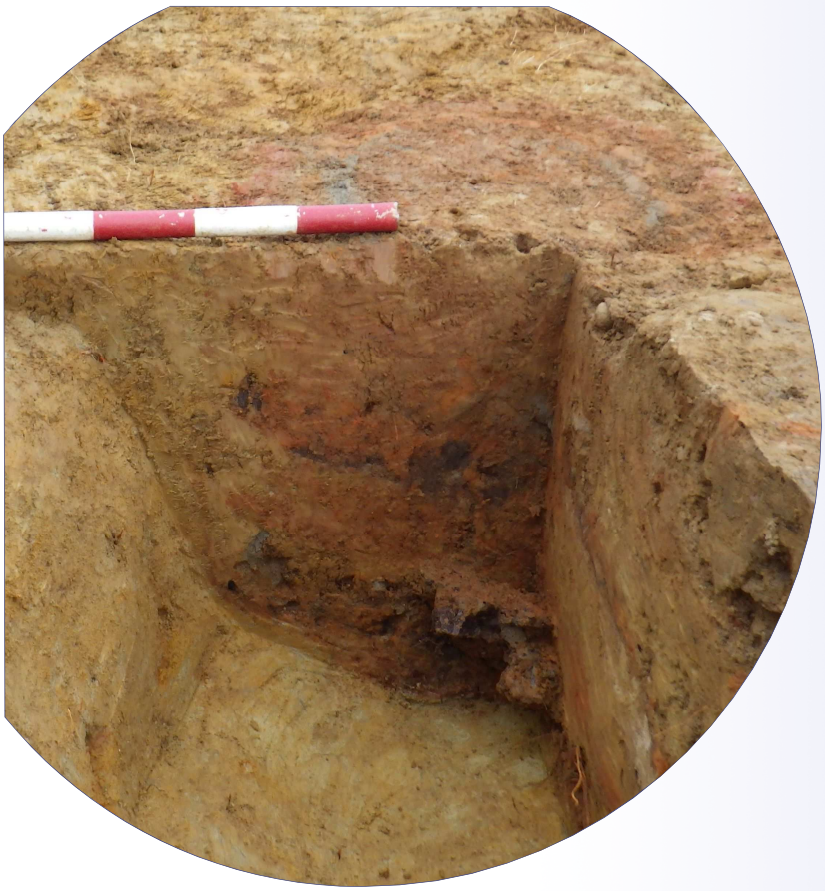

M2 Junction 5 Improvements, Kent

Archaeological Evaluation Report

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M2 Junction 5 Improvements, Kent

Archaeological Evaluation Report

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Summary

An archaeological evaluation was undertaken by Oxford Archaeology in October and November 2017 around Junction 5 of the M2, Kent. The work was commissioned by Hochtief (UK) Ltd on behalf of Highways England. A 5% sample of the 21.8 hectare site was agreed, comprising 71 trenches.

No features of archaeological significance were found south-west of the junction, and only one undated feature to the north-east. To the north-west and south-east, however, there were features and finds of a variety of dates.

A relatively large assemblage of flintwork was recovered. The majority of this was of Mesolithic date, and included both material possibly from contemporary features, including a deep pit or shaft, and redeposited in later contexts. There was also widespread flintwork of Neolithic or early Bronze Age date.

A few sherds of flint-tempered pottery of late Bronze Age or Iron age date were also found in features, but the quantities were too small to date these features with confidence. Some activity of later prehistoric date however clearly took place in the north-western part of the site.

Two areas of smelting activity were discovered, one on the north-west, the other on the south-east. Two radiocarbon dates were obtained, a late Iron Age date from the south-east area, and a late Iron Age or early Roman date from the north-west area, alongside pottery of a similar date.

One or more furnaces were uncovered as well as a relatively large quantity of metalworking debris. This included slag from non-tapping and tapping furnaces, generally assigned to the Iron Age and Roman periods respectively. A technological transition is therefore apparent at these sites, moving to more effective smelting techniques. The site shares many similarities to two bloomeries recently excavated at Stockbury nearby.

Part of the Chatham Land Front defensive line was known to pass through the site. This was built in response to a possible German invasion during World War One. Elements of this complex were discovered during the evaluation, although they do not appear to be well preserved.

Areas of made ground were discovered in the central part of the site at the bottom of the valley. These layers are over 2m deep, and were probably deposited during the construction of the M2.

Acknowledgements

Oxford Archaeology (OA) would like to thank Phil Wharton of Hochtief (UK) Ltd for commissioning this project, and Nick Frost, site manager, for his support throughout. Thanks are also extended to Simon Mason, who monitored the work on behalf of Kent County Council, for his advice and guidance. WSP monitored the project on behalf of Highways England, and OA would like to thank both Alison Plummer and Charly Vallance for their input.

The project was managed for Oxford Archaeology by Tim Allen. The fieldwork was directed on site by Rebecca Peacock, who was supported by Rachel Legge, Rachel Sisman, Ben Slader and David Pinches. Survey and digitizing was carried out by Vicky Green.

Thanks are also extended to the teams of OA staff who cleaned and packaged the finds under the supervision of Geraldine Crann, processed the environmental remains under the management of Rebecca Nicholson, and prepared the archive under the management of Nicola Scott.

The report was written by Rebecca Peacock and by Alex Davies. Benjamin Brown prepared the plans, and Charles Rousseaux the section drawings and plates. OA is grateful to all of the specialists who contributed reports.

GSB/Stratascan, part of the SUMO group, carried out the geophysical survey for Highways England, and SUMOgeophysics also conducted the additional geophysical survey following the evaluation trenching. OA would like to thank Jon Tanner, David Elks and the survey team of Stephanie Rhodes and Laura Gilling for the additional survey and report.

1 INTRODUCTION

1.1 Scope of work

1.1.1 Oxford Archaeology (OA) was commissioned by Hochtief (UK) Ltd on behalf of Highways England to undertake a trial trench evaluation at the site of M2 Junction 5 in advance of a planning application for junction improvements, in order to inform Highways England and Kent County Council (hereafter KCC) as to whether further archaeological mitigation will need to be conducted either prior to or during the scheme.

1.1.2 Consultation with the KCC Principal Archaeological Officer Simon Mason established that a 5% evaluation should be carried out of the viable area for investigation, including targeting elements of the WW1 Chatham Defence Line known from earthworks, documentary evidence and geophysical survey. WSP acting for Highways England produced a scope of works (WSP 2017).

1.1.3 OA produced a WSI (OA 2017) to match the scope of works issued by WSP, which outlined how OA should conduct the evaluation and included a trench layout, and this was approved by KCC prior to the start of the evaluation.

1.1.4 All work was undertaken in accordance with the National Planning Policy Framework (DCMS 2012), the MoRPHE Project Manager's guide (Historic England 2015a), and with the Code of Conduct of the Chartered Institute for Archaeologists (CIfA), of which OA is a Registered Organisation. The archaeological works were carried out in accordance with the standards and guidance for archaeological evaluation, excavation and archiving (CIfA 2014a; CIfA 2014b), and with the KCC requirements for trial trenching.

1.2 Location, topography and geology

1.2.1 The site lies in north Kent some 5km (3.3miles) south-west of Sittingbourne. It includes land all around the current M2 junction, and the open ground within the junction. The smaller part is a strip running alongside the A249 both to the north and south of the M2, and these strips are part of larger fields continuing to the west. The southern limit is marked by the minor road to Stockbury, the northern limit is opposite the southern end of the village of Danaway. The larger part of the site lies east of the A249. The area north of the junction is bounded on the north by the village of Danaway, but with open fields to the east, and the area to the south of the M2 bounded by Oad Street.

1.2.2 The area of proposed development is 21.8 hectares (Fig. 1).

1.2.3 The site consists of a number of fields, some cultivated, some under pasture, together with small areas of woodland. The site is situated between 70m and 80m aOD; the topography is generally undulating, with steeper inclines in places. The nearest significant watercourse is Milton Creek at Sittingbourne some 5km to the north-east, and the Thames Estuary lies 7km due north.

1.2.4 The bedrock geology of the area is mapped as Seaford Chalk, with an area of Thanet Sands on the western side. Superficial Head deposits of sand, silt and clay overlie the chalk in part (BGS 2017).

1.3 Archaeological and historical background

1.3.1 The archaeological and historical background of the site has been described in detail in the Desk Based Assessment (WSP 2015), a summary of which will be given below.

1.3.2 No prehistoric sites or findspots are known within the site.

1.3.3 A Beaker burial was found at Sittingbourne which included a copper dagger and a stone wristguard (Bristow 1798). Excavations during quarrying at Borden, some 2.5km north-east of the site, found a flint-working area, from which cores, hammerstones and tools of Neolithic and early Bronze Age date were recovered (Worsfold 1948). Prehistoric activity is believed to be widespread on the North Downs of Kent, but there has been very little development in this area to substantiate this, especially in the area close to Junction 5 of the M2.

1.3.4 Approximately 1km south of the scheme, a pipeline running across the A249 south of Stockbury uncovered an Iron Age settlement, including well-preserved furnaces from metalworking (Girbal unpublished). The Stockbury valley was probably an important route through the North Downs in prehistory, a role it certainly fulfilled by the medieval period. Three gold coins, two of Cunobelinus, the third of Claudius, were found on the boundary between the parishes of Borden and Tunstall, about 4km east of the site (Anon. 1874, 299). A third Celtic coin was recovered from the same site in 1943, and a fourth in 1968 (Kelly 1969, 259). Excavation at Borden revealed ditches and pits of late Iron Age date, together with cremations of early Roman date (Worsford 1948).

1.3.5 Roman Watling Street runs WNW to ESE some 2.4km to the north of the site. The North Downs were extensively farmed in the Roman period, as is evident from the large number of Roman villas on the north slope south of the Roman road. A group of Roman bronze vessels, a glass and a pottery vessel, probably derived from a high status burial, were recovered during the excavation of a manhole at Borden, and subsequent excavation in the adjacent area revealed early Roman features (Kelly 1964). A walled Roman cemetery is also known from Borden (Ford 1965, 249).

1.3.6 Anglo-Saxon (or Frankish) evidence from the vicinity of the site is sparse, but the village of Stockbury, 1km to the south-west of the site, was already in existence at the Norman conquest, and was recorded in Domesday Book as Stochingeberge (Palmer 2018). Tunstall to the east was also of Saxon origin, and was recorded in Domesday Book under the name Stealle as belonging to Osward in 1042, and given to Odo after the Norman conquest (Bristow 1798).

1.3.7 The Stockbury valley was an important route through the North Downs at this period, as is shown by the presence of three motte-and-bailey castles along its length. One of these was established on Church Hill east of Stockbury, only 400m west of the south end of the site (Smith *et al.* 2015). This site was later used for the Church Battery, an artillery battery in the WWI Chatham Land Front defences (ibid., 48).

1.3.8 Sittingbourne, which sits astride Watling Street to the north-east, was not mentioned in Domesday Book, but became important as a stop-off point for pilgrims using Watling Street on their way to Canterbury after the death of Thomas-a-Becket in 1187. There are two churches of Early English style in the town.

1.3.9 Oad Street, formerly Hoade Street or Wood Street, was of medieval origins, although nothing now remains dating to that period. Danaway is a recent, 19th century settlement.

1.3.10 The 1st Edition Ordnance Survey 1" to 1 mile map of 1856 shows that the part of the site lying east of the A246 was then part of Chestnut Wood. To the west of the road, much of the southern part was also wooded, but the northern part was open ground. The position was similar in 1894, when the OS 1:2500 county series shows the south-western wooded part was called Church Wood.

1.3.11 The site is known to be part of the area used in WW1 to create the Chatham Land Front defensive line, a complex of bunkers, defensive earthworks and lookout points aimed at defending north Kent from attack in the event of invasion. Around the Chatham battery these are likely to include shelters, tunnels, observation points, fire trenches and battery emplacements. In places these defences are still visible on the ground as positive or negative earthworks.

1.3.12 No previous fieldwalking or archaeological excavation has taken place within the site, but a geophysical gradiometer (magnetometer) survey was carried out by GSB Prospection in 2015 (GSB 2016; Fig. 2; report attached as Appendix F). This did not reveal any particular concentrations of potential geophysical anomalies of probable archaeological origin, but did identify short lengths of anomaly that appear to correspond to some of the WW1 defensive features (Fig. 2). The survey also identified two small areas of probable ridge-and-furrow cultivation in the eastern part of the site, and a scatter of linear features of uncertain date (Fig. 2).

1.4 Potential

1.4.1 No prehistoric activity is known from the immediate vicinity of the site. Struck flints indicating earlier prehistoric activity have been discovered in the wider area, alongside two areas of late Iron Age activity including metalworking sites south of Stockbury, and settlement features at Borden to the north-east. On present evidence the potential for prehistoric activity appears to be low.

1.4.2 Although several Roman sites are known in the wider area, the potential for Roman activity within the site appears to be low.

1.4.3 There is no evidence for activity within the site or in the immediate vicinity, although Stockbridge was a late Saxon settlement. The potential for early medieval activity is therefore believed to be low.

1.4.4 The presence of a motte-and-bailey castle only 400m west of the site, and the presence of villages recorded to the south-west and east, means that peripheral activity of the medieval period may be encountered. Ridge and furrow cultivation was found over parts of the site, showing that parts of the site lay within the fields of these medieval settlements. The potential for medieval activity is therefore considered to be low to moderate.

1.4.5 The site formed part of the WW1 defences of Kent, and plans of these, as well as some surviving earthworks and structures, show that these will certainly be

encountered by the evaluation. The potential for WW1 archaeology is therefore considered to be very high.

2 EVALUATION AIMS AND METHODOLOGY

2.1 Aims

2.1.1 The project aims and objectives were as follows:

i. To determine or confirm the approximate extent of any surviving remains.
ii. To determine the date range of any surviving remains by artefactual or other remains.
iii. To determine the condition and state of preservation of any remains.
iv. To determine the degree of complexity of any surviving horizontal or vertical stratigraphy.
v. To assess the associations and implications of any remains encountered with reference to the historic landscape.
vi. To determine the potential for the site to provide palaeoenvironmental and/or economic evidence, and the forms in which such evidence may survive.
vii. To determine the implications of any remains with reference to economy, status, utility and social activity.
viii. To determine or confirm the likely range, quality and quantity of the artefactual evidence present.
ix. To provide sufficient information to enable the significance of any archaeological remains that may be found to be established.

2.2 Specific aims and objectives

2.2.1 The specific aims and objectives of the evaluation were:

x. To date the various linear features indicated by the geophysical survey;
xi. To identify on the ground the WW1 defences indicated on early 20th century maps, and to investigate their state of preservation and understand their significance, in order to inform design decisions for the scheme;
xii. To look for evidence of further elements of the WW1 defences that may not have been marked on the maps, and, if found, to establish their probable function;
xiii. To clarify whether the absence of other archaeological features indicated by the geophysical survey in the remainder of the site is likely to be correct.

2.3 Methodology

Scope of works

2.3.1 An evaluation consisting of 71 trenches 50m long and 2m wide, or of equivalent area, was carried out (Fig. 2). Some trenches were shorter due to local constraints, and others were extended in compensation. The exact locations of the trenches around the area of Cookham battery north-west of the junction was refined with the KCC Principal Archaeological Officer Simon Mason at a site visit early in the programme of works.

2.3.2 With the agreement of Simon Mason, certain parts of the scheme area were excluded from evaluation at this stage. These were:

- The strip north of the junction roundabout between the A249 and the M2 eastbound off slip road. Any geotechnical pits to be dug in this area were to be monitored archaeologically.
- The eastern end of the scheme north of the M2, which could not be accessed by machine.
- The northern end of the strip west of the A249 north of the M2, where access could not be obtained.

2.3.3 Two parts of the scheme area were excluded from evaluation due to ecological constraints. These comprised:

- An area 30m either side of a hedge boundary towards the north end of the strip west of the A249 north of the M2, where a badger's sett is present;
- The narrow strip immediately adjacent to the junction roundabout between the Maidstone Road and the M2 westbound on slip road, where dormice are present.

2.3.4 Extensions to some trenches were required at the request of the KCC Principal Archaeological Officer, both to examine the lower parts of deep features and to clarify the character and extent of some of the exposed archaeological features. These extensions were discussed and agreed with the client's representative from WSP prior to further trenching.

Site-specific methodology

2.3.5 A summary of OA's general approach to evaluation, excavation and recording can be found in Appendix A. Standard methodologies for geomatics and survey, environmental evidence, artefactual evidence and burials can also be found in the WSI (OA 2017, Appendices B, C, D and E respectively).

2.3.6 The locations of the agreed trenches were laid out in advance using a GPS.

2.3.7 The trenches were excavated using a 360 tracked excavator fitted with a toothless bucket under close archaeological supervision.

2.3.8 Spoil was stored on either side of the trench, topsoil separated from subsoils or made ground. Soils were monitored for finds visually and except in areas of made ground, a metal detector was used during excavation and on the spoil heaps to check for finds. No concentrations of struck flints were found within the topsoil or subsoil in any trench.

2.3.9 Trenches were excavated to the first horizon at which archaeological features appear, or failing that, to the surface of the undisturbed natural geology. Trenches were normally not excavated to a depth greater than 1m; where natural was not encountered at that depth, then, following consultation with the KCC Principal Archaeological Officer and instruction from the client's representative, the trenches were stepped out at the ends to allow safe excavation of sondages to greater depth.

2.3.10 Where trenches proved to be dug into made ground (Trenches 58-71 and 16-22), trench depth was initially limited to 1m, with sondages dug to a maximum of 2m deep at either end to look for buried topsoil, subsoil or natural. Where natural was not

found at 2m deep, no further excavation was carried out below this depth for Health and Safety reasons.

2.3.11 In the south-west part of the site, when it became clear that a valley bottom had been raised with made ground more than 1m deep, the strategy was modified, digging only the sondages to 2m deep at either end of Trenches 19-22. The rest of these trenches was not excavated.

2.3.12 Where WW1 defences were found, whether below topsoil or subsoil, these were carefully cleaned by hand to expose their full extent within the evaluation trench, and to assess their state of preservation.

2.3.13 The exposed remains were cleaned by hand, photographed and planned at an appropriate scale (1:10 or 1:20), and were compared to the plans of the defences obtained in advance of the evaluation, and photographs of well-preserved parts of the defence system already investigated, to assist in their characterization.

2.3.14 No structural elements were removed, though loose finds were planned and lifted. No intact structural elements were found, other than traces of wood at the base of Trench 82.

2.3.15 Limited excavation by hand of the WW1 features was carried out where necessary to clarify their character, method of construction and state of preservation, and so establish their significance.

2.3.16 Only one earthwork feature was investigated by the evaluation. This was initially sectioned by machine under close archaeological supervision, but proved to consist of made ground of very recent date, probably deriving from the construction of the M20 in the later 20th century.

2.3.17 Where more extensive or deep excavation of trenches was requested by the KCC Principal Archaeological Officer, the appropriate methodology was agreed between the client's representative, OA and the Principal Archaeological Officer in advance, taking into account health and safety considerations.

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 The results of the evaluation are presented below, and include a stratigraphic description of the trenches that contained archaeological remains. The full details of all trenches with dimensions and depths of all deposits can be found in Appendix A. Finds data and spot dates are tabulated in Appendix B.

3.1.2 Context numbers reflect the trench numbers unless otherwise stated, e.g. pit 102 is a feature within Trench 1, while ditch 304 is a feature within Trench 3.

3.2 General soils and ground conditions

3.2.1 The topography across the site was varied, from hilltops down slopes of varying steepness to dry valley bottoms. In consequence the soil sequence varied across the site. On the north and south west (Trenches 58-63, 66-70 and 16-23) there was more than 1.5m of made ground overlying the natural geology in low-lying areas, and in many cases this exceeded the 2m depth limit of trenching. This made ground probably derived from the original construction of the M2 in the later 20th century.

3.2.2 On the north-east a number of large man-made earthworks were evident. Trenching of one of these (Trench 77) demonstrated that it was of very recent date, and made ground was also present filling recent excavations and hollows in the natural chalk geology in several of the other trenches in this area (Trenches 74-76 and 78). In this part of the site the original topsoil and subsoil had mostly been removed, presumably during construction of the M2.

3.2.3 The natural geology on the south-east (Trenches 25-37, 41-42 and 44-45) was chalk, overlain in places by patches of orange sandy silt or silty clay brickearth. Brickearth completely sealed the chalk in Trenches 38-40. Subsoil was either absent or very thin in Trenches 28-37, as this was a cultivated slope, and Trenches 25-27 at the bottom of the slope contained a very thick layer of colluvium below the topsoil.

3.2.4 On the north-west, brickearth was encountered throughout Trenches 82-87 and 89-96 and in Trench 99. Trenches 97, 98 and 100-102 contained chalk overlain by patches of brickearth. In Trench 88, which lay at the bottom of a slope, there was a deep layer of soil similar to the brickearth below topsoil, and natural geology was not reached.

3.2.5 Ground conditions throughout the evaluation were generally good, and the trenches remained dry throughout. Archaeological features, where present, were easy to identify against the underlying natural geology.

3.3 General distribution of archaeological deposits.

3.3.1 The site can be split into four areas, the north-west, north-east, south-west and south-east.

3.3.2 Bloomery features, at least some dating to the late Iron Age, were discovered in the eastern part of the north-western area. Features belonging to the WW1 defensive complex were also found in this part of the site, as well as to the far west of the area. Flint implements, some possibly in contemporary features, were also found in this area.

3.3.3 Only two undated features were discovered in the north-east area, both in Trench 72.

3.3.4 No archaeological finds or features were discovered in the south-west area.

3.3.5 The western part of the south-east area did not produce any archaeological features. Bloomery related features, again at least some dating to the late Iron Age, were discovered in the eastern part of the area, as well as features relating to WW1 defences. The majority of the flintwork was found in this part of the site, including a possible shaft.

3.3.6 Trenches 46 to 49 in the central part of the site were not excavated. Trench 43 in the south-eastern area, Trenches 59 and 64 in the north-east area, and Trenches 103-106 in the north-western area were not excavated.

3.4 North-west area (Trenches 82-102)

3.4.1 Archaeological features were present in Trenches 82, 83, 84, 86, 89, 91, 93 to 97, and 99-102 (Fig. 3). Trenches 85, 87, 88, 90, 92 and 98 were devoid of archaeology (Plate 1).

Trench 82 (*Figs. 6 and 9; Plates 2 and 3*)

3.4.2 The trench contained a large linear feature, 8203, with a straight northwest edge and the southeast edge had triangular 'zig-zag' shaped edges. It had steep, almost vertical sides and was 4.25m wide. It was filled by a mixed greyish yellow silty sand. The first 1m of the feature was hand excavated. The trench was widened and stepped by machine to excavate the full depth of the feature. In the corner of the feature on the south-east side between the straight segment and the 'zig-zag' segment, a piece of wood remained, measuring 0.10m diameter and 0.10m deep. It was very fragmented so cannot be definitely interpreted as structural. However, it was located in the corner between a linear section and one of the triangular protrusions. The location of the feature corresponded with the plans for the WW1 defences. The feature was sealed by subsoil and topsoil.

Trench 83 (*Figs. 6 and 10*)

3.4.3 This contained two linears, one of which was excavated, 8302, and a rectangular cut feature, 8304. Only the upper 0.26m of the linear at the southeast end of the trench was hand excavated and not to its full depth due to the safety limitations of 1m excavations and the depths of topsoil and subsoil of 0.32m and 0.42m respectively, which sealed the features in the trench. The cut was near vertical and the fill was a light grey, sandy silt with small flint inclusions. Post-medieval glass was retrieved from the fill. The regular sided, triangular feature, 8304 was also investigated to a depth of 0.21m. It had steep, near vertical sides and was filled with a light grey sandy silt. Both of these features were very similar to those seen in Trench 82. The features corresponded with the plans for the WW1 defences.

Trench 84 (*Fig. 6*)

3.4.4 The trench contained one ditch, 8403, which was aligned NE-SE, measured 0.35m wide and 0.08m deep, and was filled by an orangey grey sandy silt with charcoal

flecks that produced two flint blades. Topsoil and subsoil were found to overlie a natural of reddish orange to light bluish yellow sandy silt with rounded flints.

Trench 86 (*Figs. 6 and 10; Plates 4 and 5*)

3.4.5 This contained two large hollows or shafts, initially thought to be ditches. These were initially machine excavated, and then the trench was widened to determine the extent and to retrieve a soil sample and dating evidence. No finds were retrieved by hand. The trench was positioned on a downwards slope towards the south-east. The subsoil was thicker at the south-east end. The hollows or shafts were sealed by subsoil and topsoil and cut through the brownish orange chalky silt with flint nodules that overlies the natural chalk bedrock. The northwestern of the two features, 8603, was 6.6m wide and excavated to 1.3m with moderately sloped sides. Fill 8608 was redeposited chalk eroded from of the edges. The lowest fill excavated was 8607, an orangey white silty redeposited chalk, and the main upper fill excavated was 8606, a greyish brown clayey silt which produced flint-knapping debris from the soil sample. The southeastern feature, 8604, was 11.05m wide and 1.7m deep with steep sides filled by 8610, a yellowish white redeposited chalk sealed by 8609, a greyish brown clayey silt with frequent chalk and occasional charcoal flecking.

Trench 89 (*Figs. 6 and 11; Plate 6*)

3.4.6 The trench contained one ditch, 8903, aligned NW-SE. Topsoil and a subsoil colluvium overlay natural.

Trench 91 (*Fig. 6; Plate 7*)

3.4.7 This trench contained two tree-throw holes, one of which was excavated. Tree-throw 9103 had irregular sides and was sub-oval in plan. It was filled by a mixed yellowish brown and bluish grey sandy silt with small flint inclusions. Topsoil and a subsoil overlay natural.

Trench 93 (*Figs. 6 and 11; Plates 8-11*)

3.4.8 Furnace 9302 and rake-out pit 9303 were discovered at the northwest end of this trench. Further bloomery, slag-rich deposits and potential pits were evident throughout the trench. A linear towards the centre of the trench, 9319, possibly relates to a WW1 defensive structure.

3.4.9 Furnace 9302 was oval with steep sides. In discussions with Simon Mason (KCC) only a small portion of this was excavated to determine its depth and preservation. It was 0.35m wide and 0.12m deep and the base was not reached. The outer fill of the furnace was filled by a pinkish cream to pale brown chalky silt with moderate charcoal and burnt clay inclusions. The innermost fills were not excavated.

3.4.10 The associated rake-out pit, 9303, was oval with steep sides and had a flat base. It was 1.7m wide and 0.46m deep. The edge consolidation deposit, 9313, was a brownish bluish yellow mottled silty clay with occasional charcoal flecks. The pit was filled by layers 9315, 9311, 9310 and 9309, comprising redeposited natural and containing slag and pottery. Fills 9312 and 9314 contained high concentrations of burnt material and slag. The upper of the two very slag-rich fills, 9314, was a mottled reddish orange and purplish brown silty clay with frequent burnt clay, moderate charcoal and occasional flint. An

uncertain relationship exists between fill 9314 and cuts 9302 and 9303. Further excavation is required to determine this relationship. It is possible that more than one furnace or another phase of activity is represented by this fill. The lower fill, 9312, was a dark purplish brown, mottled with orangey red, sandy silt with frequent slag and charcoal.

Trench 94 (*Figs. 6 and 11*)

3.4.11 This trench was L-shaped. It contained bloomery furnace 9416, rake-out pit 9418, and associated bloomery deposits visible half way down the SW-NE section of the trench. Further bloomery deposits, 9405 and9426-27, were present in the NW-SE section of the trench. Modern features, one likely to be associated with the WW1 defences, were present in the SW-NE section of the trench.

Trench 95 (*Figs. 6 and 12*)

3.4.12 The trench contained a large cut, 9503, likely to be related to the WW1 defenses. The feature contained large pieces of wood and metal in the backfill. The limits of the feature were not revealed. Topsoil was found to overlie natural.

Trench 96 (*Fig. 6; Plates 12 and 13*)

3.4.13 The trench contained a layer of demolition material, 9604, that may relate to a gun emplacement for the WW1 defenses. An irregular feature, 9603, was also discovered. Topsoil and subsoil were found to overlie natural.

Trench 97 (*Figs. 6 and 13*)

3.4.14 The trench contained a large ditch, 9703, running NE-SW. This cut subsoil 9701, as well as a geological deposit, 9702, made up of fine sands and silts. Topsoil and subsoil were found to overlie natural.

Trench 99 (*Figs. 6 and 13; Plate 14*)

3.4.15 At the north-west end of the trench, a rectangular feature with burnt edges, 9906, was discovered. A geological linear feature, 9912, was investigated, and a NW-SE aligned linear, 9904, was found at the south-east end of the trench. Topsoil and subsoil were found to overlie natural.

Trench 100 (*Fig. 6; Plate 15*)

3.4.16 This trench was positioned on the slope of a hill that was very steep at the south end. Three undated pits were discovered, 10002, 10004, 10006. Topsoil and subsoil were found to overlie natural.

Trench 101 (*Figs. 6 and 14; Plate 16*)

3.4.17 The trench contained a series of three intercutting pits, 10105, 10107, 10110, containing burnt material and later prehistoric pottery. A void was also present but did not appear to relate to an archaeological feature. Topsoil and subsoil were found to overlie natural.

Trench 102 (*Figs. 6 and 14; Plates 17-19*)

3.4.18 The trench contained a circular pit, 10203, at the corner of the two sections of trench. The pit contained burnt material and redeposited chalk, and the natural

surrounding it was heat affected. The pit was not fully excavated despite widening the trench to allow a greater depth to be safely achieved.

3.5 North-east area (Trenches 58-78)

3.5.1 Trenches 58-78 were located in the east side of the A249 and to the north of the M2 (Fig. 4). Trenches 58-71 were to the west of Maidstone Road, and Trenches 72 to 78 to the east of Maidstone Road. The only trench to contain archaeological features in the north-east area was Trench 72.

3.5.2 Trenches 59, 64 and 65 were not excavated due to site limits and ecological constraints.

3.5.3 Trenches 58-71 were dug through a dark grey clayey topsoil overlying a made ground mixture of clay, chalk and brick and concrete rubble. The trenches were dug to 1m at which level natural was not evident. A further sondage was dug to 2m in trench 58 but natural was not reached.

3.5.4 Trench 73 consisted of topsoil, a greyish brown silt with frequent chalk and small flint inclusions, and subsoil, a brownish orange silt with frequent chalk inclusions, overlying natural chalk (Plate 20). Trench 74 consisted of topsoil overlying natural chalk. Trench 75 and 76 consisted of topsoil overlying natural and a layer of modern made ground, a brownish orange silt with chalky lenses with frequent ceramic building material (CBM), tarmac, concrete, charcoal and large flint nodules, with a minimum depth of 1.4m in Trenches 75 and 76. Trench 77 was abandoned on health and safety grounds as it contained asbestos.

Trench 72 (*Figs. 7 and 15; Plate 21*)

3.5.5 This trench contained two potential archaeological features, 7203 and 7206. Only 7203 was investigated. This was a pit that extended beyond the trench limits, containing two fills. The lower fill, 7205, was a mixed white to brownish grey silt with frequent weathered chalk, and the upper fill, 7204, was a dark orangey brown sandy silt, with frequent chalk and flint inclusions containing fired clay. The fill was sealed by a subsoil and topsoil. Discrete features were present in the trench that continued beyond the trench limit.

Trench 78 (*Fig. 7*)

3.5.6 This trench consisted of topsoil and subsoil overlying natural chalk. A modern feature, 7803, was encountered at the north-west end. It was 4.5m wide and 1.1m deep with a U-shaped profile and contained two fills. The lower fill, 7805, was a dark brownish red clay and the upper fill, 7804 was a friable, light orangey brown.

3.6 South-west area (Trenches 16-24)

3.6.1 No archaeological finds or features were uncovered in the south-west area, comprising Trenches 16-24 (Fig. 5).

3.6.2 Trenches 16 to 19 were excavated to a maximum depth of 1m with sondages dug to determine the depth of natural wherever possible. Trench 16 consisted of topsoil and subsoil overlying made ground, which itself overlay a layer of buried subsoil and then natural. Trench 17 consisted of topsoil overlying made ground of mixed chalk, grey clay

and yellow sand. Three sondages were dug to a depth of 2m and natural was not reached. Three sondages were excavated into Trench 18 through a mixed made ground of clay, chalk and brick and concrete rubble. The natural brown silty clay with flints was reached at 1.73m. Trench 19 consisted of topsoil over a mixed made ground to a depth of 1.84m at the southwest end. A redeposited natural of yellow sandy silt with occasional chalk at a depth of 1.75m was encountered at the northeast end; again natural was not reached at 2m.

3.6.3 The full length of trenches 20 to 22 were not excavated, but sondages were dug at each end. Natural was not reached at 2m in Trenches 20 or 21. A grey clayey silt topsoil, 0.3m deep, was overlaid by made ground comprising mixed chalk, yellow sand and grey clay, and redeposited natural. This was 1.70m deep in both trenches. Natural was not encountered in Trench 22 when the impact level of 1.50m was reached. The subsoil of made ground was 1.21m deep in this trench, becoming shallower up the slope to the north.

3.6.4 Due to their location further up the slope, natural chalk was encountered at a much shallower depth in Trenches 23 and 24, at between 0.4m and 0.7m. Three linear plough scars in the natural chalk with brown silty fills on north-south alignments were identified in Trench 23. A modern intrusion was evident at the north end of the trench. Three similar further plough scars were discovered in Trench 24.

3.7 South-east area (Trenches 25-45)

3.7.1 The south-east area was divided into two parts. Trenches 25-42 were located to the south of the slip road, and trenches 44 and 45 were to the north (Fig. 5).

3.7.2 Trenches 25-27, 29-35, 37 and 41 were devoid of archaeology. Trenches 25 to 27 were located along the base of the slope in the field and followed the line of the carriageway of the A249. Sondages were excavated in trenches 25 and 26, although natural was not evident at 1m (Plate 22). The topsoil overlay subsoil of sterile orangey brown sandy silt with frequent flint inclusions, probably colluvium. In Trench 27 the grey clayey silt topsoil and a subsoil of orange clayey silt overlay the natural geology of chalk, observable at 0.45m. Furrows cutting the chalk were observed in the trench (Plate 23). A natural hollow was observed in Trench 41 (Plate 24).

3.7.3 Trenches 29-35 were 0.38m to 0.45m deep. Trenches 29 and 31 consisted of topsoil and a subsoil of orangey brown silty sand overlying the natural geology of chalk. There was no subsoil present in Trenches 30, 32, 33 and 34. Areas of subsoil were seen in Trench 35, and this trench contained two tree-throw holes. One of these, 3505, was excavated and proved to be oval with irregular sides containing two fills (Plate 25). Trench 37 was 0.8m deep with topsoil and subsoil overlying a natural of brickearth at the north end of the trench, and chalk to the south. Trench 41 was a large right-angled trench consisting of topsoil overlying made ground, 4101, which itself overlay a layer of buried subsoil, 4103, followed by chalk natural containing bands of brickearth.

Trench 28 (*Fig. 28*)

3.7.4 This trench was located towards the bottom of the incline in the field and contained a series of nine small oval features, probably postholes, in a NW-SE alignment. Three of the features were excavated and four remain unexcavated. They cut through

plough scars that were cut into the chalk natural. The features were sealed by subsoil, in turn sealed by topsoil. The cuts were oval with a concave base and were filled with brown clayey silt. The postholes varied in size from 0.25m to 0.53m in diameter, and from 0.12m to 0.16m in depth.

Trench 36 (*Figs. 8 and 16; Plate 26*)

3.7.5 This trench contained one large pit, 3602. The trench was widened as the feature was initially thought to be a large trench, possibly relating to WW1 defences, requiring a stepped excavation to reach the desired depth. The pit was steep sided and contained seven fills, although the base was not reached. Fills 3606, 3607, 3608 and 3609 were light yellow and dark grey sandy silts located on the edge of the pit, relating to erosion of the sides of the feature. Fill 3605, where excavation ceased, was a dark grey clayey silt and contained frequent charcoal. This was sealed by 3604, a mid grey clayey silt that contained 47 flints, 31 of which were flint knapping debris suggestive of later Neolithic or early Bronze Age material. This was overlain by 3603, a light grey clayey silt. The pit was sealed by topsoil. There was no subsoil present in the trench.

Trench 38 (*Figs. 8 and 16; Plate 27*)

3.7.6 This trench contained a substantial WW1 feature, 3803, on a NW-SE alignment across the ESE end of the trench. It had steep sides and the base was not reached. It contained two fills: 3804 was 1m deep, comprising a light greyish brown sandy silt with occasional flint inclusions, from which a flowerpot base and a substantial amount of metal wire were recovered. This was sealed by 3805, a 0.10m deep dark greyish brown clayey silt with occasional flint inclusions.

Trench 39 (*Figs. 8, 15 and 16; Plates 28-31*)

3.7.7 This trench was shortened due to its proximity to a hedge at the south end. Subsoil was evident in places but not consistent throughout as in some areas the topsoil directly overlay the natural of yellow and grey silty clay with flint inclusions. Pit 3904 was excavated towards the north end of the trench, and showed evidence of *in situ* burning. The pit was oval and had moderately sloping sides and a concave base, and contained two fills. The earliest fill, 3905, was dark greyish black sandy silt with frequent charcoal, and the latest fill, 3906, was very similar and contained flint, pottery and slag dated to the late Iron Age or early Roman period. This pit cut an earlier linear feature, 3907, running on a NW-SE alignment. It was 0.7m wide and 0.32m deep and filled by a light greyish brown clayey silt with no finds.

3.7.8 Trench 39 also contained a number of potential bloomery related pits, 3912, 3915, 3925 and 3927. There were spread throughout the south half of the trench and 3912 and 3915 were excavated. Pit 3915 cut a potential posthole, 3918, which contained two fills, 3916 and 3917. Pit 3912 contained three fills. The earliest, 3911, was a yellowish orange silty clay with occasional flint and slag. The middle fill, 3910, was a dark, brownish grey mottled fill with frequent charcoal, slag, heat-affected clay and occasional flint inclusions. This was sealed by 3909, a dark brownish grey clayey silt with frequent charcoal, occasional flint and heat-affected clay. Pit 3915 contained two fills. The lower, 3914, was a light yellowish orange silty clay with occasional charcoal and flint. The upper

fill, 3913, was a dark brownish grey clayey silt with frequent charcoal and occasional flint and contained worked flint and slag.

3.7.9 Three tree-throw holes were evident in Trench 39. Two of these, 3902 and 3923, were investigated to confirm their character. Both contained small flint assemblages: five pieces comprising three blades, a flake and an end of blade scraper were found in 3902, and four further pieces were found in 3923.

Trench 40 (*Fig. 8*)

3.7.10 This was a large right-angled trench. The south end was shortened due to the proximity of a hedge. Small pit 4003 was found at the south end of the trench and was not excavated. The trench was extended with a short north-south section to the west in order to locate a WW1 feature marked on historic maps. The WW1 trench was not located, and it possibly follows the field boundary. A posthole, 40X03, and small pit, 40X05, were identified but not excavated.

Trench 42 (*Figs. 8 and 15; Plate 32*)

3.7.11 This trench contained small ditch, 4202, possibly a drainage gully, on a north-south alignment in the north-east end of the trench towards the top of the slope. It was 0.81m wide and filled with a brown silty clay with chalk inclusions. A natural hollow, 4204, was discovered in the south-western end of the trench. This contained consolidation layers comprising 4205, an expansive area of made ground of brick, concrete and chalk and clay rubble, with a redeposited chalk capping, 4206, lying to the south-west. Beneath 4205 a layer of dark soil was discovered, 4207, on top of a layer of redeposited chalk, 4208, in turn on top of 4210 comprising mixed chalk containing modern pottery, concrete, a large ashlar block with possible molten glass on its surface, and a small quantity of slag. No subsoil was evident in the trench, with topsoil overlaying the natural geology of chalk in areas away from the hollow.

Trenches 44 (*Figs. 8 and 15; Plate 33*)

3.7.12 Evidence of ploughing disturbance within subsoil and natural was found in this trench. Feature 4405 was identified and excavated toward the centre of the trench. However, this was relatively shallow and diffuse, and is possibly just natural disturbance or a potential tree-throw hole. No further archaeological features were present.

Trench 45 (*Figs. 8 and 15; Plates 34 and 35*)

3.7.13 A deep pit, 4508, possibly a shaft or quarry pit, was found at the east end of the trench. The feature was not bottomed, and had a depth exceeding 1.35m. Five fills were observed, comprising silty clay with chalk fragments and occasional charcoal flecks. Quantities of worked flint including a Mesolithic adze were recovered from the feature.

3.8 Test pits

3.8.1 Four geotechnical test pits, TP03-06, were subjected to archaeological observation. No archaeological features were discovered in any of the pits.

3.8.2 TP03 comprised topsoil overlaying ploughsoil and subsoil, in turn above a natural sand build-up. The chalk was not reached in the pit at a depth of 4.5m, although this was discovered in a borehole at 8.7m deep.

3.8.3 TP04 comprised topsoil overlying subsoil, above a layer of darkish brown red clay, 0.80m in depth. Natural chalk was discovered at 3.9m

3.8.4 TP05 consisted of topsoil and subsoil overlaying natural of mixed degraded chalk with yellowish brown silty sand.

3.8.5 TP06 comprised a layer of topsoil on made ground over 1.97m deep. Natural was not reached at a depth of 2.20m

3.9 Finds summary

3.9.1 The flint assemblage recovered from the evaluation was relatively large. A very limited late Upper Paleolithic component may be present, although the Mesolithic material is more numerous with some features probably containing contemporary assemblages. Mesolithic flint objects include tranchet adze, adze sharpening flake, burin, microburins and numerous blade forms. Mesolithic material is also residual in later contexts. There is also a Neolithic-early Bronze Age component, as well as burnt flint in contexts associated with bloomery features.

3.9.2 The evaluation produced a small number of undiagnostic flint tempered later prehistoric sherds, possibly dating to the Iron Age. One of these was apparently cased in a fine-textured fired clay, and may have been part of a wall of a feature such as an oven which had incorporated the sherd in its construction. Late Iron Age-early Roman sherds with grog and flint temper were also discovered. Both chronological groups were discovered in the north-west and south-east parts of the site, and in and around the two bloomery areas. A small assemblage of 19th or 20th century sherds were also recovered, including from contexts probably associated with WW1 features.

3.9.3 A small assemblage of post-medieval ceramic building material (CBM) was recovered, as well as pieces of fired clay. Some of the fired clay had wattle impressions and was recovered from later prehistoric contexts not far from the bloomery features. These may have been fragments of oven superstructure.

3.9.4 Metal finds included ironwork, much consisting of wire and plate fragments. All of the metalwork is 19th or 20th century in date, and numerous pieces were recovered from WW1 features.

3.9.5 Almost 39kg of metalworking debris were recovered. The majority of the material can be positively identified as deriving from iron smelting, and includes furnace and flow slag deriving from non-tapping furnaces, as well as tap slag from tapping furnaces. Most of this material derives from late Iron Age-early Roman contexts.

3.9.6 A large ashlar block from a modern context was the only piece of worked stone recovered. This had possible molten glass on one face.

3.10 Environmental summary

3.10.1 Fourteen environmental samples were taken during the evaluation. Significant quantities of well-preserved charcoal were present in deposits associated with iron production. Very few other charred plant remains were present.

3.10.2 Wood was recovered from three contexts associated with WW1 defences, and represented a mixture of species. None showed clear signs of being worked, although some may have been utilized in structures.

3.10.3 Two radiocarbon dates were obtained from charcoal associated with iron production. The one from the south-east area was on oak heartwood and gave a late Iron Age date range, the one from the north-east area, gave a late Iron Age to early Roman date range.

4 ADDITIONAL GEOPHYSICAL SURVEY

4.1.1 An additional geophysical survey was undertaken by Sumo Survey in December 2017 in the north-western area of the site and in the field beyond. This was undertaken to better characterise the nature and extent of the bloomery area, as well as to further define the WW1 defensive features (Fig. 17; Report attached as Appendix G). The survey concluded that further probable metalworking features including possible furnaces and areas of metalworking debris, as well as WW1 defences, are present to the immediate north-west of the site. These appear to extend beyond the area surveyed. The bloomery site is therefore of some size, with an apparently significant proportion outside of the site.

5 DISCUSSION

5.1 Reliability of field investigation

5.1.1 The conditions during the evaluation were cold, but largely dry. Trenches were left to weather for a few days to enhance the visibility of archaeological features. These were easily recognisable in the areas of chalk natural; although less clear in the areas of brickearth/silty clay natural, features were still generally distinct. Overall, the evaluation was deemed reliable.

5.2 Evaluation objectives and results

5.2.1 One of the objectives was to investigate and date linear anomalies indicated in the geophysical survey. Very few of the possible features suggested by the survey were, however, identified during excavation. Ditch 4202 does appear to correspond to one of the linear anomalies, although this remains undated.

5.2.2 A major objective was to investigate the WW1 defences known through documentary sources. This confirmed the presence of numerous features associated with this complex. A number of features could not be bottomed due to health and safety constraints, although those that were fully excavated were not well-preserved. In most instances the WW1 features corresponded with those planned on early 20th century maps, although there were a number of inconsistences. The additional geophysical survey further highlighted probable WW1 defences, some corresponding with the cartographic evidence, others not (Fig. 17).

5.2.3 A major and largely unexpected discovery were two areas of iron smelting. These were found in the north-west and south-eastern parts of the site. Additional geophysical survey was undertaken to clarify the extent of the northern bloomery area, and appears to show that it extends well beyond the limits of the site. The evaluation has successfully characterised and dated these deposits, and the smelting activity can be placed within its wider context.

5.2.4 A further unexpected discovery was the significant Mesolithic presence on the site. A relatively large assemblage of flintwork of this period was recovered, at least some possibly in contemporary features.

5.3 Interpretation

5.3.1 The Mesolithic flintwork indicates two areas of activity; Mesolithic material was principally found in the eastern part of the south-east area, although further discoveries were also made in the north-west area. The quantities recovered from the evaluation suggest fairly large sites, and hint at the possibility of contemporary features, although most of the larger assemblages from the evaluation were of mixed character.

5.3.2 The Mesolithic material included pieces of both early and later Mesolithic character, so activity of more than one phase is likely at the site.

5.3.3 Although not found in such quantity, there was also flintwork of Neolithic (mostly late Neolithic) or early Bronze Age date in both the north-west and south-east areas. This shows at least one further phase of earlier prehistoric activity, and some early

Neolithic activity is also hinted at by the flintwork. Sites of the late Neolithic or Early Bronze Age are not commonly represented by very large flint assemblages, and so the evidence for these periods is also of significance.

5.3.4 Later prehistoric activity was only represented by a few sherds of pottery in features that were otherwise undated. While there was clearly no concentrated activity within the evaluated parts of the site, the evidence does indicate that scattered features of later prehistoric date may be encountered within the site. Scattered activity is the norm in late Bronze Age and early Iron Age Kent, relatively few nucleated settlements of these periods being known (Champion 2011).

5.3.5 Two areas of iron smelting were discovered, in the northern and southern parts of the site. Features included furnaces and pits. Radiocarbon samples were submitted from both areas, returning late Iron Age and late Iron Age-early Roman dates. It should however be noted that the older of the determinations was taken from oak heartwood charcoal, and may have returned a date somewhat earlier than its use in the smelting process.

5.3.6 Pottery of late Iron Age/early Roman character was also found in both of these areas of the site, though only a small quantity in direct association with slag. A few scraps of later prehistoric flint-tempered pottery were also recovered from the bloomery areas, but these are too small to suggest with any confidence that some of the smelting activities could have pre-dated the late Iron Age.

5.3.7 An additional geophysical survey to the north of the north-western area, outside of the site boundary, indicates that this area of bloomery activity extends beyond the site, although its full limits may not have been identified (see Appendix G). Smelting activity was not uncovered on the eastern side of the A249 north of the M2, although the trenches in this area did not reach the natural due to layers of modern made ground over 2m deep. The western limit of the south-eastern area of smelting appears to have been defined, although the northern and southern extents, outside of the site boundary, are not known. Further metalworking evidence was not found in the eastern part of the south-east area.

5.3.8 The slag recovered demonstrates that two distinct types of furnaces were used. This includes simpler shallow features that are characteristic of Iron Age technology, where the slag is allowed to collect at the bottom of the furnace, as well as taller shaft furnaces where slag is tapped from the furnace during the smelt, characteristic of Roman smelting techniques. The evidence at the site therefore suggests two distinct technological traditions, and shows the move from earlier non-tapping furnaces to more efficient larger tapping furnaces. The site appears to show the transition between these technological traditions.

5.3.9 The evaluation confirmed the presence of features relating to the Chatham Land Front, a series of defences constructed during WW1 aimed at defending north Kent from attack in the event of an invasion. Given the relatively poor preservation and the limited excavation undertaken in evaluation, the precise function of the excavated features was not always clear. The evaluation confirmed some aspects of the map evidence for the location of WW1 defensive features, but appears to indicate that there were some inaccuracies in the location of the defences as marked on early 20th century

maps. Although potential WW1 trenches were marked on the valley sides either side of the A249, fewer features than expected were identified in these areas. It is likely that stripping of larger areas of the site would clarify the extent of the WW1 defences within the site, though the evaluation has generally successfully characterised the remains that were uncovered.

5.3.10 Areas of made ground were uncovered at the bottom of the valley in the north-east and south-west areas. These deposits are clearly modern, and associated with the construction of the M2 and/or the A249.

5.4 Significance

5.4.1 Very little earlier prehistoric activity has been previously recorded in the vicinity of the site, so the Mesolithic and later flintwork was unexpected. The finds were not, however, entirely surprising due to the relative lack of archaeological work in the area, and the expectation that the North Downs of Kent were regularly exploited in this period. Although Mesolithic finds are common in Kent, sites with large assemblages are less so, and in this part of Kent such sites are rare. The late Neolithic/early Bronze Age flint is also significant, as it does not appear to be related to monuments. Domestic or other types of site are rare, and thus the flintwork of both periods is of county significance.

5.4.2 The number of flint implements recovered was large given the size of the excavations, and some may have derived from contemporary features. Of particular note is the deep pit or possible shaft 4508, which was more than 1.35m deep, but was not bottomed. The excavated sample of this feature produced 350 pieces of flint, and although 300 of these were small chips recovered from sieving it is clear that a much larger assemblage is likely to exist in the unexcavated portion of the fills.

5.4.3 Deneholes are common in Kent, but vary in date and in function; those of earlier prehistoric date are most commonly flint mines, though the recovered flintwork from the evaluation does not suggest such a function. If this proved to be a ritual shaft of earlier prehistoric date, this would be of regional significance. It may however simply be a deep pit, or a shaft of later date whose backfill has incorporated surface material from the immediate surroundings.

5.4.4 The evaluation revealed two potentially extensive areas of smelting activity. Some of this activity dates to the late Iron Age, although the evidence could indicate that smelting also took place after (or even before) this period. The slag recovered indicates both non-tapping and tapping furnaces, representing the transition between two distinct technologies. Some 39kg of metalworking debris was recovered from a limited number of features, suggesting the presence of much larger quantities of material. Prehistoric iron smelting sites with such substantial remains in Britain are rare (Paynter 2007).

5.4.5 Two areas of very similar bloomery activity have however recently been excavated during the excavation of a water main, respectively 1km and 3km to the west of the site (Stockbury, STK SMS 11; Girbal unpublished). These also date primarily to the late Iron Age, and the reports also show that smelting was taking place in both tapping and non-tapping furnaces. It therefore seems likely that this area of the North Downs was a significant centre for iron production during the late Iron Age. The bloomery evidence

at the previously excavated sites was described by the British Museum as of national significance, though the discovery of two further such sites in the same area paradoxically makes each individual site less important. The previously excavated sites contained a large number of furnaces and rake-out pits, and while the one definite furnace at the M2 Junction 5 site was clearly similarly well-preserved, the evaluation did not determine whether a similar density of furnaces survives within the north-west area of the current site. No furnaces were found in the evaluation trenches in the south-east part of the site.

5.4.6 The defence network constructed in south-east Britain in preparation for a possible German invasion during WW1 is of national significance, but, other than documentary evidence in maps and photographs, information about this has only been emerging in the last five years (Smith *et al.* 2015). Compared to those elements investigated further north, the WW1 defences excavated during the evaluation were not well-preserved, but have the potential to further enhance our knowledge about character of the Chatham Land Front. The evaluation has demonstrated that the positions of the defences on early 20th century maps can be partially confirmed, although these are not present in all of the locations indicated.

5.4.7 The defences in south-east Britain were extensive, with an estimated total of more than 60 miles (Smith *et al.* 2015). The area of the site therefore comprises only a very small proportion of these defences, and the shape of the site, with its several linear areas of limited width, will only ever allow for small parts of the defences to be explored. The significance of those elements of the defences within the site are thus of less than national significance.

APPENDIX A TRENCH DESCRIPTIONS AND CONTEXT INVENTORY

Trench 16						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil and subsoil overlying made ground, which itself overlies a layer of buried subsoil and then natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
1600	Layer	-	0.33	Topsoil. Grey/brown, clayey silt, some flint inclusions.	-	-
1601	Layer	-	0.30	Subsoil. Brown, clayey silt, some flint inclusions.	-	-
1602	Layer	-	0.71	Made ground. Brown/grey, mix of clay, rubble and flint.	-	-
1603	Layer	-	0.32	Buried subsoil. Brown, clayey silt, some flint inclusions.	-	-
1604	Layer	-		Natural. Brown clay.		

Trench 17						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Three sondages dug to a depth of 2m. Natural not reached.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
1700	Layer	-	0.30	Topsoil. Dark grey, clayey silt, some flint pieces.	-	-
1700	Layer	-	1.70	Made ground. Mix of chalk, grey clay and yellow sand.	-	-

Trench 18						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground, which overlies the natural. Three sondages were dug to locate natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
1800	Layer	-	0.31	Topsoil. Grey, clayey silt, some flint pieces.	-	-
1801	Layer	-	1.73	Made ground. Grey to light grey, mix of clay, chalk and rubble.	-	-
1802	Layer	-	-	Natural. Brown, silty clay, some flint pieces.	-	-

Trench 19

General description					Orientation	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground and redeposited natural. Two sondages were dug to locate natural, however natural was not evident at 2m (0.5m below level of impact).					Length (m)	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
1900	Layer	-	0.20	Topsoil – dark grey, clayey silt; occasional flint inclusions.	-	-
1901	Layer	-	1.84	Made ground – mix of clay, chalk and rubble.	-	-
1902	Layer	-	1.75	Redeposited natural – yellow sandy silt; occasional chalk fragments.	-	-

Trench 20						
General description					Orientation	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Two sondages were dug to locate natural, however natural was not evident at 2m (0.5m below level of impact).					Length (m)	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2000	Layer	-	0.31	Topsoil – grey sandy silt; occasional flint inclusions.	-	-
2001	Layer	-	1.69	Made ground – mix of redeposited natural, yellow to light grey.	-	-

Trench 21						
General description					Orientation	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Two sondages were dug to locate natural, however natural was not evident at 2m (0.5m below level of impact).					Length (m)	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2100	Layer	-	0.30	Topsoil – grey clayey silt; occasional flint inclusions.	-	-
2101	Layer	-	1.70	Made ground – mix of chalk, yellow sand and grey clay.	-	-

Trench 22						
General description					Orientation	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Two sondages were dug to locate natural, however natural was not evident at 1.5m (impact level).					Length (m)	46
					Width (m)	2
					Avg. depth (m)	1.50
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

2200	Layer	-	0.29	Topsoil – mid grey clayey silt; occasional flint inclusions.	-	-
2201	Layer	-	1.21	Made ground – mix of yellow sand, grey clay, brown clay and chalk.	-	-

Trench 23						
General description					**Orientation**	N/S
Three linear features on N/S alignments were identified, which were investigated and determined to be plough scars in the natural chalk. A modern intrusion is evident at the N end of the trench.					**Length (m)**	69
					Width (m)	2
					Avg. depth (m)	0.40
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2300	Layer	-	0.12	Topsoil – dark greyish brown sandy silt; occasional flint inclusions.	-	-
2301	Layer	-	0.10	Subsoil – yellowish brown sandy silt; occasional flint inclusions.	CBM	-
2302	Layer	-	-	Natural – chalk; occasional flint inclusions.	-	-
2303	Layer	-	-	Natural – reddish brown/orangish brown sandy clay / brick earth.	-	-
2304	Deposit	1.11	0.05	Silty deposit – greyish brown mix of sandy silt and chalk.	Metal	-
2305	Cut	2	0.14	Plough scar – linear with steep sides and a flat base.		-
2306	Fill	2	0.14	Fill of [2305] – brownish grey clayey silt; frequent chalk flecking.	Glass Metal	Pmed/ modern
2307	Cut	1.42	0.11	Plough scar – diffuse linear with gently sloping sides and a flat base.		-
2308	Fill	1.42	0.11	Fill of [2307] – yellowish brown sandy silt; occasional flint inclusions.	Glazed pottery handle, CBM Iron	C19th/ 20th

Trench 24						
General description					**Orientation**	N/S
Trench devoid of archaeology. Three features evident, which were investigated and determined to be the remnants of plough scars in the natural chalk.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.70
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

2400	Layer	-	0.22	Topsoil – dark yellowish brown silty sand; no inclusions.	-	-
2401	Layer	-	0.17	Subsoil – yellowish brown sandy silt; occasional chalk fragments and flint inclusions.	-	-
2402	Layer	-	-	Natural - chalk; occasional flint inclusions.	-	-
2403	Cut	2	0.33	Plough scar.		-
2404	Fill	2	0.33	Fill of [2403] – brownish grey sandy silt; frequent chalk flecking.	-	-

Trench 25						
General description					**Orientation**	NW/SE
Trench devoid of archaeology. A sondage was dug to locate natural, however natural was not evident at 1m.					**Length (m)**	24
					Width (m)	2
					Avg. depth (m)	0.94
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2500	Layer	-	0.24	Topsoil – dark greyish brown clayey silt.	-	-
2501	Layer	-	0.70	Subsoil – orangish brown sandy silt; frequent flint inclusions.	-	-

Trench 26						
General description					**Orientation**	NW/SE
Trench devoid of archaeology. Machined to 1m at which level natural was not evident.					**Length (m)**	31
					Width (m)	2
					Avg. depth (m)	0.96
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2600	Layer	-	0.26	Topsoil – greyish brown sandy silt.	-	-
2601	Layer	-	0.70	Subsoil – orangish brown sandy silt; frequent chalk fragments and flint inclusions.	-	-

Trench 27						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil and subsoil overlying the natural geology of chalk.					**Length (m)**	31
					Width (m)	2
					Avg. depth (m)	0.45
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

2700	Layer	-	0.29	Topsoil – grey clayey silt; moderate small flint inclusions.	-	-
2701	Layer	-	0.16	Subsoil – yellowish orange clayey silt; occasional flint inclusions.	-	-
2702	Layer	-	-	Natural – chalk.	-	-

Trench 28						
General description					**Orientation**	NW-SE
Trench contained a series of nine small oval features, likely post holes, in a northwest-southeast alignment. Three of the features were excavated and four remain unexcavated. They cut through plough scars that were cut into the chalk natural. The features were sealed by the subsoil which was then sealed by topsoil.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.42
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2800	Layer	-	0.15	Topsoil	-	-
2801	Layer	-	0.15	Subsoil	-	-
2802	Layer	-	-	Natural chalk	-	-
2803	Cut	0.53	0.16	Post hole. Oval, concave base, shallow uneven sides. Cuts plough scars.		-
2804	Fill	0.53	0.16	Sole fill of 2803. Firm, mid brown clayey silt with chalk fleck inclusions.	-	-
2805	Cut	0.45	0.12	Post hole. Oval concave base, shallow, regular sides.		-
2806	Fill	0.45	0.12	Sole fill of 2805. Firm, mid brown, clayey silt with small chalk inclusions.	-	-
2807	Cut	0.50	0.13	Post hole. Oval, concave uneven base, shallow sides.		-
2808	Fill	0.50	0.13	Sole fill of 2807. Firm, mid brown, clayey silt fill with small chalk inclusions.	-	-
2809	Cut	0.5	-	Post hole. Unexcavated.		-
2810	Fill	0.5	-	Fill of 2809. Mid brown silty clay, moderate chalk inclusions.	-	-
2811	Cut	0.25	-	Post hole. Unexcavated.		-
2812	Fill	0.25	-	Fill of 2811. Mid brown silty clay. Chalk inclusions.	-	-
2813	Cut	0.3	-	Post hole. Unexcavated.		-
2814	Fill	0.3	-	Fill of 2813. Mid brown, silty clay, occasional chalk inclusions.	-	-
2815	Cut	0.33	-	Post hole. Unexcavated.		-

2816	Fill	0.33	-	Mid brown silty clay. Occasional chalk inclusions.	-	-
2817	Cut	0.27	-	Post hole. Unexcavated.		-
2818	Fill	0.27	-	Fill of 2817. Mid brown silty clay. Occasional chalk inclusions.	-	-
2819	Cut	0.31	-	Post hole. Unexcavated.		-
2820	Fill	0.31	-	Fill of 2819. Mid brown silty clay. Occasional chalk inclusions.	-	-

Trench 29						
General description					**Orientation**	E/W
Trench devoid of archaeology. Consists of topsoil and subsoil overlying the natural geology of chalk.					**Length (m)**	49.5
					Width (m)	2
					Avg. depth (m)	0.45
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
2900	Layer	-	0.33	Topsoil – grey clayey silt; occasional chalk fragments.	-	-
2901	Layer	-	0.12	Subsoil – light orangish brown silty sand.	-	-
2902	Layer	-	-	Natural – chalk.	-	-

Trench 30						
General description					**Orientation**	N/S
Trench devoid of archaeology. No subsoil evident, consists of topsoil overlying the natural geology of chalk.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.38
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3000	Layer	-	0.30	Topsoil – grey clayey silt; occasional chalk fragments.	-	-
3001	Layer	-	-	Natural – chalk, weathered in places.	-	-

Trench 31						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil and subsoil overlying the natural geology of chalk.					**Length (m)**	12
					Width (m)	2
					Avg. depth (m)	0.50
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3100	Layer	-	0.25	Topsoil – grey clayey silt; occasional chalk fragments.	-	-
3101	Layer	-	0.15	Subsoil – orangish brown silty sand.	-	-
3102	Layer	-	-	Natural – chalk, weathered in places.	-	-

Trench 32						
General description					**Orientation**	ENE/WSW
Trench devoid of archaeology. No subsoil evident, consists of topsoil overlying the natural. Plough scars visible running diagonally across the trench.					**Length (m)**	26.3
					Width (m)	2
					Avg. depth (m)	0.29
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3200	Layer	-	0.22	Topsoil – orangish brown clayey silt; frequent chalk flecking.	-	-
3201	Layer	-	-	Natural –	-	-

Trench 33						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. No subsoil evident, consists of topsoil overlying the natural geology of chalk.					**Length (m)**	24
					Width (m)	2
					Avg. depth (m)	0.44
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3300	Layer	-	0.25	Topsoil – mid grey silty clay; occasional chalk fragments.	-	-
3301	Layer	-	-	Natural – chalk with lenses of clay and flint.	-	-

Trench 34						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. No subsoil evident, consists of topsoil overlying the natural geology of chalk.					**Length (m)**	36.50
					Width (m)	2
					Avg. depth (m)	0.40
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3400	Layer	-	0.29	Topsoil – orangish brown silty sand; frequent chalk flecking.	-	-
3401	Layer	-	-	Natural – chalk; occasional flint inclusions.	-	-

Trench 35						
General description					**Orientation**	NE/SW
Subsoil evident in places but not consistently throughout the trench when the topsoil directly overlies the natural geology of chalk. Two natural tree bowl features evident within the trench, one of which, [3505], was investigated to confirm this interpretation. Trench devoid of archaeology.					**Length (m)**	49.50
					Width (m)	2.10
					Avg. depth (m)	0.33
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3500	Layer	-	0.25	Topsoil – dark greyish brown clayey silt; frequent	-	-

				chalk flecking and moderate flint inclusions.		
3501	Layer	-	0.09	Subsoil – greyish brown clayey silt; frequent chalk flecking.	-	-
3502	Layer	-	-	Natural – chalk; moderate flint inclusions.	-	-
3503	Fill		0.30	Fill of tree bowl [3505] – greyish brown clayey silt; frequent chalk flecking.	-	-
3504	Fill		0.40	Fill (primary) of tree bowl [3505] – light creamy brown disturbed and weathered chalk; occasional flint inclusions.	-	-
3505	Cut		0.40	Tree bowl – irregularly oval feature with varying sides and an irregular base.		-

Trench 36						
General description					**Orientation**	N-S
Trench contained one large pit. The trench was widened to locate the limits of the large pit. The pit was sealed by topsoil. There was no subsoil present in the trench.					**Length (m)**	50
					Width (m)	2.1- 3.0
					Avg. depth (m)	0.65
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3600	Layer	-	0.34	Topsoil – mid orange brown sandy silt with chalk flecks.	-	-
3601	Layer	-	-	Natural. Chalk at north end of the trench and orange sand at the south end.	-	-
3602	Pit cut	3.35	1.19	Oval. Base not excavated. Steep, irregular sides.		-
3603	Fill of 3602	3.35	0.42	Firm, light grey, clayey silt, small flint inclusions.	-	-
3604	Fill of 3602	1.4	0.72	Firm, mid grey clayey silt, small flint inclusions.	S.14	-
3605	Fill of 3602	0.54	0.24	Soft, dark grey, sandy silt, charcoal rich.	-	-
3606	Fill of 3602	1.08	0.76	Firm, light yellow, sandy silt, small flint inclusions.	-	-
3607	Fill of 3602	0.21	0.16	Soft, dark grey sandy silt, small flint pieces, charcoal rich.	-	-
3608	Fill of 3602	0.85	0.66	Firm, light yellow, sandy silt, small flint pieces.	-	-
3609	Fill of 3602	0.34	0.15	Soft, dark grey, sandy silt, charcoal rich.	-	-

Trench 37						
General description					**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil and subsoil overlying the natural geology of chalk and sand.					**Length (m)**	47
					Width (m)	2.10
					Avg. depth (m)	0.80
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3700	Layer	-	0.30	Topsoil – greyish brown clayey silt; frequent chalk flecking.	-	-
3701	Layer	-	0.30	Subsoil – brownish orange sandy silt; frequent chalk flecking.	-	-
3702	Layer	-	-	Natural – variable, orange sand toward the N. end of the trench, chalk to the S.	-	-

Trench 38						
General description					**Orientation**	ESE/WSW
Substantial WW1 trench/ditch, [3803], runs on a NW/SE alignment across the ESE. end of the trench from which substantial amounts of metal wire were recovered. A land drain runs across the WNW. end of the trench					**Length (m)**	22
					Width (m)	2.10 (up to 3.50)
					Avg. depth (m)	0.45
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3800	Layer	-	0.20	Topsoil – dark brownish grey clayey silt; occasional flint inclusions.	-	-
3801	Layer	-	0.05	Subsoil – greyish brown clayey silt; occasional flint inclusions.	-	-
3802	Layer	-	-	Natural – brownish orange with light greyish brown mottling clayey slit.	-	-
3803	Cut	1.35	1	Trench/Ditch – substantial steep sided trench cut running on SE/NW alignment. N.F.E		WW1
3804	Fill	1.35	1	Fill of trench [3803] – light greyish brown sandy silt; occasional flint inclusions and frequent iron staining. N.F.E	Metal Wire, Flowerpot base	WW1
3805	Fill	1.25	0.10	Fill of trench [3803] – dark greyish brown clayey silt; occasional flint inclusions.	-	-

Trench 39

General description					Orientation	N/S
Trench shortened due to proximity of a hedge at the S. end. Subsoil evident in places but not consistently throughout the trench when the topsoil directly overlies the natural. A pit, [3904], was excavated toward the N. end of the trench showing evidence of in-situ burning. This cuts an earlier linear feature, [3907], running on a NW/SE alignment. A number of potential bloomery related pits, [3912] [3915] [3925] [3927] are spread throughout the S. half of the trench, two of which were excavated [3912] [3915]. These overlay and sealed a potential post-hole [3918]. Three natural tree bowl features evident within the trench, two of which, [3902] [3923], were investigated to confirm this interpretation.					Length (m)	63
					Width (m)	2.10 (up to 4)
					Avg. depth (m)	0.48
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
3900	Layer	-	0.32	Topsoil – dark greyish brown clayey silt; occasional flint inclusions	-	-
3901	Layer	-	0.05	Subsoil – mid orangish brown clayey silt; occasional chalk and charcoal flecking.	-	-
3902	Cut	1.72	0.30	Tree throw – irregularly shaped feature with steep uneven sides and a concave base.		-
3903	Fill	1.72	0.30	Fill of tree throw [3902] – mixed, light grey and dark yellow sandy silt; occasional flints.	Flint Burnt stone Metal	-
3904	Cut	1.42	0.53	Pit – ovate feature with moderately sloping sides and a concave base .		Later prehistoric?
3905	Fill of pit 3904	0.70	0.50	Primary fill of pit – dark greyish black sandy silt; frequent charcoal flecking.	-	-
3906	Fill of pit 3904	1	0.50	Fill of pit – dark greyish black sandy silt; frequent charcoal flecking.	Flint Pottery Slag S.13	Later prehistoric?
3907	Cut	0.70	0.32	Ditch – linear with moderately sloping sides and a concave base.		-
3908	Fill	0.70	0.32	Fill of ditch [3907] – mixed, light greyish brown to light blueish grey clayey silt.	-	-

3909	Fill of pit 3912	1.20	0.35	Top fill of pit – dark brownish grey clayey silt; frequent charcoal flecking, occasional flint inclusions (concentrated toward the base), occasional heat affected clay. Possible bloomery related deposit.	Flint	LIA
3910	Fill of pit 3912	1	0.14	Middle fill of pit – dark brownish grey with brownish orange mottling sandy silt; frequent charcoal flecking and fragments, moderate slag, frequent heat affected clay and occasional flint inclusions. Possible bloomery related deposit.	Flint Much Slag S.12	LIA
3911	Fill of pit 3912	1.20	0.16	Primary fill of pit – mid-light yellowish orange silty clay; moderate charcoal flecking, occasional flint and slag.	Slag	LIA
3912	Cut	1.20	0.45	Pit – ovate feature with steeply sloping sides and a flat base. Possible rake-out pit relating to bloomery activities?		LIA
3913	Fill of pit 3915	1.10	0.24	Top fill of pit – dark brownish grey clayey silt; frequent charcoal flecking, occasional small sub-angular stones and flint inclusions (concentrated toward the base). Possible bloomery related deposit.	Flint Slag	LIA?
3914	Fill of pit 3915	1.10	0.13	Primary fill of pit – mid-light yellowish orange silty clay; occasional charcoal flacking and occasional flint inclusions.	-	LIA?
3915	Cut	1.10	0.30	Pit – ovate feature with steeply sloping sides and a flat base. Possibly related to bloomery activities?		LIA?

3916	Fill of PH 3918	0.35	0.50	Top fill of post-hole – brownish grey clayey silt; frequent charcoal flecking.	-	-
3917	Fill of PH 3918	0.30	0.40	Primary fill of post-hole – mid-light yellowish orange silty clay; moderate charcoal flecking.	-	-
3918	Cut	0.65	0.50	Post-hole – small ovate feature with steeply sloping tapering sides angled toward the N. and a concave base.		-
3919	Fill	2.25	0.28	Fill of tree bowl [3923] – light brownish grey clayey silt; frequent charcoal flecking and occasional flint inclusions.	Pottery Flint	LIA/ERB
3920	Fill	2	0.40	Fill of tree bowl [3923] – light yellowish brown clayey silt; moderate charcoal flecking and occasional flint inclusions.	-	LIA/ERB
3921	Fill	0.42	0.12	Fill of tree bowl [3923] – mid brownish grey clayey silt; frequent charcoal flecking.	-	LIA/ERB
3922	Fill	1.40	0.17	Fill of tree bowl [3923] – mid-light yellowish orange silty clay; occasional charcoal flecking.	-	LIA/ERB
3923	Cut	2.50	0.70	Tree bowl – large and irregular feature with generally steeply sloping sides and an irregular base.		LIA/ERB
3924	Fill	0.60	-	Fill of [3925] – dark brownish grey clayey silt; frequent charcoal flecking.	-	-
3925	Cut	0.60	-	Possible pit – small semi-ovate feature. Not excavated.		-
3926	Fill	0.55	-	Fill of [3927] – dark brownish grey clayey silt; frequent charcoal flecking.	-	-

3927	Cut	0.55	-	Possible pit – small sub-rounded feature. Not excavated.		-
3928	Layer	-	-	Natural – yellowish orange with greyish mottling silty clay; occasional flint inclusions.	-	-

Trench 40						
General description					**Orientation**	NE/SW NNW/SSE
Large right-angled trench. Shortened due to proximity of a hedge at the S. end. Plough scars visible cutting into the natural running diagonally N/S across the trench. One small pit [4003] at the SE. end. Trench 40 extension – trench extended toward the W. to locate WW1 trench marked on plan, that could not be reached by trench 40 due to access issues cause by a field boundary. The WW1 trench was not located – possibly follows the field boundary. A post-hole [40X03] and small pit [40X05] were identified but not excavated.					**Length (m)**	50 + 39
					Width (m)	2
					Avg. depth (m)	0.40
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
4000	Layer	-	0.20	Topsoil – orangish brown sandy silt.	-	-
4001	Layer	-	0.15	Subsoil – brownish orange silty sand; frequent flint inclusions. Fills the plough scars running across the trench.	-	-
4002	Layer	-	-	Natural –	-	-
4003	Cut	0.95	0.15	Pit – circular pit with symmetrical gradually sloping sides and a concave base.		-
4004	Fill	0.95	0.15	Fill of pit [4003] – orangish brown sandy silt; moderate charcoal flecking and occasional angular pebbles/gravel.	-	-
40X00	Layer	-	0.25	Topsoil – orangish brown silty clay; occasional flint inclusions.	-	-
40X01	Layer	-	0.10	Subsoil – brownish orange clayey silt; frequent small-medium flint inclusions.	-	-
40X02	Layer	-	-	Natural – orange silt with occasional small light grey silt patches; small-medium course gravel lenses.	-	-

40X03	Cut	0.55	-	Post-hole – small sub-square feature. Not excavated.		-
40X04	Fill	0.55	-	Fill of post-hole [40X03] – dark orangish brown silty clay; occasional small flint inclusions.	-	-
40X05	Cut	0.60	-	Pit – small sub-rounded feature. Not excavated.		-
40X06	Fill	0.60	-	Fill of pit [40X05] – light orangish brown silty clay; occasional charcoal flecking and small flint inclusions.	-	-

Trench 41						
General description					**Orientation**	E/W N/S
N/S extension added to the trench at the W. end. Trench devoid of archaeology. Consists of topsoil overlying made ground (4101), which itself overlies a layer of buried subsoil (4103) and then natural.					**Length (m)**	49 + 27
					Width (m)	2
					Avg. depth (m)	1.85
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
4100	Layer	-	0.22	Topsoil – greyish brown sandy silt	-	-
4101	Layer	-	0.90	Made ground – mixed, mid-light greyish brown chalky clay; occasional concrete and flint inclusions.	-	-
4102	Layer	-	-	Natural – chalk with lenses of orangish brown sandy clay; occasional flint inclusions.	-	-
4103	Layer	-	0.30	Buried subsoil – dark greyish black silt		

Trench 42						
General description					**Orientation**	NE/SW
No subsoil evident, consists of topsoil overlying the natural geology of chalk. A small ditch, possible drainage gully, [4202] on a N/S alignment runs through the SW. end of the trench. An expansive area of made ground (4206) lies to the NE. end which is unproved to be either WW1 or modern. A feature [4204] is cut into this.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.30
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

4200	Layer	-	0.30	Topsoil – mid-dark greyish brown silt; frequent chalk flecking and fragments.	-	-
4201	Layer	-	-	Natural – chalk; occasional flint inclusions.	-	-
4202	Cut	0.81	0.25	Ditch – small linear with steep side and a concave base. Possible drainage gully.		-
4203	Fill	0.81	0.25	Fill of ditch [4202] – brown silty clay; moderate chalk fragments.	-	-
4204	Cut	15	0.50	Natural hollow filled in the C20th. Not bottomed.		C20th
4205	Fill	15	0.50	Fill of [4204] – loose brown clayey silt; frequent chalk fragments, occasional charcoal and concrete lumps.	Metal Wire Cloth Concrete Glazed & painted Mug sherd	C20th
4206	Layer	-	-	Fill of [4204] – Made ground – compacted layered deposits of light greyish brown clayey silt with a redeposited chalk capping; occasional charcoal flecking.	-	C20th
4207	Layer	-	0.20	Fill of [4204] – Made ground – dark redeposited soil	-	C20th
4208	Layer	-	0.10	Fill of [4204] – Made ground – redeposited chalk	-	C20th
4209	Layer	-	0.18	Fill of [4204] – Made ground – redeposited chalk	-	C20th
4210	Layer	-	>0.70	Fill of [4204] – Made ground – mixed chalk	Pottery Concrete Slag Stone	C20th
4211	Layer	-	0.08	Fill of [4204] – Made ground – redeposited chalk	-	C20th

Trench 44		
General description	**Orientation**	NE/SW
Evidence of ploughing disturbance within subsoil and natural. One feature [4405] was identified and excavated toward the centre of the trench, however was relatively shallow and diffuse, therefore is possibly just natural disturbance or a potential tree bowl. No further archaeology apparent.	**Length (m)**	70
	Width (m)	2
	Avg. depth (m)	0.65

Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
4400	Layer	-	0.30	Topsoil – dark reddish brown sandy silt; frequent chalk flecking.	-	-
4401	Layer	-	0.35	Subsoil – orangish brown silty clay; frequent chalk flecking.	-	-
4402	Layer	-	-	Natural – chalk; occasional large flint inclusions.	-	-
4403	Fill	0.55	0.08	Fill of [4405] – greyish brown with occasional orangish mottling clayey silt; occasional flint inclusions, small sub-angular stones, charcoal flecking and moderate chalk flecking.	Glazed red earthenware	C19/20th
4404	Fill	0.55	0.48	Fill of [4405] – light greyish brown clayey silt; frequent chalk fragments and flecking and occasional charcoal flecking.	-	C19/20th
4405	Cut	0.55	0.48	Irregular semi-ovate feature with a concave base. Edges are relatively diffuse as have been heavily disturbed by ploughing.		C19/20th

Trench 45						
General description					**Orientation**	E/W
Deep pit, possibly quarry pit, [4508] at the E. end of the trench from which quantities of worked flint including a Mesolithic axe were recovered. No further archaeology identified.					**Length (m)**	75
					Width (m)	2
					Avg. depth (m)	0.40
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
4500	Layer	-	0.20	Topsoil – dark reddish brown silty clay; frequent chalk flecking.	-	-
4501	Layer	-	0.20	Subsoil – light brownish yellow sandy silt; frequent chalk fragments and occasional large flint inclusions.	-	-
4502	Layer	-	-	Natural – chalk with light pinkish cream and brick earth lenses; moderate large flint inclusions.	-	-

4503	Fill	1.25	0.28	Fill (top) of [4508] – greyish brown slightly clayey silt; moderate chalk flecking and flint inclusions and occasional charcoal flecking.	Pottery Flint S.3	Later prehistoric?
4504	Fill	1.15	0.27	Fill of [4508] – light greyish brown slightly clayey silt with lenses of brownish orange silty clay; frequent chalk fragments and flecking, frequent flint inclusions and occasional charcoal flecking.	Flint	Later prehistoric?
4505	Fill	0.46	0.36	Fill (slump) of [4508] – brownish-orange, with greenish grey lenses, silty clay; moderate chalk fragments and flecking, occasional charcoal flecking.	-	Later prehistoric?
4506	Fill	1.16	0.40	Fill of [4508] – mid-light greyish brown clayey silt with occasional lenses of brownish orange silty clay; frequent chalk flecking and flint inclusions and occasional charcoal flecking. Not fully excavated.	Flint S.4	Later prehistoric?
4507	Fill	0.70	0.90	Fill of [4508] – mid-dark brownish orange, with reddish mottling, silty clay; moderate chalk fragments and flint inclusions and occasional charcoal flecking. N.F.E.	-	Later prehistoric?
4508	Cut	1.25	1	Pit – semi-ovate feature with very sharp, near vertical, sides. N.F.E.		Later prehistoric?

Trench 58						
General description					**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil overlying made ground. A sondage was dug to locate natural, however natural was not evident at 2m.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	2
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

5800	Layer	-	0.23	Topsoil – dark grey clayey silt; occasional chalk fragments	-	-
5801	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 60						
General description					**Orientation**	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6000	Layer	-	0.43	Topsoil – dark grey clayey silt; occasional chalk fragments.	-	-
6001	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 61						
General description					**Orientation**	E/W
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6100	Layer	-	0.55	Topsoil – dark grey clayey silt; occasional rubble.	-	-
6101	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 62						
General description					**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6200	Layer	-	0.40	Topsoil – dark grey clayey silt; occasional rubble.	-	-
6201	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 63		
General description	**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.	**Length (m)**	50
	Width (m)	2
	Avg. depth (m)	1

Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
6300	Layer	-	0.40	Topsoil – dark greyish brown silty clay; moderate chalk flecking and rounded flint.	-	-
6301	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 66						
General description					**Orientation**	E/W
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6600	Layer	-	0.40	Topsoil – dark greyish brown silty clay; moderate rounded and angular pebbles.	-	-
6601	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 67						
General description					**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6700	Layer	-	0.40	Topsoil – dark grey clayey; occasional rubble.	-	-
6701	Layer	-	-	Made ground – mix of flint, chalk and rubble	-	-

Trench 68						
General description					**Orientation**	E/W
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6800	Layer	-	0.38	Topsoil – dark grey clayey silt; occasional rubble.	-	-
6801	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 69

General description					Orientation	NE/SW
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					Length (m)	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
6900	Layer	-	0.19	Topsoil – dark grey clayey silt; occasional rubble.	-	-
6901	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 70						
General description					**Orientation**	E/W
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7000	Layer	-	0.33	Topsoil – mid brown grey silty clay	-	-
7001	Layer	-	-	Made ground – mix of clay, chalk, flint and rubble.	-	-

Trench 71						
General description					**Orientation**	N/S
Trench devoid of archaeology. Consists of topsoil overlying made ground. Trench was dug to 1m at which level natural was not evident.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7100	Layer	-	0.30	Topsoil - dark grey clayey silt; occasional rubble.	-	-
7101	Layer	-	-	Made ground – mix of clay, chalk and rubble.	-	-

Trench 72						
General description					**Orientation**	NE/SW
Two potential archaeological features evident, [7203] and [7207]. One of which [7203] was investigated. Discreet features in the trench that continued beyond the trench limit.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.48
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7200	Layer	-	0.24	Topsoil –	-	-
7201	Layer	-	0.20	Subsoil –	-	-
7202	Layer	-	-	Natural – variable, chalk and orangish brown brick earth.	-	-

7203	Cut	2.50	0.30	Pit – potentially linear feature with moderately sloping sides and a flat base.		-
7204	Fill	2.50	0.24	Fill of [7203] – dark orangish brown sandy silt; frequent chalk, small sub-rounded stone and flint inclusions.	Fired clay	-
7205	Fill		0.21	Fill of [7203] – mixed, off-white to mid brownish grey weathered chalk and silt.	-	-
7206	Cut	-	-	Pit/Ditch – N.F.E.		-
7207	Fill	-	-	Fill of [7206] – N.F.E.	-	-

Trench 73						
General description					**Orientation**	NNW/SSE
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural. Small modern water pipe toward the N. end.					**Length (m)**	50
					Width (m)	1.80
					Avg. depth (m)	0.50
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7300	Layer	-	0.22	Topsoil – greyish brown silt; frequent chalk fragments and flecking, and small flint inclusions.	-	-
7301	Layer	-	0.17	Subsoil – brownish orange silt; frequent chalk fragments and flecking, occasional flint inclusions.	-	-
7302	Layer	-	-	Natural – variable, primarily chalk with occasional flint inclusions and mid brownish orange silt/brick earth with frequent chalk flecking toward the N. end.	-	-

Trench 74						
General description					**Orientation**	E-W
Trench devoid of archaeology. Consists of topsoil overlying natural.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.24
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7400	Layer	-	0.24	Topsoil. Friable, mid greyish brown, silt with frequent small chalk and flint inclusions.	-	-

7401	Layer	-	-	Natural. Compact chalk with occasional flint nodules.	-	-

Trench 75						
General description					**Orientation**	E-W
Trench devoid of archaeology. Consists of topsoil overlying natural and a layer of modern made ground of unknown depth.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.15 (where present)
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7500	Layer	-	0.24	Topsoil. Friable, mid greyish brown, silt with frequent small chalk and flint inclusions.	-	-
7501	Layer	-	1.4	Modern made ground. Mid brownish orange silt with chalky lenses, frequent CBM, tarmac, concrete, charcoal flecking and large flint nodules. Not fully excavated.	-	-
7502				Natural. Compact chalk with occasional flint nodules.		

Trench 76						
General description					**Orientation**	NW-SE
Trench devoid of archaeology. Consists of topsoil overlying natural and a layer of modern made ground of unknown depth.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.15 (where present)
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7600	Layer	-	0.24	Topsoil. Friable, mid greyish brown, silt with frequent small chalk and flint inclusions.	-	-
7601	Layer	-	1.4	Modern made ground. Mid brownish orange silt with chalky lenses, frequent CBM, tarmac, concrete, charcoal flecking and large flint nodules. Not fully excavated.	-	-

7602	Layer	Layer		Natural. Mid orangish brown brickearth.	-	-

Trench 78						
General description					**Orientation**	E-W
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural. Modern disturbance at the north west end.					**Length (m)**	32
					Width (m)	1.8
					Avg. depth (m)	0.3
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
7800	Layer	-	0.2	Topsoil. Dark yellowish brown clayey silt with chalk and flint nodules throughout.	-	-
7801	Layer	-	1.4	Subsoil. Compact dark brownish red silty clay, occasional chalk and flint inclusions.	-	-
7802	Layer	-		Natural. Moderately compact chalk with flint nodules throughout.	-	-
7803	Cut	4.5	1.1	Not clear, U-shaped profile.	-	-
7804	Fill of 7803	4.5	0.4	Friable light orangish brown.	-	-
7805	Fill of 7803	4.5	0.3	Dark brownish red clay, redeposited subsoil.	-	-

Trench 82						
General description					**Orientation**	NW-SE
Trench contained a WW1 trench, a large linear feature with triangular shaped edges in plan cutting natural. The trench was stepped to allow a full profile to be recorded. The feature was sealed by subsoil and topsoil.					**Length (m)**	50
					Width (m)	1.8 Stepped out to 5m
					Avg. depth (m)	0.65
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8200	Layer	-	0.32	Topsoil	-	-
8201	Layer	-	0.2	Subsoil	-	-
8202	Layer	-	-	Natural. Mid orange brown silty sand brickearth.	-	-
8203	WW1 Cut	4.25	1.15	Same as 8205. Linear with angular sections. Steep sloping sides. Gently sloping base towards the west.	-	-
8204	Fill of 8203	4.25	1.15	Same as 8206. Soft, mixed mid greyish yellow silty	CBM Metal	C18-19th

				sand. Occasional sub rounded stone inclusions.		
8205	Cut	-	-	Cut = 8203.	-	-
8206	Fill of 8205	-	-	Same as 8204.	Pottery	C19/20th
8207	Layer	-	-	Natural. Chalk with orange brickearth flecks.	-	-

Trench 83						
General description					**Orientation**	NW-SE
Trench contained two linears and a rectangular cut feature that cut natural. The trench was sealed by subsoil and topsoil.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.74
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8300	Layer	-	0.32	Topsoil	-	-
8301	Layer	-	0.42	Subsoil	-	-
8302	Cut	1.7	0.26	Not fully excavated. Linear, steep near vertical sides.	-	-
8303	Fill of 8302	1.7	0.26	Not fully excavated. Soft, light grey, sandy silt. Small flint inclusions.	Glass Metal	Pmed
8304	Cut	3.5	0.21	Not fully excavated. Triangular in plan, steep, near vertical sides.	-	-
8305	Fill of 8304	3.5	0.21	Soft, light grey sandy silt. Small flint inclusions.	-	-
8306	Cut	1.6	-	Unexcavated. Linear. WW1 trench.	-	WW1
8307	Fill of 8306	1.6	-	Unexcavated. Light grey sandy silt, occasional small flint inclusions.	-	-
8308	Bank?	0.84	0.37	Soft, mid yellowish grey, sandy silt. Small flint pieces.	-	-
8309	Layer	-	-	Natural	-	-

Trench 84						
General description					**Orientation**	SE-NW
Trench contained one ditch that produced flint blades. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.4
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8400	Layer	-	0.18	Topsoil. Friable dark orangey brown sandy silt. Occasional chalk inclusions.	-	-
8401	Layer	-	0.16	Subsoil. Compact mid orangey brown sandy silt.	-	-

8402	Layer	-	-	Natural. Varied. Dark reddish orange to light bluish yellow sandy silt. Occasional rounded flint.	-	-
8403	Cut	0.35	0.08	Linear, running NW-SE. Shallow, irregular base with gradual sloping sides.	-	-
8404	Fill of 8403	0.35	0.08	Loose, mid orangey grey sandy silt, small charcoal fleck inclusions.	-	-

Trench 85						
General description					**Orientation**	NW-SE
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	1.8
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8500	Layer	-	0.23	Topsoil. Friable, mid greyish brown clayey silt. Occasional flint nodules, root disturbance.	-	-
8501	Layer	-	0.35	Subsoil. Soft, mid light orangish brown with grey mottling. Moderate flint nodules, chalk fleck inclusions. Frequent root disturbance.	-	-
8502	Layer	-	-	Natural. Soft, light brownish orange with light grey mottling, clayey silt.	-	-

Trench 86						
General description					**Orientation**	NW-SE
Trench contained two large hollows or shafts, initially thought to be ditches. These were machine excavated then the trench widened to determine extent and to retrieve a soil sample and dating evidence. No finds were retrieved by hand. The trench was positioned on a downwards slope towards the south east. The subsoil was thicker at the south east end. The hollows or shafts were sealed by subsoil and topsoil.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.7
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8600	Layer	-	0.25	Topsoil. Friable mid greyish brown clayey silt, occasional chalk flecking, moderate flint nodules and small stones.	-	-

8601	Layer	-	0.40	Subsoil. Soft, mid-light orangey brown, frequent chalk flecking, occasional flint nodules, more concentrated towards base of deposit. Occasional charcoal flecking.	-	-
8602	Layer	-	-	Natural. Soft, light brownish orange mottled with light yellow, chalky silt with flint nodules.	-	-
8603	Cut	6.6	1.3	Irregular, steep sides. Base unseen. Machine excavated.	-	-
8604	Cut	11.05	1.7	Irregular.		-
8605	Deposit	2.25	0.4	Firm, light yellowish white, silty chalk, redeposited chalk.	-	-
8606	Fill of 8603	6.5	1.3	Upper fill. Soft, mid greyish brown, clayey silt. Frequent, chalk flecks.	Slag	-
8607	Fill of 8603	2.5	-	Not fully excavated. Compact, mid orangey white, silty chalk, weathered chalk.	-	-
8608	Fill of 8603	1.25	0.4	Primary fill. Compact, light yellowish white, silty chalk, redeposited chalk. Occasional flint.	-	-
8609	Fill of 8604	11.05	1.25	Upper fill. Soft, mid greyish brown, clayey silt, frequent chalk flecking, occasional charcoal flecks.	-	-
8610	Fill of 8604	3	1	Primary fill. Firm, light yellowish white, silty chalk, weathered chalk. Occasional flint inclusions.	-	-
8611	Fill of 8604	2.7	0.35	Primary fill. Firm, light yellowish white, silty chalk, frequent large flint nodules.	-	-

Trench 87						
General description					**Orientation**	NW-SE
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural. Sondage dug at NW end to depth of 1.4m to expose natural.					**Length (m)**	50
					Width (m)	1.8, up to 5m
					Avg. depth (m)	0.77
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**

8700	Layer	-	0.34	Topsoil. Friable, dark brownish orange, silty clay, small chalk and flint inclusions.	-	-
8701	Layer	-	0.43-1.4	Subsoil, colluvium. Mid brownish orange silty clay, bioturbation, angular flints and rounded pebble inclusions.	-	-
8702	Layer	-	-	Natural. Light yellowish orange silty clay.	-	-

Trench 88						
General description					**Orientation**	WNW-ESE
Trench devoid of archaeology. Consists of topsoil and subsoil colluvium. Natural not reached.					**Length (m)**	50.5
					Width (m)	2
					Avg. depth (m)	0.69
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8800	Layer	-	0.27-0.47	Topsoil. Loose, dark reddish brown, sandy silt, occasional rounded pebbles.	-	-
8801	Layer	-	0.22-0.45	Subsoil. Soft, dark brownish orange, sandy silt. Occasional angular flint nodules.	-	-
8802	Layer	-	-	Natural. Not reached.	-	-

Trench 89						
General description					**Orientation**	
Trench contained one ditch, aligned northwest-southeast. Consists of topsoil and a subsoil colluvium overlying natural.					**Length (m)**	
					Width (m)	
					Avg. depth (m)	
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
8900	Layer	-	0.37	Topsoil. Friable dark brownish orange sandy silt. Occasional flint inclusions.	-	-
8901	Layer	-	0.08-0.52	Subsoil. Firm, light brownish orange, silty clay. Angular flint inclusions.	-	-
8902	Fill of 8903	1.05	0.71	Ditch fill. Friable, dark reddish brown, silty clay. Rounded and angular flint nodules. Not fully excavated.	Glass, Stoneware pottery	C19/20th

8903	Ditch cut	1.05	0.71	Linear, aligned northwest-southeast. Steep sloped sides. Base not reached.		C19/20th
8904	Layer	-	0.10	Dark blackish brown silty clay. Rubble dump of aggregate and tarmac. Overlies subsoil, sealed by topsoil.	-	-
8905	Layer	-	-	Natural. Orange clayey silt with flint nodule band.	-	-

Trench 90						
General description					**Orientation**	E-W
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.55
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9000	Layer	-	0.33	Topsoil. Friable mid greyish brown. Occasional flint nodules and moderate chalk fragments. Root disturbance.	-	-
9001	Layer	-	0.20	Subsoil. Soft, orangish brown clayey silt. Occasional flint nodules. Root disturbance.	-	-
9002	Layer	-	-	Natural. Soft light brownish orange, occasional creamy grey mottled chalkey silt with occasional flint nodules.	-	-

Trench 91						
General description					**Orientation**	E-W
Trench contained two tree-throws, one of which was excavated. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.62
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9100	Layer	-	0.16-0.30	Topsoil. Dark brownish grey sandy silt, stone inclusions.	-	-
9101	Layer	-	0.26-0.52	Dark yellowish brown, sandy silt, stone inclusions.	-	-
9102	Layer	-	-	Natural. Mid orange brown, sandy clay, chalky patches, flint inclusions.	-	-

9103	Cut	0.62	0.36	Tree throw. Irregular, sub oval. Concave base, sloping irregular sides.	-	-
9104	Fill of 9104	0.62	0.36	Friable, mixed mid yellowish brown and light bluish grey, mixed sandy silt. Occasional small flint inclusions.	-	-
9105	Cut	-	-	Not excavated. Irregular.	-	-
9106	Fill of 9105	-	-	Dark orangish brown sandy silt mixed fill with redeposited natural. Not excavated.	-	-

Trench 92						
General description					**Orientation**	E-W
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.29
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9200	Layer	-	0.11-021	Topsoil. Dark greyish brown sandy silt, stone inclusions.	-	-
9201	Layer	-	0.13	Subsoil. Dark greyish brown, sandy silt.	-	-
9202	Layer	-	-	Natural. Mid brownish orange sandy clay.	-	-

Trench 93						
General description					**Orientation**	NW-SE
Trench contained a furnace, 9302, and a rake out pit, 9303, at the northwest end. Further bloomer, slag rich deposits and potential pits were evident throughout the trench. Linear towards the centre of the trench, possibly relates to a WW1 defensive structure.					**Length (m)**	52
					Width (m)	1.8
					Avg. depth (m)	0.50
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9300	Layer	-	0.24	Topsoil. Friable, mid grey brown clayey silt. Frequent small chalk and moderate flint.	-	-
9301	Layer	-	0.16	Subsoil. Soft, mid orangish brown chalky silt with frequent chalk flecking and occasional flint.	-	-

9302	Cut	0.35	0.12	Cut of furnace. Oval. Steep sides, base not fully excavated.		LIA/ERB
9303	Cut	1.7	0.46	Cut of rake-out pit for 9302. Oval. Steep sides, flat base.		LIA/ERB
9304	Fill of 9302	0.25	0.12	Soft, pinkish cream to pale brown, chalky silt. Moderate charcoal flecking, occasional burnt clay inclusions.	-	LIA/ERB
9305	Layer	0.08	0.55	Heat-affected natural. Soft, pale pinkish yellow, silty clay.		
9306	Fill of 9303	1.7	0.08	Soft, greyish brown chalky silt. Moderate flint nodules, charcoal flecking, occasional burnt clay. Root disturbance. Not fully excavated.	Pottery Slag S.5	LIA/ERB
9307	Fill of 9303	0.62	0.18	Soft, dark purplish grey with orangish red lenses. Chalky silt. Frequent charcoal flecking, moderate meat affected clay, occasional slag, moderate flint nodules. Root disturbance.	-	LIA/ERB
9308	Fill of 9303	0.35	0.18	Soft, light, brownish yellow, silty clay. Charcoal fleck inclusions.	-	LIA/ERB
9309	Fill of 9303	0.55	0.10	Soft, mid yellowish brown, chalkey silt. Occasional small sub rounded stones, occasional charcoal flecking.	-	LIA/ERB
9310	Fill of 9303	0.55	0.10	Soft, light creamy yellow with purplish brown mottling. Chalkey silt. Moderate heat affected clay, occasional charcoal flecking.	-	LIA/ERB
9311	Fill of 9303	0.55	0.15	Firm, light pinkish yellow, silty clay. Occasional charcoal flecking, occasional heat affected clay inclusions.		LIA/ERB
9312	Fill of 9303	0.08	0.28	Firm, dark purplish brown with mid orangish red mottling, sandy silt.	Much slag	LIA/ERB

				Frequent slag, moderate charcoal flecking.		
9313	Fill of 9303	0.95	0.04	Soft, light brownish yellow with pale bluish grey mottling, silty clay. Occasional charcoal flecking.	-	LIA/ERB
9314	Fill	0.34	0.15	Firm, mottled reddish orange and dark purplish brown silty clay. Frequent burnt clay, moderate charcoal flecking, occasional flint nodules. Uncertain if fill of 9302 or 9303.	-	LIA/ERB?
9315	Fill of 9303	0.22	0.06	Soft, light pinkish cream, chalky silt.	-	LIA/ERB
9316	Fill of 9317	1.25	-	Not excavated. Compact, dark brownish grey, sandy silt, very frequent slag and charcoal.	-	
9317	Cut	1.25	-	Bloomery pit? Not excavated. Semi – oval.		LIA/ERB?
9318	Fill of 9319	2.85	-	Soft, light yellowish brown, sandy silt. Moderate charcoal flecking, occasional flint. Not excavated.	-	LIA/ERB?
9319	WWI cut	2.85	-	Linear, right angled corner, not excavated.		WW1
9320	Fill of 9321	2.35	-	Firm, dark brownish grey, sandy silt, very frequent slag, frequent charcoal flecking. Not excavated.	-	LIA/ERB?
9321	Cut	2.35	-	Bloomery pit? Linear, likely band of bloomer deposit.	-	LIA/ERB?
9322	Fill of 9323	3.75	-	Firm, dark, brownish grey, sandy silt, very frequent slag, frequent charcoal flecking. Not excavated.	Pottery	LIA/ERB?
9323	Cut	3.75	-	Bloomery pit? Angled cut across trench. Not excavated.		
9324	Layer	-	-	Natural. Soft, mid orangish yellow silty clay and firm, orangey silty sand with yellowish mottling.		
9325	Layer	-	-	Soft, orangey yellow silty clay with occasional slag,	-	-

				charcoal flecking. Possible hillwash.		

Trench 94						
General description					**Orientation**	NE-SW/NW-SE
L-shaped trench. Contained a bloomer furnace, 9416, rake out pit 9418 and associated bloomery deposits were visible half way down the SW-NE section of the trench. Further bloomery deposits were present in the NW-SE section of the trench. Modern features, one likely associated with the WW1 defenses, were present in the SW-NE section of the trench.					**Length (m)**	52m and 50m
					Width (m)	1.8
					Avg. depth (m)	0.4
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9400	Layer	-	0.24	Topsoil. Friable, mid greyish brown silt.	-	-
9401	Layer	-	0.18	Subsoil. Soft mid brownish yellow clayey silt. Flint inclusions.	-	-
9402	Layer	-	-	Natural. Soft light yellowish orange with pale yellowish grey mottling clayey silt.	-	-
9403	Layer			Firm, mixed mid brownish yellow, yellowish brown, black and pinkish orange, sandy clay. Flint inclusions.	Glass, Glazed earthenware Fired clay CBM Slag Iron	C19/20th
9404	Layer	4.9	0.18	Bloomery deposit? Soft. Yellowish orange mottled bluish grey, silty clay. Flint nodules. Occasional charcoal.	Slag	LIA/ERB?
9405	Layer	1.86	0.2	Bloomery deposit? Firm, Dark brownish grey, sandy silt, very frequent slag, burnt clay, frequent charcoal flecking.	Much slag, S.1	LIA/ERB
9406	Layer	1.18	0.17	Bloomery deposit? Mid orangish yellow, lenses of lighter greyish white and purplish grey, clayey silt. Burnt clay, frequent charcoal flecks, occasional flint.		LIA/ERB?
9407	Layer	0.71	0.2	Bloomery deposit? Soft, light yellowish brown with bluish grey mottling, clayey	Slag	LIA/ERB?

				silt. Occasional charcoal flecking, flint and slag.		
9408	Layer	0.98	0.17	Bloomery deposit? Soft, orange and bluish grey mottling, lenses of purplish grey, clayey silt. Charcoal flecking, occasional burnt clay.	-	LIA/ERB?
9409	Layer	0.76	0.26	Bloomery deposit? Soft, light yellowish brown with lenses of whitish grey, sandy silt. Frequent charcoal, burnt clay, occasional flint.	Pottery	LIA/ERB
9410	Layer	0.48	0.28	Bloomery deposit? Soft, mottled yellowish orange, pale bluish grey, silty clay, occasional charcoal flecks.	-	LIA/ERB?
9411	Layer	0.48	0.16	Bloomery deposit? Soft, light greyish brown with whiter lenses, sandy silt. Frequent charcoal flecking.	-	LIA/ERB?
9412	Layer	1.16	0.17	Bloomery deposit? Soft, yellowish orange with bluish grey mottling, silty clay. Occasional slag, charcoal flecking.	Slag	LIA/ERB?
9413	Layer	0.38	0.28	Bloomery deposit? Soft, yellowish orange with bluish grey mottling, silty clay, occasional charcoal.	-	LIA/ERB?
9414	Layer	1.56	0.12	? = 9402. Not fully excavated. Deposit underlies bloomery deposits. Soft, mid yellowish orange bluish grey mottling, silty clay.	-	LIA/ERB?
9415	Fill of 9416	0.70	-	Not excavated. Soft, reddish orange, slightly clayey silt, frequent burnt clay.	-	-
9416	Cut	0.7	-	Furnace? Not excavated. Semi-oval.		LIA/ERB?
9417	Fill of 9418	1.6	-	Soft, greyish brown with lenses of reddish orange, clayey silt. Frequent burnt clay, charcoal flecks, occasional slag. Not excavated.	Slag	LIA/ERB?

9418	Cut	1.6	-	Rake-out pit. Oval. Not excavated.		LIA/ERB?
9419	Layer	5.45	-	Bloomery deposit? Soft, brownish orange, clayey silt. Frequent charcoal flecking, occasional slag.	-	LIA/ERB?
9420	Fill of 9421	12.0	-	Soft, orangey brown, clayey silt, occasional charcoal flecking, moderate flint. Not excavated.	-	-
9421	Cut	12.0	-	Ditch or trench. Linear? Not excavated.		-
9422	Fill of 9423	1.0	-	Not excavated. Soft, mid greyish brown, clayey silt. Occasional charcoal.	-	-
9423	Cut	1.0	-	Pit? Oval.		-
9424	Fill of 9425	3.0	-	Soft, brownish orange, clayey silt. Charcoal flecking.	-	-
9425	Cut	3.0	-	Pit? Angular, straight edged, rounded corner.		-
9426	Layer	1.1	-	Bloomery deposit? Firm, very dark brownish grey, sandy silt, frequent slag, frequent charcoal. Not excavated.	-	LIA/ERB?
9427	Layer	1.25	-	Bloomery deposit? Firm, dark brownish grey, sandy silt. Frequent slag and charcoal.	-	LIA/ERB?

Trench 95						
General description					**Orientation**	NE-SW
Trench contained a large cut likely relating to the WW1 defenses. Contained large pieces of wood and metal within the backfill. The limits of the feature were not revealed. Consists of topsoil overlying natural.					**Length (m)**	50
					Width (m)	2-5m
					Avg. depth (m)	0.38
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9500	Layer	-	0.38	Topsoil. Grey clayey silt, moderate flint.	-	-
9501	Layer	-	-	Natural. Brown sandy silt.	-	-
9502	Fill of 9503.	1.6	0.42	Dark brown, clayey silt, flint inclusions. Machine excavated.	-	-
9503	Cut	10.67	1.18	Linear. Base not reached, steep sides.		-

9504	Fill of 9503	2.37	0.72	Firm, brown clayey silt. Flint inclusions. Machine excavated.	Iron Slag	-
9505	Fill of 9503	7.56	1.01	Firm, dark yellowsish brown. Flint inclusions. Machine excavated.	-	-
9506	Fill of 9503	6.78	0.81	Firm, dark grey, silty clay. Machine excavated.	-	-
9507	Fill of 9503	1.74	1.08	Firm, mid yellowish brown, clayey silt. Flint inclusions. Machine excavated.	-	-
9508	Fill of 9503	0.72	2.76	Firm, yellowish grey, clayey sand. Flint inclusions. Machine excavated.	-	-
9509	Fill of 9503	2.96	1.12	Firm, dark grey, silty clay. Flint inclusions.	-	-
9510	Fill of 9503	2.36	1.52	Firm, mid yellowish brown clayey silt. Flint inclusions.	-	-

Trench 96						
General description					**Orientation**	ENE-WSW
Trench contained a layer of demolition material that may relate to a gun emplacement for the WW1 defenses. Consists of topsoil and subsoil overlying natural.					**Length (m)**	52
					Width (m)	1.8
					Avg. depth (m)	0.33-1.03
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9600	Layer	-	0.25-0.38	Topsoil. Brownish grey sandy silt, flint inclusions.	-	-
9601	Layer	-	0.08-0.65	Subsoil. Greyish brown, Sandy silt, flint inclusions.	-	-
9602	Layer	-	-	Natural. Dark reddish brown, sandy clay, large flint inclusions.	-	-
9603	Cut	25.6	0.36	Irregular. Deposit partially visible in section.	Glass Iron	C19/20th
9604	Fill in 9603	25.6	0.36	Firm, yellowish grey, sandy silt. Occasional charcoal.	-	C19/20th
9605	Cut of ditch	-	-	Linear. Cuts 9604?		-
9606				Number not used.		
9607	Fill of 9605	-	-	Primary fill.	-	-
9608	Fill of 9605	-	-	Secondary fill.	-	-

Trench 97		
General description	**Orientation**	NW-SE
	Length (m)	50

Trench contained a large ditch running NE-SW which cut a geological deposit made up of fine sands and silts. The ditch cut subsoil. Consisted of topsoil and subsoil overlying natural.					**Width (m)**	1.8
					Avg. depth (m)	0.4
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9700	Layer	-	0.07	Topsoil. Dark greyish brown, sandy silt. Stone and flint inclusions.	-	-
9701	Layer	-	0.1	Subsoil. Dark greyish brown, sandy silt.	-	-
9702	Deposit	-	0.5	Geological. Bands of mottled grey, yellow and brown bands of sands and silts.	-	-
9703	Cut	1.73	0.87	Linear, runs NE-SW. U-shaped profile. Steep sides, gradual sloped slightly irregular base. Machine excavated.		Modern
9704	Fill of 9703	1.73	0.4	Upper fill. Soft, yellowish pink, silty sand. Occasional flint pebbles.	-	Modern
9705	Fill of 9703	1.73	0.2	Firm, light yellowish cream, sandy silt. Frequent large angular flint nodules.	-	Modern
9706	Fill of 9703	1.53	0.3	Base fill. Soft, light orangey brown, sandy clay.	-	Modern
9707	Layer	-	-	Natural. Mid orange sandy clay with areas of iron panning and chalk patches.	-	-

Trench 98						
General description					**Orientation**	NE-SW
Trench devoid of archaeology. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.4
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9800	Layer	-	0.18	Topsoil. Dark greyish brown, sandy silt, moderate flint inclusions.	-	-
9801	Layer	-	0.30	Subsoil. Dark greysih borwn sandy silt. Chalk, stone and flint inclusions.	-	-
9802	Layer	-	-	Natural. Chalk with dark brownish sandy silt brickearth patches.	-	-

Trench 99

General description					Orientation	NW-SE
Trench contained a rectangular feature with burnt edges at the NW end, 9906; a geological linear feature was investigated, 9912; and a NW-SE aligned linear was found at the SE end of the trench. Consists of topsoil and subsoil overlying natural.					Length (m)	56
					Width (m)	2
					Avg. depth (m)	0.53
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
9900	Layer	-	0.2	Topsoil. Loose, dark greyish brown, sandy silt, frequent flints.	-	-
9901	Layer	-	0.16	Subsoil. Friable, dark greyish brown, sandy silt, frequent chalk flecks.	-	-
9902	Layer		0.17	Colluvial deposit? Dark grey brown with orange silt patches, frequent large angular flint.	-	-
9903	Layer	-	-	Natural. Mid yellowish brown clayey silt, frequent angular flints.	-	-
9904	Cut	1.6	0.2	Linear, NE-SW aligned. Shallow concave base. Shallow sloped sides.		-
9905	Fill of 9904	1.6	0.2	Sole fill. Firm, dark greyish brown, clayey silt. Occasional flint.	-	-
9906	Cut of pit	1.4	0.5	Rectangular. Straight vertical sides, flat base. Right-angled corners.		-
9907	Fill of 9906	1.4	0.04	Friable, dark brownish red, silty sand, heat affected, follows the whole cut.	-	-
9908	Fill of 9906	1.4	0.03	Firm, black, charcoal deposit lines the whole cut, linked to 9907. Charcoal appears to be in situ.	-	-
9909	Fill of 9906	1.35	0.2	Soft, orangey yellow, silty sand, small gravel and charcoal flecks throughout.	-	-
9910	Fill of 9906	1.15	0.15	Soft, light bluish grey and black, ash and charcoal, flint nodules.	Slag scraps	-
9911	Fill of 9906	1.5	0.22	Firm, light orangey yellow, silty sand, charcoal flecks.	-	-
9912	Fill of 9906	1.4	0.07	Natural hollow, linear, pale greyish yellow silty clay, sterile fill.	-	-
9913	Fill of 9906	0.45	0.15	Firm, dark brownish red, silty sand, heat affected.	-	-

Trench 100						
General description					**Orientation**	NW-SE
Trench on slope of hill, very steep at south end. Contained three pits. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	2
					Avg. depth (m)	0.65
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
10000	Layer	-	0.33-0.66	Topsoil. Brownish yellow, silty clay, chalk inclusions.	-	-
10001	Layer	-	0.07-0.27	Subsoil. Orange brown, silty clay, flint inclusions.	-	-
10002	Cut	1.5	0.12	Circular, flat base, shallow sloped sides.	-	-
10003	Fill of 10002	1.5	0.12	Sole fill. Soft, dark reddish brown and light yellow orange, sandy silt. Charcoal, chalk flecks, gravel inclusions.	-	-
10004	Cut	0.5	0.19	Circular, concave base, gradually sloping sides.		-
10005	Fill of 10004	0.5	0.19	Soft, light yellowish orange, silty sand. Flecks of charcoal, one large flint nodule, possibly part of natural.	-	-
10006	Cut	0.4	0.2	Irregular. Steep sloping sides, irregular base. Possible post hole.	-	-
10007	Fill of 10006	0.4	0.2	Soft, light yellowish orange, silty sand, charcoal flecks.	-	-
10008	Layer	-	-	Natural. Brownish yellow, sandy silt in northwest end, chalk with brickearth patches in southeast end.		-

Trench 101						
General description					**Orientation**	E-W
Trench contains a series of intercutting pits containing burnt material. A void was also present in this trench but did not appear to relate to an archaeological feature. Consists of topsoil and subsoil overlying natural.					**Length (m)**	50
					Width (m)	1.8
					Avg. depth (m)	0.45
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
10100	Layer	-	0.19	Topsoil. Dark brownish grey, sandy silt, flint and stone inclusions.	-	-

10101	Layer	-	0.23	Subsoil. Dark brownish grey, sandy silt, flint and stone inclusions.	Iron	-
10102	Layer	-	-	Natural. Light orangey yellow chalk and orangey brown sandy clay brickearth.	-	-
10103	Fill of 10105	1.06	0.24	Upper fill. Firm, light orangey yellow with black and mid reddish orange sandy silt, burnt clay, frequent charcoal, burnt stone.	Pottery Fired clay Slag S.6	Later prehistoric
10104	Fill of 10105	1.14	0.2	Firm, light orangey yellow, sandy clay, occasional flint.	-	Later prehistoric
10105	Pit cut	1.14	0.48	Sub-rounded, flat base, moderately sloping sides.		Later prehistoric
10106	Fill of 10107	1.23	0.25	Firm, yellowish brown, sandy clay, occasional flint inclusions and burnt clay not recoverable.	-	-
10107	Pit cut	1.23	0.25	Rounded, flat base, moderately sloped sides.		-
10108	Fill of 10110	0.83	1.68	Upper fill. Firm, mid yellowish brown, sandy clay, occasional charcoal and flint.	Pottery Fired clay	Later prehistoric
10109	Fill of 10110	0.83	0.17	Firm, mid yellow brown, sandy clay, occasional flint and stone inclusions.	-	Later prehistoric
10110	Pit cut	0.83	0.36	Rounded, Flat base, moderately sloping sides.		Later prehistoric

Trench 102						
General description					**Orientation**	NE-SW/ NW-SE
Trench contained a circular pit at the corner of the two sections of trench. Pit contained burnt material and redeposited chalk and the natural surrounding it was heat affected. The pit was not fully excavated despite widening the trench around it to allow a greater depth to be safely hand excavated.					**Length (m)**	
					Width (m)	1.8
					Avg. depth (m)	0.65
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
10200	Layer	-	0.35	Topsoil. Dark grey clayey silt. Chalk and flint inclusions.	-	-
10201	Layer	-	0.25	Subsoil. Mid brown sandy silt, chalk and flint inclusions.	-	-

10202	Layer	-	-	Natural. Degraded chalk, flint and yellowish brown silty sand.	-	-
10203	Pit cut	1.75	1.2	Circular, steep near vertical sides, base unexcavated.		-
10204	Fill of 10203	1.36	0.42	Upper fill. Firm, Dark greyish brown, sandy silt, frequent chalk fragments and flecking, frequent charcoal flecks, moderate flint and occasional burnt clay.	-	-
10205	Fill of 10203	0.24	0.16	Firm, dark greyish brown, sandy silt, frequent charcoal, chalk and flint.	-	-
10206	Fill of 10203	1.05	0.9	Loose, compacted towards base of fill, light creamish white, crushed or degraded chalk, occasional charcoal flecking, burnt cay and flint nodules.	-	-
10207	Fill of 10203			Same as 10206	-	-
10208	Layer	0.16	0.8	Heat-affected natural at edges of pit 10203, reddish orange, silty sand.	S.7	-
10209	Fill of 10203	0.35	0.15	Not fully excavated. Loose, dark greyish black, sandy silt, very frequent charcoal.	Fired clay S.8	-
10210	Layer	-	0.1	Redeposited natural cut by pit 10203. Soft, brownish yellow, silty sand, occasional flint.	S.9	-
10211	Layer	-	0.08	Buried soil? Cut by pit 10203. Soft, dark greyish brown, silty clay, occasional flint nodules and bioturbation.	S.10	-
10212	Layer			Natural. Sampled as a control below the potential buried soil. Soft, mid brownish yellow and bluish grey mottling, silty sand, occasional flint nodules.	S.11	

Trench TP03		
General description	**Orientation**	NW-SE
Geotechnical test pit. Stopped excavating at 4.5m deep. No archaeology found. Natural chalk (0302) not reached, although 8.7m down in borehole.	**Length (m)**	2.4
	Width (m)	0.8
	Avg. depth (m)	-

Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
0300	Layer	-	0.23	Topsoil. Loose/friable mid yellow brown sandy silt. Flecks of chalk.	-	-
0301	Layer	-	0.33	Modern disturbance in plough soil base. Pieces of dark material possibly aggregate	-	-
0303	Layer	-	2	Subsoil. Moderate compaction silty clay with fine sands. Light yellow orange.	-	-
0304	Layer	-	>2.6	Natural sand build up. Soft compaction, loose yellow/cream sand, very clean.	-	-
3002	Layer	-	-	Natural. Not reached, although 8.7m down in borehole.	-	-

Trench TP04						
General description					Orientation	
Geotechnical test pit. No archaeology present.					Length (m)	
					Width (m)	
					Avg. depth (m)	3.5
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
0400	Layer	-	0.4	Topsoil. Friable/loose dark yellow brown clay/sand.	-	-
0401	Layer	-	2.7	Subsoil. Moderately compact silty clay mid brown orange with angular grey flint nodules. Small chalk pieces towards base of layer. More clay than silt deeper in the layer with larger flint nodules .	-	-
0403	Deposit	-	0.8	Geological? Dark brownish red clay with rounded pebbles. Soft compaction. Chalk flecks and large flint nodules.	-	-
0402	Layer	-	-	Natural. Chalk.	-	-

Trench TP05		
General description	Orientation	
Geotechnical test pit. No archaeology present.	Length (m)	5
	Width (m)	5

					Avg. depth (m)	0.55
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
	Layer	-	0.35	Topsoil. Dark grey clayey silt, occasional chalk and flint pieces.	-	-
	Layer	-	0.25	Subsoil. Mid brown sandy silt, chalk and flint pieces.	-	-
	Layer	-	-	Natural. Mix of degraded chalk, flint and yellowish brown silty sand.	-	-

Trench TP06						
General description					**Orientation**	
Geotechnical test pit. No archaeology present. Natural not reached.					**Length (m)**	5
					Width (m)	5
					Avg. depth (m)	
Context No.	**Type**	**Width (m)**	**Depth (m)**	**Description**	**Finds**	**Date**
	Layer	-	0.23	Topsoil. Dark greyish brown sandy clay.	-	-
	Layer	-	1.97	Made ground.	-	-

APPENDIX B FINDS REPORTS

B.1 Prehistoric and Roman pottery

By Paul Booth

Introduction

B.1.1 The evaluation produced a scrappy collection of 19 sherds (95g) of later prehistoric and late Iron Age-early Roman date, from hand-excavated contexts and from three samples taken for recovery of environmental remains (a further 8 sherds (158g) of post-medieval pottery are discussed separately). The pottery was recorded using the codes set out in the Oxford Archaeology recording system for later prehistoric and Roman pottery (Booth 2017) and in line with recently-published standards (PCRG et al. 2016). Quantification was by sherd count, weight and rim equivalents. The pottery was typically highly fragmented and its surface condition was variable – a burnished surface survived on one sherd. The pottery is summarised by context and period in the table below.

Fabric and forms

Later prehistoric

B.1.2 Nine handmade sherds were of later prehistoric character. The fabrics of these sherds were recorded usually in terms of their two principal inclusion types (where present) and an indicator of their coarseness in a scale from 1 (very fine) to 5 (very coarse). The inclusions types present are: A quartz sand; F flint; G grog; N none visible; S shell; V vegetable/organic; Z uncertain voids.

B.1.3 The prehistoric material was quite diverse in terms of the detailed combination of inclusion types, but the majority of sherds were primarily flint-tempered. The voids in fabric ZA4 (context 3906) are more likely to indicate burnt-out organic inclusions than shell; the latter was definitely present in the small fragment in context 4503.

B.1.4 Diagnostic characteristics other than fabric were completely lacking in this material, so close dating is not possible. While it is considered likely that these sherds were of Iron Age date, tempering traditions such as flint have a long currency and an earlier (e.g. late Bronze Age) date for some of the sherds cannot be ruled out completely.

B.1.5 The single (fragmented) sherd of fabric FZ4 from context 10103, weighing an estimated 15g, was notable for having apparently been encased in a fine-textured fired clay. This may have been part of the wall of a feature such as an oven which had incorporated the sherd in its construction. The sherd did not appear to show any effects of refiring.

Late Iron Age - Roman

B.1.6 The sherds assigned to this period were all in grog-tempered or flint-tempered fabrics, assigned to ware groups E80 and E60 respectively in the OA recording system. Quartz sand and organic inclusions were characteristic secondary component of fabrics in both main groups. The E80 fabrics are broadly grog-tempered 'Belgic type' fabrics (cf. e.g. Thompson 1982, 4; equating to code SOB GT in the National Roman fabric reference collection (Tomber

and Dore 1998)), and are likely to date to the late Iron Age–early Roman period. Grog-tempered fabric traditions in Kent extend well beyond this period (e.g. Pollard 1988, 98), but the present examples are thought to belong to this early phase. The fewer flint-tempered E60 sherds are likely to have been contemporary. These included the only rim sherd from the entire assemblage, in flint and organic-tempered fabric E60 from context 9409, but the form from which this slightly atypical piece derived was quite uncertain. None of this material is likely to date after the later 1st century AD.

Table B.1.1: Prehistoric and Roman pottery by context and date

Context	Prehistoric Nosh/wt	LIA/Roman Nosh/wt	Context ceramic date	Fabrics and comment
3906	2/4		later prehistoric?	ZA4, from sample 13
3919		1/15	LIA/ERB	E80, ?jar with shoulder cordon
4503	1/1		later prehistoric?	SN4
9306		7/30	LIA/ERB	E80, E60, mostly from sample 5
9322		1/8	LIA/ERB?	E60?
9409		1/11	LIA/ERB	E60?, thickened rounded rim of uncertain form
10103	4/23		Later prehistoric	FA4, FV4 (from sample 6), FN3, FZ4
10108	2/3		Later prehistoric	FV4
TOTAL	*9/31*	*10/64*		

B.2 Post-medieval pottery

By John Cotter

B.2.1 Post-medieval pottery was discovered in eight contexts. It is quite likely that this is all of 19th century or later date.

Table B.2.1: Post-medieval pottery by context

Context	Nosh/wt
2308	1/93
3804	1/8
4205	1/4
4210	1/4
4403	1/17
8206	1/12
8902	1/15
9403	1/5
TOTAL	*8/158*

B.3 Ceramic building material

By Cynthia Poole

B.3.1 A small quantity of ceramic building material (CBM) amounting to seven fragments (67g) and a single concrete slab (1919g) was recovered from five contexts within four trenches. The assemblage has been fully recorded on an Excel spreadsheet in accordance with guidelines set out by the Archaeological Ceramic Building Materials Group (ACBMG 2007) and fabrics were characterised with the aid of x10 hand lens.

B.3.2 The CBM consists of small scraps of post-medieval rooftile, probably of 18th-19th century date and a couple of small worn amorphous scraps, probably brick. All is made in an orange-red fine sandy clay sometimes containing small iron oxide grits 1-4mm, which is likely to derive from local brickearth deposits. The roof tile was flat, probably peg tile, 12-15mm thick and hand made. One of the rooftile fragments was found in a WWI feature (ctx 8204) and the scraps of brick in a linear feature of agricultural origin (ctx 2308). In addition, a block of concrete slab 51mm thick, possibly a paving slab, of later 20th century date was found in the fill of a modern feature (ctx 4210). It had a distinctive fabric containing a high density of dark grey tabular stone inclusions 4-6mm in size.

B.3.3 The building material is likely to result from casual loss related to agricultural activity or deliberate dumping of rubbish.

B.3.4 The assemblage has no further potential for analysis and may be discarded prior to archiving.

Table B.3.1: Summary of building material by context

Context	Spot date	Nos	Wt (g)	Form	Material	Fab	Thickness	Comments
2301	Pmed	2	13	Roof	CBM	B	15mm	
2308	Pmed	2	6	Brick?	CBM	B	0	Amorphous scraps
4210	C20	1	1919	Paving slab	CBM	Concrete	51mm	Textured surface of small convex circles
8204	Pmed	1	33	Roof	CBM	B	12mm	
9403	Pmed	2	15	Roof	CBM	B	14mm	

B.4 Fired clay

By Cynthia Poole

B.4.1 A small quantity of fired clay amounting to 30 fragments (134g) were recovered from five contexts in four trenches. The assemblage has been fully recorded on an Excel spreadsheet and in summarised in the table below. Fragments ranged in size from 5 to 45mm and most were moderately to heavily abraded. Fired clay cannot normally be dated apart from a small number of distinctive diagnostic forms, none of which have been identified in this assemblage. All the fired clay was made in the same reddish brown soft fine sandy-silty clay fabric (fabric A).

B.4.2 Most pieces are amorphous, but three contexts produced featured fragments. Single wattle impressions were present on two fragments from contexts 10108 and 10209. These are possibly fragments of oven superstructure. A piece from context 10108 had a curved convex moulded surface. This was found in pit 10110 with fragments of later prehistoric pottery, which would suggest the fired clay fragment could be part of a cylindrical perforated block. One of the fragments with a wattle impression (ctx 10103) was also associated with later prehistoric pottery.

B.4.3 The material is not heavily fired and is likely to derive from oven or hearth structures or their accessories used in the course of domestic activity. The consistency in character and

fabric may suggest the fired clay is all broadly of one period possibly that of the associated pottery within two of the contexts.

Table B.4.1: Summary of fired clay record by context

Context	Sample No	Nos	Wt (g)	Spot date	Fabric	Form	Comments
7204	~	3	2	Neo-Med	A	Indet	Amorphous
9403	~	9	9	Neo-Med	A	Indet	Amorphous
10103	~	13	70	Neo-Med	A	Indet/Ov Str?	Amorphous, except one piece with wattle impression 11mm dia.
10108	~	1	18	Neo-Med	A	Ov/H furn?	Curved convex moulded surface. Possibly fragment of oven/hearth furniture.
10209	<8>	4	35	Neo-Med	A	Ov str?	Rough surface with wattle impression c 16mm dia. Possibly oven superstructure

B.5 Flint

By Mike Donnelly

Introduction

B.5.1 The M2 junction 5 evaluation brought to light a fairly large assemblage of 1045 flints and 3682 mostly very tiny pieces of burnt unworked flint weighing 4638g. The vast majority of the assemblage came from a limited number of contexts, including a possible deep shaft, some pits and layers associated with Iron Age bloomeries. A significant portion of the flint was burnt and the material very often displayed great variety in surface condition, suggesting that the flints were residual. The assemblage includes several early forms as well as Mesolithic microburins and a tranchet adze and adze sharpening flake. Many other pieces also probably belong to this period. There were also a limited number of tools that would probably date to the Neolithic or early Bronze Age. This included some of the scrapers as well a flake from a ground or polished implement.

Table B.5.1: Summary of the flint assemblage

CATEGORY TYPE	
Flake	73
Blade	16
Bladelet	14
Blade index	29.13% (30/103)
Irregular waste	16
Microburin	2
Adze sharpening flake	1
Sieved chip 10-4mm	48
Sieved chip 4-0.5mm	861
Core rejuvenation flake	1
Core multi-platform flakes	1
Scraper end	3
Scraper side	1
Scraper end+side	2
Adze	1
Awl	1
Burin	1

Ground/polished implement flake	1
Retouch other	2
Total	1045

Burnt un-worked	3682 / 4638g
No. burnt (%)	401/1045 (38.37%)
No. broken (%) (not including waste)	46/136 (33.82%)
No. retouched (%) (not including waste)	12/136 (8.82%)

Methodology

B.5.2 The artefacts were catalogued according to OA South's standard system of broad artefact/debitage type (Anderson-Whymark 2013; Bradley 1999), general condition noted and dating was attempted where possible. The assemblage was catalogued directly onto an Open Office spreadsheet. During the assessment additional information on condition (rolled, abraded, fresh and degree of cortication), and state of the artefact (burnt, broken, or visibly utilised) was also recorded. Retouched pieces were classified according to standard morphological descriptions (e.g. Bamford 1985, 72-77; Healy 1988, 48-9; Bradley 1999). Technological attribute analysis was initially undertaken and included the recording of butt and termination type (Inizan *et al.* 1999), flake type (Harding 1990), hammer mode (Onhuma and Bergman 1982), and the presence of platform edge abrasion.

Provenance

B.5.3 The bulk of the assemblage was recovered from pits (510/1045, 48.80%), but a very large percentage of this (350/1045, 33.49%) originated from an unbottomed shaft. Very few pieces came from later period ditches (2/1045, 0.19%); one possible ditch that yielded 195 (18.66%) pieces was more likely to be an infilled hollow or perhaps a shaft. The second most common feature type containing flints was layers or fills associated with bloomery activity (317/1045, 30.33%). Other features that generated flintwork included a WW1 trench and two tree-throw holes in Trench 39; the latter may have contained contemporary material.

Table B.5.2: The flint assemblage by context type

CATEGORY TYPE	Total	Percentage
Pit/shaft	510	48.80
Bloomery layers	317	30.33
Natural hollow	195	18.66
Tree-throws	9	0.86
Natural layers	6	0.57
Miscellaneous features	4	0.38
Ditches	2	0.19
Unstratified	2	0.19
Total	1045	[100]

Raw material and condition

B.5.4 The assemblage consisted of flint from various sources including chalk and glacial/riverine gravels. The majority of the flint had the very thin abrasive cortex typical of north downs flint (27/71) or displayed either moderate to thick chalk cortex (14/71), often weathered (12/71). There was also three pieces present that displayed the typical Bullhead Beds cortex (Dewey and Bromehead 1915). The remaining pieces with cortex displayed a wide range of conditions including thermal (9), polished (1), rolled (2) and indeterminate (3).

B.5.5 The assemblage was split evenly between fresh and lightly damaged pieces with around a fifth displaying either moderate or heavy edge damage. The very low figures for heavy damage (3/113, 2.65%) and lack of rolled or plough-damaged pieces suggest that much of the assemblage is *in situ* or little disturbed. Most pieces are only lightly corticated, with very few uncorticated pieces and around seven percent each displaying moderate, heavy or very heavy cortication.

B.5.6 Some of the larger assemblages paint a slightly different picture. The material from shaft 4503 reflected the proportions of the overall assemblage, but there was significant variety between the different fills in the shaft, although the assemblage size per layer is small. This variation may indicate that some fills contained contemporary material (e.g. 4506), others (e.g. 4504) largely redeposited flints. In hollow 8606, in contrast, the bulk of the assemblage was of fine chips but the six larger pieces were all fresh with light cortication, perhaps suggesting *in situ* knapping or material that had not moved far.

Table B.5.3: Flint by condition and cortication

Total assemblage	Total	%	Cortication	Total	%
Fresh	42	37.17%	None	4	3.54%
Light	47	41.59%	Light	85	75.22%
Moderate	21	18.58%	Moderate	9	7.96%
Heavy	3	2.65%	Heavy	7	6.19%
Rolled			Very heavy	8	7.08%
	113			113	
Pit 3602	Total	%	Cortication	Total	%
Fresh	5	35.71%	None	2	14.29%
Light	6	42.86%	Light	10	71.43%
Moderate	3	21.43%	Moderate	1	7.14%
Heavy			Heavy	1	7.14%
Rolled			Very heavy		
	14			14	
Shaft 4503	Total	%	Cortication	Total	**%**
Fresh	15	36.59%	None		
Light	17	41.46%	Light	29	69.05%
Moderate	8	19.51%	Moderate	5	11.90%
Heavy	1	2.44%	Heavy	3	7.14%
Rolled			Very heavy	5	11.90%
	41			42	
Hollow 8606	Total	%	Cortication	Total	%
Fresh	6	100.00%	None		
Light			Light	6	100.00%
Moderate			Moderate		
Heavy			Heavy		
Rolled			Very heavy		
	6			6	

The assemblage

B.5.7 The assemblage was relatively large for an evaluation, and 1015 of the 1045 flints originated from a limited number of features. The concentrations are important, as they indicate good preservation of flint-bearing contexts, rather than a highly diffuse spread of reworked material. However, it is also very clear that most of the flints are out of their original context but have probably not moved far.

B.5.8 The relatively limited dispersed background scatter of just 30 flints supports the view that much of the flintwork identified here is early prehistoric in character. This group included two small assemblages of material found in tree-throw holes in Trench 39 that were associated with numerous other flint-rich features and also included a blade from the subsoil. These smaller assemblages will be discussed below but they were very likely to be early in character.

B.5.9 The residual material included an adze sharpening flake and a fine burin from Trench 83, formed on an oblique truncation that also displays so-called Magdalenian retouch along its lateral margins. If this is genuine, rather than the result of post-depositional edge damage, then this piece is late Upper Palaeolithic in date. Even without Magdalenian retouch, the burin's size and form in themselves indicate a late Upper Palaeolithic or early Mesolithic date. As well as an adze from Trench 45, there was an adze-sharpening flake from Trench 99. These two finds were very far apart and are almost certainly not directly related, but they reinforce the importance of these tools to the early settlers of Kent.

Table B.5.4: Flint assemblage by main concentration

CATEGORY TYPE	Pit 3602	Pit 3905	Bloomery pit 3912	Shaft 4508	Hollow 8606	Bloomery pit 9303	Pit 10105	remainder
Flake	12	10	4	20	5	6	2	14
Blade	1	1		6				8
Bladelet		1	2	5	1	1	2	2
Blade index	7.69% (1/13)	16.67% (2/12)	33.33% (2/6)	35.48% (11/31)	16.67% (1/6)	14.29% (1/7)	50.0% (2/4)	35.0% (10/24)
Irregular waste	2	1	1	10		1		1
Adze sharpening flake								1
Microburin						1	1	
Sieved chip 10-4mm	5	5	10	3		4	21	
Sieved chip 4-2mm	26	53	228	300	189	53	12	
Core rejuvenation flake				1				
Core multi-platform flakes				1				
Adze				1				
Awl				1				
Burin								1
Ground implement flake						1		
Scraper end	1			1				1
Scraper side								1
Scraper end+side			1					1
Retouch other				1			1	
Total	47	71	246	350	195	67	39	25

No. burnt (%)	10/47 (21.28%)	14/71 (19.72%)	231/246 (93.90%)	118/350 (33.71%)	0/195 (0%)	17/67 (25.37%)	13/39 (33.33%)	4/25 (16.0%)
No. broken (%) (not including chips)	3/16 (18.75%)	5/13 (38.46%)	3/8 (37. 50%)	13/47 (27.66%)	3/6 (50.0%)	3/10 (30.0%)	3/6 (50.0%)	7/25 (28.0%)
No. retouched (%) (not including chips)	1/16 (6.25%)	0/13 (0%)	1/8 (12.50%)	4/47 (8.51%)	0/6 (0%)	1/10 (10.0%)	1/6 (16.67%)	3/25 (12.0%)

Key Contexts

B.5.10 Pit 3602 contained 47 flints, 31 of which were fine knapping debris. The pit contained one highly expedient end scraper on a preparation flake as well as 12 flakes and a single blade segment. The flake debitage was not typical of later prehistoric industries and the presence of a faceted platform on one flake is suggestive of later Neolithic or early Bronze Age material. The pit also contained an exceedingly large number (1235) of burnt unworked flint fragments weighing just 560g, and while some of the larger pieces were clearly unworked, the majority of the smaller fragments cannot be unequivocally identified as unworked material. The flints were quite heavily broken but were not particularly edge damaged and may be contemporary with the pit they were found in, or may not have not moved far from their primary depositional context.

B.5.11 Trench 39 contained several flint-rich features, and it is possible that all of the flintwork described below was derived from the same event, with numerous later features re-incorporating this material into their fills. Pit 3905 contained a flake-based assemblage of 10 flakes compared to two blade forms as well as numerous knapping chips. It lacked cores or tool forms that could indicate a date for the assemblage. Several of the flakes were thin regular examples that were often struck with a soft hammer and the flake assemblage could be seen as being early in date.

B.5.12 Bloomery pit 3912 contained a very large assemblage of 246 pieces, 238 of which were represented by very small knapping chips, many of which were burnt. This high level of burning was also present in 75% of the larger pieces and while it is possible that some of the numerous smaller chips originated from unworked flint used as construction material or as part of the industrial process, it is perhaps more likely that they relate to earlier flintwork that has been subsequently burnt and fragmented by that process. The pit also contained one large natural burnt fragment weighing 168g as well as numerous (1563) fragments weighing only 225g. The struck assemblage was made up of four flakes and two bladelets as well as a regular side and end scraper on a very squat hard-hammer flake. Such a flake would usually be seen as being mid-late Bronze Age in date, but here the flake also displays a faceted platform, something very rarely seen in later prehistoric assemblages, and a late Neolithic-early Bronze Age date is more likely.

B.5.13 Tree-throw holes 3902 and 3923 in trench 39 contained small assemblages comprising five and four pieces respectively. These features were not sampled for microdebitage. These small hand-recovered assemblages contained material with relatively little edge-damage, and although largely early in character, there is some hint that they may be mixed in date. Tree-throw 3902 contained three blades, a flake and an end of blade scraper. While the blades are clearly early, the flake was a squat hard-hammer struck example more typical of later prehistoric industries, but may simply be an outlier in an early assemblage. The scraper is most likely to be either early Mesolithic or early Neolithic in date, as long end-of-blade scrapers are rarely found in late Mesolithic assemblages.

B.5.14 Shaft 4508 contained a considerable assemblage of 350 pieces spread over three separate fills. This feature was not bottomed and was also only partially sampled, so the assemblage is likely to have been far larger than that recovered. The three fills, 4503, 4504 and 4506, yielded 239, eight and 103 flints respectively. However, hand recovery accounted for just eight, eight and three flints respectively from these fills, with 231 pieces in a sample

from 4503 and 100 pieces in a sample from 4506, making context 4504 and its smaller assemblage as dense as 4503 based solely on hand recovery. Shaft 4508 also contained 158 very small fragments of burnt unworked flint weighing just 8g. These tiny fragments most likely derive from the degradation of a larger burnt natural fragment. The flints recovered from this feature included the only core and core rejuvenation flake from the entire assemblage and also contained several tools. The tools included a very fine and large (147mm by 46mm by 41mm) tranchet adze of Mesolithic date, an awl on a preparation flake, a broken combination tool (likely to be a distal/proximal piercer/scraper) and an end scraper on a massive flake (101mm by 76mm by 31mm) that weighed 188g. This last tool had differential patina running along its retouched face that could be interpreted as re-use but there is no evidence of actual reworking in the retouched edge and the variation in patina was probably due to inclusions reacting differently to the burial environment.

B.5.15 While the tools from 4508 are largely undiagnostic, the very large end scraper and dual tool are unlikely to be Mesolithic in date. This would lead to the conclusion that the flintwork is from at least two periods and that at least some of the flints are residual. There does remain the possibility that some of the flintwork is contemporary with the shaft, given the high blade index for this feature and the lack of typically later prehistoric debitage, a Neolithic date for the second part of the assemblage would seem most likely.

B.5.16 Hollow 8603 in trench 86 also contained a large assemblage (195) made up mostly of fine knapping debris (189). While all of these fine and very small chips may not be human in origin, some are very obviously microflakes from knapping activities. The six significant pieces consisted of five flakes and a bladelet from the early stages of core reduction. These were all fresh with light cortication and this strongly indicates that they were either *in situ* or have not moved far. Trench 86 was one of four trenches in close proximity at the northwest edge of the evaluation area that all yielded flintwork. The aforementioned potentially late Upper Palaeolithic burin was recovered from trench 83, while trench 84 contained two blade forms. Trench 82 also contained a single flint flake recovered from the WW1 stop line trench.

B.5.17 Bloomery pit 9303 in trench 93 contained a similar assemblage to that recovered from pit 3912. It was composed of 67 pieces, 57 of which were knapping chips. The chips included 16 burnt pieces but the overall levels of burning were far lower here (25.37%) than in pit 3912 (93.90%). The pit did also contain 178 very small fragments of burnt unworked material weighing just 41g. These pieces are so small that their actual genesis cannot be accurately determined. The ten significant pieces comprised a microburin of Mesolithic date, a flake from a ground implement of Neolithic or early Bronze Age date, six flakes, a bladelet and a piece of irregular waste. Again, the most likely interpretation for this material is a residual and probably subsoil/buried soil derived assemblage that was redeposited into the bloomery pit.

B.5.18 Bloomery deposit 9405 generated 84 small fragments of burnt unworked flint weighing 90g. These are most likely to be accidental by-products of the industrial process rather than fuel (to heat water) or construction material.

B.5.19 Pit 10105 in trench 101 contained 39 flints comprised of 2 flakes, 2 bladelets, a probable microburin and an invasively retouched tool fragment. The pit also contained 343 pieces of burnt unworked flint weighing 2751g and this included six large nodules weighing 2450g as well as 9 nodule fragments weighing another 222g. One of the two bladelets was clearly early prehistoric in date and was not simply fortuitous in nature. The retouched tool

fragment is unlikely to be Mesolithic in date, so it would appear that this assemblage is also mixed in date with a Neolithic-early Bronze Age date being the probable date for the feature if the flintwork was contemporary.

Discussion

B.5.20 The assemblage from this evaluation was largely made up of moderate to large groups of flint from features that post-date the flint. Most had very sizeable fine fraction and while this may be due to the mechanical/thermal fragmentation of natural flint, these sample derived assemblages were scanned to a higher resolution than is normal, resulting in numerous very tiny fragments. It should also be pointed out that is extremely difficult to determine the agency that generated many of the very small burnt flint fragments. Burnt natural flint was clearly utilised here as was seen from the six large nodules in pit 10105 weighing 2450g, but there is no evidence that the metalworking activities on site relied on flint in any way as part of that industrial process. The numerous small burnt fragments and burnt flake debitage from features such as bloomery pit 3912 or from bloomery deposit 9405 can be seen as an accidental by-product of this industry.

B.5.21 The most likely explanation for the flint assemblages is that they were present on site during later prehistoric times as preserved scatters or buried middens, most likely in buried soil or subsoil horizons. These would have been truncated by the activities associated with shaft, pit and ditch digging and also from the bloomery works.

B.5.22 Some features may contain contemporary assemblages. This would include shaft 4508, hollow/shaft 8603 and possibly tree-throws 3902 and 3923 as well as pits 3602, 3905 and 10105. It should be mentioned that in many of these features the assemblages appear to represent more than one period with an earlier Mesolithic residual component and a putative Neolithic-early Bronze Age contemporary component.

B.5.23 The early component of the assemblage includes a tranchet adze, adze sharpening flake, burin, microburins and numerous blade forms that probably indicate a very rich Mesolithic phase of activity in the evaluation area. This may include a very limited late Upper Palaeolithic component as evidenced by the fine burin found in the subsoil in trench 83.

B.5.24 The flint recovered from this evaluation is of note. The possibility that early features including a deep shaft are present in the evaluation area is of potential regional significance. It would seem likely that any further works may encounter numerous additional features with early prehistoric flintwork in them. Any further works here may also encounter early prehistoric horizons, possibly within or sealed below colluvium. These may be of a significant size and are also likely to be of regional significance.

B.6 Metal finds

By Ian Scott

B.6.1 The metal finds comprise almost exclusively ironwork and much consists of wire or wire fragments, and iron plate fragments. Contexts 4205 and 9603 produced most of the ironwork, with smaller quantities from contexts 3804, 8204 and 9403. All of the metalwork appears to be relatively recent in origin, in that there is no obviously hand-made or hand-

wrought ironwork. Little if any of the ironwork can be closely dated. The catch-plate pressed or stamped metal for a simple barrel bolt (No. 5; context 3903) probably dates to the 20th century, and some of the nails (No. 20) from context 9403, in particular the annular and plasterboard nails, are certainly of 20th century date. Most of the remaining metalwork need not date much earlier.

Table B.6.1: Summary of metalwork by context

Context	Number	Description
2304	1	Iron sheet. 3 x fragments of folded and bent sheet iron. Two pieces with folded edges? Not measured.
2306	2	Cut nail, incomplete. Fe. Not measured
3604	3	Tiny spherical pellet. Non ferrous. Shot gun pellet?
3804	4	Wire fragments, some comprising pieces with five strands twisted together, including a small coil of the same. Also numerous fragments of single strands. Perhaps 100 + fragments.
3903	5	Pressed or stamped metal catch-plate for a simple barrel bolt. 20th century.
4205	9	**Fe wire**, bundle comprising thin mainly crushed a twisted thin wire, with a few pieces of thicker wire twisted into spirals. A few of the thinner pieces of wire have been roughly twisted together. The precise purpose or use of this wire is unclear but possibly it forms remains of sprung mattress. Not measured.
	10	**Fe wire**, short length twisted into a spiral with a piece of what appears to be a stocking, possibly Lisle, attached. Not measured.
	11	**Clamp**, comprising thick bar with two washers threaded at one end and secured by a nut. Welded to the other end is thick plate of L cross section. L: c 420mm
	12	**Wire cable**, formed from six strands of thick fe wire around central core formed from a seventh strand. Cut at both ends. D: 14mm; : 610m
	13	Length of **fe rod** bent back at each end to form a U-shaped. D: 13mm; L: c 570mm.
	14	Length of **fe rod** bent into a broad U- or V- shaped and at each end bent inwards at a right angle. Probably originally straight with right angle bends at each end. L: c 340mm; W: 293mm.
8204	15	**Wire**, fe, 32 x short fragments, of various lengths. Not measured.
	16	**Coil of wire** much encrusted and corroded. Fe. D: c 82mm x 78mm
	17	**Wire** twisted. Not measured
	18	**Nail**, drawn wire nail, with flat circular head, modern. L: 106mm (c 4 inches)
8303	19	**Cylindrical metal vessel**, very probably a tin can. 27 x fragments of sheet metal vessel including fragments of the base or top with embossed concentric circles. Not measured.
9403	20	**Modern nails** (x 40) including drawn wire nails and annular or plasterboard nails. Various sizes. Fe. Not measured.
	21	**Wire** fragment, fe. Not measured.
	22	**Strip** of fe, probably mild steel, bent to a dog-leg shape to form a bracket with a screw through its single fixing hole. Modern. Not measured.
	23	**Strip**, irregular, eroded thin strip of fe. Not measured.
9504	24	**Thin wire**, numerous fragments some twisted and coiled together. 50+ fragments. Not measured. Found with single length of thick wire (No. 25)
	25	**Thick fe wire**, single long piece. Not measured. Found with bundled thin wire (No. 24).
	26	**Thick wire** or **thin rod**, fe. Two lengths, one piece slightly thicker than the other, both twisted and irregularly bent. D: 5mm & 6mm. Lengths at least 620mm & 650mm.
9603	27	**Sheet iron** fragments (x 29), many small but some larger pieces. Not measured.
	28	**Wire**, 2 x curved pieces. Fe. Not measured.
	29	**Nail**, drawn wire nail with small ('lost') head. Not measured
	30	**Triangular block** of cast iron, small broken piece. Not measured.

	31	**Cast iron fragment**, large and curved. Possibly vessel, but not certain. Not measured.
	32	**Cast iron fragment**, curved possibly from vessel? Not measured.
	33	**Sheet iron** fragments (x8), many small but some larger pieces. Not measured.
	34	**Sheet iron** fragments (x17), mainly small. Not measured.
	35	**Sheet iron** fragments (x 56), mainly small. Not measured.
10101	36	**Vessel rim** fragments (2 x refitting) from a large cast iron vessel. Not measured.

B.7 Assessment of metalworking debris

By David Dungworth

Introduction

B.7.1 The metalworking debris submitted for assessment was recovered during archaeological recording works undertaken by Oxford Archaeology in the vicinity of Junction 5 of the M2 motorway in Kent. Excavation immediately north of the junction revealed one definite and one probable furnace and a series of pits containing slag. A second area south of the junction, did not include any furnaces, but did contain a couple of pits containing large quantities of slag. Radiocarbon samples obtained from each area returned late Iron Age dates.

B.7.2 Previous investigations along the line of a water pipe (Stockbury, site STK SMS 11) recovered exceptionally well preserved late Iron Age furnaces of national importance (Girbal unpublished). The iron smelting revealed at Stockbury site STK SMS 11 is on an exceptional scale (for the late Iron Age) and the remains appear to show a technology in transition.

B.7.3 Prehistoric iron smelting generally occurred in small and rather shallow furnaces (cf. Dungworth 2011; 2014). Prehistoric iron smelting slags have variable characteristics: some are present as slag cakes or furnace bottoms (Dungworth 2011; Paynter 2007) but most are rather amorphous (Dungworth 2007; 2009; Dungworth and Mepham 2012; Girbal 2010; McDonnell 1984; Starley 1998). The impression is that the slag was allowed to accumulate inside the furnace during the duration of the smelt. It is possible that the slag was removed at the end of the smelt in order to allow the furnace to be used again.

B.7.4 Roman iron smelting appears to have taken place in shaft furnaces (>1m high) and usually produces large volumes of a single type of slag: tap slag (Cleere 1970; Crew 1998; Fulford and Allen 1992; Jackson and Ambrose 1978; Jackson and Tylecote 1988; Tebbutt and Cleere 1973). It is clear that the slag was tapped from the furnace periodically during the smelting process and it is almost certain that furnaces were re-used many times.

B.7.5 The evidence from Stockbury site STK SMS 11 (Girbal unpublished) appears to show an iron smelting technology which employs elements of the prehistoric tradition (largely non-tapping) and the Roman tradition (some tapping from large shaft furnaces).

Methods

B.7.6 All of the material submitted for assessment was examined visually and recording following standard guidance (Historic England 2015b). The material was weighed and selected fragments were photographed. The main categories of material identified include the following:

Table B.7.1

Furnace Bottom	Large accumulations of slag which formed close to the base of an iron bloom smelting furnace (Historic England 2015b, fig. 14). These are usually black (although the surfaces are often weathered and brown-orange in colour) and have a density consistent with a fayalitic (Fe_2SiO_4) composition (typically 4g/cm^3). Where complete, furnace bottoms usually show an underside which has taken up the impression of the pit at the base of the furnace. Partially vitrified ceramic from the furnace structure often adheres to the outer margins of a furnace bottom. Furnace bottoms are typically 250–300mm in diameter and when complete can weigh in excess of 10kg. The accumulation of large masses of smelting slag in a furnace bottom indicates that the slag was not tapped from the furnace.
Furnace Slag (Charcoal impressions)	These lumps of slag are characterised by the frequent impressions of charcoal on the surface (and their apparent completeness). These slags are most commonly associated with an iron smelting furnace where little attempt was made to remove the slag by tapping (cf. Dungworth 2011; 2014).
Tap Slag	This comprises lumps and sheets of slag with a characteristic ropey, flowed upper surface and a lower surface which retains impressions of the ground surface over which it ran while molten (Historic England 2015b, fig. 16). This tap slag is generally black in colour, does not respond to a magnet and contains low to moderate proportions of porosity. Rarely, lumps of tap slag also contain small fragments of iron ore and/or furnace structure.
Flow slag	During bloomery smelting some slag will form and flow. In non-tapping furnaces, the slag will tend to flow vertically and comprise small runs of slag (often with some charcoal impressions, Dungworth 2011; Dungworth and Mepham 2012; Historic England 2015b, fig. 15).
Non-diagnostic Ironworking Slag	Fragments of ironworking slag (fayalitic) which lack any diagnostic surface morphology that would allow a distinction to be made between smelting and smithing (Historic England 2015b, fig. 18).
Furnace Lining	Vitrified ceramic usually showing a black vitreous (inner) face, an intermediate reduced fired ceramic layer and an oxidised-fired (outer) layer (Historic England 2015, fig. 11).
Ore	Fragments of iron-rich rock used as a raw material in iron smelting (Historic England 2015, fig. 8). While a variety of iron ores were used in bloomery smelting (*eg* FeOOH and $FeCO_3$), in most cases the surviving fragments have been roasted and so are a fairly uniform red-orange colour due to the formation of hematite (Fe_2O_3).
Hammerscale	Fragments of iron oxide (especially magnetite) which forms when iron is heated and forged. Usually black and lustrous. This occurs both as flakes (<1mm thick with a surface area up to 20mm^2) and as spheres (up to 3mm diameter) (Historic England 2015, fig. 30).

Results

B.7.7 The industrial debris from the present evaluation comprises almost 39kg of metalworking debris and sieved material. The majority of the material can be positively identified as deriving from iron smelting. This is summarised by context:

Table B.7.2: Summary of metalworking debris

Context	Weight	Description
3906	2g	This comprises a mixture of materials (all recovered from sieving soil samples) and identification is hampered by the small size of the fragments (two fractions, 4–2mm and 2–0.5mm are present). Some fragments of ore and slag are present but at least some of the material appears to be heat-magnetised residue (Historic England 2015, 61) which can form in almost any fire and is not necessarily related to metalworking).
3910	5458g	A small proportion of this material was recovered by hand and includes fragments of tap slag; however, most was recovered by sieving soil samples and identification is hampered by the small size of the fragments (four fractions, >10mm, 10–4mm, 4–2mm and 2–0.5mm are present). Fragments of ore and slag are present but at least some of

		the material appears to be heat-magnetised residue (Historic England 2015b, 61) which can form in almost any fire and is not necessarily related to metalworking).
2911	283g	A single fragment of slag was recovered from this context which comprises a dense fayalitic slag which adheres to a fragment of reduced-fired ceramic. The ceramic probably represents a fragment of furnace lining; however, the lining shows no sign of vitrification and is not fused to the slag. It appears that the slag has flowed inside a smelting furnace and come to rest against the ceramic lining (but that the lining was not subjected to other intense heating).
3913	71g	A single fragment of tap slag was recovered from this context.
4210	45g	Four small fragments of slag were recovered from this context. The small size of the slag fragments hampers precise identification of the processes which produced them.
8606	8g	Approximately 50 fragments of slag were recovered from this context (all from sieving soil samples, 10–4mm, 4–2mm and 2–0.5mm). The small size of the slag fragments hampers precise identification of the processes which produced them. Nevertheless a significant proportion of the smaller fragments comprise heat-magnetised residue (Historic England 2015b, 61) which can form in almost any fire and is not necessarily related to metalworking).
9306	3122g	Thousands of fragments of debris was recovered from this context (mostly from sieving soil samples, >10mm, 10–4mm, 4–2mm, and 2–0.5mm). The hand-recovered fragments include at least one fragment of a furnace bottom. This has a substantial mass of consolidated slag with adhering ceramic furnace lining (on the left of the photo), while the base comprises much more porous slag). The slag at the side of the furnace bottom displays some flow texture but this has clearly been constrained by the furnace lining. The fragments of slag from sieving are generally too small to allow precise identification of the processes which formed them. The sieved samples also include numerous fragments of ore, flint and heat-magnetised residues.
9312	4796g	All of the slag from this context (57 fragments) was recovered by hand. The assemblage includes both tap slags and furnace bottoms. The tap slags tend to be present as rather small and thin fragments. While tap slag can often comprise sheets made up of three or four successive flows and building up a thickness of 2–5cm, this tap slag is usually no more than 1cm thick. The furnace bottoms from this context are of variable character: some are dense and have consolidated into plano-convex cakes, others are much more porous.
9403	158g	The small size of the seven slag fragments of slag from this context hampers precise identification of the processes which produced them.
9404	150g	The small size of the slag fragments of slag from this context (100+) hampers precise identification of the processes which produced them.
9405	22479g	This context produced 58% (by weight) of all of the slags from this archaeological intervention. The material was recovered both by hand and by sieving soil samples. A substantial proportion of the slag comprises fragments that are small which hampers precise identification of the processes which produced them. Nevertheless, numerous fragments are sufficiently large and/or complete to identify diagnostic morphological features. The most easily identified category of slag from this context comprises fragments of tap slag with a characteristic ropey upper surface. The assemblage also includes numerous fragments of slag which probably represent furnace slags of one kind or another. In some cases these are likely to have been furnace bottoms (although no near complete examples from this context could be identified). Some of the furnace slag from this context comprises lumps with abundant impressions of charcoal. The example illustrated here has a relatively smooth upper surface and a rougher lower surface. The rather lobate form of the slag on the upper surface resembles the few examples of flow slag also recovered from this context. Flow slag usually consists of small but complete lumps of slag with smooth surfaces indicating that they were molten and had flowed. Unlike tap slag, however, flow slag appears to have flowed vertically and often around obstacles such as charcoal fuel. The resemblance between the flow slag and some of the furnace slag suggests that some of the flows merged together to form larger masses of

		slag. It is also possible that the eventual outcome of further slag consolidation would be the formation of a furnace bottom. The last category of material identified from this context was furnace lining. This is usually quite thin (~1cm) and has a reduced-fired (grey) outer surface and a black vitreous inner surface. The thinness of the furnace lining and the absence of a substantial outer layer of oxidised-fired clay suggest that this lining has undergone weathering processes. The sieved material includes numerous small fragments of slag, as well as ore, flint and heat-magnetised residue; however, it is the only context which produced hammerscale (both flakes and spheres).
9417	32g	A single fragment of tap slag was recovered from this context.
9504	32g	A single fragment of slag was recovered from this context but the process which produced it was not immediately apparent.
9910	1g	A single fragment of slag was recovered from this context but the process which produced it was not immediately apparent.
10103	2g	A single fragment of slag was recovered from this context but the process which produced it was not immediately apparent.

Tap slag from 3906

Slag from 3911

Fragment of a furnace bottom from 9306

Tap slag from 9312 (upper surface on the left)

Furnace bottoms from 9312

Tap slag from 9405

Furnace lining from 9405

Furnace slag from 9405

Flow slag from 9405

Discussion

B.7.8 Previous excavations at Stockbury, site STK SMS 11, by Kent Archaeological Projects (Tim Allen personal communication) along the line of a water pipeline uncovered exceptionally well preserved remains of iron smelting furnaces (Historic England 2015b, fig. 9). These were found in two areas at NGR TQ 8181 6149 (F119) and NGR TQ 8411 6141 (F113), that is, approximately 1km and 3km to the west of Junction 5. The furnaces were often preserved up to a height of 1m. This is in stark contrast to the typical surviving height of ~0.1m for early iron smelting furnaces in the UK. The furnaces were usually in pairs with a shared pit. Pottery in the fills included pre-Roman flint-tempered and grog-tempered wares, but there were also some early Roman wares. This would place the smelting activity sometime in the late Iron Age to the early mid first century AD (*c* 150BC – *c* AD 75). Approximately 256kg of technological debris (slag, clay and ore) were recovered and this included a small (15%) proportion of tap slag as well as slag cakes (cf furnace bottom) and amorphous furnace slags (Girbal unpublished). Girbal notes that the furnace bottoms (slag cakes) display a range of textures: 'a more solid type with few charcoal impressions and low porosity and another less solid with abundant tendril like slag and more charcoal impressions' (Girbal unpublished, 9). Girbal suggests that Stockbury represents an intermediary or evolutionary iron smelting technology between Iron Age slag-pit furnaces and Roman tapping furnaces.

B.7.9 The current M2 J5 Improvements evaluation produced iron smelting debris from two areas: Trench 39 and Trenches 93/94. Trench 39 produced much smaller quantities of slag (7kg compared to 32kg from trenches 93/94). Much of the material recovered from trench 39 comprised small fragments of slag (often too small to identify the process which produced them), as well as ore and flint. Nevertheless, this assemblage includes some tap slag and probably contains some furnace slags. Trench 93/94 yielded tap slag, furnace slags (including flow slag) and furnace bottoms. Assuming that all of this material relates to the same activity, this appears to be a smelting technology which employs some tapping and some non-tapping approaches (the latter a prehistoric tradition and the former most commonly seen on Roman smelting sites). One the basis of this assessment it would appear that the slags recovered from both trenches 39 and 93/94 derived from the same iron smelting tradition (despite the much smaller quantity of slag recovered from trench 39).

B.7.10 The range and proportions of slag recovered from the earlier Stockbury excavations and present M2 J5 Improvements evaluation are closely comparable. Both assemblages are dominated by relatively amorphous furnace slags. These are sometimes present as relatively dense, consolidated slag cakes but other much more porous forms (often with charcoal impressions) are present. Both assemblages include a rather modest proportion of tap slag. Both assemblages appear to show that a shared smelting technology was employed on both sites in which most of the slag accumulated inside the furnace (i.e. the prehistoric tradition) but a proportion was tapped from the furnace (i.e. the Roman tradition).

B.7.11 The excavations at M2 Junction 2 confirm that an important and potentially extensive iron smelting industry existed in north Kent east of the Medway at the end of the Iron Age. Given the historical context (Caesar's invasion in 55/54 BC and the Claudian context AD 43), a significant iron industry in this part of England is of national importance. This importance is further strengthened by the excellent (and unusual) preservation of furnace structures, at least at Stockbury, site STK SMS 11.

B.8 Stone

By Ruth Shaffrey

B.8.1 A total of six pieces of stone were submitted for analysis. Four of these are fragments of burnt (blackened) chalk (10209) and one a piece of quartzitic stone (10103). None is worked and all can be discarded. The sixth piece of stone is a large ashlar block (4210) that is tooled on at least three sides. It has been exposed to significant levels of heat, which have caused a crust to form on one side. There is also a thick deposit of blue-white vitreous material on top of that, which seems most likely to be molten glass that has fallen on to the surface. The stone type is a gritty limestone, not a type familiar to the author.

B.9 Glass

By Ian Scott

5.4.8 The glass comprises just ten sherds, made up of five sherds of vessel glass and five sherds of window glass. Pieces of window glass were recovered from contexts 2306, 8303 and 9403 and all have very regular and highly polished surfaces and therefore comparatively modern, though it is difficult to date window glass closely.

5.4.9 The vessel glass comes from contexts 2306, 8303, 8902 9403 and 9603. One very small sherd of dark green glass (No. 5) appears to be from a dip-moulded bottle and could therefore date from the later 18th to the mid-19th century. The unidentified fragment of vessel glass (No. 1) from context 2306 cannot be closely dated. The embossed sherd of vessel (No. 4) from context 8303 probably dates from the later 19th or early 20th century. The fragment in pale blur glass from the base of an oval section glass bottle (No. 6) from context 9403 may date to the later 19th century, but the fish or savoury paste jar (No. 7) from context 9603, probably dates from after WW1. It was certainly made in an automatic bottling machine.

Table B.1.9

Context	Number	Description
2306	1	**Vessel**, body sherd. Small sherd more strongly curved towards one end. Colourless.
	2	**Window glass** (2 x pieces, no refit). Modern with very regular highly polished surfaces. Colourless. Th: 2mm.
8303	3	**Window glass** (1 x piece) quite thick. Modern with very regular highly polished surfaces. Colourless. Th: 2.5mm
	4	**Vessel**, body sherd, possibly with recessed panel for embossed label. Extant embossed lettering reads: " … RIOR " perhaps from “Superior”? Late 19th or early 20th century? Very pale green glass.
8902	5	**Vessel**, small thick-walled sherd vessel in dark green glass. Very probably from a bottle. Possibly dip-moulded. Not closely datable.
9403	6	**Window glass** (2 x pieces, no refit). Modern with very regular highly polished surfaces. Colourless. Th: 1.7mm
	7	**Bottle**. Base of a small bottle of oval section. The base is indented but has no embossed lettering. Probably machine moulded and therefore possibly post World War 1. Very pale blue glass.
9603	8	**Small fish or savoury paste jar.** Decorated with horizontal ribbing around the body. Square rim for a metal cap and seal. Embossed on base "MADE IN ENGLAND" and "76". 20th century or later. Post World War 1. Colourless glass. Ht: 39mm; Rim D: 47mm

B.10 Burnt paper

By Ian Scott

B.10.1 A quantity of small fragments of burnt paper with evidence of printing was recovered from context 9403. Some of the fragments comprised several layers or sheets. None of the pieces was very large. Although completely blackened, print was still visible on a number of the fragments. Amongst these was a fragment which in part read: " ALPHA to 83426 … " which might be a reference to text messaging. More significantly was a small fragment which included the expression "… WWW.OC…", which is clearly part of a web address. Another fragment included part of a banner reading "E]XCLUSIVE …". The lettering is clearly printed onto the paper and there is no evidence for the indentations that would come from letterpress. These fragments are modern.

APPENDIX C ENVIRONMENTAL REPORTS

C.1 Environmental Samples

By Sharon Cook and Rebecca Nicholson

Introduction

C.1.1 Fourteen samples were taken during the evaluation at the M2 Junction 5 Improvement Scheme in November 2017, of which twelve were processed and their contents evaluated. The remaining two samples (<9> and <10>) were taken from the "natural" drift geology for reference purposes.

Table C.1: Environmental sample details

Sample No	Context No	Trench No	Sample Volume (L)	Flot Volume (ml)	Period	Feature Type
1	9405	94	35	50		Layer within Bloomery deposit
2	8606	86	35	20		Upper fill of pit
3	4503	45	18	5	Neo?	Upper fill of pit [4508]
4	4506	45	15	8	Neo?	Secondary fill of pit [4508]
5	9306	93	35	60	LIA/ERB?	Fill of pit [9303]
6	10103	101	35	15	Ltr prehis	Fill of pit [10105]
7	10208	102	4	0		Heat affected natural at edge of pit [10203]
8	10209	102	7	2400		[10203]
11	10212	102	6	5		"Natural" S.11
12	3910	39	35	30		Middle fill of bloomery pit [3912]
13	3906	39	35	1200	LIA/ERB?	Upper fill of pit [3904]
14	3604	36	40	600	LN/EBA?	Fill of pit [3602]

Method

C.1.2 The total volume of each sample, between 4 and 40 litres, was processed by water flotation using a modified Siraf style machine. The floating component (flot) of the samples was collected in a 0.25mm nylon mesh and the residue was washed through 10mm, 4mm, 2mm and a 0.5mm sieve. Both flot and residues were allowed to air dry. A magnet was dragged through each residue fraction after sorting for bones and artefacts. Any artefacts and bones present were noted and reintegrated with the hand-excavated finds. The dried flots were subsequently scanned using a binocular microscope at magnifications up to x 10. Identification of wild plant remains is with reference to the Digital Seed Atlas of the Netherlands (Cappers *et al*. 2006) and molluscs from Janus (1965) but these should be considered as preliminary. Nomenclature is according to Zohary and Hopf (2000) for cereals and Stace (1997) for other plants. The identification of cereals has been based on the characteristic morphology of the grains and chaff as described by Jacomet (2006), but the distortion of the grains during burning and subsequent burial means that many could not be further identified.

Results

Trench 36

C.1.3 Sample <14> from 3604 is charcoal-rich, with >100 fragments >4mm and potentially identifiable. Both heartwood and roundwood charcoal is present, from a range of species including oak (*Quercus* sp.).

Trench 39

C.1.4 The flot from sample <12> 3910 is largely composed of small-sized charcoal (2-4mm) with occasional larger fragments some of which are mineral-encrusted and a few vitrified fragments area also present suggesting high-temperature burning, consistent with the association with iron production. All of the charcoal appears to be oak (*Quercus* sp.), the great majority of which is clearly heartwood. Several small charred wild plant seeds include a small (<2mm) legume, grass (Poaceae) and several of buttercup-type (*Ranunculus* sp.).

C.1.5 Sample <13>, a fill in pit 3904 is charcoal-rich. While mainly of oak heartwood, the charcoal also includes occasional roundwood and diffuse porous fragments.

Trench 45

C.1.6 Samples <3> 4503 and <4> 4506 produced small flots which include small (mostly <4mm) charcoal fragments, most of which is oak heartwood, and terrestrial molluscs as well as some modern roots and fungal fruiting bodies. The molluscan assemblage from both samples was fairly small (*c* 50 shells/sample) but comprise several different species including *Vallonia* sp. and *Pupilla muscorum* as well as some individuals that may be of recent origin including the burrowing snail *Ceciloides acicula*.

Trench 86

C.1.7 Sample <2> 8606 produced a small flot almost all of which is of uncharred, probably intrusive roots, twigs, insect fragments and *Chenopodium* sp. Seeds. Occasional fragments of charcoal are mainly <4mm in size.

Trench 93 and 94

C.1.8 The flot from sample <5> 9306 is larger (60ml) and includes a small quantity of charred cereal grain. Although the majority of these are too poorly preserved to identify beyond indeterminate cereal, three could be identified as wheat (*Triticum* sp), six of barley (*Hordeum* sp.) and one of *Avena* sp. A single glume base fragment from emmer (*Triticum dicoccum*) or spelt (*T. spelta*) wheat was also observed. Charcoal is fairly abundant but mostly small-sized (<4mm) although a few larger fragments are present. Most is oak heartwood, but there are a small number of fragments of diffuse porous type.

C.1.9 The flot from sample <1> 9405 contains only charcoal in addition to a few uncharred seeds and roots which are likely to be of more recent origin. The charcoal is almost entirely oak (*Quercus*) heartwood, but a small number of small roundwood fragments are also present, one of which has been sent for radiocarbon dating. There are also a small quantity of fungal fruiting bodies.

Trench 101 and 102

C.1.10 The small flot from sample <6> 10103 is largely composed of modern root, but within this are around 70 poorly preserved cereal grains a few of which are identifiable as wheat

(*Triticum* sp.) and a few as barley (*Hordeum* sp.). Charcoal is mainly small-sized (2-4mm) with a few larger fragments also present.

C.1.11 While sample <7> 10208 did not produce a flot, sample <8> 10209, also from pit [10203] was extremely charcoal-rich. Sample <8> produced a flot of *c* 1.5 litres, almost all of which is roundwood charcoal. This sample also contained limestone and flint fragments in the residue as well as very occasional fragments of fired clay. Burnt flint was recovered from the residue of <7>.

C.1.12 Sample <11> 10212 produced a tiny flot comprising only roots and charcoal flecks.

Discussion and conclusion

C.1.13 The results from this assessment demonstrate the presence of significant quantities of well-preserved charcoal in some deposits, principally those from features associated with, or probably associated with, iron production. Very few other charred plant remains were present, suggesting that the area was of industrial rather than domestic significance at least during the Late Iron Age / Romano-British period.

C.1.14 No further work on these flots is warranted at the present time, but if further excavation is carried out on this site the flots from samples <8>, <13> and <14> would be worth further consideration for their charcoal composition. The presence of molluscs in samples from Trench 45 suggests that more calcareous soils exist in this area and this should be considered in any future sampling strategy for this area, although the concentration of molluscs/litre soil was fairly low and sample sizes would need to reflect this.

C.2 Wood

By Julia Meen

Introduction

C.2.1 Wood was recovered from three contexts associated with trenches dug during the WW1: contexts 9504, 9403 and 9603. These included charred items (i.e. charcoal) as well as non-charred wood. Identifications were carried out on this material, primarily to ascertain whether the wood is structural, whether it is of all the same type (suggesting a single source) or whether it is likely to be natural in origin.

Method

C.2.2 Wood that had been partially or fully charred was examined under reflected light using a Brunel Metallurgical SP-400BD microscope at up to x400 magnification. Items were fractured on the transverse, radial and tangential sections in order to observe anatomical characteristics. Where wood was uncharred, thin sections were taken from exposed sections of the wood, mounted onto a slide and examined under transmitted light. Identifications were made using Hather (2000) and Schweingruber (1990).

Results

C.2.3 Context 9504

1. An uncharred, slightly curved branch measuring 520mm in length and 16mm in diameter, with bark retained. Identified as oak (*Quercus* sp); it was noted that the growth rings were closely spaced. No signs of working were noted.

C.2.4 Context 9403

1. Fragment of a small branch, 11mm diameter, charred. Identified as cf *Prunus* (cherry/blackthorn).

2. Fragment of a small branch, 11mm diameter, uncharred. Bark retained, includes part of a thorn. Identified as *Prunus spinosa* (blackthorn).

3. Three fragments of charcoal. All identified as *Prunus spinosa* (blackthorn).

None of these gave any indications that they had been worked.

C.2.5 Context 9603

A sample of wood fragments of varying sizes was taken from this context. Examination showed that these were a mixture of entirely uncharred wood pieces – generally of the larger pieces – and charred or partially charred wood, which tended to be the smaller fragments. Pieces selected for species identification were chosen to represent this variation. All of the pieces were quite fragmentary, and none showed signs of working. Identifications are as follows:

1. *Corylus* (hazel) roundwood; charred apart from part of the outer surface
2. *Corylus* (hazel) roundwood; almost fully charred
3. *Corylus* (hazel) roundwood; fully charred
4. *Corylus* (hazel) roundwood; partially charred
5. *Corylus* (hazel) roundwood; fully charred
6. cf *Corylus* (hazel); uncharred except for part of outer surface

7-9: Three fragments of fully charred roundwood which share the same characteristics: diffuse porous; radial pore files; fine spiral thickenings; uni- and bi-seriate rays; simple perforation plates; and large vessel pitting. There are no tree species native to Britain to which this particular set of characteristics obviously point. As the context dates to the 20th century, however, the sample could potentially contain exotic imported wood from almost anywhere in the world. These characteristics do have much in common with those of horse chestnut (*Aesculus hippocastanum*), which was introduced to Britain during the 16th century.

10-12: Three larger pieces of uncharred wood, all identified as a softwood (conifer), although further identification was not possible due to cracking and disintegration of the wood.

13: Uncharred wood; unidentified.

C.2.6 These results show that the wood fragments from context 9603 contain a mixture of wood, with at least three separate taxa represented, and a mix of charred and uncharred items. All of these pieces were quite fragmentary, and none showed any signs of working. It is however possible that the charred and uncharred wood derive from different sources, and that the larger coniferous pieces had some structural use.

C.3 Charcoal

By Julia Meen

Introduction and method

C.3.1 A small selection of charcoal items was examined from each of the key charcoal deposits in order to ascertain the range of wood taxa present and evaluate the potential for further analysis. Each item was fractured on the transverse section using a Brunel Metallurgical SP-400BD microscope at up to x400 magnification, and on the radial and tangential sections where required, in order to observe anatomical characteristics. Identifications were made using Hather (2000) and Schweingruber (1990).

Results

C.3.2 All of the charcoal in sample <1> were scanned and with few exceptions, all could clearly be seen to be oak. These exceptions were extracted and fully examined to provide species identifications, as were a selection of the oak fragments in order to confirm their provisional identification. Of the examined items, the only non-oak items were a single fragment of Pomoideae (a group of anatomically similar taxa which includes hawthorn, rowan, apple and wild service) and a piece of roundwood which, as mostly pith was preserved, could not be further identified.

C.3.3 A preliminary scan of sample <5> showed that the majority of items were clearly oak. All dissimilar items were extracted and examined further, which showed that a small number of fragments of diffuse porous taxa were present: a single fragment of hazel, two fragments provisionally identified as Pomoideae type, and one fragment that could not be identified further than as being diffuse porous. It was noted that in the oak fragments more closely examined, the annual rings were very closely spaced, and several fragments of bark were also observed.

C.3.4 Sample <8> produced a large flot with abundant well preserved charcoal. Many roundwood pieces were present, but the bulk of the flot was made up of large chunks of oak heartwood. The roundwood was a mixture of hazel (*Corylus avellana*) and willow or poplar (these two taxa being very difficult to distinguish anatomically). The roundwood was of generally large diameter, and where possible annual rings counts were recorded, which showed that the hazel had a minimum of 12 to 15 rings and the willow/poplar had a minimum of 9 rings.

C.3.5 Sample <12> was previously examined and it was confirmed that only oak charcoal was present.

C.3.6 Sample <13> produced a very large, charcoal-rich flot. Analysis of a small selection of fragments showed that the assemblage was dominated by oak, mostly heartwood but with a small twig of oak also noted, plus a small number of hazel fragments. A scan of the remainder of the flot confirmed that it was overwhelmingly oak charcoal, and that roundwood was rare.

C.3.7 Sample <14> produced abundant, well preserved charcoal. The charcoal was mostly a mixture of oak heartwood and hazel, with occasional other diffuse porous taxa including probable field maple (*Acer campestre*) and cherry/blackthorn (*Prunus* sp). At least two of the hazel fragments had curvature of the rings, showing they were from larger roundwood. This

sample has a provisional date of the Late Neolithic or Early Bronze Age. The excellent preservation of this prehistoric material means further analysis during a later phase of work would be very worthwhile. The mixture of mature oak with wood from more scrubby taxa may shed light on the extent of primary woodland in this area and potentially point to regeneration of secondary woodland or creation of hedgerows, which in turn will help further understanding of how this landscape was increasingly modified by human activity during the period.

Table C.3.1: Summary of charcoal

	Sample No.	1	5	8	13	14
	Context No.	9405	9306	10209	3906	3604
	Cut No.		9303	10203	3904	3602
	Feature type	Layer within bloomery deposit	Upper fill of pit	Fill of pit	Upper fill of pit	Fill of pit
	Date		LIA/ERB		LIA/ERB	LN/EBA
Species (Latin)	**Common name**					
Quercus	oak	9 (h,r)	2 h	5 (h,r)	8 (h, r)	5 h
cf *Quercus*	cf oak		1			
Corylus avellana	hazel		1	7 (r)	2	6 (r)
cf *Corylus avellana*	cf hazel					1
Pomoideae	hawthorn/rowan/apple type	1				
cf *Pomoideae*	cf hawthorn/rowan/apple type		2 (r)			
cf *Prunus*	cherry/blackthorn type					1
cf *Acer*	cf field maple					1
Salix/Populus	willow/poplar			2		
diffuse porous			1			1
indet		1				
TOTAL		*11**	*7**	*14*	*10*	*15*

C.4 Radiocarbon dates

C.4.1 Two pieces of charcoal were submitted for radiocarbon dating. Both were associated with bloomery activity, and both returned dates belonging to the late Iron Age.

Table C.4: Radiocarbon dates

Context	**Lab number**	**Material**	**Uncalibrated date**	**Calibrated date**
9405	Beta-481026	Charcoal (*Pomoideae*)	1990±30 BP	49 cal BC – 72 cal AD (95.4% probability)
3910	Beta-481027	Charcoal (*Quercus*)	2070±30 BP	174 – 19 cal BC (92.6% probability)

APPENDIX D BIBLIOGRAPHY

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APPENDIX E SITE SUMMARY DETAILS

Site name:	M2 Junction 5 Improvements
Site code:	STM2J17
OASIS ID:	Oxforda-1-296299
Grid Reference	TQ 8550 6220
Type:	Evaluation
Date and duration:	October and November 2017
Area of Site	21.8 ha
Location of archive:	The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with Sittingbourne Museum and Maidstone Museum in due course.
Summary of Results:	An archaeological evaluation was undertaken by Oxford Archaeology in October and November 2017 around Junction 5 of the M2, Kent. The work was commissioned by Hochtief (UK) Ltd on behalf of Highways England. A 5% sample of the 21.8 hectare site was agreed, comprising 71 trenches. Finds and features can be split into three groups, and all are of significance. A relatively large assemblage of Mesolithic flintwork was recovered. This was from probable contemporary features, and redeposited in later contexts. A deep pit or shaft produced a significant assemblage. The evaluation suggests the possibility of undisturbed Mesolithic horizons. Two areas of smelting activity were discovered. A number of furnaces were uncovered alongside a relatively large amount of metalworking debris. This included slag from non-tapping and tapping furnaces, generally assigned to the Iron Age and Roman periods respectively. Two late Iron Age radiocarbon dates were obtained, alongside pottery of a similar date. A technological transition is therefore apparent at the site, moving to more effective smelting techniques. The site shares many similarities to two bloomeries recently excavated nearby. Part of the Chatham Land Front defensive line was known to pass through the site. This was built in response to a possible German invasion during World War One. Elements of this complex were discovered during the evaluation, although they do not appear to be well preserved. Areas of made ground were discovered in the central part of the site at the bottom of the valley. These layers are over 2m deep, and were probably deposited during the construction of the M2.

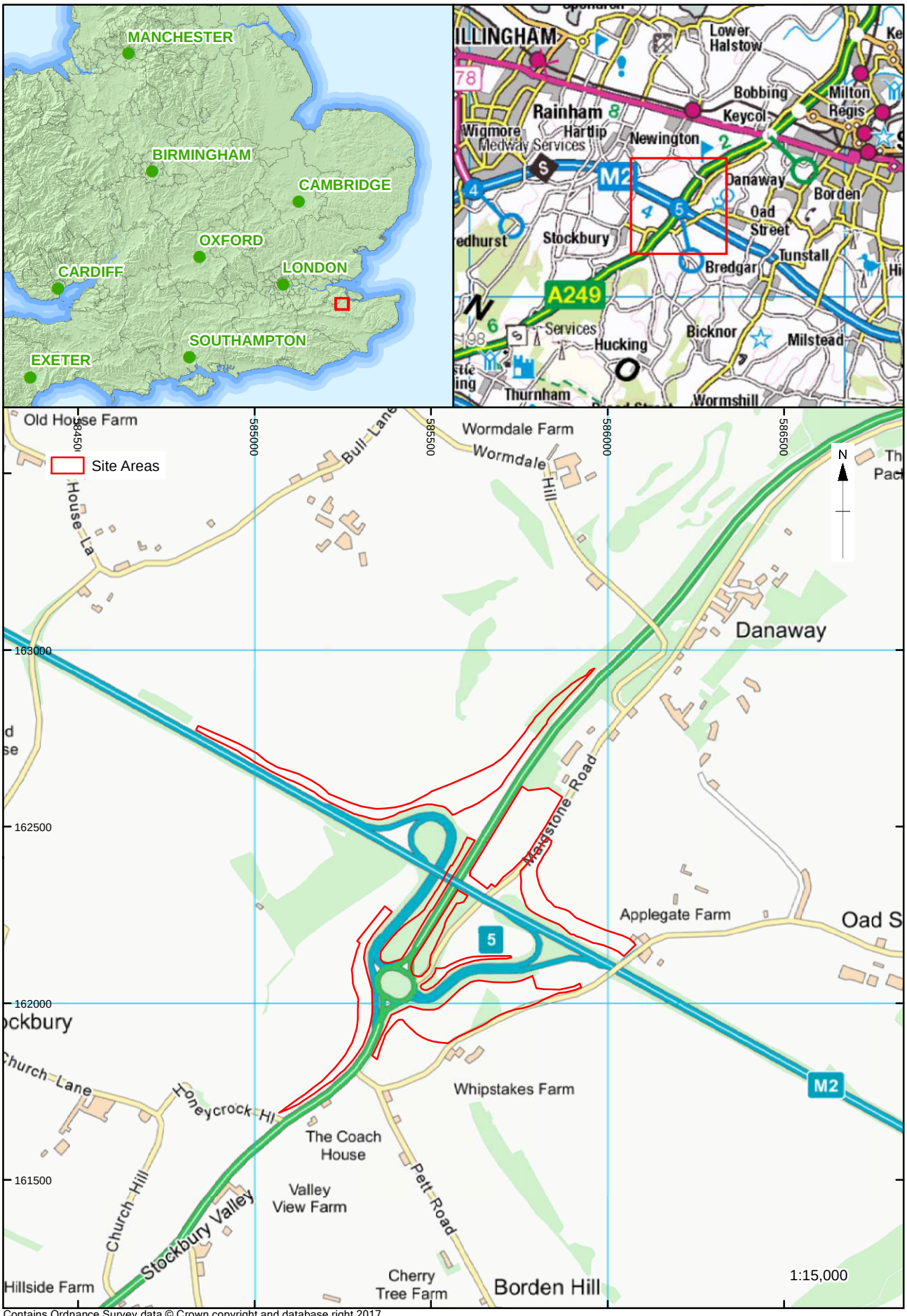


Figure 1: Site location map

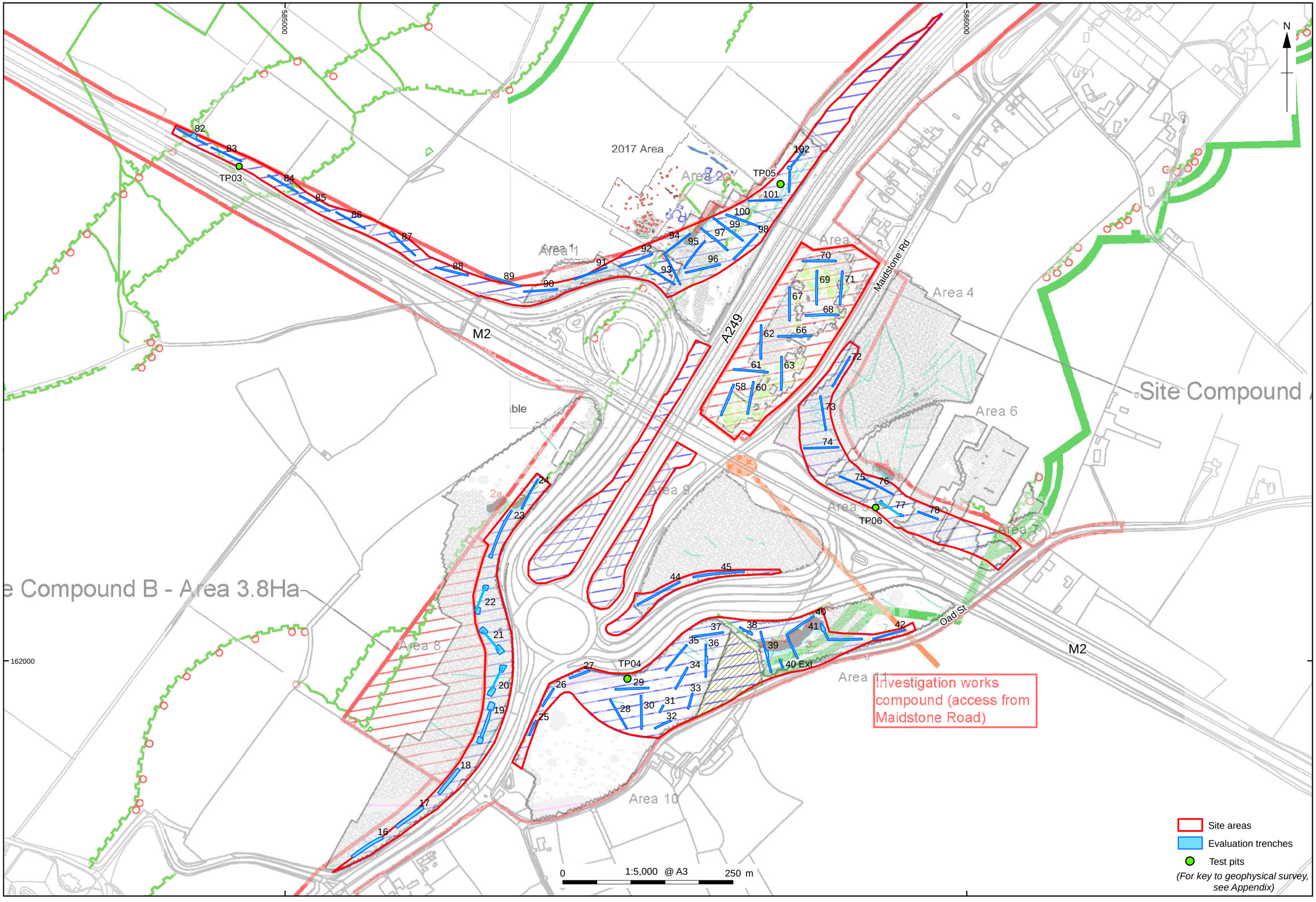


Figure 2: Trench plan in relation to geophysical survey plot and WWI trenches

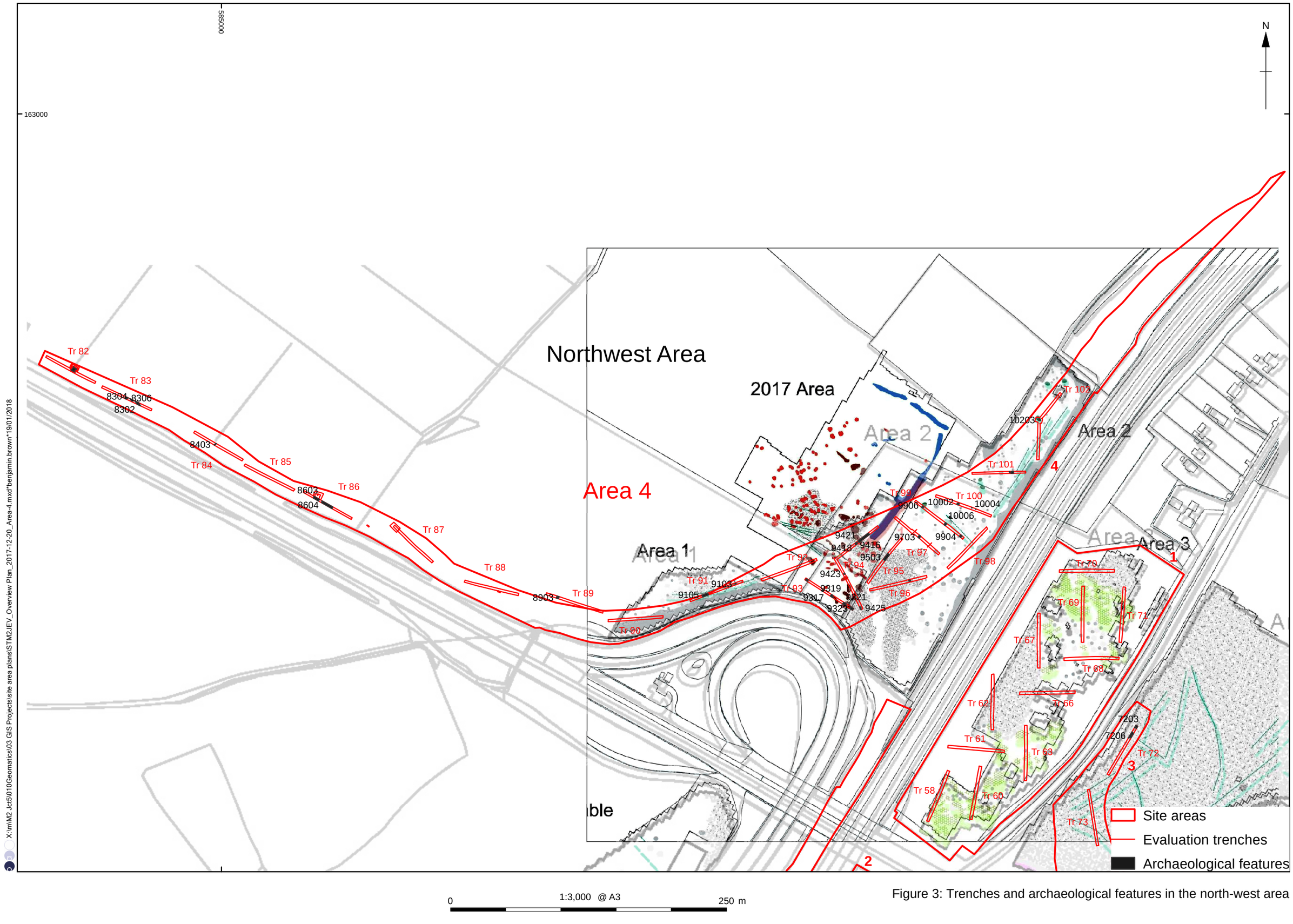
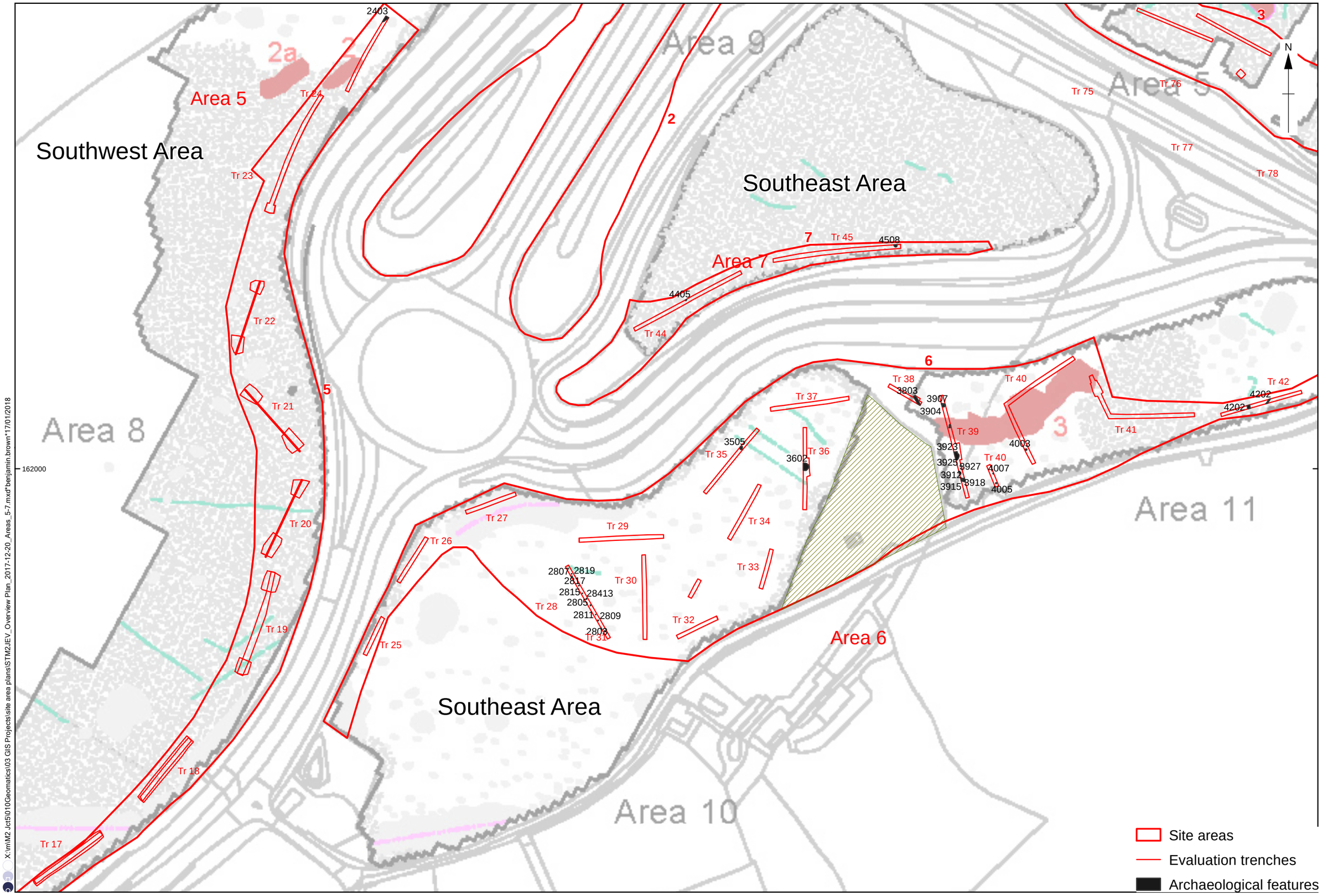


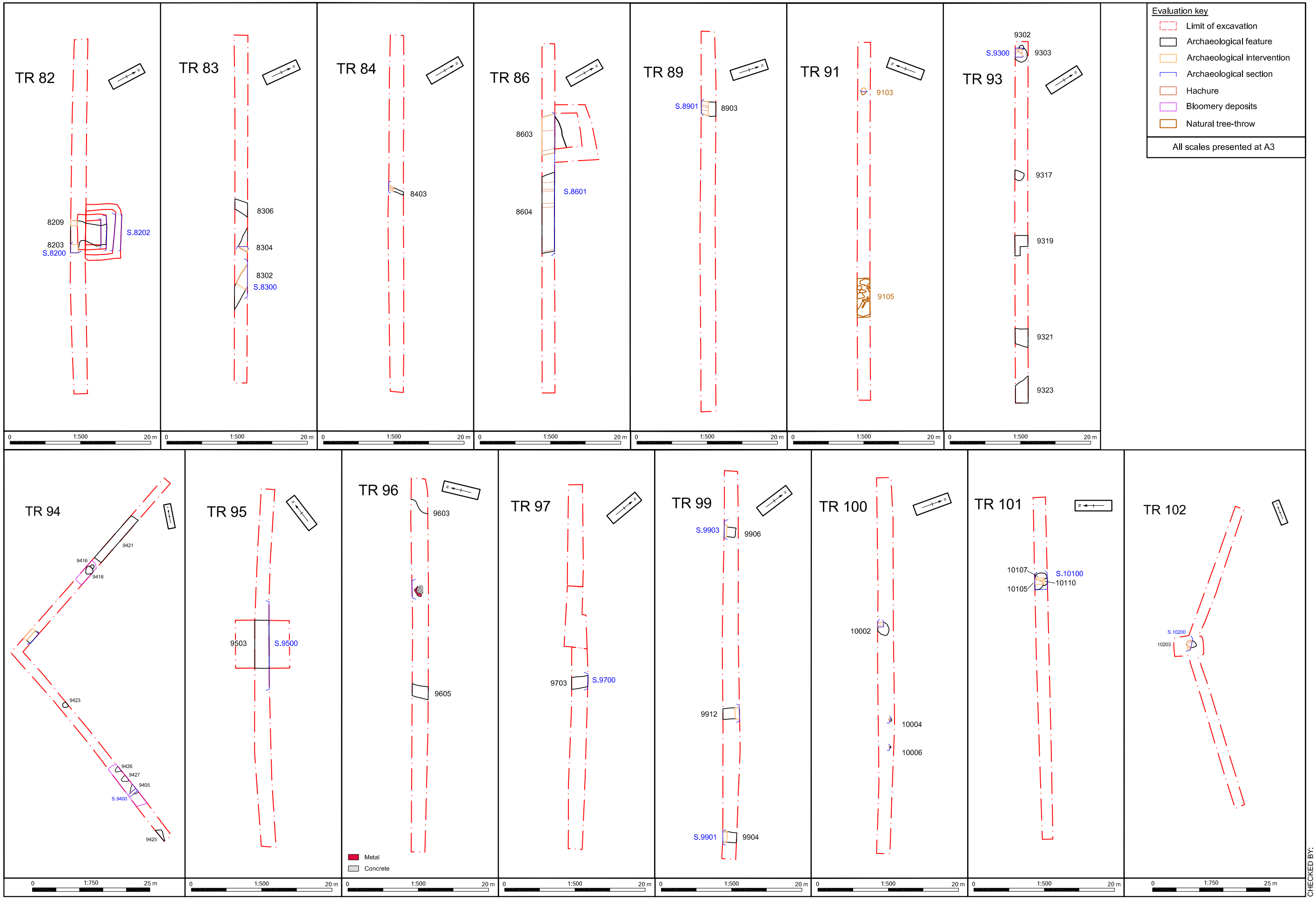
Figure 3: Trenches and archaeological features in the north-west area

Figure 4: Trenches and archaeological features in the north-east area



X:\m\M2 Jct5\010Geomatics\03 GIS Projects\site area plans\STM2JEV_Overview Plan_2017-12-20_Areas_5-7.mxd*benjamin.brown*17/01/2018

Figure 5: Trenches and archaeological features in the south-west and south-east areas



Evaluation key

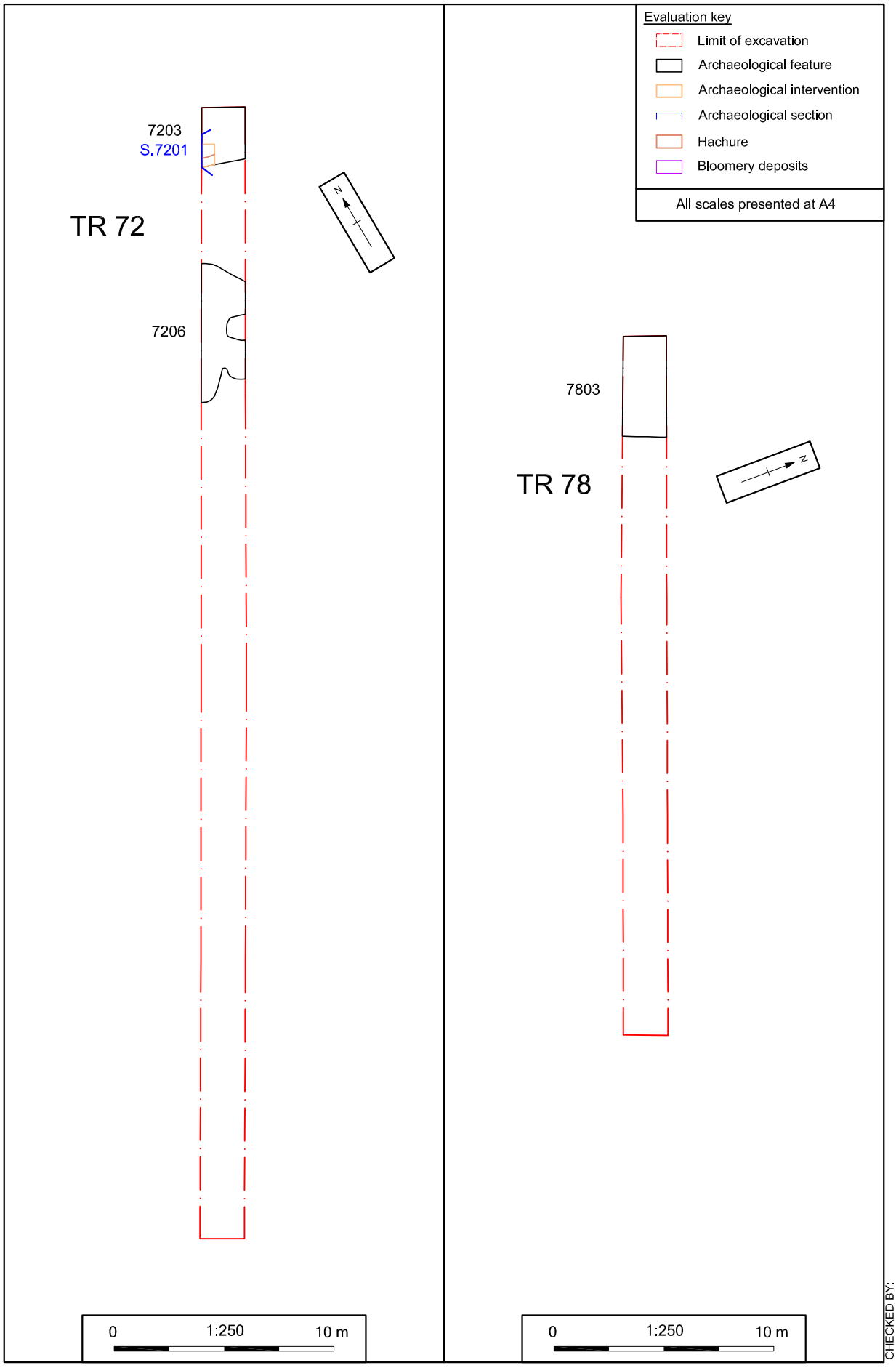
- Limit of excavation
- Archaeological feature
- Archaeological intervention
- Archaeological section
- Hachure
- Bloomery deposits
- Natural tree-throw

All scales presented at A3

X:\m\M2 Jct5\10Geomatics\02 CAD\STM2EV_M2J5_2018-01-16.dwg(North-west Trenches)***STM2JEV*Benjamin.Brown* 22 Jan 2018

CHECKED BY:

Figure 6: Detailed trench plans from the north-west area



All scales present at A4

Figure 7: Detailed trench plans from the north-east area

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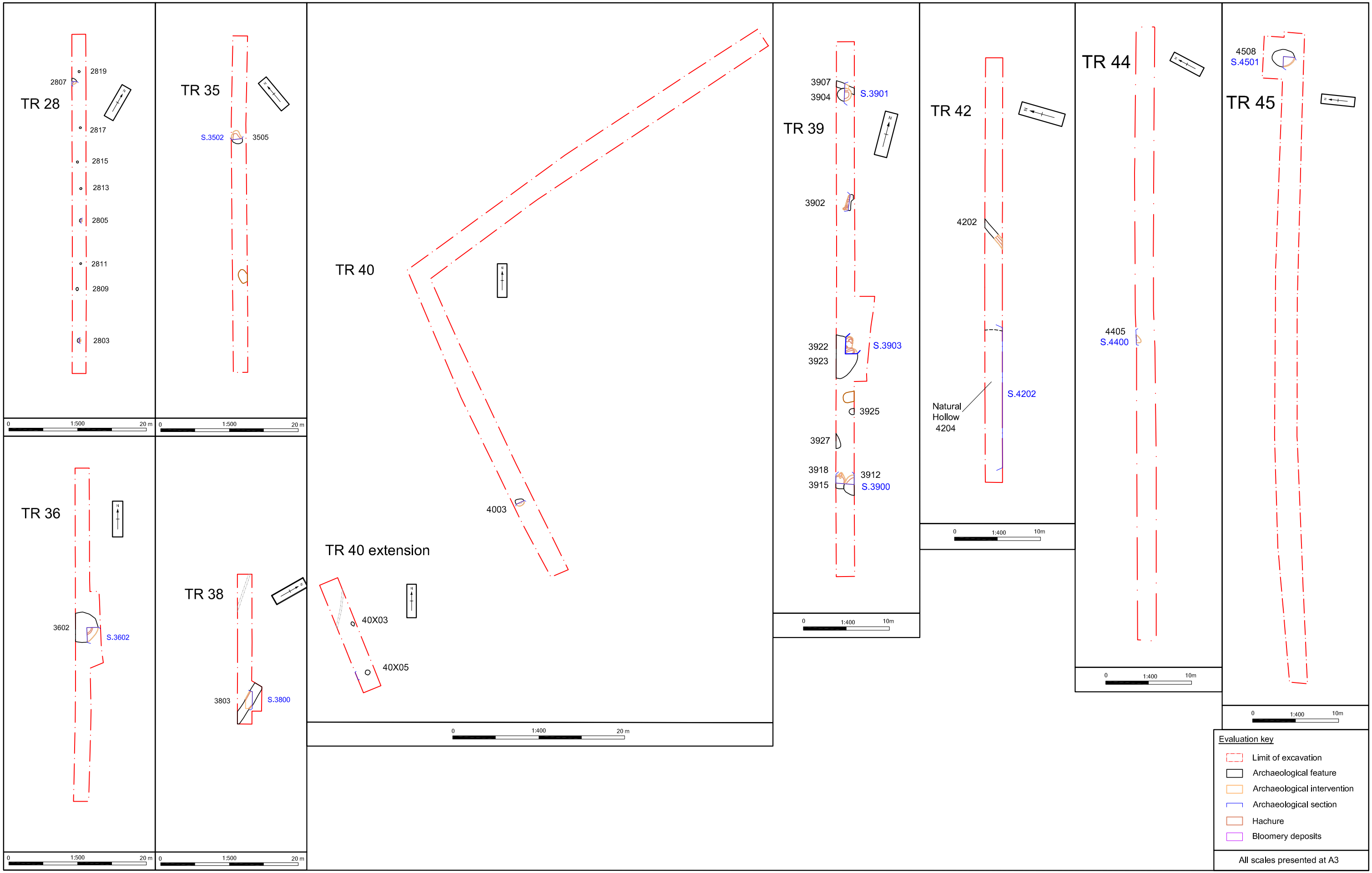

Figure 8: Detailed trench plans from the south-east area

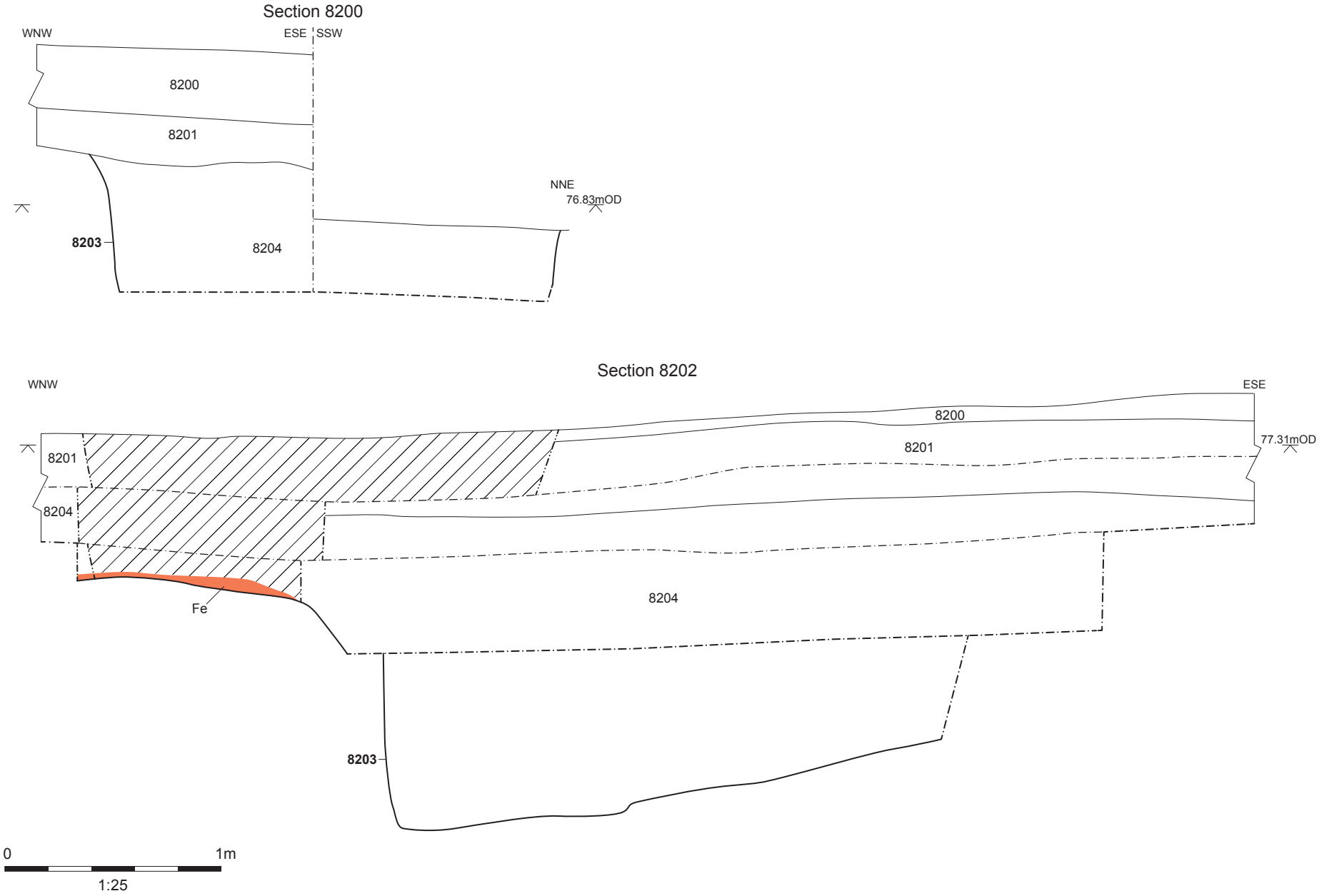

Figure 9: Sections of features in Trench 82

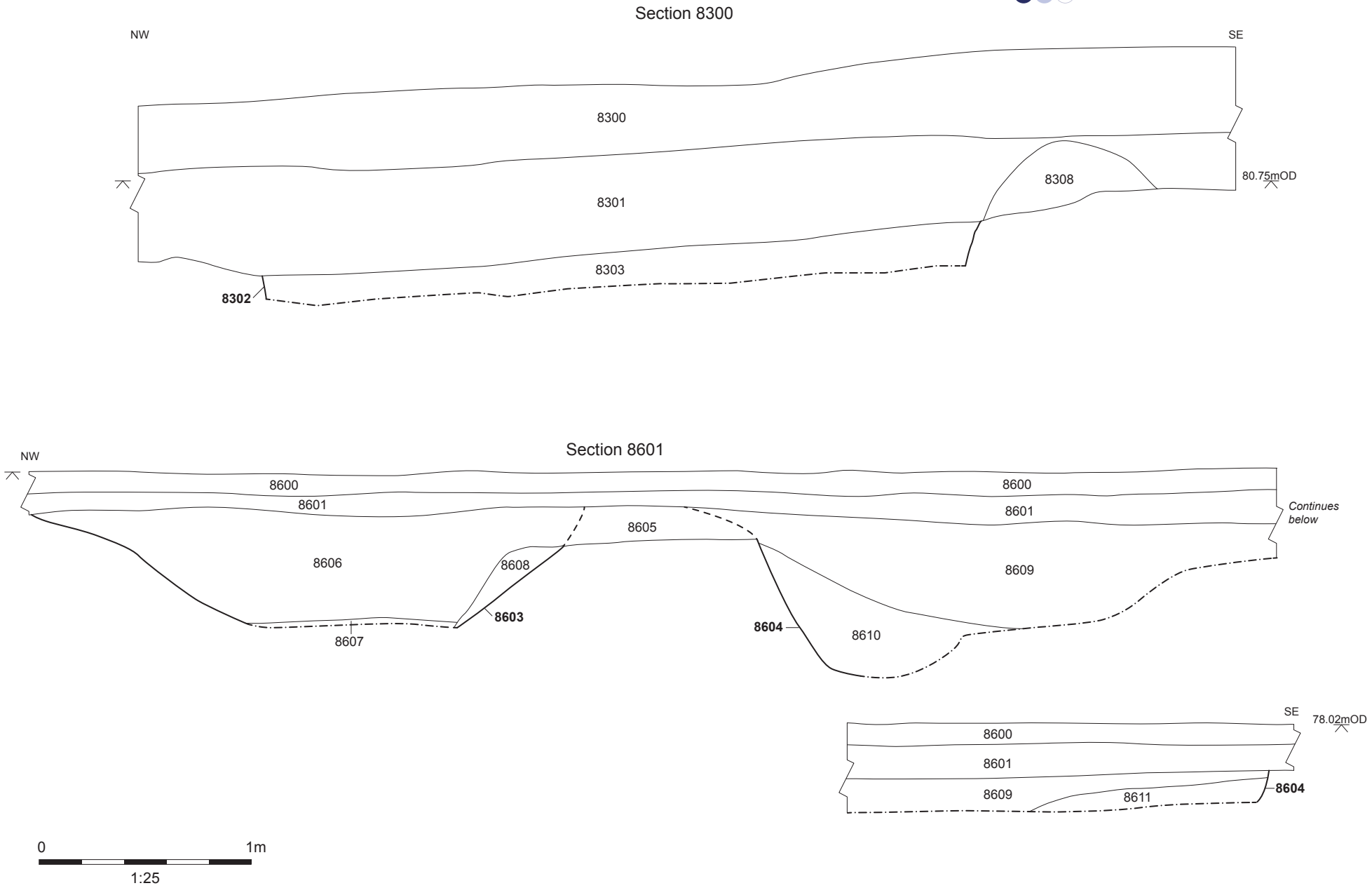

Figure 10: Sections of features in Trenches 83 and 86

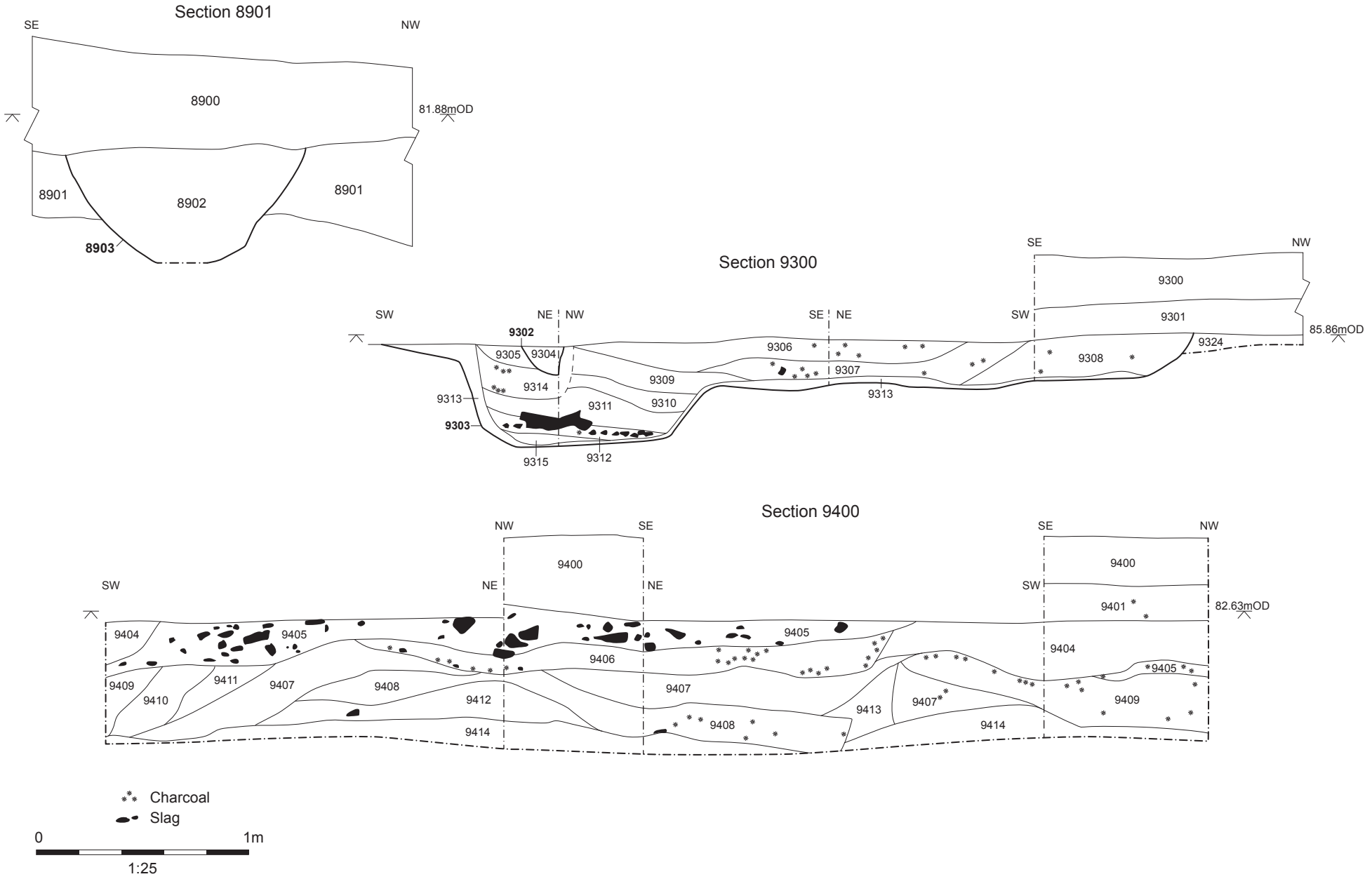

Figure 11: Sections of features in Trenches 89, 93 and 94

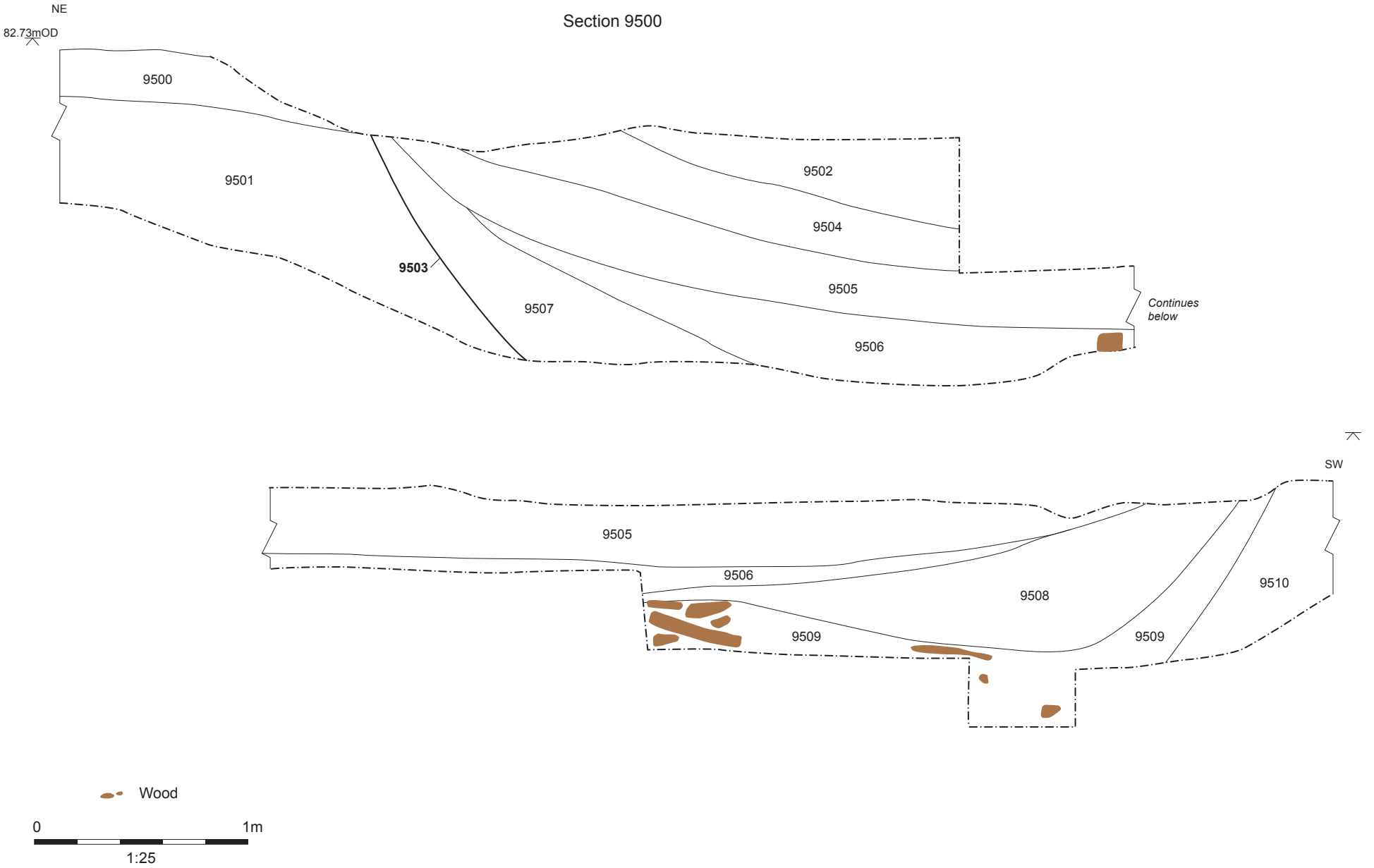

Figure 12: Trench 95 section

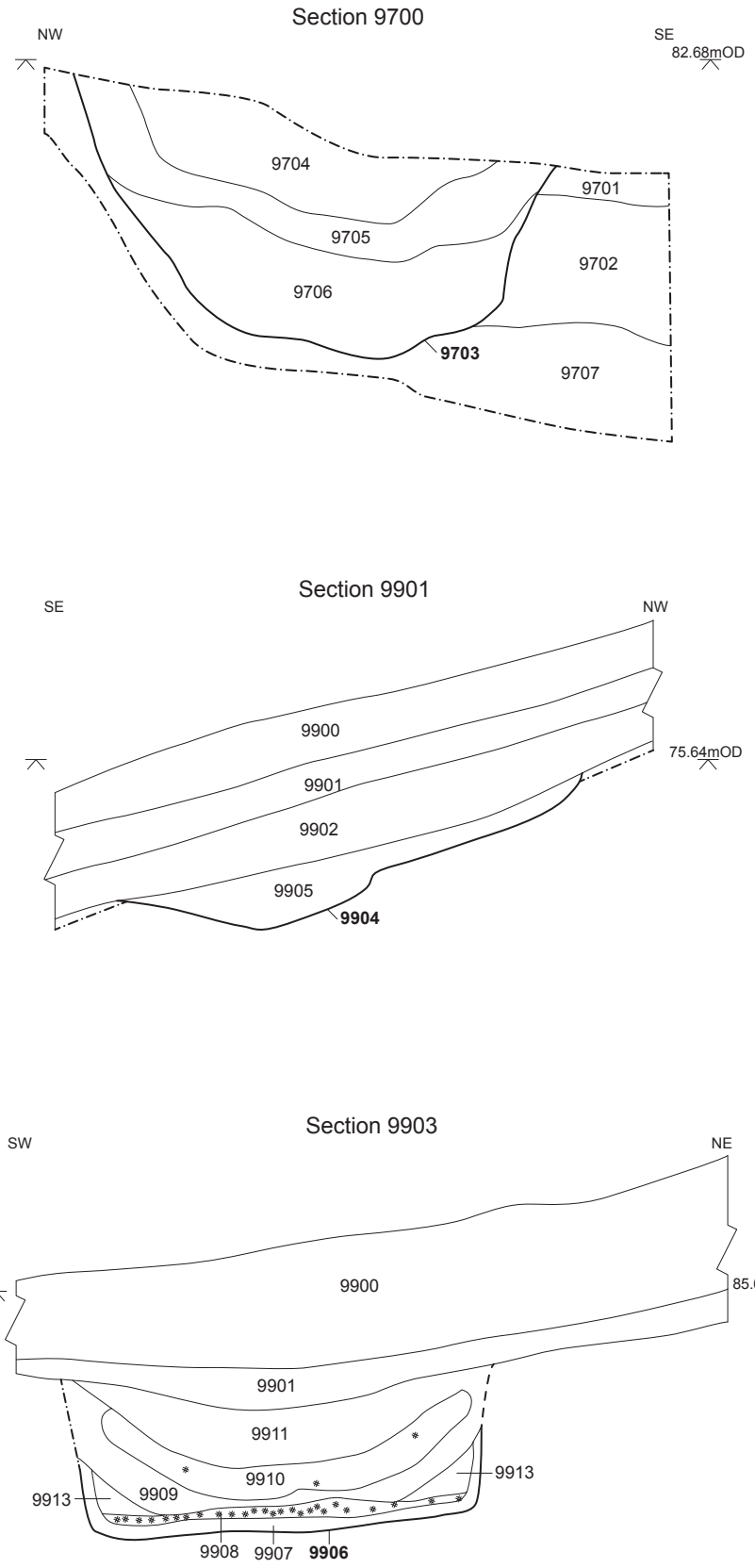

Figure 13: Sections of features Trenches 97 and 99

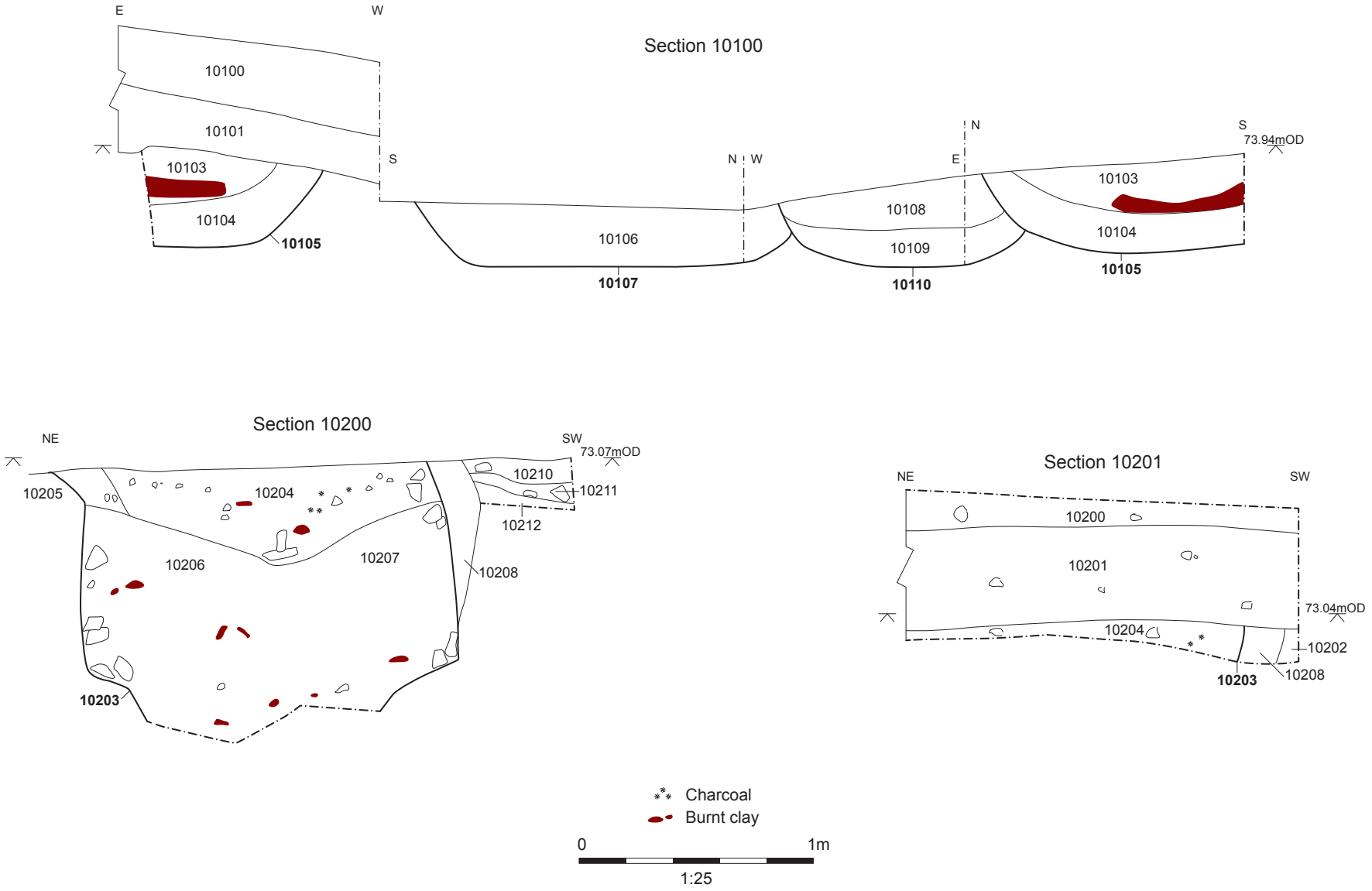

Figure 14: Sections of features in Trenches 101 and 102

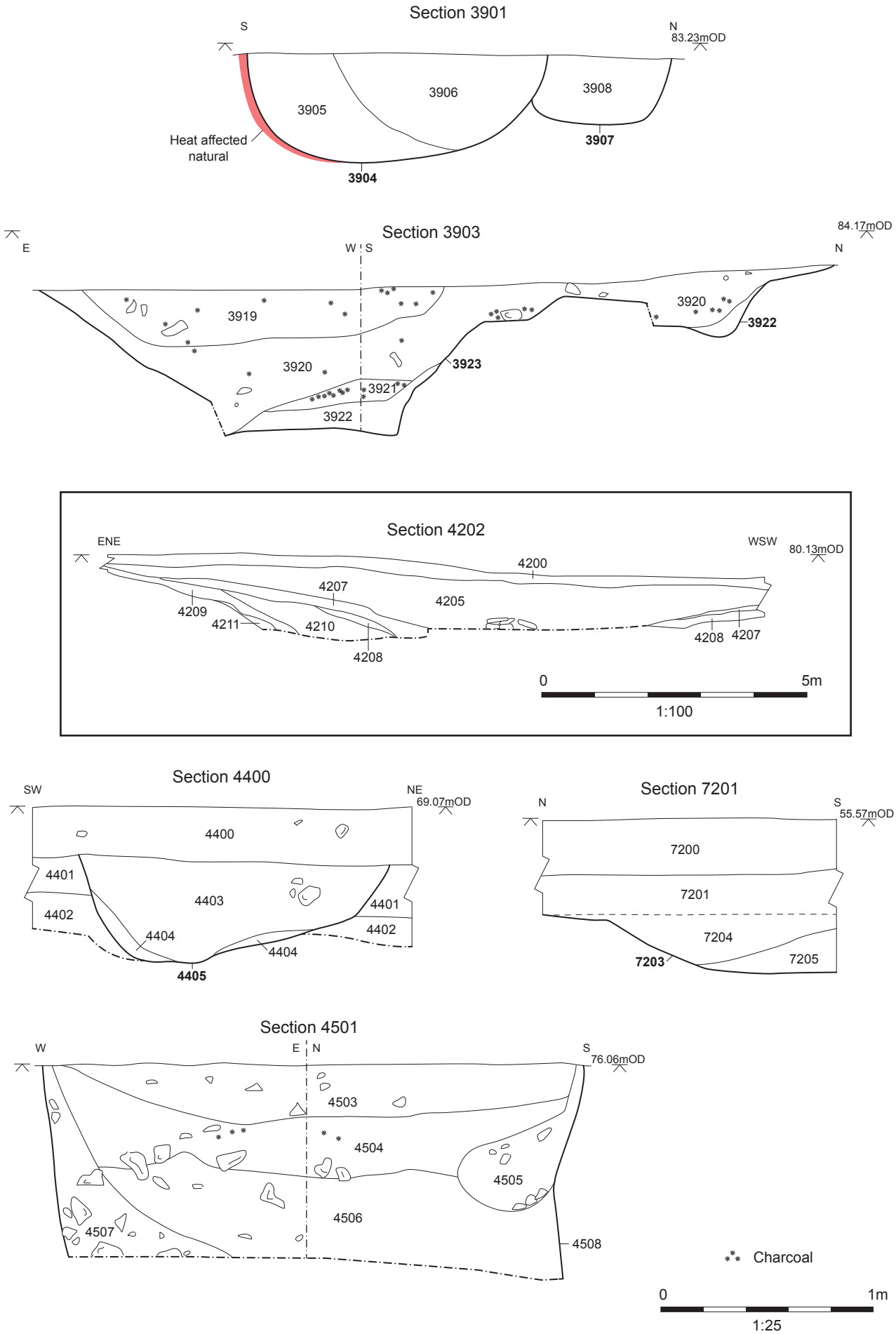

Figure 15: Sections of features in Trenches 39, 42, 44, 45 and 72

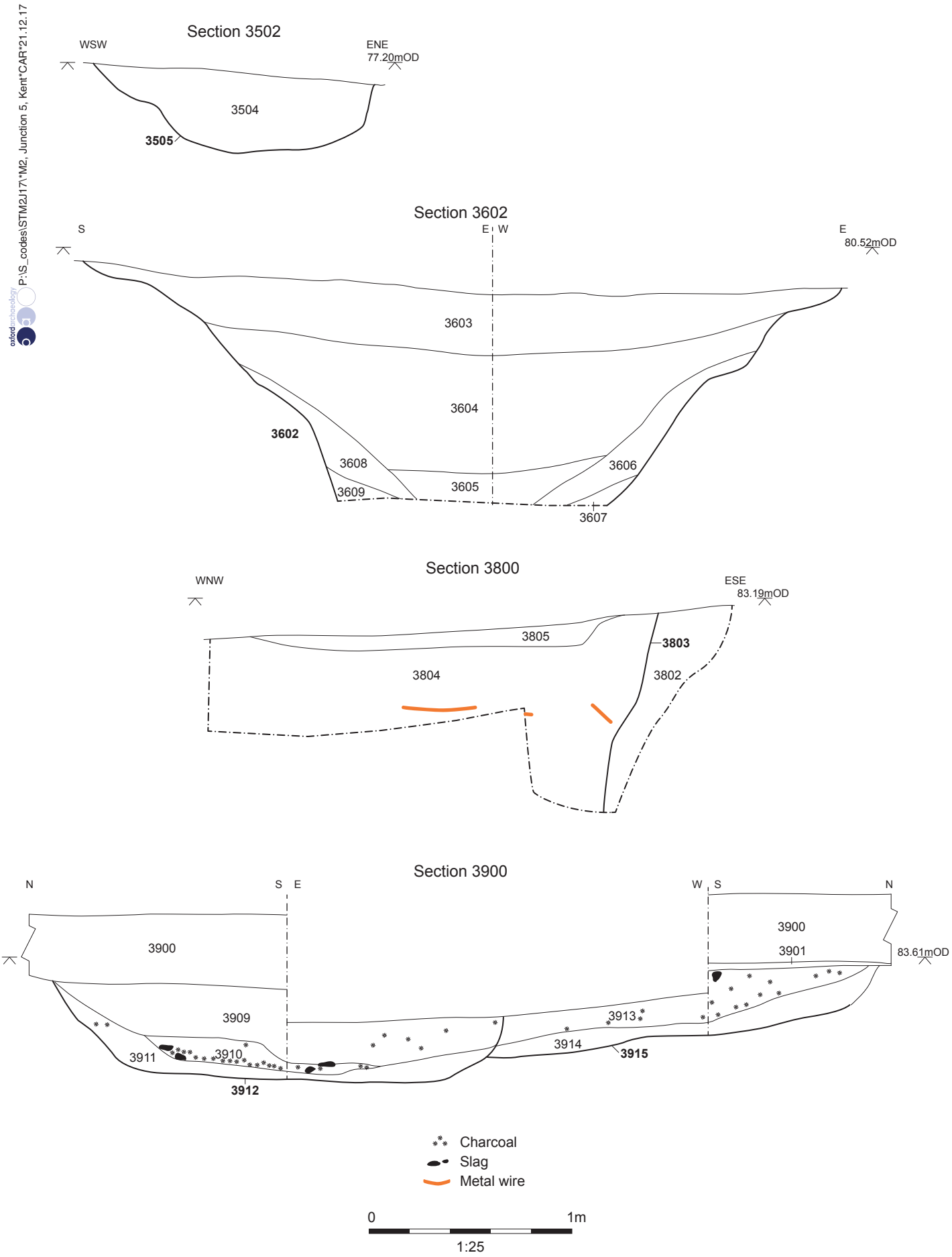

Figure 16: Trenches 35, 36, 38 and 39

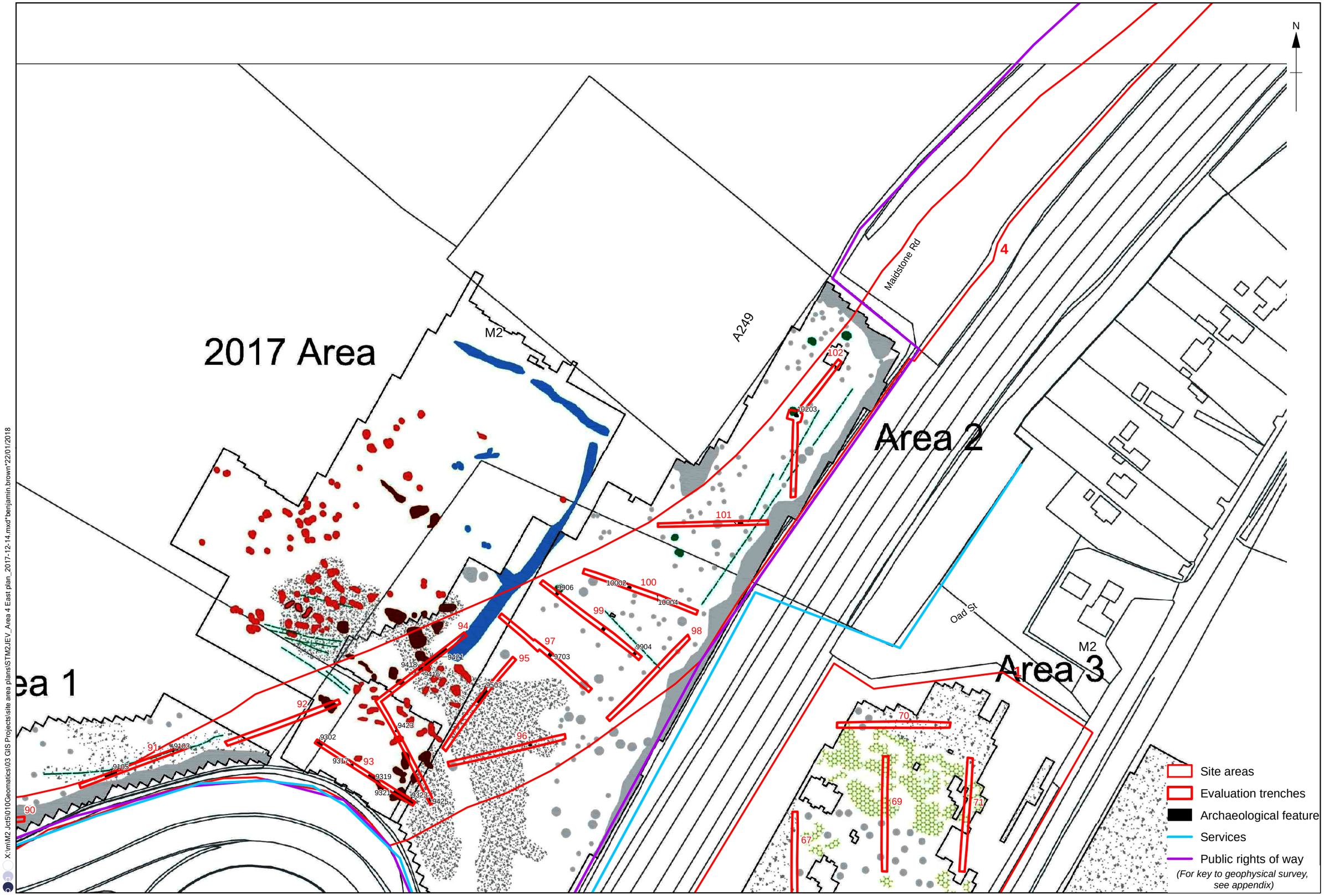

Figure 17: Interpretation of geophysical survey in the north-west area

Plate 1: North-west area, Trench 92 machine-stripped, looking NNE

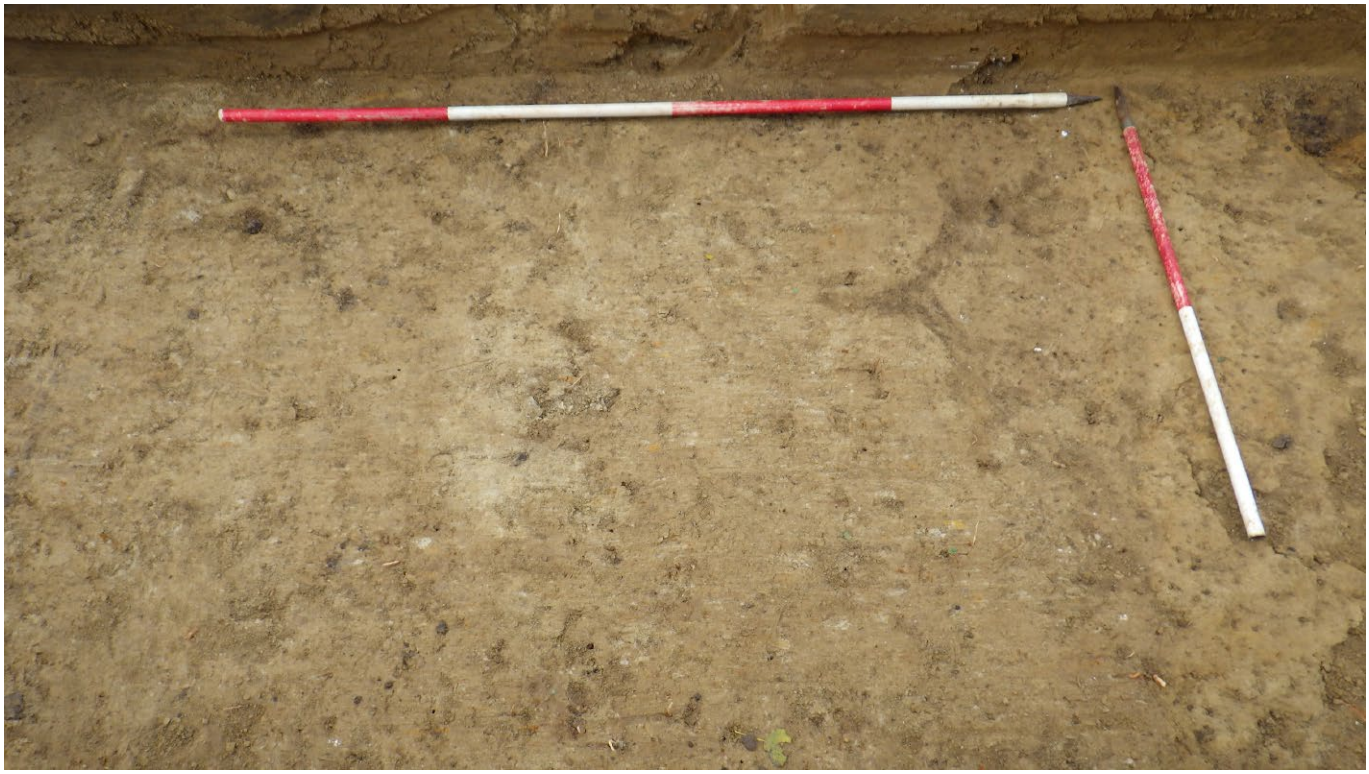

Plate 2: North-west area, Trench 82 feature 8203 stripped prior to excavation, looking SSE

Plate 3: North-west area, Trench 82 feature 8203 excavated, looking SSE

Plate 4: North-west area, Trench 86 feature 8603, looking south-east

Plate 5: North-west area, Trench 86 feature 8604, looking south-east

Plate 6: North-west area, Trench 89 feature 8903, looking west

Plate 7: North-west area, Trench 91 feature 9103 half-excavated, looking west

Plate 8: North-west area, Trench 93 features 9302 and 9303 from above, looking east

Plate 9: North-west area, Trench 93 features 9302 and 9303, quadrant dug, looking north-west

Plate 10: North-west area, Trench 93 features 9302 and 9303, quadrant dug, looking north-east

Plate 11: North-west area, Trench 93 feature 9303, quadrant dug, looking south-east

Plate 12: North-west area, Trench 96 feature 9603, looking WSW

Plate 13: North-west area, Trench 96 feature 9603, looking ENE

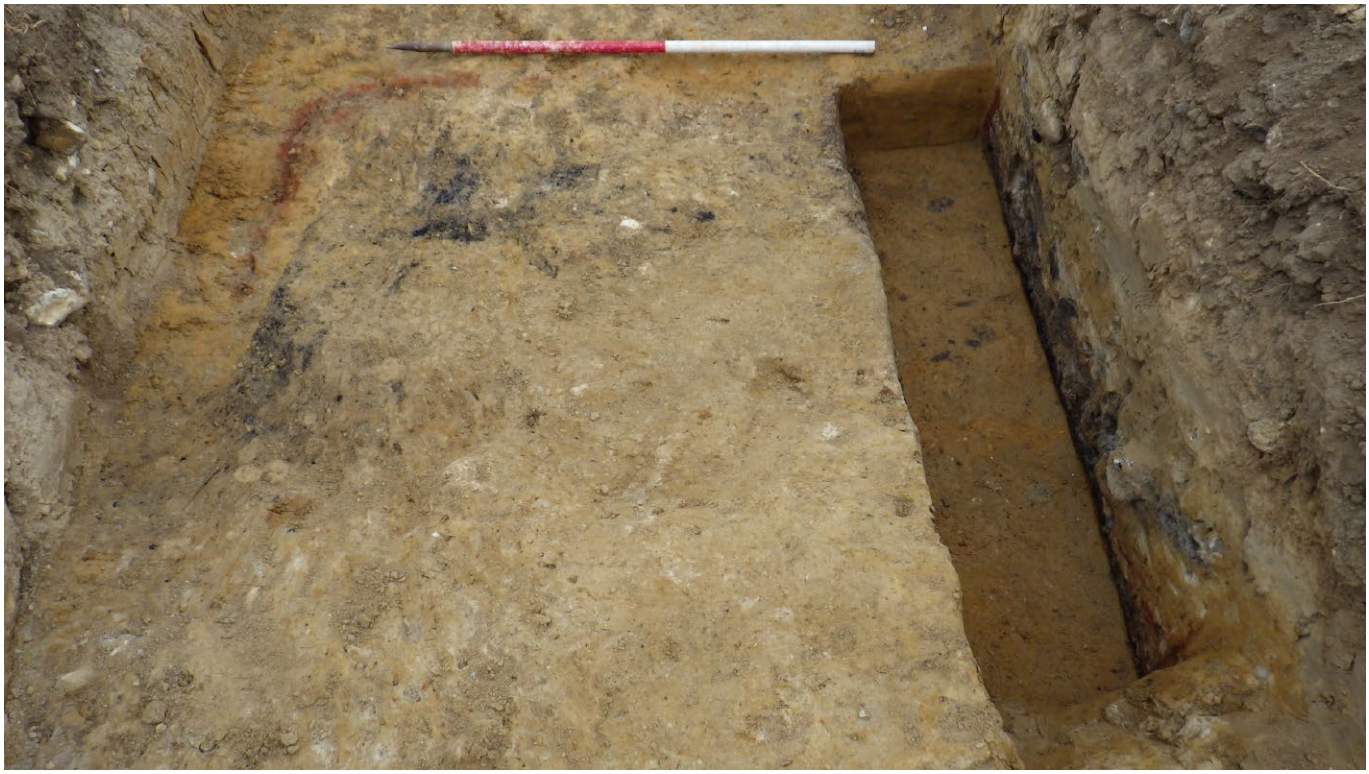

Plate 14: North-west area, Trench 99 feature 9906, looking south-east

Plate 15: North-west area ,Trench 100 feature 10004, looking north-east

Plate 16: Norh-west area, Trench 101 sondage into features 10105 and 10110, looking west

Plate 17: North-west area, Trench 102 feature 10203 part-dug, looking ESE

Plate 18: North-west area, Trench 102 feature 10203 half-excavated, looking ESE

Plate 19: North-west area, Trench 102 feature 10203 half-excavated, looking SSW

Plate 20: North-east area, Trench 73 excavated showing chalk and brickearth natural, looking south

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Plate 26: South-east area, Trench 36 feature 3602 quarter-sectioned, looking north-east

Plate 27: South-east area, Trench 38 feature 3803, looking NNE

Plate 28: South-east area, Trench 39 feature 3902 half-sectioned, looking NNE

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Plate 30: South-east area, Trench 39 features 3912 and 3915 half sectioned, looking south-east

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Plate 32: South-east area, Trench 42 excavated fills in natural hollow, looking south-west

Plate 33: South-east area, Trench 44 feature 4405, looking NNW

Plate 34: South-east area, Trench 45 stripped before hand-excavation, from north-east end

Plate 35: South-east area, Trench 45 pit or shaft 4508, looking east

GEOPHYSICAL SURVEY REPORT G1615

M2 Junction 5 Improvements
Kent

GSB PROSPECTION Ltd

Celebrating over 25 years
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Archaeological Geophysics

sumo Survey Services

Client:

WSP PARSONS BRINCKERHOFF

On Behalf Of:

highways england

GEOPHYSICAL SURVEY REPORT

Project name: M2 Junction 5 Improvements Client: WSP Parsons Brinckerhoff		Job ref: G1615
Survey date: 22 February - 1 March 2016		Report date: 17 March 2016
Field team: Alexis Thouki MA Sophie Nicholson BSc		Field Co-ordinator: Tom Hynd BSc (Hons)
Report written by: Leanne Swinbank BA		Report approved by: Jon Tanner BSc MSc PCIfA MSc PCIfA
CAD illustrations by: Leanne Swinbank		Project Director: Dr John Gater MCIfA FSA
Version number and issue date:		Amendments:
V1	17 March 2016	

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SUMO Survey Services
SUMO Group Member

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- DWG Viewer
- Digital Copies of Report Text and Figures (both PDF and native formats)

APPENDICES

1 SUMMARY OF RESULTS

Several anomalies were detected and have been interpreted as trenches forming part of the Chatham Land Front of World War One; no other results of archaeological significance were detected. Anomalies and trends of *Uncertain Origin* are barely visible over the magnetic background; therefore whilst an archaeological origin cannot be ruled out, natural or agricultural causes are the most probable. Magnetic disturbance is present throughout the dataset and is thought to be of modern origin. Two pipes were detected

2 INTRODUCTION

2.1 Background synopsis

GSB Prospection were commissioned to undertake a geophysical survey of an area outlined for residential development. This survey forms part of an archaeological investigation being undertaken by **WSP Parsons Brinckerhoff** on behalf of **Highways Agency**.

2.2 Site Details

NGR / Postcode	TQ 855 622 / ME9 7QE
Location	The site is located 3.3 miles southwest of Sittingbourne, centred around junction 5 of the M2.
HER/SMR	Kent HER
District	Swale
Parish	Stockbury
Topography	Generally undulating, more steeply sloping in places.
Current Land Use	Pasture and arable, some wooded areas which were unsurveyable.
Weather Conditions	Mostly sunny throughout the survey with only one day of rain.
Soils	Andover 1 (343h) - shallow well drained calcareous silty soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms. Striped soil patterns locally (SSEW 1983).
Geology	Bedrock - Seaford Chalk Formation – Chalk, with a band of Thanet Formation - Sand, Silt and Clay to the north. Superficial deposits consist of Head - Clay, Silt, Sand and Gravel (BGS 2016).
Archaeology	A number of WW1 land defences were identified in Environmental Assessment Report within the boundaries of the survey area, as well as a WW1 Pill Box and two crash sites located just outside (WSPPB 2015).
Survey Methods	Detailed magnetometer survey (fluxgate gradiometer)
Study Area	*c.*31ha

2.3 Aims and objectives

To locate and characterise any anomalies of possible archaeological interest within the study area. The work forms part of a wider archaeological assessment being carried out by **WSP Parsons Brinckerhoff** on behalf of **Highways Agency**.

3 METHODS, PROCESSING & PRESENTATION

3.1 Standards & Guidance

This report and all fieldwork have been conducted in accordance with the latest guidance documents issued by Historic England (2008) (then English Heriatge) and the Chartered Institute for Archaeologists (2002 & 2014).

3.2 Survey methods

Detailed magnetic survey was used as an efficient and effective method of locating archaeological anomalies.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

This project was carried out in accordance with Method Statement submitted to the Local Planning Authority (LPA).

More information regarding this technique is included in Appendix A.

3.3 Data Processing

The following schedule shows the basic processing carried out on the data used in this report:

1. *Destripe*
2. *Destagger*

3.4 Presentation of results and interpretation

The presentation of the data for each site involves a plot of the minimally processed data as a greyscale plot and an XY trace plot showing extreme magnetic values. Magnetic anomalies have been identified and plotted onto the 'Interpretation of Anomalies' drawing.

When interpreting the results several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to very specific known features documented in other sources, this is done (for example: Abbey Wall, Roman Road). For the generic categories levels of confidence are indicated, for example: probable, or possible archaeology. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification "possible".

4 RESULTS

4.1 The datasets are dominated by magnetic disturbance. Such disturbance is typical of responses associated with relatively modern remains, and in this case the construction of the M2 is a likely cause.

4.2 Anomalies [**1**], [**2**], [**3**] and [**4**] have been tentatively categorised as *WW1 Land Defences* as their locations correspond (to varying degrees of precision) with plans of the Chatham Land Front defences of the First World War (WSPPB 2015). Without this *a priori* knowledge it is likely that these anomalies would not been identified as WW1 remains but would have been interpreted as magnetic disturbance caused by general debris. However, although anomaly [**1**] in Area 1 is typical of the magnetic response of a drain or pipe, the location shows good correlation with the mapped trenching. Anomalies [**2**] and [**3**] are almost indistinguishable from the magnetic background; response [**2**] in Area 8 correlates well but only a length of *c.*23m was detected. An adjacent anomaly [**2a**] is some 16m distant from the mapped position, but otherwise has an equal claim to represent trenching. Anomaly [**3**] in Area 11 is particularly ill-defined and spread out, but coincides well with the recorded trench location. In Area 5, anomaly [**4**] could represent a short length – *c.*30m - of trench, as the alignment coincides with the trench records. Therefore, although these anomalies are only visible in truncated sections and are barely visible above the magnetic background, their correlation with mapped locations of World War One trenches has led to their classification as *WW1 Land Defences*.

4.3 Responses classified as *Uncertain Origin* have been highlighted across the survey areas. These responses include discrete anomalies and trends within the data. They lack the defined morphology of anomalies indicative of an archaeological origin and may reflect variations in the underlying geology and/or agricultural features. Whilst an archaeological origin should not be entirely ruled out for some of these anomalies, the former explanations are the most likely.

4.4 Area 3 contains a number of strong but variable and ill-defined anomalies characteristic of responses caused by high levels of geological or pedological background variation, or waterlogged ground. They have been assigned to the category *Natural.*

4.5 Services have been detected as large scale discrete anomalies (linear and non-linear) produced by a combination of surface and buried features (pipes in Areas 8 and 10) and a row of electricity poles in Area 10.

4.6 Ferrous responses adjacent to boundaries are due to fences and gates. Small scale ferrous anomalies (“iron spikes”) are present throughout the data, their form best illustrated in the XY trace plots, and these responses are characteristic of small pieces of ferrous debris in the topsoil and are commonly assigned a modern origin. The most prominent of these are highlighted on the interpretation diagram.

5 DATA APPRAISAL & CONFIDENCE ASSESSMENT

5.1 The site is relatively magnetically "noisy" probably due to debris resulting from the construction of Junction 5 of the M2, and it is possible that magnetically weak anomalies, if present, may have been masked. However, the identification of the possible World War One trenches suggests that any reasonably magnetically strong anomalies are likely to have been detected.

5.2 Site conditions were generally acceptable for survey. Some small areas, one to the north of Area 8 and one to between Areas 10 and 11, consisted of woodland and were thus unsurveyable. Several small gaps in the data in Areas 6 and 7 are due to farm buildings.

6 CONCLUSION

6.1 Four short linear anomalies have been tentatively identified as trenches from the World War One Chatham Land Front defences due the correlation of their locations with the recorded and mapped trenches.

6.2 Magnetic disturbance and strong responses of ferrous material were detected across the dataset, and are likely to be due to the construction of Junction 5 of the M2.

6.3 Numerous anomalies and trends of *Uncertain Origin* were recorded and are likely to be of agricultural or natural origin. Pipes were detected in Areas 8 and 10.

7 REFERENCES

BGS 2016 British Geological Survey, n.d., website: (http://www.bgs.ac.uk/opengeoscience/home.html?Accordion1=1#maps) Geology of Britain viewer. [Accessed 9/03/2016]

CIfA 2014 *Standard and Guidance for Archaeological Geophysical Survey*. Chartered Institute for Archaeologists.(http://www.archaeologists.net/sites/default/files/CIfAS&GGeophysics_1.pdf)

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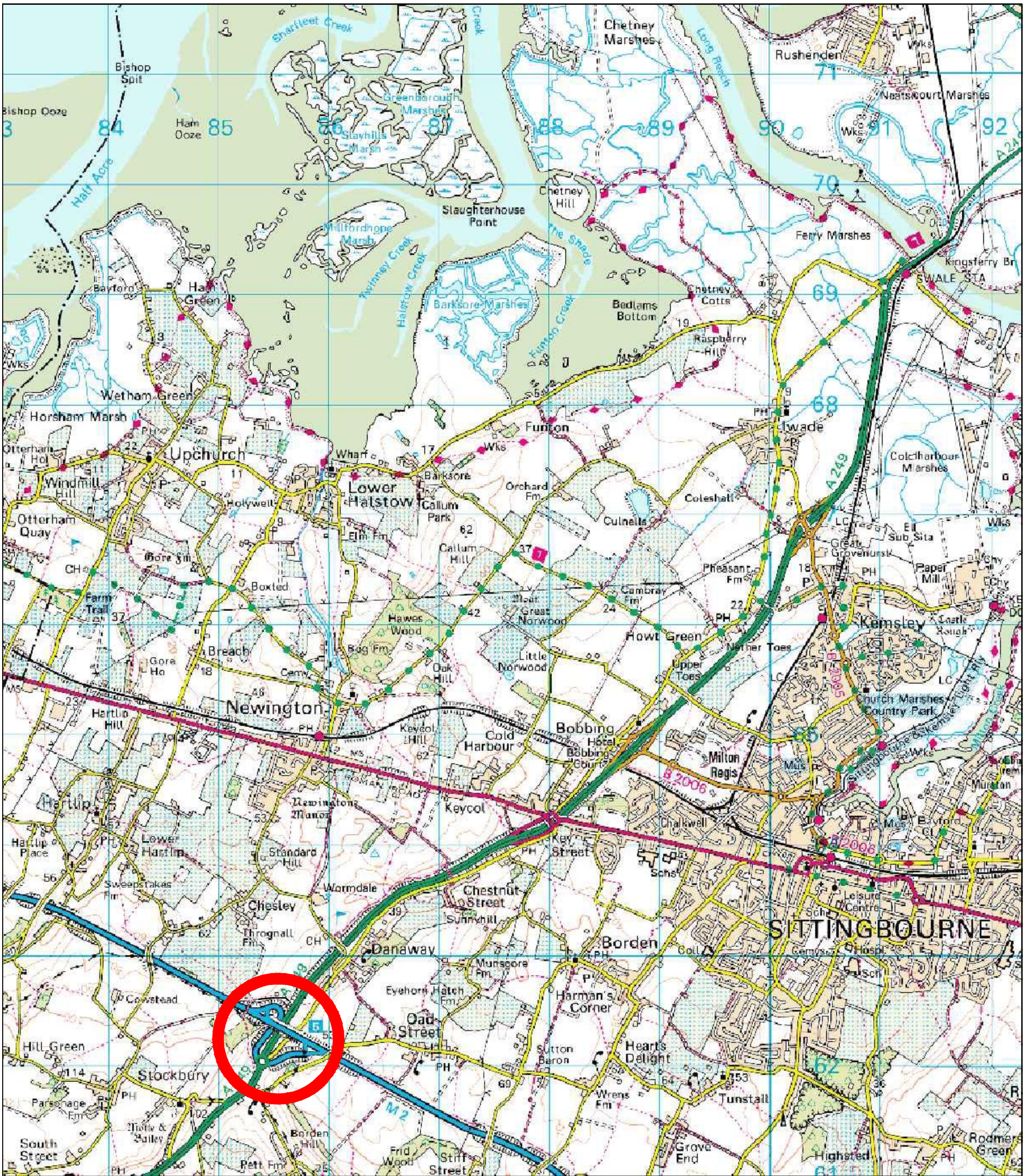
SSEW 1983 *Soils of England and Wales, Sheet 6 South East England.* Soil Survey of England and Wales

WSPPB 2015 *M2 Junction 5 Improvement Study – Environmental Assessment Report.* Unpublished draft report, WSP Parsons Brinckerhoff, Manchester



N

Title:

Site Location Diagram

Client:

WSP Parsons Brinckerhoff

Project:

G1615
M2 Junction 5 Improvements

Site Location

Scale: 0 metres 2000

1:50000 @ A3

Fig No: 1

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SUMO Survey Services

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Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (Destagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.
Interpolation	When geophysical data are presented as a greyscale, each data point is represented as a small square. The resulting plot can sometimes have a 'blocky' appearance. The interpolation process calculates and inserts additional values between existing data points. The process can be carried out with points along a traverse (the x axis) and/or between traverses (the y axis) and results in a smoother greyscale image.

Display

XY Trace Plot	This involves a line representation of the data. Each successive row of data is equally incremented in the Y axis, to produce a stacked profile effect. This display may incorporate a hidden-line removal algorithm, which blocks out lines behind the major peaks and can aid interpretation. The advantages of this type of display are that it allows the full range of the data to be viewed and shows the shape of the individual anomalies. The display may also be changed by altering the horizontal viewing angle and the angle above the plane.
Greyscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly all values below the given range are represented by the minimum intensity shade.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Probable Archaeology	This term is used when the form, nature and pattern of the response are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
Possible Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Former Field Boundary (probable & possible)	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases the response may be the result of more recent agricultural activity.
Agriculture (ploughing)	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Land Drain	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains will often lead and empty into larger diameter pipes and which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present. They are presumed to be modern.
Service	Magnetically strong anomalies usually forming linear features indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) cause weaker magnetic responses and can be identified from their uniform linearity crossing large expanses.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
Uncertain Origin	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology* and *Possible Natural* or (in the case of linear responses) *Possible Archaeology* and *Possible Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.2 nanoTeslas (nT) in an overall field strength of 48,000nT, can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

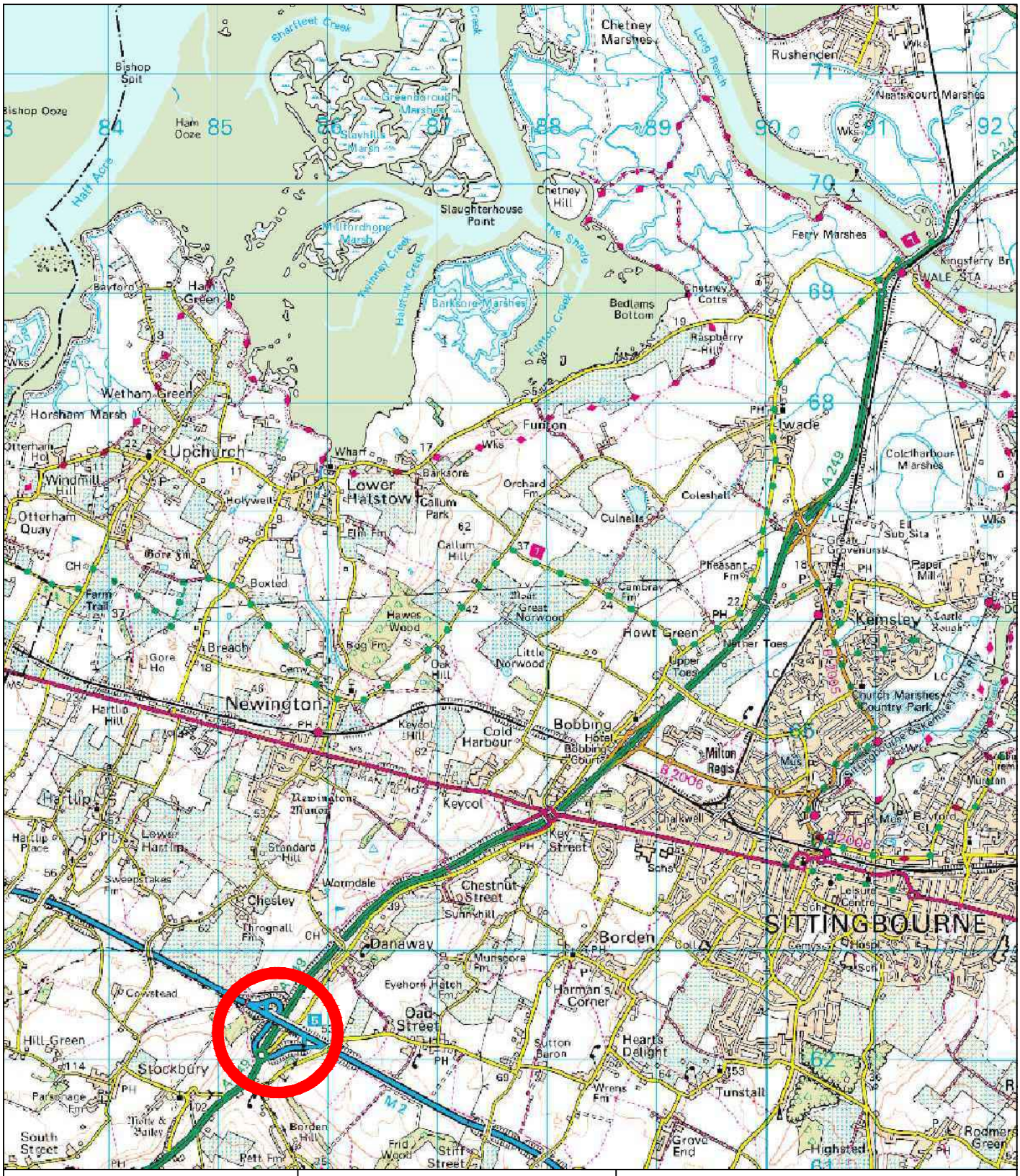
Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns and material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried field. The difference between the two sensors will relate to the strength of a magnetic field created by a buried feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity, disturbance from modern services etc.



Site Location

N

Title:
Site Location Diagram

Client:
WSP Parsons Brinckerhoff

Project:
G1615
M2 Junction 5 Improvements

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Scale: 0 metres 2000
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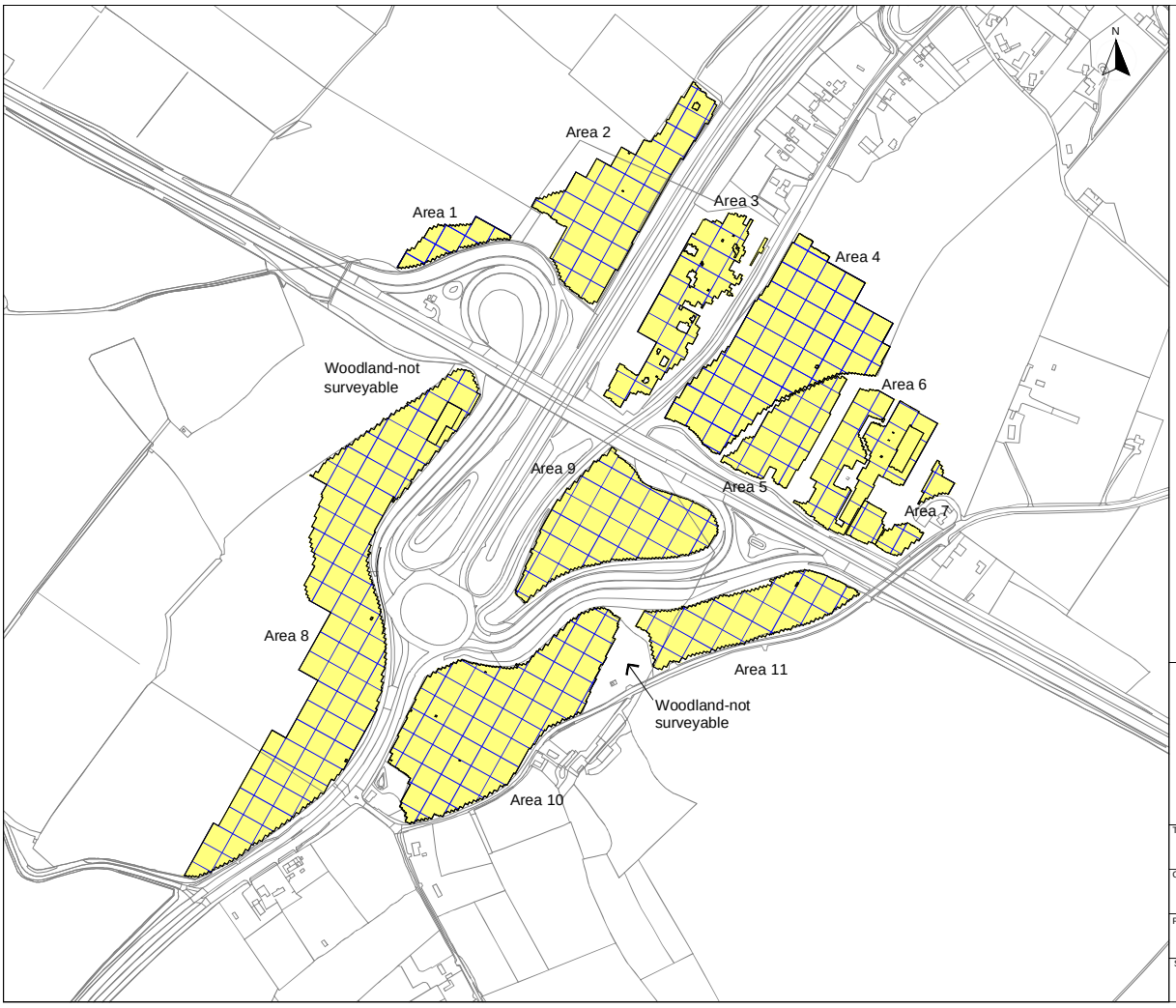

Magnetometer survey areas showing 30m grids

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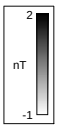
Title: Location of Survey Areas

Client: WSP Parsons Brinckerhoff

Project: G1615 M2 Junction 5 Improvements

Scale: 0 metres 200
1:5000 @ A3

Fig No: 2



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Title:
Magnetometer Survey [All Areas]
Greyscale Plots

Client:
WSP Parsons Brinckerhoff

Project:
G1615 M2 Junction 5 Improvements

Scale:
0 metres 200
1:5000 @ A3

Fig No:
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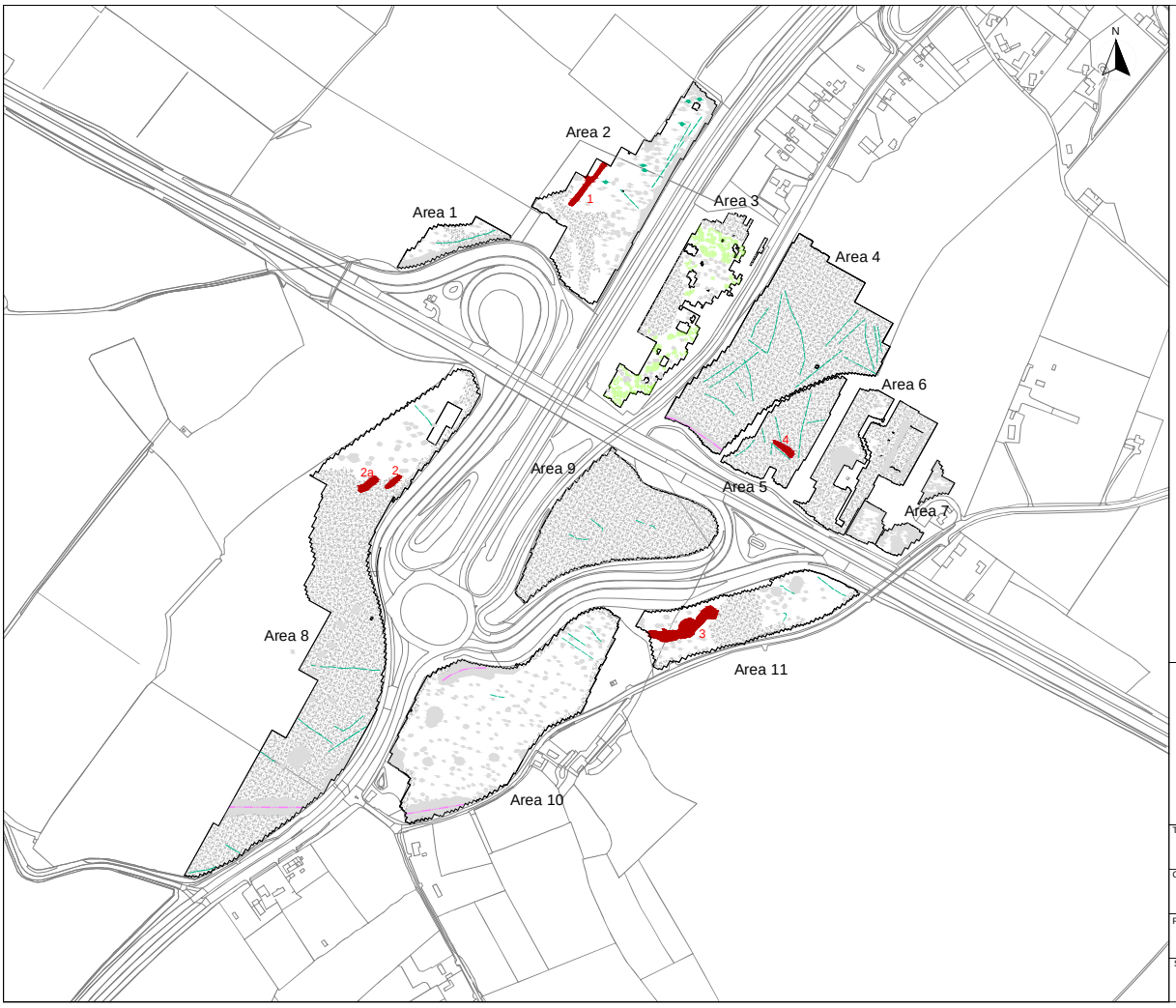

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Title: Magnetometer Survey [All Areas] Interpretation

Client: WSP Parsons Brinckerhoff

Project: G1615 M2 Junction 5 Improvements

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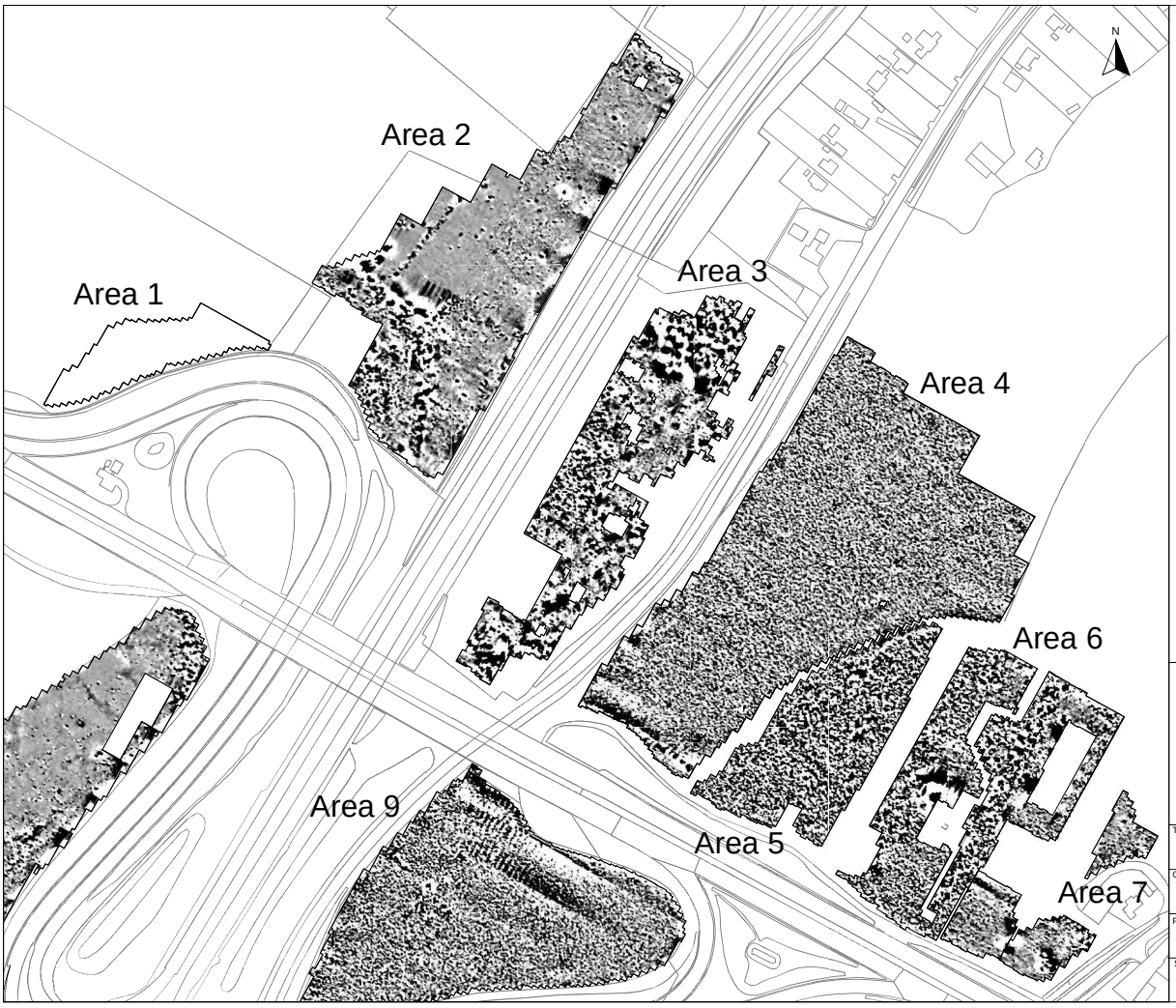

2
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-1

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Title:
Magnetometer Survey [Areas 1 - 7]
Greyscale Plots

Client:
WSP Parsons Brinckerhoff

Project:
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Scale:
0 metres 100
1:2500 @ A3

Fig No:
5

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Title: Magnetometer Survey [Areas 1 - 7] Interpretation

Client: WSP Parsons Brinckerhoff

Project: G1615 M2 Junction 5 Improvements

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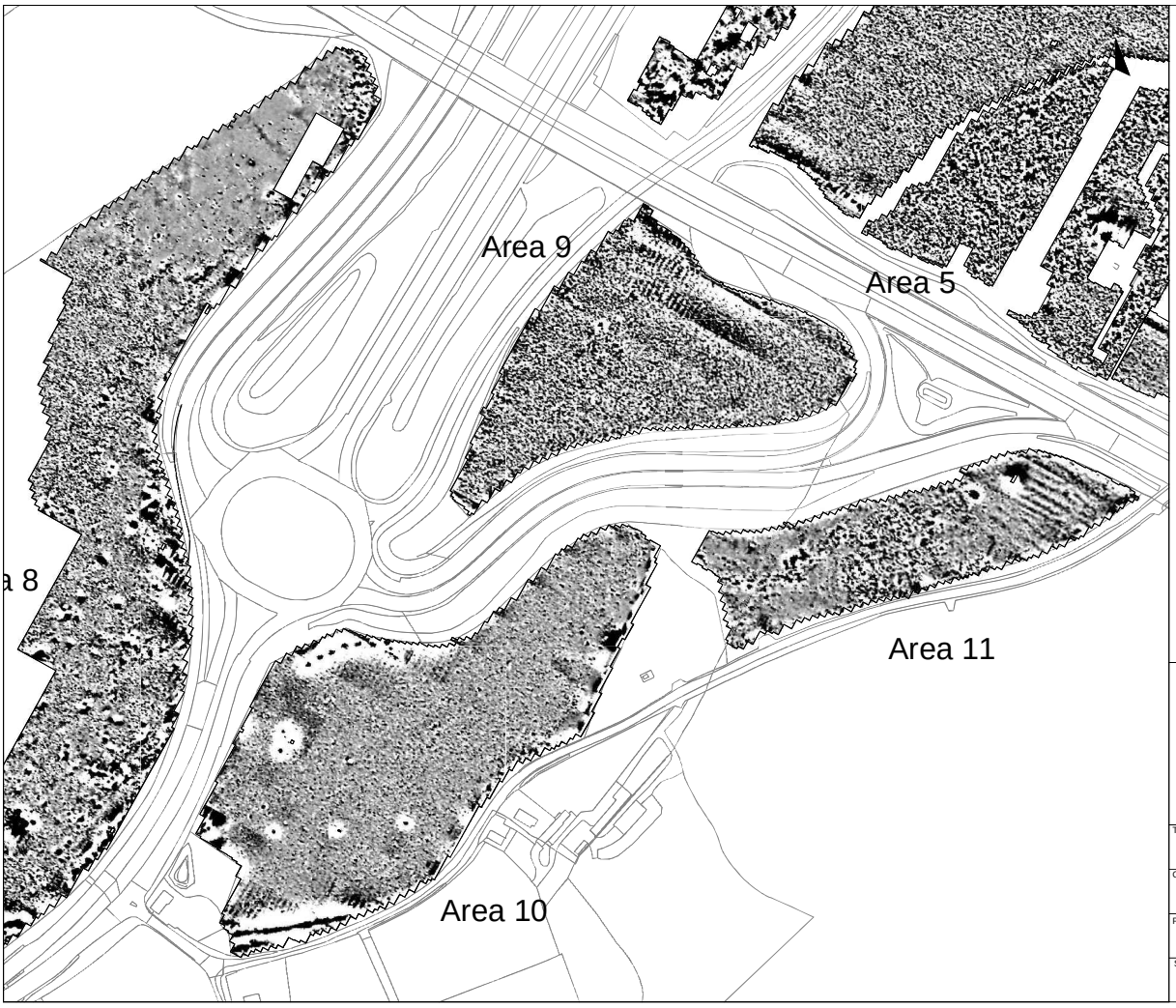

2
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-1

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Title:
Magnetometer Survey [Areas 9 - 11]
Greyscale Plots

Client:
WSP Parsons Brinckerhoff

Project:
G1615 M2 Junction 5 Improvements

Scale:
0 metres 100
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Fig No:
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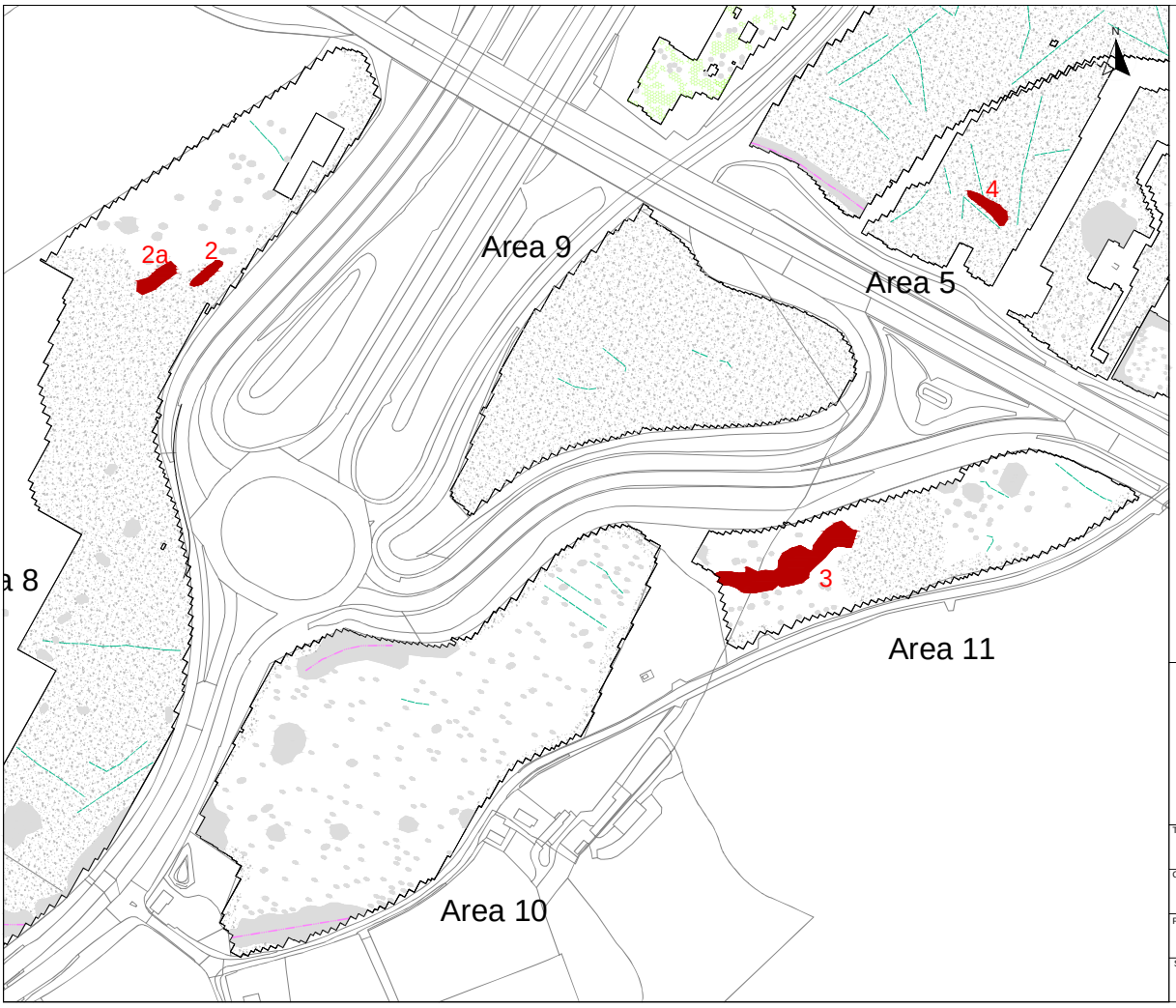

?WW1 Land Defences

Magnetic disturbance

Uncertain Origin
(discrete anomaly / trend)

Natural

Pipe

Ferrous

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Title:
Magnetometer Survey [Areas 9 - 11]
Interpretation

Client:
WSP Parsons Brinckerhoff

Project:
G1615 M2 Junction 5 Improvements

Scale:
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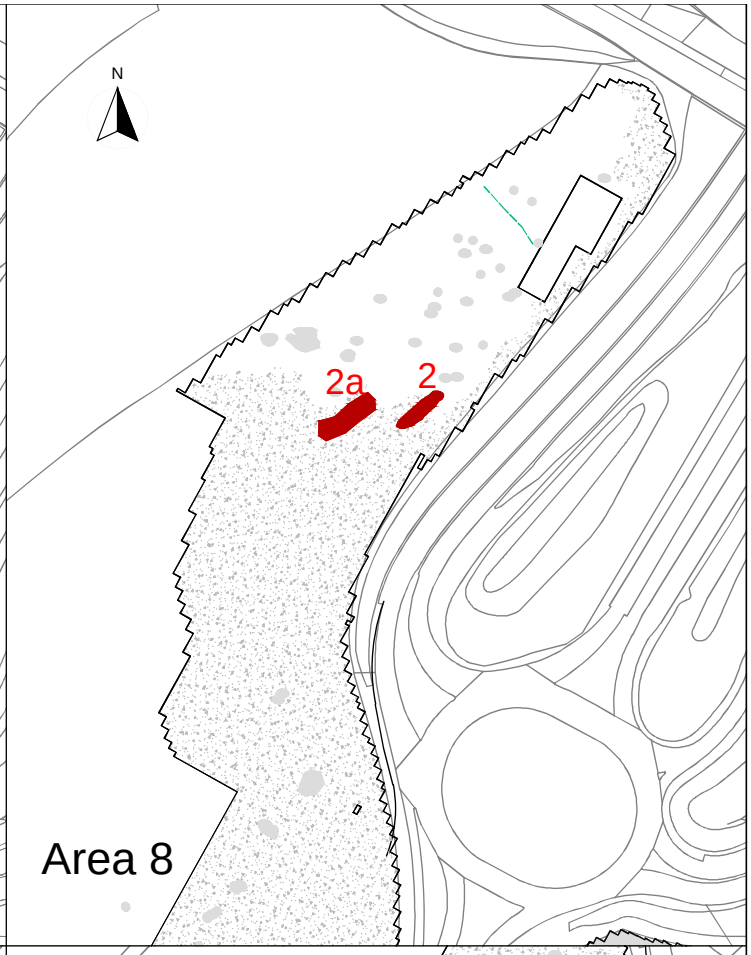

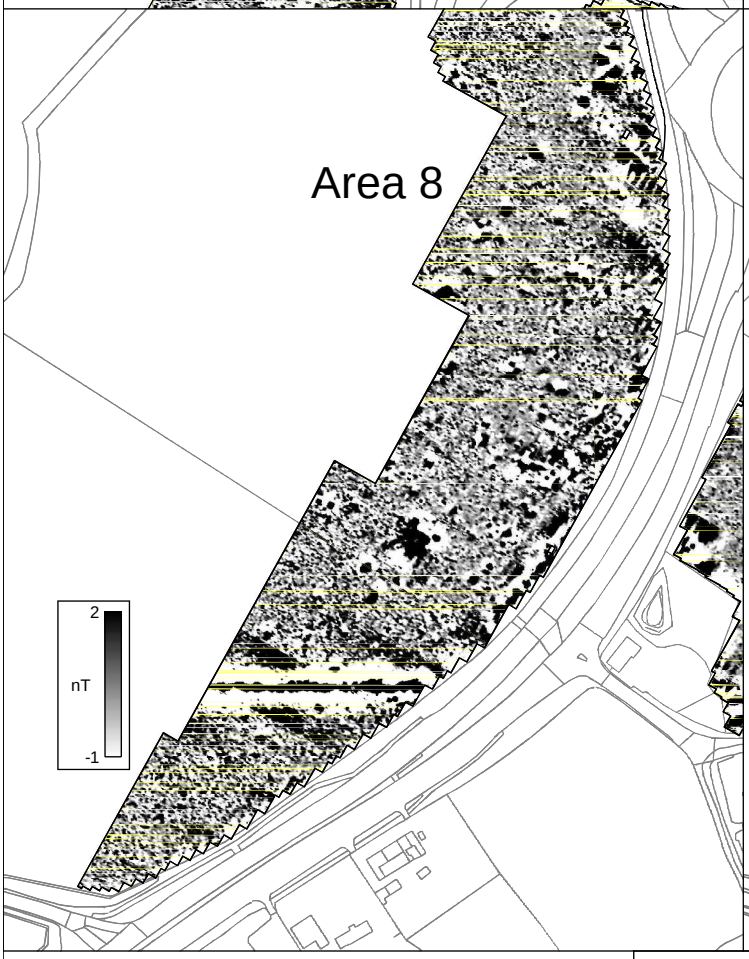

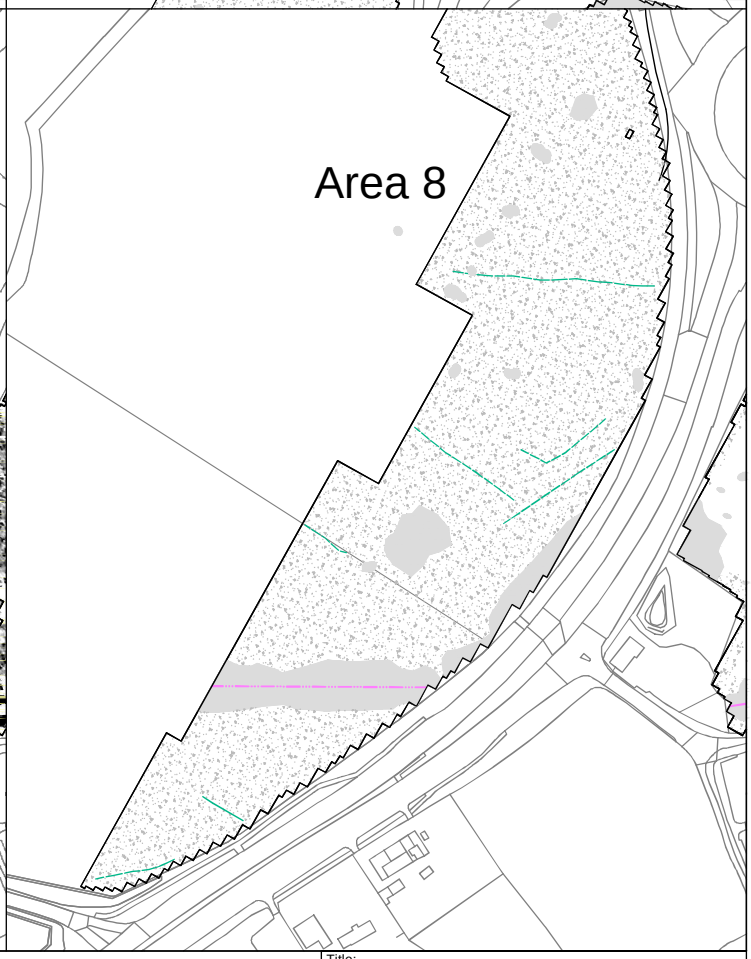

?WW1 Land Defences

Magnetic disturbance

Uncertain Origin (trend)

Pipe

Ferrous

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Title: Magnetometer Survey [Area 8]
Greyscale Plot / Interpretation

Client: WSP Parsons Brinckerhoff

Project: G1615 M2 Junction 5 Improvements

Scale: 0 metres 100
1:2500 @ A3

Fig No: 9

GEOPHYSICAL SURVEY REPORT

GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

M2 Junction 5 Improvements

Client
Oxford Archaeology
For
Highways Agency

Survey Report
12096

Date
December 2017

Incorporating

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and

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GEOPHYSICAL SURVEY REPORT

Project name:
M2 Junction 5 Improvements

SUMO Job reference:
12096

Client:
Oxford Archaeology
For:
Highways Agency

Survey date:
20 and 21 November 2017

Report date:
19 December 2017

Field co-ordinator:
Steph Rhodes BSc FGS

Field Team:
Laura Gilling MSci

Report written by:
Jon Tanner BSc MSc PCIfA
Claire Stephens BA MA

CAD illustrations by:
Jon Tanner BSc MSc PCIfA
Claire Stephens BA MA

Project Manager:
Jon Tanner BSc MSc PCIfA

Report approved by:
Dr John Gater BSc DSc(Hon) MCIfA FSA

TABLE OF CONTENTS

LIST OF FIGURES

DIGITAL CONTENT (Archive Data CD/DVD)

- Minimally Processed Greyscale Images and XY Trace Plots in DWG format
- Digital Copies of Report Text and Figures (both PDF and native formats)

1 SUMMARY OF RESULTS

A few large strong anomalies have been detected which might represent discrete metalworking features such as furnaces or pits, while clusters of smaller strong and ferrous responses could indicate spreads of metalworking debris. Alternatively, any or all of these anomalies could have a modern origin, either associated with WW1 activity or of more recent date. Some linear dipolar anomalies may represent the lines of WW1 land defences indicated on early mapping.

2 INTRODUCTION

2.1 Background synopsis

SUMO Services Ltd were commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by **Oxford Archaeology** on behalf of **Highways Agency**.

2.2 Site details

NGR / Postcode	TQ 855 626 / ME9 7QA
Location	The site is located 5.3km southwest of Sittingbourne, in the north-west quadrant of junction 5 of the M2.
HER/SMR	Kent
District	Swale
Parish	Stockbury
Topography	Gradient, steep in places
Current Land Use	Ploughed
Weather	Windy, overcast
Geology	Bedrock - Seaford Chalk Formation – Chalk, with a band of Thanet Formation - Sand, Silt and Clay to the north. Superficial deposits consist of Head - Clay, Silt, Sand and Gravel (BGS 2016).
Soils	Andover 1 (343h) - shallow well drained calcareous silty soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms. Striped soil patterns locally (SSEW 1983).
Archaeology	A number of WW1 land defences were identified in an Environmental Assessment Report within the boundaries of the survey area, as well as a WW1 Pill Box and two crash sites located just outside (WSPPB 2015). A 2016 geophysical survey around the motorway junction detected large areas of magnetic disturbance and possible remains of WW1 defences (GSB 2016). Excavations in 2017 by Oxford Archaeology have revealed significant quantities of metalworking debris, bloomer pits, slag and furnaces (Allen *pers. comm*.).
Survey Methods	Magnetometer survey (fluxgate gradiometer)
Study Area	2ha

2.3 Aims and Objectives

To locate and characterise any anomalies of possible archaeological interest within the study area.

3 METHODS, PROCESSING & PRESENTATION

3.1 Standards & Guidance

This report and all fieldwork have been conducted in accordance with the latest guidance documents issued by Historic England (EH 2008) (then English Heritage), the Chartered Institute for Archaeologists (CIfA 2014) and the European Archaeological Council (EAC 2016).

3.2 Survey methods

Detailed magnetic survey was chosen as an efficient and effective method of locating archaeological anomalies.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1.0m	0.25m

More information regarding this technique is included in Appendix A.

3.3 Data Processing

The following basic processing steps have been carried out on the data used in this report:

De-stripe; de-stagger; interpolate

3.4 Presentation of results and interpretation

. The presentation of the results for each site involves a grey-scale plot of processed data. Magnetic anomalies are identified, interpreted and plotted onto the 'Interpretation' drawings. The minimally processed data are provided as a greyscale image in the Archive Data Folder with an XY trace plot in CAD format. A free viewer is available: https://viewer.autodesk.com

When interpreting the results, several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, pedology, topography etc.). Anomalies are categorised by their potential origin. Where responses can be related to other existing evidence, the anomalies will be given specific categories, such as: *Abbey Wall* or *Roman Road*. Where the interpretation is based largely on the geophysical data, levels of confidence are implied, for example: *Probable*, or *Possible Archaeology*. The former is used for a confident interpretation, based on anomaly definition and/or other corroborative data such as cropmarks. Poor anomaly definition, a lack of clear patterns to the responses and an absence of other supporting data reduces confidence, hence the classification *Possible*.

4 RESULTS

4.1 *Possible Metal Working - ?Furnaces/Pits and ?Debris*

4.1.1 The southern half of the dataset is dominated by strong and ferrous anomalies, some relatively large and discrete, others small but concentrated in clusters (areas of magnetic disturbance). Ordinarily these would be assigned a modern origin, possibly associated with the WW1 defences which are recorded at this location. However, given the presence of Iron Age metalworking debris recovered from excavations at the southern corner of the site, it is possible that the recorded anomalies reflect similar material. The larger anomalies could represent discrete metalworking features such as furnaces or pits, while the clusters of smaller responses might indicate spreads of metalworking debris.

4.2 *?WW1 Land Defence*

4.2.1 Two narrow linear dipolar anomalies have been identified which have a form normally associated with pipes or drains. In this instance however, they appear to correspond with the lines of former WW1 land defences and may represent the remnants of these features.

4.3 *Uncertain*

4.3.1 A few weak trends in the data are noted. They form no obvious patterns and little can be determined about their likely origin.

5 DATA APPRAISAL & CONFIDENCE ASSESSMENT

5.1 Historic England guidelines (EH 2008) Table 4 states that the average magnetic response on chalk is good.

6 CONCLUSION

6.1 Most of the anomalies recorded by the survey are strong / ferrous in nature. Their interpretation as material of possible archaeological interest (?metalworking features and debris) is based on prior knowledge of such features in the immediate vicinity and not on the magnetic signature of the responses. Without this knowledge the anomalies would have been interpreted as modern, and this interpretation remains possible for any or all of the recorded responses.

7 REFERENCES

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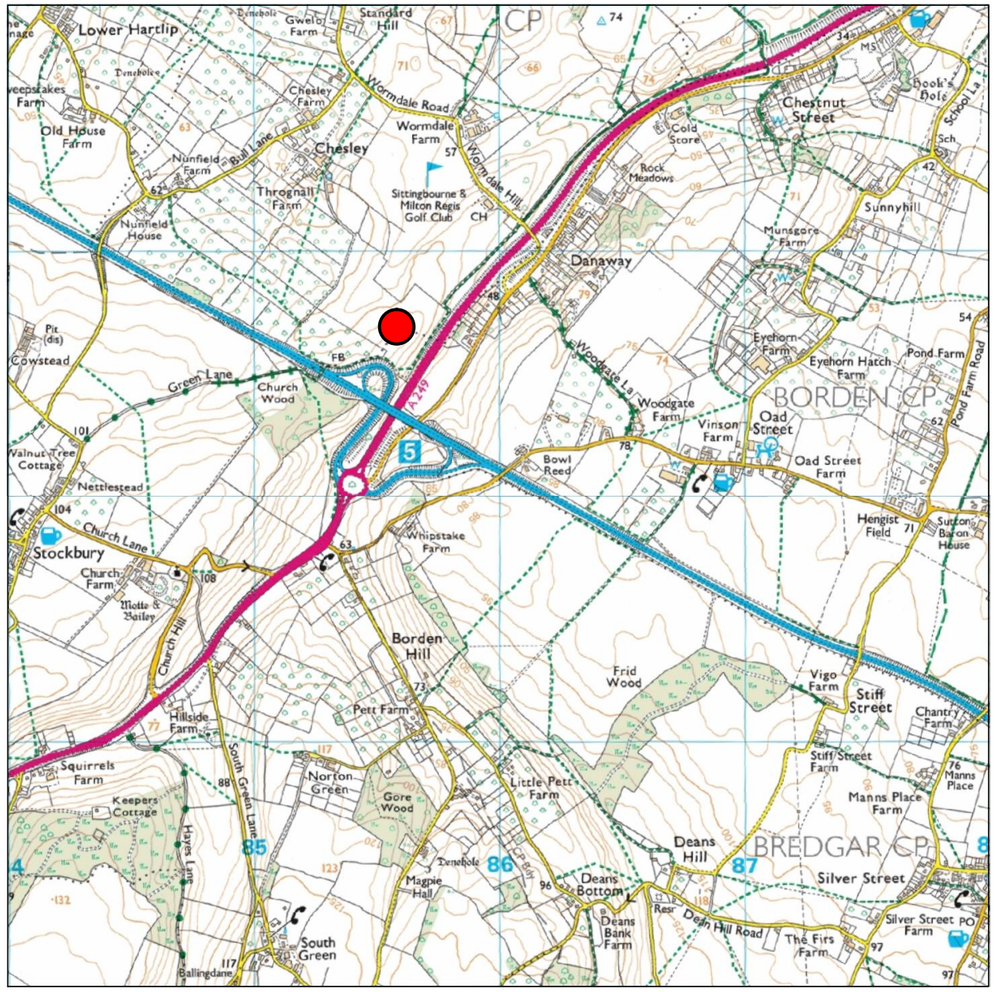

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Site Location

sumo Survey
GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

Title:
Site Location Diagram

Client:
Oxford Archaeology

Project:
12096 M2 Junction 5

Scale:
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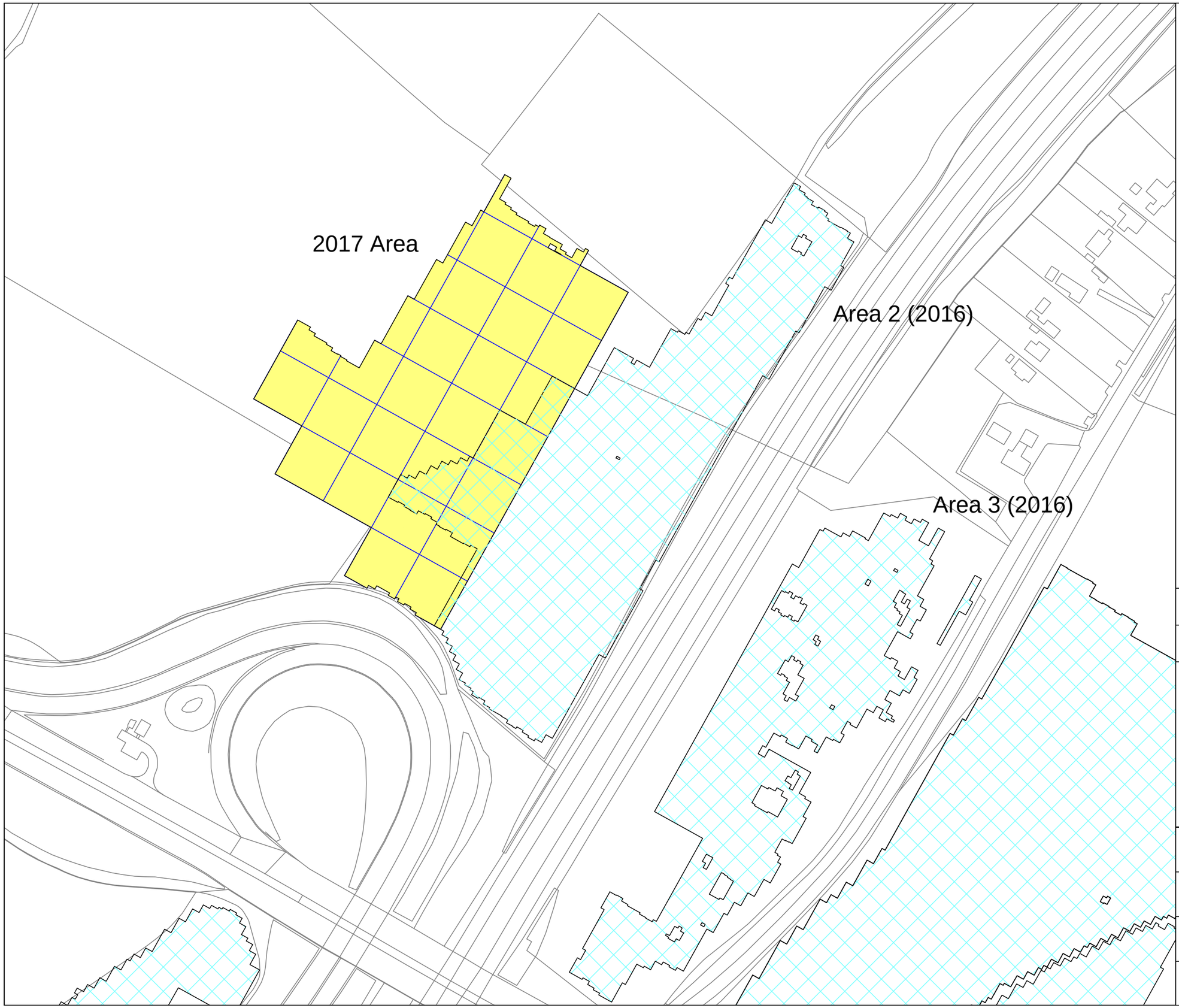
Fig No:
01



Magnetometer Survey Area showing 30m grids

Areas previously surveyed

sumo Survey
GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

Title:
Location of Survey Area

Client:
Oxford Archaeology

Project:
12096 M2 Junction 5

Scale:
0 metres 100
1:2000 @ A3

Fig No:
02

N

2
nT
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sumo Survey
GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

Title:
Magnetometer Survey
Greyscale Plots

Client:
Oxford Archaeology

Project:
12096 M2 Junction 5

Scale:
0 metres 100
1:2000 @ A3

Fig No:
03

N

KEY

	Possible Metal Working - ?Furnace/Pits
	Possible Metal Working - ?Debris
	?WW1 Land Defence
	Uncertain Origin (trend)
	Magnetic Disturbance

sumo Survey
GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

Title:
Magnetometer Survey Interpretation

Client:
Oxford Archaeology

Project:
12096 M2 Junction 5

Scale:
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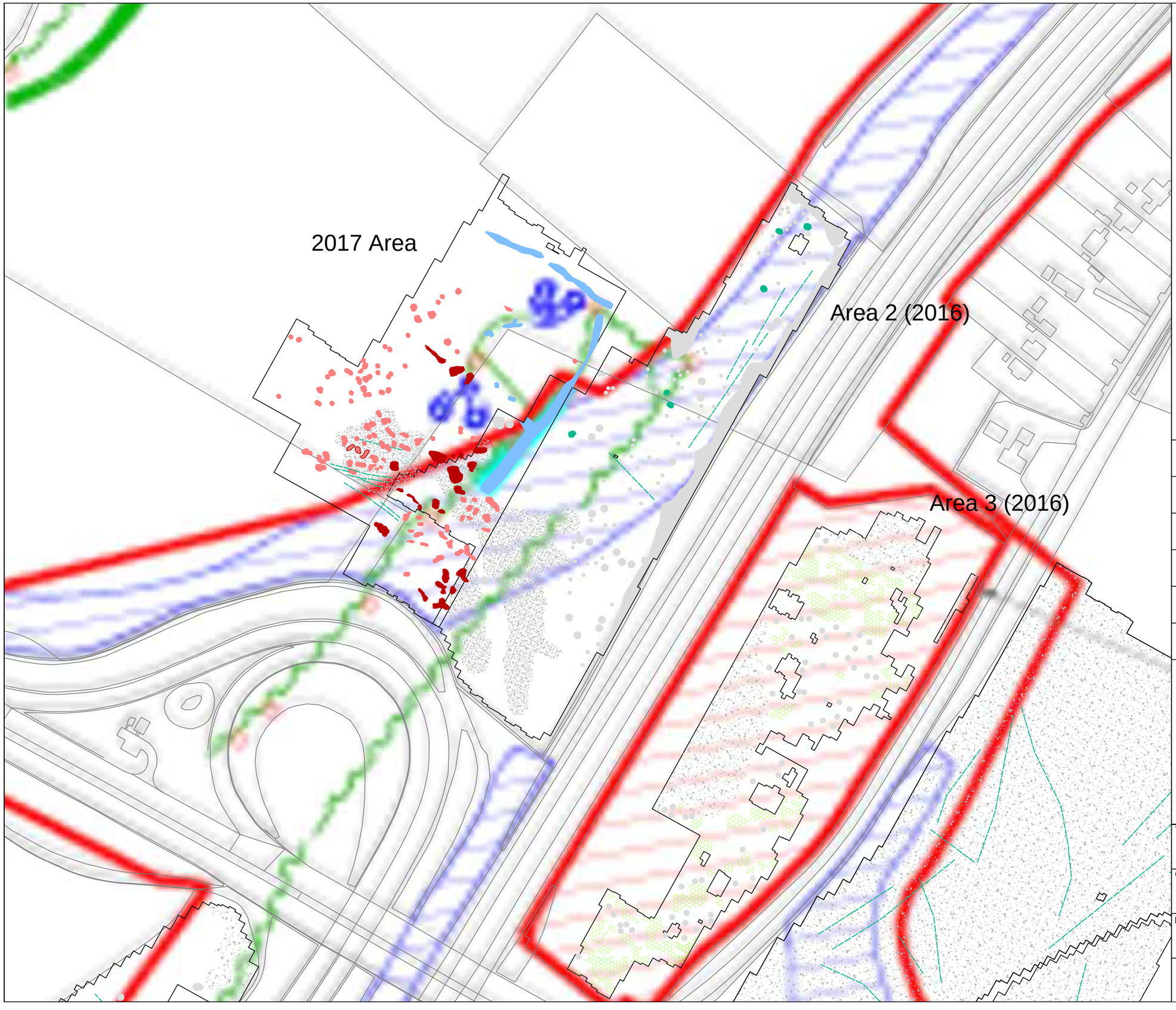
1:2000 @ A3

Fig No:
04



N

KEY

	Possible Metal Working - ?Furnace/Pits
	Possible Metal Working - ?Debris
	?WW1 Land Defence
	Uncertain Origin (trend)
	Magnetic Disturbance

sumo Survey
GEOPHYSICS FOR ARCHAEOLOGY & ENGINEERING

Title:
Magnetometer Survey
Interpretation With WW1 Defences Plot

Client:
Oxford Archaeology

Project:
12096 M2 Junction 5

Scale:
0 metres 100
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Fig No:
05

Appendix A - Technical Information: Magnetometer Survey Method

Grid Positioning

For hand held gradiometers the location of the survey grids has been plotted together with the referencing information. Grids were set out using a Trimble R8 Real Time Kinematic (RTK) VRS Now GNSS GPS system.

An RTK GPS (Real-time Kinematic Global Positioning System) can locate a point on the ground to a far greater accuracy than a standard GPS unit. A standard GPS suffers from errors created by satellite orbit errors, clock errors and atmospheric interference, resulting in an accuracy of 5m-10m. An RTK system uses a single base station receiver and a number of mobile units. The base station re-broadcasts the phase of the carrier it measured, and the mobile units compare their own phase measurements with those they received from the base station. This results in an accuracy of around 0.01m.

Technique	Instrument	Traverse Interval	Sample Interval
Magnetometer	Bartington Grad 601-2	1m	0.25m

Instrumentation: Bartington *Grad* 601-2

Bartington instruments operate in a gradiometer configuration which comprises fluxgate sensors mounted vertically, set 1.0m apart. The fluxgate gradiometer suppresses any diurnal or regional effects. The instruments are carried, or cart mounted, with the bottom sensor approximately 0.1-0.3m from the ground surface. At each survey station, the difference in the magnetic field between the two fluxgates is measured in nanoTesla (nT). The sensitivity of the instrument can be adjusted; for most archaeological surveys the most sensitive range (0.1nT) is used. Generally, features up to 1m deep may be detected by this method, though strongly magnetic objects may be visible at greater depths. The Bartington instrument can collect two lines of data per traverse with gradiometer units mounted laterally with a separation of 1.0m. The readings are logged consecutively into the data logger which in turn is daily down-loaded into a portable computer whilst on site. At the end of each site survey, data is transferred to the office for processing and presentation.

Data Processing

Zero Mean Traverse	This process sets the background mean of each traverse within each grid to zero. The operation removes striping effects and edge discontinuities over the whole of the data set.
Step Correction (De-stagger)	When gradiometer data are collected in 'zig-zag' fashion, stepping errors can sometimes arise. These occur because of a slight difference in the speed of walking on the forward and reverse traverses. The result is a staggered effect in the data, which is particularly noticeable on linear anomalies. This process corrects these errors.

Display

Greyscale/ Colourscale Plot	This format divides a given range of readings into a set number of classes. Each class is represented by a specific shade of grey, the intensity increasing with value. All values above the given range are allocated the same shade (maximum intensity); similarly, all values below the given range are represented by the minimum intensity shade. Similar plots can be produced in colour, either using a wide range of colours or by selecting two or three colours to represent positive and negative values. The assigned range (plotting levels) can be adjusted to emphasise different anomalies in the data-set.

Interpretation Categories

In certain circumstances (usually when there is corroborative evidence from desk-based or excavation data) very specific interpretations can be assigned to magnetic anomalies (for example, *Roman Road, Wall,* etc.) and where appropriate, such interpretations will be applied. The list below outlines the generic categories commonly used in the interpretation of the results.

Archaeology / Probable Archaeology	This term is used when the form, nature and pattern of the responses are clearly or very probably archaeological and /or if corroborative evidence is available. These anomalies, whilst considered anthropogenic, could be of any age.
Possible Archaeology	These anomalies exhibit either weak signal strength and / or poor definition, or form incomplete archaeological patterns, thereby reducing the level of confidence in the interpretation. Although the archaeological interpretation is favoured, they may be the result of variable soil depth, plough damage or even aliasing as a result of data collection orientation.
Industrial / Burnt-Fired	Strong magnetic anomalies that, due to their shape and form or the context in which they are found, suggest the presence of kilns, ovens, corn dryers, metal-working areas or hearths. It should be noted that in many instances modern ferrous material can produce similar magnetic anomalies.
Former Field Boundary (probable & possible)	Anomalies that correspond to former boundaries indicated on historic mapping, or which are clearly a continuation of existing land divisions. Possible denotes less confidence where the anomaly may not be shown on historic mapping but nevertheless the anomaly displays all the characteristics of a field boundary.
Ridge & Furrow	Parallel linear anomalies whose broad spacing suggests ridge and furrow cultivation. In some cases, the response may be the result of more recent agricultural activity.
Agriculture (ploughing)	Parallel linear anomalies or trends with a narrower spacing, sometimes aligned with existing boundaries, indicating more recent cultivation regimes.
Land Drain	Weakly magnetic linear anomalies, quite often appearing in series forming parallel and herringbone patterns. Smaller drains may lead and empty into larger diameter pipes, which in turn usually lead to local streams and ponds. These are indicative of clay fired land drains.
Natural	These responses form clear patterns in geographical zones where natural variations are known to produce significant magnetic distortions.
Magnetic Disturbance	Broad zones of strong dipolar anomalies, commonly found in places where modern ferrous or fired materials (e.g. brick rubble) are present.
Service	Magnetically strong anomalies, usually forming linear features are indicative of ferrous pipes/cables. Sometimes other materials (e.g. pvc) or the fill of the trench can cause weaker magnetic responses which can be identified from their uniform linearity.
Ferrous	This type of response is associated with ferrous material and may result from small items in the topsoil, larger buried objects such as pipes, or above ground features such as fence lines or pylons. Ferrous responses are usually regarded as modern. Individual burnt stones, fired bricks or igneous rocks can produce responses similar to ferrous material.
Uncertain Origin	Anomalies which stand out from the background magnetic variation, yet whose form and lack of patterning gives little clue as to their origin. Often the characteristics and distribution of the responses straddle the categories of *Possible Archaeology* / *Natural* or (in the case of linear responses) *Possible Archaeology* / *Agriculture*; occasionally they are simply of an unusual form.

Where appropriate some anomalies will be further classified according to their form (positive or negative) and relative strength and coherence (trend: weak and poorly defined).

Appendix B - Technical Information: Magnetic Theory

Detailed magnetic survey can be used to effectively define areas of past human activity by mapping spatial variation and contrast in the magnetic properties of soil, subsoil and bedrock. Although the changes in the magnetic field resulting from differing features in the soil are usually weak, changes as small as 0.1 nanoTeslas (nT) in an overall field strength of 48,000 (nT), can be accurately detected.

Weakly magnetic iron minerals are always present within the soil and areas of enhancement relate to increases in *magnetic susceptibility* and permanently magnetised *thermoremanent* material.

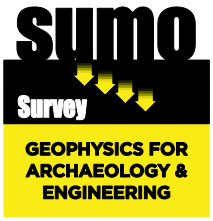
Magnetic susceptibility relates to the induced magnetism of a material when in the presence of a magnetic field. This magnetism can be considered as effectively permanent as it exists within the Earth's magnetic field. Magnetic susceptibility can become enhanced due to burning and complex biological or fermentation processes.

Thermoremanence is a permanent magnetism acquired by iron minerals that, after heating to a specific temperature known as the Curie Point, are effectively demagnetised followed by re-magnetisation by the Earth's magnetic field on cooling. Thermoremanent archaeological features can include hearths and kilns; material such as brick and tile may be magnetised through the same process.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil creates a relative contrast against the much lower levels of magnetism within the subsoil into which the feature is cut. Systematic mapping of magnetic anomalies will produce linear and discrete areas of enhancement allowing assessment and characterisation of subsurface features. Material such as subsoil and non-magnetic bedrock used to create former earthworks and walls may be mapped as areas of lower enhancement compared to surrounding soils.

Magnetic survey is carried out using a fluxgate gradiometer which is a passive instrument consisting of two sensors mounted vertically 1m apart. The instrument is carried about 30cm above the ground surface and the top sensor measures the Earth's magnetic field whilst the lower sensor measures the same field but is also more affected by any localised buried feature. The difference between the two sensors will relate to the strength of a magnetic field created by this feature, if no field is present the difference will be close to zero as the magnetic field measured by both sensors will be the same.

Factors affecting the magnetic survey may include soil type, local geology, previous human activity and disturbance from modern services.



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