



A51 Tarvin Road Improvement Scheme, Chester, Cheshire

Archaeological Watching Brief and Palaeoenvironmental Coring Report

March 2022

Client: Balfour Beatty

Issue No: V. 1

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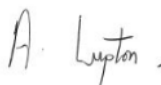
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A51 Tarvin Road Improvement Scheme, Chester, Cheshire

Archaeological Watching Brief and Palaeoenvironmental Coring Report

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Summary

Oxford Archaeology (OA) North was commissioned by Balfour Beatty to undertake an archaeological watching brief during topsoil stripping associated with the widening of the A51 Tarvin Road carriageway, as well as to undertake a borehole to recover a continuous sample of peat in the vicinity of the River Gowy, as part of the A51 Tarvin Road Improvements Scheme, Chester, Cheshire (NGR: SJ 46289 67235 to SJ 48209 66712).

The watching brief, which took place over several periods between July and September 2020, covered two areas off Tarvin Road, the compound site adjacent to the Tarvin Road roundabout (Area 1) and the south side of Stamford Road Bridge junction (Area 2).

Within Area 1, at Tarvin Road roundabout, topsoil was stripped from the whole area required for the proposed compound and foundation trenches for concrete beams and pads were excavated to support cabins. These were excavated through what appeared to be former garden soils, which revealed the remains of wall footings and possible former drains. These do not specifically match with any structures shown on the tithe map of 1838 or late nineteenth century Ordnance Survey mapping, but likely related to an amalgam of garden walls and walkways.

The topsoil removal at Stamford Road Bridge junction (Area 2) covered an 660m x 10m wide strip along the base of the road embankment either side of the River Gowy. Topsoil stripping revealed alluvial deposits overlaid by patches of made ground relating to modern landscaping. No archaeological features were revealed. As part of these works a core was taken on the western bank of the River Gowy with the intention of recovering a continuous sample of peat. Although the core did not contain any peat deposits, there was evidence of organic material which does have potential for pollen analysis.

Acknowledgements

Oxford Archaeology (OA) North would like to thank Balfour Beatty for commissioning this project, with particular mention to Andrew Bonney, Ryan Cherry, Andy Harding and Jennifer Young. OA North would also like to thank Mark Leah of Cheshire Archaeological Planning Advisory Service (APAS), for his advice and guidance.

The project was managed for OA North by Paul Dunn. The watching brief was carried out by Steve Clarke and Anne Templeton who contributed to the report, which was edited by Helen Evans. The illustrations were produced by Mark Tidmarsh. Palaeoenvironmental assessment was undertaken by Mairead Rutherford.

1 INTRODUCTION

1.1 Scope of work

- 1.1.1 Oxford Archaeology (OA) North was commissioned by Balfour Beatty to undertake an archaeological watching brief during topsoil stripping associated with the widening of the A51 Tarvin Road carriageway, as well as to undertake a borehole to recover a continuous sample of peat in the vicinity of the River Gowy, as part of the A51 Tarvin Road Improvements Scheme, Chester, Cheshire (NGR: SJ 46289 67235 to SJ 48209 66712).
- 1.1.2 The work was undertaken as part of permitted development to improve the existing road network. A brief was originally issued by the Development Management Archaeologist from Cheshire Archaeological Planning Advisory Service (APAS) and forwarded to OA North by Balfour Beatty. The brief required the production of a Written Scheme of Investigation (WSI), to be approved by CAPAS and the local planning authority prior to the commencement of the fieldwork, which would detail the archaeological works required. OA North were commissioned by Balfour Beatty to produce the WSI (*Appendix A*) and to undertake the monitoring required, which were undertaken between 13th July and 15th September 2020.

1.2 Location, topography and geology

- 1.2.1 The scheme was located to the east of Chester City Centre, Cheshire (NGRs: SJ 46289 67235 to SJ 48209 66712; Fig 1). The scheme comprises a 4.5km stretch of the A51 Tarvin Road, extending from the junction of Hare Lane and Tarvin Road, across the River Gowy at Stamford Bridge and continuing along Holme Street to Tarvin Road Roundabout in Tarvin.
- 1.2.2 The area of the scheme was predominantly rural with mainly pastoral fields which flank Tarvin Road. Eighteenth and nineteenth-century domestic and agricultural development is evident along much of the road (Mott MacDonald 2019).
- 1.2.3 The solid geology of the scheme is Triassic Period Chester Formation sandstone (BGS 2021). The overlying superficial geology is predominantly Quaternary Period Devensian till (*ibid*). This superficial geology changes in the vicinity of the River Gowy, becoming Quaternary Period clay, silt, sand and gravel alluvium (*ibid*).

1.3 Archaeological and historical background

- 1.3.1 The archaeological and historical background of the site is discussed in detail in the scheme Historic Environment desk-based assessment (Mott MacDonald 2019) and will not be repeated here, bar the assessment of archaeological potential for the area, summarised below.
- 1.3.2 The archaeological potential of the scheme is considered low for Prehistoric, Early Medieval, Medieval and Post-medieval remains, however, there is medium potential for unrecorded archaeological remains relating to the Roman period, specifically in areas not disturbed by the modern A51 Tarvin Road. There is also a medium potential for palaeoenvironmental remains to survive, specifically within the alluvial deposits in the vicinity of Stamford Bridge.

2 WATCHING BRIEF AIMS AND METHODOLOGY

2.1 Aims and objectives

2.1.1 The project aims and objectives were as follows:

- i. to adhere to and fulfil the agreed programme of works associated with the archaeological potential of the site;
- ii. to compile a professional archival record of any archaeological remains within the proposed development area;
- iii. to determine or confirm the general nature of any remains present;
- iv. to determine or confirm the approximate date or date range of any remains by means of artefactual or other evidence;
- v. to recover a continuous sample of peat, in the area of Stamford Bridge;
- vi. to describe and interpret the sediments recovered in the core geoarchaeologically;
- vii. to undertake an assessment of the potential of the peat and make recommendations for further work, likely to include palaeoenvironmental assessment and scientific dating, to determine the preservation and significance of the deposits.

2.2 Methodology

2.2.1 The full methodology was outlined in the WSI (*Appendix A*) which was adhered to in full and was fully compliant with prevailing guidelines and established industry best practice (CIfA 2020a; 2020b; 2021; Historic England 2015). A programme of field observation accurately recorded the character of deposits within the excavations.

2.2.2 The area monitored was set out and all service checks were undertaken by the client prior to the commencement of the excavation. The topsoil stripping was undertaken by a 360 degree 21-tonne mechanical excavator, fitted with a toothless ditching bucket, to the client's required depth.

2.2.3 All information identified during the site works was recorded stratigraphically, using a system adapted from that used by the former English Heritage Centre for Archaeology, with an accompanying pictorial record (plans, sections, and digital photographs). Primary records were available for inspection at all times.

2.2.4 Results of all field investigations were recorded on *pro forma* context sheets. The site archive includes a photographic record and watching brief record sheets.

2.2.5 A full professional archive was compiled in accordance with the WSI, and with current professional guidelines (CIfA 2020b; Historic England 2015). The archive will be offered to the Grosvenor Museum, Chester.

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 The results of the watching brief are presented below, and include a stratigraphic description of the areas monitored. The full details of the areas with dimensions and depths of all deposits can be found in *Appendix B*.

3.2 Area 1: Compound at Tarvin Road roundabout

3.2.1 The watching brief at Tarvin Road roundabout was in the proposed location of the site compound. The area measured approximately c 100 x 85m and was bounded on its north and east sides by the A51, and a residential access road to the west and south.

3.2.2 The area was stripped of topsoil and the spoil was deposited in the centre of the plot (Plate 1). The natural geology **102** was identified, in parts of the area where the excavations were slightly deeper, as mid-orange yellow sand, which was overlain by subsoil **101**, mid-greyish brown sandy silt, approximately 0.12m thick, which was, in turn, overlain by topsoil **100**, approximately 0.27m thick.



Plate 1: Topsoil stripping, Tarvin Road roundabout compound

3.2.3 In the western part of the area, a pair of foundation trenches required to contain steel support beams for the site accommodation were excavated (Fig 2). Running parallel, these were 23.4m long, 0.64m wide and aligned south-west/north-east.

3.2.4 In the northern part of the easternmost slot, the edge of a flagged surface or wall footing (**103**), on an apparently linear alignment, was revealed at a depth of 0.4m. At the north end, this comprised substantial limestone slabs, the largest of which was c 0.4 x 0.4m. At the south end of the structure, the slabs were smaller and of mixed lithology including sandstone, and small lumps of lime mortar were apparent. At the

north end of the structure there was evidence of a return for the structure with it turning 90 degrees to the west. Tumble to the north of the footing included several pieces of roofing slate. Within the corner formed by the two features was what appeared to be a brick-built land drain (including a short length of ceramic pipe) at 90 degrees to the feature, possibly sealed by a limestone slab. Whilst only a small portion of the structure was exposed, they appeared to represent a west/east-aligned wall, on the same alignment as a drain, with a return to the south on a north/south-alignment.



Plate 2: Wall footings 103, 1m scale

3.2.5 Between the foundation slots at the west end, one of three 1 x 0.9m pits for concrete pads (Fig 2) revealed the terminus of a wall footing (**104**) at a depth of 0.4m (Plate 3). Orientated north-east/south-west, the wall footing was 0.6m wide, and was constructed of flat rough-cut sandstone blocks.



Plate 3: Wall footing 104, 1m scale

3.2.6 Overlying wall footings **103** and **104** was a widespread deposit of mid greyish brown sandy silt (**105**) made ground. This was 0.53m deep and contained inclusions of ceramic building material, glass, iron nails and some post-medieval pottery, not retained.

3.3 Area 2: Stamford Bridge junction

3.3.1 The area of the watching brief was on the south side of the junction of Tarvin Road and Barrow Lane and comprised a narrow strip running east-to-west, either side of the River Gowy which runs north-to-south through the area (Fig 4). In total, the stripped area was 660m long and 10m wide.

3.3.2 The area on the east side of the Gowy was 430m long, and directly at the base of the embankment to the A51 (Plate 4). The topsoil (**200**) was 0.1-0.2m deep, below which were deposits of reddish brown and yellowish grey silty clay alluvium (**201**). No archaeology was revealed.



Plate 4: East side of Area 2 after topsoil stripping, looking east, 1 and 2m scales

3.3.3 The area on the west side of the Gowy (Plate 5) was also adjacent to the base of the A51 embankment and was 230m long, 10m wide. The depth of the topsoil (**200**) was 0.1-0.2m over a reddish-brown clayey silt alluvium (**201**). There were also some areas of redeposited soils having previously been used as levelling makeup. No archaeology was revealed.



Plate 5: West end of Area 2 being topsoil stripped, looking east, 1 and 2m scales

3.3.4 Following the watching brief works, a continuous sample of the deposits adjacent to the River Gowy was recovered by terrier rig from the western bank of the river, TR 1 (Fig 4). This was an area that was shown to contain pockets of peat during a previous borehole investigation survey (Mott McDonald 2019). Five 1m-long cores were retrieved from between 1 and 6m below ground level (Plate 6). The top 1m of topsoil and clay was cleared to establish a base for the terrier rig. The samples were wrapped in 1m-long plastic casing and labelled, prior to transport back to the laboratory at OA North. The lithology of the core was then assessed, and sub-samples taken for pollen assessment. No peat was present within the core. The pollen assessment indicated subsamples, as yet undated, which would be suitable for further analysis. The detailed results of the assessment are presented in *Appendix C*.



Plate 6: Core sample taken from BH1

4 DISCUSSION

4.1 Watching brief results and interpretation

- 4.1.1 The topsoil was stripped down to a level to allow the laying of the haul road and compound, rather than to expose the underlying natural. Although no archaeology was found in Area 2 it is quite possible that extant archaeology remains, below the horizon of the work.
- 4.1.2 Within Area 1, at Tarvin Road roundabout, foundation trenches for concrete beams and pads dug through former garden soils revealed the remains of wall footings. Whilst on site, a local passer-by advised that the area had been used in the twentieth-century for allotments and a market garden; this may also be indicated on the 1881 6-inch Ordnance Survey map, where north-east/south-west-aligned paths are shown, apparently separating garden plots. These are not present on the OS 1898 25-inch map, but there is a wall aligned west-to-east crossing the whole area. Taken together, these features could correspond to the wall footings **103** identified in the foundation trench and wall footings **104** within the excavation for the concrete slab. The features identified lay beneath a significant spread of what was interpreted as an imported garden soil (**105**).
- 4.1.3 Area 2, at Stamford Bridge junction, affected only a narrow corridor of land adjacent to the A51. No archaeological features were identified during the topsoil stripping, which revealed alluvial deposits and areas of redeposited soil from earlier landscaping. Environmental sampling produced no evidence for peat, however, assessment indicated the potential for further pollen analysis and dating.

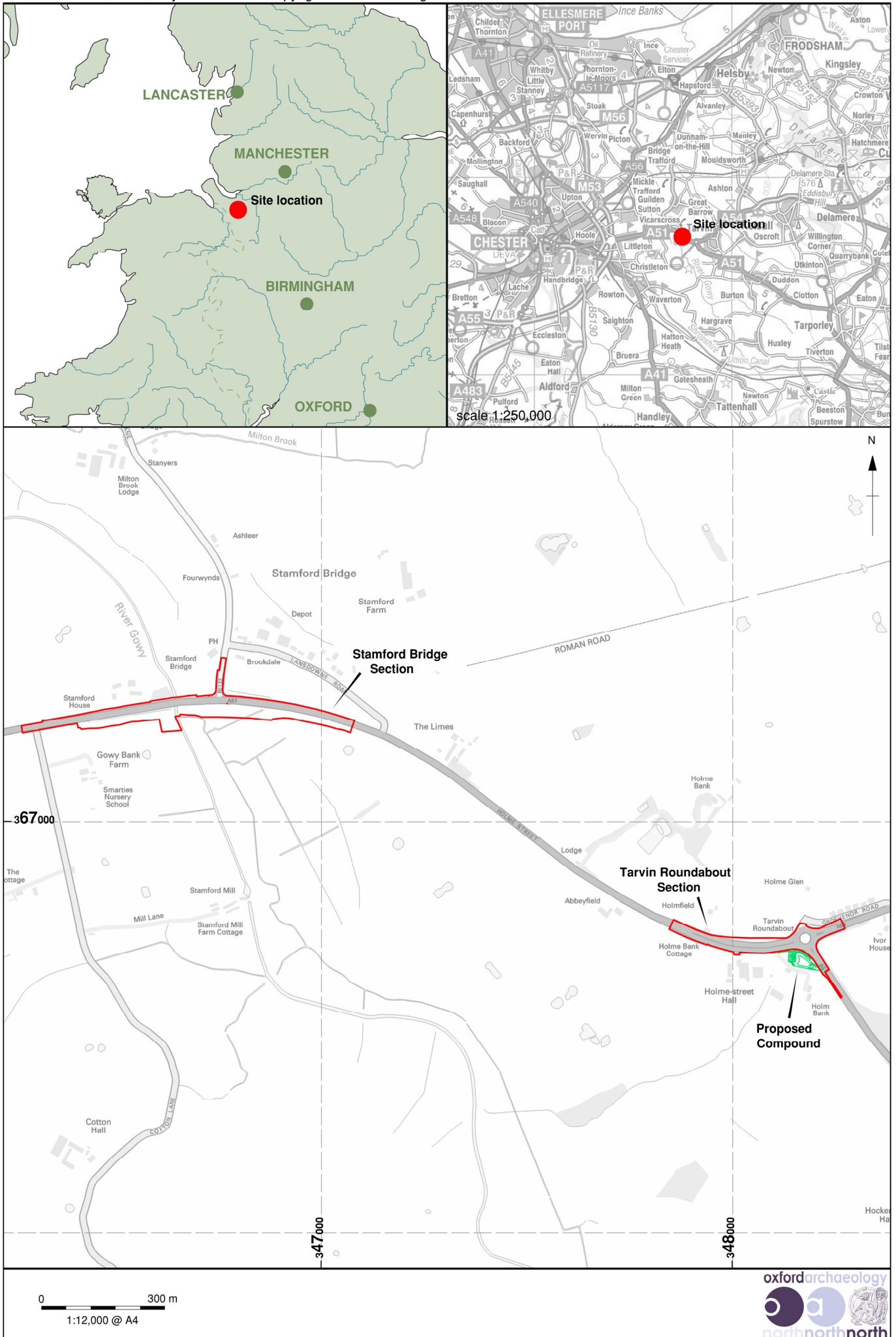
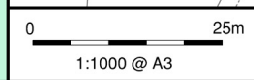
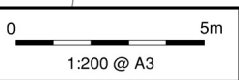
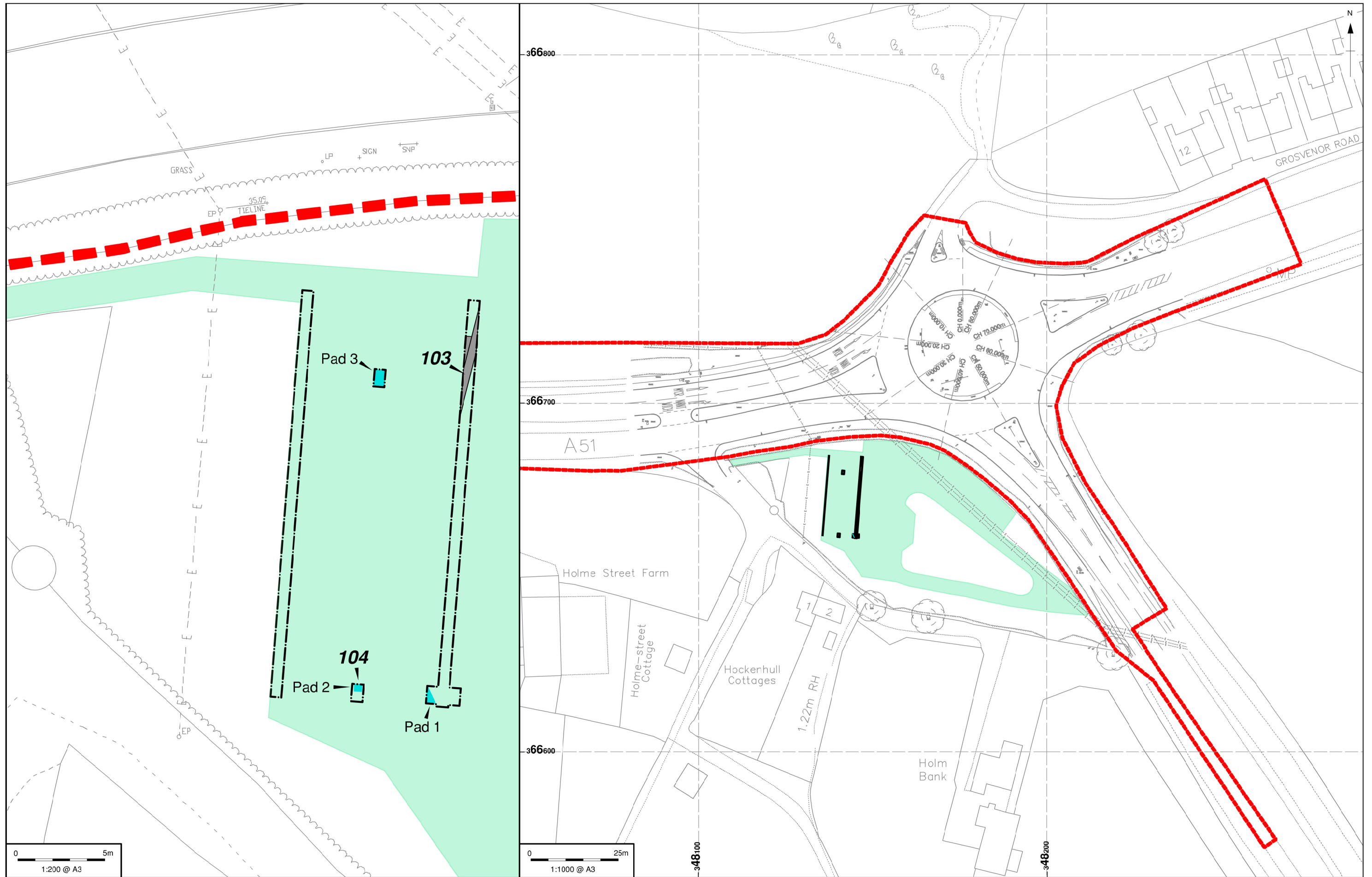


Figure 1: Site location



- Site Area
- Foundation Trenches
- Watching Brief Area (topsoil strip)
- Stone
- Concrete

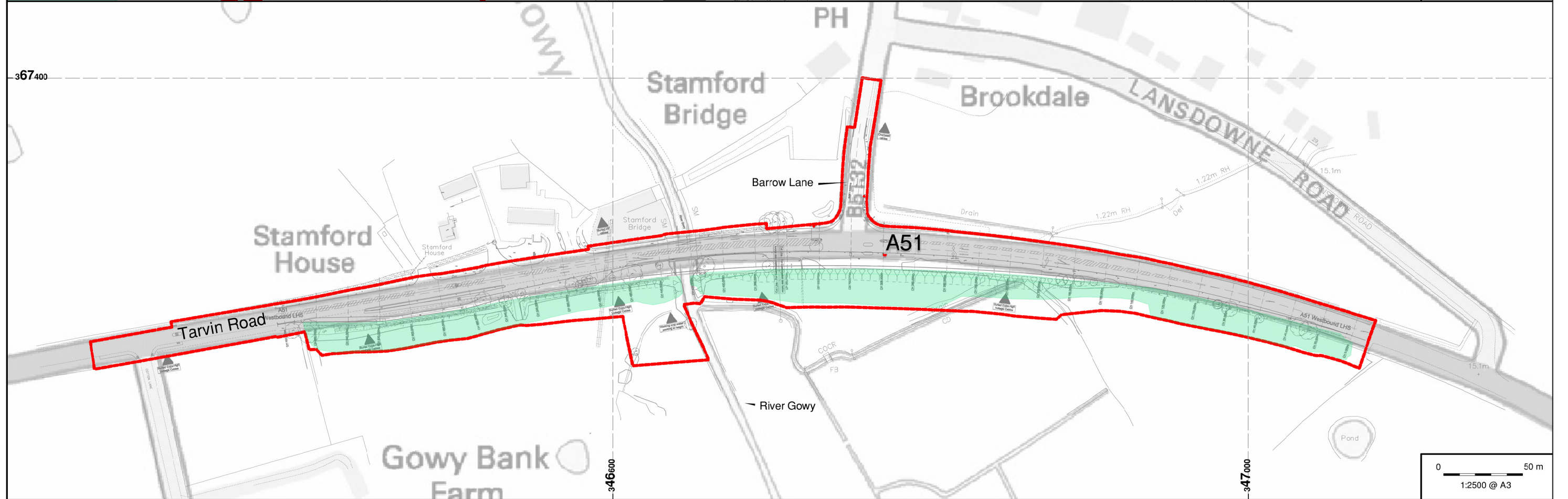
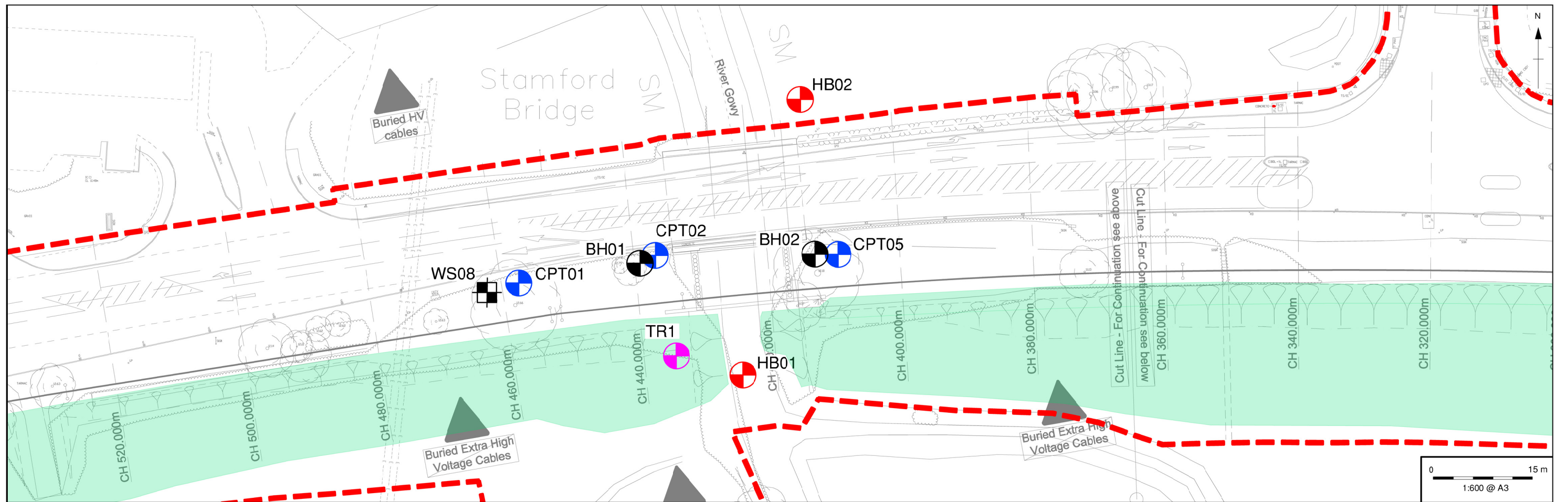


Figure 2: Tarvin to Chester (A51) Road improvements - Watching brief location in the Tarvin roundabout area

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Figure 3: Tarvin roundabout archaeological remains superimposed on an extract from the Township of Tarvin tithe map, 1838



- Site Area
- Watching Brief
- Scheme Detail



Figure 4: Tarvin to Chester (A51) Road improvements - Watching brief and borehole locations in the Stamford Bridge area

PD*L11322*MAT*Jan 2021

APPENDIX A WRITTEN SCHEME OF INVESTIGATION



A51 Tarvin Road Improvements Scheme, Chester, Cheshire

Written Scheme of Investigation
Archaeological Watching Brief and
Geoarchaeological Investigation

July 2020

Client: Balfour Beatty

Issue No: V. 2

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A51 Tarvin Road Improvements Scheme, Chester, Cheshire

Written Scheme of Investigation for an Archaeological Watching Brief and Geoarchaeological Investigation

Centred on SJ 46301 67233

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Fig 2 Plan of Tarvin to Chester (A51) Road Improvements

1 INTRODUCTION

1.1 Project details

- 1.1.1 Oxford Archaeology (OA) North has been commissioned by Balfour Beatty to undertake an archaeological watching brief during topsoil stripping and during ground works for the new bridge at Stamford Bridge, as well as to undertake a geoarchaeological borehole to recover a continuous sample of peat on the A51 Tarvin Road Improvements Scheme, Chester, Cheshire (NGR: SJ 46301 67233).
- 1.1.2 The work is being undertaken as part of permitted development to improve the existing road network. A brief was originally issued by the Development Management Archaeologist from Cheshire Archaeological Planning Advisory Service (CAPAS) and forwarded to OA North by Balfour Beatty. The brief required the production of a Written Scheme of Investigation (WSI), to be approved by CAPAS and the local planning authority prior to the commencement of the fieldwork, which would detail the archaeological works required. Those archaeological works were described in the brief as observation of ground works in the vicinity of Stamford Bridge, monitoring of topsoil stripping in the areas of the compound and lay-down areas, and the recovery of a continuous sample of peat from the area in the vicinity of Stamford Bridge.
- 1.1.3 OA North were subsequently commissioned by Balfour Beatty to produce this WSI and to undertake the archaeological works required. This document outlines how OA will implement those requirements.
- 1.1.4 All work will be undertaken in accordance with local and national planning policies (ClfA 2014a; 2014b; 2019: English Heritage 2015) referenced within this document.

1.2 Oxford Archaeology

- 1.2.1 OA North, based in Lancaster, is the northern office of Oxford Archaeology (Chartered Institute for Archaeologists' (CIfA) registered organisation no 17), the leading archaeological and heritage practice in the country, employing in excess of 250 professionals across three regional offices. OA North is itself the largest archaeological contractor in north-west England. As a registered educational charity, OA is dedicated to maintaining and promoting the highest professional, academic, commercial and ethical standards and to the provision of access to archaeology for all. It has both an established reputation and a philosophical imperative in the pursuit of efficient and cost-effective fieldwork, post-excavation excellence, and high-quality publication and outreach. We pride ourselves on our delivery of accessible outreach, including open days, lectures, information panels, leaflets, *etc.*
- 1.2.2 With over 40 years of experience in commercial archaeology, OA has undertaken tens of thousands of archaeological investigations of all types, scales and periods, from desk-based assessments to major open-area excavations. OA has particular experience of working closely with principal contractors, consultants, and curators to undertake high-quality archaeological works within the tight timetables and high-pressure environments of major projects.

1.3 Location, topography and geology

- 1.3.1 The proposed scheme is located to the east of Chester City Centre, Cheshire (centred at SJ 46301 67233; Fig 1). The scheme comprises a 4.5km stretch of the A51 Tarvin Road, extending from the junction of Hare Lane and Tarvin Road, across the River Gowy at Stamford Bridge and continuing along Holme Street to Tarvin Road Roundabout in Tarvin (Fig 2). The scheme is predominantly rural in nature and dominated by pastoral fields flanking Tarvin Road.
- 1.3.2 The solid geology of the scheme has been recorded as Sandstone of the Chester Formation, formed in the Triassic Period (BGS 2020). The overlying superficial geology has been predominantly recorded as Diamicton, Devensian Till, formed during the Quaternary Period (*ibid*). This superficial geology changes in the vicinity of the River Gowy, becoming Clay, Silt, Sand and Gravel Alluvium formed in the Quaternary Period (*ibid*).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND AND POTENTIAL

2.1 Archaeological and historical background

2.1.1 The Historic Environment Desk-Based Assessment (HEDBA) produced by Mott MacDonald (2019) discusses the archaeological potential of the site in detail and will not be repeated here.

2.2 Potential

2.2.1 The HEDBA produced by Mott MacDonald (2019) describes the archaeological potential of the scheme as low for Prehistoric, Early Medieval, Medieval and Post-Medieval remains to be encountered, however, there is medium potential for unrecorded archaeological remains relating to the Roman Period, specifically in areas not disturbed by the modern A51 Tarvin Road. There is also a medium potential for palaeo-environmental remains to survive, specifically within the alluvial deposits in the vicinity of Stamford Bridge.

2.2.2 As such, the HEDBA recommended a programme of observation and recording in the form of an archaeological watching brief, to establish whether any archaeological remains survive.

3 PROJECT AIMS

3.1 General

3.1.1 The general aims of the project can be summarised as follows:

- to adhere to and fulfil the agreed programme of works associated with the archaeological potential of the site;
- to determine or confirm the general nature of any remains present;
- to determine or confirm the approximate date or date range of any remains, by artefactual means or other evidence;
- to compile a professional archival record of any archaeological remains within the site.

3.2 Specific aims and objectives

3.2.1 The specific aims and objectives of the archaeological watching brief and geoarchaeological investigation are:

- i. to determine or confirm the general nature of any remains present;
- ii. to determine or confirm the approximate date or date range of any remains, by means of artefactual or other evidence;
- iii. to recover a continuous sample of peat, approximately 3m, in the area of Stamford Bridge;
- iv. to describe and interpret the sediments recovered in the core geoarchaeologically;
- v. to undertake an assessment of the potential of the peat and make recommendations for further work, likely to include palaeoenvironmental assessment and scientific dating, to determine the preservation and significance of the deposits.

4 PROJECT SPECIFIC EXCAVATION AND RECORDING METHODOLOGY

4.1 Scope of works

- 4.1.1 The archaeological watching brief will involve the monitoring and recording of any archaeological remains encountered during topsoil stripping in various areas of the site, specifically the compound and lay-down areas, as well as ground works for the new bridge at Stamford Bridge. The topsoil stripping and ground works will be conducted by a mechanical excavator fitted with a toothless ditching bucket, under direct supervision by a suitably experienced and qualified archaeologist at all times. Any spoil arisings from the works will be checked and any finds will be retained.
- 4.1.2 The archaeologist will be afforded the opportunity and sufficient time to investigate the areas, clean, and record any archaeological features identified. Where archaeological features are identified they may be subject to sample excavation to develop an understanding of their nature and recover appropriate environmental samples and finds. If potentially significant archaeological remains are identified, the archaeologist will inform the client and the Development Management Archaeologist at CAPAS, as advisors to the local planning authority, works will not recommence until an appropriate scheme of works are decided upon.
- 4.1.3 The geoarchaeological investigation will be undertaken by a suitably experienced geoarchaeologist, supported by either a terrier or cable percussion rig controlled by a suitably experienced and qualified specialist contractor. It is proposed that a single borehole will be sufficient to recover a continuous core of up to 3m of peat.

4.2 Programme

- 4.2.1 It is anticipated that the fieldwork, in the first instance, the watching brief on the compound area, will be undertaken by a team consisting of a single archaeologist in two days, commencing Monday 13th July 2020, under the management of Paul Dunn, Senior Project Manager. The watching brief will be maintained in the field by a Project Archaeologist as yet to be appointed. Depending on OA North's timetabling of works and weather this may be subject to change through the duration of the archaeological works. All OA North Project Officers, Supervisors and Assistant Supervisors are experienced field archaeologists capable of carrying out a range of archaeological projects.
- 4.2.2 All fieldwork undertaken by OA North is overseen by the Operations Manager, Alan Lupton MCIfA.

4.3 Site specific methodology

- 4.3.1 A summary of OA's general approach to excavation and recording can be found in *Appendix A*. Standard methodologies for Geomatics and Survey, Environmental evidence, Artefactual evidence and Burials can also be found below (*Appendices B, C, D and E* respectively).
- 4.3.2 Site specific methodologies for the archaeological watching brief will be as follows:

- i. the project archaeologist will maintain a watching brief during the topsoil stripping of the compound and lay down areas, as well as during ground works for the new bridge at Stamford Bridge;
- ii. the project archaeologist will be afforded the opportunity to clean, investigate, record and sample all archaeological remains to an appropriate degree. The hand excavation and recording methodology which will be implemented can be found in *Appendix A*;
- iii. if potentially significant remains are identified, the project archaeologist will stop excavation works. They will inform the client and will consult the Development Management Archaeologist at CAPAS, work will only continue with their approval;
- iv. a photographic and textual record will be made of the stratigraphy and archaeological features encountered;
- v. spoil arising from the excavations will be scanned for finds and palaeoenvironmental evidence, which will be collected if deemed significant;
- vi. at all times, the project archaeologist will work under the Health and Safety directions of the Principal Contractor.

4.3.3 Site specific methodologies for the geoarchaeological investigation will be as follows:

- i. the geoarchaeologist will locate the position of the borehole on the basis of a proposed location, however, this location may be altered slightly in discussion with the borehole drilling crew (i.e. to avoid services or placement of the drilling rig);
- ii. the drilling will commence once safe to do so. The monitoring geoarchaeologist will log all deposits above the peat, once the peat has been reached, a continuous sample will be taken, either by window sample or piston sample;
- iii. once the bottom of the peat has been reached, samples will stop being taken and drilling will continue into the deposits below, until natural geology is reached;
- iv. the samples will be removed from site, if piston samples have been taken, they will be returned to the laboratory of the specialist drilling contract for extrusion, under the geoarchaeologist supervision;
- v. at all times, the geoarchaeologist and the drilling crew will work under the Health and Safety directions of the Principal Contractor.

5 PROJECT SPECIFIC REPORTING AND ARCHIVE METHODOLOGY

5.1 Programme

- 5.1.1 The final report will be completed within 4 to 6 weeks of the completion of the fieldwork.
- 5.1.2 A copy of the report in Adobe Acrobat (.pdf) format will be provided to the client. Once approved a copy will then be provided to the Development Management Archaeologist at CAPAS for comment prior to final issue. Paper copies can also be provided on request.

5.2 Content

- 5.2.1 The content of this report will be as defined in *Appendix F*.

5.3 Specialist input

- 5.3.1 OA has a large pool of internal specialists, as well as a network of external specialists with whom OA have well established working relationships. A general list of these specialists is presented in *Appendix G*; in the event that additional input should be required, an updated list of specialists can be supplied.

5.4 Archive

- 5.4.1 The results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current Historic England guidelines (2015), and in accordance with the Guidelines for the Preparation of Excavation Archives for Long-Term Storage (UKIC 1990). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. This archive will be provided in the English Heritage Centre for Archaeology format.
- 5.4.2 The site archive will be deposited with the Grosvenor Museum, Chester following the completion of the project. This will follow appropriate industry guidelines (CIfA 2014b). The Archaeological Data Services online database project Online Access to index of Archaeological Investigations (OASIS) will be completed as part of the archiving phase of the project. A summary of OA's general approach to documentary archiving can be found in *Appendix H*.

6 HEALTH AND SAFETY

6.1 Roles and responsibilities

- 6.1.1 The Senior Project Manager, Paul Dunn, has responsibility for ensuring that safe systems of work are adhered to on site. Elements of this responsibility will be delegated to the project archaeologist, who implements these on a day to day basis. Paul Dunn and the project archaeologist are supported by OA North's Health and Safety Advisor, Fraser Brown.
- 6.1.2 The Director with responsibility for Health and Safety at OA is Dan Poore Tech IOSH (Chief Business Officer).

6.2 Method statement and risk assessment

- 6.2.1 A summary of OA's general approach to health and safety can be found in *Appendix I*. A risk assessment has also been undertaken and approved and will be kept on site, along with OA's standard Health and Safety file, which will contain all relevant health and safety documentation.
- 6.2.2 The Health and Safety file will be available to view at any time.

6.3 Monitoring of works

- 6.3.1 Archaeological investigations will be monitored, where appropriate, by the Development Management Archaeologist at CAPAS. Any required visits will be carried out under auspices of the Main Contractors Health and Safety Plan and visitors will wear appropriate PPE and be accompanied at all times.

7 BIBLIOGRAPHY

British Geological Survey (BGS), 2020 *Geology of Britain Viewer* [Online], available at <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> (accessed July 2020)

Chartered Institute for Archaeologists (CIfA), 2014a *Standard and guidance for archaeological watching brief*, Reading

CIfA, 2014b *Standard and guidance for the creation, preparation, transfer and deposition of archaeological archives*, Reading

CIfA, 2019 *Code of Conduct*, Reading

Historic England, 2015 *Management of research projects in the historic environment* (re-issue), London

Mott MacDonald, 2019 *A51 Tarvin Road Improvements Scheme, Chester: Historic environment desk-based assessment*, unpubl rep

United Kingdom Institute for Conservation (UKIC), 1990 *Guidelines for the preparation of archives for long-term storage*, London

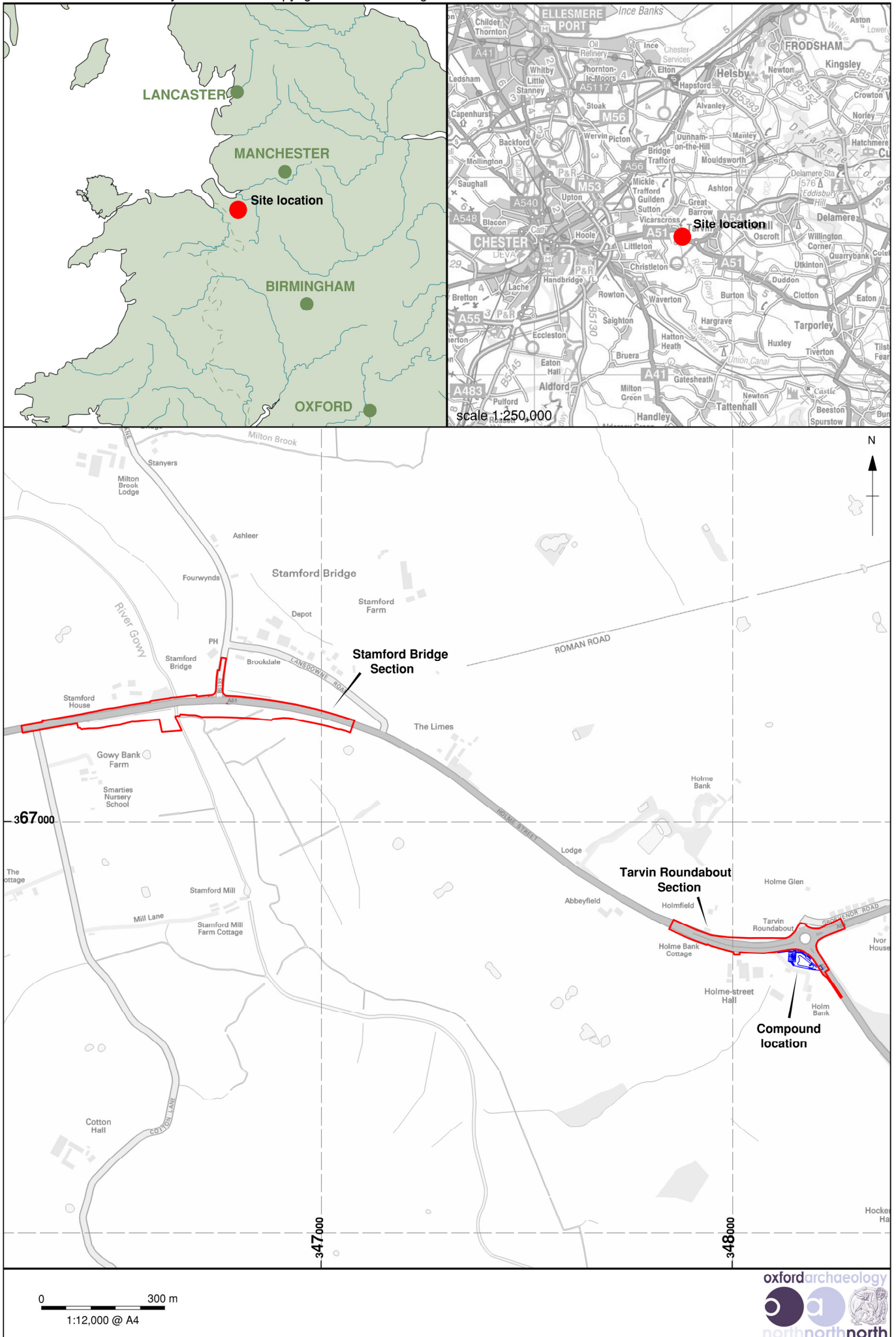
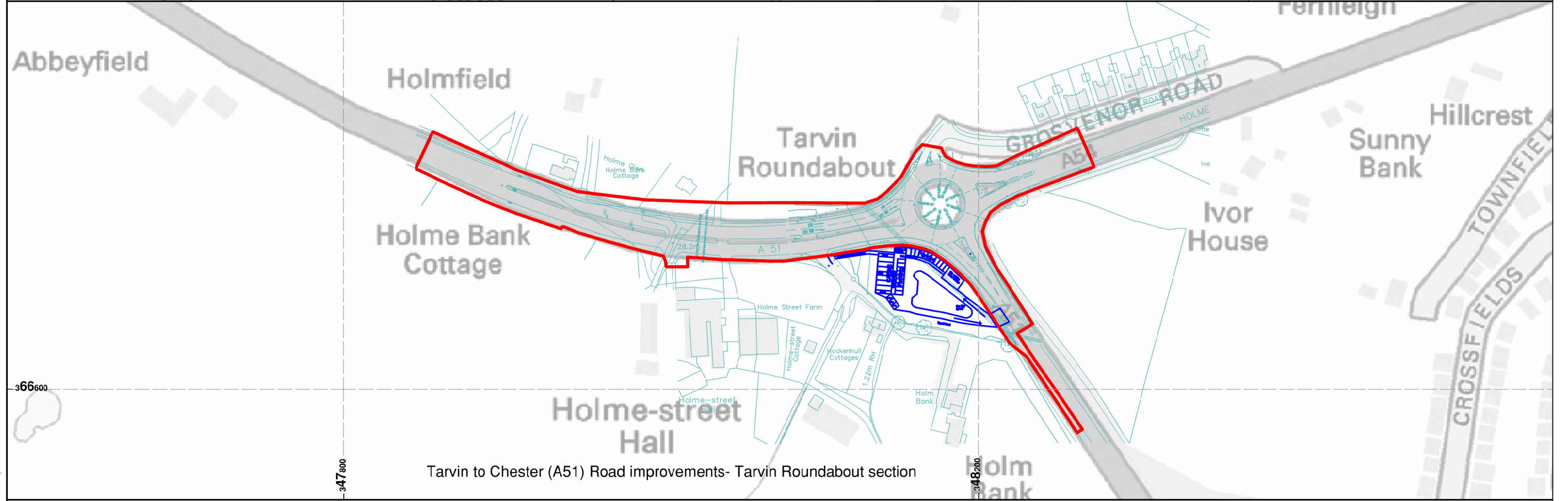
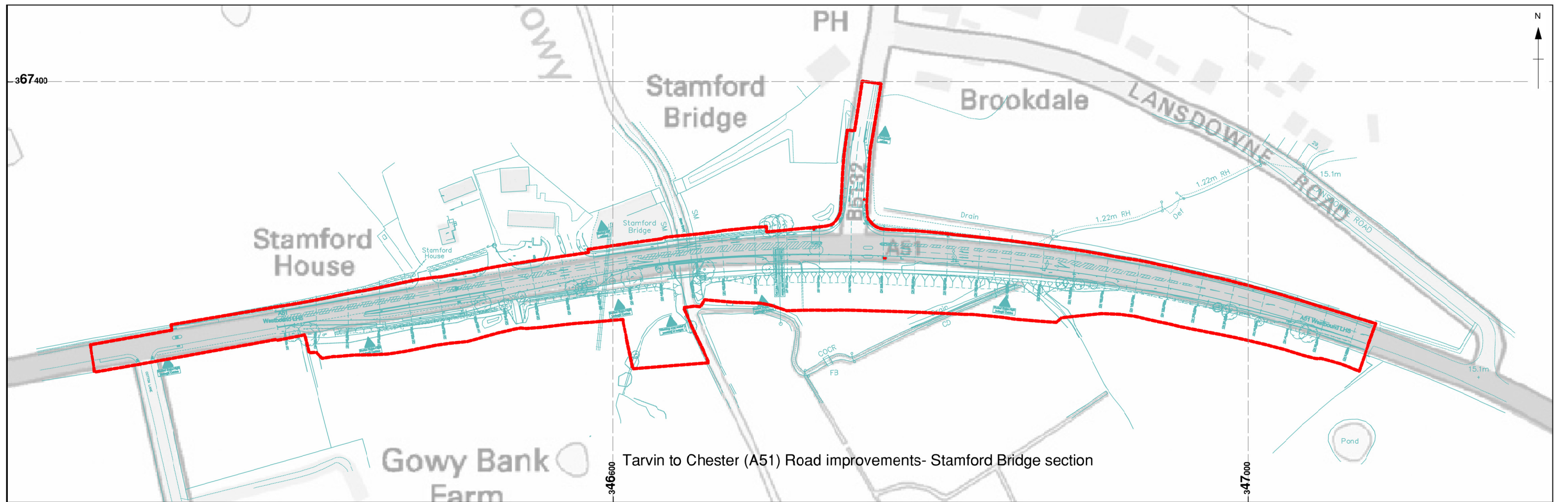


Figure 1: Site location



- Site Area
- Compound
- Scheme Detail

0 50 m
1:2500 @ A3



Figure 2: Plan of Tarvin to Chester (A51) road improvements

PD*T24522*IMAT*July 2020

OA STANDARD FIELDWORK METHODOLOGY APPENDICES

The following methods and terms will apply, where appropriate, to all OA fieldwork unless varied by the accompanying detailed Written Scheme of Investigation.

Copies of all OA internal standards and guidelines referred to below are available on request.

APPENDIX A GENERAL EXCAVATION AND RECORDING METHODOLOGY

A.1 Standard methodology – summary

Mechanical excavation

- A.1.1 An appropriate mechanical excavator will be used for machine excavation. This will normally be a JCB or 360° tracked excavator with a 1.5 m to 2 m wide toothless ditching bucket. For work with restricted access or working room a mini excavator may be used.
- A.1.2 All mechanical excavation will be undertaken under direct archaeological supervision.
- A.1.3 All undifferentiated topsoil or overburden of recent origin will be removed down to the first significant archaeological horizon, in successive, level spits.
- A.1.4 Following mechanical excavation, all areas that require examination or recording will be cleaned using appropriate hand tools.
- A.1.5 Spoil heaps will be monitored in order to recover artefacts to assist in the analysis of the spatial distribution of artefacts. Modern artefacts will be noted but not retained.
- A.1.6 After recording, evaluation trenches and test pits will usually be backfilled with excavated material in reverse order of excavation, and compacted as far as is practicable with the mechanical excavator. Area excavations will not normally be backfilled.

Hand excavation

- A.1.7 All investigation of archaeological levels will usually be by hand, with cleaning, examination and recording both in plan and section.
- A.1.8 Within significant archaeological levels the minimum number and proportion of features required to meet the aims of the excavation will be hand excavated. Pits and postholes will usually be subject to a 50% sample by volume. Linear features will be sectioned as appropriate. More complex features such as those associated with funerary activity will usually be subject to 100% hand excavation.
- A.1.9 In the case of evaluations, it is not necessarily the intention that all trial trenches will be fully excavated to natural stratigraphy, but the depth of archaeological deposits across the site will be assessed. The stratigraphy of a representative sample of the evaluation trenches will be recorded even where no archaeological deposits have been identified. Any excavation, both by machine and by hand, will be undertaken with a view to avoiding damage to any archaeological features or deposits, which appear to be worthy of preservation in situ.

Recording

- A.1.10 Written descriptions will be recorded on proforma sheets comprising factual data and interpretative elements.
- A.1.11 Where stratified deposits are encountered a Harris matrix will be compiled during the course of the excavation.
- A.1.12 Plans will normally be drawn at 1:100, but on urban or deeply stratified sites a scale of 1:50 or 1:20 will be used. Detailed plans will be at an appropriate scale. Burials will be drawn at scale 1:10 or recorded using geo-referenced digital photography.
- A.1.13 The site grid will be accurately tied into the National Grid and located on the 1:2500 or 1:1250 map of the area.
- A.1.14 A register of plans will be kept.
- A.1.15 Long sections of showing layers will be drawn at 1:50. Sections of features or short lengths of trenches will be drawn at 1:20.
- A.1.16 A register of sections will be kept.
- A.1.17 Generally, all sections will be tied in to Ordnance Datum.
- A.1.18 A full photographic record, illustrating in both detail and general context the principal features and finds discovered will be maintained. The photographic record will also include working shots to illustrate more generally the nature of the archaeological work.
- A.1.19 Photographs will be recorded on OA Photographic Record Sheets.

A.2 Relevant industry standards and guidelines

- A.2.1 The Chartered Institute for Archaeologists Standard and Guidance notes relevant to fieldwork are:
- Standard and Guidance for Archaeological Field Evaluation
 - Standard and Guidance for Archaeological Excavation
 - Standard and Guidance for an Archaeological Watching Brief.
- A.2.2 These will be adhered to at all times.

A.3 Relevant OA manual and other supporting documentation

- A.3.1 All fieldwork will be undertaken in accordance with the requirements of the OA Field Manual (ed. D Wilkinson 1992), and the revised OA fieldwork manual (publication forthcoming).
- A.3.2 Further guidance is provided to all excavators in the form of the OA 'Fieldwork Crib Sheets - a companion guide to the Fieldwork Manual'. These have been issued ahead of formal publication of the revised Fieldwork Manual.

APPENDIX B GEOMATICS AND SURVEY

B.1 Standard methodology - summary

- B.1.1** The aim of OA methodology is to provide comprehensive survey cover of all investigation areas. Additionally, it is designed to provide coverage for any areas, beyond the original scope of the project, which arise as a result of further work. It provides digital plans of all required elements of the project and locates them within an overall grid.
- B.1.2** It also maintains all necessary survey data and ensures that the relevant information is copied into the primary record, in order to ensure the integrity of the project archive. Furthermore, it ensures that all core data is securely stored and backed up. It establishes accurate project reference systems utilising a series of control stations and permanent base lines.
- B.1.3** The survey will be conducted using a combination of Total Station Theodolite (TST) survey utilising Reflectorless Electronic Distance Measurement (REDM) where appropriate, hand-measured elements and GPS (Global Positioning System), or photogrammetry.
- B.1.4** Before the main work commences, a network of control stations will be laid out encompassing the area. Control stations will be tied in to known points or existing features using rigorous metric observation. The control network will be set in using a TST to complete a traverse or using techniques as appropriate to ensure sufficient accuracy. A GPS, or other appropriate method, will be used to orientate the control network to National Grid or other recognised coordinate system.
- B.1.5** All control stations will be checked by closed traverse and/or GPS, as appropriate. The accuracy of these control stations will be accessed on a regular basis and re-established accordingly. All stations will be recorded on Survey Control Station sheets.
- B.1.6** Each control station will be marked with a PGM (Permanent Ground Marker). Witness diagrams will include the full 3-D co-ordinates generated, a sketch diagram and measurements to at least three fixed details, written description of the mark and a photograph of the control point in its environs.
- B.1.7** Prior to entry into the field all equipment will be checked, and all pre-survey information will be logged onto the field computer and uploaded onto survey equipment as appropriate. The software in the field computer will be verified and all cabling between the GPS and/or TST and computer will be checked. Prior to conducting the survey, the site will be reconnoitred for locations for a viable control network and check the line of sight and any possible hindrance to survey. Daily record sheets will be kept to record daily tasks and conditions.
- B.1.8** All spatial data will be periodically downloaded onto a field computer, and backed up onto CD, or DVD. It will be cleaned, validated and inspected.
- B.1.9** All survey data will be documented on daily survey record sheets. Information entered on these sheets includes key set up information (Instrument height etc.) as well as daily variables and errors/comments. All survey data will be digitally recorded in a raw

format and translated during the download process this shall allow for any errors to be cross referenced with the daily survey record and corrected accordingly.

- B.1.10 A weekly summary of survey work will be produced to access development and highlight problems. This information also will be recorded on the weekly survey journal. Technical support for the survey equipment and download software shall be available at all times. In those instances, where sites are remotely operated, all digital data will be backed up regularly and a copy returned to Oxford on a weekly basis.
- B.1.11 A site plan will initially be created by a rapid survey of relevant archaeological features by mapping their extent using a combination of TST and GPS. This will form the basis for deciding excavation strategy and will be updated as the excavation clarifies the extent of, and relationships between, archaeological features.
- B.1.12 Excavated archaeological interventions and areas of complex stratigraphy will be hand drawn. At least two Drawing Points (DPs) will be set in as a baseline and measurements taken off this by tape and offset. The hand drawn plans will be referenced to the digitally captured pre-site plan by measuring in the DPs with a TST or GPS. These hand drawn elements will then be scanned in, geo-referenced using the DPs as reference points and digitised following OA's digitising protocols. For further details on hand planning procedure please refer to the fieldwork guidelines.
- B.1.13 Where appropriate photogrammetry or rectified photography may be used to record standing structures or burials. This will be carried out in line with Standard OA procedures for photogrammetry or rectified photography.
- B.1.14 Survey data recorded in the field will be downloaded using appropriate downloading software, and saved as an AutoCAD Map DWG file, or an ESRI Shapefile. These files will be regularly updated and backed up with originals being stored on an OA server in Oxford.
- B.1.15 All drawings will be composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and OA Geomatics protocols. Once created, additional GIS/CAD work will normally be carried out at the local OA central office or at on-site remote locations when appropriate. Support for all GIS/CAD work will be available from OA's Oxford Office during normal office hours. The aim of the GIS/CAD work is to produce workable draft plans, which can be produced as stand-alone products, or can be readily converted to GIS format. Any hand-drawn plans will be scanned and digitised on site in the first instance. Subsequent plans will be added to the main drawing as it develops.
- B.1.16 All plan scans will be numbered according to their plan site number. Digital plans will be given a standard new plan number taken out from the site plan index.
- B.1.17 All digital data will be backed up incrementally on CD or DVD. On each Friday the entire data directory will be backed up and returned to Oxford where it will be copied onto the OA projects server. Each CAD drawing will contain an information layout which will include all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements will be made available as hard copy for archiving purposes.

B.2 Relevant industry standards and guidelines

- B.2.1 Historic England (2007) Understanding the Archaeology of Landscapes A Guide to Good Recording Practice.
- B.2.2 Historic England (2015), Metric Survey Specifications for Cultural Heritage.
- B.2.3 Historic England (2016), Understanding Historic Buildings A Guide to Good Recording Practice.
- B.2.4 Historic England (2017), Photogrammetric Applications for Cultural Heritage. Guidance for Good Practice.

B.3 Relevant OA manual and other supporting documentation

- B.3.1 OA South Metric Survey, Data Capture and Download Procedures
- B.3.2 OA South Digitising Protocols
- B.3.3 OA South GIS Protocols
- B.3.4 These will be superseded by the OA South Geomatics Manual (in progress).

APPENDIX C ENVIRONMENTAL EVIDENCE

C.1 Standard methodology – summary

- C.1.1 Different environmental and geoarchaeological sampling strategies may be employed according to established research targets and the perceived importance of the strata under investigation. Where possible an environmental specialist(s) will visit the site to advise on sampling strategies. Sampling methods will follow guidelines produced by Historic England and Oxford Archaeology. A register of samples will be kept. Specialists will be consulted where non-standard sampling is required (e.g. TL, OSL or archaeomagnetic dating) and if appropriate will be invited to visit the site and take the samples.
- C.1.2 Geoarchaeological sampling methods are site specific, and methodologies will be designed in consultation with the geoarchaeological manager on a site by site basis.
- C.1.3 Bulk soil samples, where possible of 40 litres or 100% of a deposit if less is available, will be taken from potentially datable features and layers for flotation for charred plant remains and for the recovery of small bones and artefacts. Larger soil samples (up to 100L) may be taken for the complete recovery of animal bones, marine shell and small artefacts from appropriate contexts. Smaller bulk samples (general biological samples) of 10-20 litres will be taken from any waterlogged deposits present for the recovery of macroscopic plant remains and insects. Series of incremental 2L samples may be taken through buried soils and deep feature fills for the recovery of snails and/or waterlogged plant remains, depending on the nature of the stratigraphy and of the soils and sediments. Columns will be taken from buried soils, peats and waterlogged feature fills for pollen and/or phytoliths, diatoms, ostracods and foraminifera if appropriate. Soil samples will be taken for soil investigations (particle size, organic matter, bulk chemistry, soil micromorphology etc.) and possibly for metallurgical analysis in consultation with the appropriate specialists.
- C.1.4 Bulk samples from dry deposits will be processed by standard water flotation using a modified Siraf-style machine and meshes of 0.25mm (flot) and 0.5 or 1mm depending on sediment type and like modes of preservation (residue). Heavy residues will be wet sieved, air dried and sorted. Samples taken exclusively for the recovery of bones, marine shell or artefacts will be wet sieved to 2mm. Waterlogged samples (1L sub-sample) and snail samples (2L) will be processed by hand flotation with flots and residues collected to 0.25mm (waterlogged plants) and 0.5mm (snails) respectively; these flots and residues will be sorted by the specialist. Samples specifically taken for insects, pollen, other microflora and microfauna, metallurgy and soil analysis will be submitted as whole earth to the appropriate specialists or processed following their instructions.

C.2 Relevant industry standards and guidelines

- C.2.1 Historic England 2010. Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood.
- C.2.2 Historic England 2011. Environmental Archaeology. A guide to the theory and practice of methods, from sampling and recovery to post excavation, (2nd ed)

- C.2.3 Historic England 2004. Dendrochronology: Guidelines on Producing and Interpreting Dendrochronological Dates (revision due 2020).
 - C.2.4 University of Bradford 2019 Archaeomagnetism: Magnetic Moments in the Past <https://www.brad.ac.uk/archaeomagnetism/>
 - C.2.5 Historic England 2008. Luminescence Dating. Guidelines on Using Luminescence Dating in Archaeology (revision due 2020).
 - C.2.6 Historic England 2008. Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains (currently being revised).
 - C.2.7 Historic England 2015. Archaeometallurgy. Guidelines for Best Practice.
 - C.2.8 Historic England 2015 Geoarchaeology. Using Earth Sciences to Understand the Archaeological Record.
 - C.2.9 Historic England 2017. Organic Residue Analysis and Archaeology.
 - C.2.10 Baker, P and Worley, F 2019. Animal Bones and Archaeology: Recovery to Archive. Historic England
- C.3 Relevant OA manual and other supporting documentation**
- C.3.1 Oxford Archaeology 2017. Environmental Sampling Guidelines, 4th ed.

APPENDIX D ARTEFACTUAL EVIDENCE

D.1 Standard methodology - summary

- D.1.1 Before a site begins arrangements concerning the finds will be discussed with the Finds Team Leader. Information will be provided by the project manager about the nature of the site, the expected size and make-up of the finds assemblage and any site specific finds retrieval strategies. On-site requirements will be discussed and a conservator appointed who can be called on to make site visits if required. Special requirements regarding particular categories of material will be raised at this early stage for instance the likelihood of recovering assemblages of waterlogged material, large timbers, quantities of structural stone or ceramic building material. Specialists may be required to visit sites to discuss retrieval strategies.
- D.1.2 The project manager will supply the Finds Team Leader with contact details of the landowner of the site so that consent to deposit any finds resulting from the investigation can be sought.
- D.1.3 The on-site retrieval, lifting and short term packaging of bulk and small finds will follow the detailed guidelines set out in the OA Finds Manual (sections 2 and 3), First Aid for Finds and the UKIC conservation guidelines No.2.
- D.1.4 All finds recovered from site will be transported to an OA regional office for processing; local sites will return finds at the end of each day, away based sites at the end of each week. Special arrangements can be discussed for certain sites with the Team Leader before the start of a project. Larger long running sites may in some instances set up on-site processing units to deal with the material from a particular site.
- D.1.5 All finds qualifying as Treasure will be removed to a safe place and reported to the local Coroner according to the procedures relating to the Treasure Act (1996), and the Treasure (Designation) Order 2002. Where removal cannot be effected on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft.
- D.1.6 Each box of finds will be accompanied by a finds context checklist itemising the finds within each box. The number of bags of finds from each context and individual small find from each context will be recorded. A member of the processing team will check the list when it arrives in the department. There are separate forms for finds recovered from fieldwalking.
- D.1.7 The processing programme is reviewed on a weekly basis and priorities are worked out after discussions with the Fieldwork Team Leader and the Post-excavation Team Leader. Project managers will keep the Finds Team Leader informed of any pressing deadlines that they are aware of. All finds from evaluations are dealt with as a matter of priority.
- D.1.8 All bulk finds are washed (where appropriate), marked, bagged and boxed by the processing team according to the guidelines set out in section 4 and 5 of the OA Finds Manual, First-aid for finds and the UKIC guidelines No.2. They must also take into account the requirements of the receiving museum. Primary data recording count and weight of fragments by material from each context is recorded on the site database.

- D.1.9 Unstable and sensitive objects are recorded onto the database and then packaged and stored in controlled environments according to their individual requirements. The advice of a conservator will be sought for sensitive objects in need of urgent conservation. All metalwork will be x-rayed prior to assessment (and to meet the requirements of most receiving museums).
- D.1.10 Finds recovered from the environmental sample processing will be incorporated into the main assemblage and added to the database.
- D.1.11 On completion of the processing and data entry a finds file for each archaeological investigation will be produced, a summary of which is available for the project manager. The assemblage is allocated an OA number for storage purposes. Bulk finds are stored on a roller racking system, metals in a secure controlled storage and organic finds are refrigerated where possible.
- D.1.12 The movement of finds in and out of the storage areas is strictly monitored and recorded. Carbon copy transit forms exist to record this information. Finds will not be removed from storage without the prior knowledge of the Finds Team Leader.
- D.1.13 Finds information summarised in the finds compendium is used to assess the finds requirements for the post excavation stages of the project. The Team Leader holds a list of all specialists used by OA (see below) both internal and external.
- D.1.14 On completion of the post excavation stage of the project the team prepares the finds assemblage for deposition with the receiving museum. Discussions will be held with the museum, the excavator and the Finds Team Leader to finalise any selection, retention or discard policy. Most museums issue strict guidelines for the preparation of archives for deposition with their individual labelling, packaging and recording requirements.

D.2 Relevant industry standards and guidelines

- D.2.1 UKIC, 1983, Packaging and Storage of Freshly-Excavated Artefacts from Archaeological Sites. Conservation Guidelines No.2. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.2 UKIC, 1988, Excavated Artefacts and Conservation: UK sites Revised Edition. Conservation Guidelines No.1. Archaeology Section, United Kingdom Institute for Conservation.
- D.2.3 Society of Museum Archaeologists, 1993, Selection, retention and dispersal of Archaeological Collections. Download available via <http://www.socmusarch.org.uk/publica.htm>)
- D.2.4 Watkinson, D E & Neal, V, 1998, First Aid for Finds (3rd edition). RESCUE & UKIC

D.3 Relevant OA manual and other supporting documentation

- D.3.1 Allen, L, and Cropper, C (internal publication only) Oxford Archaeology Finds Manual.

APPENDIX E HUMAN REMAINS

E.1 Standard methodology - summary

- E.1.1 Human remains will not be excavated without a relevant licence/faculty and, where applicable (for example, a post medieval cemetery), a risk assessment from the local environmental officer.
- E.1.2 All human remains will be treated with due care and regard to the sensitivities involved, and will be screened from the public throughout the course of the works.
- E.1.3 Excavation will be undertaken in accordance with ClfA (Roberts and McKinley 1993), Historic England (2018), the Advisory Panel on the Archaeology of Burials in England (APABE, 2015, 2017) and British Association of Biological Anthropology and Osteoarchaeology Code of Practice (2019) and Code of Ethics (2019). For crypts and post-medieval burials, the recommendations set out by the ClfA (Cox 2001) and by the Association of Diocesan and Cathedral Archaeologists and APABE (2010) are also relevant.
- E.1.4 In accordance with recommendations set out in the Historic England and Church of England (2005) and updated by the Advisory Panel on the Archaeology of Burials in England (2017), skeletons will not be excavated beyond the limits of the trench, unless they are deemed osteologically or archaeologically important.
- E.1.5 Where any soft tissue survives and/or materials (for example, inner coffins, mattresses and other paddings) soaked in body liquor, no excavation or handling of the remains will take place until an appropriate risk assessment has been undertaken. Relevant protocols (i.e. Cox 2001) for their excavation, recording and removal will be adhered to.
- E.1.6 OA does not excavate or remove modern burials (those less than 100 years old) and does not remove or open sealed lead coffins. Appropriate PPE (e.g. chemical suit, latex gloves) will be worn by all staff when working with lead coffins.
- E.1.7 Graves and their contents will be hand excavated in plan. Each component (for example, skeleton, grave cut, coffin (or remains of), grave fill) will be assigned a unique context number from a running sequence. A group number will also be assigned to all of these, and small finds numbers to features such as coffin nails, hobnails and other grave goods (as appropriate).
- E.1.8 Soil samples will be normally taken during the excavation of inhumations, usually from the region of the skull, chest, right hand, left hand, abdomen and pelvis, right foot and left foot. Infants (circa. less than 5 years) will normally be recovered as bulk samples. Soil samples will also be taken from graves that appear to contain no human bone.
- E.1.9 Burials (including the skeleton, cremation, coffin fittings, coffin, urn, grave goods / other) will be recorded by photographic and written record using specialised pro forma context sheets, although these records may only include schematic representations of the location and position of the skeletons, depending on the nature and circumstances of the burial.

- E.1.10 Where digital imaging is used it will be done in accordance with the British Association of Biological Anthropology and Osteoarchaeology Recommendations on the Ethical Issues Surrounding 2D and 3D Digital Images of Human Remains (2019).
- E.1.11 Where necessary, hand drawn plans (usually at 1:10, sometimes 1:5) will be made, especially of contexts where required details cannot be adequately seen using photography (for example, urned cremations; undisturbed hob nails).
- E.1.12 Levels will be taken. For inhumations this will be on the skull, pelvis and feet as a minimum.
- E.1.13 Human remains that are exhumed will be bagged and labelled according to skeletal region and carefully packed into suitable containers (for example, acid free cardboard boxes) and transported to a suitable storage location. Any associated coffins and coffin fittings will be contained with the human remains wherever possible.
- E.1.14 Urned cremations will not usually be half sectioned, but excavated in spits and/or quadrants (i.e. large deposits or spreads), or recovered as a bulk sample.
- E.1.15 Wherever possible, urned cremations will be carefully bandaged, recovered whole and will be excavated in spits in the laboratory, as per the recommendations of McKinley (2004, 2017).
- E.1.16 Unless deemed osteologically or archaeologically important disarticulated bone / chanel will be collected and reserved for re-burial if immediate re-internment as close to its original position is not practicable. In some instances, a rapid scan of this material may be undertaken by a qualified osteologist, if deemed relevant.
- E.1.17 If undisturbed, pyre sites will normally be excavated in quadrants, at the very least in 0.5 m blocks of 0.5 m spits.
- E.1.18 Pyre debris dumps will be half sectioned or quadrant and will be subject to 100% sampling.
- E.1.19 Wooden and lead coffins and any associated fittings, including fixing nails will be recorded on a pro forma coffin recording sheet. All surviving coffin fittings will be recorded by reference to Reeve and Adams (1993) and the unpublished master catalogue that is being compiled by OA. Where individual types cannot be paralleled, they will be drawn and/ or photographed and assigned a style number. Biographical details obtained from legible departum plate inscriptions will be recorded and further documentary research will be made.
- E.1.20 Funerary structures, such as brick shaft graves and/or vaults will be recorded by photogrammetry or hand-drawn at a scale of 1:10 or 1:20, as appropriate. Location, dimensions and method of construction will be noted, and the structure added to the overall trench plan.
- E.1.21 Memorials, including headstones, revealed within the areas of development will be recorded irrespective of whether they are believed to be in situ.
- E.1.22 Where required, memorials will be accorded an individual context number and will also be included as part of the grave group, if the association with a burial is clear.

E.1.23 Memorials will be recorded on pro-forma context sheets, based on and following the guidelines set out by Mytum (2002), and will include details of:

- Shape
- Dimensions
- Type of stone used
- Condition, completeness and fragmentation of stones, no longer in original positions
- Iconography (an illustration may best describe these features)
- Inscription (verbatim record of inscription; font of the lettering)
- Stylistic type

E.2 Relevant industry standards and guidelines

- E.2.1 Advisory Panel on the Archaeology of Burials in England, 2013, Science and the Dead. A guideline for the destructive sampling of archaeological human remains for scientific analysis. English Heritage Publishing.
- E.2.2 Advisory Panel on the Archaeology of Burials in England, 2017 Guidance for Best Practice for the Treatment of Human Remains Excavated from Christian Burial Grounds in England
- E.2.3 Advisory Panel on the Archaeology of Burials in England, 2015 Large Burial Grounds. Guidance on sampling in archaeological fieldwork projects
- E.2.4 Association of Diocesan and Cathedral Archaeologists and APABE, 2010 Archaeology and Burial Vaults. A guidance note for churches. Guidance Note 2
- E.2.5 British Association of Biological Anthropology and Osteoarchaeology. 2019a Code of Practice (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.6 British Association of Biological Anthropology and Osteoarchaeology. 2019b Code of Ethics (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.7 British Association of Biological Anthropology and Osteoarchaeology, 2019c Recommendations on the Ethical Issues Surrounding 2D and 3D Digital Images of Human Remains (<http://www.babao.org.uk/index/ethics-and-standards>)
- E.2.8 Cox, M, 2001 Crypt archaeology. An approach. ClfA Paper No. 3
- E.2.9 English Heritage, 2002 Human Bones from Archaeological Sites. Guidelines for producing assessment documents and analytical reports
- E.2.10 Historic England, 2018 The Role of the Human Osteologist in an Archaeological Fieldwork Project. Swindon, Historic England
- E.2.11 McKinley, J, and Roberts, C, 1993 Excavation and post-excavation treatment of cremated and inhumed human remains, ClfA Technical Paper No. 13

- E.2.12 McKinley, J, 2004 Compiling a skeletal inventory: cremated human bone. In Brickley, M, and McKinley, J (eds) Guidelines to the Standards for Recording Human Remains, ClfA Technical Paper No. 7. 9-13
- E.2.13 McKinley, J, 2017 Compiling a skeletal inventory: cremated human bone. In Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, ClfA 14-19
- E.2.14 Mitchell P, and Brickley, M (eds) Updated Guidelines to the Standards for Recording Human Remains, ClfA 2017
- E.2.15 Mytum, H, 2000 Recording and Analysing Graveyards. CBA Handbook No. 15
- E.2.16 Reeve, J, and Adams, M, 1993 The Spitalfields Project. Volume I – The Archaeology Across the Styx. CBA Research Report No. 85
- E.2.17 The Human Tissue Act 2004

E.3 Relevant OA manual and other supporting documentation

- E.3.1 Loe, L, 2008 The Treatment of Human Remains in the Care of Oxford Archaeology. Oxford Archaeology internal policy document
- E.3.2 Oxford Archaeology 2018 *Fieldwork Manual Human Remains* unpublished

APPENDIX F REPORTING

F.1 Standard methodology - summary

F.1.1 For Watching Briefs and Evaluations, the style and format of the report will be determined by OA, but will include as a minimum the following:

- A location plan of trenches and/or other fieldwork in relation to the proposed development.
- Plans and sections of features located at an appropriate scale.
- A section drawing showing depth of deposits including present ground level with Ordnance Datum, vertical and horizontal scale.
- A summary statement of the results.
- A table summarising the features, classes and numbers of artefacts contained within, spot dating of significant finds and an interpretation.
- A reconsideration of the methodology used, and a confidence rating for the results.
- An interpretation of the archaeological findings both within the site and within their wider landscape/townscape setting.

F.1.2 For Excavations, a Post-Excavation Assessment and Project Design will generally be prepared, as prescribed by Historic England Management of Research Projects in the Historic Environment (MoRPHE) 2006, Section 2.3. This will include a Project Description containing:

- A summary description and background of the project.
- A summary of the quantities and assessment of potential for analysis of the information recovered for each category of site, finds, dating and environmental data. Detailed assessment reports will be contained within appendices.
- An explicit statement of the scope of the project design and how the project relates to any other projects or work preceding, concurrent with or following on from it.
- A statement of the research aims of the fieldwork and an illustrated summary of results to date indicating to what extent the aims were fulfilled.
- A list of the project aims as revised in the light of the results of fieldwork and the current post-excavation assessment process.

F.1.3 A section on Resources and Programming will also be produced, containing:

- A list of the personnel involved indicating their qualifications for the tasks undertaken, along with an explanation of how the project team will communicate, both internally and externally.
- A list of the methods which will be used to achieve the revised research aims.

- A list of all the tasks involved in using the stated methods to achieve the aims and produce a report and research archive in the stated format, indicating the personnel and time in days involved in each task. Allowance should be made for general project-related tasks such as monitoring, management and project meetings, editorial and revision time.
- A cascade or Gantt chart indicating tasks in the sequence and relationships required to complete the project. Due allowance will be made for leave and public holidays. Time will also be allowed for the report to be read by a named academic referee as agreed with the County Archaeological Officer, and by the County Archaeological Officer.
- A report synopsis indicating publisher and report format, broken down into chapters, section headings and subheadings, with approximate word lengths and numbers and titles of illustrations per chapter. The structure of the report synopsis should explicitly reflect the research aims of the project.

F.1.4 The Project Design will be submitted to the County Archaeological Officer or equivalent for agreement.

F.1.5 Under certain circumstances (e.g. with very small mitigations), and as agreed with the County Archaeological Officer or equivalent, a formal Assessment and Project Design may not be required and either the project will continue straight to full analysis, or a simple Project Proposal (MoRPHE 2006 Section 2.1) will be produced prior to full analysis. This proposal may include:

- A summary of the background to the project
- Research aims and objectives
- Methods statement outlining how the aims and objectives will be achieved
- An outline of the stages, products and tasks
- Proposed project team
- Estimated overall timetable and budget if appropriate.

F.1.6 Once the post-excavation Project Design or Project Proposal has been accepted, the County Archaeological Officer or his appointed deputy will monitor the progress of the post-excavation project at agreed points. Any significant variation in the project design will be agreed with the County Archaeological Officer.

F.1.7 The results of the project will be published in an appropriate archaeological journal or monograph. The appropriate level of publication will be dependent on the significance of the fieldwork results and will be agreed with the County Archaeological Officer. An OASIS (Online Access to the Index of Archaeological Investigations) form will be completed for each project as per Historic England guidelines.

F.2 Relevant industry standards and guidelines

F.2.1 Oxford Archaeology (OA) adheres to the national standards in post-excavation procedure as outlined in Historic England's Management of Research Projects in the Historic Environment (MoRPHE; EH 2006). Furthermore, all post-excavation projects

take into account the appropriate regional research frameworks as well as national research agendas such as the Framework for Historic Environment Activities & Programmes in Historic England (SHAPE; EH 2008).

APPENDIX G LIST OF SPECIALISTS REGULARLY USED BY OA

G.1.1 Below are two tables, one containing 'in-house' OA specialists, and the other containing a list of external specialists who are regularly used by OA.

Internal archaeological specialists used by OA

Specialist	Specialism	Qualifications
John Cotter	Medieval and Post Medieval pottery, Clay Pipe and CBM	BA (Hons), MCIfA
Dr Alex Davies	Prehistoric Pottery	BA (Hons), MA, PhD, ACIfA
Edward Biddulph	Roman Pottery	BA (Hons), MA, MCIfA
Kate Brady	Roman Pottery	BA, ACIfA
Cynthia Poole	CBM and Fired Clay	BA (Hons), MSc
Leigh Allen	Metalwork and worked bone	BA (Hons), PGDip
Dr Ruth Shaffrey	Worked stone artefacts	BA, PhD, MCIfA
Julian Munby	Architectural Stone	BA, FSA
Dr Rebecca Nicholson	Fish and Bird Bone	BA (Hons), MA, D.Phil, MCIfA, FSA Scot
Dr Lee Broderick	Animal bone	BA (Hons), MA, MSc, FZG, SAC Dip (ecology), PhD
Dr Mairead Rutherford	Pollen	BSc, MSc
Ian Smith	Animal Bone	BA (Hons), MSc, PCIfA
Dr Martyn Allen	Animal Bone	BA (Hons), MA, PhD
Dr Denise Druce	Charred plant remains, charcoal and pollen	BA (Hons), PhD, MCIfA
Sharon Cook	Charred plant remains	BSc, MSc, ACIfA
Elizabeth Stafford	Geoarchaeology and land snails	BA (Hons), MSc
Carl Champness	Geoarchaeology	BA (Hons), MSc, ACIfA
Nicola Scott	Archaeological archive deposition	BA (Hons Dunelm)
Mike Donnelly	Flint	BSc, MCIfA
Dr Louise Loe	Human Bone	BA PhD, MCIfA, BABAO
Helen Webb	Human Bone	BSc, MSc, MCIfA, BABAO
Mark Gibson	Human Bone	BA, MSc, ACIfA, BABAO
Dr Lauren McIntyre	Human Bone	BSc, MSc, PhD, MCIfA, BABAO
Ui Choileain	Human Bone	Pg Dip, MA, Msc, BABAO
Natasha Dodwell	Human Bone	BA, MSc, BABAO

External archaeological specialists regularly used by OA

Specialist	Specialism	Qualifications
Lynne Keys	Slag	BA (Hons)
Quita Mould	Leather	BA, MA
Penelope Walton Rogers, The Anglo Saxon Laboratory	Identification of Medieval Textiles	FSA, Dip.Acc
Dana Goodburn-Brown	Conservation	BSc (Hons), BA, MSc
Steve Allen, York Archaeological Trust	Conservation	BA, MA, MAAIS
Dr Richard Macphail	Soils, especially Micromorphology	BA (Hons), MSc, PhD
Dana Challinor	Charcoal	MA, MSc
Dr Nigel Cameron	Diatoms	BSc, MSc, PhD
Dr David Smith	Insects	BA (Hons), MA, PhD
Professor Adrian Parker	Phytoliths and pollen	BSc (Hons), D.Phil
Dr David Starley	Metalworking Slag	BSc (Hons), PhD
Wendy Carruthers	Charred and waterlogged plant remains	BA (Hons)
Dr John Whittaker	Ostracods and Foraminifera	BA (Hons), PhD
Dr John Crowther	Soil Chemistry	MA, PhD
Dr Martin Bates	Geoarchaeology	BSc, PhD
Dr Dan Miles	Dendrochronology	D.Phil, FSA
Dr Jean-Luc Schwenninger	Optically Stimulated Luminescence Dating	PhD
Dr David Higgins	Clay Pipe	BA, PhD, MCIfA
Dr Hugo Anderson- Wymark	Flint	BSc, PhD, FSA Scot, MCIfA
Dr Damian Goodburn- Brown	Ancient Woodwork	BA, PhD

APPENDIX H DOCUMENTARY ARCHIVING

Standard methodology – summary

- H.1.1 The documentary archive constitutes all the written, drawn, photographic and digital records relating to the set up, fieldwork and post-excavation phases of the project. This documentary archive, together with the artefactual and environmental ecofact archive collectively forms the record of the site. The report is part of the documentary archive, and the archive must provide the evidence that supports the conclusions of the report, but the archive may also include data which exceeds the limitations of research parameters set down for the report and which could be of significant value to future researchers.
- H.1.2 At the outset of the project OA Archive manager will contact the relevant local receiving museum or archive repository to notify them of the imminent start of a new fieldwork project in their collecting area. Relevant local archiving guidelines will be observed and site codes, which integrate with the receiving repository, will be agreed for labelling of archives and finds.
- H.1.3 Where there is currently no receiving museum for the project archive, although responsibility for the archive ultimately lies with the client, OA will hold the archive on their behalf for a period of up to 3 years after completion of the report, after which time (in the event that a suitable depository has not been secured) provision for further storage of the archive will be made in agreement with Oxford Archaeology, the client and the relevant planning archaeologist.
- H.1.4 During the course of the project the Archive team will assist the Project Manager in the management of the archive including the cataloguing and development technique suitable for photographic archive requirements.
- H.1.5 The hard copy site archive will be security copied by scanning to PdFA and a copy of this will be housed on the OA Archive Server. A full digital copy of the archive, including scanned hard copy and born digital data, will be deposited with and made publicly available on-line through the ADS. A further copy will be maintained on the OA server and if requested a copy on disk will also be sent to the receiving museum with the hard copy. This will act as a safeguard against the accidental loss and the long-term degeneration of paper records and photographs.
- H.1.6 Born digital data will only be printed to hard copy for the receiving museum where practical. Archive elements that need maintaining in digital form will be sent to ADS in accordance with Arches Standard and ADS guidelines. A copy will be sent to the receiving museum by CD and back-up copies will be stored on the OA digital network. In most cases a digital copy of the report will be included in the OASIS project library hosted by ADS.
- H.1.7 Prior to deposition the Archive team will contact the museum regarding the size and content of the archive and discuss any retention and dispersal policies which may be applicable in line with local and SMA Guidelines ' Selection, Retention & Dispersal of Archaeological Collections' 1993.

- H.1.8 The site archive will then be deposited with the relevant receiving museum or repository at the earliest opportunity unless further archaeological work on the site is expected. The documentary archive will include correspondence detailing landowner consent to deposit the artefacts and any copyright licences in accordance with the receiving museum guidelines. Deposition charges will be required from the client as part of the project costs but the level of the fee is set by the receiving body, and may be subject to change during the lifespan of the project. Changes to archiving charges beyond OA's control will be passed across to the client.
- H.1.9 Oxford Archaeology will retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it will provide the receiving repository or museum for the archive with a full licence for use to the client in all matters directly relating to the project as described in the Written Scheme of Investigation, and in line with the relevant receiving body guidelines.
- H.1.10 OA will advise the receiving repository or museum for the archive of 3rd party materials supplied in the course of projects which are not OA's copyright.
- H.1.11 OA undertakes to respect all requirements for confidentiality about the client's proposals provided that these are clearly stated. It is expected that such conditions shall not unreasonably impede the satisfactory performance of the services required. Archaeological findings and conclusions can be kept confidential for a limited period but will be made publicly available in line with the above procedure either after a specified time period agreed with the client at the outset of the project, or where no such period is agreed, after a reasonable period of time. It is expected that clients respect OA's general ethical obligations not to suppress significant archaeological data for an unreasonable period.

H.2 Relevant industry standards and guidelines

- H.2.1 At the end of the project the site archive will be ordered, catalogued, labelled and conserved and stored according to the following national guidelines:
- H.2.2 The 2014 EAC Guidelines A Standard and Guide to the Best Practice for Archaeological Archiving in Europe (GB) Perrin K, Brown E et al.
- H.2.3 The 2014 CIFA Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives.
- H.2.4 The 2011 AAF guide Archaeological Archives A Guide to Best Practice in Creation, Compilation, Transfer and Curation. Brown D.
- H.2.5 The UKIC's Guidelines for the preparation of excavation archives for long-term storage.
- H.2.6 The MGC's Standards in the museum care of archaeological collections.
- H.2.7 Local museum guidelines such as Museum of London Guidelines: (<http://www.museumoflondonarchaeology.org.uk/English/ArchiveResearch/DeposRe> source) will be adopted where appropriate to the archive collecting area.
- H.2.8 The site archive will be prepared to at least the minimum acceptable standard defined in Management of Archaeological Projects 2, Historic England 1991.

H.3 Relevant OA manual and other supporting documentation

H.3.1 The OA Archives Policy.

APPENDIX I HEALTH AND SAFETY

I.1 Standard Methodology - summary

- I.1.1 All work will be undertaken in accordance with the current OA Health and Safety Policy, the OA Site Safety Procedures Manual, a site-specific Risk Assessment and, if required, Safety Plan or Method Statement. Copies of the site-specific documents will be submitted to the client or their representative for approvals prior to mobilisation, and all relevant H and S documentation will be available on site at all times. The Health and Safety documentation will be read in conjunction with the project WSI.
- I.1.2 Where a project falls under the Construction (Design and Management) Regulations (2015), all work will be carried out in accordance with the Principal Contractor's Construction Phase Plan (CPP).

I.2 Relevant industry standards and guidelines

- I.2.1 All work will be carried out according to the requirements of all relevant legislation and guidance, including, but not exclusively:
 - I.2.2 The Health and Safety at Work Act (1974).
 - I.2.3 Management of Health and Safety at Work Regulations (1999).
 - I.2.4 Manual Handling Operations Regulations 1992 (as amended).
 - I.2.5 The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (2013).
 - I.2.6 The Construction (Design and Management) Regulations (2015).
 - I.2.7 Relevant OA manual and other supporting documentation
 - I.2.8 The OA Health and Safety Policy.
 - I.2.9 The OA Site Safety Procedures Manual.
 - I.2.10 The OA Risk Assessment templates.
 - I.2.11 The OA Method Statement template.
 - I.2.12 The OA Construction Phase Plan template.



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APPENDIX B DESCRIPTION AND CONTEXT INVENTORY

Area 1						
General description					Orientation	n/a
Area stripped of topsoil and subsoil with two beam slots and pits for three pads excavated to support site accommodation, revealing wall footings and possible flagstone surface, overlain by a garden soil					Length (m)	100m
					Width (m)	85m
					Avg. depth (m)	0.4m
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
100	Layer	n/a	0.13-0.27	Topsoil; mid greyish brown sandy silt with CBM and small rounded pebbles	-	-
101	Layer	n/a	0.15	Subsoil; mid-greyish brown sandy silt, no inclusions	-	-
102	Layer	n/a	-	Natural; mid orange/yellow sand	-	-
103	Structure	0.6	0.4	Wall footings	-	Post-medieval
104	Structure	>1m	0.5	Wall footings	-	Post-medieval
105	Layer	n/a	0.53	Mid greyish brown sandy silt including CBM, fe objects, glass and small amounts of Post-medieval pottery	Post-medieval ceramics, iron objects, glass and CBM	Post-medieval

Area 2						
General description					Orientation	E-W
No archaeology revealed. Consists of topsoil overlying natural geology of silty clay alluvium.					Length (m)	660m
					Width (m)	10m
					Avg. depth (m)	0.20m
Context No.	Type	Width (m)	Depth (m)	Description	Finds	Date
200	Layer	n/a	0.1-0.2	Topsoil	-	-
201	Layer	n/a	n/a	Natural alluvial deposits of reddish brown and yellowish grey clay silt	-	-

APPENDIX C ENVIRONMENTAL REPORTS

C.1 Palaeoenvironmental Coring

By Mairead Rutherford

Introduction

C.1.1 Adjacent to Tarvin Road, on the western side of the Cheshire Plain and close to the River Gowy, a core (TR-1) was collected (by terrier rig) from an area that was shown to contain pockets of peat during a previous borehole investigation survey (Mott McDonald 2019). The lithology of the core was assessed and sub-samples taken for pollen assessment. This report presents the results of these assessments.

Methodology

C.1.2 The monoliths were cleaned, and the lithology described prior to sub-sampling. Recording of lithology followed English Heritage Geoarchaeology and Environmental Archaeology Guidelines (Ayala *et al* 2007; Campbell *et al* 2011).

C.1.3 Pollen processing was undertaken by RPS at their Northwich Laboratory, Cheshire, and followed standard procedures (method B of Berglund and Ralska-Jasiewiczowa 1986), using HCL, NaOH, sieving, HF and Erdtman's acetolysis, to remove carbonates, humic acids, particles >170microns, silicates and cellulose, respectively. The samples were then stained with safranin, dehydrated in tertiary butyl alcohol, and the residues mounted in 2000cs silicone oil. Slides were examined at a magnification of x400 by ten equally spaced traverses across a slide or until at least 100 pollen grains were counted. Pollen identification was made following the keys of Moore *et al* (1991), Faegri and Iversen (1989) and a small, modern reference collection. Plant nomenclature follows Stace (2010). Fungal spores and other non-pollen palynomorphs (NPP) utilise the key of van Geel (1978). The preservation of the pollen was noted and an assessment was made of the potential for further analysis.

Results

Lithology

C.1.4 Five 1m-long cores were retrieved from the site. The top 1m of topsoil and clay was cleared to establish a base for the terrier rig. A total of 5m of sediments (1m – 6m depth below ground level (bgl)) was collected (Plate 5), wrapped in 1m-long plastic casing and labelled, prior to transport back to the laboratory at OA North.

C.1.5 The samples were opened, cleaned and the lithologies logged (Table 1). Sub-samples focused on the interval with greatest potential for recovery of palynomorphs, between 1.95m and 2.65m. No peat was encountered within the cores.

Depth (m)	Lithology	Sub-samples
0-1.0	Not recovered	
1-1.30	Void	
1.30-1.67	Grey, slightly sandy silty clay with orange partings/staining from orange sand; stones / gravel. Gradual lower boundary.	

Depth (m)	Lithology	Sub-samples
1.67-1.71	Black/dark grey very silty sticky clay and charcoal fragments, stones. Gradual upper boundary.	
1.71-1.95	Very soft fine orange sand with large stones and pebbles / gravel. Sharp upper and lower contacts.	
1.95-2.70	Medium – dark grey silty clay, slightly sandy at 2.60-2.70m. Sharp upper and lower contacts.	1.97-1.98 2.09-2.10 2.39-2.40 2.59-2.60 2.63-2.64
2.70-3.00	Grey fine to coarse sand with stones/gravel.	
3.00-4.00	Orange sand with stones and pebbles / gravel. Inorganic.	
4.00-4.20	Void	
4.20-4.50	Yellow/Orange coarse to medium sand. Sharp lower contact.	
4.50-5.00	Very stiff orange clay.	
5.00-6.00	Medium stiff red/orange clay.	

Table 1: Lithologies and sub-sampling, Tarvin Road core

Pollen

C.1.6 The raw pollen data are presented on Table 2. Although pollen was present in five of the eight sub-samples assessed, only two levels (at 1.98m and 2.10m) provided sufficient pollen for initial interpretation and of these, only the sub-sample at 2.10m contains a sufficiently diverse assemblage on which to base an interpretation. The data presented below are therefore largely referable to this one sub-sample. Pollen preservation is good to very good. Abundant plant debris, including structured plant matter, is commonly recorded on the productive slides.

Sample Number	Tarvin Road Core-1	TR-1a	TR-1b	TR-1c	TR-1d	TR-1e	TR-1f	TR-1g	TR-1h
Preservation		-	-	-	Good	Good	Good	Good	Good
Potential		NO	NO	NO	Poss	YES	NO	Poss	NO
Depth (m)		1.44	1.60	1.68	1.98	2.10	2.40	2.60	2.64
Trees and Shrubs									
<i>Acer</i>	Sycamore								1
<i>Alnus</i>	Alder					16	5	4	5
<i>Calluna</i>	Heather				5	9	3	2	2
<i>Corylus avellana</i> -type	Hazel-type						1		
<i>Hedera</i>	Ivy					5			1
<i>Lonicera</i>	Honeysuckle					1	1		
<i>Pinus</i>	Pine				3	6		1	1
<i>Quercus</i>	Oak						2	2	1
Rosaceae	Wild roses					1			
<i>Sorbus</i> -type	Rowans						1		
Crops									
Cerealia / large grasses	Cereal-type				9	37	3	4	3
Herbs									
Asteraceae	Daisy family					7	1	2	

Caryophyllaceae	Pinks family					3			1
<i>Centaurea nigra</i>	Common knapweed						1		
Chenopodiaceae	Goosefoot family					1			
<i>Cirsium</i> -type	Thistles						2	1	1
Cyperaceae	Sedges				1	119	9	29	7
<i>Epilobium</i> -type	Willowherbs					2		1	
Fabaceae	Pea family					2			
<i>Mentha</i> -type	Mint family					1			
Poaceae	Grass family				3	50	4	5	6
<i>Plantago lanceolata</i>	Ribwort plantain					2		2	
<i>Persicaria maculosa</i>	Redshank					4			2
<i>Ranunculus</i> -type	Buttercup-type					4		1	1
<i>Rumex</i> -type	Docks/Sorrels							1	
<i>Stellaria</i> -type	Stitchworts					1		1	1
<i>Succisa pratensis</i>	Devil's Bit Scabious		1		66	12	2	1	3
<i>Taraxacum</i> -type	Dandelion-type	1			13	23	9	15	7
	Total land pollen	1	1	0	100	306	44	72	43
	Number of traverses	10	10	10	10	10	10	10	10
Ferns and Mosses									
<i>Equisetum</i> -type	Horsetails								1
<i>Ophioglossum</i> -type	Adder's Tongues					1			
<i>Polypodium vulgare</i>	Common polypody	1		3	95	48	19	15	12
<i>Pteridium</i>	Bracken				1	2			1
Pteropsida (monolete)	Fern spores (monolete)					4	3	5	2
Aquatics									
<i>Nuphar lutea</i>	Yellow water-lilies						1		
<i>Potamogeton</i>	Pondweed					1		1	
<i>Typha latifolia</i>	Bulrush					3			
Moss spores									
<i>Sphagnum</i>	Moss spores					2			
Non-pollen palynomorphs									
Freshwater algae	Undifferentiated				8	1			
Zygnemataceae	HdV-313					4	6	12	2
<i>Caryospora callicarpa</i>									1
<i>Diporothea</i> HdV-143					1				

<i>Glomus</i> HdV-207		8		6	1			1	2
<i>Podospora</i> HdV-368					2		1		
<i>Sordaria</i> HdV-55A/B					1				1
<i>Trichuris</i> HdV-531									1
Undiff. fungal spores					8	14			2
Microscopic charcoal				3	2	3	1		
Deteriorated grains				1	2	3		2	2

Table 2: Raw pollen counts for core TR-1, Tarvin Road, Cheshire

- C.1.7 The pollen is dominated by sedges (Cyperaceae) and grasses (Poaceae), with pollen of cereal-type/large grasses and dandelion-type (*Taraxacum*-type) also significant. Other herbs recorded include pollen of the daisy family (Asteraceae), devil's bit scabious (*Succisa pratensis*), pinks family (Caryophyllaceae), stitchworts (*Stellaria*-type), buttercup family (Ranunculaceae), redshank (*Persicaria maculosa*), willow-herbs (*Epilobium*-type), mints (*Mentha*-type), goosefoot family (Chenopodiaceae) and pea family (Fabaceae).
- C.1.8 Tree and shrub pollen contribute to over 10% of the pollen count – the highest frequency is of alder (*Alnus*) pollen, with heather (*Calluna*), pine (*Pinus*), ivy (*Hedera*) and rare occurrence of honeysuckle (*Lonicera*).
- C.1.9 Pollen of aquatic plants is represented by occurrences of bulrush (*Typha latifolia*) and pondweed (*Potamogeton*). *Sphagnum* moss spores are present in low numbers. Fern spores are dominated by common polypody (*Polypodium vulgare*), with occurrences also of monolete ferns (Pteropsida) and rare occurrence of adder's-tongues (*Ophioglossum*). Non-pollen palynomorphs include the presence of the algal taxa Zygnemataceae, as well as rare indeterminate fungal spores. Microcharcoal is present in low numbers.
- C.1.10 Pollen assemblages from sub-samples at 2.40m, 2.60m and 2.64m contain similar but less rich assemblages than those described above. Additional herb taxa recorded include common knapweed (*Centaurea nigra*) and thistles (*Cirsium*-type) with additional tree/shrub taxa including occurrences of oak (*Quercus*) and rowan (*Sorbus*-type). The assemblage recovered from 1.98m is distinctive in that it appears to be quite restricted, comprising an abundance of very robust pollen grains of devil's bit scabious and spores of common polypody, and is therefore unlikely to be representative of the local and regional vegetation.
- C.1.11 The organic deposits at 1.95-2.70m (bgl), probably represent a period of relative quiet deposition, and are sandwiched between fine to coarse sand and gravel deposits, the latter perhaps reflecting more turbulent deposition. Deposition of sands and gravels may be further interpreted to suggest possible flood events separated by quieter water deposition during which more organic silts and clays accumulated.
- C.1.12 The pollen data, mainly interpreted from the sub-sample at 2.10m, suggest a largely open environment, typically with a ground flora of grasses and sedges. A broad variety

of pollen of other herbs suggests a possible herb-rich meadow environment, including for example, pollen of the pinks family, daisy-types, dandelion-types, buttercup-types, stitchworts, mints, devil's bit scabious, willowherbs and ribwort plantain. Such damp meadows could have provided suitable areas for pasture for animals. Use of the land by animals for grazing is supported from recovery of coprophilic fungal spores, including *Podospora* (HdV-368) and *Sordaria* (HdV-55A/B) (van Geel 1978).

- C.1.13 Of significance is the relatively large count of pollen of cereal-type / large grasses. The dimensions of these types of pollen grains overlap, making distinction of cultivated grasses from wild varieties complex (Andersen 1979). Given other indicators for wetness (for example, from recovery of abundant pollen of sedges and pollen of aquatic plants including yellow water-lilies and pondweed, as well as from shallow water algal types such as *Zygnema*-type (HdV-313)(van Geel 1978)), it is possible that the grass pollen grains represent wild varieties, for example, sweet-grasses (*Glyceria*-type), that are known to grow in mud in or by water (Stace 2010).
- C.1.14 However, the combination of these large grass pollen types with plants such as redshank, may lend support to their identification as cultivated crops. Redshank has been described from waste, cultivated and open ground (Stace 2010). Potentially, cereal processing may have taken place nearby or arable farming may have occurred adjacent to the site.
- C.1.15 It is also possible that the cereal-type grains may have been derived from animal waste, had animals been using the meadows for pasture. Of interest is the presence of one specimen of the intestinal parasite *Trichuris* (HdV-531), which is taken as a good indicator for the presence of faecal material in the deposit (Jones 1982) and could have been derived from any of several sources, for example, people, cattle, pigs.
- C.1.16 Tree and shrub pollen is most commonly represented by alder, which thrives in damp conditions; however, the relative paucity of alder pollen in the assemblage suggests regional or distant derivation. Trees and shrubs like honeysuckle, rowans, wild roses, hazel-type and ivy may have been growing on distant hedgerows or as a component of woodland/woodland edge environments. Pollen of pine and oak suggest derivation from regional woodland stands. The occurrence of heather pollen suggests possible development of acid moorland at some distance from the site.
- C.1.17 The openness of the palaeoenvironment, based on the pollen assessment outlined above, may suggest that woodland clearance had already taken place at this site; evidence for extensive deforestation in the Cheshire wetlands suggests deforestation had commenced in the late Iron Age (Leah *et al* 1997, p. 154). This was accompanied by an increase in agricultural activity starting before the arrival of the Romans and continuing in the post-Roman period. During the early medieval period, regional pollen diagrams suggest regeneration of woodland with evidence for severe disturbance to the natural vegetation during the later medieval period (Leah *et al* 1997, p. 154).

Recommendations

- C.1.18 Rich pollen assemblages were recovered from two of eight sub-samples from the Tarvin Road core (TR-1), although the sub-sample at 1.98m suggests a very restricted assemblage. The interval from 2.02m to 2.38m could be subjected to further detailed

analysis to confirm the assessment results. However, such analysis should proceed with AMS dating of the sequence, as well as assessment of the waterlogged plant remains aimed at recovery of cereals. If cereals or other plant remains are recovered, these could be submitted for AMS dating.

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APPENDIX E SITE SUMMARY DETAILS

Site name:	A51 Tarvin Road Improvement Scheme, Chester, Cheshire
Site code:	L11322
Grid Reference	SJ 46301 67233
Type:	Watching Brief
Date and duration:	July-October 2020
Location of archive:	The archive is currently held at OA North, Mill 3, Moor Lane Mills, Moor Lane, Lancaster, LA1 1QD and will be deposited with the Grosvenor Museum, Chester in due course.
Summary of Results:	<p>The watching brief, which took place over several periods between July and September 2020, covered two areas off Tarvin Road, the compound site adjacent to the Tarvin Road roundabout (Area 1) and the south side of Stamford Road Bridge junction (Area 2).</p> <p>Within Area 1, at Tarvin Road roundabout, topsoil was stripped from the whole area required for the proposed compound and foundation trenches for concrete beams and pads were excavated to support cabins. These were excavated through what appeared to be former garden soils, which revealed the remains of wall footings and possible former drains. These do not specifically match with any structures shown on the tithe map of 1838 or late nineteenth century Ordnance Survey mapping, but likely related to an amalgam of garden walls and walkways.</p> <p>The topsoil removal at Stamford Road Bridge junction (Area 2) covered an 660m x 10m wide strip along the base of the road embankment either side of the River Gowy. Topsoil stripping revealed alluvial deposits overlaid by patches of made ground relating to modern landscaping. No archaeological features were revealed. As part of these works a core was taken on the western bank of the River Gowy with the intention of recovering a continuous sample of peat. Although the core did not contain any peat deposits, there was evidence of organic material which does have potential for pollen analysis.</p>



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