

Strip, Map and Sample of the new Overflow and Distribution Mains, Postwick, Norfolk



Archaeological Monitoring Strip, Map and Sample



October 2016

Client: Anglian Water

OA East Report No: 1971

OASIS No: oxfordar3-260722

NGR: TG 2961 0839

**Strip, Map and Sample of the new Overflow and Distribution Mains,
Postwick, Norfolk**

Archaeological Strip, Map and Sample

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Report Date: September 2016

Report Number: 1971
Site Name: Postwick Overflow and Distribution mains
HER Event No: ENF 133969/ENF 133970
Date of Works: August 2014
Client Name: Anglian Water
Client Ref:
Planning Ref:
Grid Ref: TG 2961 0839
Site Code: ENF 133969/ENF 133970
Finance Code: XNFPOD14PX
Receiving Body: Norfolk County Stores
Accession No:

Prepared by: Anthony Haskins
Position: Fieldwork Project Officer
Date:

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Table of Contents

Summary	7
1 Introduction	9
1.1 Location and scope of work.....	9
1.2 Geology and topography.....	9
1.3 Archaeological and historical background.....	9
1.4 Acknowledgements.....	12
2 Aims and Methodology	13
2.1 Aims.....	13
2.2 Regional Research Aims.....	13
2.3 Site Specific Research Objectives.....	14
2.4 Methodology.....	14
3 Results	15
3.1 Introduction.....	15
3.2 Area 1.....	15
3.3 Area 2.....	17
3.4 Area 3.....	17
3.5 Area 4.....	22
3.6 Finds Summary.....	23
3.7 Environmental Summary.....	25
4 Discussion and Conclusions	26
4.1 Area 1.....	26
4.2 Area 2.....	26
4.3 Area 3.....	26
4.4 Area 4.....	28
4.5 Significance.....	29
Appendix A. Trench Descriptions and Context Inventory	30
Appendix B. Finds Reports	38
B.1 Metal Working Debris.....	38
B.2 Worked Stone.....	38
B.3 Flint.....	40
B.4 Glass.....	41
B.5 Clay Tobacco Pipe.....	42
B.6 The Romano-British pottery.....	43
B.7 ENF133969 – Post Roman Pottery.....	44

B.8 ENF133970 - Post-Roman pottery report.....	45
B.9 Petrographic Analysis of Late Medieval LMT Pottery.....	53
B.10 CBM (brick, floor brick, fired clay and roof tile).....	55
B.11 Baked Clay (ENF 133970).....	57
B.12 Worked Bone.....	57
Appendix C. Environmental Reports.....	58
C.1 Animal Bone.....	58
C.2 Environmental samples.....	58
Appendix D. Radio-Carbon Dating.....	63
Appendix E. Bibliography.....	64
Appendix F. OASIS Report Form.....	67

List of Figures

- Figure 1. Site location showing areas of archaeological investigation (red) alongside proposed pipeline (green)
- Figure 1a. Site location, Southern sites Area 1 (red) along pipeline route (green)
- Figure 1b. Site location, Northern sites Areas 2-4 (red) along pipeline route (green)
- Figure 2. HER data with Aerial Photograph data on Areas 1 and 2 of the pipeline
- Figure 3. HER data and Aerial Photograph data on Areas 2,3 and 4 of the pipeline
- Figure 4. Phase plan, Area 1a-b. Scale 1:1000
- Figure 5. Phase plan, Area 1a-b, ENF 133969
- Figure 6. Phase plan, Area 2, ENF 133970
- Figure 7. Phase plan, Area 3a, ENF 133970
- Figure 8. Phase plan, Area 3b, ENF 133970
- Figure 9. Areas 3a and 3b with Aerial mapping (green) provided by Norfolk County Council overlain
- Figure 10. Area 3b with building from 1839 Little Plumstead and Great Plumstead title map
- Figure 11. Area 3b showing second edition OS map, Norfolk County Series, 1908
- Figure 12a. Area 4, ENF133970
- Figure 12b. Phase plan, Area 4, ENF 133970
- Figure 13. Selected sections
- Figure 14. Medieval pottery
- Figure 15. Millstone Grit Whetstone from buried soil (3024)

List of Plates

- Plate 1. ENF133970 - Bronze Age ditches 4001, 4002, 4005, 4023, 4028, 4029, 4032 & 4042, facing south-west
- Plate 2. ENF133970 - Post hole alignment 2012, 2014, 2016, 2018, 2020, facing west
- Plate 3. ENF133969 - Ditch 1004, facing south-west
- Plate 4. ENF133970 - Structure 3089, facing west
- Plate 5. ENF133970 - Well 3012 facing south, showing drain 3059
- Plate 6. Section of LMU base sherd (x50), context 3082.
- Plate 7. Section of fine LMU variant with brown clay lenses (x50), context 3116
- Plate 8. Section of MCW bowl (x50), context 3082.
- Plate 9. Section of MCW body sherd (x50), context 3116. Plate 5. Section of UPG1 sherd (x50), context 3022. Sherd 3mm thick.
- Plate 10. Section of UPG2 sherd (x50), context 3036. Sherd 4mm thick.
- Plate 11. Section of typical underfired soft LMT sherd (x50), context 3082.
- Plate 12. Section of LMT sherd (x50), context 3082.

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- Plate 13. Section of typical well-fired LMT sherd (x50), context 3082.
- Plate 14. Section of overfired, vitrified LMT sherd (x50), context 3082.
- Plate 15. Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars.
- Plate 16. Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars
- Plate 17. Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars.

List of Tables

- Table 1. Quantity and weight of stone by context
- Table 2. Flint catalogue
- Table 3. Glass catalogue
- Table 4. Clay Pipe catalogue
- Table 5. Roman pottery Catalogue
- Table 6. Pottery catalogue
- Table 7. Pottery quantification by period
- Table 8. Medieval pottery
- Table 9. Post-medieval pottery by fabric
- Table 10. Modern pottery by fabric
- Table 11. Details of LMT sherds from Plumstead and other sites in Norwich analysed in this report.
- Table 12. Brick and floor brick
- Table 13. CBM Catalogue
- Table 14. Quantity and weight of fired clay by context
- Table 15. Environmental samples from ENF133969
- Table 16. Environmental samples from ENF133970

Summary

Oxford Archaeology East carried out a series of Strip, Map and Sample excavations along the route of the Postwick Overflow and Distribution Mains associated with the new Sewage Treatment Works investigated by Oxford Archaeology East (Green and Haskins 2015).

The southern area (ENF133969), along the route of the Overflow, was located by the River Yare and a number of undated field boundaries and drainage ditches were excavated.

Excavation along the route of the Distribution Main (ENF133970) revealed a small area of enclosure ditches and post-holes to the south of the village of Great Plumstead. A single fragment of early medieval pottery dated this area of settlement to the 11th to 12th century.

To the north of Great Plumstead, along Hare Road, a series of medieval and post-medieval field boundaries were found in association with a cellared farm-building and well of post-medieval date. A series of quarry pits were identified to the south of the buildings, the upper fills of which contained fragments of fired and baked clay that are likely to be either kiln or hearth waste. An assemblage of late medieval Transitional Ware (LMT), including what are believed to be pottery waster sherds, was also recovered. Although no kiln was identified at the site it is believed that these sherds were produced nearby. The most likely calibrated radio-carbon date from charred plant remains within the fill of this pit proved to be 1350–1392 calAD (95.4% probability).

At the northern end of the route, a series of ditches were uncovered. Although the ditches were largely devoid of archaeological material a radio-carbon date of 3192 ± 31 radio-carbon years was produced from ditch fill 4008, potentially placing it in the Bronze Age.

1 INTRODUCTION

1.1 Location and scope of work

- 1.1.1 An archaeological excavation was conducted at four locations along the route of the Postwick Anglia Water Overflow and Distribution Mains.
- 1.1.2 As part of the construction of a new Sewage Treatment works at Postwick, Oxford Archaeology East were commissioned by Anglian Water to carry out a watching brief and Strip, Map and Sample exercise along the routes for a new distribution main and overflow main. The two pipelines ran for c.5km through areas identified as of potential archaeological interest. The brief identified three areas for investigation by Strip, Map and Sample excavation (Albone 2014).
- 1.1.3 The work was designed to define the character and extent of any archaeological remains within the proposed development area, prior to their potential destruction by the construction of the pipeline. This was carried out in accordance with the guidelines set out in *National Planning Policy Framework* (NPPF; Department for Communities and Local Government March 2012). In particular paragraph 141 of NPPF states that planning authorities should “require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact”.
- 1.1.4 The site archive is currently held by OA East and will be deposited with the appropriate county stores in due course.

1.2 Geology and topography

- 1.2.1 The pipelines run north to south for approximately 5km. A new sewage treatment works located at Postwick is the southern end of the Distribution Main and the northern end of the Overflow Main. The landscape comprises gentle, undulating hills dropping down to the river Yare at the southern end of the route (Fig. 1).
- 1.2.2 The southern part of the pipeline (Overflow Main) which runs from the Postwick water treatment works (TG29610839; 20m OD) to the river Yare (TG30420729; 1m OD), is primarily located on a bedrock of Crag sands and gravels. The route is largely through cultivated arable fields. Towards the river the bedrock changes to Lewis Nodular chalk with overlying peat deposits of the Breydon formation (BSG). At this point the land is heavily drained and maintained as pasture, presumably as it is too wet to use for arable cultivation.
- 1.2.3 The northern part of the pipeline (Distribution Main) runs from Norwich Road (TG29421192; 27m OD) to the Postwick water treatment works (TG29610839; 20m OD). The route runs through pastoral fields with the exception of well maintained horse grazing at Great Plumstead. This part of the pipeline is entirely on a bedrock of Crag group sands and gravels overlain by the Happisburgh Glacigenic formation (BSG).

1.3 Archaeological and historical background

- 1.3.1 The background presented below is drawn from the results of a search of the Norfolk Historic Environment Record (NHER) commissioned by Oxford Archaeology East and conducted on the 14th of April 2014. The search area covered an area 500m either side of the Postwick pipelines and sewage treatment works. The results are summarised below by area.

Overflow main (ENF133969; Fig. 2)

- 1.3.2 The area around Postwick has been subject to a significant amount of metal detecting. This has produced a number of assemblages spanning the Middle Palaeolithic through to post-medieval periods. Spot finds include coins and other metal objects (NHER 9649, 20434, 21639, 25178, 28172, 29865, 30401, 30475, 31087, 31097, 31762, 32598, 34375, 34966, 34967, 34969, 35135, 39953, 41365, 49560, 50468, 51834, 51847 & 57229).

Prehistoric

- 1.3.3 There is only limited evidence for prehistoric occupation along the route of the Overflow Main. Archaeological monitoring of the Brundall Rising Main produced prehistoric flints potentially dating from the Palaeolithic but more likely to be of Mesolithic origin (NHERs 29866, 29867, 29869 & 29870). Neolithic spot finds have also been found and a Neolithic flint scatter was identified at the Postwick Sewage Treatment Works (Green & Haskins 2015). Further Neolithic occupation has been uncovered at Postwick Hub on the A47. A prehistoric flint scatter has also been recovered at the northern end of the Overflow Main, c.300m to the west (NHER 12626). A possible Bronze Age barrow has been identified c.150m west of the route (NHER 36340) and a Bronze Age dagger was found on the southern bank of the river Yare.

Roman

- 1.3.4 A small number of Roman artefacts have been recorded. These include several Roman coins found along the route (NHER 10247, 16844, 17528, 19524, 19525, 23777, 35315, 32323) and a possible Iron Age or Romano-British harness fitting recovered c.50m to the east of the route (NHER 16845).

Saxon and medieval

- 1.3.5 More substantial evidence has been found for Saxon occupation within the vicinity. An Early Saxon grubenhaus, excavated in 1935 and originally believed to be Iron Age, was discovered 230m west of the route (NHER 10219). A Late Saxon axe head has also been found to the west in the river Yare (NHER 10248).
- 1.3.6 Possible Saxon inhumations have been found in a pit just outside the churchyard of All Saints Church in Postwick. It is unclear whether these remains are Saxon or if they were disturbed during works in the churchyard and subsequently re-buried (NHER 15987). Saxon pottery sherds were also recovered from the Brundall Rising Main watching brief (NHER 29870).
- 1.3.7 Metal detecting in the area around Postwick has found medieval artefacts. These include a copper alloy buckle (NHER 35315), a late medieval silver spoon with copper alloy mount of the Virgin and Child (NHER 16269), a copper alloy seal matrix (NHER 25177), a short cross silver half-penny of Henry II with a silver penny of Edward I (NHER 1684), a Henry III short cross penny (NHER 16845) and a cut long cross penny, also of Henry III (NHER 16847). Other medieval coin finds include a Henry II short cross penny and Henry V long cross penny (NHER 17258), a silver penny found with a medieval or post-medieval silver dagger guard (NHER 24072), a second Edward I penny along with 15th century Jetton, a bronze buckle pin and a farthing token dated 1663 (NHER 24034). Medieval metal objects have also been found to the west of the route, just south of the A47 (NHER 24063), along with a silver medieval penny of Edward I (NHER 24062).
- 1.3.8 Other medieval records of note include All Saints Church in Postwick (NHER 9695) and the suggested site of St. Ethels chapel (NHER 17402) to the north of the route –

although the chapel is believed to actually have been in Postwick itself. A potential mill mound or hayrick was identified at the northern end of the route during works at the new sewage treatment works (NHER 52049, Green & Haskins 2015). Although originally believed to be a Bronze Age barrow, evidence suggests it is more likely to be a hay-rick. Work on the Brundall Rising Main also recovered evidence for medieval land and night soiling in the form of pottery sherds (NHERs 29866, 29867 & 29870).

Post-medieval

- 1.3.9 To the south of the pipeline route, in the area of the river Yare, a number of post-medieval drainage pumps and mills have been identified, primarily from maps (NHERs 10260, 50425, 56232 & 56233). Other post-medieval features and artefacts were found along the route of the Brundall Anglian Water Rising Main (NHERs 29866, 29867, 29869 & 29870).
- 1.3.10 The route of the overflow main also crosses the line of the Norfolk railway that runs through Yarmouth, Norwich and Brandon (NHER 13571).

Undated

- 1.3.11 A number of undated crop marks have been mapped in this region, although Romano-British and medieval dates have been suggested for these, no archaeological investigations have been carried out and as such they remain undated. These features are believed to be primarily drainage and field systems with occasional trackways (NHERs 21767, 36341, 49558, 52004, 52017 & 52042). An undated pit alignment has also been identified (NHER 52048).

Distribution Main (ENF133970; Figs. 2 & 3)

- 1.3.12 As with the area around Postwick, there has been a significant amount of metal detecting undertaken in this locality. There are also several NHER entries covering a range of material from prehistoric flintwork through to post medieval metal objects (NHERs 42572, 23971).
- 1.3.13 A variety of finds have been recovered during fieldwalking and metal detector surveys along the northern Distribution Main route around Norwich. In particular, Fields 75 & 76 produced flints, Roman pottery, medieval pottery, medieval and post medieval metal objects and Roman and post medieval coins (NHER 50504, 49758).

Prehistoric

- 1.3.14 Several flint hand axes and other worked flints have been uncovered within the vicinity. These include examples of Lower Palaeolithic, Mesolithic and Neolithic date (NHER 8151, 10216, 8169, 9648, 8493). Evidence for Neolithic activity has also been found on Mousehold Heath (Bishop & Proctor 2011).
- 1.3.15 A possible Bronze Age barrow crop mark has been identified (NHER 51929). Iron Age activity is also recorded in the form of pot boilers and sherds of Iron Age pottery recovered during the watching brief along the A47 (NHER 29070). An Iron Age toggle was found near the northern end of the pipeline route (NHER 42583). Undated prehistoric flints have also been recovered along the line of the Northern Distributor route (NHER 42583).

Roman

- 1.3.16 It has been suggested that a number of crop marks along the line of the route are of Iron Age or Roman date. These include a D-shaped enclosure (NHER 45122) and a series of sub-square and rectangular enclosures (NHERs 51947, 51945, 51946 &

52037). A similar rectangular enclosure (NHER 52110) is overlain by later crop marks (NHER 51954).

Saxon and medieval

- 1.3.17 Little Saxon material has been identified along the route, although a possible group of Sunken Featured Buildings was identified in the region of the northern distributor route. These have, however, only been seen as crop marks and may actually be natural features (NHER 52045, 52046). Other evidence for medieval activity comes from a large number of cropmarks, including farm boundaries and enclosures, about halfway along the route (NHER 45126) and multi-phase, potentially medieval to post-medieval field boundary and ditch systems (NHERs 51948, 51942, 51944, 51970, 52113, 52112, 51971). Similar cropmarks (NHER 51954) have been identified overlying a Roman rectangular enclosure (NHER 52110). A large cropmark to the west of the route has been identified as medieval drainage (NHER 52005).
- 1.3.18 Mousehold Heath (NHER 53082), a large area of heathland that is believed to have been wooded, is also located near the route. By 1086 most of the woodland was confined to the northern area and the marked extent is that given by Faden's map of 1797 (<http://www.fadensmapofnorfolk.co.uk/>: accessed 24/3/2015).
- 1.3.19 A medieval bronze bit or dagger guard was found to the south and east of the distribution main route (NHER 24064).

Post-medieval

- 1.3.20 A number of post-medieval buildings and features are also recorded by the NHER. This includes an entrenchment marked on a 1585 map of Mousehold Heath (NHER 9688). Three buildings have been identified within the region of the pipeline: a 1763 farmhouse called 'Grove Farm' (45941) with associated structures (NHERs 45942 & 45941), a second farmhouse on Smee Road called 'Smee Farm', dated to the 18th century (NHER 11826) and Great Plumstead Hall, which is of uncertain date although believed to have been erected during the reign of William and Mary (NHER 12637), a metal pestle was found in the garden (NHER 8156).
- 1.3.21 A brick kiln is marked on the outskirts of Norwich on a map dated 1826 (NHER 37144). Finally a WWII bombing decoy is located to the east of the northern end of the pipeline route (NHER 11783)

Undated

- 1.3.22 A number of undated cropmarks are recorded within the NHER. They include a possible Bronze Age barrow mound to the east of route (NHER 49556), a possible Iron Age or Roman enclosure (51941), a number of undated cropmarks of ditches and field boundaries (NHERs 49557, 49554, 49553, 51953, 51952, 45123, 51949, 51932, 51930 & 52038) and a possible pit alignment at the southern end of the route (52047).

1.4 Acknowledgements

- 1.4.1 The author would like to thank Anglian Water for commissioning the work, especially Jo Everett for her assistance during the works. The author would also like to thank James Albone for monitoring the works and Paul Spoerry for managing the project. Special thanks go to Ashley Pooley for all his tireless work and the rest of the site team; Paddy Lambert, Nick Cox, Petra Weschenfelder, Dave Browne and Emily Wilson. The author would also like to thank Bryn Williams for supplying the plant and driver and the finds specialists Sue Anderson, Dr Patrick Quin (UCL), Carole Fletcher, Paul Spoerry, Chris

Faine, Rachel Fosberry, Rob Atkins and Alice Lyons. Finally thanks go to Charlotte Walton for her illustration and graphics work and Gareth Rees for the site survey.

2 AIMS AND METHODOLOGY

2.1 Aims

- 2.1.1 The original aims of the project were set out in the Brief and Written Scheme of Investigation (Spoerry 2014) and further refined in the Updated Project Design and Post Excavation Assessment (Haskins 2015).
- 2.1.2 The main aims of this excavation were:
- To mitigate the impact of the development on the surviving archaeological remains in accordance with the NPPF. In particular paragraph 141 which states that planning authorities should “require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact”. The development would have severely impacted upon these remains and as a result a full excavation was required, targeting the areas of archaeological interest.
 - To preserve the archaeological evidence contained within the excavation area by record and to attempt a reconstruction of the history and use of the site.
- 2.1.3 The aims and objectives of the excavation were developed with reference to National, Regional and Local Research Agendas (Medlycott 2011).

2.2 Regional Research Aims

Prehistoric

Bronze Age field systems; To understand Bronze Age fields systems identified through aerial photography

- 2.2.1 Several re-cut Bronze Age ditches were identified at the north of the Distribution main, these relate to crop marks identified through aerial photography. Medlycott states that 'further work, employing a variety of methods, is needed to establish or confirm the date and character of a representative sample of sites mapped by aerial photography. This is particularly the case in Norfolk, where little or no systematic investigation of such sites has been undertaken. Here, the coaxial fields and enclosures potentially dated to the Bronze Age by the Bacton to Yarmouth pipeline excavations are morphologically very similar to other extensive field systems and enclosure complexes recorded across north-east and east Norfolk. In addition, aerial photography has identified significant numbers of new ring-ditches, potentially representing hundreds of new round barrow sites and barrow cemeteries, as well as recording several other sites (e.g. hengiform monuments) that may be funerary or ceremonial in character. Further work is needed to establish the funerary nature (or otherwise) of these sites, and to elucidate their dating' (2011; p. 21).

Medieval

Industry; To add to the understanding of the medieval pottery industry

- 2.2.2 A number of medieval pottery wasters were recovered from the development along with possible kiln debris. Medlycott identified this as an area of interest - 'The medieval pottery industry within East Anglia is poorly understood; Further work is needed on the medieval pottery industries, both at a local and regional scale' (2011, p 71).

2.3 Site Specific Research Objectives

Based on the results of the archaeological works two local/site specific research objectives have been identified. These are outlined as follows.

Prehistoric

Bronze Age field systems; To understand the development of Bronze Age field systems

- 2.3.1 The Bronze Age ditches at the northern end of the development are potentially part of extensive field systems identified through the study of aerial photography. These have undergone several phases of modification as shown by the truncation of several of the ditches and potential movement and alteration of the boundaries they represented.

Medieval and post-medieval

Settlement development; To understand the development from the medieval to the post-medieval periods

- 2.3.2 Excavation work to the north and south of Great Plumstead identified medieval and post-medieval occupation. The excavated remains indicate that the settlement core of Great Plumstead has not moved a great deal, although it has changed in size and shape over time.

2.4 Methodology

- 2.4.1 The methodology used followed that outlined in the Brief (Albone 2014) and detailed in the Written Scheme of Investigation (Spoerry 2014).
- 2.4.2 Machine excavation was carried out by a 360° type excavator using a 2m wide flat bladed ditching bucket. under constant supervision of a suitably qualified and experienced archaeologist.
- 2.4.3 Spoil, exposed surfaces and features were scanned with a metal detector. All metal-detected and hand-collected finds were retained for inspection, other than those which were obviously modern.
- 2.4.4 All archaeological features and deposits were recorded using OA East's *pro-forma* sheets. Trench locations, plans and sections were recorded at appropriate scales and colour and monochrome photographs were taken of all relevant features and deposits.
- 2.4.5 Environmental samples were taken from a range of different features across the three strip map and sample areas.
- 2.4.6 The various strip, map and sample areas were excavated under good conditions, with good light and occasional cloud.

3 RESULTS

3.1 Introduction

3.1.1 The site phasing is based upon the stratigraphic and spatial relationships recorded on site, supplemented by additional spot dating of pottery and other finds including ceramic building material.

3.1.2 The phasing is as follows:

- **Period 1:** Prehistoric (Neolithic to Bronze Age)
- **Period 2:** Medieval (11th to 15th century)
- **Period 3:** Post-medieval (17th to 19th century)
- **Period 4:** Unphased

3.1.3 The results are presented below by period, sub-divided by area. The areas are given in the following order:

Overflow Main (ENF 133969)

- **Area 1a** (southern area) & **1b** (northern area): Southern Strip, Contexts 1000+ Map and Sample area (Figs. 4 & 5)

Distribution Main (ENF 133970)

- **Area 2:** Central Strip, Map and Sample, southern area (Fig. 6) Contexts 2000+
- **Area 3a** (southern area) & **3b** (northern area): Central Strip, Contexts 3000+ Map & Sample, northern area (Figs. 7 – 11)
- **Area 4:** Northern Strip, Map and Sample (Fig. 12) Contexts 4000+

3.1.4 Specialist finds information is presented in the text where appropriate and the reports can be found in appendices B and C.

3.2 Area 1

Period 3: Post-medieval (Figs. 4, 5 & 13; Plate 3)

3.2.1 A single, re-cut, north-east to south-west aligned ditch (**1004**, **1009** & **1024**) was located in Area 1b (Figs. 4 & 13). A second north to south aligned ditch (**1026**) in Area 1a (fig. 5) was also attributed to this period. Ditch **1026** was 1.26m wide and 0.16m deep with shallow, bowl shaped sides and contained a single fill (1027) of dark brownish-black peat. Sample 1002, taken from this fill, produced waterlogged plant material including seeds of black nightshade, thistles, gypsywort, spike-rush and sedges (App. C.2).

3.2.2 The re-cut ditches (**1004**, **1009** & **1024**) were aligned east to west. The earliest ditch cut (**1004**) was 2m wide and 0.52m deep with gradually sloping sides and a flat base. It contained three fills, the lowest of which (1005) was a dark grey-brown peat rich silt 0.2m thick. The middle fill (1006) was a slump of mid yellowish-brown silty sand, whilst the upper fill (1007) was a dark brown silty peat that produced waterlogged plant material including seeds of water crowfoot, thistles and sedges from sample 1000 (App. C.2). Fill 1007 was truncated to the north by ditch **1009** and both fills 1006 and 1007 were truncated by ditch **1024**. Ditch **1009** was 2.2m wide and 0.33m deep with shallow, gradually sloping sides and a concave, bowl shaped base that truncated the northern

side of ditch **1004** and fill 1007. Re-cut **1009** contained a single dark brown-grey silty sand fill (1010). The other re-cut (**1024**) had no direct relationship with ditch **1009** and therefore it cannot be determined which is the earlier. Ditch re-cut **1024** was also a shallow sided bowl shape with a relatively flat base, 0.79m wide and 0.18m deep. It contained a single, soft dark brown peaty silt (1008) formed in partially waterlogged conditions that produced a single sherd of Raeren stoneware drinking vessel dated to 1480 – 1610AD (App. B.7).

Period 4: Unphased (Fig. 5)

- 3.2.3 Due to the paucity of finds and a lack of stratigraphic relationships with the dated features, it was not possible to phase a large proportion of the features within this area of excavation. The features are described below from the north to south and then west to east as the route turns.
- 3.2.4 The most northerly feature was a north-north-west to south-south-east aligned ditch cut (**1028**). Ditch **1028** was a 0.88m wide shallow bowl shaped ditch. It was 0.18m deep that contained a single fill (1029) of brownish-yellow sandy silt. Ditch **1028** maybe the same feature as ditch **1022** (see section 3.2.6) below.
- 3.2.5 Towards the centre of the strip map and sample and just to the north of re-cut ditch **1004/1009/1024** was a second re-cut ditch (**1011 & 1014**) aligned east-north-east to west-south-west. The earliest cut (**1014**) was 1.2m wide and 0.36m deep with stepped sides and a concave base containing a single fill (1015) of mid grey-brown sandy silt. Ditch **1014** and fill 1015 were truncated to the north by ditch **1011**. Ditch **1011** was 1.76m wide and 0.69m deep with a steep sided 'U' shaped profile that contained two fills. The lower fill (1012) was a dark grey-brown sandy silt which was sealed by the upper fill (1013), a mid brown-grey sandy silt.
- 3.2.6 Ditch **1022** was aligned on the same north-north-west to south-south-east alignment as ditch **1028** and may be the same feature. Ditch **1022** had a 'U' shaped profile and was 1.5m wide and 0.48m deep. Ditch **1022** contained three fills, the lowest of which (1023) was a 0.3m thick deposit of dark grey peaty silt that was sealed to the east by an orange-brown silty-sand (1031) up to 0.39m thick. Fill 1031 was in turn sealed by the final fill (1030), which was a dark grey-brown peaty silt 0.18m thick that produced waterlogged plant material including seeds of water crowfoot, thistles and brambles from sample 1001 (App. C.2).
- 3.2.7 Terminating just to the east of, and at right angles to, ditch **1022** was a 0.45m wide and 0.2m deep ditch (**1018/1020**) aligned east-north-east to west-south-west. This feature was 'V' shaped and contained a single mid brown-yellow sand silt fill (1019/1021).
- 3.2.8 To the east of and at right angles to ditch **1018/1020** was a second north-north-east to south-south-west aligned ditch (**1002/1016**) that was parallel to ditch **1022**. Ditch **1002/1016** had a 'U' shaped profile with a flat base 0.99m wide and 0.42m deep and contained a single fill of brownish-yellow sandy silt.

3.3 Area 2

Period 2: Medieval (Figs. 6 & 13; Plate 2)

- 3.3.1 A small area was excavated under Strip Map and Sample conditions to the south of Low Lane, to the west of Great Plumstead.
- 3.3.2 The southern most features within this area were a pair of parallel, east to west aligned boundary ditches (**2002 & 2005**; Fig. 13). Based upon the shared alignment of the two ditches, they are assumed to be part of the same phase of occupation. The southern ditch (**2005**) was 1.41m wide and 0.53m deep with gently sloping sides and a 'V' shaped profile. It contained two fills, the lower of which (2006) was a dark yellowish-brown sandy silt. The upper fill (2007) was a mid yellowish-brown sandy silt. The northern ditch (**2002**) was 1.68m wide and 0.55m deep with a similar 'V' shaped profile that also contained two fills. The lower fill (2003) was a dark yellow-brown sandy silt whilst the upper fill (2004) was a mid yellow-brown sandy silt.
- 3.3.3 A single pit or ditch terminus (**2008**) was located to the north of the double ditch boundary. Feature **2008** was roughly sub-circular in plan, but extended under the eastern baulk. It was 1.2m wide and 0.28m deep with shallow sloping sides and a concave base and contained a single fill (2009) of mid yellow-brown sandy silt that produced a sherd of early medieval ware dated 11th to 12th century (App. B.8).
- 3.3.4 To the north of **2008** a single possibly curving linear ditch (**2010**) was identified. Ditch **2010** was 1.35m wide and 0.15m deep with a slightly irregular shape, shallow sides and a concave base. The ditch contained a single fill of mid grey-brown sandy silt.
- 3.3.5 A small cluster of post holes (**2012, 2014, 2016, 2018 & 2020**), broadly aligned north to south, were located to the north of ditch **2008**, immediately south of Low Road. They were between 0.45 and 0.28m in diameter and ranged in depth from 0.37 to 0.13m. The fills (2013, 2015, 2017, 2019 & 2021) were a mid grey-brown sandy silt. No finds were recovered from any of the postholes but fill 2013 was environmentally sampled and produced a small assemblage of a single charred oat, a single charred pea, barley rachis as well as seeds of stinking mayweed, dock and sedge (App. C.2).

3.4 Area 3

Period 2: Medieval (Figs. 7, 8 & 13)

- 3.4.1 A number of features located within Area 3a and 3b were attributed to the medieval period. Starting in Area 3a, the most southerly feature was a sub-rectangular pit (**3087**) that was 2.3m wide and 0.35m deep. Pit **3087** had gradually sloping sides and a flat base and contained a single fill (3086). Fill 3086 was a pale to mid brown silty sand that produced two large joining fragments of a c.500mm quern stone (App B.2).
- 3.4.2 An east-north-east to west-south-west aligned ditch (**3094**) was located to the north of pit **3087**. Ditch **3094** was 1.7m wide and 0.3m deep and contained a single fill (3093).
- 3.4.3 Inside the enclosure were four pits. The southern most, pit **3038**, was sub circular in plan, 1.8m in diameter and 1m deep, with steep to vertical sides and a concave base that truncated natural layer (3024 = 3067). Pit **3038** contained three fills (3036, 3037 & 3039). The lowest fill (3037) was a pale grey clayey silt 0.5m thick that produced sherds of pottery including late medieval and Transitional wares, Local medieval Unglazed, early medieval ware/Local medieval Unglazed, and Grimston Ware (App. B.8). Fill 3037 also produced undiagnostic fragments of CBM (App. B.9) and fragments of baked clay (App. B.11). The middle fill (3039) was a very pale grey sandy silt up to 0.5m thick. The

upper fill (3036) was a pale grey sandy silt that produced sherds of Local medieval Unglazed pottery (App. B.8) as well as a single possibly worked stone (App. B.2). A second smaller pit (**3021**), located to the north of pit **3038**, extended under the western baulk. Pit **3021** was sub-rectangular in plan, 1m wide and 0.15m deep, with concave sides and a dished base that contained a single pale grey-brown silty sand fill (3020). Two further inter cutting pits (**3062** and **3064**) and a tree throw (**3060**) were located immediately to the north of pit **3021**.

- 3.4.4 A pair of north-east to south-west aligned ditches were located c.30m north of ditch **3094**. The southern ditch (**3111/3131**) in the pair was 1.94m wide and 0.18m deep with a steep northern side and a gently sloping southern edge that contained a single fill (3110/3130) of mid brown sand. The northern ditch (**3126**) was 0.82m wide and 0.27m deep with shallow sides and a concave base. It contained a single fill (3127) of mid brown silty sand that produced a body sherd of East Norfolk Glazed ware or Yarmouth type glazed ware, dated to the 13th to 15th century.
- 3.4.5 Both ditches were truncated near the western edge of the excavation by quarry pits (**3081** & **3129**; Fig. 13). Pit **3129**, which truncated the southern ditch (**3111/3131**), was sub rectangular in plan, 2.85m wide and 0.6m deep, with steep sides and a concave base that contained a single mixed backfill (3128) of mid greyish-brown silty sand that produced residual finds including a sherd of sandy grey ware Romano-British pottery, a sherd of Sandy oxidised ware, Romano-British pottery and two struck flint flakes, as well as burnt clay (App. B.3, B.6, B.11).
- 3.4.6 Ditch **3094** was truncated by a sub-rectangular pit (**3081**), 4.6m wide and at least 0.68m deep, with steep sides and a flat base. It contained five fills, the lowest of which (3098) was a light yellowish grey sandy silt that produced nine sherds of LMT dated to the 13th to 15th century (App. B.8). The lower middle fill (3096) was a mid brown-grey sandy silt 0.41m thick that produced an assemblage of Local medieval Unglazed ware, Grimston ware and LMT ware (App. B.8). The middle fill (3082) was a 0.15m thick layer of dark reddish-grey sandy silt that produced an assemblage of pottery and burnt clay, as well as single charred specimens of bean, oat, wheat and barley grain, dock seed and meadow rue seed, and a fragment of lava quern (App. B.2, B.8, B.11, C.2). A charred fragment of *Pisum/Vicia* from this deposit was radio-carbon dated to 663 ± 29 radio-carbon years (1277–1320 or 1350–1392 calAD; App. D). The material within this layer is likely to be dump of kiln wasters and kiln debris. This layer was associated with a 0.08m thick dump of dark black-grey sandy silt forming the upper middle fill (3095).
- 3.4.7 Fills 3095 and 3082 were sealed by the upper fill of the pit (3083). This dark brown-grey sandy silt contained frequent fragments of charcoal and burnt clay along with sherds of late medieval and Transitional ware and Local medieval unglazed ware dated 13th to 15th century (App. B.8). Single, charred specimens of pea, bean, oat and wheat grain and baked clay were also recovered (App. B.11 C.2).
- 3.4.8 Pit **3081** was truncated to the north by a smaller, sub-circular pit (**3099**), 1.18m wide and 0.32m deep, that contained a single fill (3100) of a mid grey-brown sandy silt. Twenty four sherds of local medieval unglazed ware, Grimston ware and LMT pottery, dated between the 13th to 15th century, were recovered from fill 3100 (App. B.8).
- 3.4.9 Forty metres further to the north, a pair of ditches (**3122** & **3041**) aligned north-east to south-west were excavated. The southern ditch (**3122**) had a 'U' shaped profile with concave sides and a rounded base, 1.2m wide and 0.4m deep. Its single, dark orange-brown silty sand fill (3040) contained residual Romano-British Sandy oxidised ware and sandy greyware, and struck flint including a fragment of a core, a struck flake and a

fragment of burnt flint (App. B.3, B.6). On a parallel alignment approximately 12m to the north, lay ditch **3041**, which had a 'U' shaped profile and was 1m wide and 0.2m deep. It contained a single light reddish-brown silty sand (3121) that produced residual struck flints, sherds of Romano-British Sandy Grey Ware, Sandy Oxidised Ware and a fragment of non-diagnostic Iron slag (App. B.1, B.3, B.6).

- 3.4.10 A pair of north-east to south-west aligned re-cut boundary ditches (**3071/3073/3075 & 3025/3027/3029**; Fig. 13) formed two sides of an enclosure towards the centre of the Strip Map and Sample area. The earliest ditch cut (**3073**) was 0.8m wide and 0.2m deep, with a shallow 'U' shaped profile containing a single fill (3072) of pale yellowish-brown silty sand. A residual, struck notched flint flake was recovered from this fill (App. B.3). The ditch was truncated on the south side by ditch cut **3071**.
- 3.4.11 Ditch **3071** was 0.8m wide and 0.3m deep with a similar 'U' shaped profile and a single fill (3070) of pale brown silty sand. A fragment of lava quern (small find 3006) and a fragment of roof tile were recovered from this feature (App. B.2, B.10). The final ditch in the sequence (**3075**) was located to the north of **3073** but had no direct stratigraphic relationship. Ditch **3075** was 1.4m wide and 0.4m deep with a similar 'U' shaped profile to **3071** and **3073**. Again, ditch **3075** had a single fill (3074) of pale brown silty sand that produced fragments of residual Romano-British Sandy Grey Ware (App. B.6).
- 3.4.12 The northern ditch sequence (**3025, 2027 & 3029**) was similar to that of the middle ditch, with **3025** truncated on its northern edge by ditch **3027**. Ditch **3025** was 0.74m wide and 0.33m deep with a 'U' shaped profile similar to ditch **3073**. It contained a single mid grey-brown sandy silt fill (3026) that did not produce any finds. Ditch **3027**, had a 'U' shaped profile and was 0.62m wide and 0.24m deep. It contained a single fill of dark grey-brown sandy silt. As with the southern ditch sequence there was no relationship with the deeper southern ditch **3029**. Ditch **3029** had a 'U' shaped profile, was 1m wide and 0.52m deep, and contained two fills. The lower fill (3030) was a mid brown-grey sandy silt and the upper fill (3031) was a mid grey-brown silty sand. There was an unclear relationship with post-medieval ditch/hollow fill **3034**, but it is likely that ditch **3034** partially truncated the upper fill (3031) of ditch **3029**.
- 3.4.13 Tree throw **3060**, which was truncated by pits **3062** and **3064**, was 2.27m long, 1.78m wide and 0.22m deep with an irregular shape in plan, gently sloping sides and an irregular undulating base. Its single fill (3061) was a light grey sandy silt. Pit **3062** was sub-circular, 0.78m wide and 0.34m deep with a 'U' shaped profile. It contained a single fill (3063) of dark black-grey sandy silt. Pit **3064**, although not fully exposed, was also sub-circular in plan, 0.58m long, 0.35m wide and 0.22m deep with gently sloping sides, a concave base and a 'U' shaped profile. The pit contained a single fill (3065) of black and dark grey sand-silt.
- 3.4.14 Located to the north of pits **3062** and **3064** was a similarly sized pit (**3051**) that was partially truncated on its eastern edge by ditch **3053**. The visible portion of the pit was sub-circular in plan, 0.78m long, 0.54m wide and 0.17m deep. It had steeply sloping sides and a flat base and contained a single fill (3052) of mid bluish-grey sandy silt.
- 3.4.15 Located at the northern edge of the southern area, ditch **3124** was 1.40m wide and up to 0.5m deep with concave sides and a rounded base. It contained two fills. The primary fill (3125) was a 0.10m thick, pale brownish-yellow sandy silt. The upper fill (3123) was a 0.50m thick mixed deposit of pale brown and mid orange-brown sandy silt. Fill 3123 produced seven sherds of residual sandy grey ware Romano-British pottery dated to the late 1st to 2nd century AD (App. B.6).

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- 3.4.16 Located within the centre of Area 3b was an east-north-east aligned ditch (**3018**). Ditch **3018** was 0.80m wide and 0.30m deep with steeply sloping convex sides and a flat base. It was filled by a pale brown silty sand (3017) containing a small sherd of abraded LMU dated to the 11th to 14th century (App. B.8). Ditch **3018** was truncated to the north by a similarly aligned feature (**3016**), reminiscent of a medieval furrow. It was 1.40m wide, 0.20m deep and had gently sloping sides and a concave base. It contained a single fill (3015) of pale brown sandy silt. Both of these linear features were truncated by the post-medieval cellared building.
- 3.4.17 A further east-north-east aligned medieval ditch (**3009**) was located to the north of the building. Ditch **3009** was 1.45m wide and 0.70m deep with convex sides and a flat base containing two fills (3007 & 3008). The lower fill (3008) was a pale yellowish-brown sandy silt that produced two sherds of LMT dated to the 14th to 15th century (App B.8). The upper fill (3007) was a 0.40m thick dark grey sandy silt. Fill 3008 was truncated to the north by post-medieval ditch **3006**.
- 3.4.18 The northernmost feature attributed to this period was a pit (**3004**). This small, shallow, circular feature was 0.80m in diameter and 0.30m deep with gently sloping sides and a flat base. It contained a single fill (3003) of dark grey silty sand that produced a single residual sherd of abraded Thetford ware dated to the 10th to 11th century (App. B.8).

Period 3: Post-medieval (Figs.7 & 8; Plates 4 & 5)

- 3.4.19 Several features within Areas 3a and 3b were of post medieval date. The most southerly feature attributed to this period was an east-north-east to west-south-west aligned boundary ditch (**3109**) that truncated an earlier medieval ditch (**3115**). Ditch **3109** was 1.1m wide and 0.16m deep with moderately sloping sides and a rounded base that contained a single fill (3112). Ditch fill 3112 was a mid yellowish-brown sand silt that produced a single residual sherd of Romano-British pottery (dated to the mid 1st to 4th century; App. B.6).
- 3.4.20 Layer 3056 was located towards the north east end of the Area 3a. The layer (3056), which filled a natural hollow, was a dark brown-grey sandy silt, 0.20m thick, that covered an irregular sub-circular area 3.20m long by 1.35m wide. It was truncated to the west by ditch **3053**.
- 3.4.21 Located to the north of layer 3056 and running across the site on an east to west alignment was a second natural hollow (**3032**). This hollow was 3.1m wide and 0.2m deep, had an irregular shape with shallow sides and an irregular base that contained a single fill (3033). Fill 3033 was a mid grey-brown sandy silt that produced 15 sherds of residual Saxon and medieval pottery including a sherd of Thetford ware, one sherd of early medieval ware, three sherds of medieval pottery and ten late medieval sherds dated to the late 14th to 15th century. The feature also produced residual abraded fragments of brick made from red and yellow clay, dated 17th to mid 18th century (App B.10). The hollow was truncated by ditch **3034**.
- 3.4.22 Ditch **3034/3046/3053** was 1.14m wide and 0.28m deep with shallow sides and a concave base. The ditch contained several fills along its length. Ditch cut **3034** contained a single fill (3035) of dark brown grey sandy silt but did not produce any finds. Ditch cut **3046** contained a single fill (3047) of a mid brown-grey sandy silt that produced a single fragment of quern stone (SF 3005; App B.2). Finally, ditch cut **3053** contained a single fill (3054) of a very light grey silty sand, which again did not produce any finds. There was an unclear relationship between ditch cut **3034** and ditch **3029**, although it seems likely that ditch **3034** truncates the upper fill (3031) of ditch **3029**.

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- 3.4.23 A stone built well was located within the centre of Area 3b. Surrounding the well was a circular cut feature (**3019**; not excavated) 2.20m in diameter. Construction cut **3012** contained a fill of light green-grey sand used to pack out the stone well lining. The stone lining was placed slightly off centre within the construction cut. The stone lining of the well (**3013**), which was excavated in its interior to a depth of 1m, was composed of at least 7 courses of unknapped flint nodules and occasional brick fragments in even rows. The lining, which had walls between 0.2m and 0.25m thick, had a total diameter of 1.58m. The well was truncated on its southern edge by drain **3091**. It is likely that the well was used as a soak away for Building 1 at the end of its use life.
- 3.4.24 A single dark grey-brown sandy silt backfill deposit (3014) was also excavated. This produced a large assemblage of material including fragments of glass, clay pipe, sherds of Romano-British sandy greyware, Glazed Red earthenware, Cologne/Frechen stoneware, Westerwald vessel, Iron-glazed blackware, refined white earthenware, Staffordshire Scratch-Blue ware, Staffordshire White Salt-Glazed stoneware, Tin-Glazed earthenware. Early post-medieval brick (16th-18th century), 18th to 19th century brick and tile, animal bone fragments and a worked bone handle, possibly from an awl, were also recovered (App B.4, B.5, B.6, B.8, B.10, B.12, C.1).
- 3.4.25 Located to the south of well **3012**, Building 1 was a cellared building with brick floor. The square building measured 3.2m by 3.2m. It had walls (**3088** & **3089**) 0.3m to 0.32m wide, which survived to maximum height of 0.5m to 0.55m. The walls were built from red brick and flint rubble with lime mortar and an internal render. A set of red brick steps leading down to the cellar floor were built into the southern edge of the building. The three steps were 1.2m wide and led down onto a cellar floor (3058) made of red floor bricks arranged in a running bond, with the central drain formed from stretchers running along the line of the central drain (3059). The drain (3059 & 3092), which was aligned north-north-east to south-south-west, ran out of the northern wall of the building.
- 3.4.26 The brick built drain was excavated to the north of the Building. The drain was composed of a vertical sided, flat bottomed cut (**3011**) with the red brick drain built onto the floor. The drain was 0.2m deep and comprised a basal layer of three bricks running along the line of the drain. The sides were formed from three courses of stretchers in a running bond and had headers across the top of the structure. The bricks dated to the late 17th to early 18th century. The drain was backfilled with a mid brownish-red and light greyish-brown mixed silty sand (3010/3090) but did not produce any finds. The drain (3092) truncated the southern edge of the well **3012** and its lining (3013), which was replaced once the drain had been laid (3091).
- 3.4.27 A pair of east-north-east to west-south-west aligned ditches (**3006** & **3009**) were located to the north of Building 1 and well **3012**. Medieval Ditch **3009** was truncated to the north by post-medieval ditch **3006**. Ditch **3006**, which was 1m wide and 0.40m deep, had concave sides, a rounded base and contained a single, dark grey silty sand fill (3005) that produced fragments of Creamware, English stoneware and refined-white earthenware pottery dated to the 18th to 19th century, as well as glass shards from 19th to early 20th century (App. B.4, B.8). The relationship with ditch **3002** was not clear and it is likely that the two ditches were contemporary. Ditch **3002** had a similar profile, with concave sides and a rounded base, 0.8m wide and 0.3m deep. Ditch **3002** contained a single fill (3001) of a dark-grey sandy silt that did not produce any finds.

Period 4: Unphased (Figs.7 & 8)

- 3.4.28 Several unphased features were excavated within Area 3a. The most southerly, pit **3080**, was circular in plan, 1.30m in diameter and 0.2m deep, with concave sides and a flat base. It contained two fills and no finds. The lower fill (3079) was a 0.1m thick patch of mid red, heat affected gravel with frequent charcoal inclusions. This was sealed by a 0.2m thick, mid brown silty sand upper fill (3078).
- 3.4.29 Two east-north-east to west-south-west aligned ditches (**3084 & 3043**) were located to the north of similarly aligned medieval and post-medieval ditches **3109** and **3115**. Ditch **3043** was 1m wide and 0.25m deep with gently sloping sides and a concave base. It contained three fills, the lower two (3044 & 3045) were located on the north and south sections respectively. Fill 3044 was a primary slump of light yellowish-brown silty sand 0.2m thick. Fill 3045 was similarly derived and of light to mid greyish-brown silty sand, 0.15m thick. The final fill (3042) was a 0.25m thick layer of mid greyish-brown silty sand, potentially backfilling for a re-cut, which produced a single struck flint (App B.3).
- 3.4.30 Ditch **3084**, which had gradually sloping sides and a concave base, was 2.15m wide and 0.64m deep. It contained a single fill (3085) of yellow-brown silty sand that produced a fragment of roof tile (App B.10).
- 3.4.31 Natural layer 3024/3067 was located beneath pit cuts **3023** and **3038**. It had diffuse edges and comprised a mid brown-grey sandy clay 0.1m thick containing a struck flint, a millstone grit whetstone and fragments of Romano-British sandy grey ware (dated mid 1st to 2nd century; App B.2, B.3, B.6). The layer could potentially be an area of trample around pit **3038** but equally it could be a natural deposit with intrusive finds.

3.5 Area 4

- 3.5.1 All of the archaeological features identified along the pipeline route in the northern area have been assigned to Period 1. Although little dating evidence was recovered.

Period 1: Prehistoric (Fig. 12; Plate 1)

- 3.5.2 Located at the southern end of Area 4, ditch **4040/4027** was aligned north-north-west to south-south-east. The ditch was between 1.35m and 1.60m wide and upto 0.3m deep with gradually sloping sides and a concave base (Fig. 13). It contained two fills, the lower fill (4026/4039), was a 0.3m thick pale grey clay silt. The upper fill (4025/4038) was a 0.2m thick reddish-brown silt sand. No finds were recovered from either fill.
- 3.5.3 Approximately 75m to the north of **4027** were a series of inter-cutting ditches. The earliest of these was a small gully terminal (**4005**) with steep sides and a concave base. It was 0.5m wide and 0.22m deep and contained a single fill (4006) of mid grey sandy silt. It was truncated to the south by ditch cut **4002/4007** (Fig. 13).
- 3.5.4 Ditch **4002/4007/4029/4042** may have been the same as **4040/4027**. It was aligned north-north-west to south-south-east turning onto a north-east to south-west alignment. It had steep sides and a concave base. The ditch was between 1.20m-1.52m wide and 0.48-0.6m deep. Its lower fill (4003/4008/4030/4041) was a light grey sandy silt, 0.5m thick, that produced struck flints and fragments of burnt flint. The upper, tertiary fill (4004/4022/4031) was a mid grey sandy silt 0.22m thick. It was truncated by ditch **4028/4032**.
- 3.5.5 Aligned north-east to south-west, ditch **4028/4032** was at least 0.7m wide by 0.73m deep (Fig. 13). It contained five fills, the basal fill (4018/4033) comprised a dark grey silty sand, 0.20m thick. It was sealed by 4034/4017, a 0.10m thick mid brownish-grey silty sand. Fill 4034/4017 was sealed by fill 4035/4016, a mid grey silty sand, 0.20m

thick. This was sealed by fill 4036/4015, a mid orange-yellow sand, 0.24m thick. No finds were recovered and it was truncated to the north by ditch **4001**.

- 3.5.6 Ditch **4001** was a later re-cut of ditch **4028/4032**. The ditch, which was aligned north-east to south-west, was 2m wide and 0.6m deep with convex sides and a flat base. It contained five fills (4009 – 4013). The basal fill (4013) was a pale grey silty sand slump, 0.5m thick, found on the southern edge of the ditch, possibly indicating a bank. It was partially sealed by fill 4012. Fill 4012 was a 0.5m thick pale grey silty clay. It was partially overlain by a 0.2m thick pale grey clayey silt (4011). Fill 4011 also partially sealed 4013 and was overlain by 4010. Fill 4010 was a pale off-white sandy silt, 0.1m thick. The final ditch fill (4009) was a 0.3m thick tertiary fill of mid brown silty sand.
- 3.5.7 On a parallel alignment to ditch **4001**, and located 2.5m to the north, ditch **4023** was 1.20m wide and 0.38m deep with steep sides and a rounded base. It contained a single fill of brownish-yellow sandy silt. Another parallel ditch (**4043**) was located 8.7m north of ditch **4023**. Ditch **4043** was 0.7m wide and 0.2m deep with gradually sloping sides and a concave base that contained two fills. The lower fill (4044) was a mid yellowish-brown sandy silt 0.05m thick and the upper fill (4045) was a mid grey brown sandy silt. A single broken flint blade was recovered from fill 4045 (App B.3).
- 3.5.8 A single tree throw was found towards the northern end of the Strip, Map and Sample area. The tree throw (**4046**) was sub-circular in plan with vertical sides and a flat but irregular base. The feature contained a single fill (4047) of brownish-yellow sandy silt that produced fragments of struck flint (App B.3).

Period 4: Unphased (Fig. 12)

- 3.5.9 Towards the southern end of Area 4, south of ditch **4001/4028/4032**, was a natural hollow filled by numerous water lain silts. Two test pits were excavated into this to characterise the deposits. The hollow contained three natural deposits. The lowest of which (4021) was a mixed light brownish-yellow, dark brownish-red and a light brownish-grey coarse sand that was exposed but not excavated. This layer was sealed by a 0.2m thick mid greyish-brown silty sand (4020/4049) and an upper layer (4019/4048) of very light brownish grey sandy silt, 0.1m thick. Both fills produced fragments of burnt flint. The upper fill (4048) produced struck flints (App B.3).

3.6 Finds Summary

Metalwork working debris (App. B.1)

- 3.6.1 A single undiagnostic and undatable fragment of iron slag was recovered from the central Strip, Map and Sample area.

Worked Stone (App. B.2)

- 3.6.2 Sixty two fragments of quern or millstone were recovered from the central Strip, Map and Sample area on ENF133970. The fragments showed signs of abrasion and no complete examples were recovered.
- 3.6.3 A single, fine millstone grit whetstone was recovered from context 3024 and may be part of a fragment of whetstone. A single, utilised pebble was recovered from pit **3038** and a number of fragments of Rhenish lava were also recovered, including two large joining fragments from the lower stone of a lava quern in pit **3087**.

Flint (App. B.3)

- 3.6.4 A small assemblage of struck flints was recovered from the central and northern areas of ENF133970. This included two recognisable tool forms, one a notched flake of Early

Neolithic date and the second an end scraper of later prehistoric – most likely Late Bronze Age date.

Glass (App. B.4)

- 3.6.5 A total of nine shards of glass were recovered from the northern area of the central strip, map and sample on ENF133970. The glass was not closely datable but was recovered from contexts in association with the post-medieval structure.

Clay pipe (App. B.5)

- 3.6.6 The decorated clay pipe bowl and stem fragments recovered from Well **3012** have been dated to the 18th to 19th century. The pipe has not however, been dated but it is suggested to have come from a publican or hotel owner's commission for their establishment.

Roman Pottery (App. B.6)

- 3.6.7 A small residual assemblage of Romano-British pottery was recovered from the medieval features in the central strip map and sample area of ENF133970. Although small in nature and not recovered from its site of primary deposition the assemblage appears typical of locally produced vessels such as those known to have come from the kilns at Postwick during the 2nd century (Lyons 2003).

Post Roman Pottery (App. B.7)

- 3.6.8 An assemblage of medieval and post-medieval pottery was recovered from the southern and central strip, map and sample areas of ENF133970. The southern area produced a single sherd of early medieval ware from pit **2008**, most likely associated with the original medieval village of Great Plumstead.
- 3.6.9 The central area produced a number of sherds of locally produced unglazed wares, as well as a relatively large assemblage of East Norfolk Glazed ware, including what appears to be kiln wasters in direct association with quarry pit **3081**, which also contained what is believed to be kiln waste.

Ceramic Building Material (CBM) (App. B.8)

- 3.6.10 A small number of fragments of ceramic building material were recovered from the works in the central Strip map and sample area of ENF133970. The majority of these are of 18th to 19th century date and associated or recovered from the cellared building and associated drain (**3059 & 3089**).

Baked Clay (App. B.9)

- 3.6.11 A total of 2480g of burnt clay fragments were recovered from the central area of ENF133970. The majority of these were recovered from quarry pit **3083**. The majority of the fragments are identified as an orange sandy fabric with voids for withies preserved and some with flat surfaces. They have been identified as coming from either an oven or a hearth. The presence of pottery wasters in the same feature would suggest the clay comes from a kiln.

Worked Bone (App B.10)

- 3.6.12 A worked bone handle, potentially from an awl, was recovered from well fill 3014.

3.7 Environmental Summary

Faunal Remains (App. C.1)

- 3.7.1 The Strip Map and Sample area in ENF133969 produced a butchered fragment of cattle radius.
- 3.7.2 The central Strip Map and Sample area of ENF133970 produced a small assemblage comprising 18 fragments of animal bone. Of these, only six were identifiable to species with elements of cattle, pig, sheep/goat and goose present within the assemblage.

Environmental Remains (App. C.2)

- 3.7.3 Plants associated with wetland conditions and obligate aquatic plant species such as water-crowfoot (*Ranunculus* subgenus *Batrachium*) and horned pond-weed (*Zanichellia* sp.) were recovered from ENF133969.
- 3.7.4 Plant remains preserved through charring were recovered from ENF133970. Post hole **2012** produced a number of species including oat (*Avena* sp.) and a single pea (*Pisum* cf. *Sativum*) and is potentially associated with settlement evidence on the southern edge of Great Plumstead.
- 3.7.5 The central Strip Map and Sample area produced evidence of mixed food refuse predominantly composed of cereals and legumes with occasional weed seeds. The most abundant sample was from pit **3062**. The cereals included bread wheat, barley and rye. The weed seed is a mix of common weeds including dock, corncockle and stinking mayweed. Interestingly the sample also produced numerous charred and twisted stems and flowers of heather (*Calluna vulgaris*). This assemblage is likely to stem from either hearth waste or stable waste. Its undated and mixed nature precludes the possibility of further interpretation and a radio-carbon date, although of interest, will not add to the interpretation.

4 DISCUSSION AND CONCLUSIONS

4.1 Area 1

Period 3: Post-medieval (Figs. 4 & 5; Plate 3)

- 4.1.1 Several of the ditches (re-cut ditch **1004/1009/1024** & ditch **1026**) relate to drainage of the area and the drainage pump identified on the 1st edition OS map. At least one of these ditches showed signs of being maintained and re-cut ditch **1004/1009/1024** was present on OS maps as recently as the 1966 Norfolk county edition map. Undated ditch **1026** is on the same alignment as an extant drainage ditch and fits into this period. It is also present on the 1946 additions to the revised 1926 OS Six-inch map.

Period 4: Unphased (Fig. 5)

- 4.1.2 Due to the paucity of finds and a lack of stratigraphic relationships it was not possible to phase a number of the features, in particular a large proportion of the excavated ditches. The unphased ditches seem to lie on either a north-north-west to south-south-east or east-north-east to west-south-west alignment and are either parallel or at right angles to each other, suggesting that they are all part of the same field or drainage system; for example, ditch **1016/1020** respects ditch **1022**. This system of ditches, which is differently aligned to the current boundaries and the phased ditches, may therefore be part of a field system or drainage system related to the medieval and early post-medieval drainage of the farmland surrounding Postwick, prior to the installation of drainage pumps such as the one identified on the 1st edition OS map. Unfortunately due to a lack of dating material it has not been possible to confirm this hypothesis.

4.2 Area 2

Period 2: Medieval (Fig. 6; Plate 2)

- 4.2.1 The southern boundary ditch (**2002** & **2005**) that lies parallel to Low Road is potentially part of the early medieval village layout. Although it does not tie into any of the known mapping data, it may form the back boundary of plots fronting onto Low Road.
- 4.2.2 The lack of domestic material within the Strip Map and Sample area would imply that the features are related to agricultural practices rather than occupation. As such, the posthole alignment is likely to be either part of a fence line forming a boundary or a small ancillary farm building. The only dating evidence was a fragment of early medieval ware, dated 11th/12th century, from pit **2008**. It is therefore possible that some of the features located within this area of the development are of a later medieval or early post-medieval date.
- 4.2.3 As with Area 3b of the central Strip, Map and Sample area, it is unclear how the site developed in relation to the village of Great Plumstead. Both Areas 2 and 3 contain a number of ditches thought to be rural field boundaries forming either in-fields or out-fields on the edge of the villages of Great Plumstead and Little Plumstead.

4.3 Area 3

Period 2: Medieval (Figs. 7 – 11)

- 4.3.1 There was a mix of medieval pits and ditches across this area of the scheme. A number of them related to a series of parallel field boundaries identified on the aerial photography interpretation (Fig. 9). The identified boundaries primarily lay on east-north-east to west-south-west alignments which matched the modern boundaries. The small quantities of domestic material recovered suggest that these were field

boundaries on the edge of the medieval settlement of Plumstead. The focus along Hare road is, however, of potential interest as Hare road was identified as the Parish boundary between great and Little Plumstead form mapping in the 1880's. It is unclear whether this boundary has significant time depth or was part of a later reorganisation of the townships. The presence of further enclosure cropmarks and Hall farm on the opposite side of the road to the development suggests that the settlement may have previously spanned across the boundary. The known early development of Plumstead is poorly understood. There is a single Domesday entry for a significant settlement and Bloomfield records rectors for two separate churches from the early 14th century. Significant landscape change has occurred in the area due to enclosure, further complicating our understanding of the medieval and post-medieval landscape, which is potentially significantly different to the modern townships. This may indicate that the earlier settlement focus of Plumstead crossed across the parish boundary of Hare Road prior to the enclosure development of Great and Little Plumstead. This could suggest that the development of Hare Road as the parish boundary was a more recent reorganisation of the two townships.

- 4.3.2 The assemblages of late medieval/early post-medieval wares recovered from pit **3081**, are of archaeological significance. The pit, which was not fully excavated as a result of it extending under the easement, produced a large assemblage of potential kiln wasters in the form of under-fired, over-fired, blown sherds, and sherds with glaze extending across broken surfaces. This clearly suggests that the assemblage derives from a nearby pottery kiln. The thin yellowish to thicker white powdery substance found on some of the materials could be unfused or unmatured lead glaze. This, combined with the possible kiln fabric also found in pit **3081**, would suggest that a production site is nearby. As the potential production material was found in a quarry pit it implies that if LMT production was carried out near the site it was using locally derived clays and/or sands. No kiln sites have been identified this close to Norwich even though Jennings (1981, 61) has predicted that at least one kiln site lies close to the city.
- 4.3.3 Lentowicz (2009) and Anderson *et al* (1996) have suggested that the LMT pottery found within Norwich and the surrounding area is attributed to kiln sites within the area of the Waveney valley. As already stated, Jennings (1981, 61) had predicted the presence of kilns nearer to Norwich. The six LMT sherds, analysed by thin section, all have a closely related petrographic fabric. There are minor differences in the samples from the three kiln sites, such as the lower proportion of sand inclusions in sample 6. However, given that only one or two sherds have been analysed from each production site it cannot be determined whether these represent consistent characteristics of the products of these specific sites.
- 4.3.4 The close petrographic composition of the geographically separate kiln sites producing LMT in Norfolk and Suffolk is interesting. This may reflect the homogeneous bedrock and superficial geology of this wide area. The various kiln sites, however, have been found on differing superficial glacial deposits. Lee *et al* (2004) introduced a new stratigraphic sequence for the superficial glacial deposits within the Norfolk and Suffolk region around Great Yarmouth. The site at Hopton, for example, is located in an area covered with the more recent Lowestoft formation, as opposed to the possible kiln site located in Area 3, which lies within an area covered by the older Happisburgh formation. The Lowestoft formation is characterised by a dark grey clay-rich matrix (Lee *et al* 2004 p.14), whilst the Happisburgh formation is characterised by a yellowish-grey sandy clay matrix (Lee *et al* 2004 p9). This adds credence to the suggestion made by Quinn (this report) that there is some sort of regional organisation of LMT production that could involve either standardised paste preparation and/or raw materials. Certainly the

potential kiln site at Mountergate, Norwich, was situated on river terrace deposits and the raw materials would potentially need to have been brought into the production site.

- 4.3.5 Within the wider landscape it is clear that material produced at the known and suggested LMT kiln sites is in part directly comparable to material recovered from the consumption sites in Norwich. The samples from the consumption sites show clear similarities with the material from the production sites which were potentially producing a proportion of material for the Norwich market. Interestingly, only small quantities of LMT wares have been identified in the Ipswich area (Anderson *et al* 1996).
- 4.3.6 It is unclear whether the post-medieval building identified within the northern area of Area 3 (figs. 10 & 11; Plate 4) has origins in the medieval period. A number of buildings in the area are identified from the tithe map, but the surviving cellar is constructed from material dating to the 18th or 19th century with final alterations happening to it including the construction of the well in the early 20th century (See Section 4.3.8). There is no clear relationship between the kiln site and buildings but it would be sensible to assume that they are related in some way.
- 4.3.7 How the recovered medieval remains relate to the development of medieval Plumstead is still uncertain. The material culture seems to suggest that Area 3 was excavated through part of the field systems away from the habitation centre in Great Plumstead (Figs. 9-11). This supports the idea that Great and Little Plumstead have not significantly moved within the landscape, although some contraction and expansion has occurred.

Period 3: Post-medieval (Fig. 7 – 11; Plates 4 & 5)

- 4.3.8 The building located in Area 3b was built from material dated to the 18th or 19th century. The building is shown on the 1839 Tithe map of Little Plumstead (Fig. 10) and continues onto the 1st Edition OS (Fig. 11). The building is still present on the 1946 revisions of the OS map and was demolished by the 1970s. It is unclear what purpose the cellar floor had, although this is likely to be a later 18th or 19th century alteration to the building. The drainage run through the middle could indicate that the cellar was used for livestock.
- 4.3.9 The well associated with the post-medieval building was first mapped in the 1901 (Fig. 11). This suggests the well was built in the late 1800s or very early 1900s. The drain built into the cellar is a later addition to the building and well. This suggests that the drainage run was built after the well had gone out of use in the early 20th century.

4.4 Area 4

Period 1: Prehistoric (Fig. 12; Plate 1)

- 4.4.1 The ditches found within this area were orientated on a similar alignment or at right angles to the modern boundaries. The slightly irregular form of these ditches may suggest they are potentially of prehistoric date. A single large fragment of charcoal recovered from the ditches was dated 3192 ± 31 radio-carbon years (App. D).
- 4.4.2 However, the dating of a single charcoal fragment from within the ditch could not be said to provide total certainty as to its time of inception; the charcoal could easily be residual material incorporated into the ditch fill. The similarity between the ditches here and those seen at Ormesby St. Michael (Gilmour *et al* 2014) and Filby (Haskins 2012) along with the lack of artefactual remains could suggest that these are part of a similar prehistoric field system, potentially laid out in the Bronze Age. Similarly extensive systems have also been seen on the Cambridgeshire claylands at Clay Farm, Cambridge and Thorney near Peterborough for example (Gilmour *et al* 2014).

Period 4: Unphased (Fig. 12)

- 4.4.3 The two large features identified on the aerial photographic survey (Fig. 3), which cross the pipeline route within Area 4, were not visible during the Strip Map and Sample phase. One of the two features identified by the NMP has been excavated since this work was undertaken on the Norwich Northern distribution Route (NDR). Two of the trenches (1 & 3) in field G4 identified a large ditch which produced medieval pottery and glass (Pooley *et al.* 2015). Potentially, these ditches form one of the medieval boundaries of the common land on Mousehold Heath. The lack of visibility of these features may suggest that the marks identified crossing the pipeline were banked boundaries and that they did not have an associated ditch.
- 4.4.4 An area of gleyed clay and silts was identified to the south of the east-north-east to west-south-west aligned ditches. The excavated layers suggest that this was either a peri-glacial feature or a later dried up pond.

4.5 Significance

- 4.5.1 The potential Bronze Age field system located within Area 4 adds to the understanding of Bronze Age archaeology within Norfolk. Limited numbers of Bronze Age field systems have been found. These field systems, like those found at Ormesby St. Michael (Gilmour *et al.* 2014) and Filby (Haskins 2012) demonstrate that areas of significant Bronze Age settlement are present within Norfolk. This site adds to the increasing number of identified putative Bronze Age field systems.
- 4.5.2 The possibility of an LMT ware production site located nearer to Norwich than other such sites adds to the understanding of the development and production of pottery within the region at the end of the medieval and start of the early post-medieval periods. The possibility that some form of regional control of the LMT pottery production has been suggested (Quinn, this report) and that the material matches sherds from known consumer sites in Norwich suggests that at least part of the material manufactured near Great Plumstead was made for the Norwich markets, rather than produced for the local market, as suggested for the kiln site on West Road, Rickinghall Inferior (Anderson *et al.* 1996). The most likely calibrated radio-carbon date from a fragment of charred plant remains from fill 3082 of this pit proved to be 1350–1392 calAD (at 95.4% probability) which matches the earlier part of the previously presumed dates for LMT production.

APPENDIX A. TRENCH DESCRIPTIONS AND CONTEXT INVENTORY

ENF133969 – Area 1

Context	Cut	Category	Feature Type	Description	Phase
1000	1000	cut	trackway		5
1001	1000	fill	trackway	undated	5
1002	1002	cut	ditch	no dateable finds	5
1003	1002	fill	ditch		5
1004	1004	cut	ditch		4
1005	1004	fill	ditch		4
1006	1004	fill	ditch		4
1007	1004	fill	ditch		4
1008	1024	fill	ditch		4
1009	1009	cut	ditch		4
1010	1009	fill	ditch		4
1011	1011	cut	ditch	undated	5
1012	1011	fill	ditch		5
1013	1011	fill	ditch	undated	5
1014	1014	cut	ditch		5
1015	1014	fill	ditch		5
1016	1016	cut	ditch		5
1018	1018	cut	ditch		5
1019	1018	fill	ditch	trowel and shovel	5
1020	1020	cut	ditch terminus		5
1021	1020	fill	ditch		5
1022	1022	cut	ditch		5
1023	1022	fill	ditch		5
1024	1024	cut	ditch		4
1025	0	void	void		0
1026	1026	cut	ditch		4
1027	1026	fill	ditch		4
1028	1028	cut	ditch		5
1029	1028	fill	ditch		5
1030	1022	fill	ditch		5
1031	1022	fill	ditch		5
1032		layer	peat layer		5
1033		layer	alluvial		5

ENF133970 – Area 2

Context	Cut	Category	Feature Type	Description	Phase
2000	0	layer	topsoil		
2001	0	layer	subsoil		
2002	2002	cut	ditch		3
2003	2002	fill	ditch		3
2004	2002	fill	ditch		3
2005	2005	cut	ditch		3
2006	2005	fill	ditch		3
2007	2005	fill	ditch		3
2008	2008	cut	pit	extends east beyond LOE	3
2009	2008	fill	pit	extends E beyond LOE	3
2010	2010	cut	ditch		3
2011	2010	fill	ditch		3
2012	2012	cut	post hole		3
2013	0	fill	post hole		3
2014	2014	cut	post hole		3
2015	0	fill	post hole		3
2016	2016	cut	post hole		3
2017	2016	fill	post hole		3
2018	0	cut	post hole		3
2019	2018	fill	post hole		3
2020	2020	cut	post hole		3
2021	2020	fill	post hole		3

ENF133970 – Area 3

Context	Cut	Category	Feature Type	Description	Phase
3001	3001	fill	gully		4
3002	3001	cut	gully		4
3003	3004	fill	pit	Modern feature extends west beyond LOE. Cut through subsoil	3
3004	3004	cut	pit		3
3005	3006	fill	ditch	extends beyond eastern LOE	4
3006	3006	cut	ditch		4
3007	3009	fill	ditch		3
3008	3009	fill	ditch		3
3009	3009	cut	ditch	same boundary as [3006]	3
3010	3011	fill	foundation trench		4
3011	3011	cut	foundation trench		4
3012	3012	cut	well		4
3013	3012	masonry	well		4
3014	3012	fill	well		4
3015	3016	fill	ditch		3
3016	3016	cut	ditch	Extends beyond eastern LOE,	3
3017	3018	fill	ditch	Feature extends beyond eastern LOE	3
3018	3018	cut	ditch		3
3019	0	fill	well		4
3020	3021	fill	pit		3
3021	3021	cut	pit		3
3022	3023	fill	pit		3
3023	3023	cut	pit		3
3024	0	layer	buried soil		5
3025	3025	cut	ditch		3
3026	3025	fill	ditch		3
3027	3027	cut	ditch		3
3028	3027	fill	ditch		3
3029	3029	cut	ditch		3
3030	3029	fill	ditch		3
3031	3029	fill	ditch		3
3032	3032	cut	hollow		4
3033	3033	fill	hollow		4
3034	3034	cut	ditch	Unclear relationship with [3029] but feature is likely to have been truncated away and originally sealed 3029	4
3035	3034	fill	ditch		4
3036	3038	fill	pit		3

Context	Cut	Category	Feature Type	Description	Phase
3037	3038	fill	pit		3
3038	3038	cut	pit		3
3039	3038	fill	pit		3
3040	3041	fill	ditch		3
3041	3041	cut	ditch		3
3042	3043	fill	ditch		5
3043	3043	cut	ditch		5
3044	3043	fill	ditch		5
3045	3043	fill	ditch		5
3046	3046	cut	ditch		4
3047	3046	fill	ditch		4
3048	3048	cut	post hole		3
3049	3048	fill	post hole		3
3050	3048	fill	post hole		3
3051	3051	cut	post hole		3
3052	3051	fill	post hole		3
3053	3053	cut	ditch		4
3054	3053	fill	ditch		4
3055	3053	fill	ditch		4
3056		layer	hollow	Extends beyond east LOE	5
3057	0	masonry	structure	Extends beyond western LOE	4
3058	0	masonry	floor		4
3059	0	masonry	structure		4
3060	3060	cut	natural	Extends beyond western LOE	3
3061	3060	fill	natural		3
3062	3062	cut	pit		3
3063	3063	fill	pit		3
3064	3064	cut	pit	extends beyond western LOE	3
3065	3064	fill	pit	extends beyond western LOE and obscured underneath (3066)	3
3066	0	layer	dump	Whole group is a dump within a medieval tree throw.	3
3067	0	layer	natural	Same as (3024)	5
3068	3068	cut	ditch		5
3069	3068	fill	ditch		5
3070	3071	fill	ditch		3
3071	3071	cut	ditch		3
3072	3073	fill	ditch		3
3073	3073	cut	ditch		3
3074	3075	fill	ditch		3
3075	3075	cut	ditch		3
3078	3080	fill	pit		5

Context	Cut	Category	Feature Type	Description	Phase
3079	3080	fill	pit		5
3080	3080	cut	pit		5
3081	3081	cut	pit		3
3082	3081	fill	pit		3
3083	3081	fill	pit		3
3084	3084	cut	ditch		5
3085	3084	fill	ditch		5
3086	3087	fill	pit		3
3087	3087	cut	pit	full extent unknown	3
3088		masonry	wall	N & E wall of building 3057. Later rebuild on 3089. Unfrogged bricks and rounded and sub rounded flint. Rough courses. Brittle white lime mortar	4
3089		masonry	wall and steps	S & E wall of cellared building, along with steps. Original phase and was built more carefully than rebuild 3088. Unfrogged bricks and floor tile. Soft greyish-white lime mortar internal plaster. Steps consist of three risers, whilst porch/threshold	4
3090	3011	fill	backfill	lower backfill of drain trench 3011	4
3091		masonry	well	Top 4 courses of well which appear to be repair over drain rebuild alteration 3092. Single string course of headers laid on end underneath 3 courses of flint cobbles & boulders. Mid yellowish brown fine to medium sandy mortar	4
3092		masonry	well	Brick aperture for drain with flint cobbles above. Very rounded to sub-rounded flints bonded with soft greyish-white fine sandy lime mortar. Alteration of well into soakaway	4
3093	3094	fill	ditch	aerial photographs imply may be part of enclosure with 3043. Broadly similar but no active evidence to prove or disprove this so probably true	3
3094	3094	cut	ditch	see above	3
3095	3081	fill	pit	Dump of burnt material possibly from a kiln/oven into top of quarry pit	3
3096	3081	fill	pit	backfill of quarry pit, possibly thrown in at some time as burnt material above as contains charcoal and daub flecks	3
3098	3081	fill	pit	fill of quarry pit, not fully excavated due to depth	3
3099	3099	cut	pit	small medieval pit cut on north edge of quarry pit 3081	3
3100	3099	fill	pit	see above	3
3109	3109	cut	ditch	Ditch/Gully of med date. Conclusion of date attributed to lone ceramic sherd of med date.	3
3110	3111	fill	ditch	Wide shallow ditch fairly furrow like but isolated. Large quantity of med pot recovered prob as part of activity area?	3
3111	3110	cut	ditch	Wide shallow ditch fairly furrow like but isolated. Large quantity of med pot recovered prob as part of activity area?	3
3112	3109	fill	ditch	Ditch/Gully of med date. Conclusion of date attributed to lone ceramic sherd of med date.	3
3113	3113	cut	ditch	Ditch of unknown date.	3
3114	3113	fill	ditch	Ditch of unknown date.	3
3115	3115	cut	ditch	medieval boundary ditch truncated by later hole 3119.	3

Context	Cut	Category	Feature Type	Description	Phase
3116	3115	fill	ditch	medieval boundary ditch truncated by later hole 3119.	3
3117	3117	cut	post-hole	post hole possibly med in date	3
3118	3117	fill	post hole	post hole possibly med in date	3
3119	3119	cut	post hole	posthole of med date.	3
3120	3119	fill	post hole	posthole of med date.	3
3121	3122	fill	ditch	Narrow but deep ditch. Stock enclosure?	3
3122	3122	cut	ditch	Narrow but deep ditch. Stock enclosure?	3
3123	3124	fill	ditch	secondary backfill of 3124	3
3124	3124	cut	ditch	backfilled probably Roman ditch field boundary follows same alignment as med and modern boundary ditches.	3
3125	3124	fill	ditch	primary slump on base of ditch	3
3126	3126	cut	ditch	small e-w linear cut by med quarry	3
3127	3126	fill	ditch	small e-w linear cut by med quarry	3
3128	3129	fill	pit	backfill of quarry pit	3
3129	3129	cut	pit	medieval pit. Seems too large to be grain storage pit, so perhaps it's for quarrying sand	3
3130	3131	fill	ditch	sole fill of e-w ditch. Unless reworked rapidly deposited primary fill	3
3131	3131	cut	ditch	ditch no later than medieval perhaps enclosure ditch	3

ENF133970 – Area 4

Context	Cut	Category	Feature Type	Description	Phase
4001	4001	cut	ditch		1
4002	4002	cut	ditch	possibly prehistoric but no dating evidence recovered	1
4003	4002	fill	ditch		1
4004	4002	fill	ditch		1
4005	4005	cut	gully	undated	1
4006	4005	fill	gully		1
4007	4007	cut	ditch	possibly prehistoric but no dating evidence	1
4008	4007	fill	ditch		1
4009	4001	fill	ditch		1
4010	4001	fill	ditch		1
4011	4001	fill	ditch		1
4012	4001	fill	ditch		1
4013	4001	fill	ditch		1
4014	4028	fill	ditch	slumped material from south bank	1
4015	4028	fill	ditch	redeposited natural	1
4016	4028	fill	ditch	redeposited natural	1
4017	4028	fill	ditch		1
4018	4028	fill	ditch		1
4019		layer	natural	contained some burnt flint, probably washed down	5
4020		layer	natural		5
4021		layer	natural		5
4022	4007	fill	ditch		1
4023	4023	cut	ditch	unknown date, no finds	1
4024	4023	fill	ditch		1
4025	4027	fill	ditch		1
4026	4027	fill	ditch		1
4027	4027	cut	ditch		1
4028	4028	cut	ditch		1
4029	4029	cut	ditch		1
4030	4029	fill	ditch		1
4031	4029	fill	ditch		1
4032	4032	cut	ditch	undated	1
4033	4032	fill	ditch		1
4034	4032	fill	ditch		1
4035	4032	fill	ditch		1
4036	4032	fill	ditch	redeposited natural sand	1
4037	4050	fill	ditch		1
4038	4040	fill	ditch		1
4039	4040	fill	ditch		1

Context	Cut	Category	Feature Type	Description	Phase
4040	4040	cut	ditch		1
4041	4042	fill	ditch		1
4042	4042	cut	ditch	truncated wholly by ditch [4028] to north	1
4043	4043	cut	gully		1
4044	4043	fill	gully		1
4045	4043	fill	gully		1
4046	4046	cut	natural	possibly used in bronze age	5
4047	4046	fill	natural		5
4048		layer	natural		5
4049		layer	natural		5
4050	4050	cut	ditch		1

APPENDIX B. FINDS REPORTS

B.1 Metal Working Debris

By Sarah Percival

Nature of the Assemblage

- B.1.1 A single piece of undiagnostic iron slag weighing 31g was recovered from the fill of ditch 3041. The slag is not closely datable.

B.2 Worked Stone

By Sarah Percival

Introduction

- B.2.1 A total of 62 fragments of quern or millstone weighing 7,686g were collected from seven excavated contexts and from unstratified surface collection (Table 8). The fragments are worn and abraded and no complete querns or millstones were recovered.

Context	Lithology	Type	Feature	Feature type	Quantity	Weight (g)
3024	Millstone grit	Whetstone	0	Buried soil	1	1303
3036	Grit stone	Possible rubber	3038	Pit	1	396
3047	Lava	Millstone	3046	Ditch	1	267
3070	Lava	Millstone	3071	Ditch	3	694
3082	Lava	Millstone	3081	Pit	3	26
3086	Lava	Millstone	3087	Pit	2	3750
3116	Lava	Millstone	3115	Ditch	40	120
99999	Lava	Millstone	4050	Ditch	11	1130
Total					62	7686

Table 1: Quantity and weight of stone by context

Methodology

- B.2.2 A full catalogue was prepared of the total assemblage including complete and incomplete querns. Each piece was examined using a binocular microscope (x10 magnification) and the basic lithology recorded. The pieces were counted and weighed to the nearest whole gram. Type and form were observed. For saddle querns grinding surface, wear angle, thickness, secondary re-use and tooling were recorded. OAE carried out the excavation and post-excavation programmes and curate the assemblage and archive.

Nature of the Assemblage

- B.2.3 Sixty fragments of Rhenish lava weighing 5,987g include two large joining fragments from the lower stone of a lava quern. The fragments, which came from pit **3087**, are extremely worn, being only 37mm thick, with circular grooves indicating wear on grinding surface. The opposing surface is pecked. Part of the central spindle hole and exterior edge survive suggesting an overall original diameter of c.500mm. A chunky lava block 76mm thick came from ditch **3071**. The remainder of the assemblage comprises worn scraps.
- B.2.4 Querns were operated in pairs comprising an upper and lower stone. A study of a deposit of late Saxon quern stones from the Thames Exchange site in London suggests that lower stones had a radius of between 240 and 279mm, slightly small than that of upper stones, and a narrow spindle hole (Freshwater 1996, fig.5). This suggests that the

fragment found in pit **3087** is from a lower stone. The mean thickness for the quern stones is 76.8mm upper and 77.3mm for the lower stone, putting the fragment from ditch **3071** within the expected range for a late Saxon/ early medieval example (Freshwater 1996, 42).

- B.2.5 Lava was widely imported into East Anglia during the late Saxon and medieval periods and it is likely, given the pottery dating at the site that this example is of similar date. Contemporary assemblages of lava have been found extensively in Norwich (Margeson 1993, Shelley 2005, Emery 2007; Popescu 2009, Wallis 2006, 56). The lava is almost certainly derived from quarries situated in the Mayen region of Eifel, Germany, from where lava quernstones were widely distributed in the early medieval period (Parkhouse 1997).
- B.2.6 A fragment of gritstone (Fig. 15) found in buried soil 3024 has smoothing to all surfaces suggesting that it has been used as a hone. Millstone grit was commonly used for querns and has been found at several late Saxon sites in Thetford (Talbot 1999, 43; Dallas 1993, 121). The lack of local stone suitable for use for sharpening tools means gritstone would be at a premium and the fragment may have been re-purposed as an *ad hoc* hone similar to examples found in Roman contexts in Worcestershire (Whitehead 2013).

B.3 Flint

By Anthony Haskins

Introduction

- B.3.1 A small assemblage of 16 struck flints and 64 burnt flints was recovered from the northern and central strip, map and sample areas of ENF 133970. This report covers a rapid assessment for chronological and typological indicators. Due to the small size of the assemblage and limited potential to further our understanding no further work is required.

Methodology

- B.3.2 For the purposes of this report individual artefacts were scanned and then assigned to a category within a simple lithic classification system (Table 9). Unmodified flakes were assigned to an arbitrary size scale in order to identify the range of debitage present within the assemblage. Edge retouched and utilised pieces were also characterised. Beyond this no detailed metrical or technological recording was undertaken during the preliminary analysis. The results of this report are therefore based on a rapid assessment of the assemblage and could change if further work is undertaken.

Quantification

Context no.			3022	3024	3042	3058	3072	3079	3121	3128	4008	4019	4020	4041	4045	4047	4048	Total
Type	Sub type	Classification																
	Core	Core fragment							1							1		2
Flakes (>25mm <50mm)	Primary									1								1
	Secondary			1					1	1							1	4
	Tertiary												1		1	1		3
Flakes (>10mm <25mm)	Tertiary		1													1		2
All blades	Tertiary													1				1
	Broken														1			1
Retouched tools		Scraper			1													1
		Notched flake					1											1
Burnt flint (all types)						1		2	1	2	5	32	18	3				64
Totals			1	1	1	1	1	2	3	4	5	32	18	5	1	3	2	80

Table 2: Flint catalogue

Assessment

Central strip, map and sample (contexts 3000+)

- B.3.3 Burnt material was recovered from three features within the central strip, map and sample area. The small quantities suggest it is residual material from nearby burning and of little interest.
- B.3.4 The single core fragment is not diagnostic and not closely datable.
- B.3.5 The struck flint from this area is a mixed range of sizes with a scraper and notched flake recovered from ditch fill (3042) and the cellared building floor (3058). The end scraper had abrupt retouch on the distal end cutting through the patina and therefore indicating the flake was re-used at a later date typical of later prehistoric flint work and likely to be of Bronze Age date.

- B.3.6 The notched flake, however, derives from a mid brown-grey pale flint similar in form to that used at the Postwick sewage treatment works (Haskins 2015) for axe production during the Early Neolithic. The form of the notched flake would suggest a similar Neolithic date.
- B.3.7 This is a very small mixed date assemblage with residual material dating from the Neolithic through to the Late Bronze Age
- Northern strip, map and sample (contexts 4000+)*
- B.3.8 A small assemblage of burnt flint was recovered from a number of features in particular from the northern strip map and sample area, particularly in the natural gleyed hollow deposits (4019 & 4020). It is likely that this material has derived from nearby activity.
- B.3.9 The core fragment is poorly struck with several unstructured removals present and is likely to be of later prehistoric date.
- B.3.10 The range of debitage present within the northern area is a mix of flakes, which are generally poorly struck with short squat profiles and a single bladelet. It is likely this is a mixed period assemblage from the Early Neolithic date through to the Bronze Age.

B.4 Glass

by Carole Fletcher

- B.4.1 Archaeological works produced an assemblage of nine shards, weighing 0.065 kg. The glass is not closely datable and is dated by association with the material with which it was found. The glass adds little to the understanding of the site and represents the incorporation of rubbish into the features from which it was recovered.

Context	Form	Description	No. of shards	Weight (kg)	Date range
3005	Vessel	Body shards and a near complete base from a clear colourless glass vessel that may be a bottle. The base shard has a partially finished or ground pontil.	5	0.040	Pottery from the same context dates to the 18th-19th century. The vessel is likely to be 19th century.
	Vessel	Irregular shard from a cobalt blue 'Bristol Blue' vessel.	1	0.001	19th-early 20th century.
3014	Vessel	Body and neck shards from one or more green glass bottles. The surface of the glass is heavily iridised, much of which is flaking or has flaked off.	3	0.024	Not closely datable, however pottery from the same context dates to the 18th century.
Total			9	0.065	

Table 3: Glass catalogue

B.5 Clay Tobacco Pipe

by Carole Fletcher

- B.5.1 Archaeological works produced small assemblage of clay tobacco pipe including a partial decorated bowl. The majority of the clay pipe cannot be closely dated, however some of the material was recovered alongside early modern pottery, suggesting a late 18th or early 19th century date for the decorated pipe bowl recovered from the backfill of well **3012**.
- B.5.2 The fragment of clay pipe bowl from well **3012** has broken in such a way as to not be able to entirely identify the type of pipe bowl from which it has come. The upper part of the rim survives and part of the side of the bowl. The pipe bowl is decorated with a moulded form of an anchor and chain with further moulding on the surviving seam. The pipe bowl appears to be relatively upright in form, it is unknown if it had a foot or a spur, there is no rilling around the bowl. Moulded decoration on pipe bowls is found from the second half of the 18th century onwards, with elaborate designs appearing (Oswald, 1975, p.97), and the 19th century sees the full flowering of the decorated moulded bowl (Oswald, 1975, p.110). In the 19th century, Norwich pipes were often highly decorated (Karshner, 1979)
- B.5.3 A number of clay pipe bowl manufacturers have been identified in Norfolk and a list of Norfolk pipe makers is published by Atkin (Atkin, 1985) with Norwich makers published by Karshner (Karshner, 1979). Atkins discusses some of the decorated bowls *circa* 1740-1840, saying commissions for pipes were common during the 19th and 20th centuries. Publicans and hotel owners ordered pipes with the name of their establishment (Atkins, p.137). No pipe is illustrated with the anchor mark moulded upon it in Atkins' article, nor is such a mark illustrated in Oswald, and although not identified, it is likely that the anchor may represent a pub name.
- B.5.4 It seems likely that this decorated bowl is late 18th or 19th century, pottery found alongside the pipe bowl includes sherds of German stonewares, including Westerwald, Tin-Glazed earthenwares and Staffordshire White Salt-Glazed wares. Overall the context has been dated to the 18th-early 19th century, and this date can most likely be applied to the clay pipe bowl.

Context	Cut	No. stem fragments	No. bowl fragments	Weight (kg)	Description	Date range
3014	3012		1	0.003	Fragment of decorated bowl Oswald, 1975, type ??p.??	
		1		0.005	Fragment of stem	Not closely datable
3058	Masonry number		1	0.002	Fragment of bowl. The bowl form is unclear due to the way the pipe has broken. However, the size of the fragment suggests a date after the mid 17th century.	Not closely datable
99999		1		0.004	Fragment of stem	Not closely datable
Total		2	2	0.014		

Table 4: Clay Pipe catalogue

B.6 The Romano-British pottery

by Alice Lyons

The Pottery

- B.6.1 A total of 35 pottery fragments, weighing 215g, of Romano-British coarse ware pottery was recovered as a residual element within the medieval features on this site. The pottery is significantly abraded with an average sherd weight of only 6g.
- B.6.2 The assemblage comprises a small number of utilitarian coarse ware jar/bowl and flagon sherds, some of which retain soot residues were they have been exposed to an open hearth when in use as cooking pots. No fine wares or specialist wares were found as part of this group.
- B.6.3 Although small and not recovered from its primary site of deposition the group appears typical of locally produced vessels such as those known to have been manufactured nearby in the Postwick kilns during the 2nd century AD (Lyons 2003).

Methodology

- B.6.4 The pottery was counted, weighed (to the nearest whole gramme) and the fabric and form recorded. A note was also made of any surface residue.

Context	Fabric	Vessel form	Sherd Count	Sherd weight (g)	Spot date	Comment
3014	Sandy grey ware	Cooking pot	1	12	MC1-C4	Soot residue
3022	Sandy grey ware	Jar/bowl	2	3	LC1-C4	
3024	Sandy grey ware	Jar/bowl	6	18	LC1-C4	
3024	Sandy oxidised ware with grog inclusions	Bowl with an out-turned flanged rim	5	83	MC1-E/MC2	
3040	Sandy grey ware	Jar/bowl	4	5	MC1-C2	Severely abraded
3040	Sandy oxidised ware	Flagon	2	2	MC1-C3	Severely abraded
3074	Sandy grey ware	Jar/bowl	5	18	MC1-C4	Significantly abraded
3112	Sandy grey ware	Jar/bowl	1	3	MC1-C4	Severely abraded
3123	Sandy grey ware	Jar/bowl	7	53	LC1-C2	Small jar with & everted rim.
3128	Sandy grey ware	Jar/bowl	1	7	MC1-C4	
3128	Sandy oxidised ware	Jar/bowl	1	11	MC1-C3	
Total			35	215		

Table 5: Roman pottery Catalogue

B.7 ENF133969 – Post Roman Pottery

by Carole Fletcher

Methodology

- B.7.1 The Medieval Pottery Research Group (MPRG) *A guide to the classification of medieval ceramic forms* (MPRG, 1998) and *Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics* (MPRG, 2001) act as a standard.
- B.7.2 Recording was carried out using OA East's in-house system based on that previously used at the Museum of London. Fabric classification has been carried out for all previously described medieval and post-medieval types. All sherds have been counted, classified and weighed on a context-by-context basis. The assemblage is recorded in the summary catalogue. The pottery and archive are curated by Oxford Archaeology East until formal deposition.

Assemblage

- B.7.3 Archaeological works produced a single sherd of pottery weighing 0.005 kg from ditch **1024**. The sherd is a fragment of a rim from a Raeren stoneware drinking jug c.1481-1610. German stonewares are a common find on many archaeological sites. The single sherd recovered is unabraded, however, little can be inferred from a single sherd other than to suggest a general date for the context.

Pottery catalogue.

Context	Cut	Full Name	Basic Form	Sherd Count	Weight (kg)	Date
1008	1024	Raeren stoneware	Drinking jug	1	0.005	1480-1610

Table 6: Pottery catalogue

B.8 ENF133970 - Post-Roman pottery report

Sue Anderson

Introduction

- B.8.1 Four hundred and thirty-nine sherds of pottery weighing 3790g were collected from 27 contexts. Table 1 shows the quantification by period.

Period	No.	Wt/g	eve	MNV
Late Saxon	4	26		4
Early medieval	13	39		12
Medieval	142	1200	0.61	60
Late medieval	183	1693	0.62	131
Post-medieval	74	656	0.47	59
Modern	23	176	0.41	21
Totals	439	3790	2.11	287

Table 7: Pottery quantification by period

Methodology

- B.8.2 Quantification was carried out using sherd count, weight and estimated vessel equivalent (eve). The minimum number of vessels (MNV) within each context was also recorded, but cross-fitting was not attempted unless particularly distinctive vessels were observed in more than one context. A full quantification by fabric, context and feature is available in archive. All fabric codes were assigned from the author's post-Roman fabric series, which includes East Anglian and Midlands fabrics, as well as imported wares. Medieval and later wares were identified following Jennings (1981). Methods follow MPRG recommendations (MPRG 2001) and form terminology follows MPRG classifications (1998). The results were input directly onto an MS Access database.

Pottery by period

Late Saxon

- B.8.3 Four sherds (26g) of Thetford-type ware were recovered. Three sherds were residual in medieval and later features and all showed some signs of abrasion. A very abraded body sherd from pit 3004 was in a fine sandy, hard fabric with dark grey surfaces and red margins. A large piece from hollow 3032 was in a medium sandy light grey fabric. Two sherds from pit 3038 comprised a dark grey fine sandy flake (which could be later) and a sherd of Kirstead-type Thetford ware (Wade 1976).

Early medieval

- B.8.4 Early medieval wares are generally defined as fine to medium sand-tempered handmade wares which first appeared in the 11th century and continued to be made into the 13th century in rural parts of East Anglia. These handmade wares can be considered transitional between the Late Saxon and medieval wheelmade traditions, and their use overlaps with both period groups. The Norwich types found at this site were probably not in use beyond the 12th century.
- B.8.5 All thirteen sherds (39g) were body and base fragments and most were abraded and residual. A small sherd was the only find in pit 2008 in the south area. Five sherds came from pit 3023, there were five in adjacent pit 3038, and one in nearby hollow 3032, all in

the northern half of the central southern area. Large pit 3081, to the south of the central area, also contained one small sherd.

Medieval wares

- B.8.6 Medieval coarsewares are wheelmade wares which are generally of 12th–14th-century date. The pale grey fine sandy type which is typical of sites in and close to Norwich has been recorded as LMU (Jennings 1981), whilst sherds which deviate markedly from this group have been recorded as MCW. Microscope photographs of some of the main fabrics are included in the figures. Coarsewares dominated in this group, but a few small sherds of glazed wares were also found. Table 2 shows the quantifications of high medieval pottery.

Description	Fabric	No	Wt/g	Eve	MNV
Medieval coarseware	MCW	70	503	0.11	11
Local medieval unglazed (Norwich type)	LMU	67	688	0.50	45
Unprovenanced glazed	UPG	2	4		2
Grimston-type ware	GRIM	3	5		2
Total medieval (12th-14th c.)		142	1200	0.61	60

Table 8: Medieval pottery

- B.8.7 The range of forms present in the high medieval group comprised jars, bowls and jugs. Three bowl rims were present, two of T-shaped everted forms typical of the Norwich area (one MCW, one LMU; cf Jennings 1981, nos 258 and 264) and one with a beaded everted rim more typical of north Suffolk (Fig. 14.1). Rims of four jars, all LMU, were all thickened everted types of 13th/14th-century date (cf Jennings 1981, nos 302, 307, 316). One other possible rim was recorded, although it was a beaded type and appeared poorly made for a rim, so it may be half of a strap handle which had brown longitudinally. At least two and possibly three other handles, presumably from jugs, were present. The only decoration comprised thumbing of handle edges and the inner edge of one of the bowl rims.
- B.8.8 Glazed wares formed only 3.5% of the high medieval group (based on sherd count). This is a low proportion, even for a rural site. All of the sherds were body fragments and all were small, the largest piece weighing only 3g. Three sherds were of Grimston type, all with green glaze and one with brown slip decoration. The unprovenanced sherds were also green-glazed. One was a thin-walled, medium sandy ware, bright orange throughout and relatively soft (UPG1, see appendix). The other was fine sandy with sparse ferrous inclusions, pale grey externally with a dark grey core, and oxidised pinkish internal surface, with an external light green glaze (UPG2, see appendix). It may be a late Grimston product.
- B.8.9 Medieval pottery was recovered from thirteen features across the site, although most of these contained no more than five sherds each. The largest groups were recovered from pits 3038 (13 sherds), 3081 (78 sherds), 3099 (20 sherds) and ditch 3115 (15 sherds). Several of the features containing medieval pottery also contained late medieval wares, the exceptions being the small groups in ditches 3018, 3029 and 3111, pit 3023, and post-holes 3051 and 3119, and the larger group in ditch 3115. Small quantities of sherds in hollow 3032, ditch 3053 and pit 3064 were found with late medieval wares and were probably residual, but some of the larger groups in pits 3038, 3081 and 3099 may be broadly contemporary with the earliest date for late medieval wares (see below).

Late medieval

- B.8.10 There were 183 sherds of late medieval and transitional wares, the largest single group of pottery in this assemblage. Of these, 154 were recovered from pit 3081.
- B.8.11 Despite the MNV for this group of 131 vessels (possibly too high as many vessels were abraded and very fragmented), only nine rims were present. These represented eight jugs with either plain upright or collared rims, and a jar or pipkin rim of more complex everted type. One sherd was from the lower part of a collared rim of a ninth jug. These forms are paralleled in the Norwich corpus (Jennings 1981, e.g. nos 420, 452, 461), but are illustrated here (Fig. 14.2–6) because they appear to be part of a kiln waster group.
- B.8.12 Evidence that many of the sherds from pits 3081, 3099 and possibly 3038 represent production waste is in the form of many underfired sherds, fragments with unfused or unmaturing glaze, blown sherds, a few overfired sherds, and pieces with glaze on their broken edges (Plate 6), a total of 142 sherds. There were no obviously deformed pieces in the group. Two small fragments of a fired clay curved rod in pit fill 3070 may be part of a kiln prop and there were pieces of 'oven dome' in the fired clay assemblage (Percival 2015).
- B.8.13 Most of the sherds in this group were in the same fabric. Heavily fired sherds were reduced to a dark grey, sometimes with an oxidised orange to red surface, but the majority of sherds were oxidised to a brownish orange. All contained abundant very fine rounded sand with sparse larger rounded quartz (generally no bigger than 0.25mm), and sparse very fine ferrous inclusions. In the oxidised sherds, the sand appeared uncoloured or very pale cream; occasional white angular pieces were present. In the heavily fired reduced examples, the white grains stood out more clearly and the sand may have been partly vitrified. Some example sherds were photographed at x50 magnification and plates are included in the appendix.

Illustrated vessels

2. LMT baluster jug, upright flat-topped rim. Very small spot of unfused glaze. Pit fill 3082.
3. LMT baluster jug, upright flat-topped rim. Very small spot of unfused glaze. Pit fill 3082.
4. LMT jug, collared rim. Soft, ?biscuit-fired. Pit fill 3082.
5. LMT jug, collared rim. Soft, ?biscuit-fired. Pit fill 3082.
6. LMT jar or pipkin, complex everted rim. Soft, biscuit-fired? Pit fill 3082.

Post-medieval

- B.8.14 Post-medieval pottery fabric quantities are shown in Table 3.

Description	Fabric	No	Wt/g	Eve	MNV
Dutch-type redwares	DUTR	9	72	0.10	5
Iron-glazed blackwares	IGBW	1	2		1
Glazed red earthenware	GRE	35	374	0.10	32
Speckle-glazed Ware	SPEC	18	133	0.27	13
Tin glazed earthenwares	TGE	4	7		3
Cologne/Frechen Stoneware	GSW4	2	35		1
Westerwald Stoneware	GSW5	5	33		4
Totals		74	656	0.47	59

Table 9: Post-medieval pottery by fabric

B.8.15 Apart from one sherd of Dutch-type redware in pit 3038 and one sherd of glazed red earthenware in foundation trench 3011, all pottery in this group came from well 3012.

B.8.16 The group was dominated by local and Dutch-type redwares, many of which were in poor condition due to post-depositional abrasion. Identifiable vessels included a jug, a dish, a possible bowl, a possible plate and a chamber pot. Two other rims were present but were too small to determine the vessel form. Other wares included some small and abraded fragments of tin-glazed earthenware, two sherds of a Frechen stoneware vessel, and some pieces of Westerwald stoneware including two with cobalt blue painted decoration, one incised and the other with an applied motif, possibly a lion.

Modern

B.8.17 Table 4 shows the quantities of modern pottery recovered.

Description	Fabric	No	Wt/g	Eve	MNV
Refined white earthenwares	REFW	12	125	0.26	10
Creamwares	CRW	1	1		1
English Stoneware	ESW	1	14		1
English Stoneware Staffordshire-type	ESWS	1	2		1
Staffordshire scratch-blue ware	SSBW	1	2		1
Staffordshire white salt-glazed stonewares	SWSW	7	32	0.15	7
Totals		23	176	0.41	21

Table 10: Modern pottery by fabric

B.8.18 Four sherds were recovered from ditch 3006, comprising two rim fragments of a refined whiteware plate with polychrome transfer print decoration, a small fragment of creamware and a sherd of brown-glazed stoneware.

B.8.19 Nine sherds in this group were from well 3012. They comprised a refined whiteware body sherd, a white-dipped stoneware tankard fragment, a scratch-blue decorated white stoneware, and fragments of several white salt-glazed stoneware vessels including a small ginger jar.

B.8.20 Most of the refined whitewares were unstratified and included rim sherds of three plates and a dish, and a saucer base. Most sherds were transfer-printed with a variety of blue or brown patterns, and there was one spongeware stencil. A base fragment of white salt-glazed stoneware was also unstratified.

Pottery by context

Area 2

B.8.21 A single, small abraded sherd of EMW was recovered from pit fill 2009.

Pit 2008: Fill 2009 contained one abraded sherd of EMW. 11th/12th c.+

Area 3b

Ditches and pit

B.8.22 Three features produced sherds of pottery of different periods. It is likely that the single sherd of Thetford-type ware in pit 3004 was residual, whilst the two sherds of LMT from ditch 3009 and the four fragments of refined wares from ditch 3006 may well provide closure dates for these features.

Pit 3004: One small, abraded sherd of THET was recovered from fill 3003. 10th/11th c.+

Ditch 3006: Fill 3005 contained two sherds of a REFW plate with ?handpainted polychrome transfer-printed border, a tiny sherd of CRW and a base fragment of ESW. 19th c.+

Ditch 3009: Two body sherds of LMT were found in fill 3008. L.14th–16th c.

Cellared building and associated features

B.8.23 The foundation trench for drain 3059 produced two sherds of 16th-century pottery. Pottery of this date was also recovered from well 3012, although this was not bottomed; it appears to have continued to be backfilled into the late 18th or early 19th century, with 85 sherds of broadly post-medieval and modern date being recovered from the top 1.2m. Ditch 3018 produced a single sherd of medieval pottery.

Trench 3011: A tripod base fragment of LMT and an abraded body sherd of GRE were recovered from fill 3010. 16th c.+

Well 3012: Eighty-five sherds were recovered from upper fill 3014, comprising four LMT, eight DUTR, one IGBW, 34 GRE, 18 SPEC, four TGE, two GSW4, five GSW5, six SWSW, 1 SSBW, 1 ESWS and 1 REFW. The sherds ranged from 16th- to late 18th-century date. Identifiable vessels comprised a DUTR ? jug, GRE ?plate and ?bowl, SPEC chamber pot and dish, and SWSW ginger jar. Final infill L.18th/E.19th c.?

Ditch 3018: Primary fill 3017 contained a small, abraded sherd of LMU (coarser fabric than typical). 11th–14th c.

Area 3a

B.8.24 Three pits, a post-hole, four ditches and a hollow in this part of the site produced a total of 58 sherds, the largest groups being from pit 3038 (23 sherds) and hollow 3032 (15 sherds). Of most significance in this group are the sherds of LMT waste from pit 3064 and ditch 3071, some 90–100m to the north of the main deposit of this type in pit 3081 (see below). A few other LMT sherds from this area suggest that it was in contemporary use, and there is also a significant proportion of medieval pottery in this part of the site.

Pit 3023: Five sherds of EMW, one of LMU and a relatively coarse UPG were found in ditch fill 3022. 12th/13th c.?

Pit 3038: Twenty sherds came from upper fill 3036 and there were three from primary fill 3037. From the upper fill there were sherds of THET, EMW, MCW, LMU and UPG, along with late medieval wares (LMT, DUTR) suggesting that the upper fill was of 15th/16th-century date or contained some intrusive material. The primary fill contained an abraded sherd of THETK, and two sherds of LMU including a large fragment of a jug handle. 13th–14th c.?

Pit 3064: Abraded sherds of MCW and LMU were found in fill 3065, along with a small sherd of underfired LMT. L.14th–16th c.

PH 3051: Three small sherds of two LMU vessels were found in fill 3052. 11th–14th c.

Hollow 3032: Fifteen sherds were collected from fill 3033, of which one was Late Saxon (THET), one was early medieval (EMW), three were medieval (LMU jar rim, GRIM) and ten were late medieval (LMT). L.14th–16th c.

Ditch 3029: An abraded sherd of LMU came from ditch fill 3030. 11th–14th c.

Ditch 3053: One small sherd of Roman greyware (not included in the above report), a small sherd of LMU and a small sherd of LMT were recovered from fill 3055. Infill L.14th–16th c.

Ditch 3071: Two sherds of LMT with poorly fixed glaze were found in fill 3070, in association with two small curving pieces of a fired clay ?kiln prop. L.14th–16th c.

Ditch 3111: A medieval coarseware ?handle and a small body sherd of GRIM were found in fill 3110. 13th/14th c.

B.8.25 Two ditches, two pits and a post-hole in this part of the site produced 250 sherds, of which 233 came from large pit 3081. The majority of sherds from this pit, and some from the intercutting pit 3099, were pieces of LMT waste and these are discussed further below. Ditch 3115 and post-hole 3119, which cut it, contained only medieval wares and were probably closed before LMT production began. Ditch 3126 contained only a tiny sherd of underfired LMT, which could be intrusive.

Ditch 3115: Fifteen sherds of MCW and LMU were recovered from fill 3116, including nine sherds of a jar with a thickened everted rim (cf Jennings 1981, no. 302). 13th/14th c.

PH 3119: Fill 3120 contained one sherd of LMU, possibly redeposited from the fill of ditch 3115. 11th–14th c.+

Pit 3081: Five fills of this pit contained 233 sherds, the majority from 3082 (157 sherds). There were 21 sherds of LMU and one fragment of EMW which are assumed to be residual in this context. Fifty-seven sherds of MCW may also be residual, but 54 of these were from a single bowl in a medium sandy fabric with black surfaces and a red core, in a form similar to LMU bowls (cf. Jennings 1981, no. 264), probably of 14th-century date and perhaps contemporary with the fill. All fills contained fragments of LMT wasters, a total of 154 sherds, including the lowest fill (3098) which contained only LMT. There were cross-matches between sherds in all fills, suggesting that they were contemporary. L.14th–16th c.

Pit 3099: Twenty-five sherds were collected from fill 3100. There were fourteen sherds of LMU, including a handle fragment and a thickened everted jar rimsherd (cf. Jennings 1981, no. 307), and six sherds of MCW including four from a bowl with an everted beaded rim. Five base and body sherds of LMT, of which four were probably wasters, were also recovered. L.14th–16th c.

Ditch 3126: A tiny sherd of underfired LMT was found in fill 3127. L.14th–16th c.

Summary and discussion

B.8.26 A small quantity of pottery was possibly or certainly of Late Saxon date and there was a slightly larger assemblage of early medieval material. Both groups were largely residual in medieval contexts. At the other end of the phases, post-medieval and modern pottery were recovered from a small number of contexts, mainly from features associated with the brick surface and well in the north-central area of the site. The bulk of the assemblage is of high and late medieval date.

B.8.27 The majority of the assemblage was recovered from pits and linear features, with a few sherds derived from post-holes and other negative features. Of the high medieval wares, the largest groups were from pits 3038, 3081, 3099 and ditch 3115. Most of the smaller groups contained at least one abraded sherd and the small quantity suggests that most of these sherds had moved some distance from areas of occupation before they were deposited. Those from field boundaries in particular probably represent waste dispersed across the fields during manuring, eventually entering the open ditches through erosion or deliberate backfilling. Late medieval wares were concentrated in features to the south of the central area, particularly pit 3081, but were occasional inclusions in some of the feature fills further to the north. Where LMU sherds were included in large numbers in the same features, it is likely that they were broadly contemporary with the late medieval wares. Their condition and the presence of sooting suggested that they had been used in a domestic setting, presumably by the same people who disposed of the late medieval pottery manufacturing waste. LMT was certainly present in some quantity in Period 5.1 of the Castle Mall excavations, with a date range of c.1345 to the mid 15th century (Lentowicz 2009, 610), whilst small quantities were present in Period 4, suggesting that it may have been in production from as early as the early/mid 14th century (Lentowicz 2009, 512).

B.8.28 Of greatest significance in this relatively small and dispersed assemblage is the quantity of late medieval and transitional ware from pit 3081 and associated features. As noted above, this group contained a number of presumed waster sherds. These were in the

form of both underfired and overfired examples, although no warping was seen in any of the sherds. Unfortunately there was very little evidence for a kiln or kiln furniture, with only small quantities of fired clay 'oven dome' being present. Assuming that the waste material does indeed represent an LMT production site, this is the closest one to Norwich to have been identified. Kilns have been excavated in north Suffolk (Anderson et al. 1996) and there is a large quantity of kiln waste from sites in the Waveney Valley (Hardy 1985). Jennings (1981, 61) predicted that there would be 'at least one production centre' in the vicinity of the city. LMT sherds were recently recovered from a large pit in South Walsham, in association with late LMU products, and were in fabrics and forms which were slightly different from the north Suffolk types (Anderson 2010); it was suggested that they may be from a more local late medieval pottery industry. Sherds found at Witton included a collared jug rim and other LMT-style forms, which were dated to the 14th/15th centuries and described as similar to products of the putative kilns at Potter Heigham and Woodbastwick (Lawson 1983, 81). It has long been suspected that these parishes were production centres for LMU (Jennings 1981, 41), and probably also for LMT, although unfortunately the fieldwalking assemblages recovered from them have not been studied in detail and remain unpublished.

- B.8.29 A high proportion of the material from Plumstead comprised soft, fully oxidised sherds. Similar underfired unglazed sherds are present in the assemblages from the known kiln sites at Rickinghall and Hopton, Suffolk (Anderson et al. 1996), where it has been suggested that they were 'biscuit-fired'. The technique of double-firing (firing the unglazed pot at a high temperature, followed by glazing and firing at a slightly lower temperature) is thought to have been introduced to England in the post-medieval period. It was certainly in use by the 13th century in the maiolica industry in Italy, and appears to have been used in Cistercian ware manufacture and in the production of some slipwares in England by the 16th century (Courtney 2004, 188). The earliest tin-glazed earthenware potters in England were based in Norwich from c.1567, albeit for a very short period, but they would certainly have used the double-firing technique in the production of their wares. The earliest saggars to have been discovered at an East Anglian production site so far are those from Fulmodeston (Wade-Martins 1983), also dated to the 16th century, although the use of these does not necessarily imply double-firing. No saggars have so far been found in direct association with LMT production.
- B.8.30 Alternatively, given the generally poor application of glaze in the LMT industry as a whole, it is possible that the unglazed sherds were from parts of vessels which were simply not glazed. This seems unlikely in the case of the rim sherds, and some of the body fragments appear to be pieces of flatwares, which would normally be glazed internally at the very least. Some of the softer fired sherds had spots of glaze on one or both surfaces, but this may simply be due to carrying out biscuit and glost firing in different parts of the same kiln. It has been suggested that some tin-glazed wares may have been fired in this way (Jackson 1999).
- B.8.31 Other sherds from the site had thin yellowish or thicker white powdery deposits on the surfaces, presumed to be unfused or unmaturing lead glaze. Glaze may remain in this state if the temperature is too low, if it is not fired for long enough, or if it is of the wrong chemical composition (e.g. Jope and Ivens 1981; Hurst and Freestone 1996). These sherds were certainly wasters and could not have been used in this state.
- B.8.32 The similarity of most of the sherds suggests that much of the assemblage represents the waste from a single kiln firing. The quantity recovered does not suggest that the entire load failed (although pit 3081 was not fully excavated).

B.8.33 It should be noted that the kiln waste from pit 3081 was originally identified as 'East Norfolk glazed ware' (Jennings 1985, 201) or 'Yarmouth-type glazed ware' (Anderson 2005) during the assessment (Fletcher with Spoerry 2015). This is not surprising, as neither ware is currently well defined in published sources. Whilst it can be stated with certainty that this material is not in the fabric referred to by the present author as 'Yarmouth-type glazed ware', the fabric of 'East Norfolk glazed ware' is not described in any detail by Jennings, or any of the other authors who have noted its presence on sites in Norwich (e.g. Bown 1988, 79; Lentowicz 2009, 511). Jennings had intended to publish a more detailed discussion based on a group from Great Yarmouth (Jennings 1985, 201; NHER 17802), but unfortunately this report was not compiled. Where a brief fabric description is provided, it does not appear to be the same as 'Yarmouth-type glazed ware', and indeed sounds much more like late medieval and transitional ware. This is a conundrum, as both wares were originally identified by Jennings and it seems unlikely that she would have separated them if they were in fact the same. However, the range of fabrics made by the LMT production sites along the Waveney Valley had not been studied when Jennings was working on the Norwich material and it is possible that she was unaware of the diversity of this material (Anderson et al. 1996). Interestingly, Jennings (2002a, 213) suggests that 'East Norfolk glazed ware', which was found in a Period 4 (1375–1450) group from Heigham Street, Norwich, may have been replaced by LMT in the early 15th century. It may well be that 'East Norfolk glazed ware' should be regarded as a product of the infant LMT industry. Certainly several of the few illustrated forms (e.g. Bown 1988, no. 160; Jennings 1985, no. 116) seem to be collared or slightly inturned jug rims, types which are typical of LMT, and indeed appear to have been the most common product represented in the waster pit at Plumstead.

B.9 Petrographic Analysis of Late Medieval LMT Pottery

By Dr. Patrick Quinn

Background, Sample Materials and Aims of Analysis

B.9.1 Petrographic analysis has been undertaken on six sherds of Late Medieval and Transitional (LMT) pottery from known and suspected kiln sites in Norfolk and Suffolk that may have supplied Norwich and the surrounding towns (Anderson et al. 1996), including material from recent excavations at Hare Road, Plumstead. The aim of the analysis was to characterise the ceramics and determine the compositional and technological characteristics of the Plumstead kiln and other production centres. Three sherds of LMT pottery from consumption contexts in the Norwich area have been included for comparison. Details of the nine analysed samples provided by the client presented are given in Table 11.

Analytical Number	Sample Number	Site	Notes
1	ENF133970 (3081)	Hare Road, Plumstead	LMT kin waste, underfired sherd
2	ENF133970 (3081)	Hare Road, Plumstead	LMT kiln waste, normally fired sherd
3	NHER 8388	Potter Heigham 'kiln site'	Assumed LMT production site
4	NHER 1076	Woodbastwick Site I, Blackhill Wood	Assumed LMT production site
5	HPN 005	Hopton kiln site, Suffolk	Known LMT kiln site
6	ENF137925 (1111)	Mountergate, Norwich	Possible LMT kiln waste
7	ENF135993 (91)	Muspole St, Norwich	A finer type of LMT from an urban consumer site
8	ENF135993 (138)	Muspole St, Norwich	A slightly coarser type of LMT from an urban consumer site
9	ENF124705 (4)	43 Panxworth Road, South Walsham	Example of a soft LMT sherd from a rural consumer site

Table 11: Details of LMT sherds from Plumstead and other sites in Norwich analysed in this report.

Methodology

B.9.2 Small pieces of all nine samples were mounted in epoxy resin and prepared as standard 30 µm petrographic thin sections at the Institute of Archaeology, University College London. The thin sections were studied under the microscope in terms of the compositional, textural and microstructural characteristics of their inclusions, matrix and voids, and interpreted in terms of their constituent raw materials and their manufacturing technology. All samples were compared to one another in order to detect compositional and technological connections and differences.

Petrographic Characterisation and Classification

B.9.3 All nine samples are characterised by rounded quartzose sand inclusions and angular quartz and mica inclusions in a non-calcareous clay matrix (Plates 15-17). Despite this shared composition, some samples exhibit unique characteristics that set them apart. These are outlined below, as are similarities between specific samples.

B.9.4 Samples 1 and 2 of possible LMT kiln waste from Hare Road are petrographically closely related to one another. Both samples are characterised by the presence of rounded, coarse-fine sand-sized quartzose inclusions in a non-calcareous clay silty

matrix (Plate 15A-D). The conspicuous rounded sand inclusions are composed of mono- and polycrystalline quartz as well as less common un-twinned feldspar and chert. Sample 2 contains a possible amphibole sand grain. The sand inclusions vary in size up to 1.375 mm. Finer, silt-sized inclusions are common in both samples. These are more angular and composed of quartz, muscovite mica, rare feldspar, amphibole and zircon. They appear to have been naturally occurring in the clay source used to make the sherds, though rare streaks of silty material in both samples may suggest otherwise. The ceramics may have been fashioned from a sandy clay source, or the rounded sand inclusions could have been added as temper. Small pellets of inclusion-poor clay in sample 1 might support the latter idea. This sample has many conspicuous iron rich pellets and concretions, some of which contain silt-sized quartz clasts. Thin elongate mesovoids occur in both thin sections, especially that of sample 2 and are aligned parallel to the sherd margins. The two samples differ in terms of their firing with sample 1 being well oxidised and the clay matrix sample 2 a dark reduced grey. Sample 1 has a highly birefringent clay matrix, suggesting a firing temperature <850°C.

- B.9.5 Samples 3, 4 and 5 from the Potter Heigham, Woodbastwick and Hopton production sites bear strong similarities to samples 1 and 2 from Hare Road. All have rounded, sandy quartzose inclusions as well as abundant angular, silty material in a non-calcareous clay matrix (Plate 15E-F, Plate 16A-D). Chert, feldspar, white mica and polycrystalline quartz occurs in all three samples. Sample 3 is a little less silty than samples 1 and 2 and perhaps contains less mica. Sample 4 is very similar to the Hare Road sherds as is sample 5, which exhibits a silty streak as in samples 1 and 2 and also a fine sand-sized amphibole inclusion.
- B.9.6 Sample 6 is again very similar to the other waster sherds. However, it differs in that it contains less sand-sized inclusions and has a slightly more silty base clay than the others (Plate 16E-F). It is well oxidised and was fired <850°C as sample 1.
- B.9.7 The three LMT sherds from the consumer sites of Muspole Street, Norwich and South Walsham have a comparable composition under the microscope to the general petrographic fabric represented by the kiln sites (Plate 17). Sample 9 from South Walsham is a close match for sample 2 in terms of its composition, texture and firing conditions. Sample 8 from Muspole Street is a little coarser than some of the kiln samples, but otherwise matches others, e.g. samples 1, 3, 4. Sample 7 contains less medium and coarse sand-sized inclusions than most of the kiln sherds, but has more abundant fine sand sized inclusions. It is highly fired (>850°C) with an optically inactive clay matrix, giving it a different appearance to the others.

Discussion

- B.9.8 The six LMT sherds analysed from the known and suspected production sites in Norfolk and Suffolk all have a closely related petrographic fabric. Minor differences exist between the samples from the three kiln sites, such as the lower proportion of sand inclusions in sample 6 from Hopton. However, given that only one or two sherds have been analysed from each production site in this study, it is not clear whether these represent consistent differences that can be used to characterise the products of these specific sites. Detailed petrographic analysis of ceramics from Medieval (Trave et al. 2014) and Roman (Amicone and Quinn 2015) pottery production sites indicates that significant textural variation can be present within pottery of the same type due to natural variability in the raw materials utilised, the specific amounts of temper used between batches and the intrinsic variability of clay pastes. The minor differences detected here must be viewed in the light of these and other such findings.

- B.9.9 Good matches exist between the petrographic fabrics of the three LMT sherds analysed from two consumption sites in the Norwich area and the production material. Particularly close matches exist between sample 9 from South Walsham and sample 2 from the Hare Road kiln, as well between sample 8 from Muspole and samples 3, 4 and 5 from Potter Heigham, Blackhill Wood and Hopton respectively. These matches may indicate that LMT samples 8 and 9 could have been produced at kilns in the Norwich area such as those which have been analysed in this report. They certainly have the same general fabric from which the kiln samples were manufactured. In the context of the small assemblage of material analysed here, sample 7 is not a particularly good match for the analysed samples from the four kilns sites. This may mean that it was not produced at any of these, though the small numbers of samples analysed does not permit such an interpretation to be made at this point.
- B.9.10 The close petrographic composition of the geographically separate kiln sites producing LMT in Norfolk and Suffolk is interesting. This may reflect the homogeneous bedrock and superficial geology of this wide area, which is characterised by Pleistocene Crag covered by ubiquitous glacial sands and gravels (Chatwin 1961). Additionally or alternatively, it may also reflect the influence of some sort of regional organisation of LMT production that could involve standardised paste preparation and the transport of raw materials. This is a tentative interpretation, but one worth bearing in mind.

B.10 CBM (brick, floor brick, fired clay and roof tile)

By Rob Atkins

Introduction

- B.10.1 A small assemblage of CBM (brick, floor brick and roof tile) was found in the central strip map and sample (Table 15) and these were weighed by context and type (Table 16).
- B.10.2 All CBM was collected and retained from the site except those from two structures. A representative brick or floor brick were taken from these two structures (cellared building 3059 and drain 3089). All complete lengths, widths and thickness of the brick and floor brick pieces were recorded.

Type	No. of contexts	No. Fragments	Weight (g)
Brick	5	19	5924
Floor brick	2	5	4743
Tile	4	4	176
Total		35	10903

Table 12: Brick and floor brick

Results

- B.10.1 The assemblage probably dates to the post-medieval period. Possibly the earliest CBM were bricks found with the backfill of well 3014 and these may be c.16th century in date. It is likely that three bricks from the well had been deliberately heavily overfired. These would have been used in wall of building(s) to create a pattern such as chequered design by creating a contrast to the other normally fired bricks. Bricks and floor bricks taken from cellar 3059 and drain 3089 date to the 18th to mid 19th century.

Context	No	Wt (g)	Dimensions	Comments
3014	11	1140	2) 52mm (2") 3) 40mm (1½"); 47mm (1¾") 50mm (2") x 2	Brick in three fabrics: 1) 1x orange/pink & purple (50g). Estuarine clay. L.med/E. post-med 2) 1x orange sandy. (138g). Sanded. Small internal cracks. Lime mortar included internal (?reused). 16th-early 18th 3) 8x orange to red (952g). Sanded. Some very small internal cracks. 3x heavily overfired causing significant vitrification. 16th-early 18th. More likely earlier part of this date range.
3014	4	293	2) 29mm (1) thick	Floor brick in two fabrics: 1) Two orange/yellow clay mixed. (113g) 18th to mid 19th 2) Two in a yellow sandy fabric (180g). 18th to mid 19th
3014	1	97		Roof tile. Orange sandy. 18th to mid 19th
3033	1	41		Brick. Red and yellow clay mixed. 17th to mid 18th
3036	5	23		? Brick. Undiagnostic fragments
3059	1	2144	220mm (8¾") 106mm (2¼") 50mm (2")	Orange sandy. Sanded. Complete brick. Arrises near vertical. Excess clay removed from mould. Slightly overfired causing some cracks on faces. Lime mortar attached. Late 17th-18th
3070	1	14		?Roof tile. Orange sandy
3085	1	60		Roof tile. Orange sandy.
3089	1	2576	226mm (9"), 104mm (2") 57mm (2¼")	Orange sandy. Sanded. Complete brick. Well made. Near vertical arises. Lime mortar attached. 18th to mid 19th
3089	1	4450	230mm (9)"x 230mm (9)" 49mm (5")	Floor brick. Near complete but in pieces (large square floor brick). Orange sanded. Near vertical arises. Well made. C18th to mid 19th
	35	10903		

Table 13: CBM Catalogue

B.11 Baked Clay (ENF 133970)

By Sarah Percival

Introduction

B.11.1 A total of forty fragments weighing 2480g were collected from two pits. The assemblage is fragmentary and abraded.

Methodology

B.11.1 The complete assemblage was analysed and the baked clay recorded by context, grouped by form and fabric, and counted and weighed to the nearest whole gram. Surface treatment and impressions were recorded along with the form and number of surviving surfaces. Fabrics were identified following examination using a x10 hand lens and are classified by major inclusion present. The archive is held by OAE.

Nature of the Assemblage

B.11.1 Forty lumps of baked clay weighing 2480g were collected from the fills of pits 3038, 3081 and 3129 which also contained medieval pottery. One piece, from pit 3038 is made of hard, fine fabric with rare grog and elongated voids indicating the former presence of organic material such as grass. This formless fragment may be from a structure such as an oven or hearth.

B.11.2 Five fragments, from pit 3129, have visible sand inclusions along with sparse quartzite pieces. The clay is poorly mixed with swirls of cream visible within the orange clay matrix. It is probably a heavily abraded lump of medieval to post medieval brick.

B.11.3 Pit 3081 produced 34 pieces weighing 2,267g, including thirteen pieces with one flattened surface. The pieces are made of orange sandy fabric with sparse angular quartz and flint inclusions. Some pieces have cylindrical voids perhaps from withies. These fragments may also be from an oven or hearth.

Context	Fabric	Description	Feature type	Feature	Quantity	Weight (g)
3036	Hard fired dense sandy fabric with rare grog inclusions and sparse elongated voids	Irregular lump	Pit	3038	1	100
3128	Orange sandy poorly mixed fabric with cream swirls sparse angular quartz inclusions	Irregular lump. Probably brick.	Pit	3129	5	113
3082	Orange sandy fabric with vegetative impression	Irregular lump	Pit	3081	7	60
3083	Orange sandy fabric sparse angular quartz and flint inclusions.	13 pieces have flat surfaces	Pit	3081	27	2207
Total					32	2480

Table 14: Quantity and weight of fired clay by context

B.12 Worked Bone

By Chris Faine

B.12.1 SF **3014** (3014): Portion of bone handle, most likely worked from a large mammal upper limb element. Length: 60.6mm Width: 20.6mm. Broken to a point post-deposition at one end with the other end sawn flat. A portion of the socket remains. An upper muscle attachment appears to have been shaped to form a support for the tip of the thumb Most likely an awl handle.

APPENDIX C. ENVIRONMENTAL REPORTS

C.1 Animal Bone

By Chris Faine

ENF133969

- C.1.1 A single fragment of bone was recovered from context **1008** in the form of a partial cattle radius. Although heavily weathered butchery was observed midshaft.

ENF133970

- C.1.2 One hundred and eighteen grams of animal bone was recovered from the evaluation. Eighteen fragments were recorded with 6 being identifiable to species, recovered from contexts **3010** & **3014**. Context **3010** contained a portion of adult cattle inominate. Context **3014** contained juvenile pig and sheep femora fragments, along with juvenile pig 1st phalanx and adult sheep/goat mandible (no teeth were recovered). A partial goose carpometacarpal.

C.2 Environmental samples

By Rachel Fosberry

Introduction

- C.2.1 Environmental samples were taken from features excavated within areas of ENF133969 and ENF133970 of the Postwick pipeline in order to assess the quality of preservation of plant remains and their potential to provide useful data as part of further archaeological investigations. Samples were taken from ditch fills in area ENF133969 that are thought to be medieval to post-medieval in date along with a possible palaeochannel. This area is close to the river Yare and the samples were all preserved by waterlogging.
- C.2.2 The sites at ENF133970 were comprised of three areas of strip, map and sample. Samples were taken from features such as pits and a structure that are thought to date to the medieval period in addition to a prehistoric enclosure ditch.

Methodology

- C.2.1 Different methodologies were used for each site; the samples from ENF133969 were known to be comprised of peat and preserved by waterlogging. Sub-samples of one litres of each of the bulk samples was processed and dried. Samples preserved by waterlogging should really be examined whilst still wet as drying will cause shrinkage of organic components making identification more difficult. Assessment of a dried sample can be performed rapidly and it is easier ascertain the presence of macroscopic environmental indicators and to assess the level of preservation of plant remains and the diversity of plants present. It was considered to be the most practical method for this initial stage in order to ascertain whether further, more detailed analysis would be suitable.
- C.2.2 The samples from ENF133970 were processed according to the standard Oxford Archaeology East processing methods with one bucket (up to 10 litres) of each bulk sample processed for this initial assessment.
- C.2.3 The samples (and sub-samples) were processed by water flotation (using a modified Siraff three-tank system) for the recovery of charred plant remains, dating evidence and any other artefactual evidence that might be present. The floating component (flot) of the

samples was collected in a 0.3mm nylon mesh and the residue was washed through 10mm, 5mm, 2mm and a 0.5mm sieve. Both flot and residues were allowed to air dry. A magnet was dragged through each residue fraction prior to sorting for artefacts. Any artefacts present were noted and reintegrated with the hand-excavated finds. The dried flots were subsequently sorted using a binocular microscope at magnifications up to x 60 and a complete list of the recorded remains are presented in Table 16. Identification of plant remains is with reference to the *Digital Seed Atlas of the Netherlands* and the authors' own reference collection. Nomenclature is according to Zohary and Hopf (2000) for cereals and Stace (1997) for other plants. Carbonized seeds and grains, by the process of burning and burial, become blackened and often distort and fragmentary leading to difficulty in identification. Plant remains have been identified to species where possible. The identification of cereals has been based on the characteristic morphology of the grains and chaff as described by Jacomet (2006).

Quantification

- C.2.4 For the purpose of this initial assessment, items such as seeds, cereal grains and legumes have been scanned and recorded qualitatively according to the following categories

= 1-10, ## = 11-50, ### = 51+ specimens ##### = 100+ specimens

Items that cannot be easily quantified such as charcoal, magnetic residues and fragmented bone have been scored for abundance

+ = rare, ++ = moderate, +++ = abundant

Results

ENF133969

- C.2.1 Preservation of plant remains from site ENF133969 is by waterlogging in which plant remains have retained much of their original features due to being in a constantly wet environment. Roots, leaves and unidentifiable plant material are abundant in all of the samples although identifiable plant parts such as seeds are relatively sparse. Seeds of plants that are likely to have been growing on the banks of the ditches include thistles (*Carduus/Cirsium* sp.), brambles (*Rubus* sp.), and black nightshade (*Solanum nigrum*). Plants that prefer wet soils that may be found on the sides of the ditches include sedges, (*Carex* spp.), spike-rush (*Eleocharis* sp.) and gypsywort (*Lycopus europaeus*).
- C.2.2 There are also seeds of water-crowfoot (*Ranunculus* subgenus *Batrachium*) which is an obligate aquatic that indicates that the ditches **1004** and **1022** were water-filled. Layer 1032 contains a slightly different assemblage. It contains water-crowfoot and also horned pondweed (*Zanichellia* sp.) which is another obligate aquatic indicating that this layer was also under water. Seeds of buttercup (*Ranunculus acris/reprens/bulbosus*) and of the campion family (Caryophyllaceae) represent plants that are likely to have been growing nearby.

Sample No.	Context No.	Cut No.	Feat. Type	Flot vol.	Waterlogged seeds	Flot comments
1000	1007	1004	ditch	80	##	waterlogged plant material including seeds of water crowfoot,

Sample No.	Context No.	Cut No.	Feat. Type	Flot vol.	Waterlogged seeds	Flot comments
						thistles and sedges
1001	1030	1022	ditch	100	#	waterlogged plant material including seeds of water crowfoot, thistles and brambles
1002	1027	1026	ditch	400	#	waterlogged plant material including seeds of black nightshade, thistles, gypsywort, spike-rush and sedges
1003	1032		layer	90	#	waterlogged plant material including seeds of buttercups, thistles, water-crowfoot, horned pondweed, sedges

Table 15: Environmental samples from ENF133969

ENF133970

- C.2.3 Preservation of plant remains at site ENF133970 is by carbonisation. Sample 2000, fill 2013 of post hole **2012** contains occasional charred plant remains, mostly as single specimens, including an oat (*Avena* sp.) grain, a single pea (*Pisum* cf. *sativum*), a fragment of barley (*Hordeum vulgare*) stem and occasional charred seeds of stinking mayweed (*Anthemis cotula*), dock (*Rumex* sp.) and sedge (*Carex* sp.). If the post hole was part of a domestic structure, the presence of such items can be explained as possibly derived from a hearth and been swept into the hole around the post.
- C.2.4 Samples 3000 – 3006 were taken from pits, some of which were intercutting and a post hole. Most of the samples contain the charred remains of mixed food refuse predominantly comprised of cereals and legumes with occasional weed seeds. The most interesting and abundant assemblage is in Sample 3002, fill 3063 of undated pit **3062**. Cereal grains dominate and include a mixture of bread wheat (*Triticum aestivum sensu lato*), oats, barley and rye (*Secale cereale*). Occasional chaff elements in the form of cereal stems (indicated by culm nodes) and barley and rye rachis fragments are also present. Legumes have been identified by their characteristic morphology and their size indicates that both peas (*Pisum* sp.) and beans (*Vicia* sp.) are present but they have lost their diagnostic features. The proportion of charred weed seeds is relatively high with numerous dock (*Rumex* sp) seeds present along with a seed head of corncockle (*Agrostemma githago*) and occasional seeds of stinking mayweed, rye grass (*Lolium* sp.) and nipplewort (*Lapsana communis*). The flot is also comprised of numerous small charred twisted stems and flowers of heather (*Calluna vulgaris*).
- C.2.5 Samples 4000 – 4005 taken from ditch fills, a tree throw and an alluvial layer were unproductive and contain only sparse charcoal.



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v.draft

Sample No.	Context No.	Cut No.	Feature Type	Volume processed (L)	Flot volume	Cereals	Chaff	Legumes	Weed Seeds	Charcoal	Residue comments	Flot comments
2000	2013	2012	post hole	10	60	#	0	#	#	+++	No finds	single charred oat, single pea, barley rachis,. Seeds of stinking mayweed, dock and sedge
3001	3050	3048	post hole	10	20	0	0	0	0	+++	fired clay	abundant charcoal
3002	3063	3062	pit	10	35	###	#	#	###	+++	No finds	rich in mixed cereals (barley, rye, wheat, oats),occasional peas and beans, numerous dock seeds, occasional seeds of corncockle and stinking mayweed, stems and flowers of heather
3003	3079	3086	pit	10	400	0	0	0	0	++++	No finds	Abundant charcoal
3004	3095	3081	pit	8	30	#	0	#	#	+++	pottery	single charred specimens of pea, rye grain and dock seed
3005	3083	3081	pit	10	15	#	0	#	0	++	pottery	single charred specimens of pea, bean, oat and wheat grain
3006	3082	3081	pit	8	20	#	0	#	#	+++	pottery	single charred specimens of pea, bean, oat, wheat and barley grain, dock seed and meadow rue seed
4000	4008	4007	ditch		2	0	0	0	0	+	No finds	Sparse charcoal only
4001	4008	4002	ditch	10	1	0	0	0	0	++	No finds	charcoal only
4002	4047	4046	tree bowl	8	1	0	0	0	0	+	No finds	sparse charcoal only
4003	4048	TP	layer	8	1	0	0	0	0	+	No finds	sparse charcoal only
4004	4026	4027	ditch	10	1	0	0	0	0	+	No finds	sparse charcoal only
4005	4013	4001	ditch	8	1	0	0	0	0	+	No finds	sparse charcoal only

Table 16: Environmental samples from ENF133970

Discussion

- C.2.6 All four samples from ENF133969 contain waterlogged seeds but not with great diversity or abundance. Preservation in anoxic environments can be variable dependent on many factors including which plant species were originally present and environmental conditions such as acidity and fluctuation of the water table. Plants parts, in particular seeds, are often well preserved with the outer testa and cell-structure visible but there appears to have been differential preservation at this site as it is the tougher-coated seeds that have survived. The presence of obligate aquatics such as horned pondweed and water-crowfoot indicate plants were actually growing within the water-filled features and the other plant species present most likely represent plants such as sedges that would be growing on the bank sides whilst brambles, thistles and black-nightshade may have been growing on the tops of the banks of the ditches.
- C.2.7 The main area of recovery of charred plant remains from ENF133970 appears to be from an area of inter-cutting pits. The pit that contains the most abundant charred assemblage is (pit **3062**) is undated which precludes further investigation. It would be possible to obtain a radiocarbon date from the cereal grains but the assemblage as a whole appears to be mixed as it contains several different food types and is most likely to represent the disposal of hearth waste or possibly stable waste which is probably not worthy of further investigation. The presence of burnt heather may indicate its use as fuel or may be the result of the burning of flooring/bedding material as cut, dried heather had a variety of uses in the medieval period.
- C.2.8 In summary, environmental sampling from both of the sites excavated in this area of the Postwick pipeline has shown that, whilst there is preservation of plant remains, the information that can be gleaned from them is limited. The plant remains recovered from ENF133969 show that the deposits sampled have remained waterlogged and that the features once supported aquatic plant communities and common bank/ditch flora. The samples from ENF133970 have shown that there is preservation of plant remains that most likely date to occupation in the medieval period.

APPENDIX D. RADIO-CARBON DATING



RADIOCARBON DATING CERTIFICATE

13 October 2015

Laboratory Code SUERC-63230 (GU38802)

Submitter Rachel Fosberry
Oxford Archaeology East
15 Trafalgar Way
Bar Hill
Cambs. CB23 8SQ

Site Reference ENF 133970
Context Reference 3082
Sample Reference 3006

Material Charred plant remains : Pisum/Vicia

$\delta^{13}\text{C}$ relative to VPDB -23.9 ‰

Radiocarbon Age BP 663 \pm 29

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

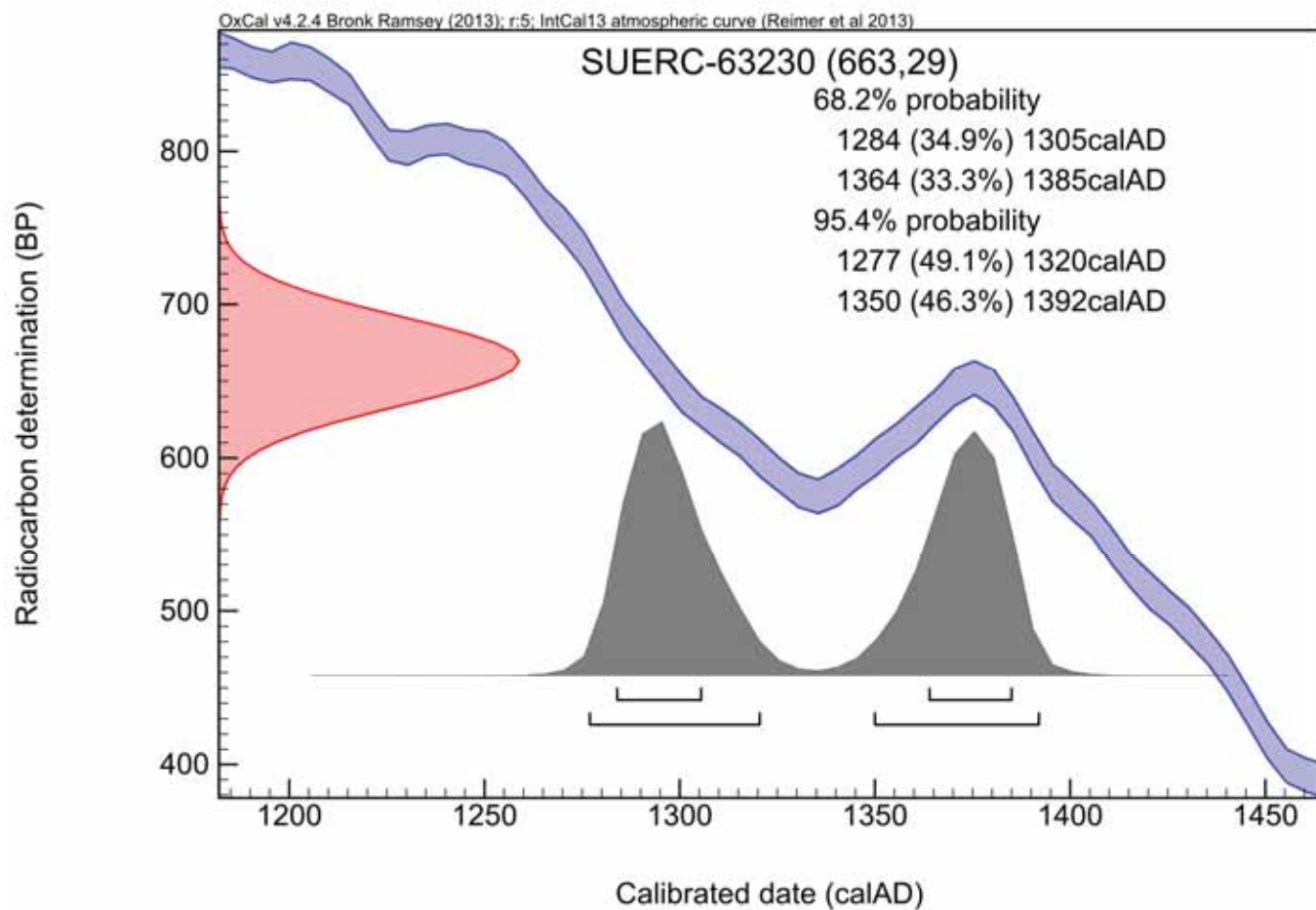
The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email Gordon.Cook@glasgow.ac.uk or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- *E. Dunbar* Date :- 13/10/2015

Checked and signed off by :- *P. Nayantub* Date :- 13/10/2015

Calibration Plot



RADIOCARBON DATING CERTIFICATE

06 January 2015

Laboratory Code SUERC-57095 (GU35869)

Submitter Rachel Fosberry
Oxford Archaeology East
15 Trafalgar Way
Bar Hill
Cams. CB23 8SQ

Site Reference ENF133970

Context Reference 4008

Sample Reference 4000

Material charcoal : indeterminate

$\delta^{13}\text{C}$ relative to VPDB -25.8 ‰

Radiocarbon Age BP 3192 ± 31

N.B. The above ^{14}C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email g.cook@suerc.gla.ac.uk or telephone 01355 270136 direct line.

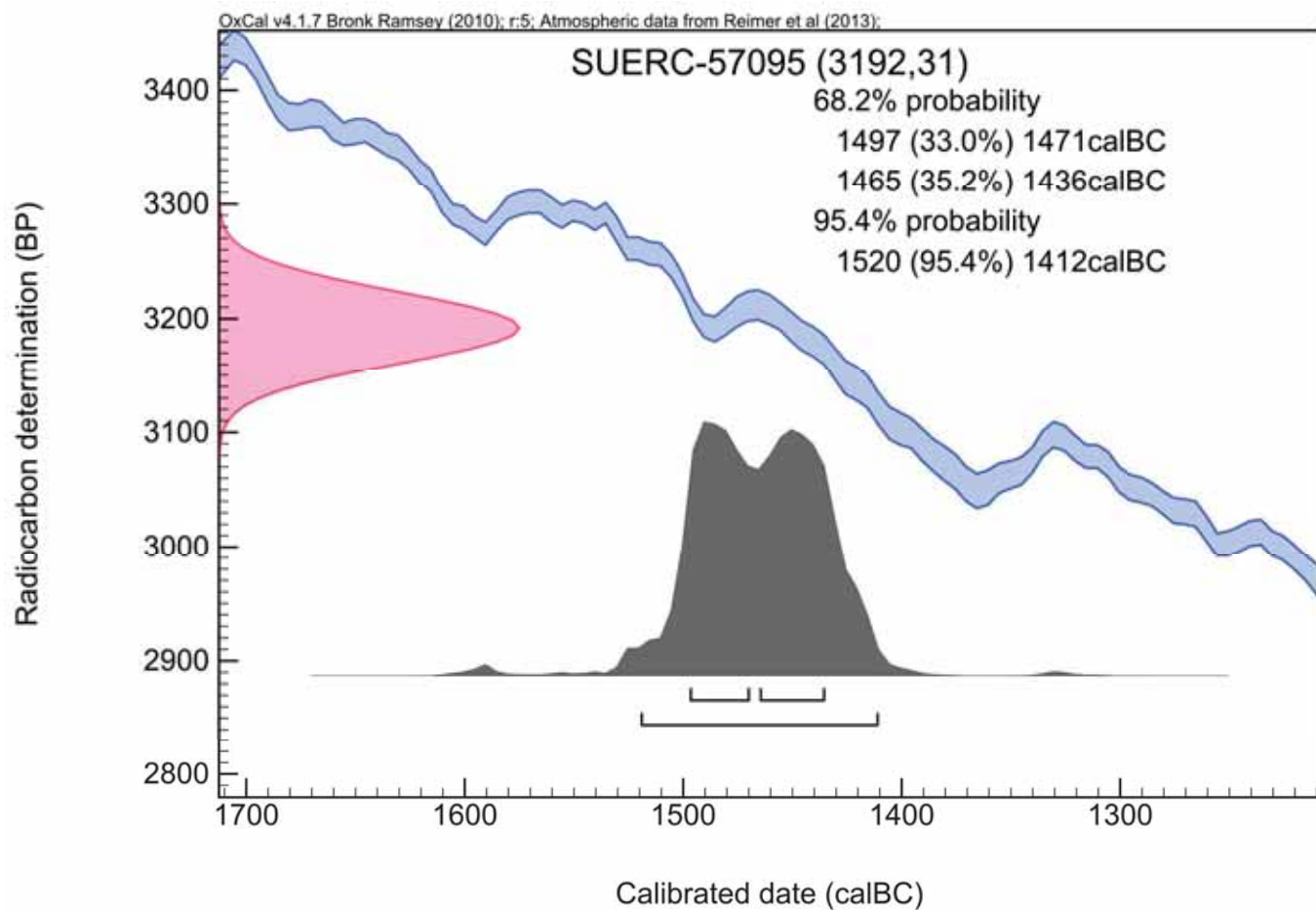
Conventional age and calibration age ranges calculated by :- *E. Dunbar*

Date :- 06/01/2015

Checked and signed off by :- *P. Nayantub*

Date :- 06/01/2015

Calibration Plot



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APPENDIX F. OASIS REPORT FORM

All fields are required unless they are not applicable.

Project Details

OASIS Number	oxfordar3-260722		
Project Name	Strip, map and sample of the new overflow and distribution mains at Postwick, Norfolk		
Project Dates (fieldwork) Start	07-08-2014	Finish	03-10-2014
Previous Work (by OA East)	Yes	Future Work	No

Project Reference Codes

Site Code	ENF133969 ENF133970	Planning App. No.	
HER No.	ENF133969 ENF133970	Related HER/OASIS No.	oxfordar3-207337

Type of Project/Techniques Used

Prompt	Water Act 1989 and subsequent code of practice
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Please select all techniques used:

<input type="checkbox"/> Field Observation (periodic visits)	<input checked="" type="checkbox"/> Part Excavation	<input type="checkbox"/> Salvage Record
<input type="checkbox"/> Full Excavation (100%)	<input type="checkbox"/> Part Survey	<input type="checkbox"/> Systematic Field Walking
<input type="checkbox"/> Full Survey	<input type="checkbox"/> Recorded Observation	<input type="checkbox"/> Systematic Metal Detector Survey
<input type="checkbox"/> Geophysical Survey	<input type="checkbox"/> Remote Operated Vehicle Survey	<input type="checkbox"/> Test Pit Survey
<input type="checkbox"/> Open-Area Excavation	<input type="checkbox"/> Salvage Excavation	<input checked="" type="checkbox"/> Watching Brief

Monument Types/Significant Finds & Their Periods

List feature types using the [NMR Monument Type Thesaurus](#) and significant finds using the [MDA Object type Thesaurus](#) together with their respective periods. If no features/finds were found, please state "none".

Monument	Period	Object	Period
ditch	Bronze Age -2.5k to -700	pottery	Medieval 1066 to 1540
quarry pit	Medieval 1066 to 1540	cbm	Post Medieval 1540 to 1901
farm building	Post Medieval 1540 to 1901		Select period...

Project Location

County	Norfolk	Site Address (including postcode if possible)
District	Broadland	Brundall Low Road Postwick NR13 5DU
Parish	Postwick with Witton	
HER	Norfolk	
Study Area	48000 sq. m	National Grid Reference TG29610839

Project Originators

Organisation	OA EAST
Project Brief Originator	James Albone
Project Design Originator	Paul Spoerry
Project Manager	Paul Spoerry
Supervisor	Anthony Haskins

Project Archives

Physical Archive	Digital Archive	Paper Archive
Norfolk County Stores	OA East	Norfolk County Stores
ENF133969/ENF133970	ENF133969/ENF133970	ENF133969/ENF133970

Archive Contents/Media

	Physical Contents	Digital Contents	Paper Contents
Animal Bones	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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Notes:

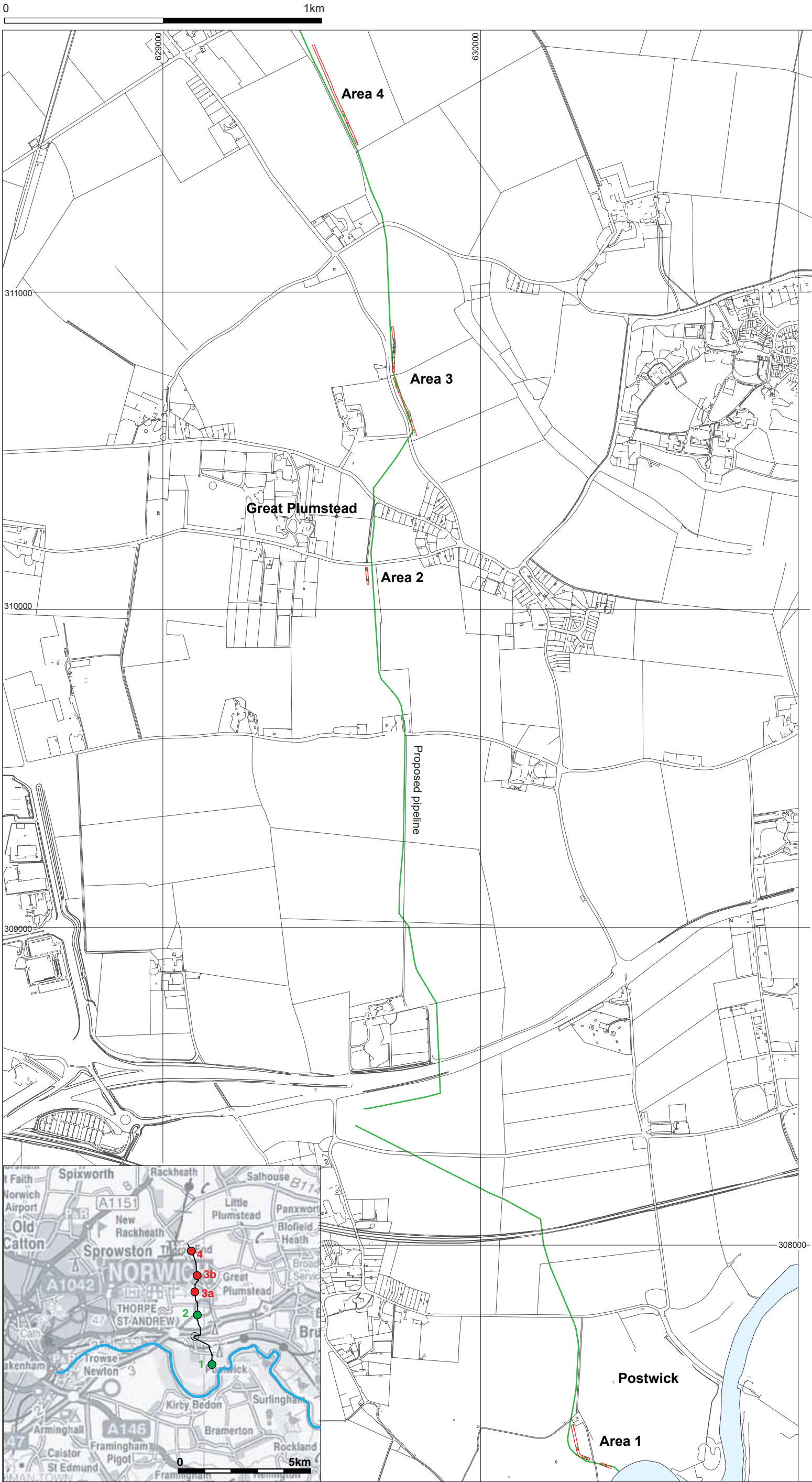


Figure 1. Site location showing areas of archaeological investigation (red) alongside proposed pipeline (green)

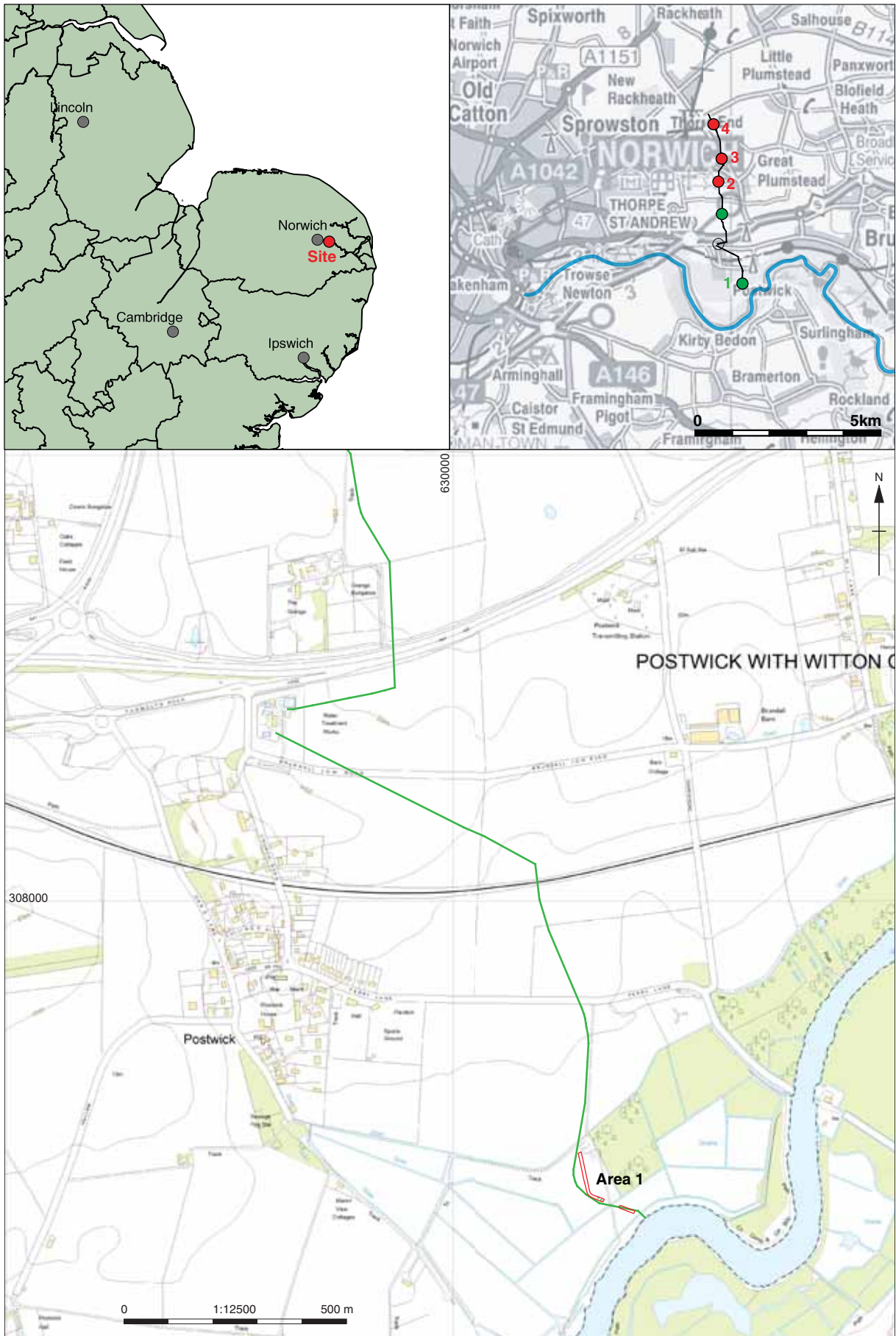


Figure 1a: Site location, Southern sites Area 1 (red) along pipeline route (green)

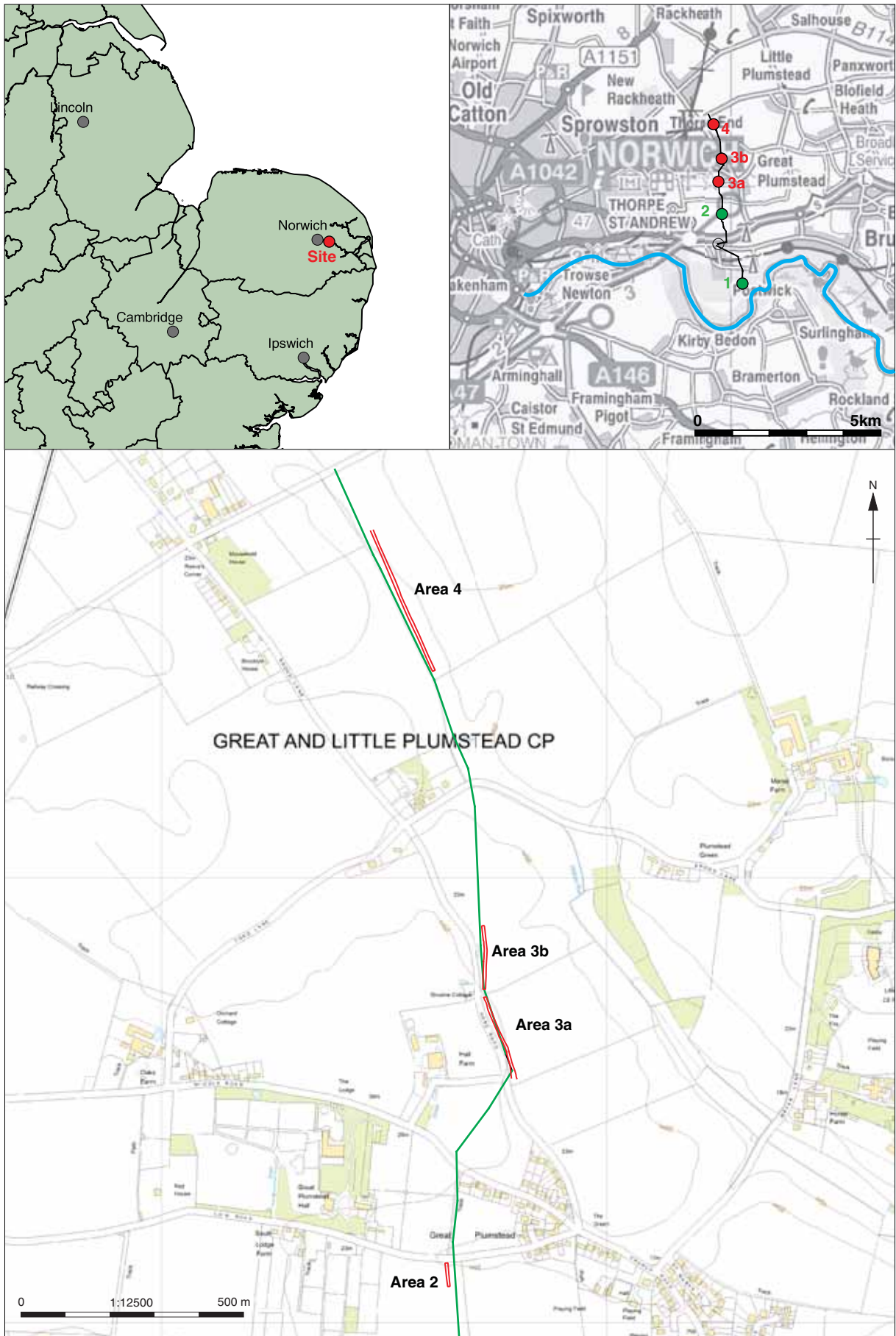


Figure 1b: Site location, Northern sites Areas 2-4 (red) along pipeline route (green)

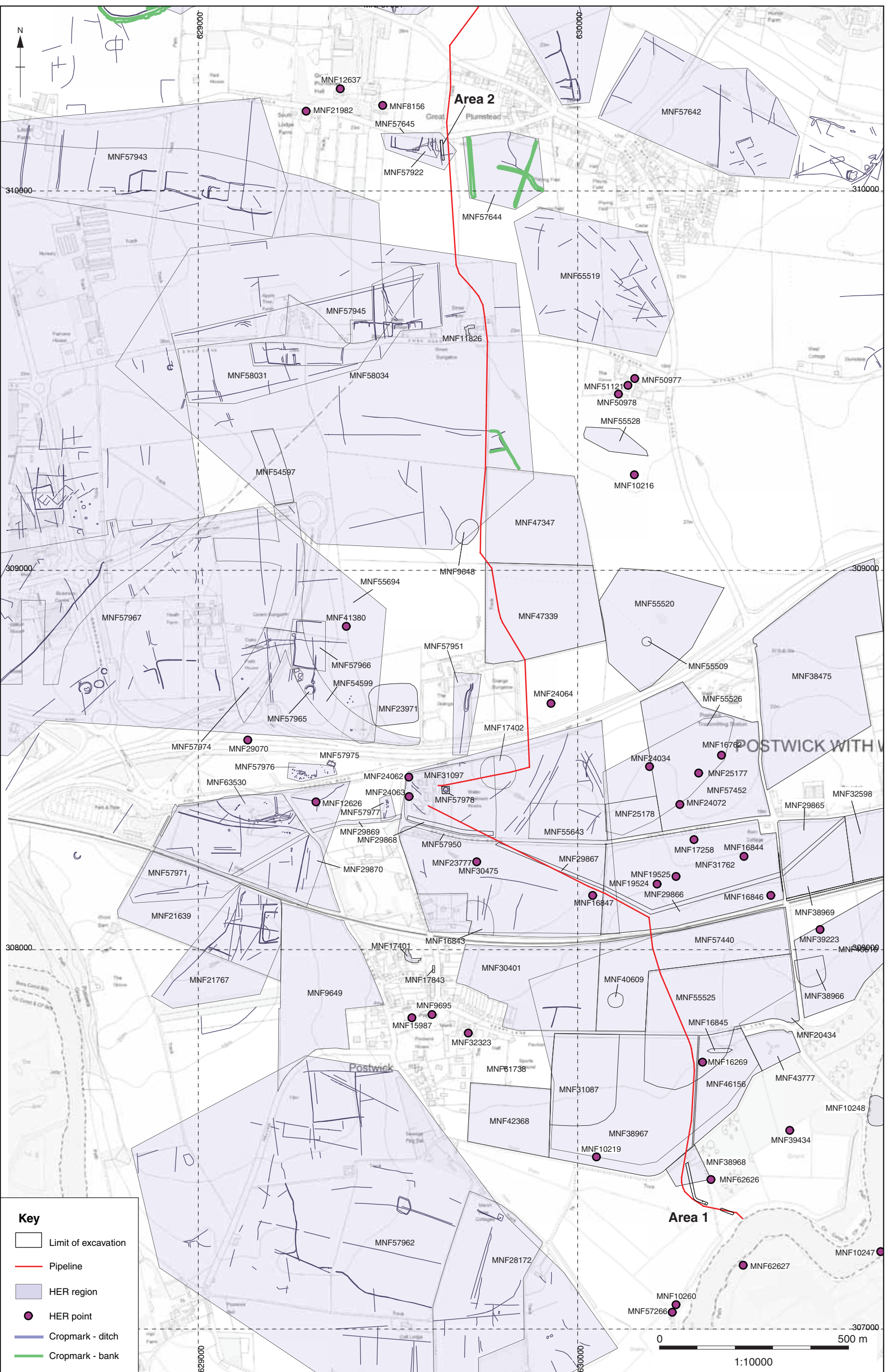


Figure 2: HER data with Aerial Photograph data on Areas 1 and 2 of the pipeline

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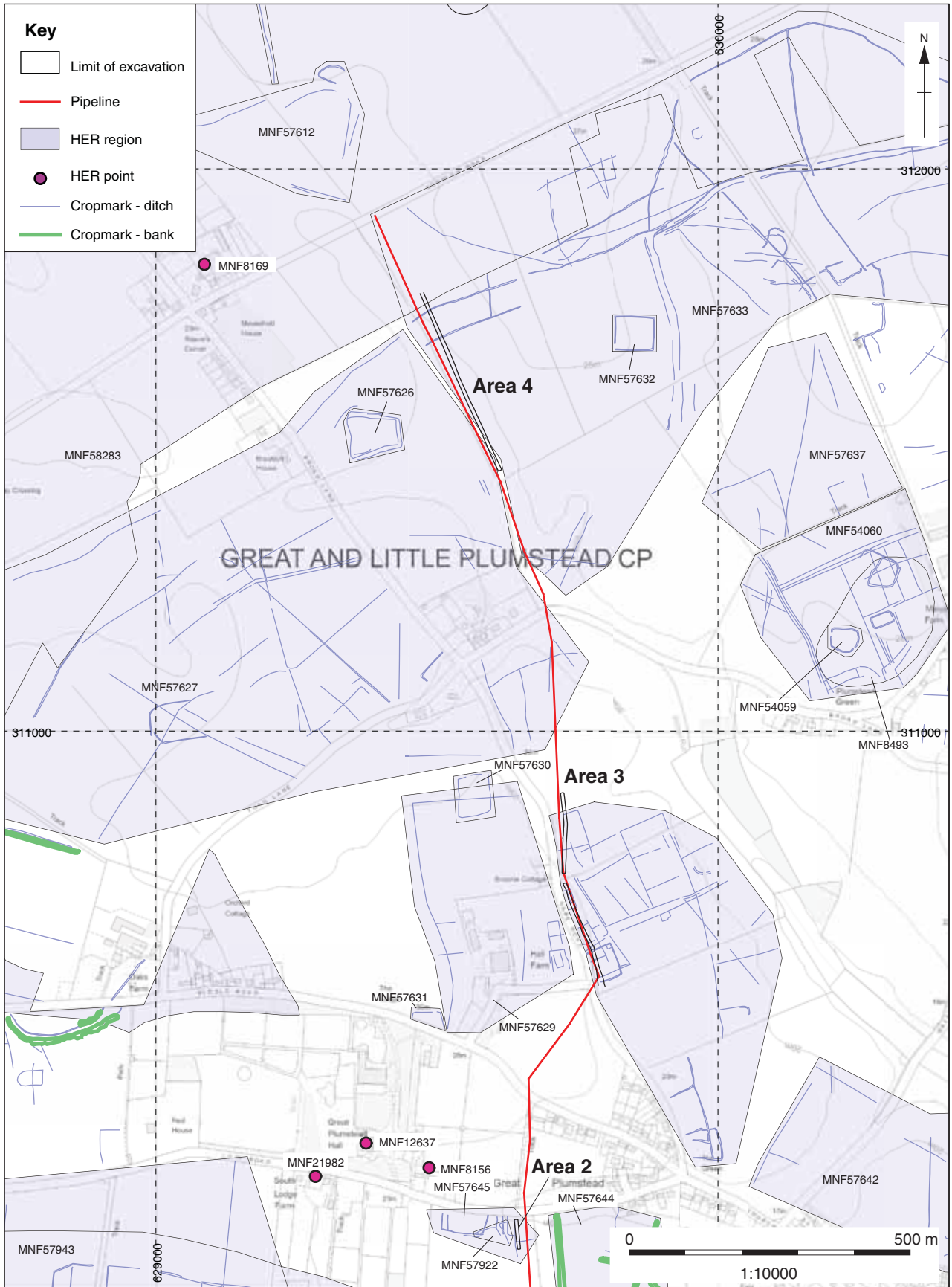


Figure 3: HER data and Aerial Photograph data on Areas 2,3 and 4 of the pipeline

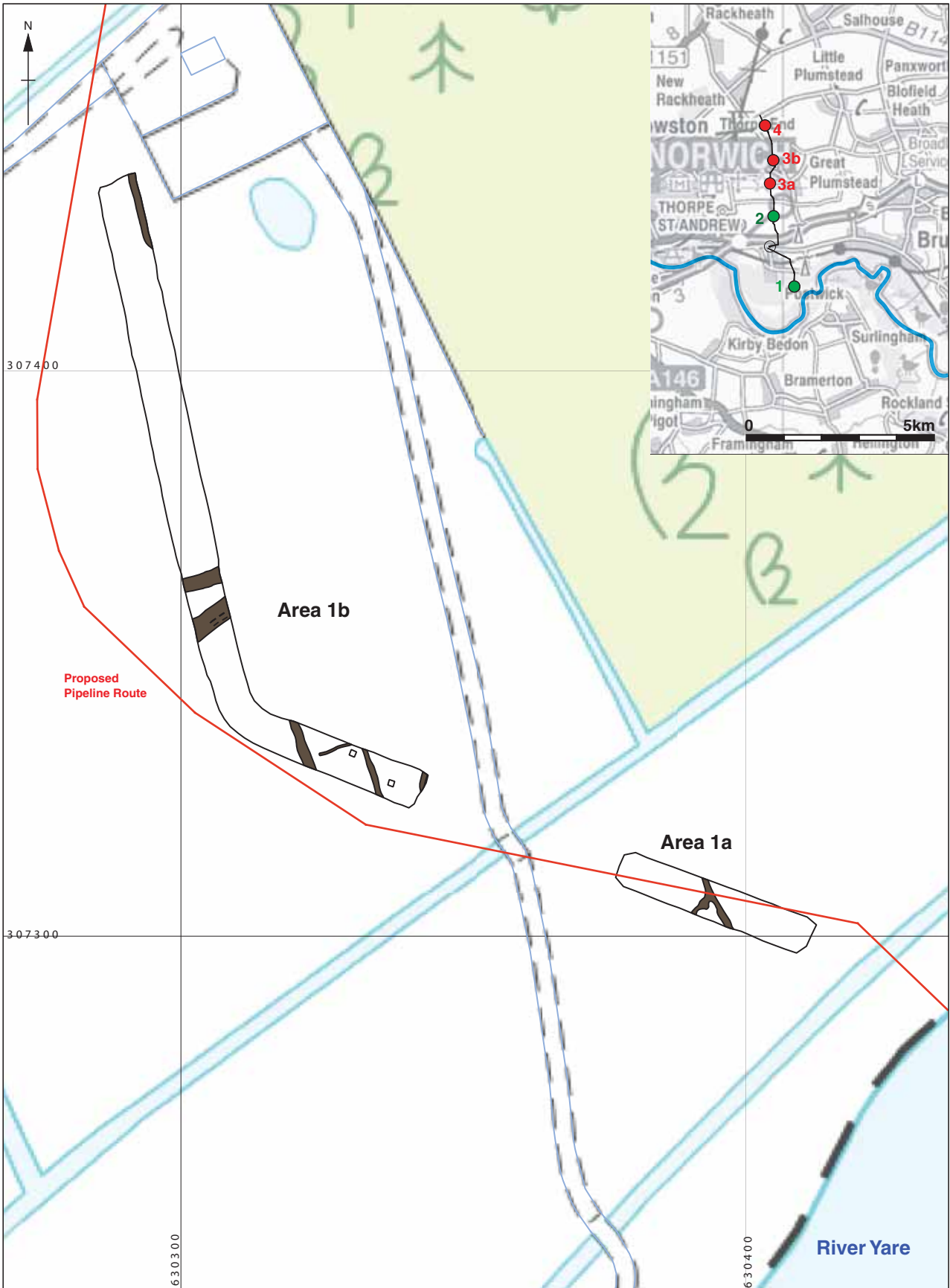
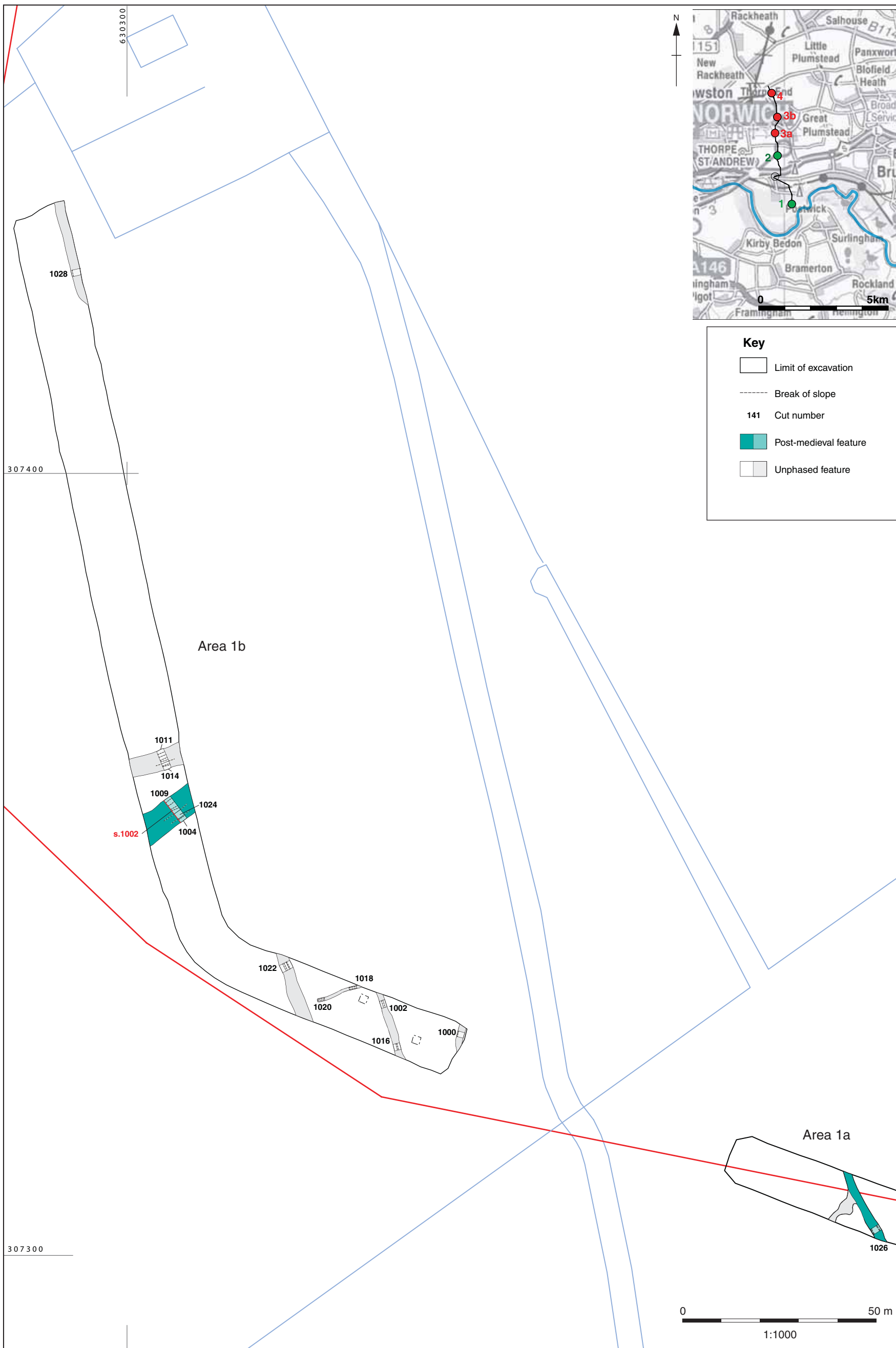


Figure 4: Phase Plan Areas 1a-b. Scale 1:1000



Report Number 1736

Figure 5: Phase Plan Area 1a and Area 1b ENF133969

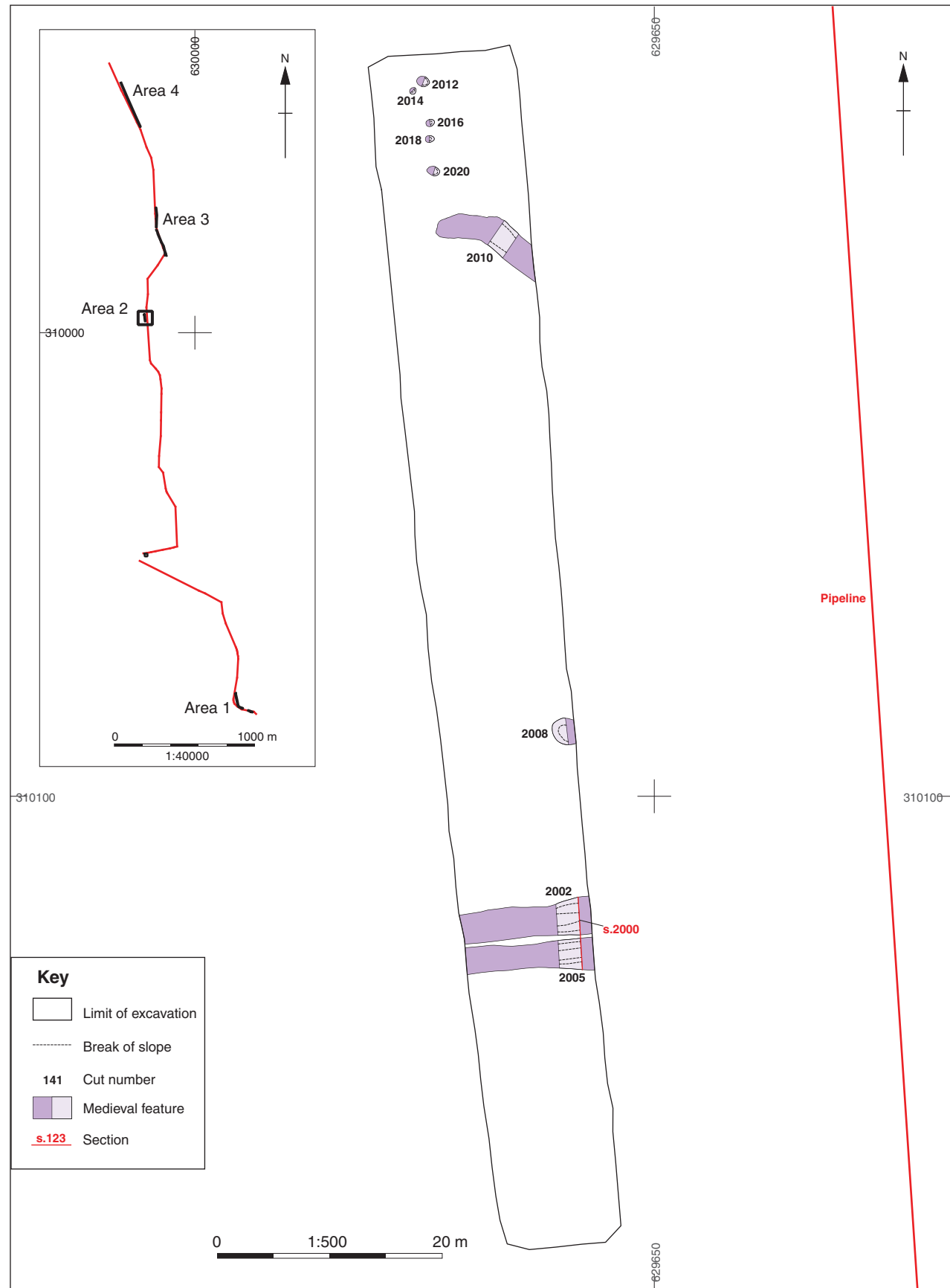
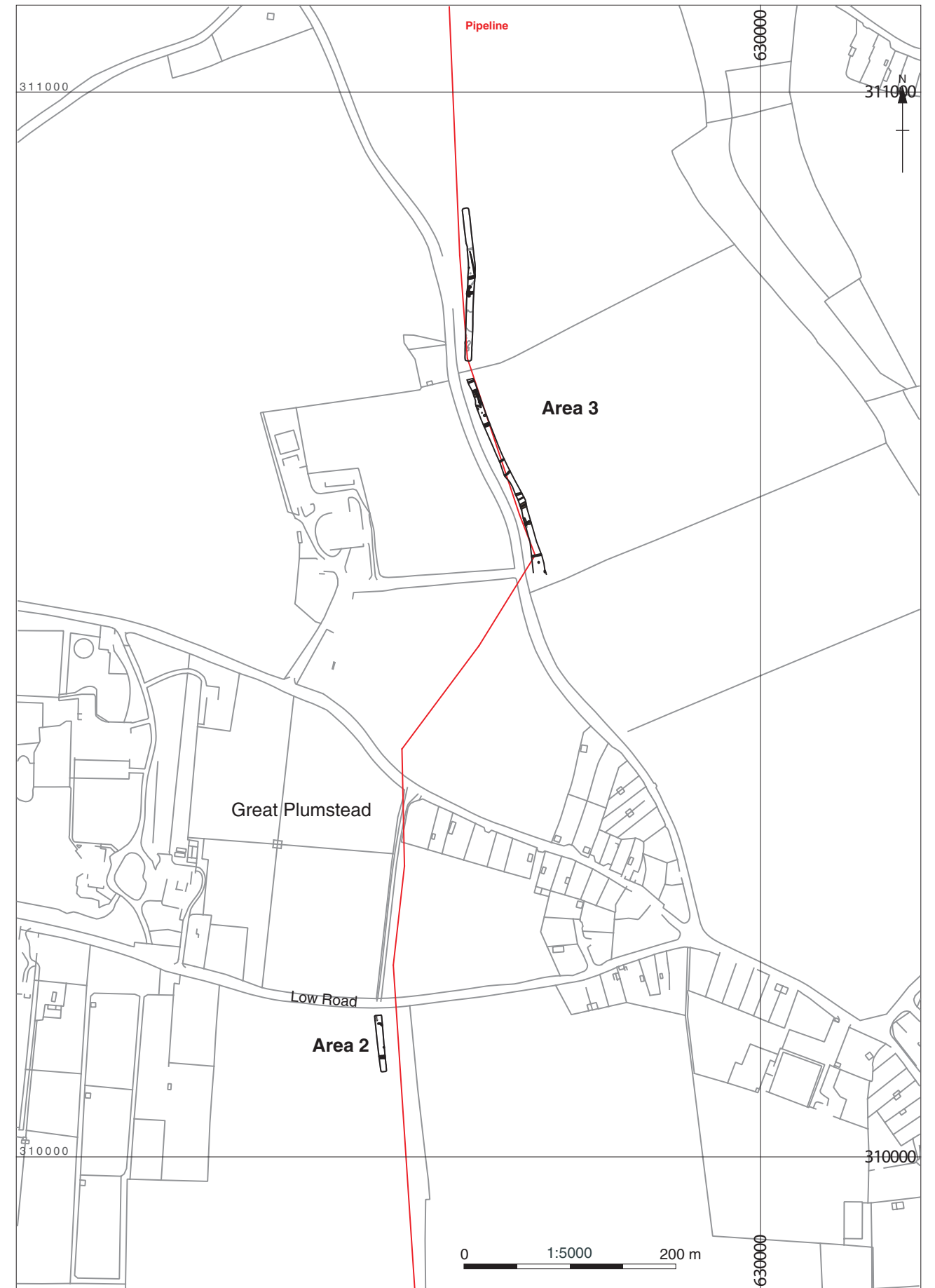


Figure 6: Phase plan, Area 2, ENF 133970



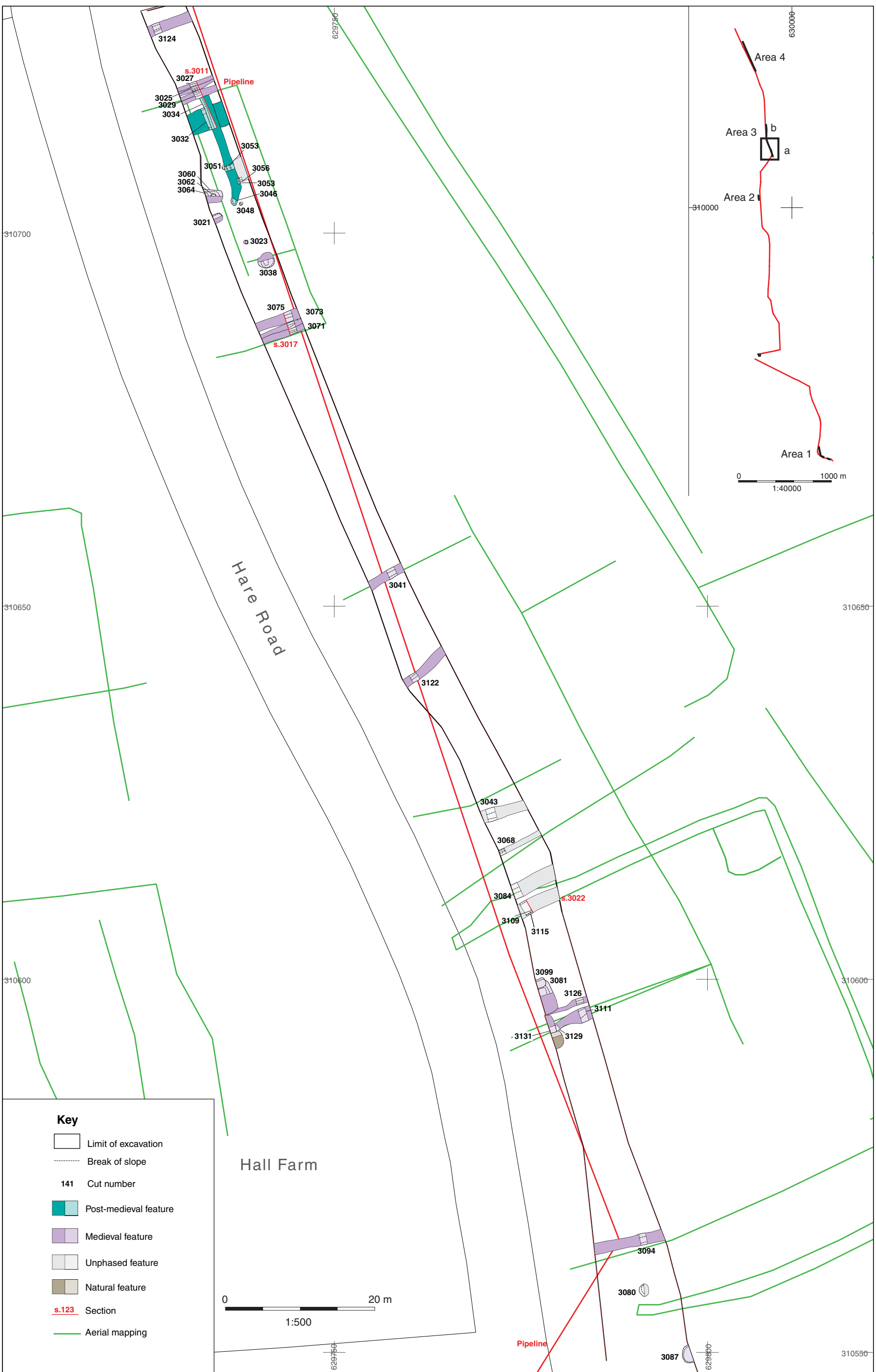


Figure 7: Phase plan, Area 3a, ENF 133970

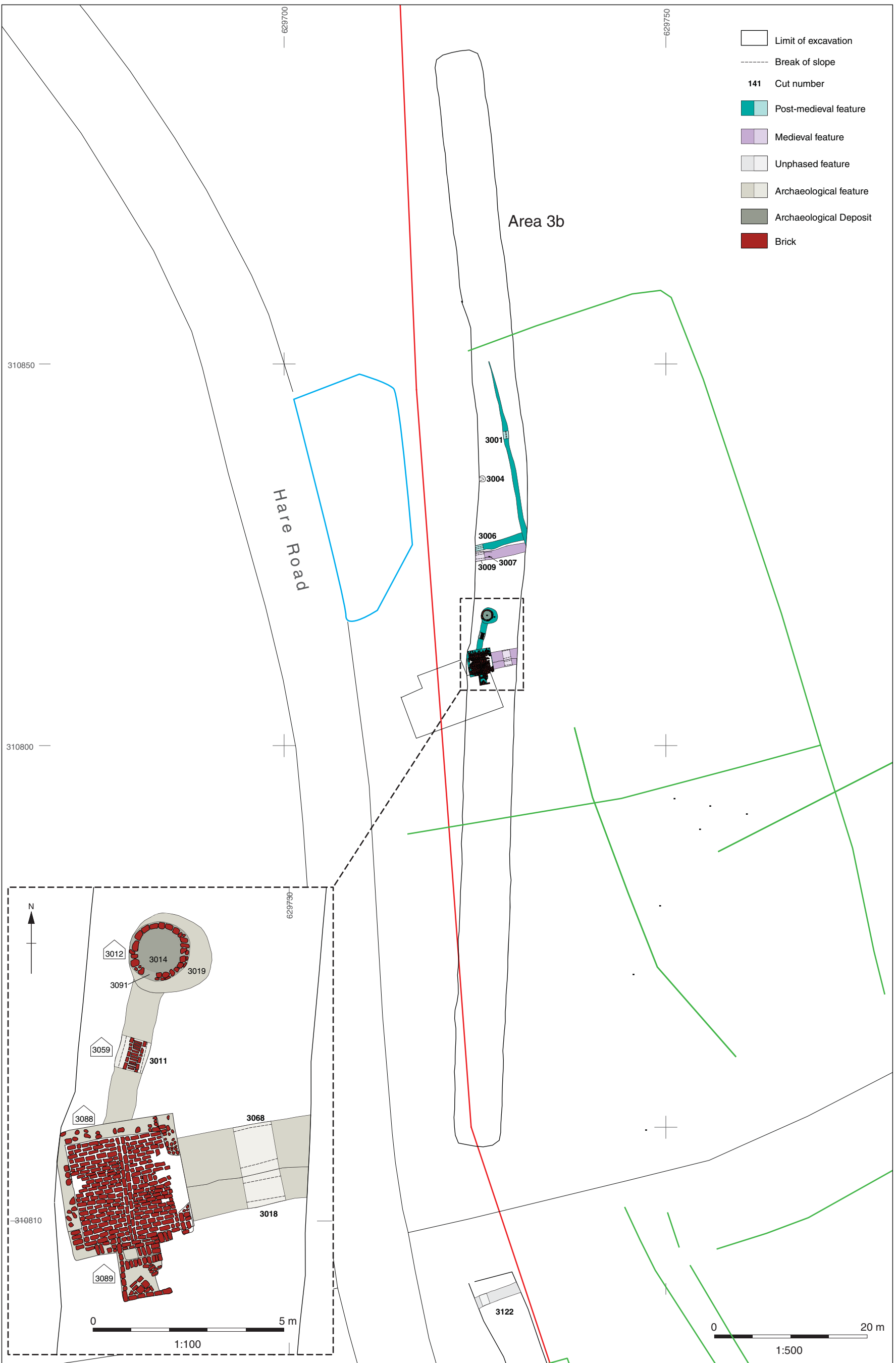


Figure 8: Phase plan, Area 3b, ENF 133970

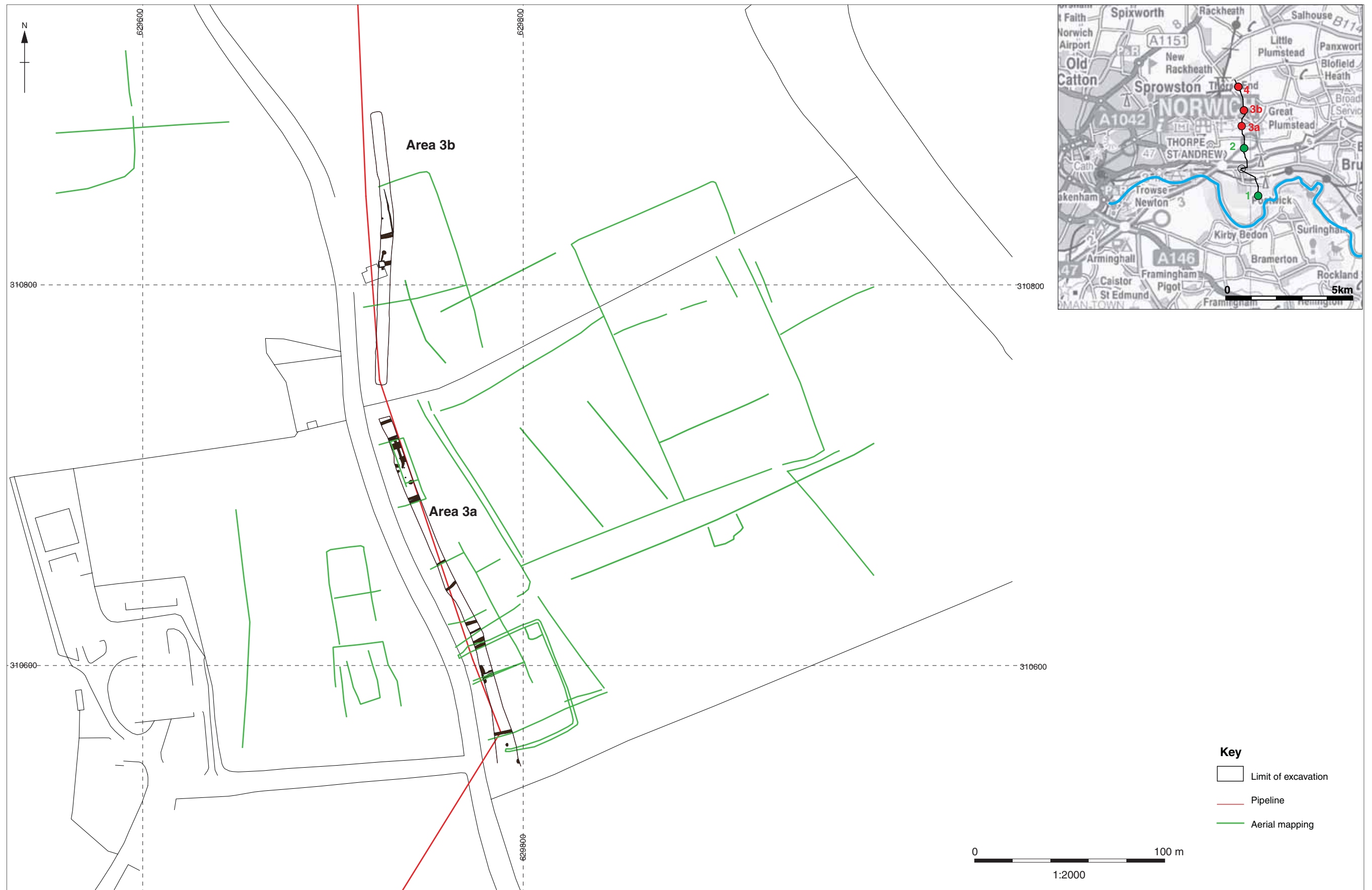
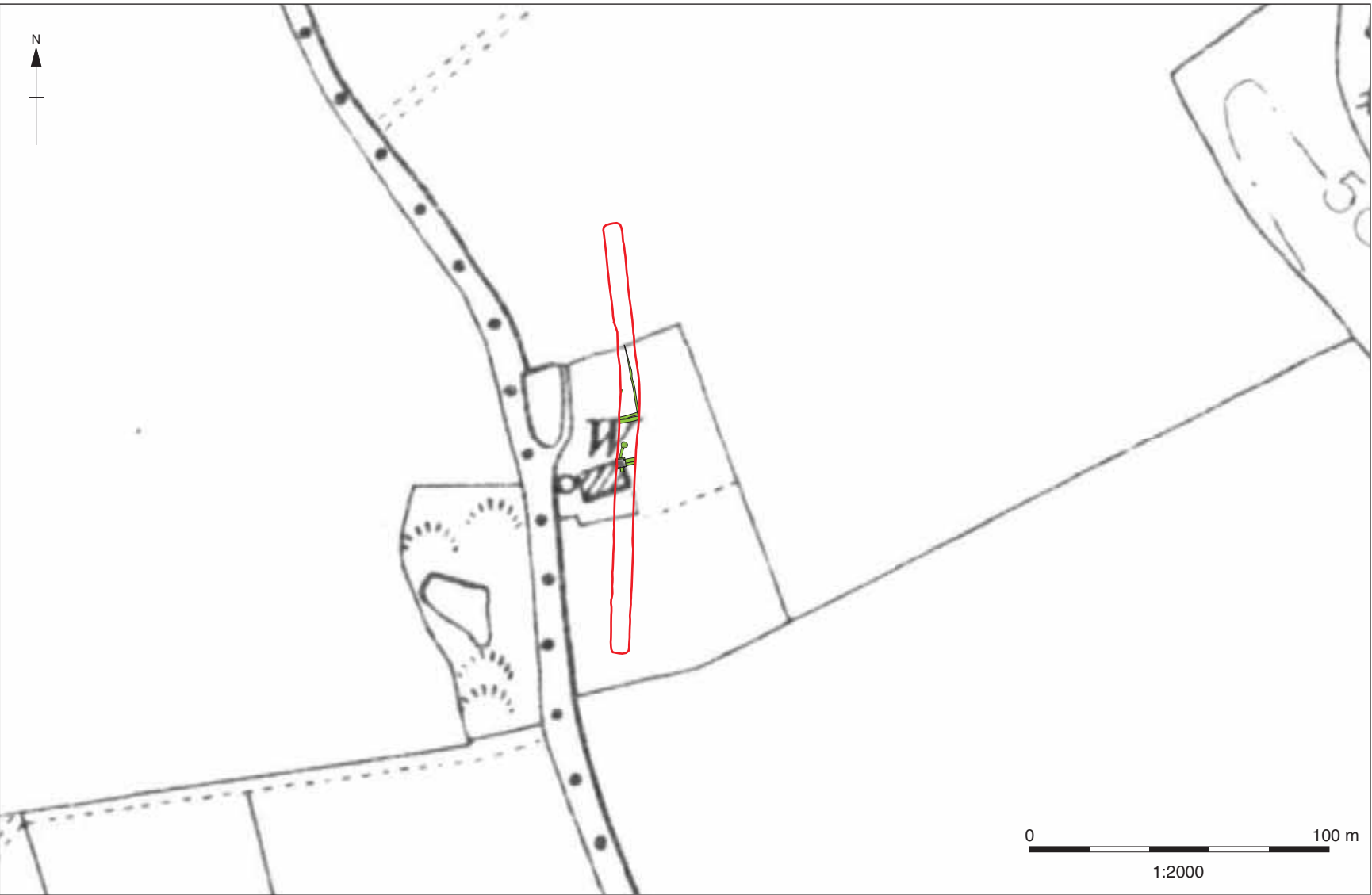


Figure 9: Areas 3a and 3b with Aerial mapping (green) provided by Norfolk County Council overlain



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Figure 11: Area 3b showing second edition OS map, Norfolk County Series, 1908

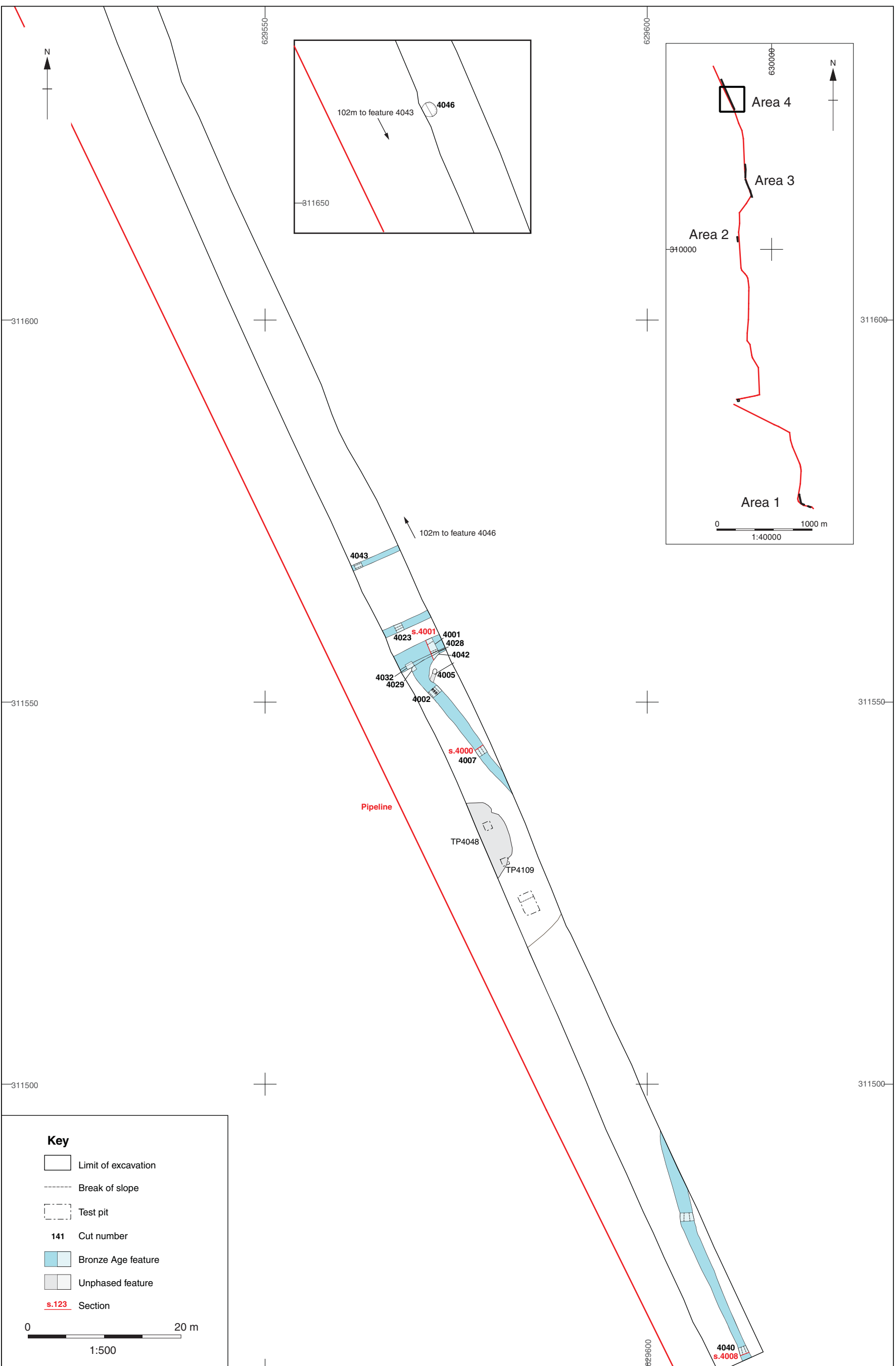


Figure 12b: Phase plan, Area 4, ENF 133970

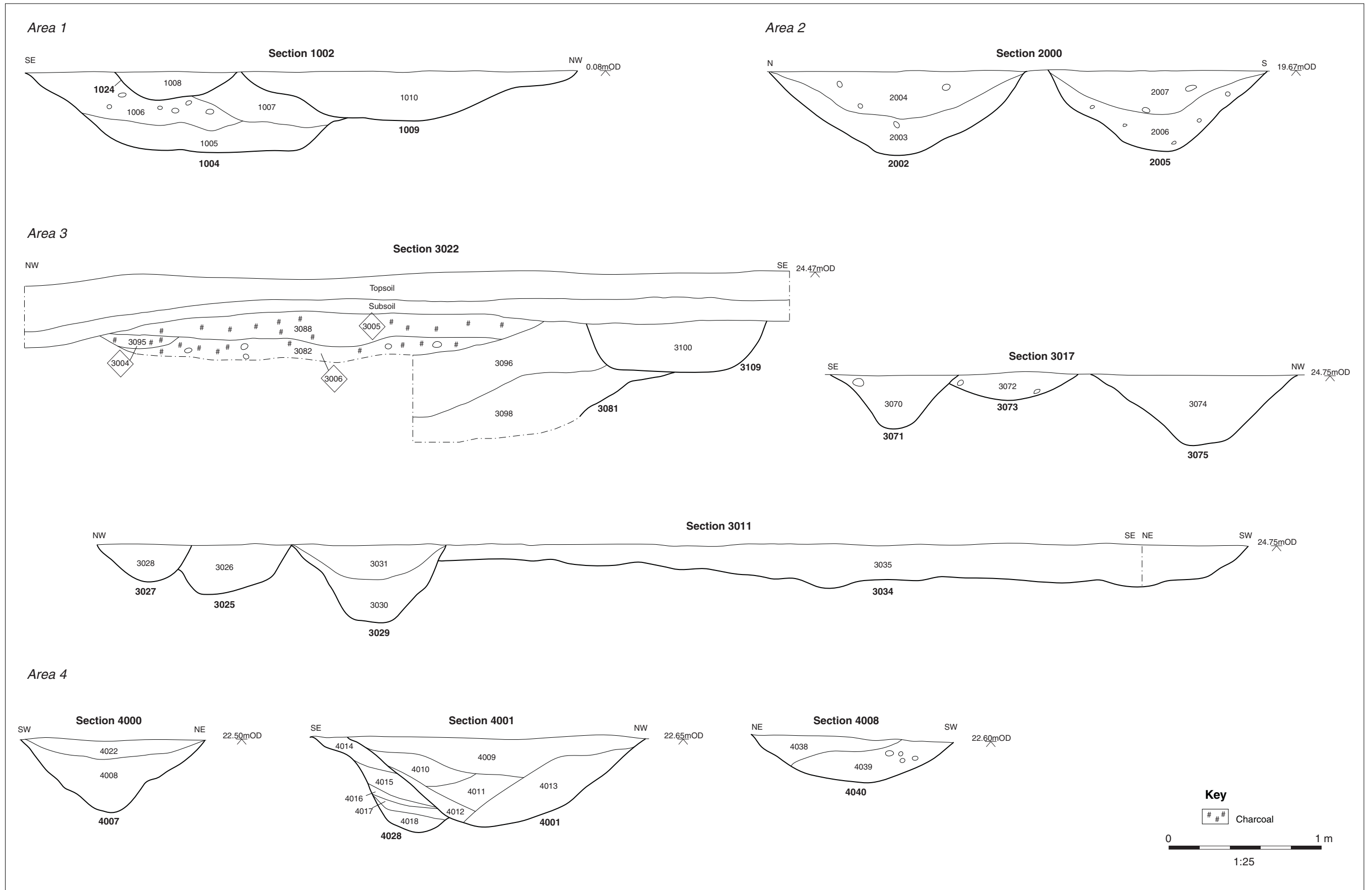


Figure 13: Selected sections

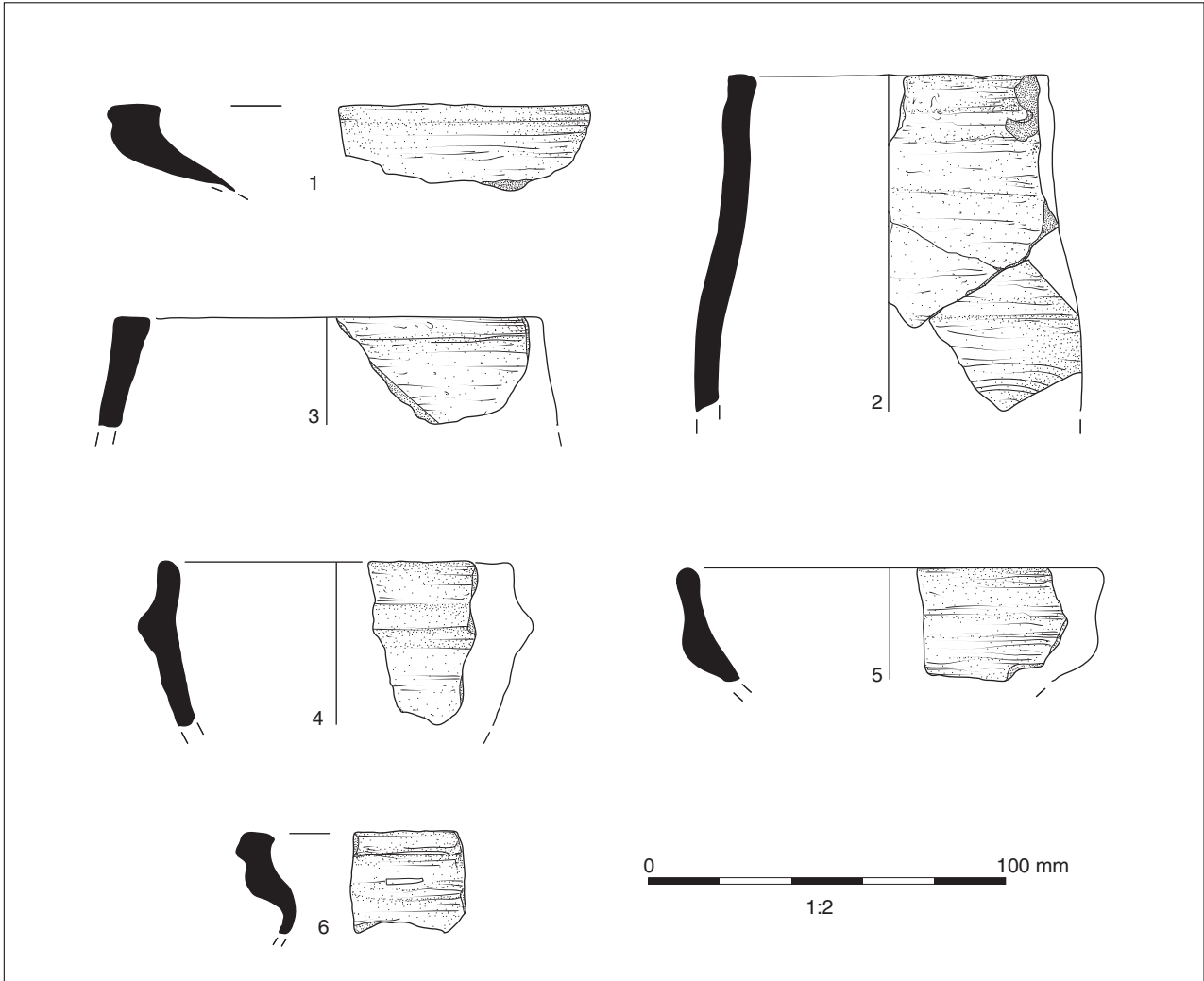


Figure 14: Medieval pottery

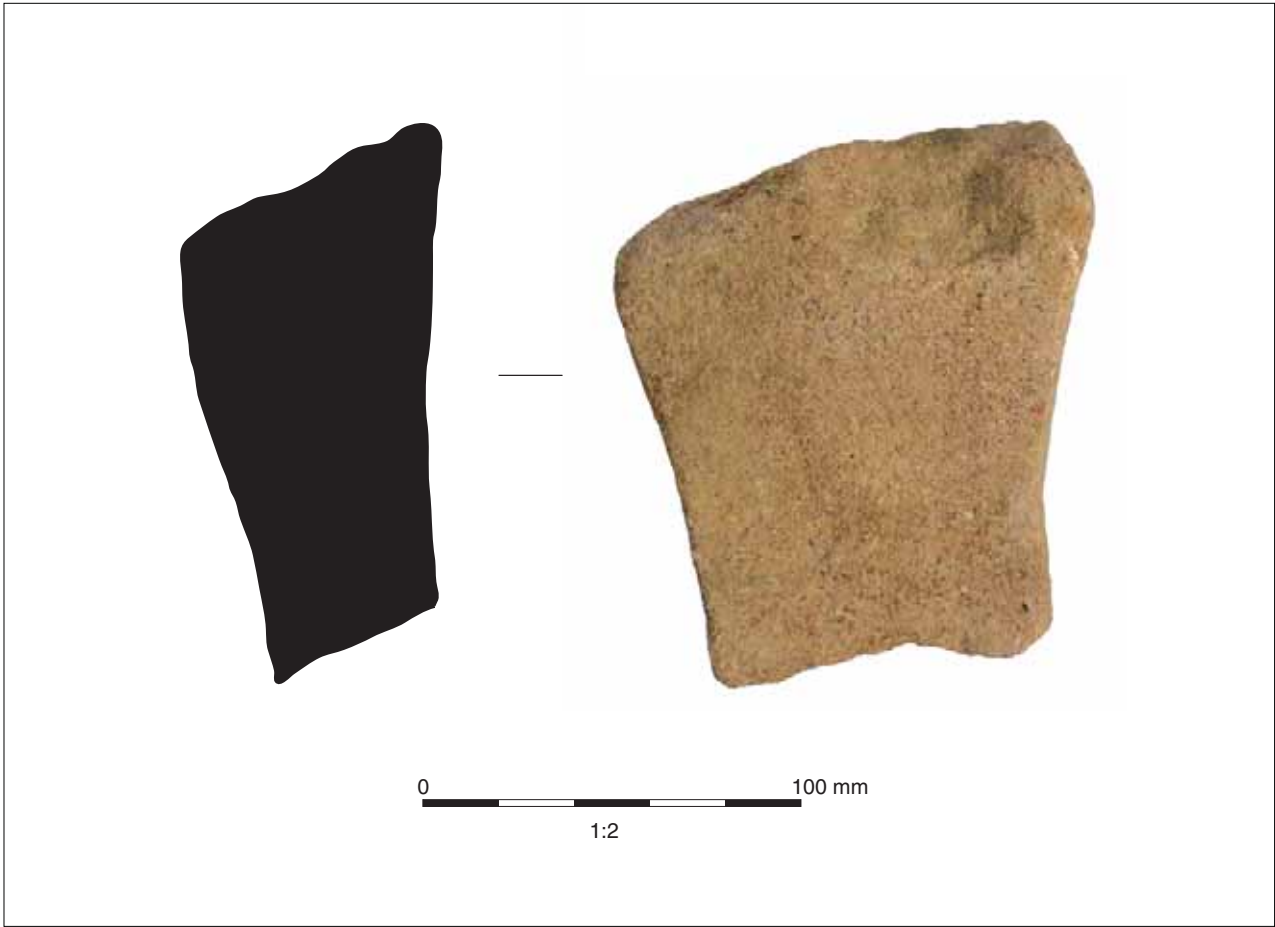
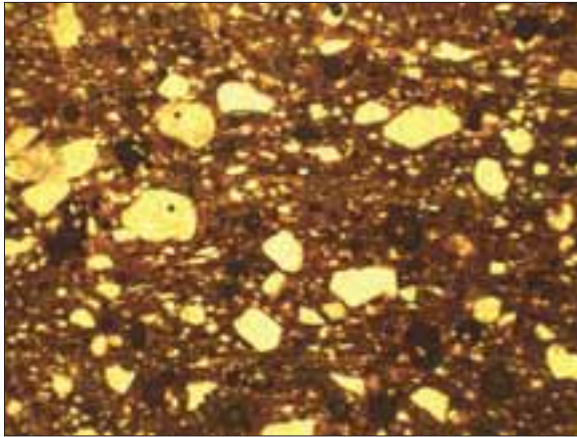
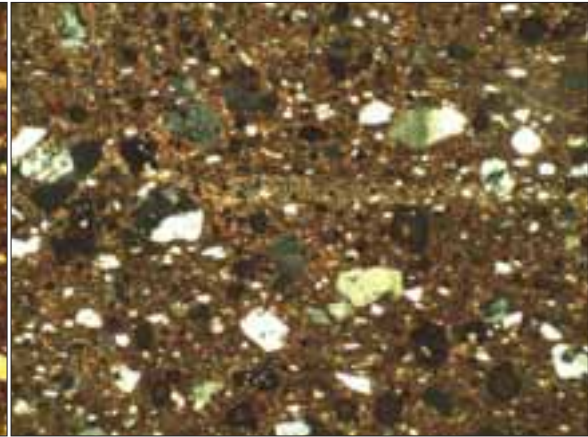


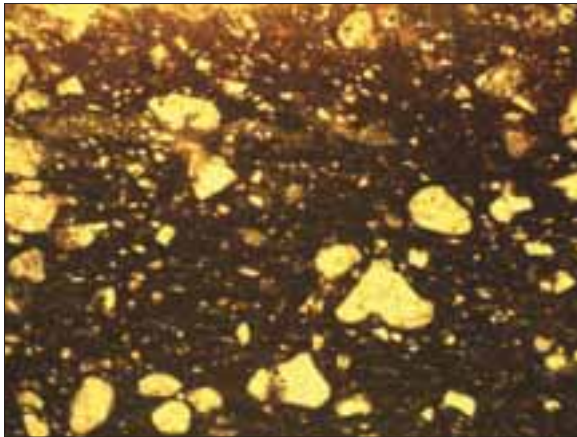
Figure 15: Millstone Grit Whetstone from buried soil (3024)



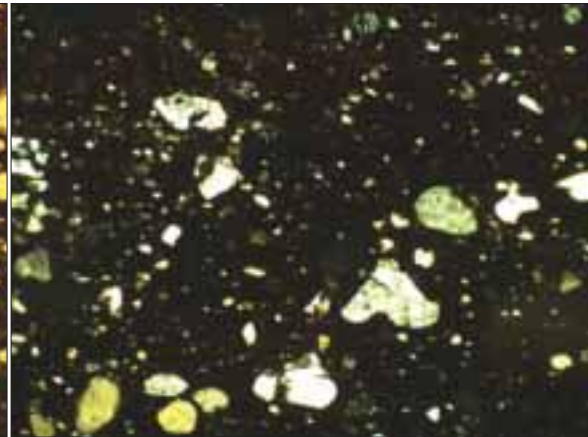
A - 1 Plumstead (PPL)



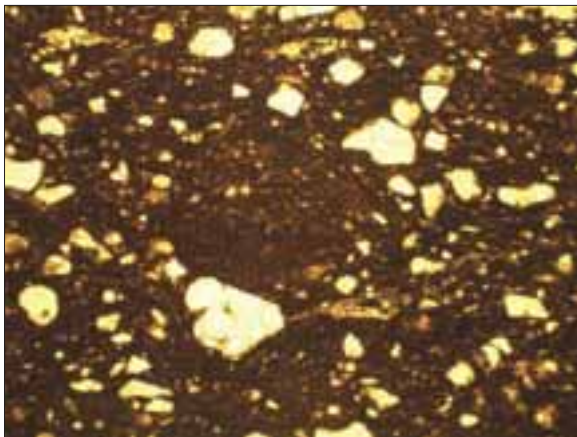
B - 1 Plumstead (XP)



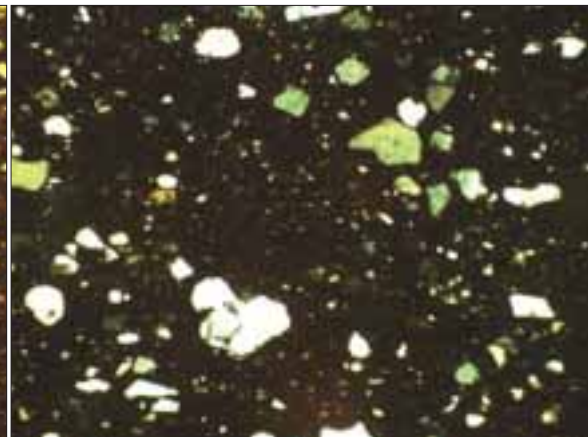
C - 2 Plumstead (PPL)



D - 2 Plumstead (XP)

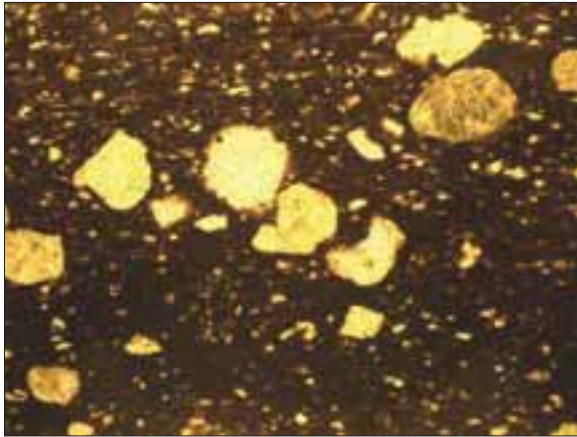


E - 3 Potter Heigham (PPL)

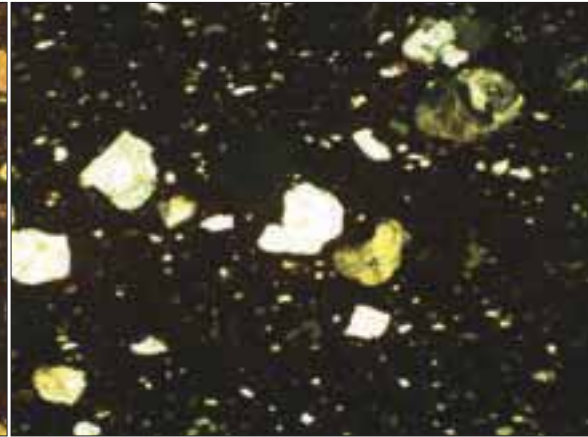


F - 3 Potter Heigham (XP)

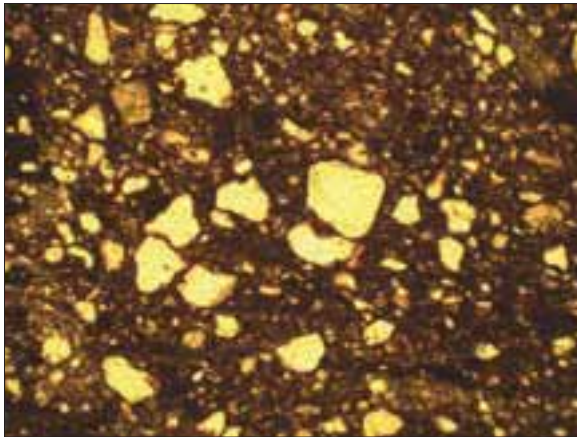
Plate 16: Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars.



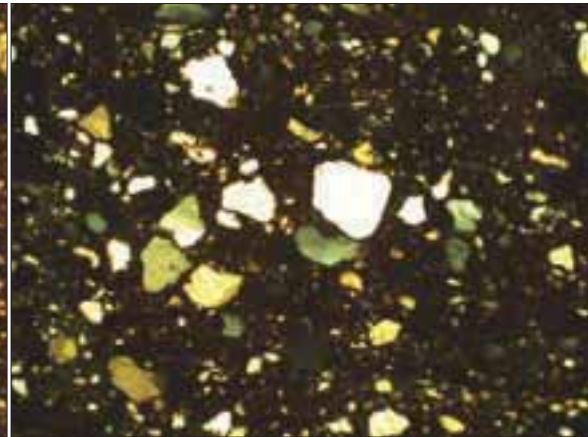
A - 4 Blackhill Wood (PPL)



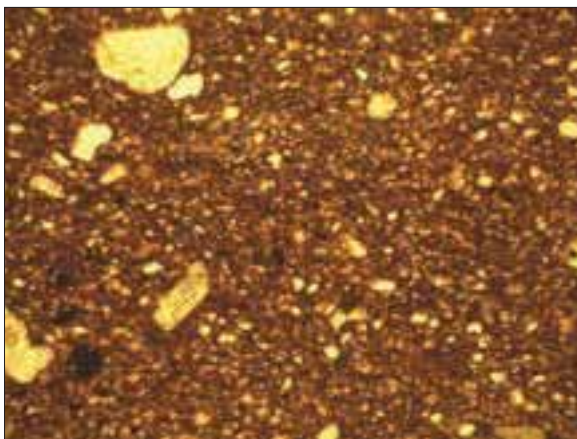
B - 4 Blackhill Wood (XP)



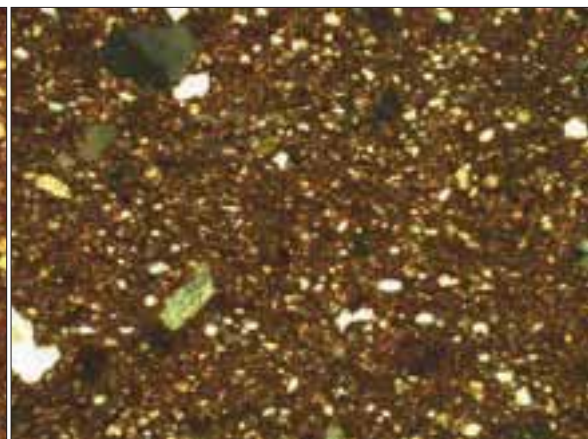
C - 5 Hopton Kiln Site (PPL)



D - 5 Hopton Kiln Site (XP)

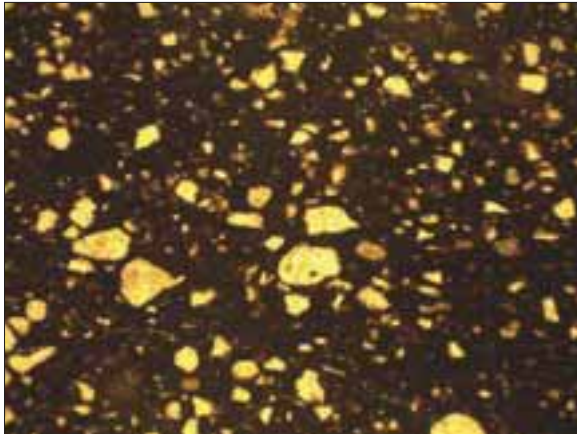


E - 6 Mountergate (PPL)

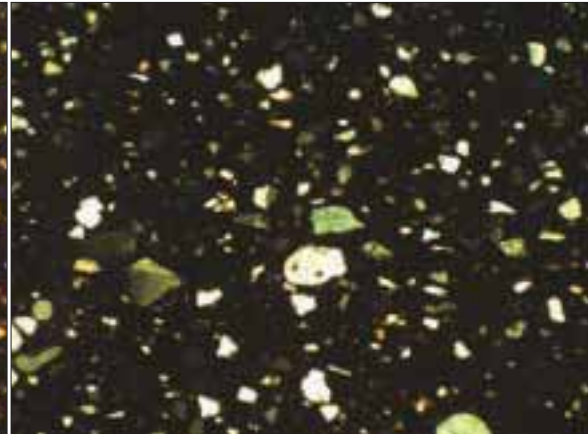


F - 6 Mountergate (XP)

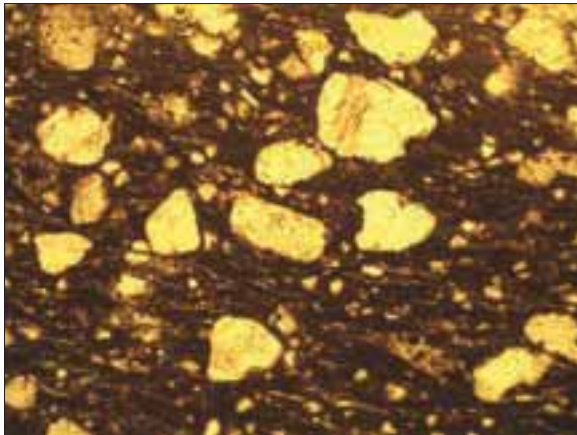
Plate 17: Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars.



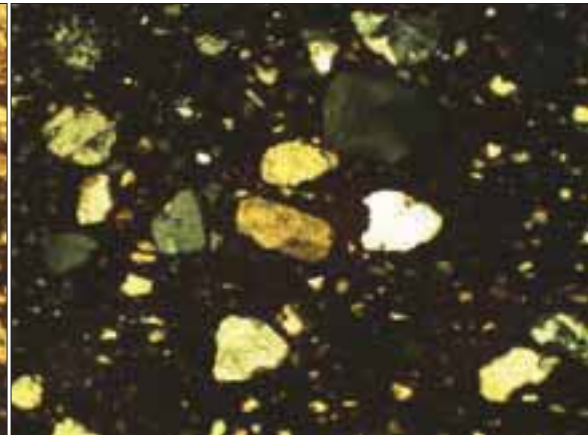
A - 7 Muspole Street (PPL)



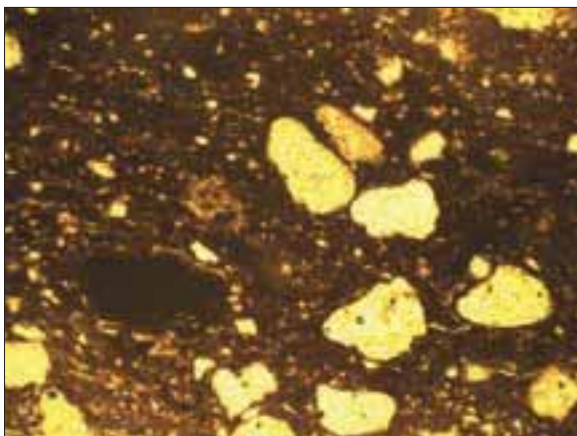
B - 7 Muspole Street (XP)



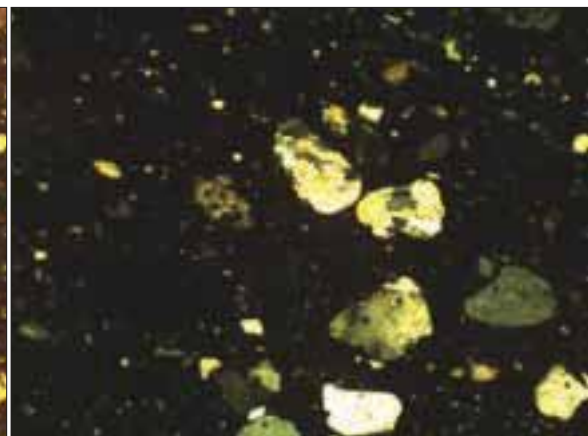
C - 8 Muspole Street (PPL)



D - 8 Muspole Street (XP)



E - 9 South Walsham (PPL)



F - 9 South Walsham (XP)

Plate 18: Thin section photomicrographs of LMT sherds from Plumstead and other sites in Norwich analysed in this report. Image wide = 2.9mm. PPL = plane polarised light, XP = crossed polars.



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