making sense of heritage

Exeter Flood Defence Scheme
Exeter, Devon

Archaeological Fieldwork Report

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March 2015

wessex archaeology

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Archaeological Fieldwork Report

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Summary

Wessex Archaeology was commissioned by CH2M Hill, on behalf of the Environment Agency, to carry out a phased programme of multi-disciplinary archaeological pre-determination evaluation with a small element of phase 1 mitigation works associated with the proposed improvement scheme for the River Exe flood defences within the city of Exeter, Devon. The works, which comprised geophysical survey, archaeological trial trenching, test pitting, watching brief and historic building recording, were undertaken between September and December 2014.

The investigations reported on here consist of the following works:

- Geophysical survey
    - Zone 1 – Sidings Field (NGR 290875 094150)
    - Zone 6 – Habitat Creation Area (NGR 293650 090125)
    - Zone 6 – Exeter and Devon crematorium and the Northbrook golf course (NGR 293800 090425)
- Trial trench evaluation
    - Zone 3 – adjacent to Exe Bridge (Trench 1, NGR 291536 092082)
    - Zone 4 –Exeter Quay (Trenches 3 and 4, (NGR 2991982 092117)
    - Zone 4 – Piazza Terracina (Trench 5, NGR 192102 091960)
    - Zone 6 – along Mill Road (Village Green) (Trenches 10-12, NGR 294062 90014)
    - Zone 1 – Sidings Field – Trenches 37-40, NGR 290875 094150)
- Test Pitting
    - Zone 6 – Northbrook and existing Woodland (NGR 293758 90331)
- Watching brief
    - Zone 5 – Trew's Flood Relief Channel (NGR 292750 091080).

The historic building recording elements of the scheme have been reported on separately (WA 2014b).

The geophysical survey identified a few anomalies of possible archaeological interest although the majority of the detected features appear to relate to agricultural and modern activity: former field boundaries, ploughing scars and relatively modern services. Some ditch-like anomalies of possible archaeological significance were detected, but these could also be explained as modern or agricultural features. Small weakly magnetised features can produce responses that are below the detection threshold of magnetometers; it was therefore considered probable that archaeological features could survive which were not identified through geophysical survey.

Evaluation Trench 1 was positioned on the western side of the River Exe to look for any remnants of a causeway leading up to the Exe bridge; no archaeological material was found and there was no evidence for the southern end of a causeway or bridge, which may have been below the maximum excavated depth. Trenches 3 and 4 were located on the eastern side of the Exe at Exeter Quay. The trenches contained a cobbled surface edged by a stone kerb, probably representing the surface of the old quay. Trench 5, located to the north of the canal basin at the

edge of Piazza Terracina on the western side of the Exe, showed that the footings of the basin compound wall of 1830 survived below modern deposits.

Three trenches (10-12) were located to the north of the village green, Mill Lane, intended to test for the remains of historic quaysides and wharves and possible ship and boat building docks. Trench 10 (to the north-west of the village green) could not be excavated due to the canopy of a tree. Trench 11 (within the north-east extents of the village green) contained post-medieval mortar layers and two postholes. Trench 12 (to the north-east) contained layers of post-medieval made ground.

Four trenches (37-40) located on the eastern side of the Exe at Sidings Field revealed a number of modern features but no archaeological features of significance.

Twenty eight 1m by 1m test pits excavated in woodland to the south of Exeter and Devon crematorium and the Northbrook golf course on the eastern bank of the Exe revealed a number of archaeological deposits belonging to a series of mill buildings and associated features recorded on nineteenth century mapping. A very small quantity of finds was recovered from the trenches, dating to the medieval and post-medieval periods.

A watching brief, maintained during groundworks associated with the deepening of Trew's Flood Relief Channel, recorded a generally uniform sequence of topsoil above alluvial silts and gravels along the entire length of the channel. The combined thickness of these deposits averaged 3.5–4 m, with 1–1.5 m of 20th century made ground covering the base of the channel. The watching brief exposed no significant deposits associated with infilled former river channels or the presence of early human activity.

Acknowledgements

The works were commissioned by CH2M Hill on behalf of the Environment Agency. Wessex Archaeology would like to thank the staff at EA and CH2M Hill, in particular Ed Wilson and Rob Butler (EA) and Chris Green and James Goad (CH2M Hill), for their considerable assistance during the work. Wessex Archaeology would also like to thank the main contractor, Team Van Ord, for their assistance in the completion of the works, in particular Mike Barron and Alistair Wylham.

The assistance of Andy Pye of Exeter City Council, who monitored the fieldwork, is also gratefully acknowledged.

Finally thanks are extended to the owner of Bar Venezia for allowing site access to Trench 5 and, to Kelly James for her valued advice and assistance during the geophysical survey of the Exeter and Devon Crematorium.

The geophysical data were acquired under the direction of Wessex Archaeology. Jen Smith and Ben Urmston processed the geophysical data which was interpreted by Jen Smith and Ross Lefort. The geophysical work was quality controlled by Dr. Paul Baggaley. The archaeological evaluation was undertaken by Susan Clelland (Zone 3), Simon Flaherty and Peter Fairclough (Zone 4), Marc Steinmetzer and Peter Fairclough (Zone 4) and Ray Kennedy and Darryl Freer (Zone 6). The Test pitting was carried out by Peter Fairclough, Tom Burt, Rachel Williams, Mark Bagwell and Roy Krakowicz. The watching brief was undertaken by Marc Steinmetzer and John Martin.

This report was written by Ross Lefort (geophysics), Simon Flaherty, Marc Steinmetzer, Peter Fairclough and Ray Kennedy (archaeological evaluation, test pitting and watching brief) and Lorraine Mepham (finds). The report was compiled by Andrew Powell, Steve Thompson and Matt Leivers. The illustrations were prepared by Ross Lefort and Liz James.

The project was managed on behalf of Wessex Archaeology by Simon Cleggett.

Exeter Flood Defence Scheme
Exeter, Devon

Archaeological Fieldwork Report

1 INTRODUCTION

1.1 Project background

1.1.1 Wessex Archaeology (WA) was commissioned by CH2M Hill ('the Client'), on behalf of the Environment Agency (EA), to carry out a phased programme of multi-disciplinary archaeological pre-determination evaluation with a small element of phase 1 mitigation works associated with the proposed improvement scheme for the River Exe flood defences ('the Scheme') within the city of Exeter, Devon (**Fig. 1**).

1.1.2 The Scheme, which is being developed by EA in partnership with Exeter City Council (ECC) and Devon County Council (DCC), favours the augmentation of the current flood defences, and involves repairs to existing embankments, the construction of new embankments and flood defence walls, and the creation of improved habitat areas.

1.1.3 A desk-based assessment (DBA) (WA 2013) concluded that the Scheme encompasses an area of considerable historical importance and contains areas of significant below-ground archaeological potential, in addition to numerous built heritage assets, some of which could be impacted by the construction works. It should be noted that - in order to mitigate those impacts - further archaeological recording work is likely to be required by the local planning authority (ECC) via a planning condition, the scope of which will be agreed with the client's (EA) archaeological advisor and ECC.

1.1.4 Subsequently, a Written Scheme of Investigation (WSI) (WA 2014a) was submitted to and approved by ECC. It set out the strategy and methodology by which WA would implement the present phase of the multi-disciplinary archaeological investigation. Site specific WSIs were prepared prior to the commencement of individual pieces of work. The works, which comprised geophysical survey, archaeological trial trenching, test pitting, watching brief, and historic building recording, were undertaken between September and December 2014.

1.2 Scope of document

1.2.1 This document outlines the results of the following pieces of archaeological work:

- Geophysical survey
    - Zone 1 – Sidings Field (NGR 290875 094150)
    - Zone 6 – Habitat Creation Area (NGR 293650 090125)
    - Zone 6 – Exeter and Devon crematorium and the Northbrook golf course (NGR 293800 090425)
- Trial trench evaluation

- Zone 3 – adjacent to Exe Bridge (Trench 1, NGR 291536 092082)
- Zone 4 –Exeter Quay (Trenches 3 and 4, (NGR 2991982 092117)
- Zone 4 – Piazza Terracina (Trench 5, NGR 192102 091960)
- Zone 6 – along Mill Road (Village Green) (Trenches 10-12, NGR 294062 90014)
- Zone 1 – Sidings Field (Trenches 37-40, NGR 290875 094150)

- Test Pitting
  - Zone 6 – Northbrook and existing Woodland (NGR 293758 90331)
- Watching brief
  - Zone 5 – Trew's Flood Relief Channel (NGR 292750 091080).

1.2.2 The historic building recording is reported separately (WA 2014b).

1.3 Scheme location and geology

1.3.1 The Scheme encompasses an area of 347 ha, centred on National Grid Reference (NGR) 291490 092080, within the floodplain of and in areas adjoining the Rivers Exe and Creedy and the Exeter Canal, extending from Cowley Bridge in the north to Countess Wear Waste Water Treatment Works in the south. The corridor occupied by the Scheme is approximately 8 km long and between 80 and 850 m wide.

1.3.2 The underlying geology is mapped as interbedded Carboniferous Mudstone and Sandstone of the Crackington Formation to the north, Permian Sandstone of the Whipton Formation and Permian Breccia of the Alphington Breccia Formation in the central part, and Permian Breccia of the Heavitree Breccia Formation to the south (British Geological Survey on-line data). A complex sequence of alluvial deposits overlies the bedrock within the floodplain of the River Exe, reflecting the dynamic nature of such environments.

1.4 Archaeological and historical background

1.4.1 The archaeological and historical background to the scheme and the surrounding area has been extensively studied and presented in detail within the DBA (WA 2013). A summary of the results is presented here.

1.4.2 No direct evidence of Palaeolithic activity has been recorded within the floodplain area to the south of the Exeter canal basin, but Pleistocene river terrace deposits which may contain Palaeolithic material are believed to survive in isolated patches. It is known from previous archaeological investigations that the river occupied a broader shifting system of channels associated with a wider floodplain, creating the potential for the presence of infilled former river channels containing palaeoenvironmental deposits, waterlogged remains, and other evidence of early human activity associated with the exploitation of the river and marsh.

1.4.3 Archaeological investigations have identified the existence of a possible subsidiary channel of the main river which flowed from the western bank of the Exe to the south and south-west during prehistoric times (Exeter Archaeology 1998). Excavations slightly to the

north of this revealed a further palaeochannel and a curving late prehistoric ditch on the west bank of the river.

1.4.4 The river is likely to have been of key importance to prehistoric communities due to the resources and opportunities it presented, although there is a paucity of known prehistoric remains within the Scheme boundary. Evidence dating to later prehistoric periods suggests a background level of activity including isolated findspots and assemblages of worked flint from the area between Countess Wear and Topsham. Evidence of Bronze Age and Iron Age settlement activity is also known from the river terraces to the south (Exeter Archaeology 1999).

1.4.5 The area occupied by the modern Exe bridges is thought to have been the location of a river crossing since prehistoric times. The continuing significance of the River Exe is underscored by the number of settlements along its course which derive their names from it. Exwick, Exminster, Nether Exe and Exeter itself (amongst others) all take their name from *isca*, a word meaning simply water (Gover *et al.* 1969).

1.4.6 The Roman army constructed a fortress shortly after the invasion of Britain close to the site of the Exe bridges in order to control the river crossing, while the foundation of the town of *Isca Dumnoniorum* followed in subsequent decades. Extensive evidence of Romano-British activity has been uncovered during archaeological investigations within Exeter, while within the area around the river a major supply base/works depot at St Loyes, on the bluff directly above the crematorium, and small fort and contemporary and later Roman civil remains at Topsham have both been uncovered more recently. A quantity of residual pottery and tile was recovered during excavations at Shooting Marsh Stile in 1984 (Henderson 1985). It is thought that a port situated near the head of the estuary at Topsham handled most of Roman Exeter's trade (Henderson 1991).

1.4.7 The archaeological record suggests that the town was temporarily abandoned around the beginning of the AD 5th century, until the emergence of activity during the Saxon period. Exeter grew into a large and prosperous city throughout the medieval and post-medieval periods. Settlements along the river sought to control its power to drive mills, while land was reclaimed from the floodplain to provide space for new development. Exeter possessed no quay prior to the late 16th century as during the Roman and early medieval periods the river may have been too shallow to allow the passage of anything more than the smallest craft (Hoskins 1974 and Henderson 1991). It is thought that in the later medieval period all goods destined for the city passed through the port of Topsham (Henderson 1991) and other landing places on the estuary, such as Countess Wear.

1.4.8 At Haven Banks towards the centre of the Scheme an earlier river channel was identified dating from before the 16th century, in addition to deposits of sub-Roman or medieval date and waterlogged deposits of post-medieval date. The Exeter Canal was built between 1563–66, beginning upstream at Trew's Weir, and rejoining the river at Matford Brook. It was only after the completion of the canal, which allowed lighters to carry goods to the city from sea-going vessels anchored in the estuary, that a proper quay and dockside facilities were built. The canal originally had three sets of pound locks, necessary to maintain the water level.

1.4.9 With the Restoration came a period of renewed prosperity for the City with the volume of trade, in woollen cloth especially, increasing rapidly. This in turn led the City Chamber in 1676 to start work on improving the Exeter Canal and Quay that continued piecemeal until 1701. In 1676 Richard Hurd extended the canal to the south and constructed a large basin

and quay. Excavation in 1987 revealed part of the 'New Cut', a large artificial channel built to divert water from the river to facilitate the construction of a new deep water approach channel and wharf at Exeter Quay in 1698-1701, to allow larger ships of up to 200 tons access to Exeter's quayside (Henderson 2000).

1.4.10 In 1819 James Green was appointed to appraise the ship canal and its prospects for improvement. Works followed to widen and deepen the canal, while at the same time the canal was extended further south to Turf Reach. The Canal Basin was opened in 1830 and was surrounded by coalyards and warehouses. The basin was initially linked to the railway main line by a broad gauge connection, though this was subsequently converted to narrow gauge. Railway turntables were located at each of the northern corners of the basin, one of which was excavated in 2008 (Steinmetzer 2010).

1.4.11 The arrival of the railway ultimately contributed to the decline of the canal as a means of transport, while the latter half of the 20th century saw almost all of the industrial activity disappear from this part of the city.

2 AIMS AND METHODS

2.1 Aims

2.1.1 The overall aim of the archaeological programme was to capture sufficient evidence (ie, data, records, images etc.) to inform consideration of any further design amendments that may be considered appropriate in order to mitigate the potential impact of the Scheme on the archaeology and heritage of the area.

2.1.2 The aim of the geophysical survey was to establish the presence/absence, extent and character of detectable archaeological remains within the survey area, to enable effective targeting of the trial trenching.

2.1.3 The aim of the trial trenching and test pitting was to determine the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site, and if present to define their character, extent, quality and preservation to enable an assessment of their significance in a local, regional, national or international context and, crucially, to inform the detailed design of the scheme.

2.1.4 The aim of the watching brief was to carry out a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons, where there was a possibility that archaeological deposits may be disturbed or destroyed. This applies in this case to the phase 1 works (widening and deepening of the flood relief channel).

2.2 Methods and monitoring

2.2.1 The methodology for the present phase of mitigation works was set out within the WSI (WA 2014a), and complied with the Chartered Institute for Archaeologists standards and guidance for geophysical survey, and archaeological evaluations and watching briefs (CIfA 2014a; 2014b; 2014c).

2.2.2 All works were monitored by Andy Pye, ECC's Principal Project Manager (Heritage) (hereafter PPMH), on behalf of the LPA. All reasonable access was provided to the works.

3 GEOPHYSICAL SURVEY

3.1 Survey area

Zone 1 – Sidings Field

3.1.1 The survey area comprised approximately 1.5 hectares of floodplain pasture on the eastern bank of the River Exe towards the north-western limits of the City of Exeter, centred on NGR 290874 94147. The site occupied land west of the Network Rail Material Storage Site on King Edward Street and directly upstream from Exwick Mills Weir (**Fig 1**).

Zone 6 – Habitat Creation Area and Exeter and Devon crematorium and the Northbrook golf course

3.1.2 The two sites were adjacent to each other towards the southern limits of the City of Exeter on the eastern side of the Exe, centred on NGR 293650 090125 and NGR 293800 090425. The Habitat Creation Area was approximately 230 m south of the Exeter and Devon Crematorium and was bordered by the St James Mill Leat on the western side, the Northbrook watercourse and Northbrook Golf Course to the east, and woodland to the rear of properties on Mill Lane and School Lane to the south.

3.1.3 Detailed gradiometer survey was undertaken over all accessible parts of the three areas with a total of 12.6 ha surveyed (**Fig. 2**).

Soils and geology

3.1.4 The bedrock geology under the Sidings Field site is recorded as Crackington formation interbedded mudstone and sandstone that dates to the Carboniferous period. Superficial deposits are recorded as Quaternary alluvium (clay, silt, sand and gravel) although river terrace and head deposits are recorded close by. The bedrock geology under the habitation creation area and crematorium/golf course sites is recorded as mostly Alphington breccia formation with Heavitree breccia formation along the eastern edge of the sites; both geological formations date to the Permian period. The superficial deposits under the habitation creation area are recorded as alluvium and the crematorium/golf course are recorded as a mix of alluvium, head and river terrace deposits (BGS on-line data).

3.1.5 The soils underlying the Sidings Field site are typical brown alluvial soils of the 561b (Teme) association. The soils under the Habitat Creation Area and Crematorium/Golf Course sites are largely unclassified as this area is considered urban although typical brown alluvial soils of the 561b (Teme) association and pelo-alluvial gley soils (SSEW 1983) are likely. Soils derived from such geological parent material have been shown to produce magnetic contrasts acceptable for the detection of archaeological remains through magnetometer survey.

3.2 Methodology

Introduction

3.2.1 The detailed magnetometer survey was conducted using a Bartington Grad601-2 dual fluxgate gradiometer system. The survey was conducted in accordance with English Heritage guidelines (2008).

3.2.2 The geophysical survey was undertaken under the direction of Wessex Archaeology in two phases between 30th September and 27th October 2014. Field conditions at the time

of the surveys were good with firm conditions under foot. A total of 12.6 ha of a possible 15.1 ha was surveyed; some areas were lost to artificial obstructions and wooded areas.

Method

3.2.3 Individual survey grid nodes were established at 30 m x 30 m intervals using a Leica Viva RTK GNSS instrument, which is precise to approximately 0.02 m and therefore exceeds English Heritage recommendations (2008).

3.2.4 The magnetometer survey was conducted using a Bartington Grad601-2 fluxgate gradiometer instrument, which has a vertical separation of 1 m between sensors. Data were collected at 0.25 m intervals along transects spaced 1 m apart with an effective sensitivity of 0.03nT, in accordance with English Heritage guidelines (2008). Data were collected in the zigzag method.

3.2.5 Data from the survey were subject to minimal data correction processes. These comprise a zero mean traverse function (±5nT thresholds) applied to correct for any variation between the two Bartington sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography. These two steps were applied to all survey areas, with no interpolation applied.

3.2.6 Further details of the geophysical and survey equipment, methods and processing are described in **Appendix 3**.

3.3 Results and interpretation

Introduction

3.3.1 The gradiometer survey was successful in identifying a small number of anomalies of possible archaeological interest although the majority of the detected features appeared to relate to agricultural and modern activity. Regions of increased magnetic response and at least three modern services were also detected.

3.3.2 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of 1:2000 (**Figs 3–7**). The data are displayed at -2nT (white) to +3nT (black) for the greyscale image and ±25nT at 25nT per cm for the XY trace plots.

3.3.3 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (**Figs 3**, **6** and **7**). Full definitions of the interpretation terms used in this report are provided in **Appendix 4**.

3.3.4 Numerous ferrous anomalies are visible throughout the detailed survey dataset. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation.

Zone 1 – Sidings Field

3.3.5 The Sidings Field survey area revealed very little in the way of archaeological features (**Fig. 3**). Agricultural features in the form of field boundaries (4000), a possible associated cut feature (4001) and numerous ploughing scars make up the bulk of the observed features.

3.3.6 The northern end of the field was dominated by a dense spread of ferrous responses possibly associated with the construction of the nearby railway (the area may also have been used to dump arisings from dredging). Within this dense spread were some linear

features (such as 4002); the exact nature of these features is unclear so they have been classed as coherent ferrous.

3.3.7 A short ditch-like anomaly (4003) appears to be partially obscured by ferrous responses. This anomaly has magnetic values around +3nT and a 13m long segment can be seen in the data. This feature has been classed as possible archaeology as it shares an alignment with the agricultural features 4000 and 4001.

3.3.8 A modern service aligned northwest–southeast (4004) lay towards the southern limit of the area.

Zone 6 – Habitat Creation Area

3.3.9 The survey area contains few anomalies of archaeological interest with the majority of detected features relating to agricultural activity (**Fig. 6**). Former field boundaries corresponding to features on historic maps can be seen (4005 to 4011).

3.3.10 A broad area of increased magnetic response runs through the data (4012); this feature also features on historic maps and is marked as a drain. The feature looks to have been filled with highly magnetic debris such as metallic and ceramic material. The smooth anomalies within this area that are interpreted as possible archaeology may relate to deeply buried ferrous responses.

3.3.11 There are other ditches (such as 4013 and 4014) that respect the recorded field boundaries but are not recorded on any of the maps consulted. These features are classed as agricultural and could represent earlier boundaries or could simply be agricultural features such as drains that are not mapped. A group of parallel trends (4015) may also represent agricultural features.

3.3.12 There are wide spreads of geological responses in this area that are defined by weakly magnetic, broad, diffuse edged positive and negative responses. Within this wider spread are some stronger curvilinear responses (such as 4016) that are considered to represent palaeochannels.

Zone 6 – Exeter and Devon crematorium and the Northbrook golf course

3.3.13 The survey area was dominated by dense concentrations of ferrous responses and spreads of increased magnetic response (**Fig. 7**). Two linear coherent ferrous responses (4017) may be associated with landscaping features of the former Northbrook Park. Some crescent shaped anomalies (4018) on the golf course are classed as possible archaeology but are far more likely to relate to features cut for the current golf course. Two modern services (4019 and 4020) are located at the western and northern limits of the Site.

3.3.14 There are numerous weak linear trends running through the entire dataset, the function and identity of which is unclear and they are regarded as being of uncertain origin. There are also a number of small sub-oval shaped positive anomalies of possible archaeological interest. These anomalies could represent cut archaeological features such as postholes but could equally relate to natural features or deeply buried ferrous objects; as there is no significant patterning in their spatial distribution these features are considered to be of low archaeological potential.

Conclusion

3.3.15 Very few archaeological features were identified from the dataset with the majority relating to former field boundaries, ploughing scars and relatively modern features related to services. Some ditch-like anomalies of possible archaeological significance were detected but these could also be explained as modern or agricultural features.

3.3.16 Dense spreads of ferrous responses were observed over various parts of the three survey areas. These ferrous anomalies are strong enough to mask weaker archaeological features that may lie underneath. The frequency of such responses is not considered great enough to prevent an assessment of the majority of the three sites however.

3.3.17 The relative dimensions of the modern services identified by the gradiometer survey are indicative of the strength of its magnetic response, which is dependent upon the materials used in their construction and the backfill of the service trench. The physical dimensions of the services indicated may therefore differ from their magnetic extents in plan; it is assumed that the centreline of services is coincident with the centreline of their anomalies, however. Similarly, it is difficult to estimate the depth of burial of the services through gradiometer survey. It should be noted that small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be encountered than have been identified through geophysical survey.

4 EVALUATION - TRIAL TRENCHING AND TEST PITTING

4.1 Methodology

4.1.1 All works were undertaken in accordance with the methodology set out within the WSI (WA 2014a) and in compliance with the standards outlined in the CIfA's Standard and Guidance for Archaeological Evaluations (CIfA 2014b), excepting where they are superseded by statements made below.

4.1.2 All trenches were set out using GPS in general accordance with the proposed pattern outlined in the WSIs although adjustments to the layout were required to take account of on-site constraints. The trench locations were tied in to the Ordnance Survey.

4.1.3 The trial trenches were excavated using a 360º excavator equipped with a toothless bucket and under constant supervision by Wessex Archaeology, except where otherwise stated. Machining proceeded in spits, and ceased at the uppermost archaeological horizon or natural geology, whichever was encountered first. Where appropriate, hand cleaning was undertaken to establish the nature of the deposits and archaeological features to address the aims of the evaluation.

4.1.4 Spoil derived from hand-excavated archaeological features was visually scanned and metal-detected as appropriate for the purposes of finds retrieval. All artefacts from excavated contexts were retained, except from where features or deposits were identified as modern in date. Finds were treated in accordance with the relevant standards and guidance from the CIfA (2014b; 2014c) and the Museums, Libraries and Archives Council (1999).

4.1.5 All exposed archaeological deposits were recorded using WA's *pro forma* recording system. A complete drawn record of excavated archaeological features and deposits was compiled, including plans and sections drawn to appropriate scales (1:20 for plans, 1:10 for sections), with reference to the Ordnance Survey National Grid. The Ordnance Datum

(OD) height of all principal features and levels were calculated and plans/sections were annotated with OD heights.

4.1.6 A photographic record was maintained during the evaluation using digital cameras equipped with an image sensor of not less than 10 megapixels. Digital images are subject to managed quality control and curation processes which embed appropriate metadata within the image and ensure long term accessibility of the image set.

4.1.7 Trenches completed to the satisfaction of the Client and the ECCAO were backfilled using the excavated materials in the approximate order in which they were removed by Wessex Archaeology and left level on completion. No other reinstatement or surface treatment was undertaken.

4.1.8 Site survey was carried out using a Leica Viva series GNSS unit using the OS National GPS Network through an RTK network with a 3D accuracy of 30 mm or below. All survey was recorded using the OSGB36 British National Grid coordinate system.

4.2 Results

4.2.1 The following sections provide a summary of the information held in the Site archive. Details of individually excavated contexts and features are retained in the Site archive and a tabulated version of these can be found in **Appendix 1**.

4.3 Zone 1 – Sidings Field: Trenches 37-40

4.3.1 The evaluation at Sidings Field (centred on NGR 291488 092081) comprised the excavation of four 50 m by 1.8 m trenches (Trenches 37-40) targeted upon the results of the geophysical survey.

Trench 37

4.3.2 Trench 37 was targeted on geophysical anomalies 4002 and 4003. Excavations revealed a 1.7 m deep modern linear cut (3705) of unknown function that had been backfilled with modern debris (3706) probably associated with the railway sidings adjacent to the site. The modern feature was recorded cutting the natural alluvium layer (3704), which sealed natural (3705). The modern feature was sealed by 0.30 m of subsoil (3702) and topsoil (3701).

Trench 38

4.3.3 Trench 38 was targeted upon geophysical anomaly 4001 and following the removal of 0.40 m of topsoil and subsoil (3801 and 3802) natural alluvium (3803) was revealed, 0.36 m thick and sealing natural (3804). No archaeological finds or features were observed.

Trench 39

4.3.4 Trench 39 was targeted on a geophysical linear anomaly 4000 identified as a former field boundary. Following the removal of 0.44 m of current topsoil and subsoil (3901 and 3902) the remains of a modern farm track were observed cutting the top of the natural alluvium (3903), 0.16m thick and capping the natural (3904).

Trench 40

4.3.5 Trench 40 was positioned in a blank area from the geophysical survey and following the removal of 0.30 m of topsoil and subsoil (4001 and 4002) natural (4003) was revealed. No archaeological finds or features were observed.

Conclusion

4.3.6 On currently available evidence, it is likely that Sidings Field has been subjected to significant disturbance. In all likelihood, this disturbance is related to the proximity of the Site to the Railway Sidings and its use for the dumping of dredging arisings over a considerable period. Recent fieldwork has demonstrated that anomalies dentified during geophysical survey are of negligible archaeological interest and that varying levels of disturbance are prevalent.

4.4 Zone 3 – adjacent to Exe Bridge: Trench 1

Trench 1

4.4.1 Trench 1 (centred on NGR 291536 092082) was located on the western bank of the River Exe in order to investigate the remains of a possible causeway leading to the bridge. It was reduced in size from 8 m by 2 m to 2.9 m by 1.4 m due to modern services and tree canopies.

4.4.2 The trench was excavated to a depth of 1 m below the current ground surface without the natural geology being reached. At a depth of 0.95 m a highly compact levelling layer (105) possibly compacted by machine, consisting of stone, ceramic building material (CBM) and clinker was encountered. This was overlain by four layers of modern made ground (101, 102, 103 and 104) below the topsoil and turf (100) (**Fig. 9**, **Plate 1**). No archaeological finds or features were identified and there was no evidence for the southern end of a causeway or bridge. The medieval surface is likely to have been well below the base of the trench.

4.5 Zone 4 –Exeter Quay: Trenches 3 and 4

4.5.1 Trenches 3 and 4 (centred on NGR 2991982 092117) were located on the eastern bank of the River Exe, relocated and reduced in size due to the presence of services and planters. Trench 3 measured 1.9 m by 11.5 m; Trench 4, to the immediate north-east, measured 2 m by 4.5 m.

Trench 3

4.5.2 Trench 3 was excavated to a depth of 1.2 m below the current ground surface without the natural geology being reached. It revealed a complicated series of deposits behind the wall of Exeter Quay (**Fig. 10**). The lowest recorded layer appeared to consist of redeposited natural comprising red sandy clay with occasional rounded pebbles (308). This was overlain by a 0.35 m thick mixed soil layer (307). At the eastern end of the trench a thin lens of black soot and ash (311) sealed (307), above which was a further 0.2 m thick make up layer of soil (306), and a layer of shillet or slate fragments (305).

4.5.3 These were overlain by two interleaving layers of mortar (309 and 310), which formed the bedding layer for a cobbled surface (312) formed of bedded tightly packed beach or river pebbles probably representing the surface of the old quay. The surface was encountered at 0.5 m below ground level, (**Plate 2**). On the eastern side of surface (312) a line of edging stones forming a kerb. The surface had also been impacted upon by a curving feature (314), which seemed to have resulted in the removal of some of the cobbles and compressed others, suggesting that there may have been a structure overlaying the cobbles. The cobbled surface was also cut by a modern pipe trench (filled with 318).

4.5.4 The cobbled surface sloped gently down towards the north-west, from 7.08–6.86 m above Ordnance Datum (aOD), then more sharply to form a possible drainage channel at 6.78 m

aOD before rising again to 7.14 m aOD at the north-west edge of the trench. The drain, which appears to run north-east to south-west, towards the quay edge, was later backfilled with sandy gravel (316), although its line appeared still to be marked, since two large blocks of Devon Sandstone were located on its eastern edge on the same alignment. The cobbled surface was overlain by made ground comprising layers of clay (303 and 304), below the bedding layer (302) and tarmac (301) of the present car park.

Conclusion

4.5.5 Trench 3 identified significant remains of cobbled surfacing (312) overlaying successive deposits of made ground. With the exception of modern service trenching, the stratigraphic formation of the Quay appears to have survived relatively intact. The cobbled surfacing appears to have been sealed beneath made ground (304) capped by tarmac. The made ground (304) contained diagnostic clay pipe elements dated from 1660 to 1680 amongst a background of material dating from the medieval to the post medieval periods. In turn, the cobbled surfacing overlies sequences of imported made ground that are clearly planned horizontal deposits and not a series of dumps, apparently managed responses to the changing needs of the Quayside. The cobbled surfacing (312) overlaid redeposited material (306). The layer of redeposited material (306) contained pottery dating from the 17th to the early 18th centuries. The cobbled surfacing (312) therefore is likely to have been in place after the early 18th century. Made ground (304) contains residual material of an earlier date. The dating of the cobbled surface then, concurs broadly with the results of an evaluation carried out by AC Archaeology (2014, 6) which describes layers as infill of the 1680 dock which was filled in c.1701. The late 16th and 17th century quay walls were not encountered, although these may lie beneath the cobbled surfaces (which were not removed).

Trench 4

4.5.6 Trench 4 was positioned to the north of Trench 3 and cobbled surface (312) continued into it, where it was recorded as surface 404. The surface was cut by a number of modern service trenches (405, 406 and 407) (**Fig. 11**, **Plate 3**) which were overlain by two layers of made ground, the lower (403) comprising redeposited natural red sandy clay with occasional rounded gravel, the upper (402) consisting of mid grey/brown silty clay with rounded pebbles. These were sealed by the bedding and tarmac of the car park (401).

4.6 Zone 4 – Piazza Terracina: Trench 5

Trench 5

4.6.1 Trench 5, centred on NGR 192102 091960, was located to the north of the canal basin at the edge of Piazza Terracina on the eastern side of the River Exe, in order to locate the earlier quay wall. It measured 6.5 m by 1.8 m, and was excavated to a maximum depth of 1.3 m. Alluvial silts and gravels (507) were exposed at a depth of 0.45 m below the current ground surface and these were overlain throughout the trench by modern made ground (501 and 506). A northeast–southwest aligned wall foundation (504) was exposed at the centre of the trench (**Fig. 11**, **Plates 4** and **5**). This cut through alluvial clays and gravels (507–510). These were in turn truncated by a concrete structure (502-503) at the north-east end of the trench, with modern deposits (511–513) dumped against the northeast face of the structure.

4.6.2 The wall foundation corresponds with the line of existing property boundaries, a boundary shown on the 1839 St Thomas Tithe map and the 1876 Ordnance Survey map and represents the footings of the limestone compound wall built in 1830 around both sides of the basin, for security and probably customs purposes.

4.7 Zone 6 – along Mill Road, Countess Wear (Village Green): Trenches 10-12

4.7.1 Three trenches (10-12) were located in the north part of the village green, Mill Lane, and were intended to test for the remains of historic quaysides and wharves and possible ship and boat building docks, along the line of the proposed flood defence.

Trench 10

4.7.2 Trench 10 (to the north-west of the village green) could not be excavated due to the canopy of a tree.

Trench 11

4.7.3 Trench 11 (within the north-east extent of the village green) measured 5 m by 1.5 m and was excavated to a maximum depth of 1.20 m. From the maximum excavated depth to 0.60 m below the current ground surface were a series of mixed ashy dumped deposits of stone, brick rubble, slate, coal and redeposited sandy gravel (1111 and 1103).

4.7.4 These deposits were cut by a wall foundation (1113) aligned roughly north – south and turning to the east through approximately 90 degrees at its southern end. To the east of this feature was a layer of mixed lime mortar and sand (1105), with a distinct pink colour apparently caused by heat. To the west of the wall foundation was a layer of lime mortar (1104), much whiter than 1105 and not apparently heat-affected (**Fig. 13** and **Plate 7**). It is suggested that 1113 represents a lime kiln or similar industrial structure with 1105 as its internal floor and 1104 an external surface. The robbed wall foundation was filled with another mixed dump deposit with rubble, stone, slate and coal. The in-filled foundation and layer 1105 were each cut by a posthole (1106 and 1108 respectively) the former of which retained fragments of decayed wood in its fill. Topsoil and made ground covered the whole. No datable material was recovered from Trench 11.

Trench 12

4.7.5 Trench 12 (to the north-east) measured 4.5m by 1.5m and was excavated to a maximum depth of 1.20 m, at which depth it still contained layers of modern made ground. No archaeological features were encountered.

Conclusion

4.7.6 No remains were identified of earlier waterfronts or wharves, but such may still be present at depth as it was not possible to excavate below 1.20m. All deposits and features encountered were of modern (19th century or later) date.

5 TEST PITTING

5.1 Zone 6 – Northbrook and existing Woodland

5.1.1 Twenty eight 1 m x 1 m test pits were hand-excavated in the wooded area adjacent to Mill Lane (**Fig. 14**). The test pits were positioned on the impact line of proposed flood defences. The test pitting was requested by Exeter City Council to determine the impact the proposed flood defence barrier would have on the surviving below ground features in an area of the known archaeology consisting of a) potential earlier remains associated with the medieval mill leat and the likely site of an earlier medieval mill (possibly one of those mentioned as belonging to the priory in the 13th century - see below) somewhere in the area of the later paper mills, and b) remains belonging to the later paper mill complex,

shown in the area of the proposed flood wall on the 1st edition Ordnance Survey 1:2500 map.

5.1.2 An early member of the Courtenay family, Isabella de Fortibus, Countess of Devon, constructed a stone weir around 1284-5 which led to the nearby medieval manor of La Sege or Hyneton Sege later becoming known as Wear and today as Countess Wear. Although this structure lay within the vicinity of the site the exact location is unknown.

5.1.3 The weir may have been built to power the Countess' mills, the locations of which are also unknown. The Countess' weir may have replaced an earlier timber fish weir built by Baldwin de Redvers between 1239 and 1245. Observations made of timber structures disturbed by dredging following the 1960 flood suggest a possible location for the fish weir approximately 400 m to the south of the Site. The Cluniac Priory of St. James approximately 900 m to the north-west of the Site, founded in the 12th century, also held a mill complex on the Exe. A 12th century grant makes reference to a mill, while repairs to two mills are recorded in a 13th century account. The mills were likely powered by the St. James Leat, which is fed from the St. James Weir. The St. James Leat is the same feature which was used to power the later Countess Wear Paper Mills: it borders the Site on the West. While the exact locations of these two mills are unknown, it is common for the infrastructure of earlier mills to be subsequently re-used and adapted for later mills - in this case the later paper mills immediately south of and adjacent to this site.

5.1.4 Numerous sites associated with canals running alongside the River Exe are located within or in the vicinity of the Site, as are two paper mills, a match factory and a number of lime kilns. Of particular importance are the Countess Wear Mills.

5.1.5 Due to constraints on surveying and the proximity of mature trees, dense undergrowth and areas of contamination, some of the proposed locations were moved. Test Pits moved from their original locations were relocated to an appropriate position within five metres of origin. Those in the north of the area were not excavated as they were sited too far away from the proposed flood defence lines; some of these were subsequently redeployed to evaluate alternative alignments for the flood wall to the south-west.

5.1.6 The Test Pits are summarised in **Appendix 2**.

Test pits containing features

5.1.7 **Test Pit 1** (centred on NGR 293768 092367) was excavated to a depth of 0.68 m, at which point natural geology was reached. Evidence of compacted soil layer (012) may relate to an earth bank used to retain the Mill Leat.

5.1.8 **Test Pit 4** (centred on NGR 295763 90340) was excavated to a depth of 0.86 m, at which point natural geology was reached. A ceramic drain pipe (043) was recorded at depth of 0.70 m. The pipe was orientated towards the surviving mill buildings.

5.1.9 **Test Pit 5** (centred on NGR 293767 90335) was excavated to a depth of 0.20 m where a cobbled surface and brick constructed drain were encountered. This surface is likely to be an exterior surface associated with the Mill buildings and could represent a road or yard surface (**Plate 8**).

5.1.10 **Test Pit 6** (centred on NGR 293768 90330) was excavated to a depth of 0.20 m where a concrete surface was encountered. This surface may represent an interior surface associated with the Mill.

5.1.11 **Test Pit 7.2** (centred on NGR 293767 90326) was excavated to a depth of 0.20 m where a concrete surface was encountered. This surface may represent the interior surface of a building.

5.1.12 **Test Pit 9** (centred on NGR 293764 90314) was excavated to a depth of 0.90 m. At 0.20 m a metalled surface (901) was encountered. This was removed and a further metalled surface was revealed above an iron pipe that appeared to be running toward the circular tank structures in the south east.

5.1.13 **Test Pit 10** (centred on NGR 293772 90301) was excavated to a depth of 0.30 m. At this depth a brick floor surface (104) was recorded. This floor was associated with the Mill and could have been an exterior yard surface.

5.1.14 **Test Pit 11** (centred on NGR 293750 90341) was excavated to a depth of 0.50 m and contained evidence of an earth bank used to retain the Mill Leat. Natural geology was recorded at 0.50 m.

5.1.15 **Test Pit 12** (centred on NGR 293758 90339) was excavated to a depth of 1.20 m. Several layers of demolition rubble were removed. A roughly faced limestone block wall bonded with lime mortar (1214) was recorded (**Plate 9**). Natural geology and the base of the wall were not encountered before the limit of excavation at 1.20 m was reached.

5.1.16 **Test Pit 13** (centred on NGR 293758 90331) was excavated to a depth of 0.60 m. Evidence of a trench-robbed wall [1303] (1302) was recorded (**Plate 10**); the wall had a northeast - southwest alignment and is shown on the 1880 O.S. map as a component of the mill buildings extending to the north.

5.1.17 **Test Pit 14** (centred on NGR 293735 90324) was excavated to a depth of 0.80 m. Several layers of demolition rubble were removed to reveal a cinder surface (1404) possibly a pathway associated with the mill. Natural geology was encountered at 0.80 m.

5.1.18 **Test Pit 15** (centred on NGR 293749 90319) was excavated to a depth of 0.27 m revealing a metalled surface (1504) and a brick built drain (1503). These deposits relate to buildings within the western area of a complex of buildings associated with the later mill.

5.1.19 **Test Pit 18** (centred on NGR 293740 90319) was excavated to a depth of 0.52 m. Layers of brick rubble and slate were removed to reveal a compacted metalled surface (1804) probably a pathway or yard.

5.1.20 **Test Pit 26** (centred on NGR 293750 90342) was excavated to a depth of 1.20 m. Several layers of demolition rubble were removed. Below this a roughly faced limestone block wall bonded with lime mortar (266) was recorded (**Plate 11**). Natural geology was not encountered before the limit of excavation was reached at 1.20m.

5.1.21 **Test Pit 27** (centred on NGR 293740 90370) was excavated to a depth of 0.52 m. Below the topsoil several layers of made ground were encountered containing rubble and industrial waste. A mortar floor surface (274) was encountered at 0.52 m.

5.1.22 **Test Pit 28** (centred on NGR 293752 90327) was excavated to a depth of 0.90 m. Below the topsoil several layers of made ground were encountered containing rubble and concrete.

5.1.23 **Test Pit 29** (centred on NGR 293748 90308) was excavated to a depth of 0.20 m. A compacted metalled surface (292) was encountered. This was probably a path or yard surface.

5.1.24 **Test Pit 30** (centred on NGR 293756 90310) was excavated to a depth of 0.20 m. A compacted cobbled surface (304) was encountered. This surface was a component of a probable pathway or yard surface.

Test pits containing only demolition rubble

5.1.25 **Test Pit 7** (centred on NGR 293761 90322) was excavated to a depth of 0.80 m and encountered demolition rubble.

5.1.26 **Test Pit 8** (centred on NGR 29378 90323) was excavated to a depth of 0.90 m and encountered layers of demolition.

5.1.27 **Test Pit 16** (centred on NGR 293750 90335) was excavated to a depth of 1.20 m. Several layers of demolition and made ground were recorded (**Plate 12**). Natural was not encountered.

5.1.28 **Test Pit 23** (centred on NGR 293740 90319) was excavated to a depth of 0.75 m. Below the topsoil several layers of demolition rubble were encountered. Natural was reached at 0.75 m.

Test pits without archaeological features

5.1.29 **Test Pit 2** (centred on NGR 293764 092367) was excavated to a depth of 0.60 m at which point natural geology was reached.

5.1.30 **Test Pit 3** (centred on NGR 293763 92367) was excavated to a depth of 0.86 m at which point natural geology was reached.

5.1.31 **Test Pit 17** (centred on NGR 293757 90379) was excavated to a depth of 0.45 m. Below the topsoil several layers of made ground were encountered containing 19th century waste. Natural was encountered at 0.45 m.

5.1.32 **Test Pit 22** (centred on NGR 293738 90357) was excavated to a depth of 0.75 m and encountered layers of made ground until natural geology was reached.

5.1.33 **Test Pit 24** (centred on NGR 293729 90338) was excavated to a depth of 1.10 m. Several layers of made ground containing industrial and modern rubble were encountered until natural was reached.

5.1.34 **Test Pit 25** (centred on NGR 293740 90341) was excavated to a depth of 0.66 m. Several layers of made ground containing 19th century waste were recorded. Natural was not encountered.

5.1.35 **Test Pit 19** (centred on NGR 293750 90342) was excavated to a depth 0.75 m. A layer of modern contaminated material was excavated until for health and safety reasons the location was abandoned.

Conclusion

5.1.36 The test pitting was designed to test for the survival of remains pre-dating the mill complex shown on the 1880s Ordnance Survey, and for surviving below-ground elements of that

complex. No early remains were identified on the line of the proposed flood wall (or elsewhere); numerous remains - walls, floors, and yard and path surfaces - belonging to the later mill complex were encountered. **Fig. 14** shows the relationship of these features to the test pit layout and the proposed lines of the flood defence wall.

5.1.37 A number of pits with floor surfaces appear to concentrate around the existing footpath. It's possible these surfaces represent floors and pathways around the Mill ancillary buildings. It's likely that there was a wider road aligned on the same orientation as the existing footpath. The path ran through the Mill providing access between the various processing areas.

5.1.38 Test pits 26 and 12 revealed the wall of a reservoir-like structure (**Plate 11**). This structure can be seen on the 1880s mapping. The upper courses have been robbed away and the reaming crater subsequently used as a dumping ground for domestic rubbish.

5.1.39 Test pit 13 had evidence of a robbed wall-part of a structure (**Plate 10**) that may have been a component of a north south range of buildings shown on the 1880s OS map.

6 WATCHING BRIEF

6.1 Zone 5 – Trew's Flood Relief Channel

6.1.1 The watching brief was maintained during groundworks involving the deepening of the main flood relief channel centred on NGR 292750 091080 (**Fig. 15**, **Plate 6**).

6.1.2 As groundworks involving the deepening of the main flood relief channel could not be undertaken under direct archaeological supervision due to Health and Safety requirements, it was agreed following consultations between James Goad (CH2M Hill), Ed Wilson (EA), the ECC PPMH and Wessex Archaeology that intermittent site visits would be undertaken and that only the low-flow channel would be monitored.

6.1.3 A generally uniform overlying layer sequence of topsoil above alluvial silts and gravels was exposed along the entire length of the flood relief channel. The combined thickness of these deposits averaged 3.5–4 m, with 1–1.5 m thick 20th century made ground covering the base of the channel. The watching brief exposed no significant deposits associated either with infilled former river channels, or the presence of early human activity.

7 FINDS

7.1 Introduction

7.1.1 A small quantity of artefacts was recovered during the course of the fieldwork and the results are presented by trench and test pit below.

7.2 Trenches

7.2.1 A very small quantity of finds was recovered from Trenches 3, 4 and 5, as well as a few unstratified finds. Quantities by material type and by context are given in **Table 1**. Datable finds range in date from medieval to post-medieval. Condition of the material is fair to poor; the animal bone in particular has suffered high levels of surface abrasion, and the assemblage in general is highly fragmented.

Table 1 All finds by context (number/weight in grammes)

Trench	Context	Animal bone		CBM		Clay pipe		Pottery		Other finds
		no.	*g.*	no.	*g.*	no.	*g.*	no.	*g.*	
3	304	3	*24*	3	*173*	4	*18*	-	-	14 slate
3	306	2	*32*	-	-	16	*64*	2	*52*	1 lead
3	308	-	-	1	*44*	-	-	-	-	-
3	316	4	*179*	-	-	-	-	-	-	-
3	317	-	-	-	-	2	*6*	-	-	-
4	402	-	-	-	-	1	*7*	1	*7*	1 slag
4	403	-	-	-	-	1	*3*	-	-	-
5	500	1	*49*	-	-	6	*68*	3	*120*	-
5	506	-	-	-	-	3	*10*	3	*124*	-
	U/S	-	-	-	-	1	*6*	3	*115*	-
	Totals	**10**	***284***	**4**	***217***	**34**	***182***	**12**	***418***	**-**

CBM = ceramic building material

Pottery

7.2.2 Of the 12 sherds recovered, one is medieval and the remainder post-medieval. The medieval sherd (from made ground 402 in Trench 4), a small, abraded and undiagnostic body sherd, is in a coarse fabric containing metamorphic rock inclusions; the source is likely to lie to the north or west of Exeter.

7.2.3 The 11 post-medieval sherds consist almost entirely of coarse redwares, one black-glazed and two with sgraffito decoration. There is also one sherd of Westerwald stoneware. The overall date range is likely to be 17th to early 18th century, and corresponds to that of the clay pipes (see below).

Clay tobacco pipes

7.2.4 Most of the clay pipe fragments are plain stems. One of these, from topsoil in Trench 5, appears burnt and slightly misshapen, with a glaze splash; it may be a waster from pipe-making but, as the topsoil has apparently been imported to the Site, it does not necessarily originate from nearby. Local production of clay pipes seems to have started by *c.* 1640; pipe-making is attested in the city, for example at Bartholomew Street in the late 17th/early 18th century, and a waster of a similar date has also been found closer to the Site at Shilhay (Oswald 1984).

7.2.5 Two stems are from heeled bowls of late 17th/early 18th century date, and there are three datable bowls, two from the period *c.* 1660–1680 (one from made ground 304 in Trench 3, one found unstratified), and one from the period *c.* 1690–1720/30 (Trench 5 topsoil).

Ceramic building material

7.2.6 This category includes one fragment from a medieval crested ridge tile with incised decoration (made ground 308 in Trench 3). One fragment from a stratigraphically higher made ground layer in the same trench (304) is from a modern glazed drainpipe, while the other two fragments from the same context are undiagnostic, but almost certainly post-medieval.

Animal bone

7.2.7 Despite the relatively poor condition of the animal bone, all fragments could be identified to species. Only cattle, sheep and horse are represented, and body parts comprise mostly long bones and foot bones. No butchery marks were observed.

Other finds

7.2.8 Other finds comprise a small group of roofing slate fragments from made ground 304 (medieval or post-medieval), a small fragment of lead window lighting came from make-up layer 306; and a piece of slag, probably ironworking residue, from made ground 402.

7.3 Test Pits

7.3.1 Finds were recovered in very small quantities from a number of test pits. The range is limited; all datable finds are post-medieval. Quantities by context are presented in **Table 2**.

Pottery

7.3.2 Wares represented amongst the pottery assemblage include coarse redwares (one slip-decorated), stonewares and refined wares. The latter two types are of modern date, while the two sherds of redware (TP3, layer 33; TP8, layer 83) are likely to be earlier.

7.3.3 The stonewares are mostly feldspathic-glazed containers of 19th or early 20th century date, including one complete cylindrical ribbed preserve jar with a basal stamp of W P Hartley of Aintree (Hartley's moved to Aintree from Bottle in 1896), from TP26 (topsoil 261). There is also a flat lid with a hollow cylindrical knop, with multiple perforations (TP10, layer 1012).

7.3.4 The refined wares (creamware, pearlware, whitewares, yellow ware) consist mostly of flatwares, some transfer-printed; one plate carries the stamp of the Royal Clarence Hotel (Cathedral Yard, Exeter, built in 1769).

Clay Pipe

7.3.5 A complete bowl from context 262, with a forward-drooping bowl and short spur, appears to be a Dutch pipe, identifiable through the late occurrence of milling around the rim; this pipe can be dated to the late 18th century (Atkinson 1972, 177, fig. 79, no. 26). In addition, a plain stem fragment was found in TP8 (layer 83).

Glass

7.3.6 The glass comprises four complete bottles, found together in TP26 (topsoil 261). One is a round-bottomed cylindrical beverage bottle (late 19th century), embossed with the mark C. HAM'S / CHAMPAGNE / GINGER BEER / EXETER. Charles Ham appears in trade directories as a soda water (or mineral water) manufacturer from 1893-1914, with addresses at Fore Street and Mary Arches Street in Exeter. The second is a rectangular chemists' bottle (late 19th/early 20th century), with tablespoon gradation marks, and the name MILTON & SON / EXETER; this establishment appears in the same trade directories (1893-1914), in the High Street. The third is a square brown bottle with the embossed mark AMERICAN CLOTH CLEANER, a product known from at least the 1880s. The fourth is a small, clear rectangular bottle with no marks, perhaps a bottle for scent or other toiletry item.

Metalwork

7.3.7 All metal objects are of iron. This includes three nails (TP8, layers 82 and 83), a set of dividers (TP28, concrete floor surface 286), a small handle, possibly from furniture (TP10, layer 1012), a lock mechanism and a deadbolt (both from TP27, layer 273).

Animal Bone

7.3.8 One sheep metatarsal was recovered from TP8 (layer 82), and three sheep phalanges from TP3 (layer **33**).

Other Finds

7.3.9 Other finds comprise a pantile fragment (TP22, layer 2202), two brick fragments (TP28, layer 287), and a four-hole bone button (TP3, layer 33).

Table 2 All finds by context (number/weight in grammes)

T.Pit	Context	Animal bone		CBM		Clay pipe		Pottery		Other finds
		no.	g.	no.	g.	no.	g.	no.	g.	
3	33	3	*12*	-	-	-	-	*5*	*38*	Worked bone (1)
8	82	1	*23*	-	-	-	-	-	-	Iron Obj. (2)
8	83	-	-	-	-	1	*1*	1	*2*	Iron Obj. (1)
10	1012	1	*15*	-	-	-	-	*7*	*2042*	Iron Obj. (1)
22	2202	-	-	1	*4*	-	-	1	*1*	-
26	261	-	-	-	-	-	-	2	*401*	Glass (4) 1011g
26	262	-	-	-	-	1	*2*	-	-	-
27	273	-	-	-	-	-	-	-	-	Iron Obj. (3)
28	286	-	-	-	-	-	-	-	-	Iron Obj. (1)
28	287	-	-	2	*8*	-	-	-	-	-
30	304	-	-	-	-	-	-	-	-	Iron Obj. (1)
	U/S	-	-	-	-	-	-	-	-	-
	Totals	**5**	***50***	**3**	***12***	**2**	***3***	**16**	***2484***	

CBM = ceramic building material

8 DISCUSSION, CONCLUSIONS AND ASSESSMENT OF POTENTIAL

8.1.1 Geophysical survey was employed in accessible areas with the purpose of identifying potential archaeological remains, enabling these to be targeted by trial trenching to assess their character, date and state of survival, and thus whether or not they represent a potential design constraint for the scheme, and also what if any further archaeological work may be required to mitigate the impact of the scheme.

Zone 1 – Sidings Field

8.1.2 The geophysical survey of Sidings Field had identified a number of anomalies of a possible archaeological origin (**Fig.3**) confirmed by subsequent trial trenching (Trenches 37 to 40) to be of probable fluvial origin and probable former field boundaries of post-medieval and modern date.

8.1.3 On currently available evidence, it is likely that Sidings Field has been subjected to significant disturbance. In all likelihood, this disturbance is related to the proximity of the Site to the Railway Sidings and its use for the dumping of dredging arisings over a considerable period. Recent fieldwork has demonstrated that identified anomalies are of negligible archaeological interest and, that varying levels of disturbance are prevalent on Site. The potential for surviving below ground archaeology on the Sidings Field Site is therefore assessed as **Low**.

Zone 3 – adjacent to Exe Bridge

8.1.4 Trial trenching was employed across the Scheme as both a preliminary evaluation and, as a method of calibrating the results of geophysical survey where possible. The extent and location of trial trenching adjacent to the Exe Bridge (Trench 1) was unavoidably restricted

by the presence of live services and mature trees. Trench one encountered a heavily compacted (and virtually impenetrable) horizon (**Plate 1**) below 1m of successive layers of modern made ground. As excavation ceased at this level, no finds or features relating to the causeway (or associated structures) of the historic Exe Bridge were identified.

8.1.5 Demonstrably, successive events have raised the level of the topography in this position through deposits of made ground. These accumulative events will have effectively sealed any potentially surviving below ground archaeology to a depth of at least 1m below modern ground surface. There is the possibility that any surviving below ground archaeology in this location would be undisturbed (particularly by services that are likely to occupy made ground) and in its original stratigraphic position. Archaeological remains relating to the Exe Bridge and its causeway may survive at a greater depth (possibly upwards of 3m) below the layers of made ground. As the trial trenching did not penetrate the layer of heavily compacted made ground at a depth of 1m, the potential for surviving below ground archaeology on the Site is therefore assessed as **Unknown**.

Zone 4 –Exeter Quay

8.1.6 The two trial trenches at Exeter Quay (Trenches 3 and 4) identified significant remains of cobbled surfacing overlaying successive deposits of made ground. A primary objective of the trenching in this location was to locate and identify earlier quay walls, principally the corner of the 16th century quay (in case it extended further SW than projected (see **Fig. 8**)), and the quay wall built in 1676 just west of it. An additional objective was to assess what remains survive within the footprint of the large sump chamber originally proposed in this area of the quay, in terms of previous quay surfaces and other structures. There also may be remains surviving at a greater depth than the trenches, such as of the bank or thwart weir protecting the 16th century quay, or of other remains on the river foreshore predating the 17th century reclamation of this area. Modern services and access issues prevented a trench from being sited close to the corner of the 16th century quay, although valuable inferences can be offered.

8.1.7 With the exception of modern service trenching, the stratigraphic formation of the Quay appears to have survived relatively intact. The cobbled surfacing (**Fig.10**) appears to have been sealed beneath modern made ground capped by tarmac. In turn, the cobbled surfacing overlies sequences of imported made ground that are clearly planned horizontal deposits and not a series of dumps. The sequence of imported deposits, recorded to a depth of 1.2 m during this evaluation, consisted mainly of sandy clays and riverine pebbles interspersed with layers of slate. The sequences of largely undisturbed made ground recorded during this evaluation appear to have been managed responses to the changing needs of the Quayside and may date to the extensive alterations to and expansion of the Quay in 1676 and then again in 1680-81 when the Custom House was built (see fig. 12 in Henderson 1991 and WA 2013, 34). The cobbled surfacing (**Plate 2**) is likely to date to a point after the early 18th century.

8.1.8 Trenches 3 and 4 did not encounter remains of the quay walls of the late 16th century or of 1676, although these may well lie beneath the cobbled surfaces which were not removed, and also did not encounter the water table within the depth of the evaluation limits of 1.2 m. As two phases of excavation carried out between 1985-6 and 1988-9 (WA 2013, 33) have demonstrated, the extensive sequences of stratified archaeological deposits survive up to 4m below modern ground surface. On this basis, the potential for surviving below ground archaeology on the Quay Site is therefore assessed as **Moderate** to **High**.

Zone 4 – Piazza Terracina

8.1.9 Evaluation trenching to the north of the Canal basin, adjacent to Piazza Terracina (Trench 5) identified a wall foundation (**Plate 5**) that represents the footing of the basin compound wall of *c.* 1830, a standing section of which remains adjoining the North Warehouse. The wall foundation and other elements of the 19th century were found to be sealed beneath modern deposits. The wall foundation appears to have cut undisturbed alluvial silts and gravels. On this basis, the potential for surviving below ground archaeology on the Site is therefore assessed as **Moderate** to **High**.

Zone 5 – Trew's Flood Relief Channel

8.1.10 The watching Brief carried out during works on the Trew's Flood Relief Channel (**Plate 6**) did not identify significant deposits associated with palaeochannels or the presence of early human activity.

Zone 6 – Habitat Creation Area and Exeter and Devon crematorium and the Northbrook golf course

8.1.11 Geophysical survey of the Habitat Creation Area identified anomalies likely to represent agricultural activity, former field boundaries and palaeochannels (**Fig.6**). At the time of writing, field evaluation through trial trenching has not been undertaken: based on the geophysical survey, the potential for surviving below ground archaeology on the Site is assessed as low to moderate: only (probably post-medieval) field boundaries with no indication of settlement or other enclosures; the only real potential within the palaeochannels.

8.1.12 Geophysical survey of the Exeter and Devon crematorium and the Northbrook golf course identified a number of anomalies (**Fig.7**). A proportion of the anomalies are likely to be a reflection of the activities of the crematorium and the golf course themselves however, there remains the possibility that some anomalies and trends may be of archaeological interest. At the time of writing, intrusive field evaluation (through trial trenching) of the anomalies identified has not been undertaken and as such, the potential for surviving below ground archaeology on the Site is therefore assessed as **Unknown**.

Zone 6 – Northbrook and existing Woodland

8.1.13 Test Pitting within the woodland to the SW of St James Leat and to the rear of Mill Yard, at Countess Wear, was carried out with the primary objective of identifying surviving below-ground archaeology within the corridor of proposed flood defence systems (**Fig.14**). Three distinct areas of surviving below ground archaeology were identified. Test Pits (Tp) 5, 6 and 7.2 identified hard surfaces (floors) to the south and west of the extant remnant mill structures. This would suggest that despite ongoing disturbance through illicit bottle-digging, that potentially internal floor surfaces relating to the mill survive intact. These surfaces may have sealed archaeological remains relating to earlier structures attested to within historic documentation.

8.1.14 Tp 12 (**Plate 9**) and 26 (**Plate 11**) identified surviving segments of limestone wall beneath layers of demolition rubble. The walls were identified within an area of focus for bottle-digging to the west of the extant mill structures and as such, demonstrate that there remains the potential for survival despite considerable disturbance. It is unclear as to whether the walls identified in Tp 12 and 26 are related chronologically or physically to the extant remnant mill structures, although the shared orientation and presence on the same historic mapping suggests that they are. The levels of the identified walls suggest that

they may be a sunken feature, perhaps a reservoir related to the wheel pit to the north-east.

8.1.15 Tp 9, 10, 15, 18, 27, 29 and 30 identified a concentration of hard surfaces (floors) focussed to the south and west of the extant mill structures. This may suggest that separate, outlying structures and/or hard surfaces once occupied this position (**Fig. 14**).

8.1.16 The test pitting has demonstrated that despite significant disturbance, intact structural elements do survive below ground. There remains the possibility that earlier features may lie sealed beneath the surfaces identified. In the event of the scheme going ahead, open area excavation in this location would be required to excavate and record the chronological and physical relationships between the extant and the recently identified structural elements and to excavate and record any earlier remains that will be affected by the ground works for the scheme.

8.1.17 The potential for significant and surviving below ground archaeology on this Site is therefore assessed as **Moderate** to **High**, depending on the exact route taken by the flood defences through these remains.

Zone 6 – along Mill Road, Countess Wear (Village Green)

8.1.18 Proposed trenching along Mill Road was restricted to an area known as the Village Green. Preliminary trench locations were abandoned due to a requirement for ecological consents. Within the Green area, three trenches (Trenches 10, 11 and 12) were proposed but only two (Trenches 11 and 12) were excavated. These were constrained by the presence of a large sewer running through the site and a tree canopy.

8.1.19 Trenching identified layers of modern made ground predominantly consisting of demolition rubble to a depth of at least 1.2 m. The remains of a possible lime kiln (numerous examples are known in the vicinity) were recorded within Trench 11 (**Fig.13**) the foundations of which, had been cut through the made ground (**Plate 7**). Made ground in this area may have sealed earlier archaeological remains or alternatively, may be an indicator of localised disturbance, such as the large sewer. Trench 11 did not encounter finds or features but did confirm the presence of made ground to 1.2 m. On this basis, the potential for significant and surviving below ground archaeology on the Site is **Unknown**.

9 STORAGE AND CURATION

9.1 Museum

9.1.1 It is recommended that the project archive resulting from the excavation be deposited with Royal Albert Memorial Museum. The Museum has agreed in principle to accept the project archive on completion of the project RAMM: 14/59. Deposition of any finds with the Museum will only be carried out with the full agreement of the landowners.

9.2 Archive

9.2.1 The complete Site archive, which will include paper records, photographic records, graphics, artefacts, ecofacts and digital data, will be prepared following the standard conditions for the acceptance of excavated archaeological material by Royal Albert Memorial Museum, and in general following nationally recommended guidelines (SMA 1995; CIfA 2014d; Brown 2011; ADS 2013).

9.2.2 All archive elements will be marked with the RAMM: 14/59, and a full index will be prepared.

9.2.3 The archive will be deposited within six months of the submission of the final version of this report (subject to the agreement of RAMM), unless any further phases of work are carried out, in which case the combined archives will be deposited together on completion. A digital version of this report will be made available via OASIS once it has been formally submitted in support of the planning application.

9.3 Discard policy

9.3.1 Wessex Archaeology follows the guidelines set out in Selection, Retention and Dispersal (Society of Museum Archaeologists 1993), which allows for the discard of selected artefact and ecofact categories which are not considered to warrant any future analysis. Any discard of artefacts will be fully documented in the project archive.

9.3.2 The discard of environmental remains and samples follows nationally recommended guidelines (SMA 1993; 1995; English Heritage 2002).

9.4 Copyright

9.4.1 The full copyright of the written/illustrative archive relating to the site will be retained by Wessex Archaeology Ltd under the Copyright, Designs and Patents Act 1988 with all rights reserved. The Museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use shall be non-profitmaking, and conforms to the Copyright and Related Rights regulations 2003.

9.5 Security copy

9.5.1 In line with current best practice (e.g. Brown 2011), on completion of the project a security copy of the written records will be prepared, in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

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Appendix 1: Trench Summaries

Zone 3 – adjacent to Exe Bridge

Trench 1	**Dimensions :**	2.4m by 1.6m	**Ground surface level:**	9.61–9.66 m aOD
	Centre point Coordinates (NGR):	291536 092082		
Context	Category	Description	Depth (bgl)	
100	Layer	Topsoil and turf	0–0.10	
101	Layer	Made ground: reddish sand and gravel; hogging; compacted	0.10–0.30	
102	Layer	Made ground: thin spread of reworked mid–light brown silty sand; fragments of CBM	0.30–0.35	
103	Layer	Made ground: compacted demolition debris, comprising brick, stone, tarmac, glass etc	0.35–0.75	
104	Layer	Made ground: redeposited subsoil; compact fine gravel and silty sand; mid-yellow/brown	0.75–0.95	
105	Layer	Made ground: machine compacted levelling layer of stone, CBM and clinker	0.95–1.00+	

Zone 4 –Exeter Quay

Trench 3	**Dimensions :**	12m by 2m	**Ground surface level:**	7.46–7.63 m aOD
	Centre point Coordinates (NGR):	NGR 291980 092116		
Context	Category	Description	Depth (bgl)	
301	Layer	Tarmac	0.0–0.05	
302	Layer	Hogging	0.05–0.10	
303	Layer	Levelling layer, mixed brown clay	0.10–0.15	
304	Layer	Red sandy clay with slate and mortar	0.15–0.52	
305	Layer	100% slate fragments <2 mm	0.55–0.65	
306	Layer	Grey/brown mixed soil, with large rounded cobbles, slate and mortar	0.65–0.75	
307	Layer	Grey/brown mixed soil, with cobbles, slate and mortar	0.75–1.15	
308	Layer	Red sandy clay, clean with occasional rounded pebbles	1.15–1.20	
309	Layer	Pale grey mortar, with red pebbles and occasional limestone fragments	0.55–0.60	
310	Layer	Thin lens of pale grey mixed mortar	0.82–0.85	
311	Layer	Black silty soot and ash	0.85–0.87	
312	Surface	Cobbled surface	0.50	
313	Layer	Fill of 314	-	
314	Cut	Cut of modern intrusion	-	
315	Layer	Fill of pipe trench	-	
316	Layer	Fill of drain	-	
317	Layer	Lower fill of drain	-	

Trench 4	**Dimensions :**	4.6m by 1.8	**Ground surface level:**	*7.59–7.63 m aOD*
	Centre point Coordinates (NGR):	291983 092121		
Context	Category	Description	Depth (bgl)	
401	Layer	Tarmac/hogging	0.0–0.20	
402	Layer	Made ground: mid grey/brown silty clay with rounded pebbles	0.20–0.35	
403	Layer	Made ground: red sandy clay with occasional rounded gravel	0.35–0.60	

404	Surface	Cobbled surface	0.60
405	Cut	Cut for modern services	0.60
406	Cut	Cut and fill of modern services: mid red/brown silty clay with shillet and pebbles	0.60
407	Cut	Cut and fill of modern services	0.60

Zone 5 – Piazza Terracina

Trench 5	**Dimensions :**	7.8m by 2m	**Ground surface level:**	7.60m aOD
	Centre point Coordinates (NGR):	292102 091960		
Context	Category	Description	Depth (bgl)	
500	Layer	Topsoil: mid brown silty clay	0.0–0.10	
501	Layer	Made ground: mid reddish brown silty clay	0.10–0.40	
502	Structure	Concrete structure in 503	0.45–1.20+	
503	Cut	Cut for concrete footing 502	0.45–1.20+	
504	Structure	Quay wall: NW–SE aligned wall foundation in 505	0.50–0.90	
505	Cut	Cut for wall foundation 504	0.50–0.90	
506	Layer	Demolition deposit between walls: mid red silty clay	0.45–0.62	
507	Layer	Alluvial sand and gravel	0.45–0.75	
508	Layer	Alluvial sand and gravel	0.75–1.05	
509	Layer	Alluvial sand and gravel	1.02–1.20+	
510	Layer	Alluvial sand and gravel	1.20–1.30+	
511	Layer	Made ground: mid reddish brown sandy gravel	0.45–0.75	
512	Layer	Made ground: mid reddish brown sandy gravel	0.75–1.05	

Zone 6 – along Mill Road (Village Green)

Trench 11	**Dimensions :**	5m by 1.5m by 1.2m	**Ground surface level:**	2.80 – 3.13m aOD
	Centre line Coordinates (NGR):	294055.08, 90015.77 (north-east) 294049.97, 90013.53 (south-west)		
Context	Category	Description	Depth (bgl)	
1101	Layer	Topsoil/made ground. Very dark grey to black. Contains occasional sandstone and limestone fragments <0.02m.	0.0-0.30m	
1102	Layer	Topsoil. Very dark grey to black. Contains occasional sandstone and limestone fragments <0.02m.	0.30-0.50m	
1103	Layer	Redeposited natural. Reddish brown sandy silt. Contains frequent rounded river gravels.	0.50-0.60m	
1104	Layer	External floor surface. Creamy white lime mortar with occasional limestone fragments and ceramic building materials.	0.40-0.45m	
1105	Layer	Internal floor surface. Pinkish red lime mortar and sand.	0.40-0.45m	
1106	Cut	Posthole. Circular. Filled with 1107. Cuts 1110.	0.40-0.50m	
1107	Fill	Fill of 1106. Contains fragments of wood.	0.40-0.50m	
1108	Cut	Posthole. Circular. Filled with 1109. Cuts 1105.	0.40-0.60m	
1109	Fill	Fill of 1108. Mid grey brown soil with occasional mortar.	0.40-0.60m	
1110	Fill	Fill of 1113. Backfill of wall foundation. Consists of brick rubble, stone, slate and coal in sandy matrix.	0.40-0.50m	
1111	Layer	Made ground. Mid greyish black matrix with abundant ash, stone, brick rubble, slate and coal.	0.60-1.20m	
1112	Layer	Natural. Reddish brown sandy gravel.	0.65m+	
1113	Cut	Wall foundation trench. Aligned north-south with an eastward return at the southern end.	0.40-0.50m	

Trench 12	**Dimensions :**	4.5m by 1.5m by 1.2m	**Ground surface level:**	3.56 – 3.74m aOD
	Centre line Coordinates (NGR):	294068.66, 90013.01 (north-west) 294073.23, 90011.08 (south-east)		
Context	Category	Description	Depth (bgl)	
1201	Layer	Topsoil. Dark greyish- brown silty loam.	0-0.25m	
1202	Layer	Redeposited natural. Mid pinkish brown sandy gravel with abundant small to medium sub-angular stones.	0.25-0.48m	
1203	Layer	Redeposited natural. Mid reddish pink sandy gravel. Contains brick rubble and slate.	0.48-0.60m	
1204	Layer	Backfill of modern rubble in greyish brown sandy matrix.	0.60-0.70m	
1205	Layer	Redeposited natural. Mid reddish pink sandy gravel. Contains coal and brick rubble.	0.70m-0.85m	
1206	Layer	Backfill of modern rubble in mid brownish grey sandy silt matrix. Contains sub-rounded stone, brick rubble, glass, china.	0.85m +	

Zone 1 – Sidings Field

Trench 37	**Dimensions :**	49.4m by 2m by 0.52m	**Ground surface level:**	10.87m aOD
	Centre line Coordinates (NGR):	290892.67, 94243.16 (south) 290889.39, 94273.11 (northwest) 290908.19, 94274.93 (east)		
Context	Category	Description	Depth (bgl)	
3701	Layer	Topsoil. Mid reddish brown silty clay with rare sub-angular and sub-rounded stones <.01m. Common rooting. Turf	0-0.12m	
3702	Layer	Subsoil. Mid/Pale reddish brown silty clay with very rare angular and rounded stones <.01m	0.12-0.30m	
3703	Layer	Alluvium. Pale brown silty clay with rare rounded pebbles <0.1m	0.30-0.49m	
3704	Layer	Natural. Head Deposit. Common rounded stones	0.49m	
3705	Cut	Modern cut of unknown purpose	c.1.7m deep	
3706	Fill	Backfill of modern rubbish contains brick, coal, slag and concrete.		
Note. This is an 'L' shaped trench				

Trench 38	**Dimensions :**		**Ground surface level:**	10.72m aOD
	Centre line Coordinates (NGR):	290889.64, 94174.86 (northeast) 290853.72, 94141.25 (southwest)		
Context	Category	Description	Depth (bgl)	
3801	Layer	Topsoil. Mid brown silty clay, with no inclusions visible. Common rooting. Turf	0-0.15m	
3802	Layer	Subsoil. Mid reddish brown, silty clay with no inclusions visible.	0.15-0.40m	
3803	Layer	Alluvium. Mid reddish brown silty clay, with no inclusions visible and common manganese inclusions	0.40-0.76m	
3804	Layer	Natural. Pale reddish brown silty clay with no inclusions visible. Occasional patches of orange/ yellow natural. Occasional manganese inclusions. At 33.7m head deposit present	0.76m +	
Note: A sondage to 1.2m in depth at eastern end of trench was dug, but head deposit was not present				

Trench 39	**Dimensions :**		**Ground surface level:**	10.93m aOD
	Centre line Coordinates (NGR):	290867.19, 94093.63 (southwest) 290886.63, 94114.69 (north) 290904.54, 94098.76 (southeast)		
Context	Category	Description	Depth (bgl)	
3901	Layer	Topsoil. Mid brown silty clay with rare sub-rounded stones <0.01m. Common rooting. Turf	0-0.10m	
3902	Layer	Subsoil. Mid / Dark silty reddish brown clay with occasional sub-rounded stone inclusions <0.03m	0.10-0.44m	
3903	Layer	Alluvium. Pale brown silty clay with rare sub-rounded stone inclusions <0.10m and occasional manganese inclusions	0.44-0.60m	
3904	Layer	Natural. Changeable from head deposit to pale brown silty clays		
Note. This is an 'L' shaped trench				

Trench 40	**Dimensions :**	49.4m by 2m by 0.52m	**Ground surface level:**	10.86 aOD
	Centre line Coordinates (NGR):	290885.34, 94043.59 (northwest) 290918.88, 94005.35 (southeast)		
Context	Category	Description	Depth (bgl)	
4001	Layer	Topsoil. Mid brown silty clay, with no inclusions visible. Common rooting. Turf	0-0.12m	
4002	Layer	Subsoil. Mid greyish brown silty clay with rare/occasional rounded stone inclusions <0.10m	0.12-0.30m	
4003	Layer	Natural. Pale brown silty clay with a band of head deposit running through it at the southern end of the trench. Becomes more sandy towards the NW end of the trench	0.30m +	

Appendix 2; Test Pit Summaries

Test Pit 1			
Dimensions: 1.00 x 1.00m	Max. depth: 0.68m	Ground level: 4.74m aOD	
Easting: 293768.67	Northing: 90367.62		
Context	Description		Depth (m)
11	*Topsoil*	Dark grey-brown sandy loam 2% with sub-rounded river gravel, <1-3cm. Loose heavily rooted.	0.00-0.20m
12	*Layer*	Mid grey-brown silty clay loam with brick slate and rubble. 5%, sub-angular - sub-rounded river gravels, <1-6cm. Fairly compact.	0.20-0.40m
13	*Layer*	Orangey yellow sandy clay with 5% sub-rounded river gravels occasional limestone fragments <0.10m	0.32- - 0.41m
14	*Layer*	Orangey yellow sandy clay with 2% sub-rounded river gravels <0.01m and occasional angular limestone fragments <0.07m	0.41m – 0.68m
15	*Natural*	Natural geology. Pale yellow-orange sandy gravel compact 2% sub-angular pebbles, <0.8cm.	0.68m

Test Pit 2			
Dimensions: 1.00 x 1.00m	Max. depth: 0.60m	Ground level: 4.59m - aOD	
Easting: 293764.40	Northing:90361.37		
Context	Description		Depth (m)
21	*Topsoil*	Dark grey-black sandy loam. 2% with sub-angular gravel sub-rounded pebbles, <1-3cm. Loose heavily rooted.	0.00-0.20 bgl
22	*Layer*	Mid grey-brown silty clay with brick slate and rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Fairly compact.	0.20-0.40 bgl
23	*Layer*	Orangey brown sandy clay with 5% sub-rounded river gravels <0.01m.	0.40- - 0.60m
24	*Natural*	Natural geology. Reddy brown sandy gravel with rounded river gravels, <1-8cm compact.	0.60m

Test Pit 3			
Dimensions: 1.00 x 1.00m	Max. depth: 0.86m	Ground level: 4.62m aOD	
Easting: 293763.67	Northing: 903437.26		
Context	Description		Depth (m)
31	*Topsoil*	Dark brown sandy loam. 2% with sub-angular gravel sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.31m
32	*Layer*	Dark grey-brown sandy clay with slate and rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. compact.	0.31-0.49m
33	*Layer*	Orangey brown sandy clay with 5% sub-rounded river gravels <0.01m.	0.49-0.86m
34	*Natural*	Natural geology. Reddy brown sandy gravel with rounded river gravels, <0.08cm compact.	0.86m

Test Pit 4			
Dimensions: 1.00 x 1.00m	Max. depth: 0.60m	Ground level: 4.16m aOD	
Easting:293763.65	Northing:90340.70		
Context	Description		Depth (m)
41	*Topsoil*	Dark brown sandy loam. 2% with sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.30m
42	*Layer*	Orangey brown sandy clay with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Fairly compact.	0.30-0.60m
43	*Layer*	Mid brown sandy clay with slate and rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Fairly compact. In-situ ceramic pipe.	0.30-0.60m
44	*Natural*	Natural geology. Reddy brown sandy gravel with rounded river gravels, <1-8cm compact.	0.60m

Test Pit 5		
Dimensions: 1.00 x 1.00m	Max. depth: 0.30m	Ground level: 04.76m aOD

Easting: 293767.63		Northing: 90335.40	
Context	Description		Depth (m)
51	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.30m
52	*Layer*	Pale grey brown sandy clay with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. .	0.30-0.60m
53	*Layer*	Cobbled surface comprising roughly coursed rounded river gravels <0.08m	0.60m

Test Pit 6			
Dimensions: 1.00 x 1.00m	Max. depth: 0.20m	Ground level: 04.34m aOD	
Easting: 293768.49		Northing: 90330.87	
Context	Description		Depth (m)
61	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.10m
62	*Layer*	Greyish brown sandy clay with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Compact.	0.10-0.20m
63	*Layer*	Cobbled surface comprising roughly coursed rounded and elongated river pebbles <0.08m	0.20m

Test Pit 7			
Dimensions: 1.00 x 1.00m	Max. depth: 0.20m	Ground level: 04.53m aOD	
Easting: 293768.49		Northing: 90330.87	
Context	Description		Depth (m)
71	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.10m
72	*Layer*	Greyish brown sandy clay with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Compact.	0.10-0.20m
73	*Layer*	Grey brown concrete Floor service.	0.20m

Test Pit 7.1			
Dimensions: 1.00 x 1.00m	Max. depth: 0.80m	Ground level:04.44m aOD	
Easting: 293761.56		Northing: 90322.88	
Context	Description		Depth (m)
75	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.50m
76	*Layer*	Mid brown sandy clay with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-6cm. Compact.	0.50-0.80m
77	*Layer*	Grey brown concrete Floor surface.	0.80m

Test Pit 8			
Dimensions: 1.00 x 1.00m	Max. depth: 0.90m	Ground level: 3.89m aOD	
Easting: 29378.72		Northing: 90323.80	
Context	Description		Depth (m)
81	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.28m
82	*Layer*	Greyish brown mortar with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-8cm. Compact.	0.28-0.37m
83	*Layer*	Mid brown sandy clay with moderate angular gravel fragments < 0.05m	0.37–0.68m
84	*Layer*	Light orangey brown sandy clay with moderate angular gravel fragments < 0.05m	0.68–0.90m
85	*Natural*	Light yellowy brown sandy clay with moderate angular gravel fragments < 0.05m and occasional rounded river gravel <0.05m	0.90m

est Pit 9			
Dimensions: 1.00 x 1.00m	Max. depth: 0.90m	Ground level: 04.10m aOD	
Easting: 293764.81		Northing: 90314.28	
Context	Description		Depth (m)

91	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.28m
92	*Layer*	Greyish brown mortar with slate and brick rubble. 2% sub-angular - sub-rounded gravel, <1-8cm. Compact.	0.28-0.37m
93	*Layer*	Mid brown sandy clay with moderate angular gravel fragments < 0.05m	0.37– 0.68m
94	*Layer*	Light orangey brown sandy clay with moderate angular gravel fragments < 0.05m	0.68 – 0.90m
95	*Natural*	Light yellowy brown sandy clay with moderate angular gravel fragments < 0.05m and occasional rounded river gravel <0.05m	0.90m

Test Pit 10			
Dimensions: 1.00 x 1.00m		Max. depth: 0.31m	Ground level:03.93m aOD
Easting: 293772.17		Northing: 90301.85	
Context	Description		Depth (m)
1011	*Topsoil*	Dark brown sandy loam. 2% sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.17m
1012	*Layer*	Mid brown sandy clay. 2% sub-angular - sub-rounded gravel, <1-8cm. Compact.	0.17-0.26m
1013	*Layer*	Grey brown sandy clay demolition rubble with moderate angular gravel fragments < 0.05m	0.26-0.31m
1014	*Layer*	Very dark grey brown Brick floor surface	0.31m

Test Pit 11			
Dimensions: 1.00 x 1.00m		Max. depth: 1.10m	Ground level: 04.62m aOD
Easting: 293750.49		Northing: 90341.44	
Context	Description		Depth (m)
1111	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.20
1112	*Layer*	Reddy brown gravely clay demolition rubble with moderate sub-rounded gravel fragments < 0.05m	0.17-0.50m
1113	*Natural*	Mid brown silty clay. 2% sub-angular - sub-rounded gravel, <1-8cm. Compact.	0.20-0.17m
1114	*Cut*	Cut linear with steep sides and horizontal base.	0.50-1.10m
1115	*Fill*	Fill of Linear mid greyish brown silty clay rounded pebbles and sub rounded gravels.	0.50-1.10m

Test Pit 12			
Dimensions: 2.00 x 1.00m		Max. depth: 1.10m	Ground level: 04.16m aOD
Easting: 293758.58		Northing: 90339.54	
Context	Description		Depth (m)
1211	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.20m
1212	*Layer*	Mid to dark brown gravely clay demolition rubble with moderate sub-rounded gravel fragments < 0.05m	0.17-0.50m
1213	*Layer*	Dark reddy orange silty sand with sub angular gravel demolition rubble.	0.50 1.10m
1214	*Wall*	Roughly faced limestone block wall bonded with lime mortar	0.50 1.10m
1215	*Cut*	Cut of wall un excavated	0.50 1.10m

Test Pit 13			
Dimensions: 1.00 x 1.00m		Max. depth: 1.2m	Ground level: 04.20m aOD
Easting: 2937858.72		Northing: 90331.89	
Context	Description		Depth (m)
1301	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded pebbles, <1-5cm. Loose heavily rooted.	0.00-0.20m
1302	*Fill*	Fill of robber trench mid brown silty sand sub angular sub rounded gravel.	0.20–0.60m
1303	*Cut*	Cut of robber trench north east south west orientation with steep sides and a flat base.	0.07-0.43m
1304	*Layer*	Brownish cream mortar demolition rubble with moderate sub-rounded	0.19–4.0m

		limestone fragments < 0.10m	
1305	*Layer*	Dark red clayey mortar angular gravel.	0.40-0.50m
1306	*Layer*	Whitish grey compacted mortar floor surface	
1307	*Layer*	Orange brown silty sand with sub rounded stones and rubble fragments	0.50–0.57m
1308	*Layer*	Brownish orange silty clay with occasional angular gravel <0.05m	0.40-0.60m

Test Pit 14			
Dimensions: 1.00 x1.00m		Max. depth: 1.2m	Ground level: 03.71m aOD
Easting: 293735.77		Northing: 90324.85	
Context	Description		Depth (m)
1401	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00-0.20
1402	*Layer*	Reddish brown clayey silt rubble with moderate sub-rounded gravel fragments < 0.10m	0.20 – 30m
1403	*Layer*	Dark red clayey mortar angular gravel.	0.30m-0.50m
1404	*Layer*	Black compacted cinder floor surface	
1405	*Layer*	Reddy orange brown silty sand with sub rounded stones and rubble fragments	0.42–0.45m
1406	*Layer*	Off white layer of lime mortar	0.51–0.55m
1407	*Layer*	Reddy orange brown silty sand with sub rounded gravels	0.51m-0.55m
1408	*Layer*	Mid greyish brown silty clay	0.80m

Test Pit 15			
Dimensions: 1.00 x 1.00m		Max. depth: 0.27m	Ground level: 03.54m aOD
Easting: 293749.91		Northing: 90319.97	
Context	Description		Depth (m)
1501	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.10m
1502	*Layer*	Mid grey brown clayey silt rubble with moderate sub-rounded gravel fragments < 0.10m	0.10m-0.27m
1503	*Layer*	Brick constructed drain	0.27m
1504	*Layer*	Dark grey black compacted metaled floor surface	0.27m

Test Pit 16			
Dimensions: 1.00 x 1.00m		Max. depth: 1.2m	Ground level:04.44m aOD
Easting: 293750.82		Northing: 90335.82	
Context	Description		Depth (m)
1601	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00-0.30m
1602	*Layer*	Reddish brown clayey sandy clay with rubble with moderate sub-rounded gravel fragments < 0.10m	0.30-0.70m
1603	*Layer*	Dark red clayey mortar angular gravel.	0.70-0.92m
1604	*Layer*	Black compacted cinder floor surface	0.92m-1.08m
1605	*Layer*	Reddy orange brown silty sand with sub rounded stones and rubble fragments	1.08m–1.20m

Test Pit 17			
Dimensions: 1.00 x 1.00m		Max. depth: 0.27m	Ground level: 04.50m aOD
Easting:293757.36		Northing: 90379.26	
Context	Description		Depth (m)
1701	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m-0.20m
1702	*Layer*	Mid grey brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.20m-0.45m
1703	*Natural*	Orangey brown clay gravel with occasional rounded pebbles	0.45

Test Pit 18			
Dimensions: 1.00 x 1.00m	Max. depth: 0.27m	Ground level: 04.67m aOD	
Easting: 293740.45	Northing: 90319.26		
Context	Description		Depth (m)
1801	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m-0.20m
1802	*Layer*	Mid grey brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.20m–0.45m
1803	*Natural*	Dark grey black compacted metaled floor surface	0.45

Test Pit 19			
Dimensions: 1.00 x1.00m	Max. depth: 0.27m	Ground level: 04.62m aOD	
Easting: 293750.55	Northing: 90342.55		
Context	Description Trench abandoned		Depth (m)
261	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m – 0.60m
262	*Layer*	Mid greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. Heavily contaminated, trench abandoned.	0.60m – 0.75m

Test Pit 20			
Dimensions: 1.00 x1.00m	Max. depth	Ground level	
Easting:	Northing:		
Context	Description Not Excavated		Depth (m)

Test Pit 21			
Dimensions: 1.00 x 1.00m	Max. depth	Ground level	
Easting:	Northing:		
Context	Description Not Excavated		Depth (m)

Test Pit 22			
Dimensions: 1.00 x 1.00m	Max. depth 0.75	Ground level: 04.74m	
Easting: 293738.78	Northing: 90357.19		
Context	Description		Depth (m)
2201	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m-0.32m
2202	*Layer*	Dark reddish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.32m-0.44m
2203	*Layer*	Dark reddish brown clayey silty sand with moderate sub-rounded gravel fragments < 0.10m.	0.44m–0.70m
2204	*Natural*	Brownish red sandy clay gravel fragments <0.05m	0.70–0.75m

Test Pit 23			
Dimensions: 1.00 x 1.00m	Max. depth: 0.27m	Ground level: 04.71m aOD	
Easting: 293745.35	Northing: 90357.71		
Context	Description		Depth (m)
231	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m-0.22m
232	*Layer*	Greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.22m-0.34m
233	*Layer*	Whitish grey mortar	0.14m-0.24m
234	*Layer*	Reddish brown sandy clay	0.24m-0.40m
235	*Layer*	Mid reddish brown sandy silt	0.40-0.70m
236	*Natural*	Mid reddish brownish red sandy clay with sub rounded flat pebbles <1%	0.70–0.75m

Test Pit 24			
Dimensions: 1.00 x 1.00m	Max. depth: 0.27m	Ground level: 03.98m aOD	
Easting: 293729.39	Northing: 90338.41		
Context	Description		Depth (m)
241	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.25m
242	*Layer*	Greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.25m–0.40m
243	*Layer*	Mid brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm lenses of mortar and abundant rubble.	0.40m–0.55m
244	*Layer*	Brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm lenses of mortar and abundant rubble.	0.50m
245	*Layer*	Mid reddish brown sandy silt	0.55m-90m
246	*Layer*	Black angular soot ash and cinders lenses of mortar and abundant rubble.<0.05m	0.70–0.75m
247	*Layer*	Reddish brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm lenses of mortar and abundant rubble.	0.95m
248	*Natural*	Reddish brown clayey silts frequent sub rounded angular gravels	0.95m-1.10m

Test Pit 25			
Dimensions: 1.00 x 1.00m	Max. depth: 0.27m	Ground level: 04.42m aOD	
Easting:293740.74	Northing: 90341.71		
Context	Description		Depth (m)
251	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.35m
252	*Layer*	Mid yellow brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.35m–0.53m
253	*Natural*	Orangey brown clayey silt with moderate sub-rounded gravel fragments < 0.10m.	0.53m–0.66m

Test Pit 26			
Dimensions: 2.00 x1.00m	Max. depth: 0.27m	Ground level: 05.32 aOD	
Easting: 293749.55	Northing: 90342.55		
Context	Description		Depth (m)
261	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.60m
262	*Layer*	Mid greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.60m–0.75m
263	*Layer*	Orangey brown clayey silt with moderate sub-rounded gravel fragments < 0.10m.	0.75m–0.90m
264	*Natural*	Yellowy brown silty clay natural with moderate angular flint and gravel fragments	0.90m–1.2m
265	*Cut*	Cut of large rectangular pit	1.40m
266	*Stone wall*	Large dry stone wall individual limestone blocks 0.25m X 0.25m	1.40m

Test Pit 27			
Dimensions: 1.00 x1.00m	Max. depth: 0.27m	Ground level:03.72m aOD	
Easting: 293740.13	Northing:90370.38		
Context	Description		Depth (m)
271	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.27m
272	*Layer*	Mid greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m. heavily rooted	0.27m–0.30m
273	*Layer*	Orangey brown clayey silt with moderate sub-rounded gravel frags < 0.10m.	0.30m–0.46m
274	*Layer*	Pinkish grey white compacted mortar surface.	0.46m–

			0.52m

Test Pit 28			
Dimensions: 1.00 x1.00m		Max. depth: 0.27m	Ground level: 03.99m aOD
Easting: 293752.47		Northing: 90327.76	
Context	Description		Depth (m)
281	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.28m
282	*Layer*	Mid dark greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m and brick rubble.	0.28m–0.42m
283	*Layer*	Concrete slab	0.42m–0.50m
284	*Layer*	Brick and mortar rubble	0.50m–0.65m
285	*Layer*	Mid reddish brown sandy silt	0.55m–0.63m
286	*Layer*	Concrete floor surface	0.63–0.82m
287	*Layer*	Reddish brown sandy gravel, sub-angular gravel and sub-rounded gravels	0.82m–0.90m
288	*Layer*	Yellowish brown clayey silty clay with sub-rounded pebbles >2%	0.90m-0.95m

Test Pit 29			
Dimensions: 1.00 x1.00m		Max. depth: 0.27m	Ground level: 03.78 aOD
Easting: 293748.47		Northing: 90308.84	
Context	Description		Depth (m)
291	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.20m
292	*Layer*	Mid dark greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m and brick rubble.	0.20m

Test Pit 30			
Dimensions: 1.00 x1.00m		Max. depth: 0.27m	Ground level: 03.84 aOD
Easting: 293756.75		Northing: 90310.27	
Context	Description		Depth (m)
301	*Topsoil*	Dark brown sandy loam, sub-angular gravel and sub-rounded gravels, <1-5cm. Loose heavily rooted.	0.00m–0.13m
302	*Layer*	Mid dark greyish brown clayey silt with moderate sub-rounded gravel fragments < 0.10m and brick rubble.	0.13m–0.17m
303	*Layer*	Tarmac	0.17m–30m
304	*Layer*	Cobbled surface	0.30m

Appendix 3: SURVEY EQUIPMENT AND DATA PROCESSING

Survey Methods and Equipment

The magnetic data for this project was acquired using a Bartington 601-2 dual magnetic gradiometer system. This instrument has two sensor assemblies fixed horizontally 1 m apart allowing two traverses to be recorded simultaneously. Each sensor contains two fluxgate magnetometers arranged vertically with a 1 m separation, and measures the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03nT over a ±100nT range, and measurements from each sensor are logged at intervals of 0.25 m. All of the data are stored on an integrated data logger for subsequent post-processing and analysis.

Wessex Archaeology undertakes two types of magnetic surveys: scanning and detail. Both types depend upon the establishment of an accurate 20 m or 30 m site grid, which is achieved using a Leica Viva RTK GNSS instrument and then extended using tapes. The Leica Viva system receives corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02 m in real-time and therefore exceed the level of accuracy recommended by English Heritage (2008) for geophysical surveys.

Scanning surveys consist of recording data at 0.25 m intervals along transects spaced 10m apart, acquiring a minimum of 80 data points per transect. Due to the relatively coarse transect interval, scanning surveys should only be expected to detect extended regions of archaeological anomalies, when there is a greater likelihood of distinguishing such responses from the background magnetic field.

The detailed surveys consist of 20 m x 20 m or 30 m x 30 m grids, and data are collected at 0.25 m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20 m or 30 m grid respectively, and are the recommended methodologies for archaeological surveys of this type (EH, 2008).

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125 m intervals along traverses spaced up to 0.25 m apart, resulting in a maximum of 28800 readings per 30 m grid, exceeding that recommended by English Heritage (2008) for characterisation surveys.

Post-processing

The magnetic data collected during the detail survey are downloaded from the Bartington system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

As the scanning data are not as closely distributed as with detailed survey, they are georeferenced using the GPS information and interpolated to highlight similar anomalies in adjacent transects. Directional trends may be removed before interpolation to produce more easily understood images.

Typical data and image processing steps may include:

- Destripe – Applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- Destagger – Shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- Despike – Filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data)

Typical displays of the data used during processing and analysis:

- XY Plot – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies.

- Greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

Appendix 4: Geophysical interpretation

The interpretation methodology used by Wessex Archaeology separates the anomalies into four main categories: archaeological, modern, agricultural and uncertain origin/geological.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- Archaeology – used when there is a clear geophysical response and anthropogenic pattern.
- Probable archaeology – used for features which give a clear response but which form incomplete patterns.
- Possible archaeology – used for features which give a response but which form no discernible pattern or trend.

The modern category is used for anomalies that are presumed to be relatively modern in date:

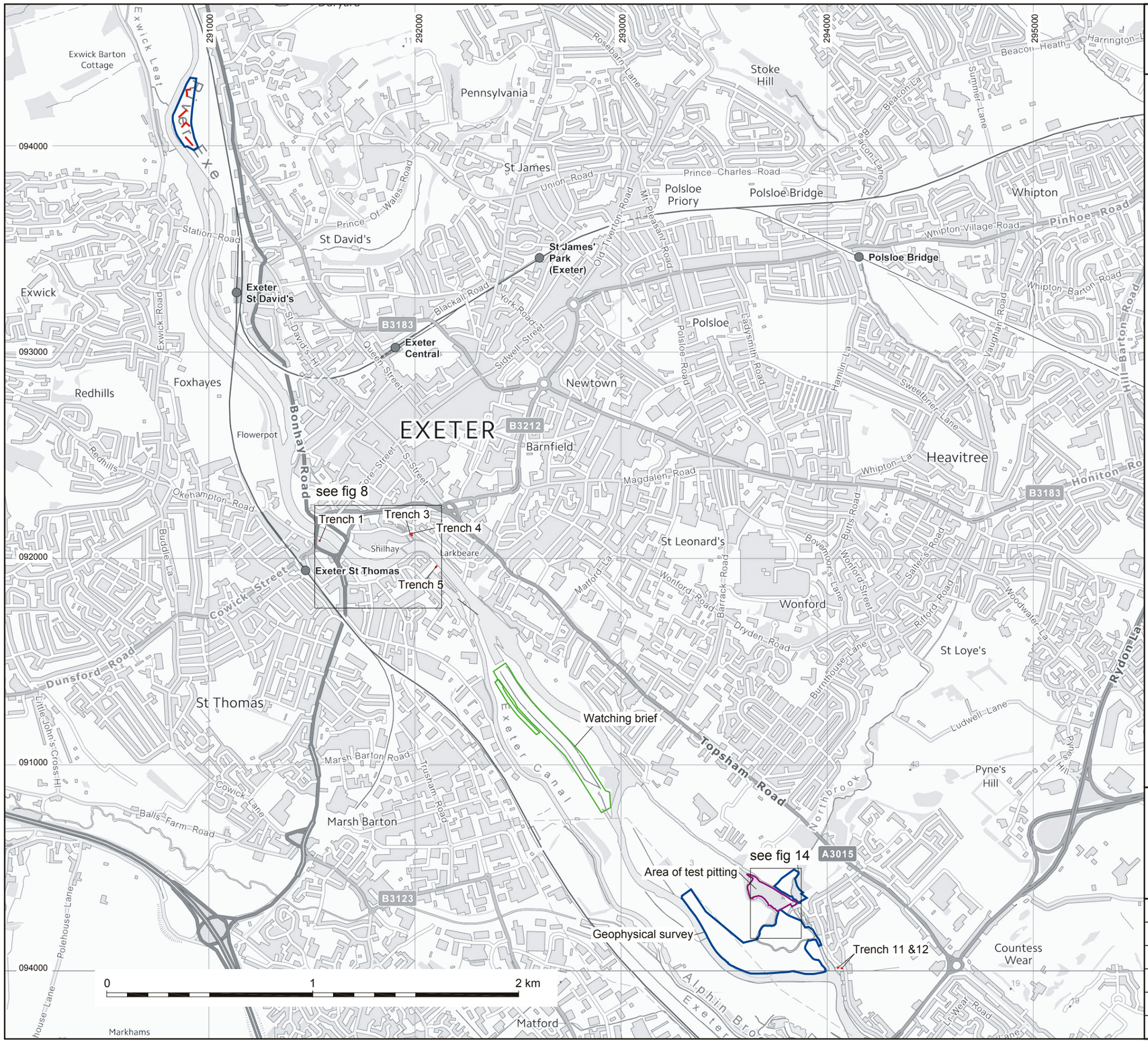
- Ferrous – used for responses caused by ferrous material. These anomalies are likely to be of modern origin.
- Modern service – used for responses considered relating to cables and pipes; most are composed of ferrous/ceramic material although services made from non-magnetic material can sometimes be observed.

The agricultural category is used for the following:

- Former field boundaries – used for ditch sections that correspond to the position of boundaries marked on earlier mapping.
- Agricultural ditches – used for ditch sections that are aligned parallel to existing boundaries and former field boundaries that are not considered to be of archaeological significance.
- Ridge and furrow – used for broad and diffuse linear anomalies that are considered to indicate areas of former ridge and furrow.
- Ploughing – used for well-defined narrow linear responses, usually aligned parallel to existing field boundaries.
- Drainage – used to define the course of ceramic field drains that are visible in the data as a series of repeating bipolar (black and white) responses.

The uncertain origin/geological category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- Increased magnetic response – used for areas dominated by indistinct anomalies which may have some archaeological potential.
- Trend – used for low amplitude or indistinct linear anomalies.
- Superficial geology – used for diffuse edged spreads considered to relate to shallow geological deposits. They can be distinguished as areas of positive, negative or broad bipolar (positive and negative) anomalies.



Trench location

Area of watching brief

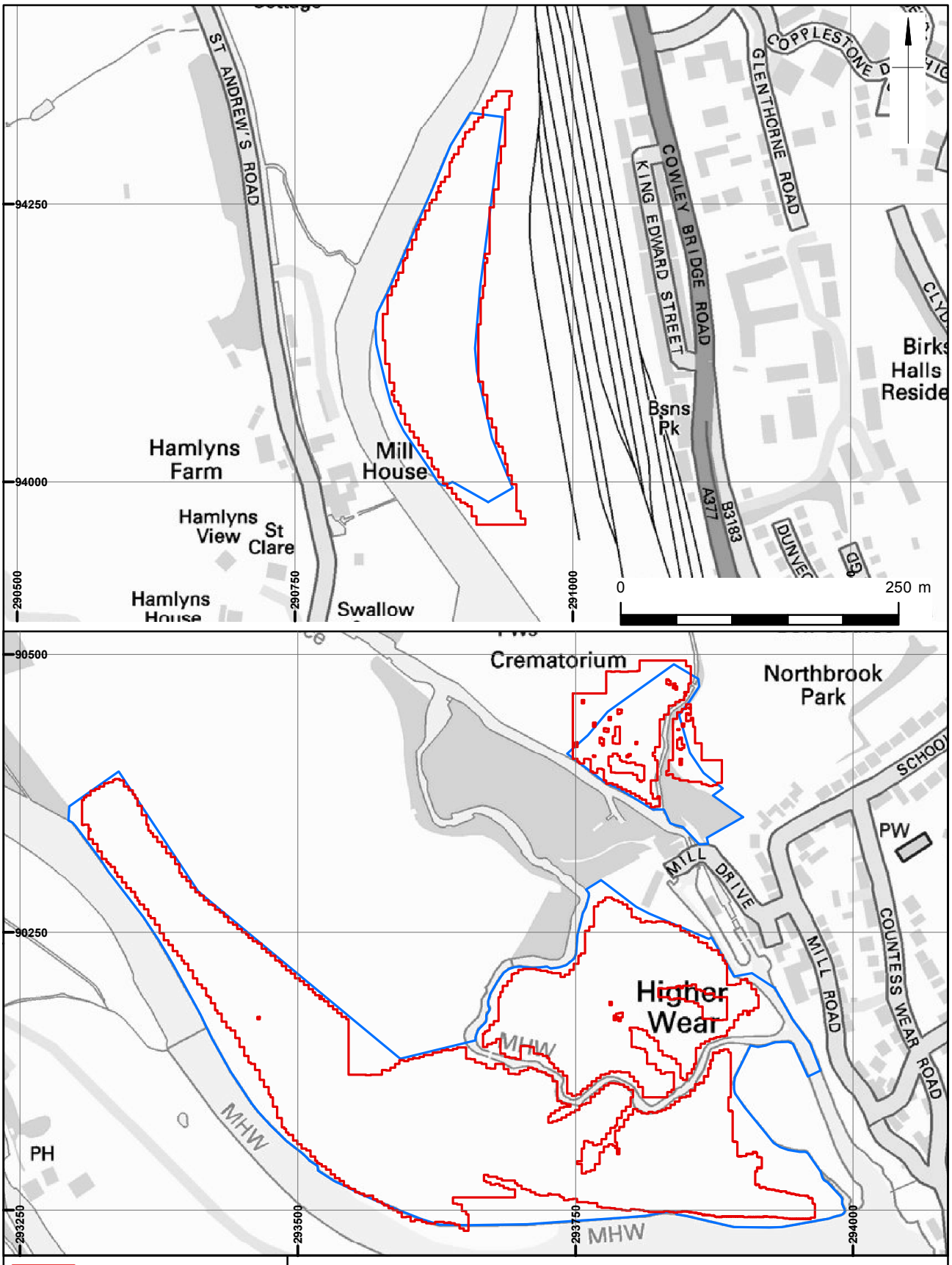
Geophysical survey site boundary

Test pitting area

Date:	05/03/2015
Revision Number:	1
Scale:	1:8000 @ A3
Illustrator:	SEJ/KMN
Path:	X:\PROJECTS\105800\GO\Rep figs_RoundUpReport\2015_01_21

Scheme location, with locations of geophysical survey areas, evaluation trenches, test pits and watching brief areas

Figure 1



Detailed Survey Extents

Site Boundary

Date:	21/01/2015	Revision Number:	0
Scale:	1:5000 at A4	Illustrator:	KMN
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Gradiometer survey extents

Figure 2

290800
290900
291000
94300
94200
94100
94000
93900
+3nT
-2nT
+25nT
-25nT
4002
4003
4001
4000
4004
N

Archaeological Features
- Possible Archaeology

Modern Features
- Modern Service
- Coherent Ferrous
- Ferrous

Uncertain Origin
- Increased Magnetic Response
- Trend

Geological Features
- Superficial Geology
- Palaeochannel

Agricultural Features
- Former Field Boundary
- Agricultural
- Ploughing

Background
- Detailed Survey Extents

0 100 m

Date:	21/01/2015	Revision Number:	0
Scale:	1:2000 at A3	Illustrator:	RDL/KMN
Path:	X:\PROJECTS\105800\Graphics_Office\Rep figs_RoundUpReport\2015_01_21		

Sidings field survey area: greyscale plot, XY trace plot and interpretation

Figure 3

293300
293400
293500
293600
293700
293800
293900
90400
90300
90200
90100
90000
+3nT
-2nT
0
100 m
Detailed Survey Extents

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Scale:	1:2000 at A3	Illustrator:	RDL/KMN
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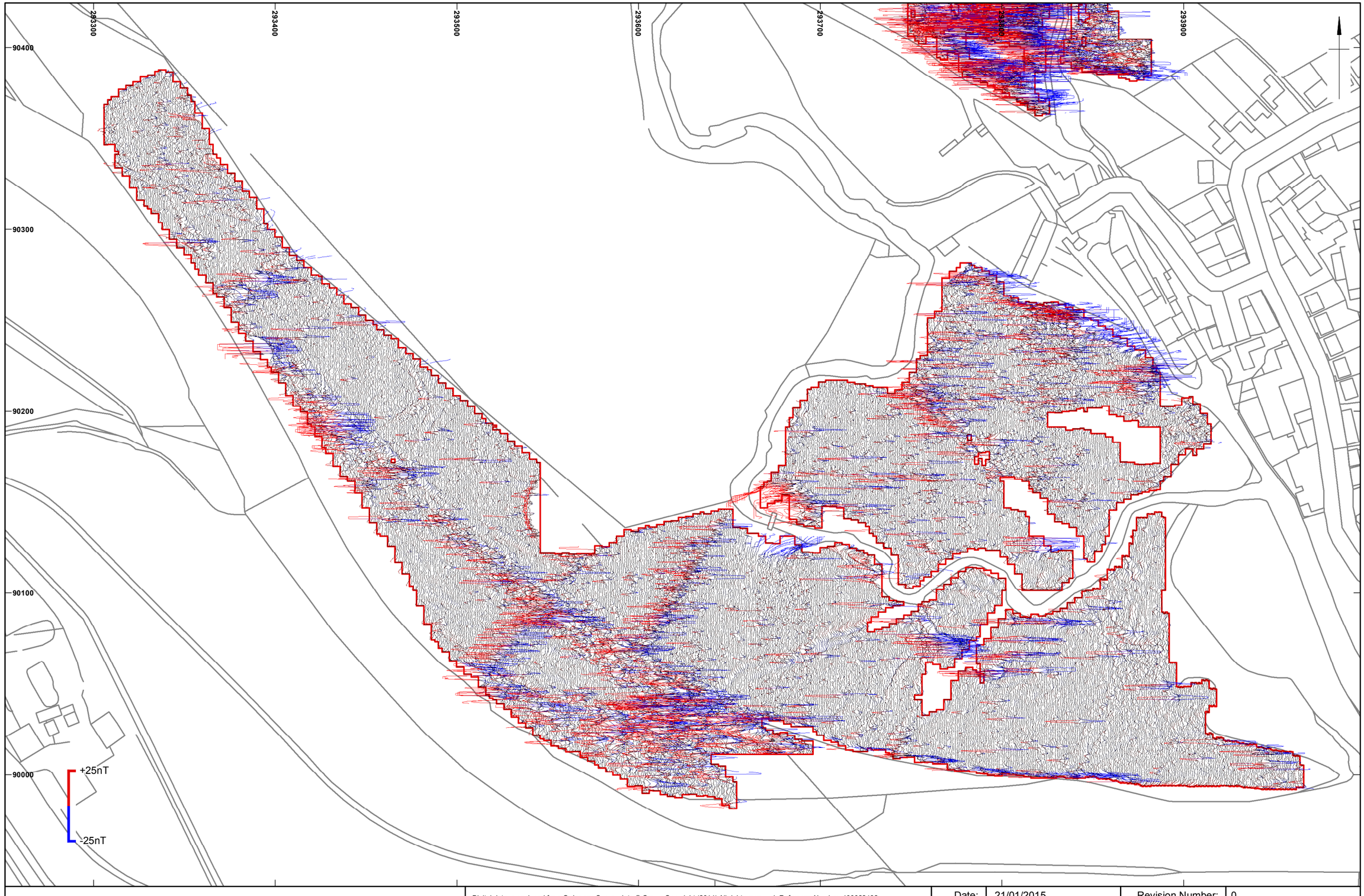
Habitat Creation Area survey area: greyscale plot

Figure 4



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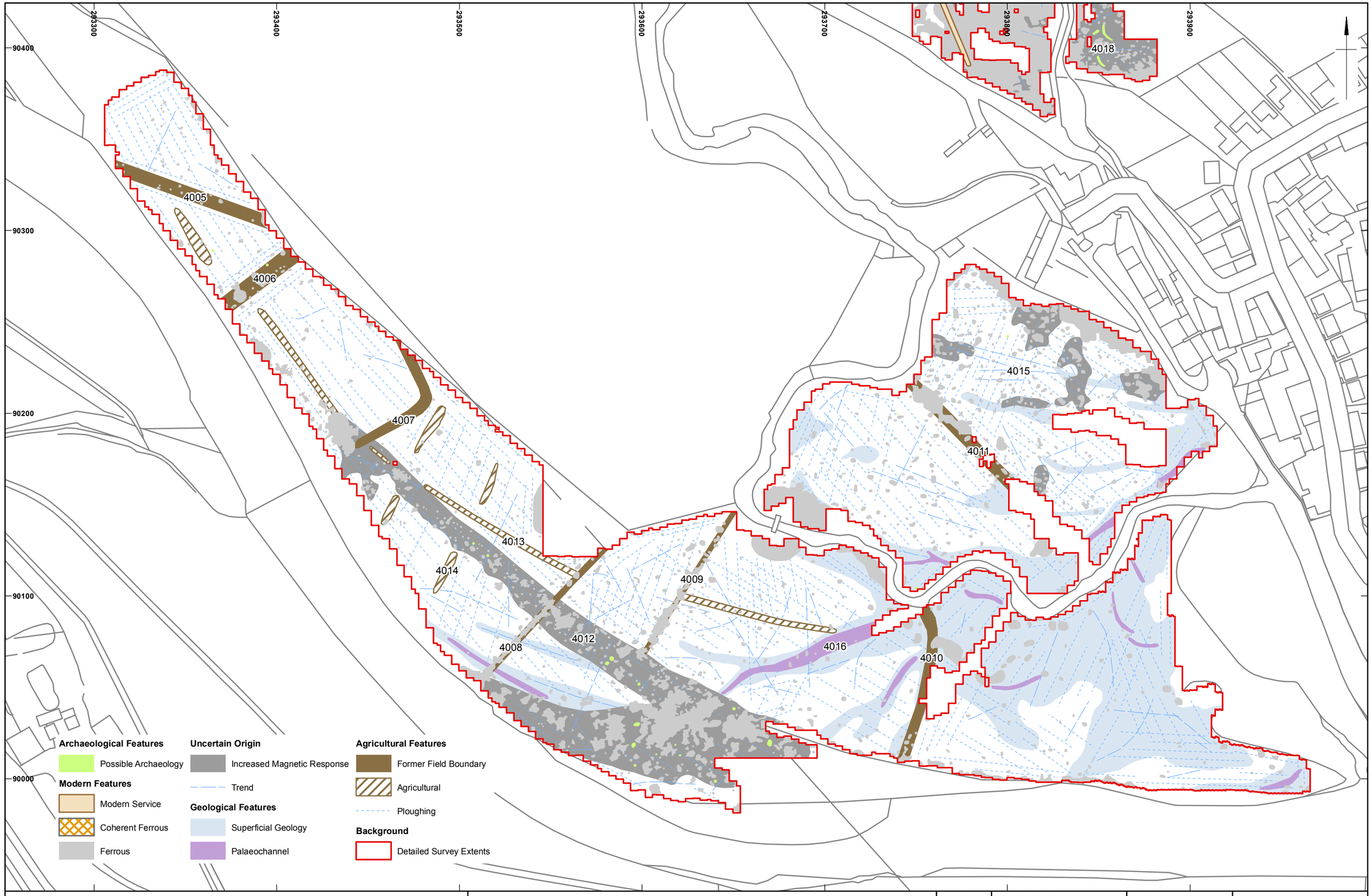
Habitat Creation Area survey area: XY trace plot

Figure 5



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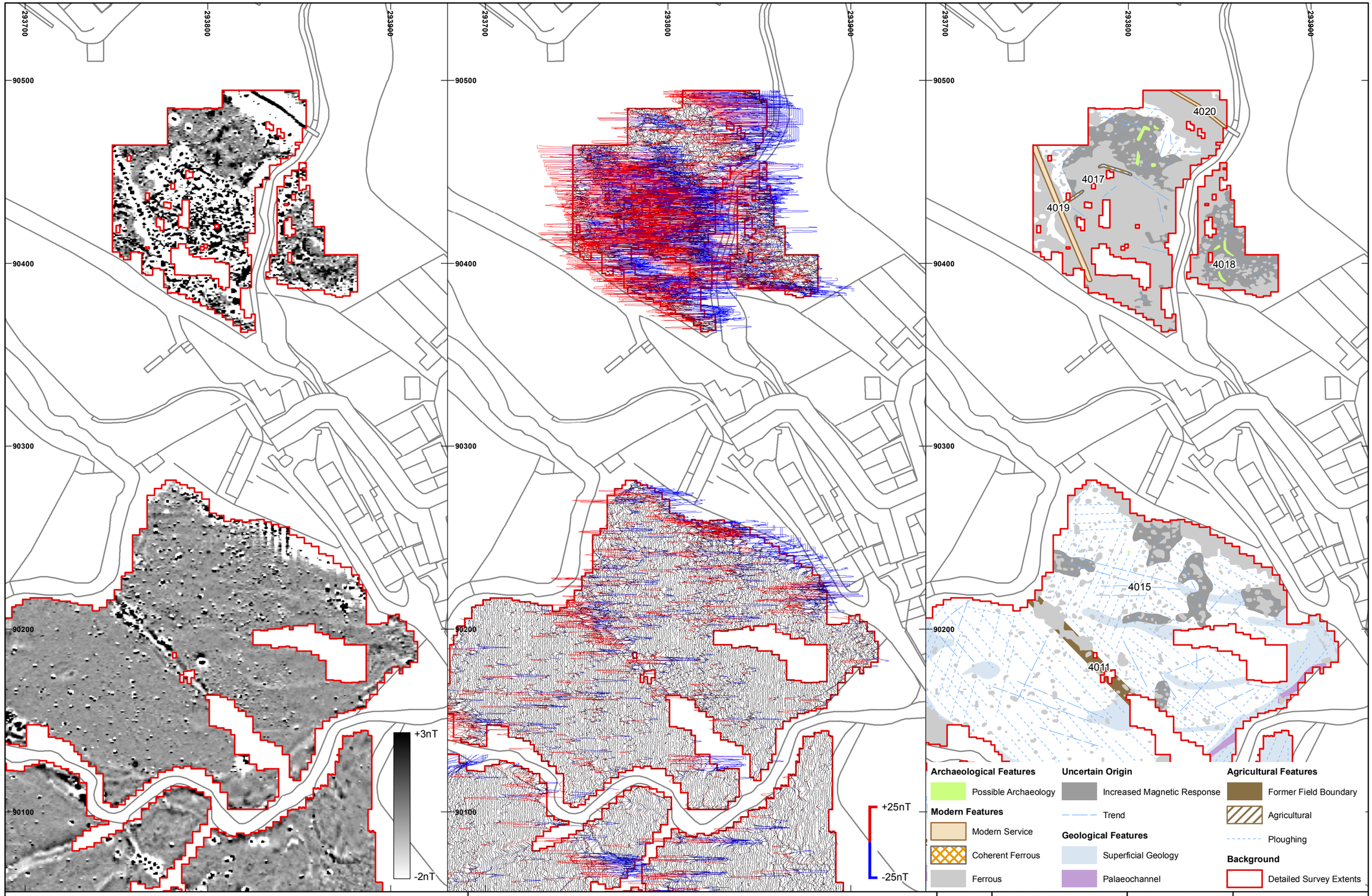
Habitat Creation Area survey area: interpretation

Figure 6



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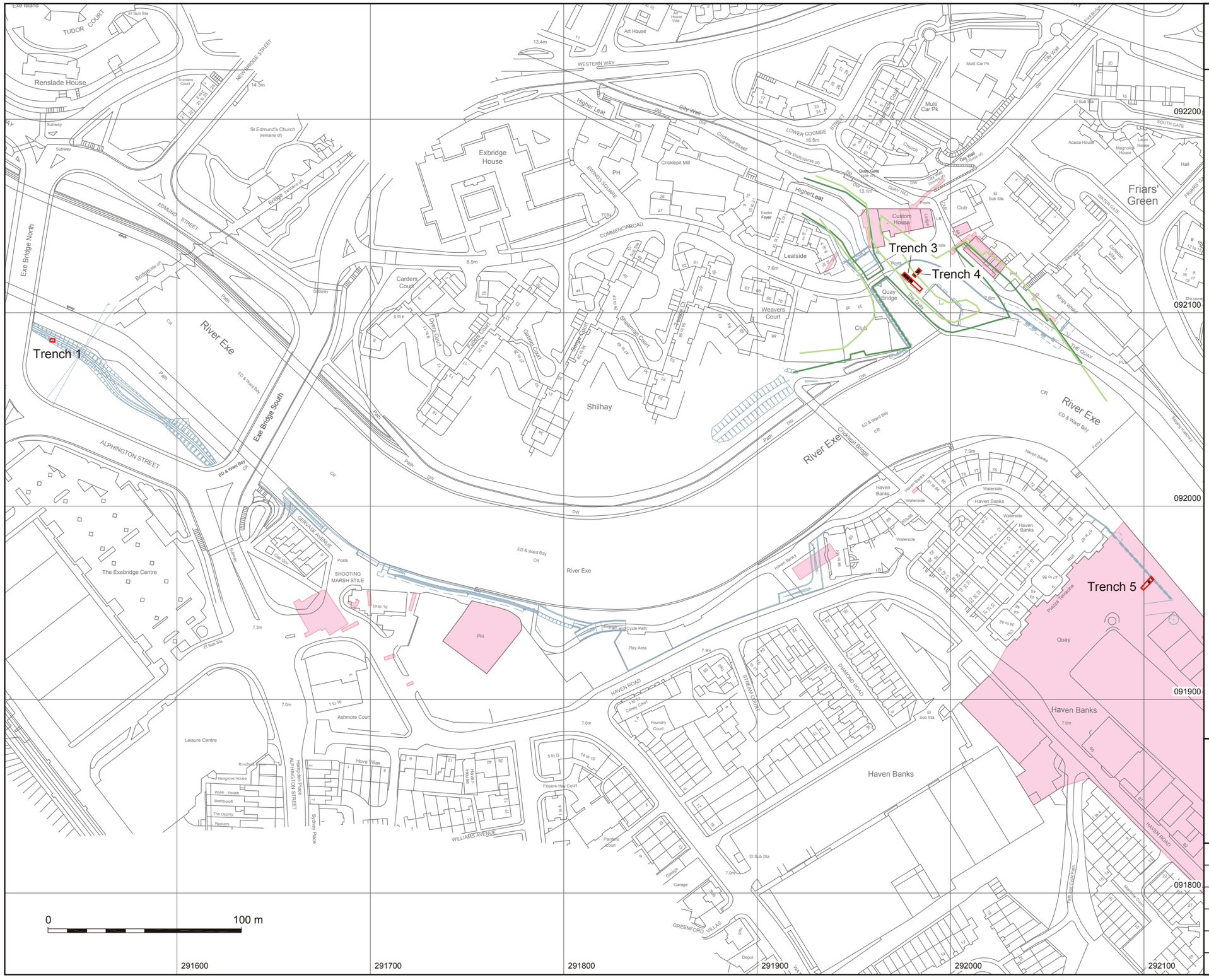
Crematorium and golf course survey area: greyscale plot, XY trace plot and interpretation

Figure 7



Trench
Previous archaeological events
Proposed flood defences
Quay 1564 - c.1590 (after Henderson 1991)
Quay 1680 - 1701 (after Henderson 1991)

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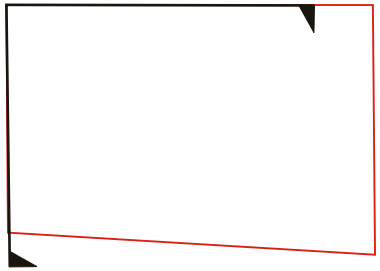
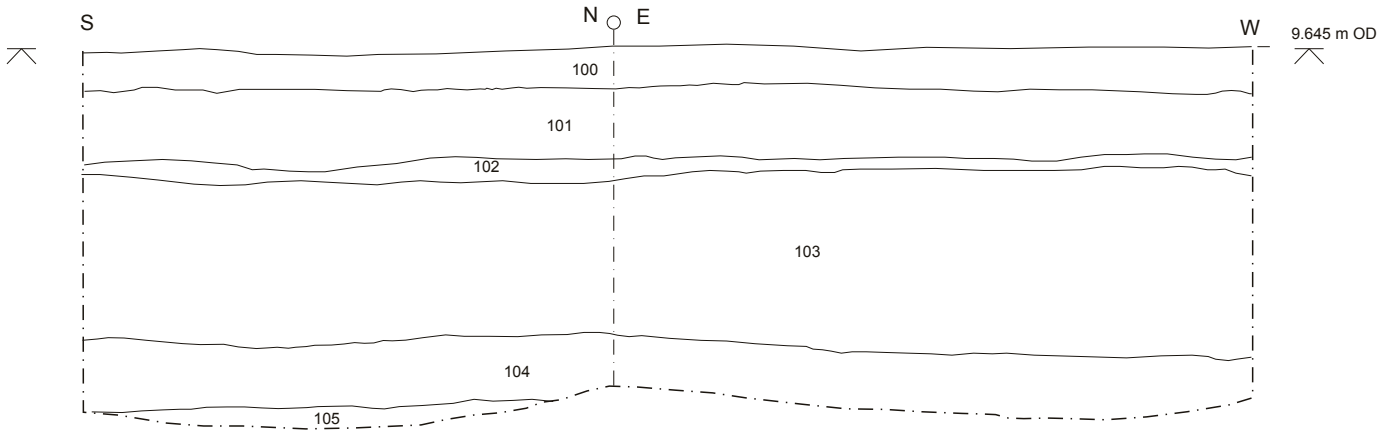
	\Rep figs_RoundUpReport\2015_01_21

Location of trenches 1 and 3-5

Figure 8

Trench 1





Section line

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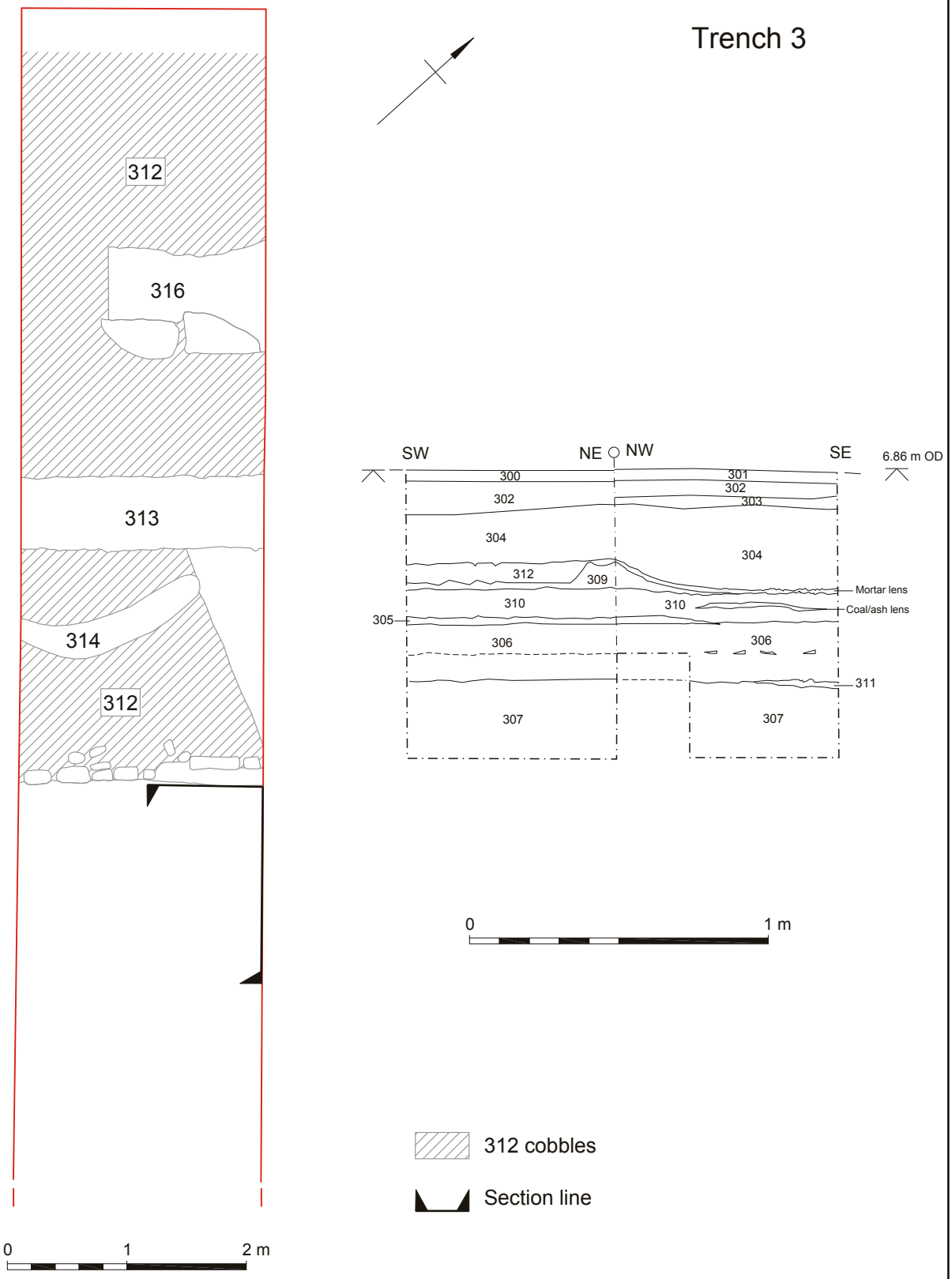
Path:	X:\PROJECTS\105800\GO\Rep figs_RoundUpReport\2015_01_21		

Zone 3 – adjacent to Exe Bridge Trench 1: south and east facing sections

Figure 9



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Path:	X:\PROJECTS\105800\Graphics_Office\Rep figs_RoundUpReport\2015_01_21		

Zone 4 – Exeter Quay Trench 3: plan and south-east and south-west facing sections Figure 10

Trench 4

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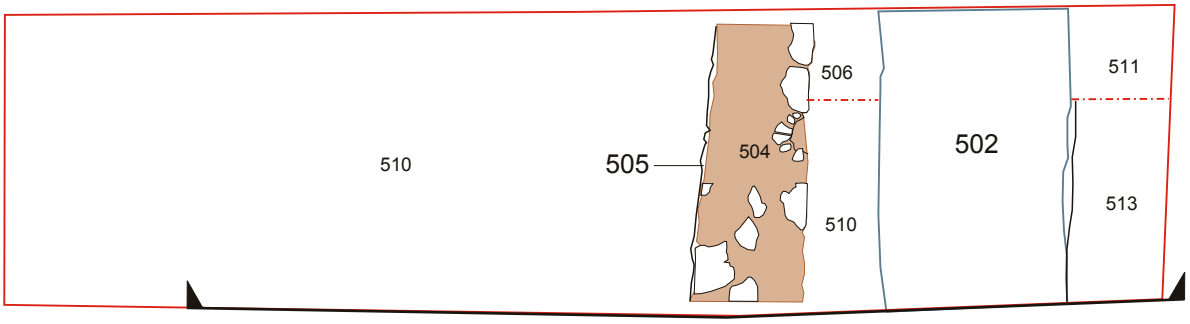
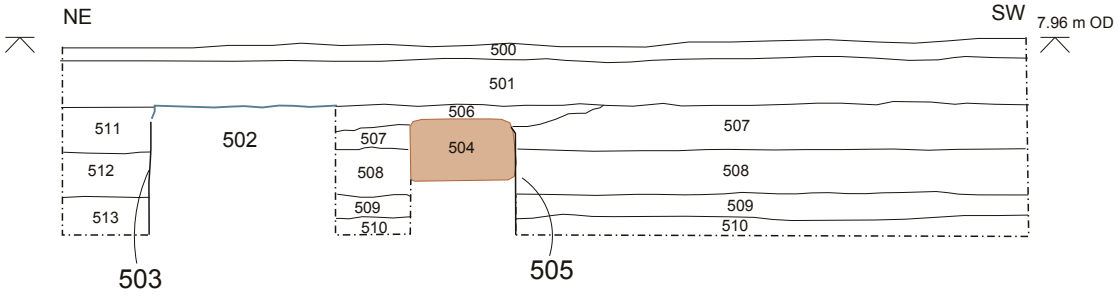
Zone 4 – Exeter Quay Trench 4: plan

Figure 11

Trench 5



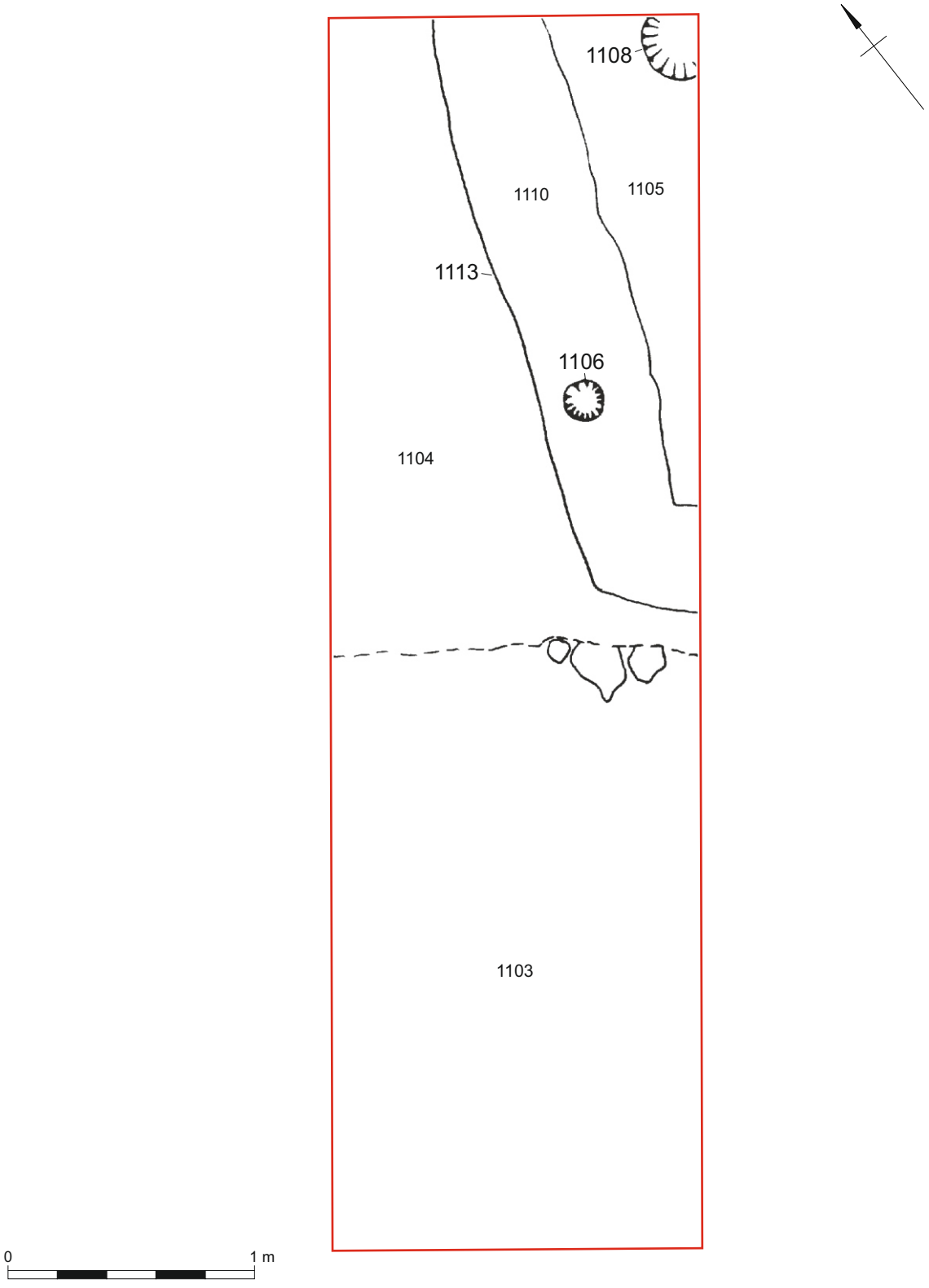


Section line

0 1 2 m

Date:	05/03/2015	Revision Number:	1
Scale:	Plan & section 1:50	Illustrator:	SEJ/KMN
Path:	X:\PROJECTS\105800\Graphics_Office\Rep figs_RoundUpReport\2015_01_21		

Zone 4 – Piazza Terracina Trench 5: plan and north-west facing section Figure 12



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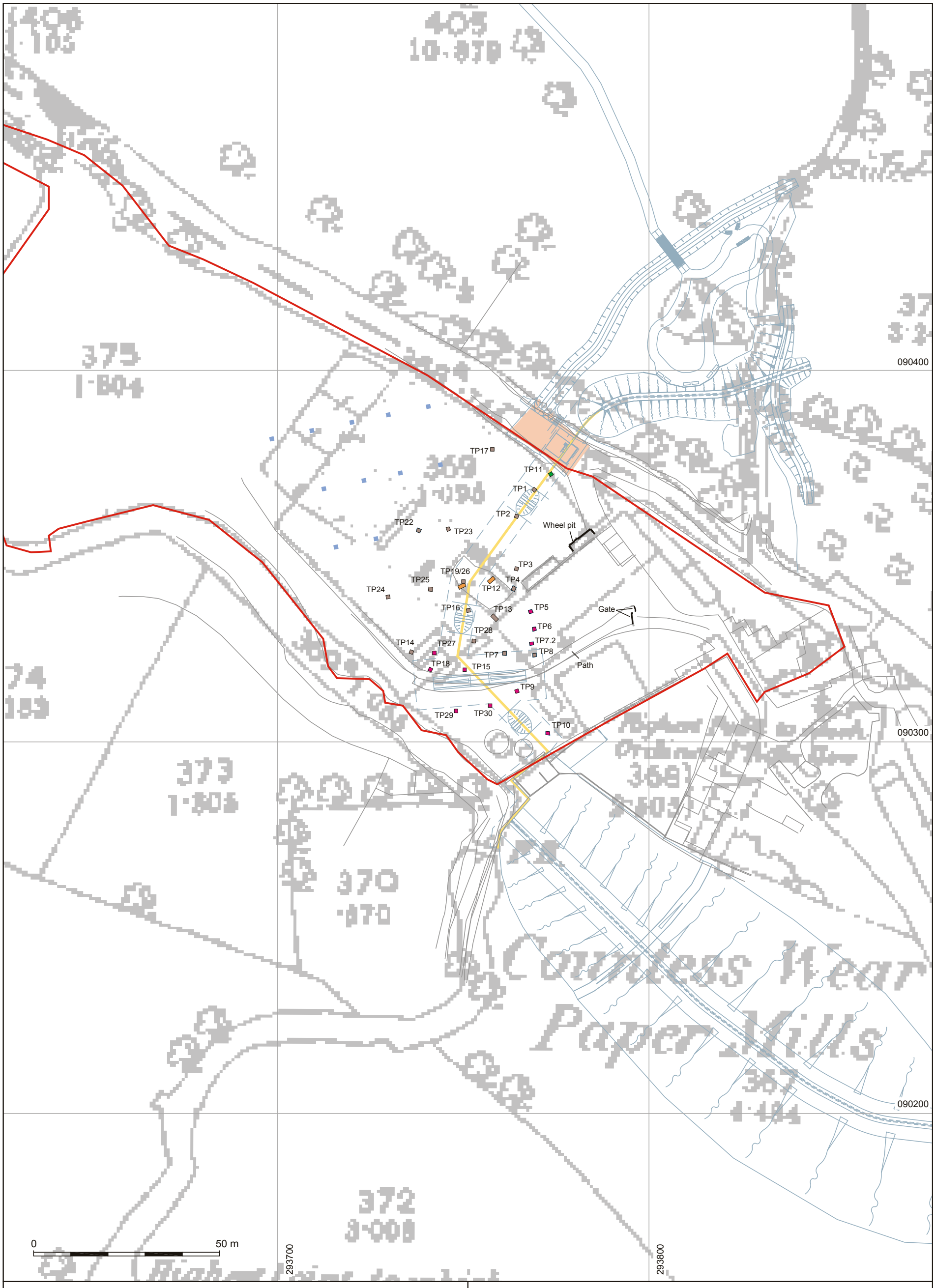
Zone 6 – along Mill Road (Village Green) Trench 11: plan

Figure 13



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Test Pit results over 1889 mapping

Figure 14

Area of watching brief

Area of Historic building survey

Palaeochannel

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Watching brief: monitored area

Figure 15

Plate 1: Zone 3 – adjacent to Exe Bridge Trench 1, viewed from the east

Plate 2: Zone 4 –Exeter Quay Trench 3, viewed from the north-west

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Plate 3: Zone 4 –Exeter Quay Trench 4, viewed from the north-east

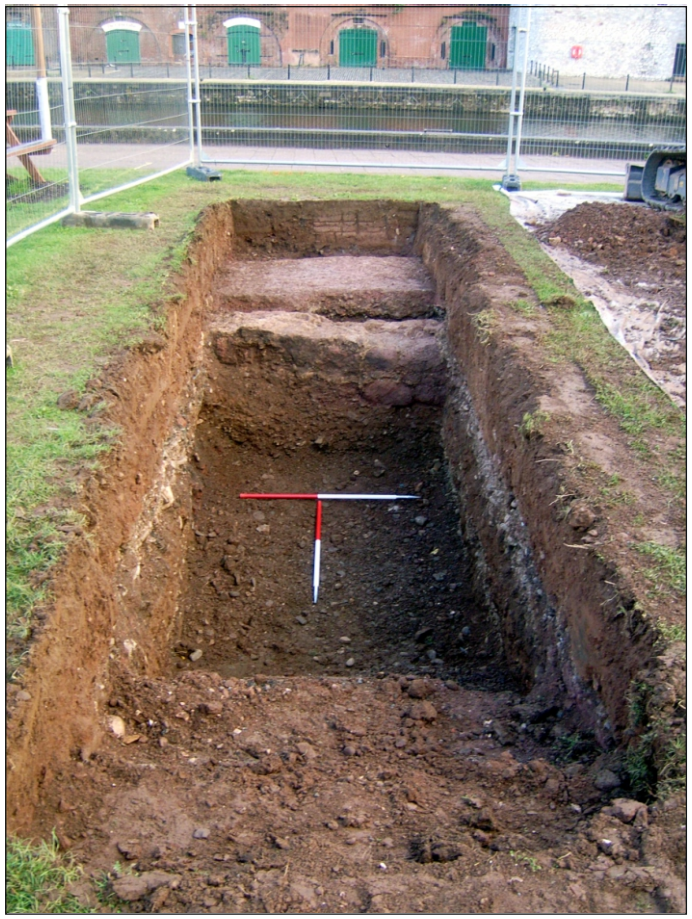

Plate 4: Zone 4 – Piazza Terracina Trench 5, viewed from the south-west

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Scale:	N/A	Illustrator:	SEJ/KMN
Path:	X:\PROJECTS\105800\Graphics_Office\Rep figs_RoundUpReport\2015_01_21		

Plate 5: Zone 4 – Piazza Terracina Trench 5, wall 504 with alluvial deposits (right), viewed from the south-west

Plate 6: Watching brief area showing excavation methodology, viewed from the south

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Scale:	N/A	Illustrator:	KMN
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Plate 7: Zone 6 – along Mill Road (Village Green) Trench 11, viewed from the north-east

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Scale:	N/A	Illustrator:	KMN
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Plate 8: Zone 6 – Northbrook and existing Woodland Test Pit 5 cobbled surface from the south

Plate 9: Zone 6 – Northbrook and existing Woodland Test Pit 12 north east facing wall of reservoir (1204)

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Zone 6 – Northbrook and existing Woodland Test Pit 13 robbed wall from the south west (1303)

Plate 11: Zone 6 – Northbrook and existing Woodland Test Pit 26 wall of reservoir from the east (266)

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Zone 6 – Northbrook and existing Woodland Test Pit 16 demolition rubble to 1.20m from the south

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