LAND NORTH OF WALSHES ROAD (PHASE 1), CROWBOROUGH, EAST SUSSEX

POST-EXCAVATION ASSESSMENT REPORT

PCA REPORT NO: R14761

SITE CODE: XWRC20

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PRE-CONSTRUCT ARCHAEOLOGY

LAND NORTH OF WALSHES ROAD (PHASE 1), CROWBOROUGH, EAST SUSSEX: AN ARCHAEOLOGICAL ASSESSMENT REPORT

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1 ABSTRACT

Pre-Construct Archaeology Ltd was commissioned by RPS Consulting Ltd to undertake an archaeological investigation on land to the north of Walshes Road, Crowborough, East Sussex, Specifically, consented development Phase 1. The site is the subject of a residential development for which planning permission has been granted by the Local Planning Authority. This document provides the results of the evaluation, which comprised 27no 30m X 2m trial trenches and an area excavation of c.20m X 30m.

The investigation was carried out according to the approved method statement and appears to have met the aims that were set out in defining a discrete area of significant archaeological potential, which comprises evidence for Early to Middle Iron Age iron production. Elsewhere, undated features of potential archaeological origin were found to survive at a minimum depth of between c 0.27m and 0.50m below the existing ground surface and over the western half of the site, although in uniformly low concentration. The shallow nature of the majority of archaeological features may suggest erosive agricultural practices may have impacted the Site over a long period, perhaps combined with bioturbation.

The features uncovered in Trench 13/Area 1 provide evidence for iron smelting and in particular the deposition of the waste products of that process; the evidence has been dated by radiocarbon dating to the Early to Middle Iron Age. The location the features and waste products within a small, natural gully may be taken to suggest the smelting activity was nearby and perhaps relatively short lived. The date, nature and significance of the evidence for iron smelting is set out in specialist reports that contain recommendations for further analysis.

2 INTRODUCTION

2.1 Project Background

2.1.1 Pre-Construct Archaeology Ltd (PCA) was commissioned by RPS Consulting Ltd to undertake an archaeological investigation on land to the north of Walshes Road, Crowborough, East Sussex, (**Figure 1**), hereafter 'the site' (centred at NGR TQ 5264 2925). Specifically, consented development Phase 1. The site is the subject of a residential development for which planning permission (Planning Ref WD/2020/0369/MFA) has been granted by the Local Planning Authority (LPA).

2.1.2 This document provides the results of the investigation, which comprised 27no 30m X 2m trial trenches along with a small area excavation opened around trench 13 measuring c.20m X 30m (Area 1). This document has been prepared in accordance with the Chartered Institute for Archaeologists standard and guidance for archaeological field evaluation (CIfA 2014) and Management of Research Projects in the Historic Environment (Historic England, 2015).

2.2 Location, Topography and Geology

2.2.1 The bedrock geology belongs to the Ashdown Formation - Sandstone and siltstone, interbedded, a sedimentary bedrock formed between 145 and 133.9 million years ago during the Cretaceous period. No superficial deposits are recorded. The Phase 2 evaluation identified c. 0.55m of topsoil and subsoil over the natural light yellow/orange sandy and clayey silt. The natural had white mottling and occasional sandstones and ironstones.

2.2.2 The site rises gently north from Walshes Road, but then drops sharply in the vicinity of the brook and there are unlikely to be alluvial deposits within the PDA that would mask archaeological feature.

2.3 Archaeological and Historical Background

Prehistoric and Romano-British

2.3.1 The earliest remains known in the study area come from a watching brief in 2010 on the Groombridge to Langton Green Water Main, over 1km north of the site, which recovered an Upper Palaeolithic scraper (pastscape.org).

2.3.2 A number of lithics have been found in the Crowborough area according to the Portable Antiquities Scheme which belong to the Lambert Collection and have been dated to the Mesolithic and Neolithic, however their precise find-locations are uncertain.

2.3.3 The study area, and the Weald more generally, is known to have been a focus of iron smelting in the Iron Age and Romano-British periods. A bloomery with pottery from both periods was found at Scaland Wood, approximately 1km south-west of the site in 1981. Rose Hill, Poundfield is the site of a bloomery of probable Romano-British date, which was located 740m to the north-east, found on the bed of Crowborough Ghyll.

2.3.4 Just north of the site undated features and Late Iron Age or Romano British remains were found during an evaluation and later during excavation including post holes, ditches and gullies and a quantity of pottery. This has been interpreted as a field system and settlement.

2.3.5 A trackway along the Newenden-Hawkhurst-Ticehurst-Wadhurst ridgeway 500m to the north may be of prehistoric or Roman date, and Roman pottery has been found in small quantities at Walsh Manor.

Early Medieval and Medieval

2.3.6 The name Crowborough is recorded from the late 13th century and pre-dates the settlement of this name, it derives from Old English crawe-beorg which means 'crow hill' and specifically meaning a rounded hill or tumulus and probably refers to the Crowborough Beacon.

2.3.7 The Weald was a wooded landscape into the medieval period and settlement would have been small and dispersed. Crowborough is not recorded in the Domesday survey but the manor of Rotherfield was in the ownership of the King. In 1086 there were 24 households at Rotherfield which is in the largest 40% of settlements recorded in the survey. Amongst the recorded resources is woodland for 80 swine which could have included the area of Crowborough.

2.3.8 Crowborough itself is located on '*dounelond*' which was extensive common land. The eastern flank of Crowborough Down had been partly enclosed in the mid-14th century by Rotherfield manor. Much of the settlement and farms in the area were small scale until the late post-medieval period.

2.3.9 The Historic Landscape Characterisation for Sussex records that the site in origin is made up of one cohesive assart field (enclosed and cleared woodland) which is probably medieval or earlier along with regular informal piecemeal enclosures. The latter could also be medieval in date and is typical with a trackway passing through them (i.e. the modern bridleway).

2.3.10 A few farmsteads with medieval origins are recorded in the Study Area. Luxford farmstead lies 50m to the southwest of the site and Haywards Farm 725m to the south-east. The area would have been divided up into smaller field parcels and a lost field boundary was identified in the north-west field in LiDAR where a bank and ditch run east-west. Others can be seen in later mapping on the ground. LiDAR also showed the surface of the fields with faint linear markings which could be ridge and furrow.

2.3.11 A late medieval or post-medieval ditch was found 50m to the north at Rockington Nurseries (MES36212) during an excavation, probably an early post-medieval field boundary. To the south 580m away is Walsh Manor moated site, a Scheduled Monument dated to the medieval period that includes ornamental fishponds.

2.3.12 The Portable Antiquities Scheme records a sword of cruciform shape from this period from Crowborough but the precise location of the find is not available.

Post Medieval

2.3.13 A possible medieval or post-medieval bloomery was identified after iron cinder was found in Toll Wood to the north of the site.

2.3.14 In the late 18th century, there were a few scattered cottages and farm buildings in the area. By the mid-19th century these had developed into the modest hamlet of Crowborough Town. The first reference to Crowborough as a distinctive place is in 1734 when a chapel and school were built at the bequest of Sir Henry Fermor. To the east of the site the HLC also records a hamlet at Jarvis Brook from the 18th century.

2.3.15 The HER records a number of 19th century farmsteads in the Study Area, the nearest being Hammers Farm. enclosed by the site, Walshes Manor to the south, Tubwell Farm to the north and The Beeches to the north.

2.3.16 Development of the Weald waste in the 19th century for housing led to the emergence of Crowborough as a new town. The coming of the railway in 1868 facilitated the growth of the town as it became accessible from London for both visitors and new residents who were drawn to the open landscape and Ashdown Forest. Famous residents of Crowborough included Sir Arthur Conan Doyle. Crowborough Station is located within the Study Area to the north-east of the site and the railway tunnel and airshafts are in the south. Between 1879 and 1899 the town of Crowborough developed significantly, which continued into the late 20th century.

Modern

2.3.17 The study area was heavily defended during WWII with numerous pillboxes, anti-tank and anti-aircraft sites particularly along the eastern edge of the Study Area. These include a light aircraft emplacement and a searchlight battery at Jarvis Brook which were part of the Kentish Gun Belt. There are pillboxes 100m and 150m to the south-east of the site including two in the Baptist Church grounds. There is another at Jarvis Brook to the north.

3 AIM

3.1 Archaeological Investigation

3.1.1 The aim of the archaeological Investigation, as set out in the Written Scheme of Investigation (PCA 2021), was to:

- To determine the palaeo-topography of the site.
- To determine the presence or absence of palaeoenvironmental remains.
- To determine the presence or absence of prehistoric activity,
- To determine the presence or absence of Romano-British activity.
- To establish the presence or absence of early medieval activity.
- To establish the presence or absence of medieval activity.
- To establish the presence or absence of post-medieval activity.
- To ascertain whether any traces of the post-medieval usage of the site for agricultural purposes are evident.
- To establish the extent of past post depositional impacts on the archaeological resource.

4 RESULTS

4.1 Introduction

4.1.1 The following presents a summary of the investigation results based upon the Site archive, which comprises a site diary, trench recording sheets, drawings and digital photographs. A summary of recorded contexts is provided in a Context Index in **Appendix 1** and photographs of the trenches in **Appendix 2**. Specialist finds reports are provided in **Appendices 3-7** and the OASIS report in **Appendix 8**. The archive is held at PCA's London office under the site code **XWRC20** and will in due course be deposited with a relevant local museum.

4.2 Methodology

4.2.1 The archaeological investigation was undertaken following the methodology that was detailed in the written scheme of investigation (PCA 2021), which was approved by the Local Planning Authority in advance of the commencement of works and on the advice of their archaeological advisor Neil Griffin, County Archaeological Officer, East Sussex County Council.

4.2.2 The investigation comprised the excavation of twenty-seven trenches measuring 30m x 2m (**Figure 2**). The array of trenches was intended to provide a reasonable sample of the Site in order to establish its archaeological potential. The trenches were opened and investigated between the 21st June and 5th of August 2021, with the exception of trench 24 – which was deemed inaccessible. Trenches 27 and 25 were both shortened to avoid ecological habitats and trench 28 was realigned, also to avoid ecological habitats.

4.2.3 Area 1 was opened up around trench 13 and measured c.20m X 30m. This allowed for better characterisation and investigation of the archaeological features uncovered (**Figure 2**).

4.3 Summary of Deposition Sequence

4.3.1 Natural geology was observed in all trenches. Comprising a yellow silty clay mottled with grey, with occasional sandstones and ironstones (**Plate 1**).

4.3.2 Overlying the natural geology was a subsoil, observed in the majority of trenches and occurring between depths of 0.14m-0.46m below ground level (BGL), comprising a greyish brown silt clay. Overlying this was topsoil, observed in all trenches and up to 0.42m deep, comprising dark greyish brown silty clay. This general sequence was recorded in representative sections (**Figure 5**, **Plates 2-4**)

4.4 Archaeological Features

4.4.1 No archaeological features, deposits or finds were revealed in 21 trenches, nos. 1, 2, 5, 7, 10-12, 14-23 and 25-28.

Early to Middle Iron Age features

4.4.2 Feature group 10029 was investigated in Trench 13 and subsequently investigated in an expanded area around the trench, Area 1, located just inside the northern extent of the site, a low-lying area at the base of a steep sided and natural gully. The feature group comprised [1304], [10021], [10022] and [10030] (**Figure 4**). The features were investigated in a number of controlled sections. These were aimed at the retrieval of quantities of the slag, burnt clay and charcoal from secure contexts within the general sequence of fills. The features were irregular in plan form, size and depth, measuring between 3.46m and 4.99m wide, 0.92m and 2.06m+ long and between 0.25m and 0.78m deep, and were never full exposed in plan. All had concave profiles with sides of varying steepness (**Figure 7**). The stratigraphic relationship of these features was unclear, and the fills were amalgamated in places.

4.4.3 All the features in group 10029 contained similar and numerous fills, broadly following a similar pattern of deposition (**Plates 5 and 6**). The lower fills (1307), (1308), (10023), (10024) (10040) and (10039) comprised of dark grey – mid reddish orange silty clay. measuring between 0.22m – 0.51m thick. The fills were characterised by the large amounts of charcoal, burnt clay fragments and iron slag recovered during excavation. Interpreted as deliberate backfill with waste material from the iron processing. Specifically iron smelting, with fragments of furnace slag recovered from the fills (see **Appendix 7**). The fragments of burnt clay were too small to establish their original form, though it is likely that they were part of a kiln (see **Appendix 5 & 6**).

4.4.4 Overlying these fills were layers of grey – greyish orange silty clay (1305), (1306), (10025), (10026), (10027), (10031), (10041), (10033), (10032), (10035), (10034), (10036), (10038) and (10042). Measuring between 0.06m – 0.48m thickness. Interpreted as colluvial deposits, no finds were recovered from these layers. Fill (10037) was observed overlying (10038) and (10042), and below (10036) within feature [10033]. (10037) comprised a thin layer (measuring 0.06m thick) of dark grey silty clay, similar to the lower backfill deposits. No finds were recovered from this layer. It was interpreted as possible backfill.

4.4.5 Fragments of charcoal were recovered from samples taken from layer (1305), radio carbon dating was undertaken on some of these fragments, from which an Early to Middle Iron Age date was obtained, 517-380 BCE and 229-92 BCE (see **Appendix 4** for the C14 report). (1305) was a colluvial deposit measuring between 0.08-0.27m thick. The layer was observed across the width of trench 13 extending c.7m+ along the NE-SW section of the trench.

Undated features

4.4.6 A total of 15 undated features were uncovered across six trenches, nos. 3, 4, 6, 8, 9 and 13, as well as in Area 1.

4.4.7 Trench 3 contained one steep sided, curved linear feature [304], aligned north-south. It measured 0.46m wide by 0.33m deep, extending 2.6m within the trench (**Figure 3 & 6**). It contained a single fill (305) comprising a dark grey silty clay; no finds or dateable material were recovered from this feature.

4.4.8 Trench 4 contained two features, linear feature [404] and pit [406] (**Figure 3**). Linear feature [404] was revealed in the southern half of the trench and was aligned east-west (**Plate 7**). It had steep sides and a concave base and measured 0.4m wide, 0.14m deep and extended across the width of the trench. It contained one fill comprising dark grey silty clay. No finds or dateable material were recovered from this feature.

4.4.9 Pit [406] was partially uncovered in the northern part of the trench. A sub-circular pit with moderately steep sides and a concave base it measured 1.14m long, 2.98m wide and was 0.19m deep (**Figures 3 & 6, Plate 8**). It contained a single fill comprising a dark brownish grey silty clay. No finds or dateable material were recovered from this feature.

4.4.10 Trench 6 contained one linear feature [603] uncovered towards the middle of the trench (**Figures 3 & 6**). It was aligned northwest-southeast and had an irregular profile, steep sides and a concave base. It measured 1.07m wide, 0.15m deep and extended across the width of the trench. It contained one fill comprising a mid grey silt clay, with common inclusions of natural sandstone fragments (**Plate 9**). No finds or dateable material were recovered from this feature.

4.4.11 Trench 8 contained one feature, linear feature [803] uncovered in the northern end of the trench (**Figures 3 & 6**). It was aligned north-west to south-east. With steep shallow sides and a concave base it measured 0.46m wide, 0.11m deep and extended across the width of the trench. It contained one fill (804) comprising a dark grey silty clay (**Plate 10**). No finds or dateable material were recovered from this feature.

4.4.12 Trench 9 contained one feature, pit [904] partially uncovered towards the middle of the trench (**Figures 4 & 6**). Circular in plan and cut by a modern land drain, it had moderately steep sloping sides and a flat base and measured 1.96m in diameter and 0.34m deep. It contained three fills. The lowest fill (905) was 0.05m thick and comprised a dark grey silty clay with common small charcoal inclusions. The middle fill (906) measured 0.05m thick and comprised a light grey silt clay, containing occasional sandstone and charcoal fragments. The upper fill (907) measured 0.24m thick and comprised a mid-grey silty clay containing occasional sandstone and charcoal fragments (**Plate 11**). No finds or dateable material were recovered from this feature.

4.4.13 Trench 13 and Area 1 contained a total of nine undated features. Pit [10018] was located to south of feature group 10029 in Area 1 (**Figures 4 & 6**). It was a sub-oval shape in plan, with a concave profile and gradually sloping sides. It measured 1.42m long, 1.02m wide and was 0.24m deep. The base of the cut comprised scorched clay, above which were three fills (10019), (10020) & (10028). The lowest fill (10028) was confined within the western part of the feature, comprising a dark grey, silty clay, 0.04m thick. Fragments of iron slag were recovered from this fill. Overlying this was a dark reddish brown silty clay (10020), measuring 0.14m thick; fragments of burnt clay were recovered from this fill, including furnace slab fragments. Above this was a layer of mid-greyish brown silty clay (10019), measuring 0.1m thick (**Plates 12-13**); no dateable finds were recovered from this feature, although it may be associated with the Iron Age features and evidence for iron working immediately to the north.

4.4.14 Five small pits were uncovered in the southern part of Area 1 (**Figure 4**), pits [10003], [10005] (**Figure 6**), [10007], [10009] and [10013]. Measuring between 0.32m and 0.65m in diameter and between 0.06m and 0.15m deep, all had irregular concave profiles and contained one fill, comprising a grey to greyish brown, mottled orange sandy clay. No finds or dateable material was recovered from these features (**Plates 15-16**).

4.4.15 Pit [10011] was partial uncovered along the northern edge of Area 1 (**Figure 4 & 6**). Measuring 1.6m+ wide, 3.3m long and 0.13m deep it was sub-circular in plan, with a concave profile. It contained one fill (10012) comprising a mid-brownish grey sandy clay. No finds or dateable material was recovered from the feature.

4.4.16 Layer (10016) was observed at the base of the slope in the eastern part of Area 1 (**Figure 4 & 6**), which comprised a mid greyish brown sandy clay up to 0.22m thick. Bellow (10016) at the very base of the slope was layer (10017), comprising a mid brownish grey sandy clay, 0.13m thick (**Figure 6**). No finds were recovered from either of the layers and it seems likely these two deposits formed part the natural deposit sequence.

4.5 Discussion

4.5.1 The archaeological features revealed by the evaluation were confined to the western half of the site. Features revealed in the western-most field were unremarkable and possibly of natural origin.

4.5.2 Pit [904] in trench 9 contained residues most likely from a fire, although whether domestic or industrial remains unclear. This pit is stratigraphically earlier than a modern land drain found to be truncating it, though no further dating evidence was recovered to indicate whether it could be considered an outlier of the group of Iron Age features in Area 1.

4.5.3 Of greater significance, feature group 10029 in Trench 13/Area 1 corresponds with an anomaly seen on the geophysical survey of the site. Two interpretations for the origins of these features seem possible, that they were natural features – the eroded form of a small water course in the base of a natural gully – or the result of clay extraction pits and perhaps associated with the iron smelting activity represented by the slag and related material within their backfill. It is entirely possible that both may be true. The fills of these features appear to represent a mixture of deliberate backfill, laden with waste from iron smelting, and natural infill. It is not known exactly where the iron was being smelted, though pit [10018] is a possible contender (see below). But the waste products appear to have been deposited in these features. Specialist analysis of the slag (see **Appendix 7**) highlighted the absence of hearth bottoms and smithing micro-slags within the assemblage, which suggests that the site was used for smelting the iron and that the smithing was undertaken elsewhere.

4.5.4 Pit [10018] was uncovered just a few meters south of group 10029 and though not dated it is likely contemporary with group 10029; it contained iron slag and the scorched natural around it might indicate a high temperature activity, such as smelting, some fragments of burnt clay furnace slab were recovered from the fills of the feature.

4.5.5 The remaining features across Area 1, include six undated pits are of low significance. Given the irregular shape or shallow depth of the pits it is likely that they are of natural origin, such as bioturbation.

4.6 Conclusion

4.6.1 The investigation was carried out according to the approved method statement and appears to have met the aims that were set out in defining a discrete area of significant archaeological potential, which comprises evidence for Early to Middle Iron Age iron production. Elsewhere, undated features of potential archaeological origin were found to survive at a minimum depth of between c 0.27m and 0.50m below the existing ground surface and over the western half of the site, although in uniformly low concentration. The shallow nature of the majority of archaeological features may suggest erosive agricultural practices may have impacted the Site over a long period, perhaps combined with bioturbation.

4.6.2 The features uncovered in the Area 1 provide evidence for iron smelting and in particular the deposition of the waste products of that process; the evidence has been dated by radiocarbon dating to the Early to Middle Iron Age (specifically 517-380 and 229-92 BCE). The location the features and waste products within a small, natural gully may be taken to suggest the smelting activity was nearby and perhaps relatively short lived. The date, nature and significance of the evidence for iron smelting is set out in specialist reports in **Appendices 3-7** and recommendations from those reports form the proposals set out below.

5 UPDATED PROJECT RESEARCH THEMES AND FURTHER POTENTIAL

5.1 Original Research Themes

5.1.1 The aim of the archaeological Investigation, as set out in the Written Scheme of Investigation are listed below, along with how the investigation detailed in this report has met these aims

- To determine the palaeo-topography of the site.
- To determine the presence or absence of palaeoenvironmental remains.
- To determine the presence or absence of prehistoric activity,
- To determine the presence or absence of Romano-British activity.
- To establish the presence or absence of early medieval activity.
- To establish the presence or absence of medieval activity.
- To establish the presence or absence of post-medieval activity.
- To ascertain whether any traces of the post-medieval usage of the site for agricultural purposes are evident.
- To establish the extent of past post depositional impacts on the archaeological resource.

5.1.2 The investigation established the presence of prehistoric activity within the Site, specifical evidence of Early-Middle Iron Age iron smelting activity.

5.1.3 The shallow nature of many of the features observed across the site would suggest that later agricultural activity has had a negative impact on the chance of further archaeological resources surviving across much of the Site. The exception being the lower lying areas of the Site, around Area 1 where colluvial deposits appear to have offered some protection to the surviving archaeological remains.

5.2 Updated Research Themes

5.2.1 From this assessment of the results of the excavation the following updated research themes have emerged:

- How does the Iron Age activity within the Site fit into the wider narrative of the area and region during this period?
- What can further analysis of the finds assemblage tell us about the activity carried out within the Site during the Iron Age period?

5.3 Local Research Frameworks

5.3.1 The South East Research Framework Resource Assessment and Research Agenda (SERF) identifies research priorities for the county of Sussex and defines methodologies intended to consolidate knowledge (SERF, 2019). Any further research should address the areas outlined by the Archaeological Framework:

> ***'Technology and material culture***
> *Despite the obvious potential of material culture to contribute to our understanding of later prehistoric societies, its significance has been downplayed and there have been few studies of any craft or industry in the region. Much research could be done with material from previous excavations, but other questions will require new fieldwork…*
> *…The origins of iron production, especially in the Weald, need further investigation, with absolute dating of early production residues…*
> *…There is a need for regional analysis of the usage, circulation, consumption and deposition of artefacts made of bronze, iron, bone, antler and stone.'*

5.4 Specialist Recommendations

5.4.1 Further specialist assessment of the iron slag and high temperature debris was recommended (**Appendix 7**). This included that further detailed recording of the slag should be carried out and that:

- *'Further detailed examination of samples is necessary. There is the need to be aware that crushed ore or roasted fines may be present but not recognisable except by a specialist.*
- *The building material and possible stone from context (1308) require examination by specialists in building materials and stone. A fragment of brick was recovered from context (1308) sample <2>.*
- *A fragment of possible worked stone was also present in (1308) <2>. In addition to this, a number of small pieces of pale coloured stone were found in the assemblage in various contexts.*
- *A piece of pinkish mortar (?) was also present in context (1308).*
- *Dating of charcoal in the slag assemblage in the paleo-channel is desirable I order to enhance the dating of material recovered from the extended Area 1 investigation*
- *The assemblage requires further examination and laboratory analysis by a qualified archaeometallurgist.*
- *At the current time, the slag should be retained until analysis is undertaken*.'

5.4.2 No further specialist analysis of the charcoal was recommended, but the report highlighted appropriate samples for further dating:

> '*Dating for Phase 1 has been provided by Sample <3> Pit [1304] Context [1305]. That is Iron Age. In respect of material for AMS ^{14}C dating from Phase 2 (Area1) excavations, the following sub-samples have produced charcoal fragments suitable for dating if required:*

(i) Sample <5> Pit [10018] Context [10020]
(ii) Sample <8> Pit [10022] Context [10024]
(iii) Sample <10> Pit [10030] Context 10039] – Lower Fill.'

5.4.3 The specialist reports for the fired clay (**Appendix 5 and 6**) had no recommendations for further work because *'due to the abraded nature of the pieces, there is little further work that can usefully be done. No further analysis is required.'*

5.5 Proposals for Further Work

5.5.1 It is proposed that a short publication is prepared for 'Sussex Archaeological Collections' describing the results of the excavation and setting the results into context and in light of the new research objectives detailed above.

5.5.2 As well as setting out the main findings of the excavation in a phased, structural report, the proposed publication will include the results of programme of specialist analysis following the recommendations listed above in section **5.4**.

5.5.3 This additional specialist work will include:

- Further detailed examination of samples. There is the need to be aware that crushed ore or roasted fines may be present but not recognisable except by a specialist.
- The building material and possible stone from context (1308) requires examination by a specialists in building materials and stone.
- Further examination and laboratory analysis of the slag assemblage by a qualified archaeometallurgist.

5.5.4 The report will be published as a journal article in an appropriate outlet such as 'Sussex Archaeological Collections'.

6 ARCHIVE PREPARATION AND DEPOSITION

6.1 The Site Archive

6.1.1 The Site archive, to include all project records and retained cultural material produced by the project, will be prepared in accordance with '*Guidelines for the Preparation of Excavation Archives for Long-term Storage*' (UKIC 1990) and the Institute for Archaeologists 'Standard and Guidance for the creation, compilation, transfer and deposition of archaeological archives' (CIfA 2014). On completion of the project PCA will arrange for the archive to be deposited with the relevant museum.

6.2 Copyright

6.2.1 The full copyright of the written/illustrative archive relating to the Site will be retained by Pre-Construct Archaeology Ltd under the Copyright, Designs and Patents Act 1988 with all rights reserved. East Sussex County Council, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use shall be non-profitmaking, and conforms to the Copyright and Related Rights regulations 2003. Further distribution and uses of the report either in its entirety or part thereof in paper or electronic form is prohibited without the prior consent of Pre-Construct Archaeology Ltd.

6.2.2 The licence extends to the use of all documents arising from this project in all matters relating directly to the project, as well as for bona fide research purposes, which includes the East Sussex County Council Historic Environment Record.

6.2.3 Pre-Construct Archaeology Ltd has made every effort to ensure the accuracy of the content of this report. However, Pre-Construct Archaeology Ltd cannot accept any liability in respect of, or resulting from, errors, inaccuracies or omissions this report may contain

7 ACKNOWLEDGEMENTS

PCA is grateful to Duncan Hawkins of RPS for commissioning the evaluation and to Neil Griffin of East Sussex County Council for his advice.

The evaluation was supervised by Gareth Howland with assistance from Bartolomiej Grden, Ben Thomas and Lewis Allan. This report was prepared by Gareth Howland with graphics prepared by Mark Roughley. The project was managed by Helen Hawkins and Paul McCulloch.

8 REFERENCES

Champion, T. 2019. South East Research Framework Resource Assessment and Research Agenda for the Middle Bronze Age to Iron Age periods [online], Kent County Council, Available at: < https://www.kent.gov.uk/__data/assets/pdf_file/0020/93170/South-East-Research-Framework-Resource-Assessment-and-Research-Agenda-for-the-Middle-Bronze-Age-and-Iron-Age.pdf> [accessed 07/04/2022]

Hather, J. 2000.*The Identification of the Northern European Woods: A guide for archaeologists and conservators*. London: Archetype Publications Ltd.

Hudspith, V.A. and Belcher, C.M. 2017. Observations of the structural changes that occur during charcoalificaton: Implications for identifying charcoal in the fossil record. *Palaeontology* 60, 503-510.

Jane, F.W. 1970. *The Structure of Wood*. London: Adam & Charles Black.

Keys, L. 2021. Evaluation report for iron slag and related high-temperature debris from Land North of Walshes Road, Crowborough, Ashdown Forest, East Sussex (XWRC20). Unpublished report. PCA Ltd.

Leney, l. and Casteel, R.W. 1975. Simplified procedure for examining charcoal specimens for identification. *Journal of Archaeological Science* 2, 153-59.

Prior, J. and Alvin, K.L. 1983. Structural changes on charring woods of *Dichrostachys* and *Salix* from Southern Africa. *IAWA Bulletin New Series* 4, 197-206.

Reimer, P, *et al*, 2020, The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0-55 cal KP). *Radiocarbon* 62, 725-757.

Wheeler, J 2007. The implications of iron-working on the woodlands of Rievaulx and Bilsdale, North Yorkshire, United Kingdom: Historical, Palaeoecological and Palaeoenvironmental perspectives circa 1068-2000. Unpublished PhD thesis: University of Bradford.

Wheeler, J. 2011. Charcoal analysis of industrial fuelwood from medieval and early modern iron-working sites in Bilsdale and Rievaulx, North Yorkshire, UK: evidence for species selection and woodland management. *Environmental Archaeology*: 16, 16-35.

Wheeler. J. 2021. Archaeological Charcoal Report Phase 1: Land North of Walshes Road, Crowborough, Ashdown Forrest, East Sussex (XWRC20). Upublished report: PCA Ltd.

White, D.J.B. and Robards, A.W. 1966. Some effects of radial growth upon the rays of certain ring-porous hardwoods. *Institute of Wood Science* 17: 45-52.

Williams, D. 1973. Flotation at Siraf. *Antiquity* 47: 198-202

Appendix 1: Context Index

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
1	101	Friable, dark brownish grey silt clay	Topsoil	-	-	-
1	102	Friable, dark orangish brown silty clay	Subsoil	-	-	-
1	103	Firm, mid brownish orange clay	Natural	-	-	-
2	201	Friable, mid greyish brown silty clay	Topsoil	-	-	-
2	202	Friable, light brownish grey silty clay	Subsoil	-	-	-
2	203	Firm, light orangish yellow clay	Natural	-	-	-
3	301	Friable, mid brownish grey silty clay	Topsoil	-	-	-
3	302	Friable, dark brownish grey silty clay with occasional sandstone	Subsoil	-	-	-
3	303	Firm, light brownish yellow clay	Natural	-	-	-
3	304	Linear feature with steep to convex sides, a sharp break of slope and concave base. Length: 2.6m, width: 1.18m, depth: 0.33m. Orientated north to south. Filled by 305.	Cut			Cut of large linear, with a single fill of 305. Cut of a natural feature, possibly a hedgerow or other flora. Sides are irregular and the base is highly variable with at least one convex side. These inconsistencies likely come from root damage.
3	305	Friable, dark grey silty clay. Length: 2.6m, width: 1.18m, thickness: 0.33m. Fill of large linear 304.	Fill			Single fill of large linear 304, fill likely the result of natural (secondary) backfill, although the soil is somewhat darker and other natural backfills on site.
4	401	Friable, dark brownish grey silty clay.	Topsoil	-	-	-
4	402	Friable, mid grey silty clay.	Subsoil	-	-	-
4	403	Firm, mid brownish orange clay.	Natural	-	-	-

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
4	404	Linear feature with steep sides, a sharp break of slope and a concave base. Length: 1.2m, width: 0.4m, depth: 0.14m. Orientated east to west, filled by 405, cut of drainage ditch.	Cut			Linear feature, single fill of 405. Likely a drainage ditch. Feature is small and shallow.
4	405	Firm, dark grey silty clay. Length: 1.2m+, width: 0.4m, thickness: 0.14m. Single fill of linear 404.	Fill			Single fill of small linear 405. Fill is likely the result of natural (secondary backfill and is visually similar to subsoil 402.
4	406	Sub-circular feature with moderately steep sides and a sharp break of slope and a concave base. Length: 1.14m, width: 2.98m, depth: 0.19m. Cut of large pit, filled by 407	Cut			Cut of large shallow pit, unknown function though the shape may indicate this is a tree bowl.
4	407	Friable, dark brownish grey silty clay/clay with occasional small to medium sandstone. Length: 1.14m, width: 2.98m, thickness: 0.19m. Fill of large pit	Fill			Fill of large tree bowl 406. Filled as the result of natural (secondary) backfill.
5	501	Friable, mid brownish grey silty clay	Topsoil	-	-	-
5	502	Friable, mid greyish brown silty clay/clay	Subsoil	-	-	-
5	503	Firm, mid orangish yellow clay	Natural	-	-	-
6	601	Friable, mid brownish grey silty clay	Topsoil	-	-	-
6	602	Firm, mid yellowish brown/grey silty clay/clay	Natural	-	-	-
6	603	Linear feature with steep to vertical sides and a concave base. Length: 2m+, width: 2m, depth: 0.57m. Orientated northwest to southeast. Filled by 604	Cut			Cut of linear, single fill of 604. Maybe be a hedgerow, evidence for deposited natural in 604. The cut is irregular alongside the sides and the base.
6	604	Firm, mid grey silty clay/clay with common small to large sandstone. Length: 2m+, width: 2m, depth: 0.57m. Single fill of linear 603.	Fill			Fill of linear 603, possible hedgerow. Some redeposited natural possibly as the result of root damage/disturbance. No finds recovered.
7	701	Friable, mid brownish grey silty clay	Topsoil	-	-	-
7	702	Firm, light brownish yellow clay	Natural	-	-	-
8	801	Friable, mid brownish grey silty clay	Topsoil	-	-	-

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
8	802	Firm, mid greyish yellow silty clay/clay	Natural	-	-	-
8	803	Linear feature with moderately steep sides and a concave base. Length: 1m+, width: 1.2m, depth: 0.58m. Orientated northwest to southeast. Filled by 804.	Cut			Cut of drainage ditch, single fill of 804.
8	804	Firm, dark grey silty clay/clay with occasional small sandstone. Length: 1m+, width: 1.2m, thickness: 0.11m. Single fill of linear 803.	Fill			Single fill of drainage ditch 803
9	901	Friable, dark greyish brown silty clay.	Topsoil	-	-	-
9	902	Friable, mid brownish grey silty clay.	Subsoil	-	-	-
9	903	Firm, mid brownish orange clay with occasional small to large sandstone.	Natural	-	-	-
9	904	Semi-oval feature with moderately steep sides, a sharp break of slope and a flat base. Length: 1.4m, width: 1.96m, depth: 0.34m. Truncated by a modern land drain. Filled by 905, 906 & 907.	Cut			Cut of large but shallow pit, most likely a fire waste pit and then manually backfilled.
9	905	Friable, dark grey silty clay with common small charcoal inclusions. Length: 1.4m, width: 1.96m, depth: 0.05m. Lowermost fill of undated ditch 904.	Fill			Lowermost fill of 904. No finds or dating evidence recovered. The amount of charcoal in and slightly discoloured clay it suggest that it was a deliberate disposal of hot ashes in a pit.
9	906	Friable light grey silty clay with occasional sandstone fragments, occasional charcoal fragments. Length: 1.4m, width: 1.96m, thickness: 0.05m. Middle fill of pit 904.	Fill			Middle fill of 904. No finds or dating evidence. Presence of charcoal and discoloured soil suggest it was deliberate disposal of hot ashes.
9	907	Friable, mid grey silty clay with occasional charcoal, common small to large sandstone. Length: 1.4m, width: 1.96m, depth: 0.15m. Upper most fill of pit 904.	Fill			Uppermost fill of ditch 904. Amount of charcoal in pit and slightly discoloured clay around it suggest deliberate disposal of hot ashes in situ.
10	1001	Friable, mid greyish black silty clay.	Topsoil	-	-	-
10	1002	Friable, dark greyish brown silty clay.	Subsoil	-	-	-

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
10	1003	Firm, mid brownish orange clay.	Natural	-	-	-
11	1101	Friable, mid brown silty clay	Topsoil	-	-	-
11	1102	Friable, mid orangish brown silty clay	Subsoil	-	-	-
11	1103	Firm, light orangish yellow clay	Natural	-	-	-
12	1201	Friable, mid brown silty clay	Topsoil	-	-	-
12	1202	Friable, light grey silty clay	Subsoil	-	-	-
12	1203	Firm, mid brownish orange clay	Natural	-	-	-
13	1301	Friable, mid greyish brown silty clay	Topsoil	-	-	-
13	1302	Friable, light greyish brown silty clay	Subsoil	-	-	-
13	1303	Friable, light brownish grey/yellow clay with occasional large sandstone.	Natural	-	-	-
13	1304	Sub-ovular feature with steep sides, a sharp break or slope and a concave base. Length: 1m+, width: 8.6m, depth: 0.97m. Filled by 1306, 1307 & 1308.	Cut		10029	Cut of large pit, filled by upper fill of 1306, middle fill of 1307 and lower fill of 1308. Cut of large disposal pit, very deep and partially below the water table. Situated at the bottom of a basin. This feature was likely related to iron production, possibly as slag or waste disposal.
13	1305	Friable, dark brownish grey silty clay. Length: 1m+, width: 6.32m, thickness: 0.21m. Single layer of grey material visible in section drawing 14, adjacent to 1304.	Layer			Layer seen above pit 1304, likely hill wash or buried soil.
13	1306	Friable, mid beige brown silty clay. Length: 1m+, width: 8.6m, thickness: 0.14m. Upper fill of 1304.	Fill		10029	Fill of pit, likely backfill to cap pit.
13	1307	Friable, dark greyish black silty clay with common small to medium charcoal inclusions. Length: 1m+, width: 1.4m, thickness: 0.15m. Middle fill of large pit.	Fill		10029	Middle fill of large pit [1304]. Dark coloured fill, colour likely as a result of abundance of charcoal. Assorted chunks of metal, possibly slag, recovered from this context as well as lowest fill 1308.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
13	1308	Friable, mid reddish orange silty clay with common small to medium charcoal & small fragments of burnt clay. Length: 1m+, width: 1.10m, thickness: 0.24m. Lowest layer of pit 1304.	Fill		10029	Lowest fill of large pit 1304. 1308 has a highly distinct red colour due to the burnt clay inclusions. It is highly likely it is a backfill of an iron processing site that either happened at the location or somewhere nearby. A significant amount of assorted metallic clumps were recovered.
14	1401	Friable, mid brown silty clay	Topsoil	-	-	-
14	1402	Friable, light brownish grey silty clay	Subsoil	-	-	-
14	1403	Firm, mid yellowish brown clay/silty clay	Natural	-	-	-
15	1501	Friable, dark greyish brown silty clay.	Topsoil	-	-	-
15	1502	Friable, mid grey silty clay	Subsoil	-	-	-
15	1503	Friable, light greyish orange clay/silty clay	Natural	-	-	-
16	1601	Friable, mid greyish brown silty clay	Topsoil	-	-	-
16	1602	Friable, dark brownish grey silty clay	Subsoil	-	-	-
16	1603	Friable, light grey silty clay	Natural	-	-	-
17	1701	Friable, mid brownish grey silty clay	Topsoil	-	-	-
17	1702	Friable, light grey silty clay	Subsoil	-	-	-
17	1703	Firm, mid yellowish orange silty clay	Natural	-	-	-
18	1801	Friable, mid grey silty clay	Topsoil	-	-	-
18	1802	Friable, light brown clay with occasional small sandstone	Natural	-	-	-
19	1901	Friable, mid greyish brown silty clay	Topsoil	-	-	-
19	1902	Friable, light grey silty clay	Subsoil	-	-	-
19	1903	Firm, mid orange clay	Natural	-	-	-
20	2001	Friable, mid brown silty clay	Topsoil	-	-	-
20	2002	Friable, mid greyish orange silty clay	Subsoil	-	-	-
20	2003	Firm, light brownish orange clay	Natural	-	-	-
21	2101	Friable, dark greyish brown silty clay	Topsoil	-	-	-
21	2102	Friable, light orangish grey silty clay	Subsoil	-	-	-

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
21	2103	Firm, mid brownish orange clay	Natural	-	-	-
22	2201	Friable, mid greyish brown silty clay	Topsoil	-	-	-
22	2202	Friable, light grey silty clay	Subsoil	-	-	-
22	2203	Friable, mid greyish yellow clay	Natural	-	-	-
23	2301	Friable, mid greyish brown silty clay	Topsoil	-	-	-
23	2302	Friable, light grey silty clay	Subsoil	-	-	-
23	2303	Firm, light orange clay	Natural	-	-	-
25	2501	Friable, mid greyish brown silty clay	Topsoil	-	-	-
25	2502	Friable, dark orangish brown silty clay	Subsoil	-	-	-
25	2503	Friable, light brownish grey silty clay	Natural	-	-	-
26	2601	Friable, mid greyish brown silty clay	Topsoil	-	-	-
26	2602	Friable, mid orangish brown silty clay	Subsoil	-	-	-
26	2603	Firm, light brownish grey clay	Natural	-	-	-
27	2701	Friable, mid greyish brown silty clay	Topsoil	-	-	-
27	2702	Friable, light brownish grey silty clay	Subsoil	-	-	-
27	2703	Firm, light yellowish orange clay	Natural	-	-	-
28	2801	Friable, mid greyish silty clay	Topsoil	-	-	-
28	2802	friable, mid brownish grey silty clay	Subsoil	-	-	-
28	2803	Firm, mid greyish yellow clay	Natural	-	-	-
Area 1	10003	Circular shape with moderately straight sloping sides and a concave base. Diameter: 0.32m, depth: 0.06m. Filled by 10004.	Cut			Cut of shallow pit, possible post hole.
Area 1	10004	Friable, light blueish grey mottled with mid orange sandy clay. Occasional flecks of manganese. Diameter: 0.32m, depth: 0.06m. Fill of 10003	Fill			Fill of pit 10003, probable natural infill.
Area 1	10005	Circular shape with steep slope on west edge, moderately steep on east edge with a concave base. Diameter: 0.39m, depth: 0.15m. Filled by 10007	Cut			Cut of pit, possible post hole.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
Area 1	10006	Friable, dark greyish brown, mottled with mid orangish brown sandy clay. Diameter: 0.39m, thickness: 0.15m.	Fill			Fill of pit 10005, probable natural infill.
Area 1	10007	Sub-circular shape, with shallow concave sides on western edge, steep concave on eastern edge and an uneven base. Diameter: 0.33m, depth: 0.06m. Filled by 10008	Cut			Cut of pit, possible post hole.
Area 1	10008	Friable, dark greyish brown sandy clay. Diameter: 0.33m, thickness: 0.06m.	Fill			Fill of pit 10007, probable natural infill.
Area 1	10009	Irregular circular shape with moderately steep concave sides and an uneven base. Diameter: 0.65m, depth:0.2m. Filled by 10010.	Cut			Irregular cut of pit, likely disposal pit.
Area 1	10010	Friable, mid greyish brown mottled with mid orangish brown sandy clay. Diameter: 0.63m, thickness: 0.2m.	Fill			Fill of pit 10009, probable natural infill
Area 1	10011	Sub-circular/irregular shape with gently sloping concave side and a concave base. Length: 3.3m, width: 1.6m, depth: 0.13m. Filled by 10012.	Cut			Large but shallow cut of pit. Irregular shape suggests tree bowl or considerable bioturbation of the feature.
Area 1	10012	Friable, mid brownish grey sandy clay with occasional manganese flecks. Length: 3.3m, width: 1.6m, thickness: 0.13m.	Fill			Fill of pit 10011. Possibly redeposited natural with a similar colour, but lighter that subsoil.
Area 1	10013	Irregular circular shape, with shallow straight slopes and a concave base. Diameter: 0.5m, depth: 0.07m. Filled by 10014.	Cut			Cut of irregular pit, likely bioturbation.
Area 1	10014	Friable, mid greyish brown mottled with medium orangish brown. Sandy clay. Diameter: 0.5m, thickness: 0.07m.	Fill			Fill of pit 10013. Probable natural infill.
Area 1	10016	Friable, mid greyish brown sandy clay with occasional sandstone fragments. Width: 5.28m, thickness: 0.22m	Layer			Layer of hill wash or possible resettled subsoil in the dip of slope.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
Area 1	10017	Friable, mid brownish grey sandy clay with occasional charcoal flecks. Width: 1.34m, thickness: 0.13m.	Layer			Layer of hill wash at the very base of slope.
Area 1	10018	Sub circular shape with sides gradually sloping on the western edge and moderately steep on the eastern edge, with a concave base. Length: 1.42m, width: 1.02m, depth: 0.24m. Orientated east to west. Filled by 10019, 10020 & 10028.	Cut			Undated cut of pit. Clay base is suggestive of either burnt natural clay or in situ burning or scorching. Feature is up hill of pit group 10029 on a small natural ridge.
Area 1	10019	Friable, mid greyish brown silty clay. Length: 1.42m, width: 1.02m, thickness: 0.1m. Uppermost fill of pit 10018.	Fill			Uppermost fill of pit 10018. Similar composition to subsoil, which may indicate natural (secondary) backfill.
Area 1	10020	Friable, dark reddish brown silty clay with occasional medium stone and infrequent burnt clay inclusions. Length: 1.42m, width: 1.02m, thickness: 0.14m. Middle fill of pit 10018.	Fill			Middle fill of pit 10018. Finds include slag and burnt clay.
Area 1	10021	Sub-circular shape with moderately steep sides and a concave base. Width: 0.28m, depth: 0.25m, uncertain length. Filled by 10023.	Cut		10029	Cut of pit. May be the same feature as 10022, but this is unclear and not at all visible in section.
Area 1	10022	Sub-circular shape with moderately steep to shallow sides and a concave base. Length: 2.06m, width: 3.46m, depth: 0.51m. Filled by 10024, 10025, 10026, 10027.	Cut		10029	Cut of large pit or cluster of pits. Likely cut as to means of slag deposit. Full extent of feature is unclear and may the same context as 10021.
Area 1	10023	Firm dark greyish black silty clay. Width: 0.28m, thickness: 0.25m, length uncertain.	Fill		10029	Fill of pit 10021. May be the same context as 10024, based on soil colour and composition.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
Area 1	10024	Firm dark greyish black silty clay with common small charcoal, length: 2.06m, width: 3.46m, thickness: 0.51m.	Fill		10029	Lower fill of pit 10022. Context is filled with chunks of slag, a waste product from iron smelting process. Although it does not seems likely the actual smelting was carried out in the feature.
Area 1	10025	Friable, mid brownish orange/grey silty clay. Length: 2.06m, width: 3.46m, thickness: 0.24m. Upper fill of pit 10022.	Fill		10029	Uppermost fill of 10022, possibly a layer of redeposited natural mixed with 10024.
Area 1	10026	Friable, light grey silty clay, length: 2.06m, width: 3.46m, thickness: 0.36m. Upper-middle fill of 10022.	Fill		10029	Upper-middle fill of pit 10022. Could be a layer of secondary backfill or redeposited natural.
Area 1	10027	Friable, light greyish orange silty clay. Length: 2.06m, width: 3.56m, thickness: 0.17m. Lower-middle fill of 10022.	Fill		10029	Lower-middle fill of pit 10022, could be a layer of redeposited natural or secondary backfill.
Area 1	10028	Firm, dark greyish black silty clay. Length: 0.8m, width: 0.4m, thickness: 0.05m. Lower fill of pit 10018.	Fill			Lower fill of pit 10018. Large pieces of slag recovered from western portion of the pit.
Area 1	10029	Pit group 10029 includes: 1304, 10022, 10030. Large sub-circular features, full extent unknown. Features uncovered at the bottom of a natural basin.	Group		10029	Large feature containing waste from iron production, see 10030 for more details.
Area 1	10030	Sub-circular shape with steep, irregular sloping sides and a concave base. Length: 0.92m, width: 4.99m, depth: 0.78m. Orientated north to south. Truncated by 10043. Filled by 10031, 10032, 10033, 10034, 10035, 10036, 10037, 10038, 10039, 10040, 10041, 10042. Full extent of the feature is unknown and the base was never fully visible.	Cut		10029	Large feature containing waste from iron production. It is possible that this is a natural or partially natural feature that was used for clay extraction and backfilled with the waste material. Current theory is that this is an old channel which may be natural, used for material (clay and/or iron) extraction.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
Area 1	10031	Firm, light orangish grey silty clay. Length: 0.9m, width: 3.78m, thickness: 0.41m.	Fill		10029	Upper fill of large pit 10030, cut by 10043. Most likely formed as the result of natural backfill.
Area 1	10032	Friable, light grey/mottled with orange silty clay. Length: 0.9m, width: 0.83m, thickness: 0.48m. Fill of large pit 10030.	Fill		10029	Lower fill of large feature 10030, or possibly a layer of redeposited natural material adjacent to the feature. Much of the context 10032 was obscured by the water level.
Area 1	10033	Friable, light mottled grey/brown silty clay with small sparse sandstone inclusions. Length: 0.9m, width: 0.95m, thickness: 0.07m. Middle fill of large pit 10030.	Fill		10029	Middle fill of feature 10033. Band of clay material likely the result of natural backfill.
Area 1	10034	Firm, light orange mottled greyish brown clay. Length: 0.9m, width: 2.61m, thickness: 0.32m.	Fill		10029	Fill of large feature 10030. Likely created as the result of natural backfill following a rough slope, as is visible in section 24A. Similar in appearance to 10041.
Area 1	10035	Friable, dark reddish brown silty clay. Length: 0.9m, width: 1.26m, thickness: 0.06m.	Fill		10029	Middle fill of feature 10033. Likely the result of natural backfill.
Area 1	10036	Firm, mid brownish grey silty clay. Length: 0.9m, width: 1.86m, thickness: 0.12m.	Fill		10029	Middle fill of feature 10033. Probably the result of natural backfill.
Area 1	10037	Firm, dark grey silty clay. Length: 0.9m, width: 2.43m, thickness: 0.09m.	Fill		10029	Middle fill of large feature 10033. Probably the result of natural backfill. The darker colour of this context may suggest some interaction with 10039.
Area 1	10038	Friable, light grey mottled brown sandy clay with sparse small sandstone inclusions. Length: 0.9m, width: 1.11m, thickness: 0.08m.	Fill		10029	Middle fill of feature 10033, likely created through natural backfill. 10038 is the only context in the feature to be recorded as sandy clay and is noticeably sandier compared to other contexts in the feature.

Trench/Area No.	Context Number	Description	Type	Phase	Group	Interpretation
Area 1	10039	Firm, dark greyish brown silty clay with occasional small sandstone. Length: 0.9m, width: 3.36m, thickness: 0.22m.	Fill		10029	Back fill of feature 10033. 10039 is deliberate backfill of waste from an iron smelting process, and the dark colour of the context appears to be a direct result of that. Full extent od 10040 not visible due to water levels.
Area 1	10040	Loose, light grey mottled brown/orange clayey sand. Length: 0.9m, width: 2.83m, thickness: 0.32m. Lowermost fill of feature 10033.	Fill		10029	Lowest fill of feature 10033. Deliberate backfill of waste material (slag, burnt clay) from an iron smelting process. Full extent of 10040 not visible due to water levels.
Area 1	10041	Firm, light orange mottled greyish/brown clay. Length: 0.9, width: 1.19m, thickness: 0.19m	Fill		10029	Middle fill of large feature 10033. Likely the same as 10034. Cut by 10043. Likely the result of natural backfill.
Area 1	10042	Friable, light grey mottled brown silty clay. Length: 0.9m, width: 0.52m, thickness: 0.06m.	Fill		10029	Upper middle fill of large feature 10033. Possibly a small interface layer between 10037, 10040. Not visible on large section drawing 24A
Area 1	10043	Linear shape with straight sides and a flat base. Length: 0.9m+, width: 0.44m, depth: 0.14m. Orientated northwest to southeast. Filled by 10044. Cut of small land drain.	Cut			Cut of small land drain/drainage ditch. Finds from 10044 suggest a post-medieval date.
Area 1	10044	Friable, mid greyish brown silty clay. Length: 0.9m, width: 0.44m, thickness: 0.14m. Single fill of drainage ditch.	Fill			Single fill of small drainage ditch 10043. Recovered pot suggests a post medieval date.

Appendix 2: Photographs

Plate 1. Overview of Trench 6, taken looking northeast with a 1m scale.

Plate 2. Southwest facing representative section of trench 5, with a 1m scale.

Plate 3. East facing representative section of trench 10, with a 1m scale.

Plate 4. Southeast facing representative section of trench 26, with a 1m scale.

Plate 5. Overview of area showing feature group 10029, taken looking northeast with a 1m scale

Plate 6. Northwest facing section of pit [10030] part of group 10029, taken facing east with a 2m scale.

Plate 7. Overview of linear feature [404], taken looking west with a 0.4m scale.

Plate 8. Overview of pit [406], taken looking west with a 1m and 0.4m scales.

Plate 9. Southeast facing section of linear feature [603], with a 1m scale.

Plate 10. Overview of linear feature [803], taken looking northwest.

Plate 11. Overview of pit [904], taken looking south with a 1m scale.

Plate 12. West facing section of pit [10018], - taken after a quarter of the pit had been excavated -with a 0.5m scale.

Plate 13. Overview of pit [10018], - taken after half of the pit had been excavated – facing south with a 0.5m scale.

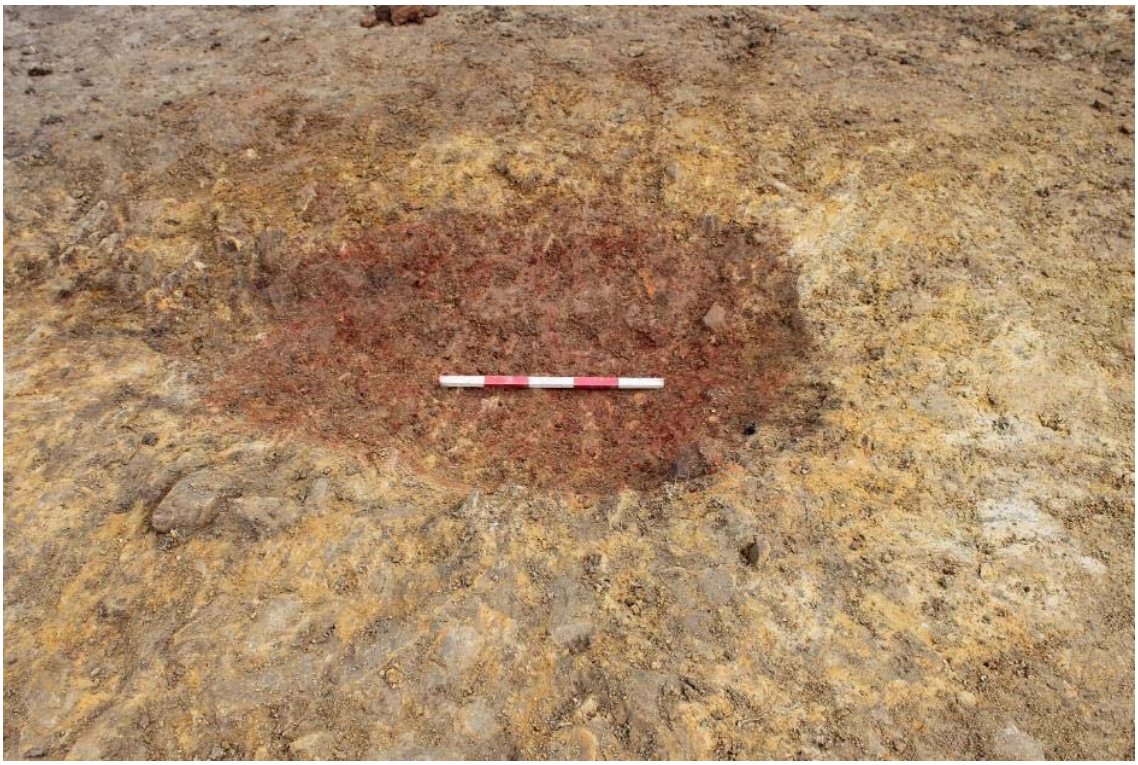

Plate 14. Overview of pit [10018] fully excavated, taken looking north with a 0.5m scale.

Plate 15. West facing section of pit [10007], with a 0.3m scale.

Plate 16. North facing section of pit [10009], with a 0.3m scale.

Plate 17. Overview of pits [10009] and [10013], taken looking south with a 0.3m scale.

Appendix 3: Archaeological Charcoal Assessment Report

By Jane Wheeler

Introduction

This report presents the results of the charcoal analysis from Phase 2 (Area 1) excavations in conjunction with the earlier evaluation of charcoal from Phase 1 (Trench 13) excavations (Wheeler 2021). A total of three environmental bulk samples collected from two pits from Phase 1 excavations, with an additional seven bulk samples being produced during Phase 2 excavations. Analysis was undertaken to: (i) provide a wood-type species summary of charcoal to assess arboreal and shrub resources exploited for fuelwood in relation to iron-working; and due the dearth of artefacts which would normally provide relative date ranges for such features, (ii) identify suitable charcoal fragments for AMS radiocarbon (^{14}C) dating. ^{14}C dating of Phase 1 Pit [1304] Context [1305] provided an Iron Age provenance for this feature. Additional charcoal from Phase 2 features, suitable for ^{14}C dating, has subsequently been identified in accordance with the second phase of analytical work, and are flagged up at the end of this report in respect of the three Phase 2 pits ([10018], [10022], and [10030], respectively).

Material and Method

All charcoal sub-samples were derived from the bulk samples and extracted using the Siraf method of flotation (Williams 1973). A standard sampling strategy of 50 x fragments was implemented (after Wheeler 2007). A total of 120 charcoal fragments were analysed from Phase 1 features, and 245 fragments from Phase 2 features. Fragment counts <50 reflect the maximum number of fragments available in each respective sample-set. Standard methods of identification followed Leney and Casteel (1975). Each fragment was fractured to provide a fresh transverse section (TS), tangential longitudinal section (TLS), and radial longitudinal section (RLS). Examination of the TS used a UltraZoom-3 stereo microscope. Analysis of TLS and RLS sections used a high-power incident microscope up to 400x. Identification to genus was made using a modern wood-type key (Hather 2000). Nomenclature follows Hather (2000).

Anthracological data has been maximised. Subsuming non-taxon analysis, i.e., volume (mm) and weight (g), counts of annual growth rings (AGRs) if present (to maximise dendrological information), the presence of pith and/or bark (to assess growth structure/formation and area, such as branchwood or twigwood etc.), structural markers for degradation and heat (i.e., coaling/coking and vitrification), species identification, and additional observations (after Wheeler 2011 and 2007). Phase 1 charcoal samples were submitted to Beta Analytic in Miami for radiometric analysis. Radiocarbon dates were calibrated using IntCal20 (Reimer et al. 2020).

Results

All charcoal fragments from Phase 1 and Phase 2 features were heavily contaminated with ferritic ochre/minerogenic particles within the axial and radial systems of the wood anatomy. Fine root fibre contaminants were also noted. Charcoal data for Phase 1 features are presented in Table 1, and in Table 2 for Phase 2 features. Results are presented by excavation phase, feature and respective context, and environmental sample number. AMS ^{14}C dating results (Phase 1) are detailed in Table 3.

PHASE 1

(A) Trench 9: Pit [904] Context [907] Upper Fill - Environmental Sample <1>

Quercus sp. (Oak) was the dominant species (96%). Indeterminate fragments comprising 4% of the sub-sample. The latter classification due to juvenile wood anatomy hindering identification to species. 36% of fragments displayed AGRs (ranging between 7-1 ring counts). 12% had very narrow and tight AGR formation suggestive of growth in a stressed (e.g., overgrown environment) or late/old growth (Jane 1970). There was an equal ratio (50:50) of coaled and vitrified fragments in this sub-sample. Whilst coaling of the wood anatomy can be the result of degradation within the taphonomic environment, it can also be partially attributed to the burning or re-burning, vitrification is a marker for burning at temperatures >800°C (Hudspith and Belcher 2017, Prior and Alvin 1983).

(B) Trench 13: Pit [1304] Context [1308] Fill (base deposit underlying [1307]) Environmental Sample <2>

The fill produced by Context [1308] has been interpreted as iron-working residue. *Quercus* sp. (Oak) quantitatively dominates this charcoal sub-sample (94%). Of the remaining fragments, 4% were identified as Betulaceae (Birch family) and 1% as Indeterminate. The friable condition of the latter 2 x categories hindering identification, as opposed to juvenile wood anatomy. All 50 x fragments were also degraded and very friable, displaying coaled atomical structures and texture that is attributable to water percolation and saturation in the burial environment. 26% of fragments were vitrified. 24% displayed AGRs (ranging between 8-2 ring counts) which were well-spaced flares of pores indicative of fast spring-growth in a relatively open environment (Wheeler 2011).

Pit [1304] Context [1305] Backfill (underlying [1302] and overlying [1306] Environmental Sample <3>: Iron Age

Quercus sp. (Oak) dominated this sub-sample (90%). The remaining 10% of fragments were categorised as Indeterminate due to their friable condition preventing identification. All fragments were coaled, with 20% displaying vitrified anatomical structures. 35% of fragments revealed AGRs (ranging between 9-2 ring counts) which were very narrow and tight growth bands indicative of a stressed environment or late/old slow growth (Jane 1970). AMS ^{14}C dating of 2 x charcoal fragments (XWRC20-1305a and XWRC20-1305b) from this context provided an Iron Age provenance for the deposit (see Table 2).

PHASE 2

(C) Area 1: Pit [10018] Context [10019] Upper Fill - Environmental Sample <4>

All charcoal fragments (100%) were *Quercus* sp. (Oak). The majority of which showed signs of coaling (55%) but also vitrification (45%) associated with exposure to high-temperature burning >800°C (Prior and Alvin 1983).

Pit [10018] Context [10020] Middle Fill – Environmental Sample <5>

Context [10020] produced 100% of fragments identified as *Quercus* sp. (Oak) with similar ratios of coaling and vitrification to that noted in the overlying context [10019].

Pit [10018] Context [10028] Lower Fill – Environmental Sample <6>

The lower fill [10028] also produced a dominance (100%) of *Quercus* sp. (Oak), with similar proportions of coaled to vitrified fragments.

(D) Area 1*: Pit [10022] Context [10025] Upper Backfill – Environmental Sample <7>*

Context [10025] produced 5 x small charcoal fragments. 80% of which were *Quercus* sp. (Oak). 20% were classified as Indeterminate due to small fragment size and poor preservation.

Pit [10022] Context [10024] Lower Fill – Environmental Sample <8>

The charcoal sub-sample from Context [10024] comprised 98% *Quercus* sp. (Oak) and 2% Indeterminate fragments. The majority of fragments (71%) displayed a coaled and degraded anatomical structure, with 29% displaying vitrification. This sub-sample also produced the only multiple fragments for a sample-set from the site, for both excavation phases, of AGR counts with 13-19 growth rings counted. All of which demonstrated growth patterns of indicative of slower grown/latewood (White and Robards 1966). Whilst the fragmented nature of the charcoal from Context [10024] is recognised, along with relatively small fragment size, it is feasible that the source of the Oak recovered from Pit [10022] was from a managed wood source, as the narrow AGRs in accordance with meristem cell patternation (Haas and Schweingruber 1993/1994) are indicative of pollarding.

(E) *Area 1: Pit [10030] Context [10039] Upper Fill – Environmental Sample <10>*

The lower fill of Pit [10030] produced 100% *Quercus* sp. (Oak) fragments. 88% of fragments were coaled and 22% were vitrified.

Pit [10030] Context [10040] Lower Fill – Environmental Sample <9>

Context [10040] produced the only charcoal sub-sample from Phase 2 Pit [10030] to contain a species other than *Quercus* sp. (Oak). Oak providing the bulk of the sample-set (94%) with *Corylus* sp. (Hazel) (4%). 2% of fragments being classified as Indeterminate due to structural degradation. 70% of fragments were coaled, with an additional 30% displaying further degradation – coking. This may be a marker for the recycling of fuel in a secondary and/or less heat-important process, or incorporation of reused material into a secondary fuelwood admixture (Wheeler 2007).

Discussion

PHASE 1

The charcoal assemblage from the Phase 1 excavations at the Walshes Road site shows that *Quercus* sp. (Oak) is the dominant taxa in respect of the two pits, and each respective context. The only other wood-type species identified being Betulaceae (Birch family). However, the latter species provided only 2% of the Phase 1 assemblage. Indeterminate fragment tallies were the result of degradation and juvenile wood anatomy preventing keying to species identification. However, species diversity which is low (1-4 species implying high human selectivity of preferred species) indicates that Oak was selected as the prominent choice for fuelwood. 89% of all fragments were coaled, with 43% displaying vitrified structures indicative of high temperature burning. Coaling and vitrification both a common observation in charcoal from iron-smelting bloomery, proto-bloomery and blast furnace deposits (Wheeler 2007).

No metallurgical residues/artefacts were provided by Environmental Sample <1> from Pit 904 Context [907] (Keys 2021). However, this charcoal sub-sample indicates that the residue was associated with a metallurgical process, i.e., iron-working. In comparison, the two environmental samples which produced the charcoal from Pit 1304 (Samples <2> Context [1308] and <3> Context 1305) were from deposits that produced evidence for smelting and, perhaps for Context [1308] (due to the presence of iron (Fe) flakes and spheres (Keys 2021)) - smithing. The radiocarbon dates produced by charcoal from Context [1305] indicate Pit [1304] and its metallurgical artefacts and fuelwood provide an Iron Age date.

The Phase 1 charcoal data-set is limited qualitatively and quantitatively. Taxon and non-taxon analyses have maximised the anthracological assemblage. Small fragment size has limited interpretations of the assemblage beyond species presence. AGR counts have been tallied but provided limited dendrological data (such as fast and/or late growth) in a proportion (17%) of the assemblage from these two pit features. This suggests that mature branch and/or trunk wood was utilised. However, the remaining 83% of fragments provided no indication of source or resource management – be that mature specimens or fast-growing juvenile sources (e.g., managed coppice or pollarding).

PHASE 2

The Phase 2 charcoal assemblage was quantitatively and qualitatively more substantial in comparison to the material produced by Phase 1 features. However, the data provides a similar conclusion in respect of deliberate human selectivity of particular species in direct association with the metal-working. For Phase 2 that species is Oak. The species has a compressive strength (0.74 10^3kg/m^3: 220kg/m^3) which maintains high combustibility and the maintenance of temperatures required for successful iron-smelting (e.g., ≥1000°C). All three Phase 2 Pits [10018], [10022], and [10030] produced Oak. The lower fill from Pit [10022] Context [10024] was notable in being the deposit that provided fragments that suggest a managed wood source may have provided the raw wood utilised for charcoal, and, in turn, the fuel for iron-smelting. An additional hypothesis of charcoal re-use/re-cycling was suggested in respect of Pit [10030] Context [10040] due to the secondary degradation and “coking” noted in 30% of charcoal fragments from this deposit and as to the utility of Pit [10030]. Is the deposit simply waste, or the result of fuel recycling for a secondary or subsidiary process to smelting?

Data-sets for both the Phase 1 and Phase 2 assemblages have proved similar in respect of deliberate species selection. However, there is a discreet difference in species admixture (i.e., small inclusions of Hazel and Birch) identified in Phase 1 features, in comparison to the prevalence of Oak in Phase 2 features. Whilst species difference is statistically inconspicuous, it may be a marker, nonetheless, for fuelwood process or change in resource selection and utilisation in conjunction with a specific metallurgical method, or changes to resource availability.

Recommendations for further work and AMS ^{14}C dating

1. No recommendations are made for further work on the charcoal assemblage. The datasets have been maximised in respect to Phase 1 and Phase 2 excavations. All bulk material has been analysed and assessed statistically. The combined charcoal results for Phase 1 and Phase 2 presented in this report should be incorporated into the environmental section of the final report/publication.
2. Dating for Phase 1 has been provided by Sample <3> Pit [1304] Context [1305]. That is Iron Age. In respect of material for AMS ^{14}C dating from Phase 2 excavations, the following sub-samples have produced charcoal fragments suitable for dating if required:

(i) Sample <5> Pit [10018] Context [10020]
(ii) Sample <8> Pit [10022] Context [10024]
(iii) Sample <10> Pit [10030] Context 10039] – Lower Fill.

Appendix 4: Report of Radiocarbon Dating Analysis

Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

November 18, 2021

Mr. Duncan Field
Pre-Construct Archaeology
PCA Unit 54-55 Brockley Cross Business Centre
London, SE4 2PD
United Kingdom

RE: Radiocarbon Dating Results

Dear Mr. Field,

Enclosed are the radiocarbon dating results for two samples recently sent to us. As usual, the method of analysis is listed on the report with the results and calibration data is provided where applicable. The Conventional Radiocarbon Ages have all been corrected for total fractionation effects and where applicable, calibration was performed using 2020 calibration databases (cited on the graph pages).

The web directory containing the table of results and PDF download also contains pictures, a cvs spreadsheet download option and a quality assurance report containing expected vs. measured values for 3-5 working standards analyzed simultaneously with your samples.

Reported results are accredited to ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 standards and all chemistry was performed here in our laboratory and counted in our own accelerators here. Since Beta is not a teaching laboratory, only graduates trained to strict protocols of the ISO/IEC 17025:2017 Testing Accreditation PJLA #59423 program participated in the analyses.

As always Conventional Radiocarbon Ages and sigmas are rounded to the nearest 10 years per the conventions of the 1977 International Radiocarbon Conference. When counting statistics produce sigmas lower than +/- 30 years, a conservative +/- 30 BP is cited for the result unless otherwise requested. The reported d13C values were measured separately in an IRMS (isotope ratio mass spectrometer). They are NOT the AMS d13C which would include fractionation effects from natural, chemistry and AMS induced sources.

When interpreting the results, please consider any communications you may have had with us regarding the samples.

Thank you for prepaying the analyses. As always, if you have any questions or would like to discuss the results, don't hesitate to contact us.

Sincerely,

Chris Patrick

Chris Patrick
Vice President of Laboratory Operations

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REPORT OF RADIOCARBON DATING ANALYSES

Duncan Field — Report Date: November 18, 2021

Pre-Construct Archaeology — Material Received: November 12, 2021

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 609293	XWRC20-1305a	2350 +/- 30 BP	IRMS δ13C: -23.9 o/oo
	(94.7%) 517 - 380 cal BC	(2466 - 2329 cal BP)	
	(0.7%) 537 - 532 cal BC	(2486 - 2481 cal BP)	

Submitter Material: Charcoal
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-PRIORITY delivery
Percent Modern Carbon: 74.64 +/- 0.28 pMC
Fraction Modern Carbon: 0.7464 +/- 0.0028
D14C: -253.64 +/- 2.79 o/oo
Δ14C: -260.02 +/- 2.79 o/oo (1950:2021)
Measured Radiocarbon Age: (without d13C correction): 2330 +/- 30 BP
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

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REPORT OF RADIOCARBON DATING ANALYSES

Duncan Field — Report Date: November 18, 2021

Pre-Construct Archaeology — Material Received: November 12, 2021

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 609294	XWRC20-1305b	2150 +/- 30 BP	IRMS δ13C: -25.9 o/oo
(63.1%)	229 - 92 cal BC	(2178 - 2041 cal BP)	
(27.7%)	353 - 285 cal BC	(2302 - 2234 cal BP)	
(4.6%)	77 - 54 cal BC	(2026 - 2003 cal BP)	

Submitter Material: Charcoal
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-PRIORITY delivery
Percent Modern Carbon: 76.52 +/- 0.29 pMC
Fraction Modern Carbon: 0.7652 +/- 0.0029
D14C: -234.82 +/- 2.86 o/oo
Δ14C: -241.37 +/- 2.86 o/oo (1950:2021)
Measured Radiocarbon Age: (without d13C correction): 2160 +/- 30 BP
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

BetaCal 4.20

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: d13C = -23.9 o/oo)

Laboratory number **Beta-609293**

Conventional radiocarbon age **2350 ± 30 BP**

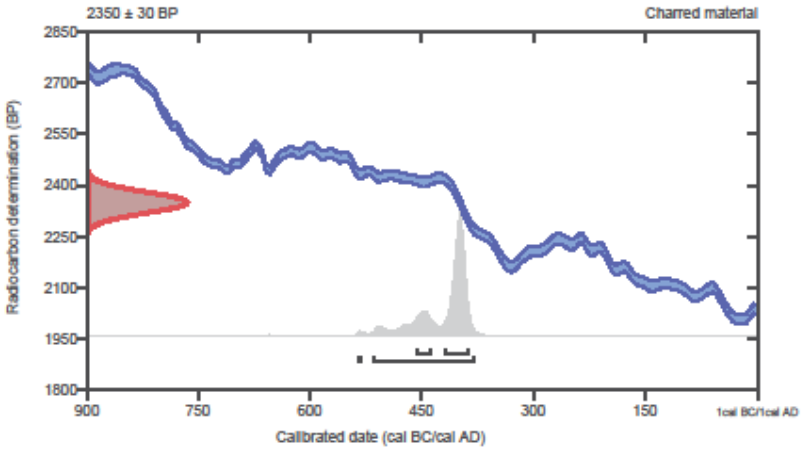
95.4% probability

(94.7%)	517 - 380 cal BC	(2466 - 2329 cal BP)
(0.7%)	537 - 532 cal BC	(2486 - 2481 cal BP)

68.2% probability

(56.2%)	420 - 387 cal BC	(2369 - 2336 cal BP)
(12%)	460 - 439 cal BC	(2409 - 2388 cal BP)

XWRC20-1305a



Database used

INTCAL20

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL20

Reimer, et al., 2020, Radiocarbon 62(4):725-757.

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BetaCal 4.20

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: d13C = -25.9 o/oo)

Laboratory number **Beta-609294**

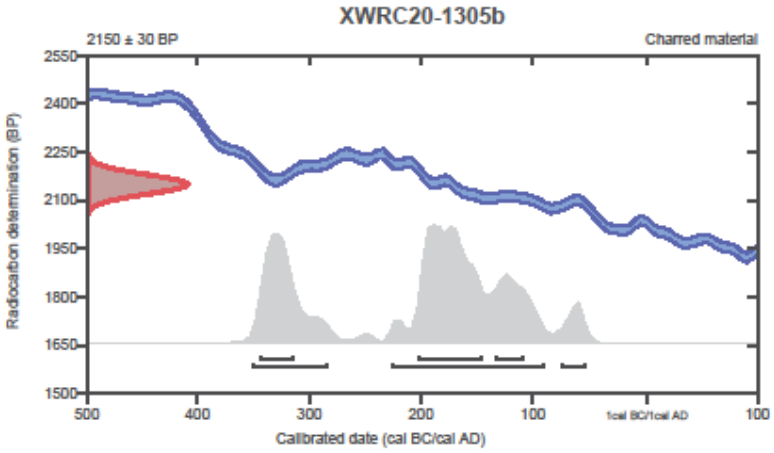
Conventional radiocarbon age **2150 ± 30 BP**

95.4% probability

(63.1%)	229 - 92 cal BC	(2178 - 2041 cal BP)
(27.7%)	353 - 285 cal BC	(2302 - 2234 cal BP)
(4.6%)	77 - 54 cal BC	(2026 - 2003 cal BP)

68.2% probability

(38.4%)	204 - 148 cal BC	(2153 - 2097 cal BP)
(19.1%)	346 - 316 cal BC	(2295 - 2265 cal BP)
(10.7%)	136 - 111 cal BC	(2085 - 2060 cal BP)



Database used

INTCAL20

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

References to Database INTCAL20

Reimer, et al., 2020, Radiocarbon 62(4):725-757.

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Quality Assurance Report

This report provides the results of reference materials used to validate radiocarbon analyses prior to reporting. Known-value reference materials were analyzed quasi-simultaneously with the unknowns. Results are reported as expected values vs measured values. Reported values are calculated relative to NISTSRM-1990C and corrected for isotopic fractionation. Results are reported using the direct analytical measure percent modern carbon (pMC) with one relative standard deviation. Agreement between expected and measured values is taken as being within 2 sigma agreement (error x 2) to account for total laboratory error.

Report Date: November 24, 2021
Submitter: Mr. Duncan Field

QA MEASUREMENTS

Reference 1
Expected Value: 129.41 +/- 0.06 pMC
Measured Value: 129.47 +/- 0.37 pMC
Agreement: Accepted

Reference 2
Expected Value: 0.42 +/- 0.04 pMC
Measured Value: 0.42 +/- 0.03 pMC
Agreement: Accepted

Reference 3
Expected Value: 96.69 +/- 0.50 pMC
Measured Value: 96.40 +/- 0.29 pMC
Agreement: Accepted

COMMENT: All measurements passed acceptance tests.

Validation: Chris Patrick
Digital signature on file

Date: November 24, 2021

Appendix 5: Fired Clay Assessment Report Phase 1

INTRODUCTION

A few fragments of fired clay possibly from a kiln were retained from the excavation at Walshes Road, Crowborough. All the material was collected from the same context [1305]. The examples were made of a very fine clay with abundant quartz and occasional pebbles. The majority of the fragments are small and abraded, except three examples with the surface completely vitrified. Most of the material is reddish, with black cores. No item as such as bars could be identified as the size of the material is small and no surfaces were observed.

DISTRIBUTION

Context	Fabric	Form	Amount	Date range of material		Latest dated material	
1305	3102	Fired clay fragments	162	1500BC	1700	1500BC	1700

Summary

This assemblage of material from Walshes Road, contains a small quantity of fired clay fragments, which are at present undated. Due to the small size of these pieces, it is not possible to establish their original form and function, although it is likely that they were part of the kiln.

Appendix 6: Fired Clay Assessment Report Phase 2

Introduction

A total of 141 fired clay fragments, weighting 958g were recovered from three contexts. All the pieces are very abraded, and only a few fragments from context [10020] preserved flat surfaces. The assemblage was examined using a 20x binocular microscope and recorded by fabric, form and condition, and was quantified by fragment and weight.

The items were made of a solid clay/silty fabric with occasional quartz inclusions and reddish surfaces. Occasionally the fabric preserved small iron fragments in the surface, result of the iron smelting. No forms were able to be distinguished due to the abraded nature of the assemblage, except some furnace slab fragments found in fill [10020] from Pit [10018], with 21mm thickness. Though, no diagnostic fragments were identified, the examples are likely to have been part of iron kilns.

Distribution

Context	Fabric	Form	Amount	Date range of material		Spot date	
10020	3102	Fired clay fragments	24	2200	400	-100	50
10039	3102	Fired clay fragments	56	2200	400	-100	50
10040	3102	Fired clay fragments	61	2200	400	-100	50

Summary

This assemblage of material from Walshes Road, contains a small quantity of fired clay fragments, which are at present undated. Due to the small size of these pieces, it is not possible to establish their original form and function, although it is likely that they were part of the kiln. The fired clay is likely to be late Iron Age as some kilns from this date were undercover in the area. All the material came from fills, indicating that the material had been redeposited. However, due to the abraded nature of the pieces, there is little further work that can usefully be done. No further analysis is required.

Appendix 7: Iron Slag and High Temperature Debris Assessment Report

Introduction and methodology

NOTE: This report replaces an earlier report written for material from Phase 1 of excavations at the site.

An assemblage of well over 85kg+ was recovered by hand on site and from samples processed afterward; it is currently stored in twelve bread crates, whilst the sample residues from the paleo-channel are stored with Duncan Field. For this report it was examined by eye and tested with a magnet. The material was categorised on the basis of morphology, with a magnet used to test for iron-rich material and to detect any micro-slags in the soil adhering to slags or in samples.
Each slag or other material type in each context was weighed, except for the larger chunks of furnace slag which were above 5kg each (see quantification table for contexts involved); the latter require weighing (see Recommendations for Further Work). Contexts examined have been initialled on the outside of the bag or – in the case of the material in crates - on the label.
Quantification data and details are given in the table below in which weight (wt.) is shown in grams.

Quantification table

		XWRC 20		**Land north of Walshes Road, Crowborough, East Sussex**
cxt	**<s>**	**slag type**	**Wt**	**comment**
907	1	charcoal	3	
907	1	flot. sample	3	Fibrous material; not slag
907	1	sample residue	106	4mm. Charcoal, stone, undiagnostic.
907	1	stone 235	4mm.	
907	1	stone 600	4mm. x1. Burnt	
907	`1	sample residue	187	1-4mm. Grit, charcoal,
1305	3	charcoal	5	
1305	3	Flot sample	5	Fibrous material; not slag
1305	3	sample residue	2704	undiagnostic, stone, fired clay
1305	3	slag runs	541	
1305	3	undiagnostic	311	1-4mm.
1305		cinder 88		
1305		fired clay	86	
1305		furnace runs	969	
1305		furnace slag	5759	x1. slag block fragment
1305		furnace slag	1750	x1. slag block fragment; slag runs down lump.
1305		non-magnetic residue	438	nothing of relevance: grit, etc.
1305		slag runs	1660	
1305		stone 388		

1305		undiagnostic	13767	Probably furnace slag
1305		undiagnostic	2023	x1.
1305		vitrified hearth lining	55	interior vitrified like ceramic
1305		vitrified hearth lining	195	x2. one partially fired; other vitrified; thickness 20mm
1308	2	brick fragment	401	Brick fragment
1308	2	charcoal	25	
1308	2	Flot sample	2	Fibrous material; not slag
1308	2	heat magnetised residue	176	1-4mm. Grit, tiny undiagnostic slag, stone, some tiny iron flakes, charcoal - everything very tiny. No hammerscale flakes or spheres present.
1308	2	mortar?	3	4mm. CBM specialist to look at this context.
1308	2	sample residue	1681	4mm. Small undiagnostic slag, stone, vitrified hearth lining, cinder, fired clay.
1308	2	sample residue	2249	Stone, undiagnostic, vitrified hearth lining, slag runs
1308	2	slag runs	448	
1308	2	stone	20	4mm. Worked stone
1308	2	undiagnostic	2117	Poss. furnace slag.
1308	2	vitrified hearth lining	46	4mm.
10019	4	sample residue	32	<1mm. Very tiny undiagnostic (some magnetic), fired clay
10019	4	sample residue	260	1-2mm. Tiny undiagnostic, fired clay, grit, charcoal
10019	4	sample residue	503	2-4mm. Tiny undiagnostic, fired clay, grit, charcoal
10020		burnt stone	1477	
10020		fired clay	58	
10020		furnace lining	1234	slagged surface
10024	8	sample residue	2234	charcoal, stone, undiagnostic, cinder, slag blobs
10024		burnt stone	414	
10024		charcoal	6	X1. Passed to Duncan Field for wood ID & RC dating
10024		fired clay	23	
10024		furnace slag	2659	including small runs
10024		furnace slag	371	voids from burnt out charcoal
10024		furnace slag	282	x1. flowed (nice example)
10024		slag dribbles	190	x1.
10024		slag runs	382	
10024		stone	69	x3
10024		undiagnostic	2413	
10024		vitrified hearth lining	21	
10026	7	iron rich slag run	69	
10026	7	iron rich undiagnostic	92	
10026	7	sample residue	608	>4mm. Fired clay, stone, small undiagnostic (some magnetic, some not)

10026	7	sample residue	285	1-2mm. Tiny undiagnostic, fired clay, grit
10026	7	sample residue	215	2-4mm. Tiny undiagnostic, fired clay, grit
10026	7	slag runs	25	
10026	7	stone	152	
10039		cinder	30	
10039		fired clay	108	
10039		furnace lining	162	x1
10039		furnace lining	926	x1. Curved fragment - small diameter. KEEP.
10039		furnace lining	5000+	x1. with slag adhering
10039		furnace lining	4086	
10039		furnace slag	5000+	x1.
10039		furnace slag	5000+	x1.
10039		furnace slag	5000+	x1.
10039		furnace slag	5000+	x1.
10039		furnace slag	1120	x1. partially burnt-out charcoal/wood
10039		furnace slag	5758	
10039		slag dribbles	140	x2.
10039		stone	251	
10039		undiagnostic	493	x1.
10039		undiagnostic	1422	x1. Sim. to SHB L140, D110, D80
10039		undiagnostic	542	
10039		vitrified hearth lining	126	x1
10039		vitrified hearth lining	88	
10040	9	sample residue	1894	>4mm. Fired clay, stone, iron-rich undiagnostic, undiagnostic, charcoal
10040		fired clay	498	
10040		fired clay	814	
10040		furnace lining	1658	slagged
10040		furnace lining	868	x1.
10040		furnace lining	1556	
10040		furnace slag	5000+	large charcoal inclusions
10040		furnace slag	2489	x1. More like a slag block fragment
10040		furnace slag	2784	
10040		furnace wall fragment	763	x2
10040		iron rich undiagnostic	5000+	lump containing bloom?
10040		iron-rich lump	746	very magnetic: split bloom?
10040		iron-rich undiagnostic	232	
10040		run slag	207	x1.
10040		stone	317	x1. Fine sandy white stone

10040	undiagnostic	1400

Total weight = 85kg +

Slag types in assemblage and their weights

Slag type	Wt	Process
Furnace lining	11253+	Smelting
Furnace slag	22972+	Smelting
Iron flakes	1	Smithing?
Slag runs	2144	Smelting
Slag runs & dribbles	4562	Smelting
Sample residues	13134	Diagnostic
Iron-rich runs	69	Undiagnostic
Iron-rich undiagnostic	6070+	Undiagnostic
Undiagnostic	24488	Undiagnostic
Burnt stone	1891	Non-diagnostic
Charcoal	39	Non-diagnostic
Cinder	118	Non-diagnostic
Fired clay	1587	Non-diagnostic
Mortar	3	Non-diagnostic
Vitrified hearth lining	531	Non-diagnostic

Explanation of processes and terms

Activities involving iron can take two forms: smelting or smithing.

Smelting

This is the manufacture of iron from ore and fuel in a smelting furnace. The products are a spongy mass called an unconsolidated bloom consisting of iron with a considerable amount of slag still trapped inside, and slag (waste). The slag produced varies depending on the technology used in different periods: furnace slags (including slag blocks and furnace bottom cakes), run slag, tap slag, dense slag or, in later periods, blast furnace slag.

At the Crowborough site the diagnostic smelting slag is furnace slag. This is a general term used for slag which can be recognised as having been produced by smelting but which is incomplete or has no particular morphology which can identify the furnace type or technological method used.

Run slag is what its name suggests and was produced by smelting.

Smithing

This involves the hot working (using a hammer) of the bloom to remove excess slag (primary smithing) or, more commonly, the hot working of one or more pieces of iron to create or to repair an object (secondary smithing). As well as bulk slags, including the smithing hearth bottom (a plano-convex slag cake which builds up under the tuyère hole (the hottest area, where the air from the bellows enters the hearth), smithing generates micro-slags. No smithing hearth bottoms or smithing micro-slags were present in the Crowborough assemblage despite a few very broken iron flakes (note: NOT smithing flakes) being recovered from context (1308) sample <2>.

Slag described as undiagnostic cannot be assigned to smelting or smithing either because of morphology or because it has been broken up during deposition, re-deposition or excavation.

Discussion

Iron slag and related high-temperature debris

Despite the size of the assemblage it is difficult to identify most slag by morphology because of its fragmentary nature, even when large; the material was almost certainly subjected to re-deposition. Those slags with recognisable morphology were furnace slags, i.e. those produced by smelting. Three large fragments from possible slag blocks were recovered from contexts (1305), (10039), (10040). Other types present were run slags.

No smithing hearth bottoms (the bulk slag diagnostic of smithing) or smithing micro-slags were present. The absence does hint that the bloom(s) produced by the smelt were removed for primary smithing elsewhere. One – possibly two – very magnetic chunks (both from 10040) may, in fact, be blooms that were discarded or accidentally lost. One of these is half of a piece that has been very cleanly split in two, possibly to examine it. These iron-rich objects require examination and laboratory analysis to determine whether they are indeed blooms. A tiny quantity of iron flakes was recovered from a sample <2> of context (1308) which may lend support to blooms being split to check for quality before being sent for primary smithing or trading elsewhere.

Little in the way of furnace lining was present with the slag from pits in the first phase of excavation, whereas more was found amongst the slag in Phase 2 (the palaeo-channel contexts of 10033, etc.). One would expect furnace lining to be a dark colour owing to lack of oxidisation but most of the fragments are either partially or highly fired; some has an internal surface so highly fired it resembles ceramic glaze.

The overall impression from the slag - its fragmentary state, the lack of micro-slags, and the fragmentary nature of the furnace lining - is that of an assemblage of smelting waste removed from the original smelt site and redeposited in the adjacent water course/palaeo-channel and pits where it was found.

Charcoal and dating

Some oak charcoal from pit [1304] context (1305) was sent for radiocarbon dating, and returned a Middle Iron Age date. In view of the wood being oak, this date may need some modification at a later stage. In the contexts from Phase 2 (the palaeo-channel, etc) more charcoal was recovered which may provide more good dates for the larger material.

Other material

A fragment of brick was recovered from context (1308) sample <2>.
A fragment of possible worked stone was also present in (1308) <2>. In addition to this, a number of small pieces of pale coloured stone were found in the assemblage in various contexts.
A piece of pinkish mortar (?) was also present in context (1308).
All these will require examination by specialists in building materials and stone.

Importance of the assemblage

The assemblage is of local, regional and – possibly – national importance in view of its date.

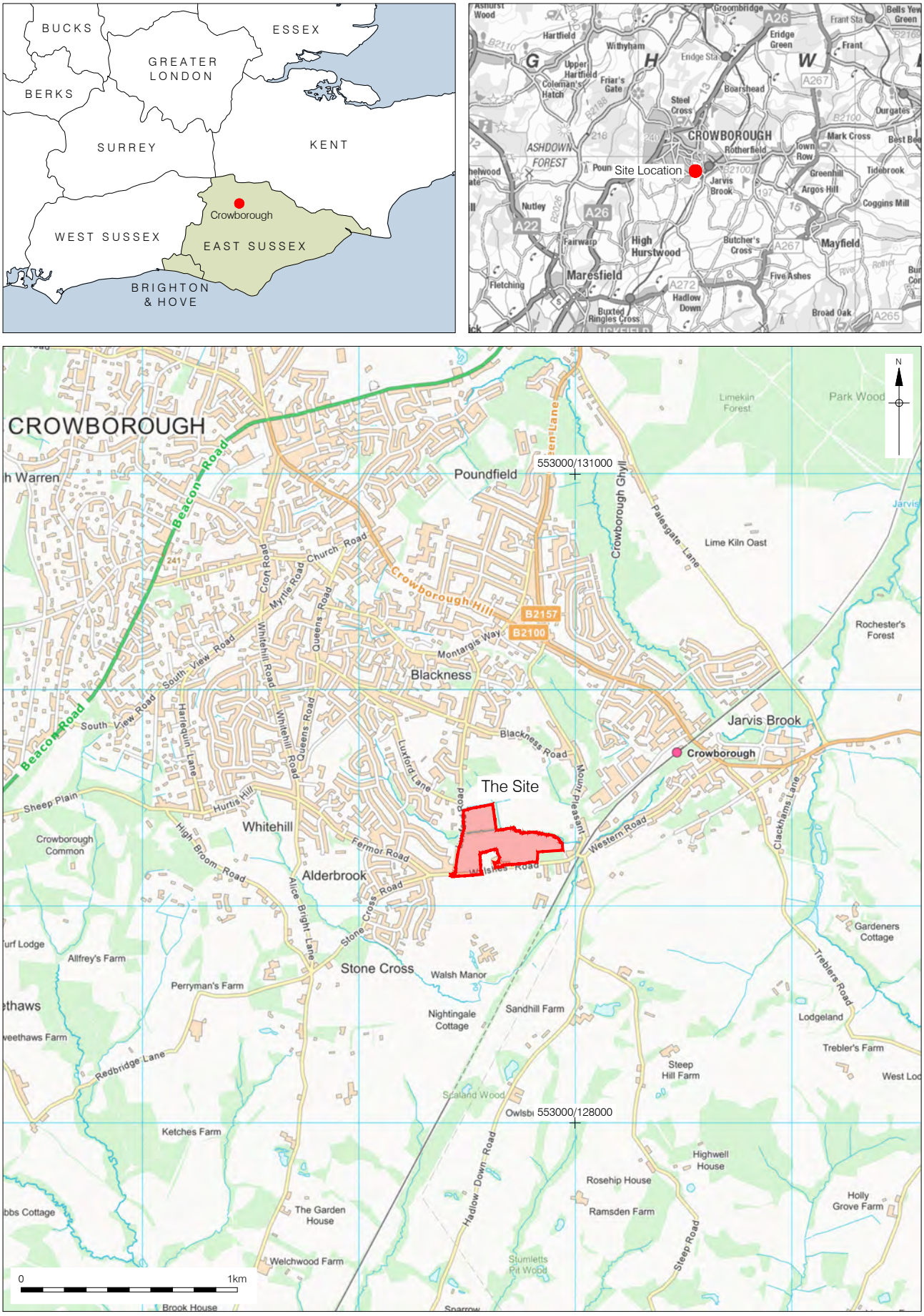
Recommendations for further work

- Large pieces of furnace slag (5kg +) require weighing to obtain correct weight.
- Samples not yet examined need to be done. There is the need to be aware that crushed ore or roasted fines may be present but not recognisable except by specialist eye.
- The building material and possible stone from context (1308) require examination by specialists in building materials and stone.
- A fragment of brick was recovered from context (1308) sample <2>.
- A fragment of possible worked stone was also present in (1308) <2>. In addition to this, a number of small pieces of pale coloured stone were found in the assemblage in various contexts.
- A piece of pinkish mortar (?) was also present in context (1308).
- Dating of charcoal in the slag assemblage in the paleo-channel will hopefully be sent for dating for the Phase 2 material.
- The assemblage requires further examination and laboratory analysis by a qualified archaeometallurgist.
- At the current time, the slag should be retained until analysis is undertaken.

Appendix 8: OASIS Form

Summary for preconst1-503840

OASIS ID (UID)	preconst1-503840
Project Name	Evaluation at Land North of Walshes Road, Crowborough, East Sussex
Activity type	Evaluation
Project Identifier(s)	Walshes Road, Crowborough
Planning Id	WD/2020/0369/MFA
Reason For Investigation	Planning requirement
Organisation Responsible for work	Pre-Construct Archaeology Ltd
Project Dates	21-Jun-2021 - 05-Aug-2021
Location	Land North of Walshes Road, Crowborough, East Sussex NGR : TQ 52640 29250 LL : 51.0423331483941, 0.175952486843513 12 Fig : 552640,129250
Administrative Areas	Country : England County : East Sussex District : Wealden Parish : Crowborough
Project Methodology	The evaluation comprised the excavation of twenty-seven trenches measuring 30m x 2m. The array of trenches was intended to provide a reasonable sample of the Site in order to establish its archaeological potential. The trenches were opened and investigated between the 21st June and 5th of August 2021, with the exception of trench 24 – which was deemed inaccessible. Trenches 27 and 25 were both shortened to avoid ecological habitats and trench 28 was realigned, also to avoid ecological habitats. Area 1 was opened around trench 13 measuring c.20m X 30m to allow better characterisation of the archaeological features uncovered.
Project Results	The evaluation was carried out according to the approved method statement and appears to have met the aims that were set out. Undated archaeological remains were found to survive at a minimum depth of between c 0.27m and 0.50m below the existing ground surface and over the western half of the Site, although in uniformly low concentration. The shallow nature of the majority of archaeological features may suggest erosive agricultural practices may have impacted the Site over a long period. As such, the proposed development, which will involve widespread below-ground disturbance for roads, houses and landscaping, is likely to have a severe impact on the remaining archaeological potential. The features uncovered in the area around trench 13 appear to be relatively well-preserved and shows that the Site was used for iron production at some point in the past. The location this feature is situated in – within a small basin – is topographically unique to this part of the Site, suggesting this activity may be isolated to this area. The evidence of iron processing within the Site is of local and regional significance.
Keywords	Fire Pit - UNCERTAIN - FISH Thesaurus of Monument Types Pit - IRON AGE - FISH Thesaurus of Monument Types
HER	East Sussex HER - noRev - LITE
HER Identifiers	
Archives	



11/11/21 MR

Figure 1
Site Location
1:2,000,000, 1:250,000, 1:25,000 at A4

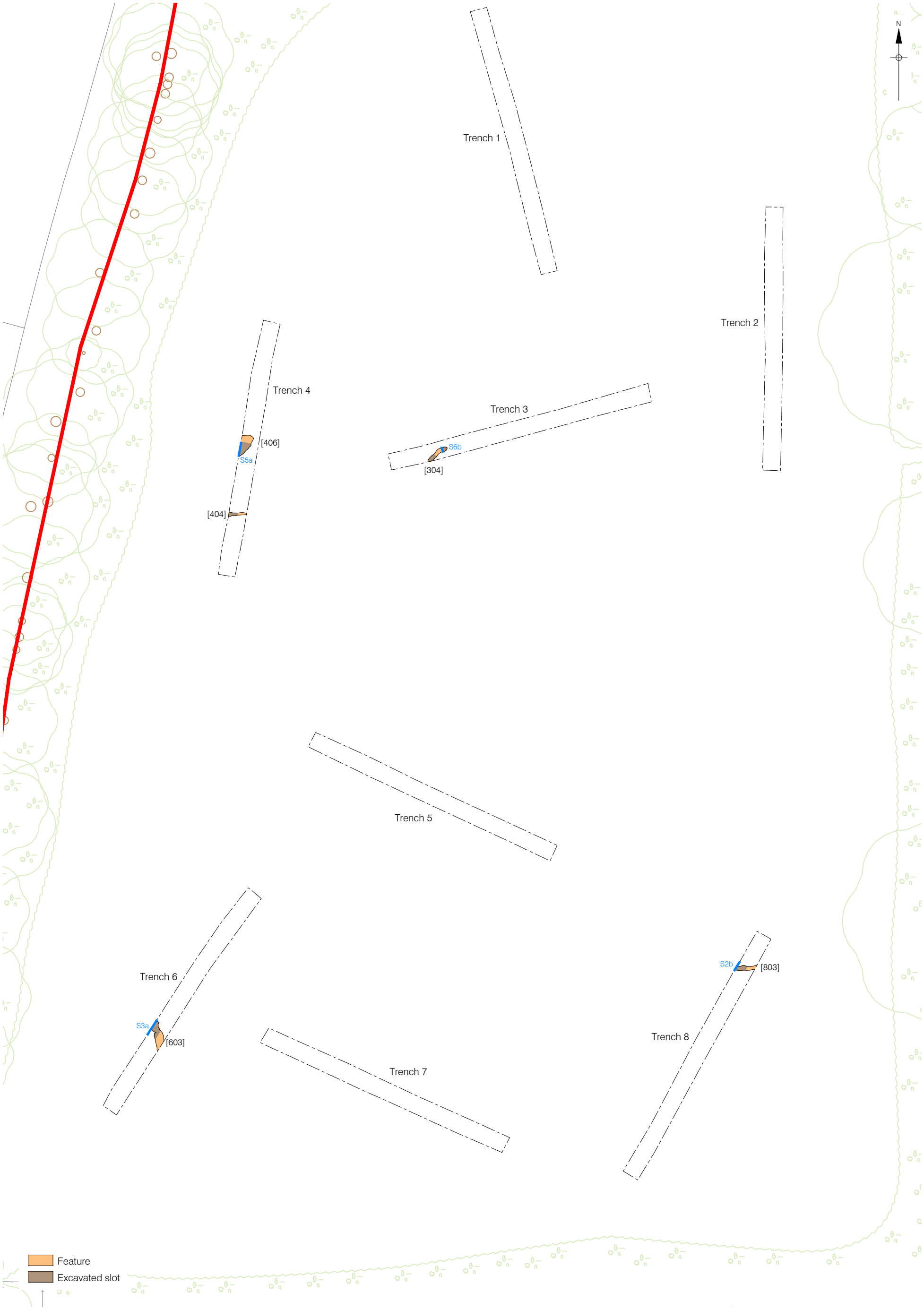
Proposed development plan reproduced from a drawing by LDA Design Consulting Ltd. (March 2017)

0 50m

11/11/21 MR

Figure 2
Detailed Site Location
1:1,250 at A3

Proposed development plan reproduced from a drawing by LDA Design Consulting Ltd. (March 2017)

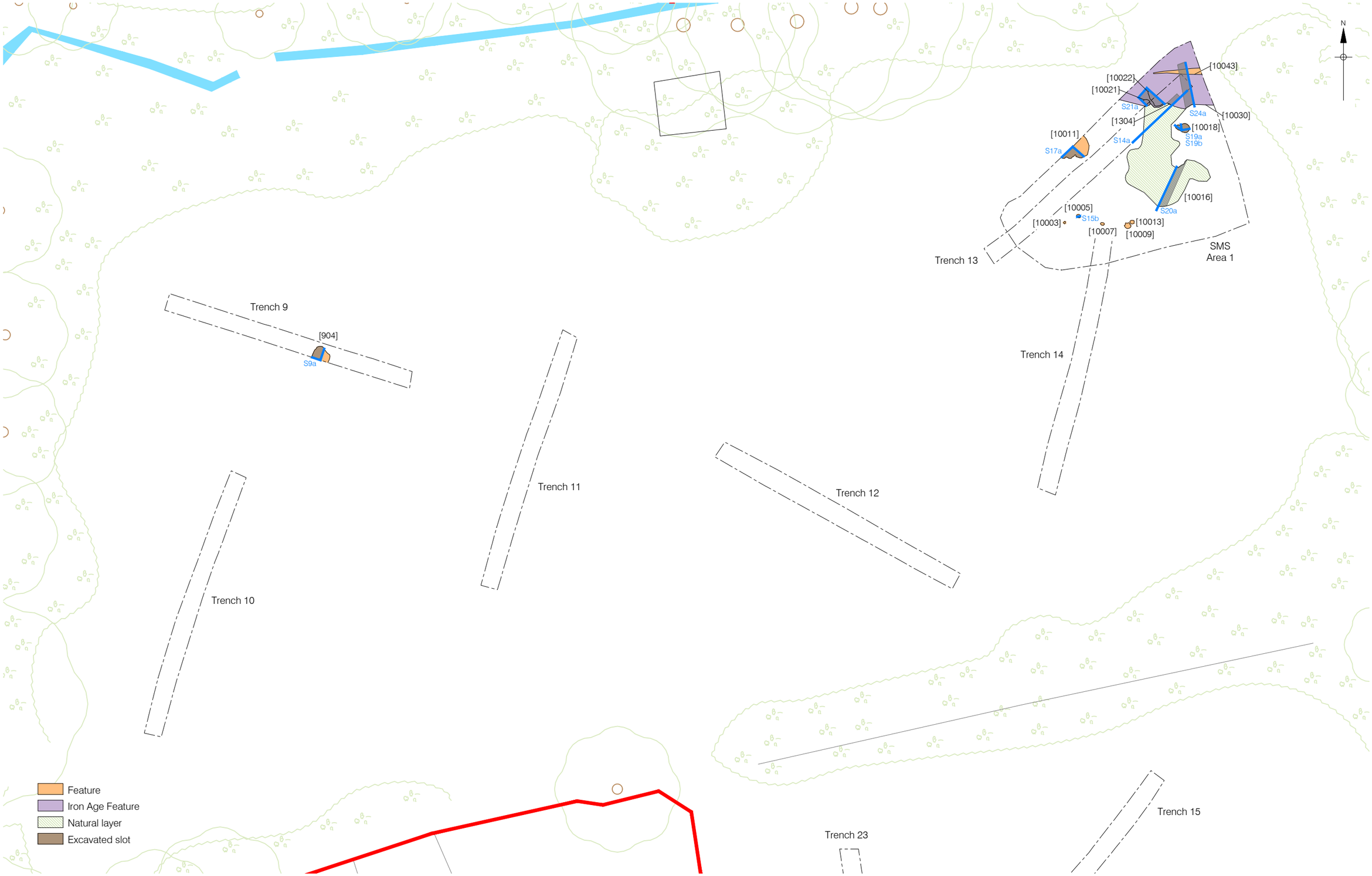


0 20m

11/11/21 MR

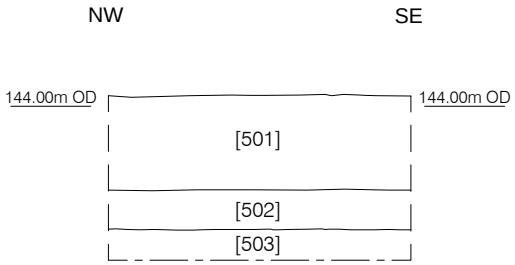
Figure 3
Plan of Trenches 1 to 8
1:400 at A3

Proposed development plan reproduced from a drawing by LDA Design Consulting Ltd. (March 2017)

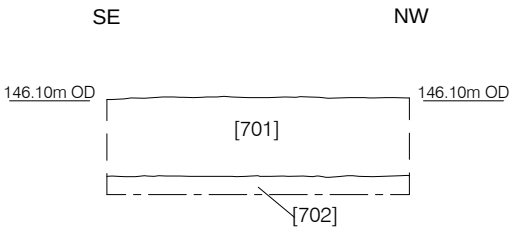


22/07/21 MR

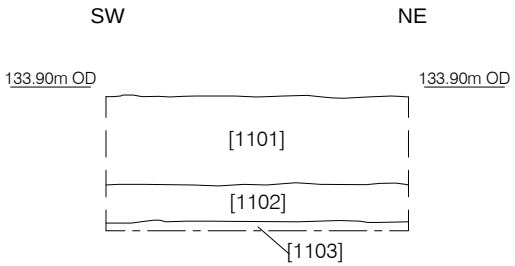
Figure 4
Plan of Trenches 9 to 14 and SMS Area 1
1:400 at A3



Section 1D
Trench 5
Southwest facing

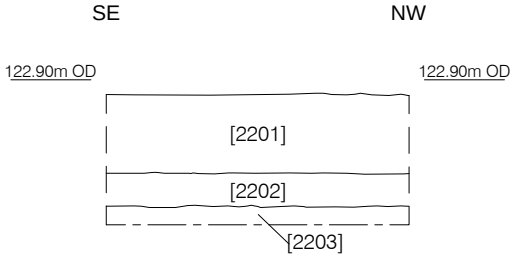


Section 1A
Trench 7
Northeast facing

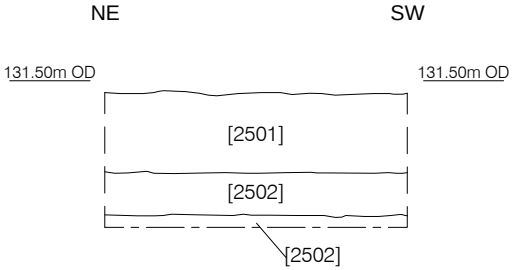


Section 6C
Trench 11
Southeast facing

Section 8A
Trench 16
West facing



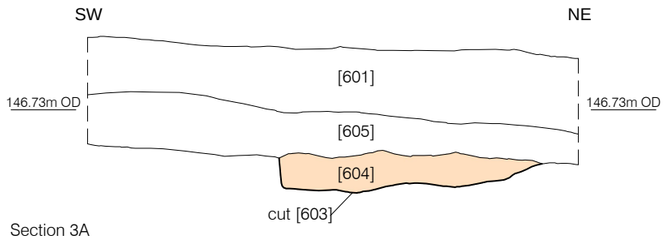
Section 12A
Trench 22
Northeast facing



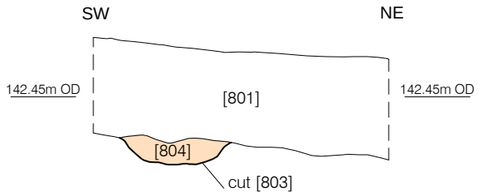
Section 12B
Trench 25
Northwest facing

26/11/21 MR

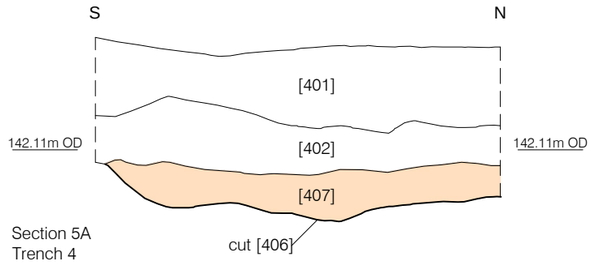
Figure 5
Representative Sections
1:25 at A4



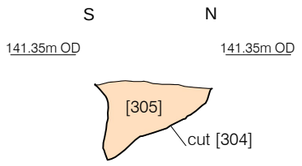
Section 3A
Trench 6
Southeast facing



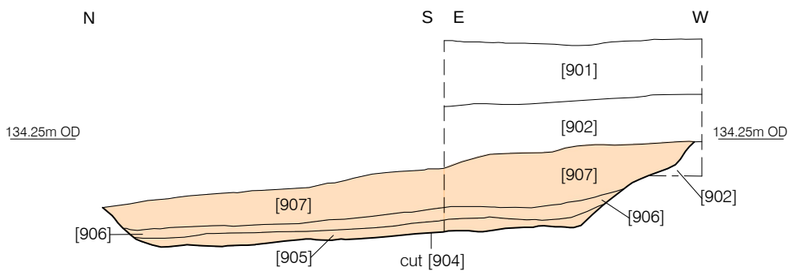
Section 2B
Trench 8
Southeast facing



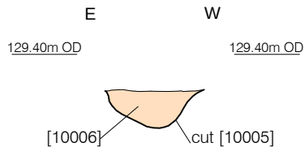
Section 5A
Trench 4
East facing



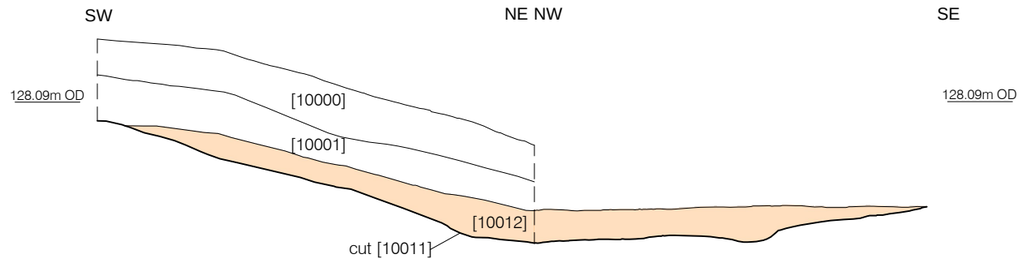
Section 6B
Trench 3
East facing



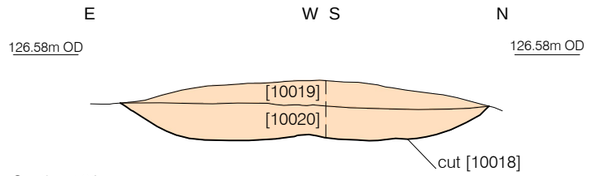
Section 9A
Trench 9
West and North facing



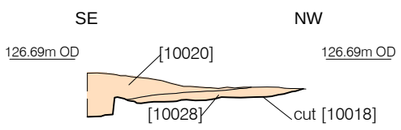
Section 15B
SMS Area 1
North facing



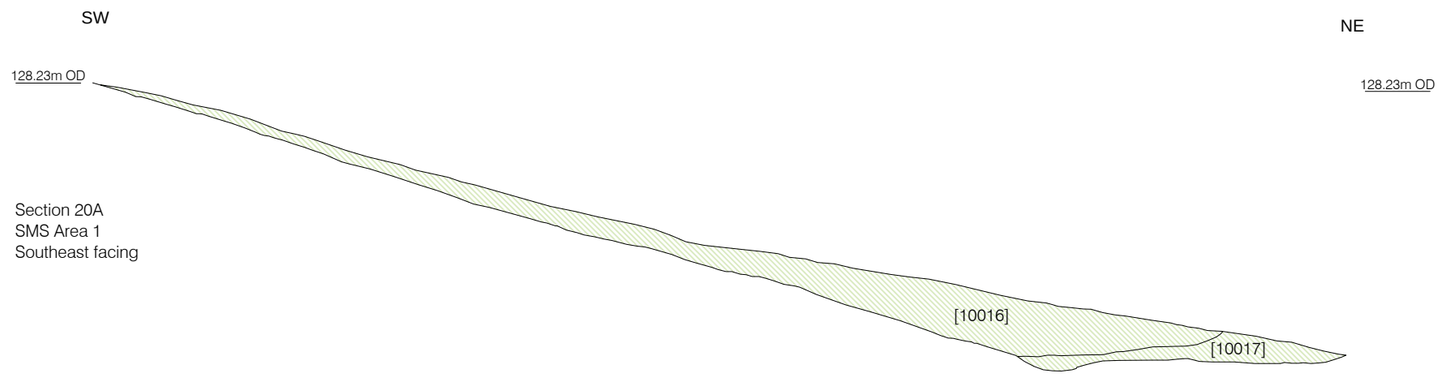
Section 17A
SMS Area 1
Southeast and Southwest facing



Section 19A
SMS Area 1
North and East facing



Section 19B
SMS Area 1
Northeast facing



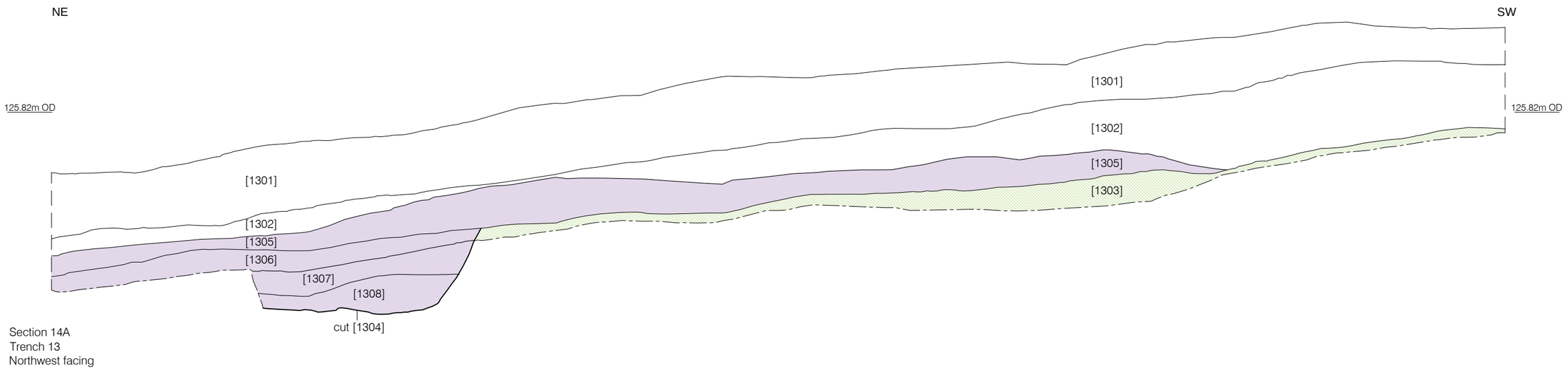
Section 20A
SMS Area 1
Southeast facing

Feature
Natural layer

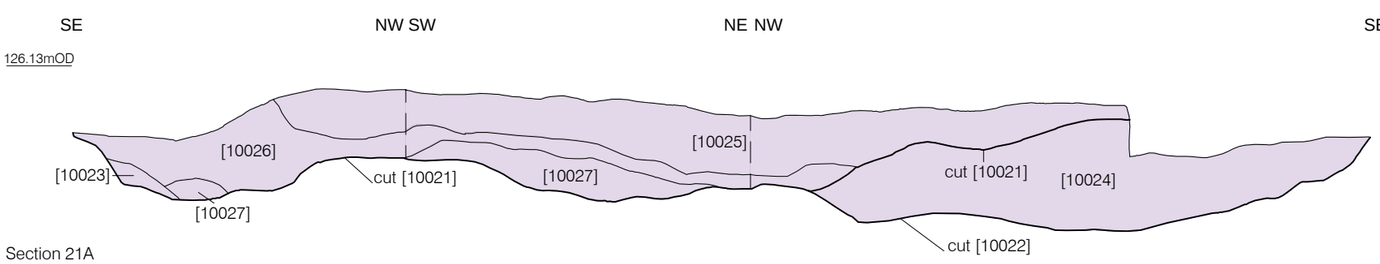
0 1m

26/11/21 MR

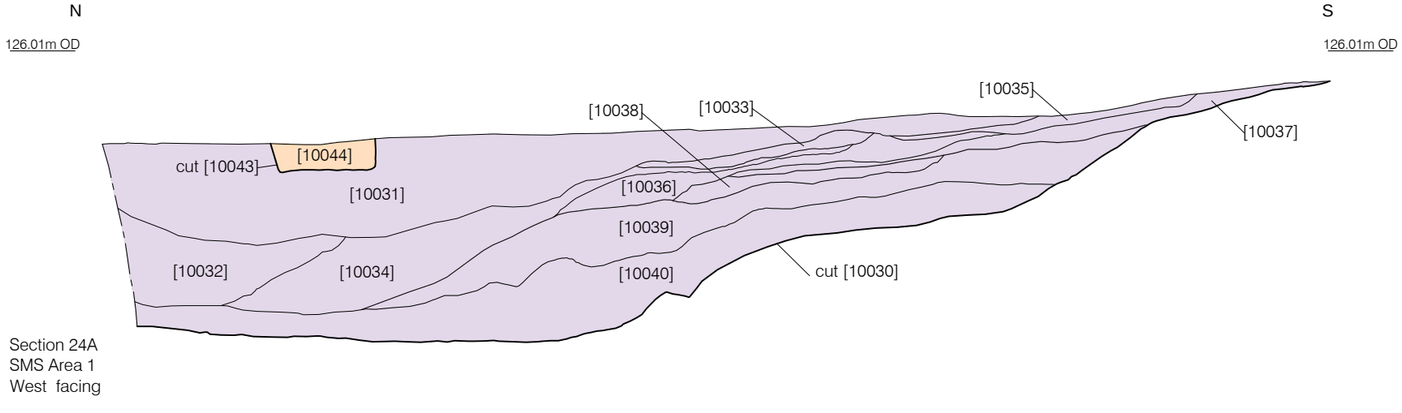
Figure 6
Feature Sections
1:25 at A3



Section 14A
Trench 13
Northwest facing



Section 21A
SMS Area 1
Northeast, Southeast and Southwest facing



Section 24A
SMS Area 1
West facing

Feature
Iron Age Feature
Natural layer

0 1m

26/11/21 MR

Figure 7
Feature sections containing slag deposits
1:25 at A3

P C A

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