had become a later internal frontier within the Roman province, and was certainly a monitored and fortified cross-Pennine route. The dating of both the signal station and the Roman phase of the enclosure show that these sites were not occupied until during, or more likely a few decades after, the Roman advance into Brigantia. Therefore, during its late Iron Age phase the enclosure is likely to have been located on the northern, Brigantian, side of the Gallus frontier. It is also notable that occupation at the Roman fort at Brough is not evidenced prior to *c*.AD 80 and so this fort too, is likely to have been built after the Roman advance inside what had been Brigantian territory. Together with the fort at Templeborough these sites indicate not only a garrisoned and marshalled corridor by the late 1st - early 2nd century AD, but also an enhanced communication network linked by roads and signalling, no doubt associated with surveillance and security of a key cross-Pennine route in what may have remained a hostile and remote environment at this time. Although the route of this frontier/ defended cross-Pennine corridor is not known with precision its broad course can be described. The fort at Templeborough lies on the south side of the river Don and was founded in the pre-Flavian period, prior to the advance north into Brigantia. Therefore, it is reasonable to believe that the frontier extended along the Humber and then up the river Don, and certainly south of the 'Roman Rigg' that parallel's the lower Don on its northern side. Where the Don meets the Sheaf, in what is now Sheffield City centre immediately below the location of Sheffield castle, the frontier is likely to have continued west following the Sheaf until it came to its headwaters where it followed the Limb Brook, past Whirlow, and then over Burbage Moor, before descending down Callow Bank to Hathersage and along the floor of the Hope Valley to the Roman fort at Brough (Navio). From here the frontier appears to have continued further west along the Hope Valley, perhaps through Winnat's Pass and along Rushup Edge before descending to the Cheshire Plain and on to Chester. This broad frontier appears to have continued from late Iron Age times through into the early medieval period. Toponyms and place-names indicate the frontier status of this corridor. The word 'Limb' is derived from Old English and means 'limit', whilst 'Dore' which is situated on the south side of the Limb valley below Whirlow, literally means 'door' or 'portal' in Old English. Dore is also recorded in the Anglo-Saxon chronicles as the meeting place between the Anglo-Saxon Kings of Mercia/Wessex and Northumbria with several meetings recorded there. Dore lay in Mercia and not Northumbria and is well established as being on the threshold of the two kingdoms (see for example Higham 1993), and it is therefore noteworthy that Dore lies on the south side of the Limb valley whereas Whirlow lies on its north side. The placenames, positions of these settlements either side of the deeply

defined gorge, and the dating of the Whirlow enclosure together serve to indicate that the Limb Brook formed a north-south frontier in Anglo-Saxon times, but also going back to late Iron Age-Roman times as well. The position of hillforts on Wincobank Hill and Carl Wark, together with the scarp edge enclosure in Ecclesall Woods, all lie along this route and further serve to reinforce the frontier status of this corridor in Iron Age – Roman times. Furthermore, there are two 'Toot Hills' or 'watch hills' located along this route, one above Hathersage close to the line of the Roman road that is thought to traverse Burbage Moor and the other at the west end of Rushup Edge before the descent to the Cheshire Plain. It seems possible that the Roman road network was overlaid on to this frontier following the invasion of Brigantia.

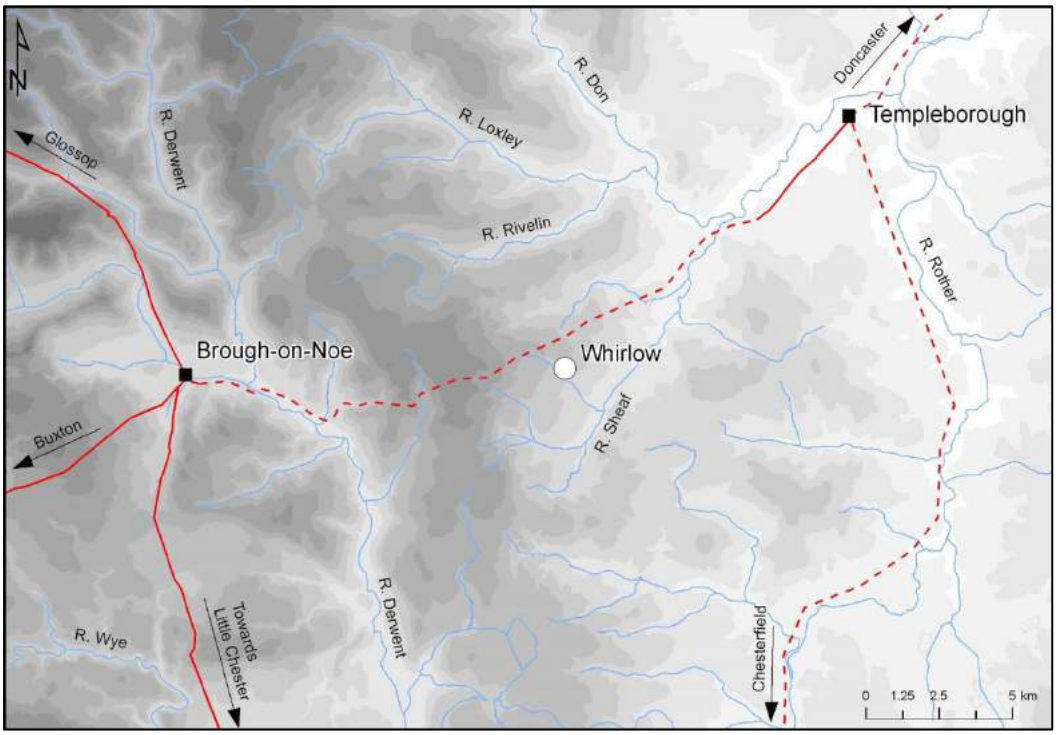


Figure 97. Map showing Roman road network between the forts at Brough and Templeborough (dashed lines are projected courses).

8.17 The value of geophysical survey in bringing these frontier remains to light cannot be overstated. It has provided the way in to a hidden and forgotten history that, although previously out of grasp, is one that has been key in shaping the history and character of the Sheffield and Peak District region. This study has produced only a basic and preliminary insight into this frontier area, but in time thorough study should add further details. More of this frontier and its rich history will survive as buried remains and, with further programmes of geophysical survey and excavation, significant discoveries can be expected.

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10.2 All statements and opinions contained within this report arising from the works undertaken are offered in good faith and compiled according to professional standards. No responsibility can be accepted by the author/s of the report for any errors of fact or opinion resulting from data supplied by any third party, or for loss or other consequence arising from decisions or actions made upon the basis of facts or opinions expressed in any such report(s), howsoever such facts and opinions may have been derived.

APPENDICES

Appendix I. Written Scheme of Investigation (WSI)

Whirlow Hall Farm Archaeological Works

Written Scheme of Investigation for Fieldwork

1. Introduction

1.1. Project Background

1.1.1. The Whirlow Hall Farm archaeological works comprise a programme of ongoing research, recording and archaeological investigations into the history of Whirlow Hall Farm. The project is being led by the Timetravellers and the fieldwork and analysis comprise a professionally-directed programme of training, participation, learning activities and public engagement. The Timetravellers will involve local schools, community groups and volunteers to participate in a range of activities to help discover and record the history and archaeology of Whirlow Hall Farm.

1.1.2. Earlier phases of research and fieldwork were undertaken during 2011, including the production of an archaeological desk-based assessment, building recording, fieldwalking, geophysical survey, test pitting, and evaluation excavation.

1.1.3. Part of a large rectilinear enclosure with outlying field boundaries was found during the geophysical survey undertaken at Whirlow Hall Farm during May 2011. The enclosure has a ditch and two opposing entrances on the east and west. Archaeological excavations were undertaken on the ditched enclosure in the summer of 2011 and these provided evidence to show that this was a high status Roman farmstead overlying an earlier Iron Age one (Waddington 2012). Two trenches were excavated: Trench 1 was located over the western entrance into a large rectilinear enclosure and Trench 2 was located over two narrow parallel linear ditch features to the north-east of the enclosure. Trench 1 was located over one of the entrances so that an understanding of the constructional form of the enclosure and its entrance could be obtained. The topsoil was stripped back by hand and the first archaeological layer was discovered only 30cm below the modern ground surface. The excavation of this area is not yet complete as only the upper, Roman, layer has been recorded. Trench 2 evaluated two linear flanking ditches of a trackway and on excavation these proved to be highly truncated and very shallow.

1.1.4. The excavation of Trench 1 revealed two sections of the enclosure ditch, which had been cut down into the sandstone bedrock and contained the remains of a small revetment wall on its inner edge. The ditch defined a settlement of some importance positioned close to a main Roman road linking the forts of Brough on Noe and Templeborough. Along with the ditch, the remains of a compacted stone yard surface and a stone foundation wall relating to a rectangular Roman building were also discovered. A post hole located in the centre of the entrance to the enclosure is thought to have held a large gatepost.

1.1.5. Roman pottery was found within the ditch fill and yard surface which mostly dates from the 2nd century AD, the period of the emperors Hadrian and Marcus Aurelius. Some fineware pottery imported from Gaul (France) was discovered, adding another dimension to the importance of the site. The farmstead's location along the busy trade route from Sheffield to the Peak District conjures up an image of a busy settlement that was trading with places far afield. An industrial aspect to the site has been suggested by the discovery of a range of lead objects found in the topsoil by metal detectoring across the site.

1.1.6. Sealed below the Roman period metalling, that also contained Roman pottery within its makeup, was a large, though shallow, pit that revealed evidence for in situ burning and contained a substantial assemblage of late Iron Age native pottery. This deposit was radiocarbon dated to the late 1st century AD.

1.1.7. A scheme of fieldwalking was also previously undertaken across two fields within the Whirlow Farm Estate. The fields were found to contain a large amount of finds spread across each field. Although the finds included much post-medieval material, namely clay pipe fragments and ceramics, Field 1 was found to contain 14 lithics and Field 2 was found to contain 60. The spread of the lithics in Field 2 was of particular interest as it was of predominantly Mesolithic date.

1.1.8. This document is a written scheme of investigation (WSI) confirming the nature of the further fieldwork that is proposed as part of a Heritage Lottery Grant application.

1.2. **Overall Objectives**

1.2.1. The overall objectives of the proposed fieldwork are as follows:

- To investigate the early origins of Whirlow Hall farm and examine the question of Iron Age and Roman settlement in the Sheffield.
- To understand the form, function, extent, phasing and chronology of the enclosure site.
- To increase the knowledge and awareness of the heritage of Whirlow Hall Farm for a wide audience, to include schools across Sheffield and beyond, young people, volunteers, visitors, and the local community.
- To raise awareness of the natural and historic heritage of Whirlow Hall Farm
- To provide volunteers, school children, young people and members of the public with training and experience in recording and looking after historic and archaeological remains

1.2.2. Any changes to the agreed WSI will be discussed with, and agreed with, South Yorkshire Archaeology Service before implementation.

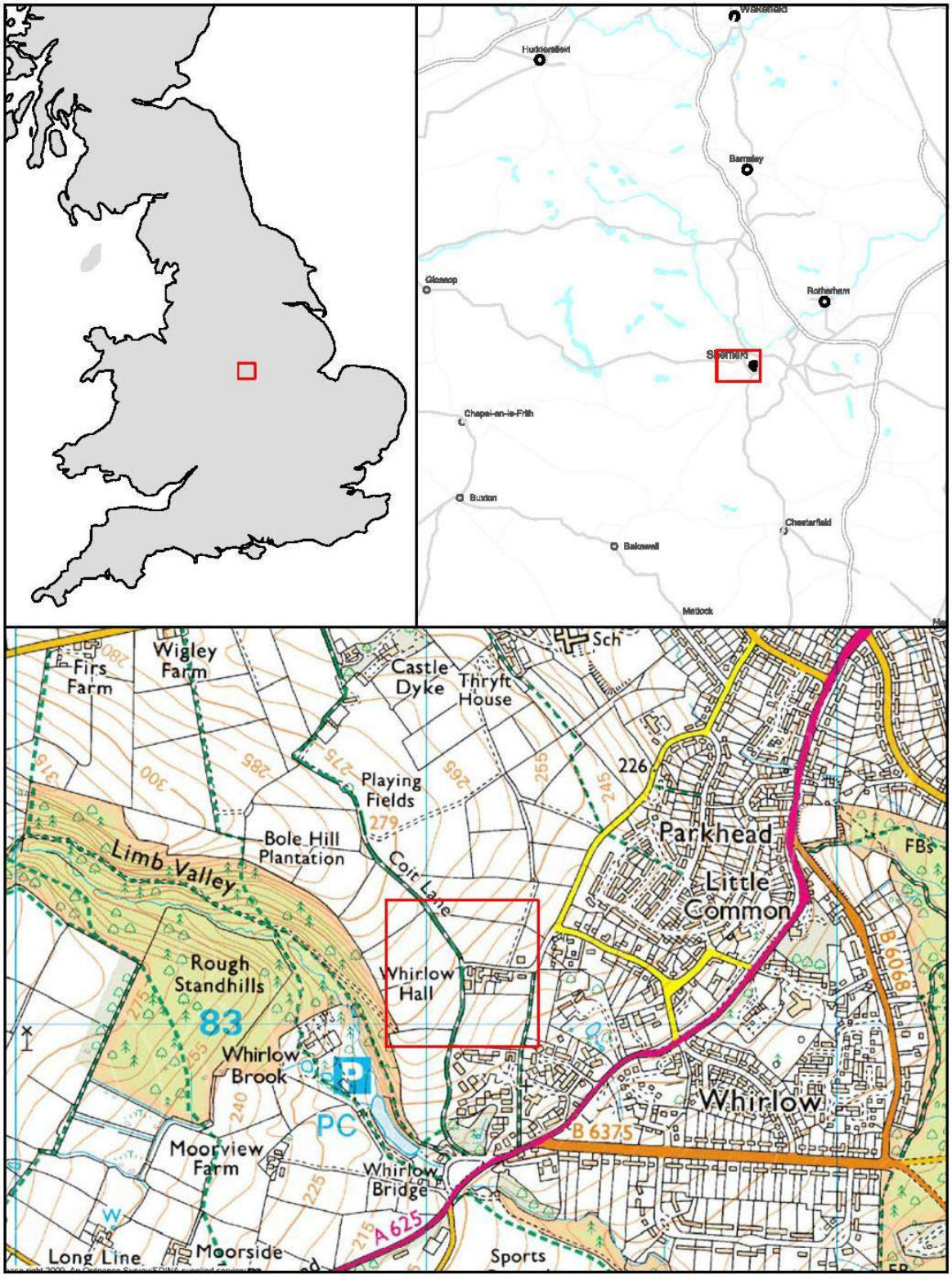

Figure 1 Location of Whirlow Hall Farm.

2. Archaeological Excavation

2.1. **Aim and Objectives**

2.1.1. The aim of the archaeological excavation is to identify and assess archaeological features at Whirlow Hall Farm in order to inform on:

- the location, extent and potential significance of buried archaeology on the site
- the nature and date of any archaeological features encountered.

2.1.2. The following objectives will contribute towards accomplishing this aim:

- Complete the excavation of the trench located across the entrance to the enclosure.
- Excavate a second trench within the interior of the enclosure to attempt to identify any other internal structures and establish the function and date of any further features.
- Recover artefacts and palaeoenvironmental data suitable to help date activity associated with the site and to shed light on past activities as well as use of the wider landscape.

2.2. **Methodology**

2.2.1. The proposed excavation will include the re-opening and completion of the previously excavated Trench 1 situated across the enclosure's west entrance, and the extension of this trench northwards (Trench 1a) to examine more of the Roman building partly exposed in Trench 1. A further trench (Trench 3) will be also be excavated on the internal north-west corner of the enclosure to examine and establish the extent of the stone-founded building thought to continue to this point where the geophysics suggests the wall returns (Fig. 2). The precise locations of these trenches and any extensions will be discussed and agreed in advance with SYAS and the English Heritage Regional Science Advisor.

2.2.2. All archaeological work will comply with:

- *Regional statement of good practice for archaeology in the development process, Yorkshire, the Humber & the north east* (SYAS 2011 - available for download from the SYAS website).
- The Chartered Institute for Archaeologists (CIfA) *Code of Conduct* (2014a) and *Standard and Guidance for Archaeological Field Evaluation* (CIfA 2014b).
- Relevant English Heritage best practice guidance documents (see below).

2.2.3. Any changes to the agreed project design will be discussed with, and agreed by, SYAS before implementation.

2.2.4. All turf, topsoil and backfilled spoil will be carefully removed by machine and turfs carefully stacked on plastic sheets with turf laid on to turf and soil laid on to soil to prevent degradation of the turf. Once the trenches have been cleaned, features will be

examined by sectioning as appropriate.

2.2.5. Excavation of archaeological features will be undertaken as far as is required to characterise them, identify sequence and, where possible, to establish their date.

2.2.6. All archaeological features and deposits will be excavated by hand using trowels and small tools unless unusually large feature fills, such as large ditch deposits, occur when in such instances larger hand tools may be used. All archaeological deposits and features will be recorded with an above ordnance datum (AOD) level.

2.2.7. The site will be accurately tied into the National Grid and located on a 1:2500 or 1:1250 map of the area. The site archive will include plans and sections at 1:50; 1:20 or 1:10 as appropriate with long sections of each trench and sections and profiles of each feature, a photographic record, and full stratigraphic records on recording forms/context sheets. Each context will be recorded on pro-forma records which will include the following: character and contextual relationships; detailed description (dimensions and shape; soil components, colour, texture and consistency); associated finds; interpretation and phasing as well as cross-references to the drawn, photographic and finds registers. Each context will be recorded on an individual record.

2.2.8. A photographic record will be maintained including photographs of all significant features and overall photographs of each area or trench. All images will be taken in black and white print, colour slide and digital format, and will contain a graduated photographic scale. The main photographic archive will comprise 35mm b/w SLR print film and 35mm colour slides, supplemented by digital SLR (minimum 7 megapixels).

2.2.9. All stratified finds will be collected by context or, where appropriate, individually recorded in 3 dimensions. All finds and pottery will be retained other than material which is 19th century or later.

2.2.10. Any deposits relating to funerary/ritual activities, such as burials and cremation deposits, will be left in situ, where feasible. However, should it be deemed necessary to remove any such human remains, this will be undertaken in line with best practice (English Heritage 2004a; English Heritage and The Church of England 2005; APABE/English Heritage 2013; Brickley and McKinley 2004). Domestic/industrial activity (such as walls, postholes, floors, hearths) will be sufficiently excavated to understand their form and function and to recover potential dating evidence and artefact and ecofact assemblages. Typically this will be a minimum of 20% of all linear features, half-sections of discrete features (e.g. post holes) and 100% of hearths or artefact-rich pits which have high potential for recovery of artefacts and ecofacts.

2.2.11. Area deposits such as buried soils, or middens, will be hand excavated at a minimum 10%. Subsequent excavation by machine will be considered.

2.2.12. Dr Andy Hammon, English Heritage's Science Advisor for Yorkshire & Humberside, will be provided with advance notice of the commencement of the fieldwork and afforded the opportunity to visit the site once the fieldwork is underway. For all securely stratified deposits not contaminated by high-levels of residual material and relevant to the aims of

the sampling strategy, 40-60 litres of sample will be taken, or 100% of the sample if smaller. This material will be floated and passed through graduated sieves, the smallest being a 300µ mesh. Should other types of environmental deposits be encountered appropriate specialist advice will be sought and an appropriate sampling strategy devised. Samples will be assessed by a suitable specialist with provision for further analysis as required. All environmental sampling will be undertaken in line *with Environmental Archaeology a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage 2011).

2.3. **Finds Processing and Storage**

2.3.1. All finds processing, conservation work and storage of finds will be carried out in compliance with the CIfA *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials* (2014d) and those set out by UKIC (1990).

2.3.2. Artefact collection and discard policies will be appropriate for the defined purpose.

2.3.3. Bulk finds which are not discarded will be washed and, with the exception of animal bone, marked. Marking and labelling will be indelible and irremovable by abrasion. Bulk finds will be appropriately bagged, boxed and recorded. This process will be carried out no later than two months after the end of the excavation.

2.3.4. All small finds will be recorded as individual items and appropriately packaged (e.g. lithics in self-sealing plastic bags and ceramic in acid-free tissue paper). Vulnerable objects will be specially packaged and textile, painted glass and coins stored in appropriate specialist systems. This process will be carried out within two days of the small find being excavated.

2.3.5. Metal finds will be sampled, processed and analysed in line with *Centre for Archaeology Guidelines: Archaeometallurgy* (English Heritage 2001), and *Guidelines on the X-radiography of archaeological metalwork* (English Heritage 2006a). Any waterlogged artefacts or ecofacts will be sampled, processed and analysed using *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (English Heritage 2010) and *Waterlogged Organic Artefacts. Guidance on their Recovery, Analysis and Conservation* (English Heritage 2012).

2.3.6. Artefacts, ecofacts and deposits suitable for dating purposes will be identified and obtained in line with *Dendrochronology: Guidelines on producing and interpreting dendrochronological dates* (English Heritage 1998), *Archaeomagnetic Dating: Guidelines on producing and interpreting archaeomagnetic dates* (English Heritage 2006b), and *Luminescence Dating: Guidelines on using luminescence dating in archaeology* (English Heritage 2008b).

2.3.7. Any surface finds will be collected, recorded and processed in line with *Our Portable Past: a statement of English Heritage policy and good practice for portable antiquities/surface collected material in the context of field archaeology and survey programmes (including the use of metal detectors)* (English Heritage 2014) and any finds

deemed to constitute 'treasure' under the terms of the *Treasure (Designation) Order 2002* will be dealt with in line with *The Treasure Act 1996 Code of Practice* (England and Wales (DCMS 2008). Any metalwork recovered by the excavation will be analysed and reported on by a relevant specialist. The metalwork recovered from the original excavation has now been analysed and reported on and this will be integrated with any further analysis resulting from this excavation and included in the site report.

2.3.8. During and after the excavation all objects will be stored in appropriate materials and storage conditions to ensure minimal deterioration and loss of information (including controlled storage, correct packaging, and regular monitoring, immediate selection for conservation of vulnerable material). All storage will have appropriate security provision.

2.3.9. All retained artefacts and ecofacts will be cleaned and packaged in accordance with the requirements of the recipient museum.

2.3.10. A risk assessment will be undertaken before commencement of the work and health and safety regulations will be adhered to at all times.

2.3.11. A site information board will be mounted in an accessible position for visitors to the farm to inform them about the excavations and regular site tours will be given. An open day will also be held during the excavation.

2.4. **Report**

2.4.1. Following completion of the excavation the contractor will produce a report which will include:

- A non-technical summary.
- Introduction and objectives of the excavation.
- Methodology of the excavation.
- An objective summary statement of results.
- A phased stratigraphic discussion of the archaeological features.
- An interpretive discussion of the results, placing them in a local and regional framework and an assessment of the importance of the remains.
- Appropriate supporting illustrations, including a site plan, trench and section plans, feature sections and plans and a phased site plan.
- A site location plan at 1:2500 or 1:10000 as appropriate and a phased interpretation of the site as appropriate.
- The results of an assessment of artefacts, ecofacts and industrial residues carried out by suitable specialists, who will be furnished with relevant contextual and stratigraphic information.
- If sufficiently significant remains are recovered then an analysis of the above based upon the specialist assessment recommendations.
- A detailed context index and supporting data in tabulated form or in appendices.
- An index to and the proposed location of the archive.
- References.
- A copy of the brief and OASIS form

- Photographs of work in progress on the site.

2.4.2. Within the report:

- All plans will be clearly related to the national grid.
- All levels will be quoted relative to ordnance datum.

2.4.3. Copies of the final report will be deposited with the South Yorkshire Sites and Monuments Record (SMR), and will be submitted to South Yorkshire Archaeology Service as a paper copy and a digital copy on CD or DVD.

2.4.4. Additional project dissemination will be undertaken as required by the significance of the archaeological finds and deposits encountered. Additional dissemination may include: an article for the Annual Review of archaeology in South Yorkshire, a talk at South Yorkshire Archaeology Day, more formal dissemination such as a journal article.

2.5. **Archive Deposition**

2.5.1. A digital, paper and artefactual archive, which will consist of all primary written documents, plans, sections, photographs and electronic data will be submitted to archive. Advice on the retention and discard of finds and samples will have been provided by specialists during the assessment and/or analysis phases and this information will be discussed with the museum when preparing the site archive. Arrangements for the deposition of the finds and site archive will be made with Museums Sheffield in advance of commencement of fieldwork. In line with the "Archaeological Archive Deposition Policy for Museums in Yorkshire and the Humber" the uniform region-wide approach to the preparation and deposition of archaeological archives will be followed. This process requires the completion and submission of forms to Museums Sheffield at the project initiation, mid-point review and completion stages (the template forms from the SYAS website will be used). The archaeological contractor will contact the museum's archaeological curator (Martha Lawrence) to discuss archaeological archiving requirements at the project initiation stage. Following agreement with the client, details of archiving arrangements will be incorporated into the project design. This will include confirmation that a budget to cover the museum's deposition charge has been allowed for. The digital archive will be prepared in line with current best practice outlined in Archaeology Data Service /Digital Antiquity Guides to Good Practice (ADS/Digital Antiquity 2011) and a copy will be deposited with the Archaeology Data Service at the University of York. On completion, confirmation of deposition with Museums Sheffield will be supplied to SYAS.

2.5.2. The contractor will either arrange for copyright on the deposited material to be assigned to the archive, or will licence the archive to use the material, in perpetuity; this licence would allow the archive to reproduce material, including for use by third parties, with the copyright owner suitably acknowledged.

2.5.3. All artefacts and associated material will be cleaned, recorded, properly stored and deposited in the archive (see above), in line with *Archaeological Archives: A guide to best*

practice in creation, compilation, transfer and curation (Brown 2007), and *Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives* (CIfA 2014e).

2.5.4. A full set of annotated, illustrative pictures of the site, excavation, features, layers and selected artefacts will be supplied to the HER and deposited with the archive as digital images on a CD ROM that will be attached with the report.

2.5.5. South Yorkshire Archaeology Service will be notified on completion of fieldwork, with a timetable for reporting and archive deposition.

2.5.6. Written confirmation of the archive transfer arrangements, including a date (confirmed or projected) for the transfer, will be included as part of the final report.

2.5.7. An OASIS online record http://ads.ahds.ac.uk/project/oasis/ has been initiated for the project. Key fields will be completed on Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the HER. This will include an uploaded .pdf version of the entire report (a paper copy will also be included within the archive).

2.5.8. South Yorkshire Archaeology Service will be notified of the final deposition of the archive.

3. Geophysical Survey

3.1. **Coverage**

3.1.1. A geophysical survey totalling some 10.59 ha has previously been undertaken during the previous work on the site, covering the areas depicted in yellow on Figure 3. It is intended to conduct a further geophysical (magnetometer) survey over an area c.9.8 ha in size, comprising those areas closest to the core of the Whirlow Hall Farm Estate (highlighted in purple on Figure 3).

3.2. **Selected technique**

3.2.1. The geophysical survey technique selected for the site is magnetometry as this has been shown to work well on this site to identify archaeological remains. Magnetometry using Fluxgate Gradiometer instruments is the preferred geophysical technique utilised for the detection of buried features such as iron-based features and objects, or those subjected to firing such as kilns, hearths and even the buried remains of brick walls. It is also used to locate more subtle features such as boundary or enclosure ditches, pits and post holes which have been gradually in-filled by more humic material. The breakdown of organic matter through microbiotic activity leads to the humic material becoming rich in magnetic iron oxides when compared with the subsoil allowing features to be detected. In addition to this, variations in the magnetic susceptibility between the topsoil, subsoil and bedrock have a localised effect on the Earth's magnetic field enabling the detection of features such as backfilled ditches or pits due to the fact that the topsoil has more

magnetic properties than the subsoil or bedrock, resulting in a 'positive' magnetic anomaly. Conversely, earthwork or embankment features can also be identified as 'negative' magnetic anomalies due to the action of placing less magnetic subsoil on top of more magnetic top soil.

3.3. **Objectives**

3.3.1. The objective of the detailed gradiometer survey is to identify anomalies of possible archaeological origin within the survey area (see Figure 2) in order to inform on the location and potential significance of any further buried archaeology on the site.

3.3.2. The presentation and interpretation of the results will be carried out in accordance with the *Code of Conduct of the Chartered Institute for Archaeologists* (CIfA 2014a) and will follow the English Heritage guidelines (2008a) *Geophysical Survey in Archaeological Field Evaluation* and the CIfA *Standard and Guidance for archaeological geophysical survey* (2014c). ARS Ltd is a corporate member of the International Society of Archaeological Prospection (ISAP).

3.4. **Methodology**

3.4.1. A survey grid comprising 30m x 30m individual grids will be set up over the selected survey areas. The survey will use a temporary survey grid accurately positioned using a suitable DGPS system. The temporary grid will be co-registered to the Ordnance Survey National Grid using digital tiles provided by ARS Ltd or suitable digital map tiles provided by the client.

3.4.2. These grids will then be surveyed using a Bartington Grad 601-2 gradiometer. The Grad 601-2 has two gradiometer sensors and therefore collects two lines of data during each traverse. Data are collected in a zigzag fashion within the grid starting in the north-west corner, facing east. Readings are taken every 0.25m on traverses 1m apart. This equates to 3600 readings in a complete 30mx30m grid. Sensor balance will be checked and adjusted at regular intervals.

3.4.3. At the end of each day the data will be downloaded to a PC or laptop using *Geoscan Geoplot V3*.

3.4.4. All staff employed on the geophysical survey will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical survey.

3.4.5. All staff will be made aware of the archaeological potential of the area and will be fully briefed on the work required by this WSI.

3.5. **Data Processing, Interpretation and Report**

3.5.1. Data processing will be undertaken by a geophysicist using *Geoscan Geoplot V3*. Anomalies will be digitised and geo-referenced. They will be colour coded using ARS Ltd's standard scheme to provide the most likely interpretation. Anomalies will be numbered and catalogued as systematic groups or individual anomalies as appropriate.

The final report will include a graphical and textual account of the techniques undertaken, the data obtained and an archaeological interpretation of that data and conclusions about any likely archaeology. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- A Non-technical summary
- Introduction
- Geological and topographical setting
- Methodology
- Discussion of archaeological and historical background
- Discussion on the results of the survey
- Conclusions and recommendations
- Sources
- Copy of brief
- Figure showing location of the site
- Figure showing location of survey grids and referencing
- Figure showing processed data
- Figure showing trace plots of processed data
- Figure showing abstraction and interpretation of anomalies.

4. Fieldwalking

4.1. **Introduction**

4.1.1. The fields at Whirlow Hall Farm are only ploughed intermittently in alignment with the needs of the farm as an educational resource, and it is therefore likely that a limited number of areas would be available for fieldwalking during the life of the project. Two fields have already been subject to fieldwalking during previous work, and these are depicted by magenta hatching on Figure 2. Any of the remaining fields that are ploughed during the course of the project and are suitable for fieldwalking will be surveyed using the methodology outlined below.

4.2. **Methodology**

4.2.1. Fieldwalking undertaken at close-spaced intervals of 2m transects provides a c.100% surface coverage assuming each person observes the ground 1m either side of their transect and that the field in question is walked when there is bare soil or limited sprouting crop. Fields will be line-walked at 2m intervals following the detailed methodology set out in Passmore and Waddington (2009).

4.2.2. All walkers will be asked to keep to this range of visibility to ensure consistency throughout the survey. Every find spot will be point-referenced with a total station and the field boundaries surveyed so that field plots can be related to the Ordnance Survey grid.

4.2.3. Each find will be marked by a cane inserted into the ground and the find inserted into a

plastic bag for ease of cataloguing and identification.

4.2.4. Each field will be mapped according to slope unit (morphometric mapping) so that each find spot can be ascribed to the type of slope on which it was found. The slope unit categories will be based on those devised for fieldwalking projects elsewhere in England (Waddington 1999, 45-6), which were abstracted from standard slope types identified by Butzer (1982, 58).

4.2.5. Slope type will be recorded as this has important implications for the interpretation of surface artefact distributions as geomorphic processes operating on different slope units will affect artefact distribution and retrieval in different ways (Waddington 1999, 85-91). These processes need to be taken into account before meaningful inferences can be made.

4.2.6. A catalogue of all finds will be produced noting type, date, measurements and material etc. for the various finds. A report will be produced containing accurate field plots showing slope units and findspots of different types of material as well as text descriptions of each field, together with discussion. Dr Clive Waddington is the individual appointed to assess and analyse small finds from the fieldwalking (see also below).

4.3. **Report**

4.3.1. A report detailing the results of the fieldwalking will be submitted to SYAS. The report will describe the work undertaken and the results obtained. It will (as a minimum) include the following.

- A Non-technical summary
- Introduction
- Archaeological and Historical Background
- Methodology
- Discussion on the results of the survey including specialist analyses.
- Conclusions and recommendations
- Figure showing location of the site
- Figure showing location of the fieldwalking finds.
- Colour photographs of selected artefacts.

5. Earthwork Survey and other training

5.1.1. As one of the principle aims of the project is *'To provide volunteers, school children, young people and members of the public with training and experience in recording and looking after historic and archaeological remains',* the project proposals will also involve experienced professionals providing training in archaeological techniques. As well as involving volunteers in the filedwalking and excavation elements of the project, it is envisaged that such training will also involve earthwork survey of selected features within the estate of Whirlow Hall Farm, desk-based research methodologies, earthwork survey, and air photograph analysis.

6. Changes to Methodology or Work Programme

6.1.1. Changes to the approved methodology or programme of works will only be made with the prior written approval of South Yorkshire Archaeology Service.

7. Monitoring Arrangements

7.1.1. The contractor will liaise with South Yorkshire Archaeology Service at regular intervals throughout the course of the work so that appropriate monitoring visits can be arranged:

South Yorkshire Archaeology Service
Development Services
Sheffield City Council
Howden House
1 Union Street
Sheffield
South Yorkshire
S1 2SH
01142 736428

8. Project management

8.1.1. The contractor directing the work on behalf of the Timetravellers will be a Registered Organisation with the Chartered Institute for Archaeologists (CIfA). Registered Organisations are continuously assessed to ensure that the highest standards of work are carried out, in line with the *Code of Conduct* of the CIfA (2014a).

8.1.2. All staff employed on the project will be suitably qualified and experienced for their respective project roles and have practical experience of geophysical surveying and reporting. All staff will be made aware of the archaeological importance of the area surrounding the site and will be fully briefed on the work required by this specification. Each member of staff will be fully conversant with the aims and methodologies and will be given a copy of this WSI to read. All professionals employed on the works will be fully qualified and experienced archaeologists; this will ensure that appropriate decisions regarding excavation and sampling will be made in the field.

9. Staff and Specialists

9.1.1. The Project will be managed by an experienced archaeologist with 'Member' status of the Chartered Institute for Archaeologists.

9.1.2. Only specialists who can provide the required level of expertise will be employed to carry out specialist analytical work. The successful contractor will be required to provide a list of specialists for approval in advance of works commencing.

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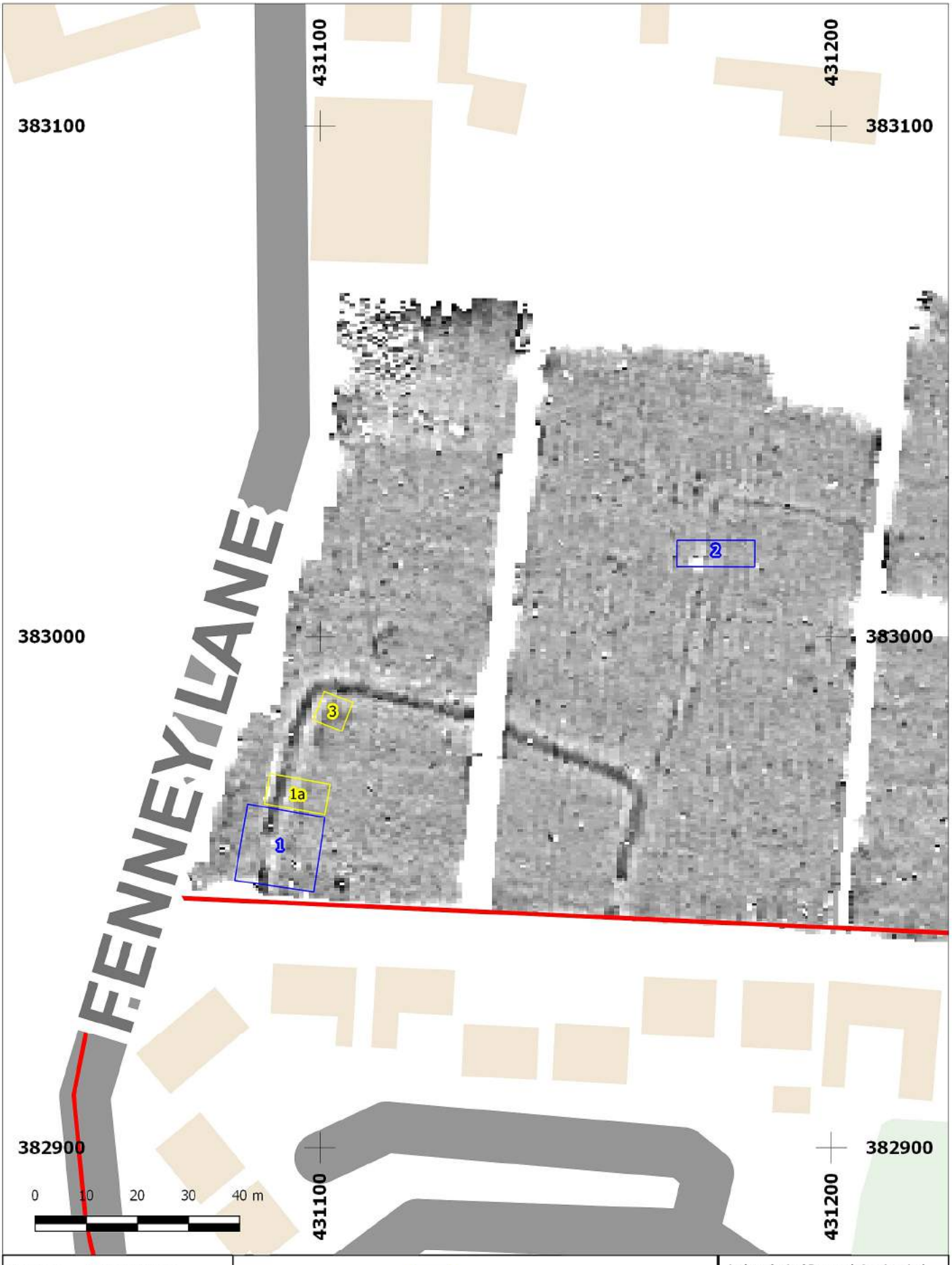
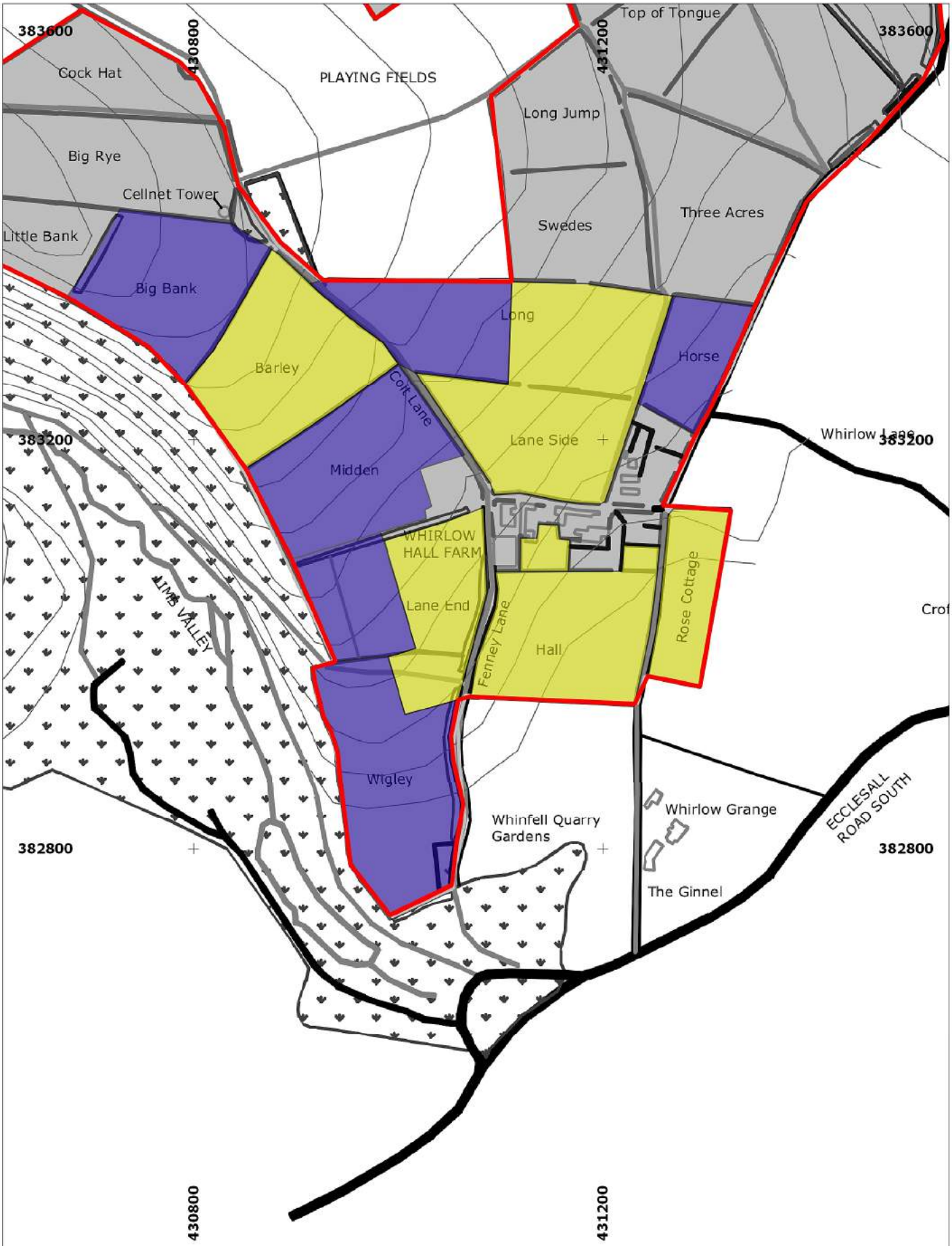


Site name: Whirlow Hall Farm Date: May 2015 Drawn by: AB Scale: 1:5000 @ A4	Whirlow Hall Farm Estate boundary Previous trench locations Proposed trench locations	**Archaeological Research Services Ltd** Angel House Portland Square Bakewell Derbyshire DE45 1HB Tel: 01629 814540 www.archaeologicalresearchservices.com
This drawing: © ARS Ltd Contains Ordnance Survey data © Crown copyright and database right 2015	**Figure 2:** **Proposed additional trench locations**	



Site name: Whirlow Hall Farm Date: May 2015 Drawn by: AB Scale: 1:5000 @ A4	Whirlow Hall Farm Estate boundary Geophysics - completed Geophysics - proposed N	**Archaeological Research Services Ltd** Angel House Portland Square Bakewell Derbyshire DE45 1HB Tel: 01629 814540 www.archaeologicalresearchservices.com
This drawing: © ARS Ltd Contains Ordnance Survey data © Crown copyright and database right 2015	**Figure 3:** **Proposed additional geophysical survey areas**	

Appendix II. OASIS Form

OASIS DATA COLLECTION FORM: England

Printable version

OASIS ID: archaeol5-283312

Project details

Project name	Excavation At Whirlow Hall Farm, Sheffield
Short description of the project	An exploratory excavation took place over a large late Iron Age - Roman period rectilinear enclosure identified by geophysical survey at Whirlow Hall Farm during July-August 2011, with a second phase of excavations in June-July 2016. Two trenches were excavated in 2011; Trench 1 was located over the west entrance of the rectilinear enclosure and Trench 2 was located over the parallel flanking ditches of a trackway leading to the east entrance of the enclosure. The 2016 excavation expanded Trench 1 and completed its excavation and also opened Trench 3 within the north-west edge of the enclosure and Trench 4 on a geophysical anomaly beyond the enclosure on its north side. A further exploratory excavation took place higher up on the Whirlow Hall Farm estate on an area of plateau on top of Bole Hill where Trench 5 targeted a square double ditch-defined site identified by geophysical survey, and which on the basis of the work reported here is confidently interpreted as the remains of a Roman signal station.
Project dates	Start: 20-06-2016 End: 08-07-2016
Previous/future work	Yes / Not known
Type of project	Research project
Monument type	NA None
Monument type	NA None
Significant Finds	POTTERY Roman
Investigation type	'"Part Excavation"'
Prompt	Research

Project location

Country	England
Site location	SOUTH YORKSHIRE SHEFFIELD SHEFFIELD Whirlow Hall Farm
Study area	0 Hectares
Site coordinates	SK 31233 83177 53.344297923682 -1.53081524996 53 20 39 N 001 31 50 W Point

Project creators

Name of Organisation	Archaeological Research Services Ltd
Project brief originator	Archaeological Research Services Ltd
Project design	Archaeological Research Services Ltd

originator	
Project director/manager	Clive Waddington
Project supervisor	Clive Waddington
Type of sponsor/funding body	Heritage Lottery Fund

Project archives

Physical Archive recipient	Sheffield Galleries and Museums Trust
Physical Contents	"Ceramics","Glass","Metal","Worked stone/lithics"
Digital Archive recipient	Archaeological Data Services
Digital Contents	"other"
Paper Archive recipient	Sheffield Galleries and Museums Trust
Paper Media available	"Context sheet","Drawing","Photograph","Report","Section"

Entered by	Caitlin Halton (Caitlin@archaeologicalresearchservices.com)
Entered on	21 April 2017

OASIS:

Please e-mail Historic England for OASIS help and advice
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