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PART ONE – OUTLINE ARCHAEOLOGICAL MITIGATION STRATEGY

1. Introduction

1.1 Project background

- 1.1.1 AECOM (hereafter known as 'the Consultant') has been commissioned by Longfield Solar Farm Energy Ltd (the 'Client') to design the archaeological evaluation and mitigation works for Longfield Solar Farm (hereafter known as 'the Scheme').
- 1.1.2 The Scheme is a proposed solar farm with energy storage which will generate and store renewable electricity for export to the National Grid. The Scheme will comprise the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility with a total capacity exceeding 50 megawatts (MW), an energy storage facility and an export/import connection to the National Grid, via an extension of the existing Bulls Lodge Substation.

1.2 Overview of the document

- 1.2.1 This Overarching Written Scheme of Investigation (OWSI) includes the scope, guiding principles and methods for the planning and implementation of archaeological evaluation and essential archaeological mitigation works for each of the identified sites. These have been identified following analysis of the results of desk-based research and analysis of aerial photographs, geophysical surveys and preliminary trial trench evaluation [APP-057 to APP-064] undertaken as part of the Scheme.
- 1.2.2 It details the archaeological mitigation proposed to evaluate the presence and significance of previously unrecorded remains and reduce the effect of the Scheme on the archaeological resource. The evaluation will be undertaken on areas of planned intrusive activities, identified in the detailed design, and the mitigation will comprise either the protection/preservation of archaeological remains, where possible, or, where remains cannot be preserved, a structured programme of archaeological investigation to mitigate the loss.
- 1.2.3 Further, this document presents the approach to consultation and approvals, project management, fieldwork methodology, and the post-excavation analysis and publication stages for investigations carried out as part of the advance archaeological works for the Scheme.
- 1.2.4 This document also summarises (where applicable) the extent of previous investigations, provides the research framework for the Scheme, and describes the proposed mitigation works and methods that will be implemented.
- 1.2.5 In summary, the OWSI:
- Is the control document for the programme of archaeological evaluation of the detailed design and the mitigation undertaken on each site or area

of archaeological interest in advance of and as part of the construction phase of the Scheme.

- Details the principles and methods for the preparation of the Site Specific Written Scheme(s) of Investigation (SSWSI) for each site.
- Will be a certified document with its implementation being secured by Requirements 12 and 25 in Schedule 2 of the Development Consent Order (DCO), forming part of the Scheme's Construction Environmental Management Plan (CEMP), which will be derived from the Outline CEMP [APP-214] submitted as part of the DCO application.

1.3 The strategy of the document

- 1.3.1 This document sets out the scope, guiding principles and methods for the planning and implementation of the required SSWSIs for each site.
- 1.3.2 The SSWSIs are documents that relate to particular elements of archaeological fieldwork and detail specific measures to be applied or adopted as part of the programme of archaeological works. They will be prepared by the Archaeological Contractor for the Scheme in accordance with the principles and methods set out in this OWSI and will be approved by the archaeological advisors for Essex County Council (ECC) and, where relevant, with Historic England (the Curators).
- 1.3.3 The individual SSWSIs will be prepared by the Archaeological Contractor in consultation with the Archaeological Clerk of Works (ACoW) and the Curators. Each SSWSI will be prepared prior to the fieldwork for each site (the subject of that SSWSI) commencing and is designed to answer specific research questions to advance knowledge gain, or to ensure the protection of archaeological features whilst being mindful of public benefit.

1.4 Roles and responsibilities

- 1.4.1 The following terminology is used throughout this document:
- The Client – Longfield Solar Energy Farm Ltd, or their representative (hereafter referred to as the Client's Representative).
 - The Principal Contractor (i.e. the construction contractor for the Scheme).
 - ACoW (as appointed by the Principal Contractor).
 - Archaeological Contractor (as appointed by the Principal Contractor).
 - Curators – the local planning authority archaeologist for ECC as well as representatives of Historic England (including, but not limited to, the Inspector of Ancient Monuments, the Inspector of Historic Buildings and the Regional Scientific Advisor).
- 1.4.2 The archaeological evaluation and mitigation strategy has been produced by AECOM working alongside the Client's Representative in consultation with the Curators.
- 1.4.3 An Archaeological Contractor will be appointed and will be responsible for the delivery of the archaeological mitigation programme, as set out in this OWSI. This responsibility will include all on-site and off-site works, including preparation of SSWSIs and reporting and publication. The Archaeological

Contractor's Fieldwork Manager and/or the appointed ACoW will be responsible for oversight of the archaeological programme and will be the principal points of contact for the Curators.

- 1.4.4 An ACoW will be appointed and will be responsible for monitoring the work undertaken by the Archaeological Contractor on behalf of the Principal Contractor to ensure compliance with this OWSI and the SSWSIs. They will also be responsible for liaising with the Principal Contractor to monitor construction activities to ensure compliance with the OWSI and the CEMP. The ACoW will also organise and attend regular site meetings to be held with the Curators.
- 1.4.5 The Curators will monitor the fieldwork to ensure that it is carried out to the required standard and specification as set out in this OWSI and the SSWSIs, and ensure that it will achieve the desired aims and objectives. The relevant Curators will attend site meetings, to be arranged by the ACoW, to review the progress and results of the fieldwork. These meetings will also be used to inform sign-off of sites prior to construction. Further detail is provided in Section 7 of this document.

1.5 Policy and guidance

- 1.5.1 The Strategy conforms with current good practice and takes account of guidance outlined in:
- Overarching National Policy Statement for Energy (EN-1) (Ref 1).
 - Draft Overarching National Policy Statement for Energy (EN-1) (Ref 2).
 - National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 3).
 - Draft National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 4).
 - National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 5).
 - Draft National Policy Statement for Electricity Networks Infrastructure (EN-5) (Ref 6).
 - National Planning Policy Framework (NPPF) (Ref 7) and National Planning Practice Guidance (Ref 8).
 - Management of Research Schemes in the Historic Environment (Ref 9).
 - Archaeological field evaluation (Ref 11), archaeological excavation (Ref 12); archaeological watching brief (Ref 13); the creation, compilation, transfer and deposition of archaeological archives (Ref 14); and for the collection, documentation, conservation and research of archaeological materials (Ref 15).
 - Historic England have also issued a variety of guidance notes for environmental archaeology, human remains, scientific dating, preservation of archaeological remains and archaeological conservation (see Appendix A).

1.6 Structure of document

- 1.6.1 This document comprises of the following three parts:

Part one - the detailed archaeological strategy

- 1.6.2 It describes the principles to be applied in undertaking archaeological evaluation and mitigation on the Scheme and proposed strategies. This section details the relevant archaeological baseline, survey results and rationale for evaluation and mitigation for each of the identified areas.
- 1.6.3 For those areas where archaeological investigation and recording is proposed, relevant research themes and period-based questions are indicated. These have been identified in consultation with specialists, drawing on (but not limited to):
- Research and Archaeology Revisited: a revised framework for the East of England (NB The East of England Regional Research Framework was updated in 2021 and is available online at researchframeworks.org) (Ref 16).
 - Understanding the British Iron Age: an agenda for action (Ref 17).
 - The Rural Settlement of Roman Britain (Ref 18).
 - First World War Fieldworks in England (Ref 19).
- 1.6.4 Scheme specific research questions have also been developed.

Part Two - the overarching scope of works

- 1.6.5 In this part, the strategy for each of the evaluation and mitigation approaches is discussed and outline method statements are presented. These method statements will form the basis of the works to be detailed in SSWSIs.
- 1.6.6 The requirements for communication, monitoring and reporting are identified and the procedure for completion of the archaeological works is set out. Assessment, reporting and archiving requirements are outlined.

Part three - appendices

- 1.6.7 These are as follows:
- Appendix A Standards and Guidance.
 - Appendix B Archaeological Evaluation and Mitigation Action Areas.
 - Appendix C Public Archaeology and Community Engagement Strategy.

2. Purpose and objectives

2.1 Purpose of this document

- 2.1.1 The purpose of the OWSI is to detail the scope of the fieldwork methodologies and detail the required strategy to evaluate and mitigate impacts of the Scheme, in line with ECC's requirements for a programme of archaeological investigations. The strategy for each mitigation site is designed to answer specific research questions to advance knowledge gain, or to ensure the protection of archaeological features where they do not need to be excavated.
- 2.1.2 The primary aim of the strategy is to maximise knowledge gain and not all sites will be fully excavated. The mitigation of the Scheme is not designed to allow recording for recording's sake, but rather to excavate those sites with intrinsic or group value, which will add to the corpus of knowledge for the region.
- 2.1.3 The archaeological mitigation approach in this OWSI will be developed and implemented through the SSWSIs in line with the following parameters:
- Observe professional codes, guidance and standards (see Appendix A).
 - Consider archaeological and cultural heritage evidence from all periods and its contribution to the understanding of the historic landscape and its use over time.
 - Only undertake extensive intrusive works in areas where there will be a direct impact through development (as identified in the ES [as certified by the DCO]), or where there is a need to consider design changes.
 - Utilise the information provided by other disciplines (for example, geotechnical investigations).
 - All works must take account of all statutory designations.

2.2 Objectives

- 2.2.1 All those undertaking archaeological work associated with the Scheme will:
- Ensure that a robust programme of archaeological evaluation is undertaken, where deep intrusive activities are planned, to adequately evaluate the archaeological potential and significance of these areas.
 - Ensure a detailed programme of archaeological work is in place to appropriately mitigate impacts on any archaeological remains due to the Scheme.
 - Promote high quality research using intensive excavation methodologies and scientific techniques to explore a transect through the landscape and investigate past settlement patterns, develop new research questions and feed back into the relevant research strategies.
 - The results of archaeological investigation will be published within an appropriate period following assessment and analysis (see Section 11 below for further details). The results of fieldwork interventions should be combined into a single report.

- Ensure that the results of the investigations (i) are made publicly available in an appropriate format for assimilation into the ECC Historic Environment Records; (ii) develop an understanding of the historic environment resource of the Scheme by the public at large; and (iii) disseminate in a timely manner via the Online Access to the Index of Archaeological Investigations (OASIS) and the Archaeological Data Service (ADS).
- Ensure the physical archive (artefacts and ecofacts) is publicly accessible through their deposition at the Braintree Museum and/or the Chelmsford Museum.

2.3 Aims of specific intervention types

2.3.1 The following archaeological evaluation and mitigation actions are proposed; the application of these will be determined in consultation with the Curators. Relevant descriptions of proposed mitigation actions are presented in Table 2-1 below. These will be undertaken in a staged approach based on the detailed design and the location of intrusive activities such as low voltage cable routes (Work No. 6 of the Scheme [APP-007]).

Table 2-1 Archaeological Mitigation Measures

Recording Method	Description
Trial Trench Evaluation (Preliminary works stage)	<p>In areas where access has been denied prior to public examination or where insufficient information on the location of extensive intrusive activities was available (cable route, compounds, substations, etc.), a targeted or sample-based mechanical or hand excavated trench-based investigation would be undertaken to record the extent and significance of previously unrecorded archaeological remains and to inform decision making on further mitigation recording that may be appropriate.</p> <p>The aims are:</p> <ul style="list-style-type: none"> • to assess the extent, date, character and state of preservation of any archaeological remains within the Site. • to assess the potential that the Scheme has to address research questions presented in the East of England Regional Research Framework (https://researchframeworks.org/eoe/). • to assess the effect that later activity has had on the state of preservation of any archaeological resource within the Site. • to inform the scope of any archaeological mitigation that may be required.
Detailed Excavation (preliminary works stage)	<p>A programme of controlled, intrusive fieldwork with defined objectives which maps, examines, records and interprets archaeological remains at a site or within a specified area. The records made and the objects and samples gathered during the fieldwork are combined and studied (assessed and if appropriate analysed) and the results published in detail appropriate to the project design. Detailed Excavation, which may incorporate extensive sample excavation ('strip and record' or 'strip, map and sample'), trench mitigation or test pit mitigation (with soil sieving and artefact recovery), would be undertaken where significant archaeological remains are either known from assessment or evaluation works. Detailed</p>

Recording Method	Description
	excavation may be targeted at specific sites, areas of interest or a sample range of locations. The extent of the investigation and the excavation strategy for each detailed excavation area would be agreed in consultation with the Curators.
Archaeological Monitoring and Recording (preliminary works and construction stages)	A programme of observation, investigation and recording of archaeological remains undertaken in specific areas where the presence of or moderate potential for archaeological remains has been demonstrated or can be predicted, but where detailed investigation prior to the main construction programme is unfeasible due to safety or logistical considerations, or undesirable due to environmental or engineering constraints. The contractors preferred method of working would be controlled as necessary to allow archaeological recording to take place to the required standard.
Preservation <i>in situ</i>	An area of development that has been excluded to conserve archaeological remains, thereby preserving it for later generations. Measures for preservation <i>in situ</i> would include protective fencing, exclusion zones or burying / sealing remains beneath fill material to ensure that they are not disturbed (including use of a protective barrier membrane between the existing ground surface and the fill, and control measures for plant movements at construction).

3. Archaeological background

3.1 Introduction

- 3.1.1 The archaeological background of the Scheme has been presented in Chapter 7, Cultural Heritage of the Environmental Statement (ES) [APP-039.]. This includes the historical and archaeological background of the Scheme within a defined 1km study area and the results of archaeological evaluations undertaken as part of the Scheme. The archaeological background is summarised here.
- 3.1.2 In preparation of the cultural heritage assessment, desk-based research, following the ClfA Standard and guidance for historic environment desk-based assessment (Ref 20), was undertaken setting out the requirements for the phased archaeological evaluation of the Scheme.
- 3.1.3 The assessment work included analysis of aerial photographs and available LiDAR data, geophysical survey and a programme of archaeological evaluation through trenching targeting identified anomalies within areas of potential impact. These are presented as Appendices to the ES [APP-058 through APP-064].

3.2 Aerial photography and LiDAR

- 3.2.1 A review of aerial photographic and LiDAR data was undertaken in December 2020. Aerial photographic data was consulted from the Essex County Council Archives as well as digital images available from online sources. The Historic England archives were not accessible due to the COVID pandemic. LiDAR data was obtained from the Digital Terrain Model and the Digital Surface Model from the Environment Agency. The evidence from this survey revealed a number of potential prehistoric, Roman, medieval, post-medieval and modern remains. In particular, the survey identified a multi-occupation site, a curvilinear enclosure of possible prehistoric date, 20th century practice trenches, a rectilinear enclosure, and a number of field boundaries indicative of field systems of likely medieval and later date.

3.3 Geophysical surveys

- 3.3.1 A geophysical survey (detailed magnetometry) was undertaken to support the archaeological assessment of the Scheme. The survey covered the majority of the Scheme, but omitted the two solar array fields, the HV cable route, and the Bulls Lodge substation. The survey results indicated numerous enclosure features of probable Iron Age or Roman date as well as later agricultural features of the medieval and post-medieval periods. The results were generally poor due to the local geology and soils, but broadly aligned with the aerial photographic and LiDAR analysis. More recent features, such as the 20th century practice trenches, were not detected.

3.4 Trial trenching evaluation

- 3.4.1 Archaeological evaluation trenching was undertaken between 28th June and 16th August 2021 as part of the archaeological evaluations for the Scheme. The scope and extent of the works were based on the results of the geophysical survey and targeted areas of known archaeological potential and

areas of planned extensive intrusive activities. The solar panel array areas were not evaluated by trial trenching as it was agreed with ECC that these would result in greater impacts to the archaeological resource than the expected impact from the piled solar panel foundations. The exact location of cable routes and access routes was not known at the time of the trial trenching. Given the results of the Aerial Photographic and LiDAR assessment and geophysical survey, it was considered unlikely that the Scheme would result in significant effects and that evaluation could be secured through this OWSI as a condition of consent.

- 3.4.2 The evaluation consisted of the excavation of 43 trenches and seven contingency trenches across seven areas to ascertain the archaeological potential of the site. Evidence for archaeology dating from the early Neolithic to post-medieval periods was identified on the site. Two areas contained a concentration of features of Iron Age and Roman date. Practice trenches identified in aerial photographs could not be located due to poor preservation.

3.5 Archaeological baseline

- 3.5.1 The Scheme comprises 452.93ha of arable, enclosed agricultural fields, separated by hedgerows, tree lines, small areas of woodland, the Bulls Lodge Substation, and minor roads and farm access tracks. The Scheme is in close proximity to several post-medieval farmsteads and cottages as well as a patchwork of semi-ancient woodlands. The fields have been subject to removal of field boundaries throughout the 19th and 20th centuries and repeated modern ploughing. Much of the area retains a potential for undisturbed archaeological remains to be present below the ploughsoil (shown by the trial trenching to be roughly 300-400mm).
- 3.5.2 The Scheme is located on relatively flat ground sloping gently towards the south. A small stream known as Boreham Stream is located to the west of the Scheme while the River Ter flows approximately 3km east of it, both of which flow into the River Chelmer to the south.
- 3.5.3 Superficial deposits across the Scheme comprise mainly sedimentary glaciogenic diamicton and glaciofluvial deposits. Sporadic patches of Brickearth are also noted across the Scheme. These overly London Clay sedimentary bedrock of no archaeological interest.
- 3.5.4 The glacial deposits that overlie the Site are considered to have limited archaeological potential beyond isolated Palaeolithic finds in secondary deposition. No such remains were identified in the study area in the desk-based assessment, although it is worth noting that an Upper Palaeolithic struck flint was recovered from the fill of a Roman ditch during the archaeological evaluation.
- 3.5.5 While the River Chelmer is known as a focal point of early Holocene occupation, little evidence of such activity has been revealed within the Scheme or study area. A scatter of Neolithic material has been recorded 260m west of the Scheme as have some scatters of undated lithic material further west. The trial trenching evaluation recorded two early Neolithic flint cores from secure contexts (a ditch and a pit) in the south-east corner of the Scheme, immediately north of Toppinghoehall Wood.

- 3.5.6 A number of circular cropmarks identified within the Essex Historic Environment Record (HER), and through a study of aerial photographs, likely indicate the presence of later prehistoric settlement or funerary activity within and in proximity to the Scheme. These are similar in nature to remains identified further afield which have been dated to the Bronze Age and Iron Age and suggest scattered later prehistoric occupation throughout the area. A number of archaeological investigations have identified evidence of this occupation, all of which demonstrate a clear concentration on elevated locations near streams, palaeochannels, and rivers.
- 3.5.7 The only evidence of Bronze Age activity within the Scheme was recorded in trial trenching within the Battery Storage Area (BESS), where a single ditch was found to contain Late Bronze Age to Iron Age pottery and a number of possible struck flints, and another ditch contained Iron Age pottery and a residual Bronze Age core.
- 3.5.8 One circular cropmark was identified near Ringers Farm in aerial photographs, as geophysical anomalies and confirmed through trial trenching. Pottery evidence of mid- to late Iron Age as well as late Iron Age/Romano British date was recovered from ditches and pits. Several other features were undated in the area but likely related. While this area has been removed from the Scheme, it does indicate likely Iron Age occupation in the area. Further evidence of Iron Age activity was recorded in ditches within the eastern half of the BESS and west of Porter's Wood as a possible trackway.
- 3.5.9 The Roman period is well attested in the area, and is likely to have been a focal point of Roman activity, given the proximity of the Scheme to the London to Colchester Roman Road, 200m to the south, and the important Roman settlement of Chelmsford (Caesaromagus). The remains of a villa or small settlement were recorded at Great Holts Farm, 300m west of the Scheme, and a Roman aisled hall, suggestive of a Roman Principa, was recorded at Bulls Lodge mineral extraction area, 500m north-west of the south-western end of the Scheme. Cropmarks near Toppinghoe Hall suggest the possible presence of a small Roman settlement 200m south of the Scheme. The aerial photographic and LiDAR analysis and geophysical survey identified a possible enclosure and field system, which were further investigated by trial trenching, and recorded a number of features containing significant quantities of Roman pottery. These remains likely indicate the presence of a small Roman settlement, likely a farmstead, within the Scheme, just west of Porter's Wood. A pit and a ditch near Ringers Farm (now outside the Scheme) were also found to contain Iron Age to Roman pottery.
- 3.5.10 Clearly settled in the later prehistoric to Roman period, the area of the Scheme was largely agricultural throughout the medieval period. Several small scattered medieval farmsteads have been recorded within the Bulls Lodge mineral extraction area and it is expected that a similar pattern would have been present within the Scheme itself. However, whereas the Bulls Lodge farms were abandoned when Newhall Palace was emparked¹ in the 13th century, the Order limits would have remained in continuous use. It is therefore expected that many of the post-medieval farmsteads extant within the Order limits may have earlier medieval origins, and thus the potential for buried medieval farmsteads to be present within the modern fieldscape is lower than within the former Newhall Park. Moated sites and farmsteads including

¹ The act of enclosing and creating a park.

medieval features are noted on the periphery of the site at Ringers Farmhouse, Wakering Hall, Lyons all, Terling Hall Farmhouse, Whitehouse Farm, and Brent Hall amongst others. Both Fairsteads and Great Leighs have churches of medieval origins and likely indicate the nearest medieval settlements to the Scheme surviving today. Only a single feature recorded by the trenching was found to be of likely medieval or post-medieval date.

- 3.5.11 The rural and agricultural character of the Scheme continued throughout the post-medieval period. Several extant farmsteads are noted as dating to this period on the Scheme's periphery, indicative of an increasingly enclosed landscape and rising population density. Nevertheless, the area remained characterised by scattered farmsteads, much as it was in the medieval period. By the 18th and 19th centuries, several new large estates began to be constructed in the area, in part due to the popularity of Hatfield Peverel as a stopping off point between London and Ipswich. The railway line connected London to Hatfield Peverel in 1844 and accelerated this trend by attracting wealthy London commuters. Archaeological remains dating to this period largely consist of former field boundaries reflecting parliamentary enclosures as well as changes in agricultural practices. Cartographic and aerial photographic evidence suggests that the Scheme underwent few changes in the 20th and 21st centuries.
- 3.5.12 A number of cropmarks indicative of practice trenches were identified through aerial photographs north of Toppinghoehall Wood. These are assumed to date to the First World War as they are not visible on aerial photographs from the early 1940s, suggesting that they had already been backfilled by then. To the west of the Scheme was the Second World War Boreham Airfield which suggests some likely military presence throughout the area at the time. Trial trenching targeting the location of the practice trenches found no evidence of these features. This was likely due to the clay soils making this very difficult to identify and to the absence of material remains. Some undated features were recorded in the area, but no dateable material was recovered.

4. Research Agendas

4.1 Introduction

- 4.1.1 Consideration of research agendas and themes is key to understanding the potential evidential significance of archaeological remains. The broad principles of a number of existing research agendas will be applicable to the works set out in this document.
- 4.1.2 The proposed trial trenching has no formal research aims as the goal will be to identify and characterise the archaeological resource for an appropriate mitigation strategy to be developed.
- 4.1.3 The research agenda presented below is key to identifying the focus for the archaeological mitigation, and to identify the sites that require further investigation. The purpose is to identify sites which will provide maximum information to answer the research questions set by the relevant frameworks and for the Scheme.
- 4.1.4 The mitigation strategy has taken the research questions into account, utilising information from desk-based studies, and archaeological evaluation. This has resulted in scheme wide research questions, as well as those specific to each mitigation site presented below. The research questions will be reviewed and updated throughout the project – they are not fixed. For example, excavation at one site may lead to different questions for an adjoining site. The strategy should be flexible, and based on real-time information. The questions will be reviewed during preparation of the SSWSIs, during fieldwork and during preparation of the post-excavation assessment report.
- 4.1.5 The following section provides an overarching strategy, based primarily on the regional and thematic research agendas. Each site will have specific questions, as detailed in Appendix B. However, the SSWSIs will have an updated research section and questions. The questions presented in this document are not fixed and the questions set in the SSWSIs should be responsive to the Scheme. It is not expected that each research question detailed in Appendix B will be answered fully by any one site, but will instead contribute to the overall corpus of knowledge.

4.2 Relevant agendas

- 4.2.1 The relevant research agendas for the mitigation strategy are:
- Research and Archaeology Revisited: a revised framework for the East of England (Ref 16).
 - The review of the Regional Historic Environment Research Framework for the East of England (Ref 21), including papers by Cooper; Brudenell; Evans; Hills; Hoggett; Martin; Antrobus & Ayers, and Andrews (NB The East of England Regional Research Framework was updated in 2021 and is available online at researchframeworks.org).
 - Understanding the British Iron Age: an agenda for action (Ref 17).
 - The Rural Settlement of Roman Britain: an online resource (Ref 18).
 - First World War Fieldworks in England (Ref 19).

4.3 Overarching themes

4.3.1 The overarching themes of the research questions for the OWSI relate to the following:

- Neolithic chronologies.
- Neolithic – Bronze Age transition.
- Bronze Age chronologies.
- Bronze Age settlement patterns.
- Bronze Age – Iron Age transition.
- Iron Age settlement and field patterns.
- Iron Age enclosure types.
- Iron Age – Roman transition.
- Interconnectivity of Roman settlements and the role of roads.
- Roman industrial sites.
- Roman – early medieval transition and possible settlement continuity.
- Early medieval settlement and field types and forms.
- Medieval and post-medieval agricultural systems.

4.4 Research questions by period

4.4.1 As there are no known sites of earlier than Neolithic date, period specific research questions are omitted for the Palaeolithic and Mesolithic periods. Neolithic remains were so limited that no research questions could be targeted through investigations of these remains and as such this period is also omitted.

Bronze Age

4.4.2 There is one site dated to the Bronze Age within the Scheme. Although only a single ditch contained Bronze Age material from a secure context, several features were recorded in the vicinity with no dateable material which could prove to be related. Although poorly understood, this site may be indicative of Bronze Age field systems or settlement activity.

4.4.3 The presence of Bronze Age features can help to refine the chronologies of Bronze Age sites within the East of England. Further dating of Bronze Age settlement is required to refine the understanding of their distribution and chronology in the landscape. Equally, ceramic studies would be enhanced by better cross-referencing between typological methods of dating and scientific methods.

4.4.4 The transition between the Bronze Age and the Iron Age is poorly understood. This appears to be a period of marked change, with the abandonment of many late Bronze Age field systems. The scale, rate and nature of these changes are not well documented.

4.4.5 Priorities for research which the Scheme has the potential to address from the research agendas are identified as follows:

Settlement activity

- 4.4.6 Examination of the inter-relationships between settlements, together with variation and changes in settlement types, offers considerable potential to explore the social changes taking place, as well as the interrelationship between settlements and monuments. This, coupled with more extensive palaeoenvironmental evidence, would enable past landscapes and economies to be recreated (Ref 16).
- 4.4.7 Addressing 'gaps in knowledge' (Middle Bronze Age settlement, archaeology beyond the river gravels) – while significant progress has been made to this, the proposed Scheme will be able to add to the corpus of knowledge. It is now apparent that many areas of the region's claylands were extensively occupied by the end of the Middle Iron Age. Further work is needed to understand the processes of permanently settling these heavy soils, and how they unfolded over the course of the period. To what extent can 'pioneering' phases of occupation be recognised, and when did these give way to widespread permanent settlements? The character of clayland occupation in the Late Bronze Age and Early Iron Age require closer definition. Does this occupation differ to that on the gravels or other geologies? Is there any evidence that specific activities were being conducted on the clay? (Ref 22).
- 4.4.8 Further analysis is needed to explore the range of settlement forms in the Late Bronze Age to Middle Iron Age, and establish their patterning and distribution. Attempts should be made to correlate patterns with the quantity and range of finds to try and benchmark different types of sites. Is there a correlation between enclosure forms and economic signature from animal bone retrieved, or the ceramic repertoire recovered? Are all types of find found across all types of site, or is there patterning in the content and composition? (Ref 22).

Dating

- 4.4.9 The application of Bayesian modelling to radiocarbon dates based on rigorously selected samples will help to refine chronologies. Ceramic studies would be enhanced by better cross-referencing between typological methods of dating and scientific methods.
- 4.4.10 Dating of structures (e.g. roundhouses) and settlement enclosures (Ref 23).
- 4.4.11 Field system chronologies – accepting the complexities involved in dating Bronze Age land boundaries, teasing out a more refined understanding of specific construction sequences remains important (Ref 23).

Field Boundaries and Field Systems

- 4.4.12 Whilst it is now acknowledged that ditch-defined field systems were widely constructed in the region during the Middle Bronze Age, the later history of these features requires further investigation. How long did Middle Bronze Age boundary systems continue to structure the organisation of the early to mid-first millennium BC landscapes? Further work is also needed to define if, where and when earlier field systems were actively maintained, or establish whether new systems were constructed (Ref 22).

Iron Age

- 4.4.13 Iron Age evidence was found in the majority of sites investigated by trial trenching. Few Iron Age remains were found within the BESS, but these were

associated with a number of undated features which could indicate the presence of a prehistoric settlement and field system. Two parallel ditches in proximity to the Roman enclosure west of Porter's Wood may indicate the presence of a multi-occupation site. Examination of the transition will pose a number of research questions about settlement development and the relationship of the native peoples with the Roman incomers.

- 4.4.14 Priorities for research which the Scheme has the potential to address, identified from the research agendas, are as follows.

Settlement types

- 4.4.15 Distribution, density and dynamics need further study, including zonation of use/internal spaces; location of sites with reference to topography and geology, resources, communication routes, etc.
- 4.4.16 The character of the wide variety of enclosure types (domestic, agricultural, etc.) is a matter for further research. The extent to which this apparent proliferation is a product of our interpretative frameworks, however, and the tendency to assign a (Late) Iron Age/Roman date to undated rectilinear enclosures and fields primarily on the basis of their morphology, needs further investigation, including ground-truthing. Simultaneously, it is at present almost impossible to distinguish later Iron Age sites from those of Roman date on the basis of morphology alone. There is also great potential for investigating the relationships between field systems and long-distance trackways, and settlements, enclosures and funerary sites (Ref 16).
- 4.4.17 Further analysis is needed to explore the range of settlement forms in the Late Bronze Age to Middle Iron Age, and establish their patterning and distribution. Attempts should be made to correlate patterns with the quantity and range of finds to try and benchmark different types of sites. Is there a correlation between enclosure forms and economic signature from animal bone retrieved, or the ceramic repertoire recovered? Are all types of find found across all types of site, or is there patterning in the content and composition? (Ref 22).

Dating

- 4.4.18 Even in artefact "rich" areas like Wessex and south-east England, the dependence and reliance of absolute dating on only a few key sequences and diagnostic artefact types is often overlooked. The existing, essentially ceramic-based, chronology relies heavily on the proposition that broadly similar regional assemblages were in use at the same time. The apparent persistence of handmade 'middle Iron Age' pottery traditions into the Roman period in parts of southern and eastern England, without an intervening 'late Iron Age' phase defined by wheelmade pottery, affords a good illustration of this point (Ref 17).
- 4.4.19 The application of Bayesian theory to radiocarbon dates could help refine the absolute chronology for the region. While radiocarbon dating is an essential tool in the excavation of Iron Age features, what is dated is important. As well as those features that might be important for the sequence of the site, features with good pottery assemblages need to be targeted. Finds of datable metalwork in context — particularly brooches and coins — are of great importance, and need to be clearly correlated with pottery and other material. Finds of early and middle Iron Age brooches, pins and other metalwork are very rare, any found in context are of crucial importance (Ref 16).

Clayland settlement and exploitation

- 4.4.20 It is now apparent that many areas of the region's claylands were extensively occupied by the end of the Middle Iron Age. Further work is needed to understand the processes of permanently settling these heavy soils, and how they unfolded over the course of the period. To what extent can 'pioneering' phases of occupation be recognised, and when did these give way to widespread permanent settlements? The character of clayland occupation in the Late Bronze Age and Early Iron Age require closer definition. Does this occupation differ to that on the gravels or other geologies? Is there any evidence that specific activities were being conducted on the clay (Ref 22)?

The agrarian economy, field systems, and the areas between

- 4.4.21 Most Iron Age settlements were farmsteads, most Iron Age people were farmers, and farming formed the basis of Iron Age societies. Although archaeobotanical and archaeozoological studies are offering more sophisticated elucidation of Iron Age agricultural regimes and their variation in space and time (e.g. Jones 1996; Hambleton 1999), this work is only loosely articulated with research on other aspects of material culture and society. A more inclusive approach is required, which would transcend the normal separate reports on the animal and plant remains. One answer is to develop an agrarian sociology for the Iron Age (Ref 17).
- 4.4.22 Clear finds recovery strategies should be established and made explicit in published reports: complex interpretations are unsustainable without well-excavated, quantified data. This needs to operate at various levels. There should also be deliberate targeting of potentially artefact-bearing deposits, for example in the digging of stretches rather than constrained sections of ditches (Ref 22).
- 4.4.23 Deposition and related taphonomic problems have been a popular topic in Iron Age studies for several years now, as ideas of deliberate deposition with ritual intent have caught on. However, mere identification of ritual is insufficient without an attempt to explain it (Ref 22).

Iron Age/Roman transition

- 4.4.24 On sites of this period, does the evidence suggest a seamless transition or a change in use of the land or farmstead, or continued occupation of the site but a change in building-types or agricultural practice? How far is there assimilation of late Iron Age culture into Roman or does acculturation occur? Are religious sites and deities, Roman ways and styles adopted first by the ruling elite and then by the masses? To what extent do indigenous building styles persist? Is there continued use of field systems (with modest adaptation) as late as the early 2nd century? (Ref 16).

Roman

- 4.4.25 A single site of Roman date was identified within the Scheme through trial trenching. Earlier Iron Age remains in close proximity and pottery recovered from the early Roman period (1st century AD) along with large quantities of pottery with wider date ranges (AD40-400) were recovered. These dense finds from a small number of trenches suggest the presence of a small Roman settlement with possible earlier Iron Age occupation.

4.4.26 Priorities for research, which the Scheme has the potential to address, from the research agendas are identified as follows.

Romanisation

4.4.27 Understanding both the continuity of Iron Age into Roman settlement and the 2nd century 'Romanisation', identifying continuity as well as new settlement structure and land use which develops across the region at this time and explanations for this at site, landscape and political levels. Some regions show evidence of re-organisation several decades after the Roman Conquest (Ref 16).

Rural settlements and landscapes

4.4.28 Many rural sites have been excavated in recent years, particularly near Bulls Lodge to the west and Chelmsford to the south-west. Although the data needs collation and analysis, this work raises a number of issues: What forms do the farms take, and is the planned farmstead widespread across the region? What forms of buildings are present and how far can functions be attributed to them? Are there chronological/ regional/ landscape variations in settlement location, density or type? How far can the size and shape of fields be related to the agricultural regimes identified, and what is the relationship between rural and urban sites? How common are aisled buildings within the region, and how are they used? A general impression from fieldwork suggests that far greater numbers of rural sites are present in the late Iron Age and early Roman period than the later Roman period, a pattern recognised elsewhere in Britain, but worth confirming and quantifying in the East of England. Settlement typology should be reviewed across the region to establish consistent terminology and test hierarchical models and consider how and why such hierarchies developed (Ref 16).

Dating

4.4.29 Where assemblages of material culture are often very limited and where preservation of environmental data are very poor, a better grasp of chronology, drawing on more extensive and rigorous radiocarbon dating, is essential. This can only be resolved by extensive programmes of scientific dating (Ref 18).

Finds studies

4.4.30 More synthetic work needs to be undertaken, for instance, are items such as mortaria and samian bowls used differently on rural sites than on urban, as seems to be the case in some areas? A brief survey suggests that puddingstone querns are more common on rural sites than urban where their place is taken by lava querns, does the distribution of other finds show similar variation? Structured deposition is now accepted as being a widespread phenomenon, there is, however, a need to classify the different forms this takes and critically interpret their meaning. Detailed recording of in situ assemblages would aid understanding (Ref 16).

4.4.31 As highlighted in the Reading Project studies, as issues of ceramic trade/supply are coming to the fore it is imperative that relevant specialists are familiar with the full range of major pottery industries so that the scale of their regional distributions can be mapped. Conversely, with 'Early' kilns now being widely found on settlements the context of their production needs to be explored: were they strictly local settlement related or were some more widely traded? (Ref 24).

Early Medieval and Medieval

4.4.32 Although only a single feature of possible medieval date was recorded within the Order limits, the historic landscape is evidently one rooted in the period and retains many remnant medieval features. This includes extant farmsteads, field boundaries, and evidence of ridge and furrow. A number of medieval farmsteads and windmills have been excavated within Bulls Lodge to the west, suggesting that there may be a potential for such remains to be encountered here. Although no mitigation is currently proposed targeting medieval remains, it is anticipated that the evaluation may reveal features which could inform the following research agendas:

Rural settlement

4.4.33 The origins and development of the different rural settlement types need further research, also the dynamics of medieval settlement. Much of the region has primarily a dispersed pattern, not nucleated, and more small hamlets are being discovered all the time. More data will add to our understanding of the way places appear, grow, shift and disappear (Ref 16).

4.4.34 A review of the settlement evidence in 'Greater East Anglia' (Essex, Suffolk and Norfolk) has highlighted some of its distinctive and significant features. These include a high incidence of dispersed farmsteads of medieval origin, many of them moated, and settlements arranged around the edges of common pastures called greens or tyes, which are often peripheral to their parishes and, it is suggested, post-Norman Conquest in origin (Ref 25). Specific questions include:

- The importance of studying the medieval evidence within its wider landscape.
- Palaeoenvironment sampling and the dating of extant historic landscape features such as field boundaries.
- Settlement change, evolution and abandonment, particularly with reference to the evolution of greens and green-side settlements.

Landscapes

4.4.35 There is huge potential for further research into topics such as field systems, enclosures, or roads and trackways, in particular utilising historic maps and documents. The use of National Mapping Project (NMP) transcriptions and interpretations for researching settlement might be taken further, for example where it has added significant new information to previously surveyed sites, or has identified physical evidence for sites which were previously known only from documents or surface/metal-detected finds (Ref 16).

Industry

4.4.36 The production and processing of food for urban markets is a key element in understanding the relationship between towns and their rural hinterlands from the Roman period onwards. The interchange between rural food supplies and urban industrial and craft products was essential for both town and village or hamlet (Ref 16).

Post-Medieval

- 4.4.37 Evidence of post-medieval date is limited but given that the landscape is predominantly a post-medieval one, the Scheme has the potential to address aims from the following research agendas.

Landscape

- 4.4.38 The wider landscape requires acknowledgement as the context for post-medieval settlement and industrial development, as well as farm buildings. Conversely, the impact of social and economic change – religion, enclosure, poverty, etc – on the landscape should be taken into account. (Ref 26).

Modern

- 4.4.39 Although the Order limits hold few modern features of interest, the field north of Toppinghoehall Wood holds a number of practice trenches likely dating to the First World War. The following research agenda aims could be informed by the Scheme.

First World War training areas

- 4.4.40 Identifying First World War training areas in England remains difficult given the ephemeral nature of the earthworks. Practice trenches may offer an opportunity to investigate previously unknown training areas. A few large sites are known from contemporary maps, but most areas of practice trenches were small in scale and their location and extent were often not recorded. Can practice trenches inform on the location of such training camps (Ref 19).
- 4.4.41 Furthermore, the techniques and range of construction are poorly understood. Well preserved remains of trenches and tunnels could reveal whether it is possible to distinguish between trenches dug to learn trench construction techniques and those dug to practice occupation, night supply and signalling (Ref 19).

PART TWO - OVERARCHING SCOPE OF WORKS

5. Mitigation strategy

5.1 Archaeological evaluation requirements

- 5.1.1 Archaeological trial trenching undertaken thus far has targeted known remains identified through desk-based research, an aerial photographic and LiDAR assessment, geophysical survey and areas of planned extensive intrusive activity such as the BESS.
- 5.1.2 To minimise impact to the archaeological resource from archaeological trenching, areas where the impact from the Scheme will be limited to piled solar panel foundations will not be subject to trial trench evaluations prior to construction.
- 5.1.3 The extent and location of cabling, compound locations, levelling earthworks and the precise location of inverters and converters is not secured in the DCO and will be finalised in the detailed design. Any activity requiring topsoil stripping and/or excavations earthwork will be subject to trial trench evaluation prior to construction. Should significant remains be encountered, every effort will be made to avoid impacts to the archaeological resource. Where this is not possible, a programme of archaeological mitigation will be designed and agreed with the Curators and set out in a SSWSI in keeping with this OWSI.
- 5.1.4 The archaeological trial trenching will amount to a 4% sample of accessible and open land subject to impacts greater than those caused by the PV Mounting Structure piles. An additional 1% sample contingency can be used to investigate additional areas during the evaluation. Where narrow impacts are expected, such as from cable trenches or maintenance tracks, a buffer of 5m on either side of the expected trench, road will be evaluated so that a minimum corridor of 10m is evaluated to allow for micrositing. Where a wider easement or working right-of-way is needed, this will be included within the trial trenching evaluation.

5.2 Archaeological mitigation requirements

- 5.2.1 The basic principle for the mitigation strategy is to mitigate impacts on archaeological sites resulting from the construction and/or operation of the Scheme. Given that much of the Scheme will cause only localised impact as a result of solar panel piled foundations, only significant archaeological remains identified through evaluation which would be impacted through more extensive intrusive activities (roads, cable trenches, compounds, inverters and converters, etc.) will be targeted for mitigation.
- 5.2.2 Only those sites which maximise information and which have the ability to answer as comprehensively as possible the Scheme and site-specific research questions will be further investigated through excavations. There will be some sites that do not fit this criteria and additional work upon them will not be undertaken.

5.2.3 Based on the results of the aerial photographic and LiDAR assessment, geophysical survey, and targeted trial trenching, two sites have been identified which require archaeological excavations ahead of construction. These can be seen on Figure 1 and are as follows:

- Site 1 - Prehistoric features dating from the Neolithic to the Iron Age identified north of Toppinghoehall Wood (BESS & PDA 31). The area of excavation is limited to the eastern half of the BESS (Work No. 2) where remains are densest and in the footprint of the proposed compound (Work No. 10) and access road (Work No. 6).
- Site 2 – Cropmarks north of Bulls Lodge Substation to be preserved in situ through no-dig solution for the laydown/compound area (Work Nos. 4B and 5B).

5.2.4 Prior to the start of the archaeological works, procedures will be adopted in the CEMP to ensure that sites of archaeological interest are protected, as detailed in this document, as certified by the DCO. This will involve fencing for sites to be retained (see Section 9) and clear notices on site fences. Toolbox Talks will be provided by the ACoW and/or the Archaeological Contractor to inform all site personnel of the archaeological and historic environment constraints on site, the protection measures that are required, and their obligations under this OWSI to ensure that these are put in place and complied with. The Toolbox Talks will identify sensitive areas/sites that must not be disturbed until investigation is completed and the site signed-off to construction, or where long-term protection is required. In addition, a Toolbox Talk will be given on the procedures for unexpected finds or archaeological remains that are identified, particularly burials, during soil stripping and the process on how to report these.

5.2.5 In addition, the Archaeological Contractor will prepare a detailed outreach strategy. This must follow the outline strategy presented in Appendix C.

5.3 Unexpected finds

5.3.1 If unexpected finds (sites, artefacts, environmental remains or ecofacts, monuments or features) are made during the works, a site consultation meeting(s) will be convened between the Archaeological Contractor, the ACoW, and the relevant Curators, to consider the significance of the find. Depending on the outcome of the consultation meeting, an addendum to the SSWSI or a new SSWSI will be prepared by the Archaeological Contractor in consultation with the ACoW and the relevant Curator.

5.3.2 The procedure for dealing properly with any unexpected finds during the construction process will be set out in each approved SSWSI and recorded in the CEMP. This includes where unexpected features extend outside of the boundary of each mitigation area. Should archaeological features revealed within the mitigation areas continue outside of the area, and are likely to be subject to construction impact, the mitigation area may need to be extended to sufficiently characterise the material. This will only be undertaken following an understanding of the impact and with the agreement of the Client's representative, the ACoW and the Principal Contractor, in consultation with the Curators. No works will be extended beyond the Order limits.

5.3.3 Any unexpected archaeological discoveries made by the Principal Contractor or their sub-contractors should be reported to the ACoW immediately. It is

anticipated that any area of unexpected remains outside of existing mitigation areas will be marked-out on site, and that plant or vehicles shall not be permitted to enter the marked-out area except if given clearance to do so by the ACoW. All construction works within the marked-out area will be suspended until completion of the archaeological investigation in that area.

5.4 Site specific written schemes of investigation

- 5.4.1 SSWSIs will be prepared setting out in detail the mitigation measures for each archaeological site listed above. The SSWSIs will be informed by the strategy described in this document. Existing information and new datasets collected as fieldwork progresses will inform the design of mitigation works in the SSWSIs during the investigations.
- 5.4.2 The SSWSIs will be produced by the Archaeological Contractor. The information contained within the following sections of this document will guide the Archaeological Contractor when compiling each SSWSI.
- 5.4.3 Information to be contained within the SSWSIs and the approvals process is detailed in Section 6.
- 5.4.4 The specification for the archaeological works contained within the SSWSIs will be written in accordance with this OWSI and the current Standard and Guidance for archaeological evaluation and archaeological excavation prepared by the ClfA (Ref 11 and Ref 12) and the current ClfA Code of Conduct (Ref 13) and will adhere to current and relevant good practice and standards and guidelines (see Appendix A).
- 5.4.5 Each SSWSI will set out the timing and order of the investigative works and will include details of how the archaeological programme will interact with other construction activities, and the parties undertaking them, at each stage of the archaeological works. Each SSWSI will include a programme for the archaeological work that will be referenced against key milestones/events in the overall design and construction programme.
- 5.4.6 In areas where archaeological remains or other heritage assets are to be retained (e.g. protected by temporary perimeter fencing, beneath fill materials, beneath concrete foot foundations, or control measures for plant movements at construction), the method statement will be prepared at the start of the relevant phase of works in order to describe specific protection measures to be applied to the site or area of interest, and following procedures outlined in the Outline CEMP [APP-214].

5.5 Archaeological project team

- 5.5.1 The Principal Contractor will employ an ACoW who will form part of the construction team to, include but not limited to, monitor archaeological site works, liaise with the Archaeological Contractor and the Principal Contractor, review SSWSIs, and attend regular site meetings to be held with the Curators.
- 5.5.2 The archaeological mitigation works will be delivered by one or more Archaeological Contractors, to be appointed by the Principal Contractor. The Archaeological Contractor will have prime responsibility for delivery of the full programme of archaeological mitigation as set out in the OWSI, including all on and off site works; outreach activities; technical and non-technical

publication and dissemination; and preparation and deposition of the archaeological project archive with the recipient museums and archives.

5.5.3 The Archaeological Contractor will include named key specialists who will either be site-based or have a regular site presence, or who will be on-call at short notice. The Archaeological Contractor and the specialists will have experience of working in the region with the types of geologies, sites and artefacts expected. These will include (as a minimum) the following roles:

- Project Manager.
- Environmental archaeology co-ordinator.
- Environmental archaeology supervisor.
- A Roman buildings specialist.
- Archaeobotanist (including palynology).
- Coleoptera and molluscs specialist.
- Charcoal specialist.
- Materials scientist.
- Finds co-ordinator/processing specialist.
- Small finds specialist.
- Lithics specialist with relevant period expertise.
- Ceramics specialist with relevant period expertise.
- Ceramic buildings material specialist.
- Coins specialist.
- Metalwork specialist.
- Specialist in wood.
- Worked stone specialist.
- Geoarchaeologist.
- Archaeological surveyor.
- Digital data co-ordinator/manager (and assistants as required).
- Human remains specialist.
- Animal bone specialist.
- Scientific dating specialist, with expertise in chronological modelling.
- Specialist in phosphate and lipid analysis.
- Conservation specialist.
- Metal-detectorist.
- Landscape historian.
- An archives manager.
- Geomatics team and illustrators.

- Public Archaeology and Community Engagement Team (see Appendix E).
- 5.5.4 The names and qualifications of the individuals fulfilling these roles will be provided to the ACoW for information and comment immediately after appointment of the Archaeological Contractor, with the details passed to the Curators for information. The post-holders shall be in place at the start of the mitigation programme. Any changes to the named post-holders will be notified to the ACoW who will inform the Curators.
- 5.5.5 The specialists appointed to the archaeological team will be integrated into the Archaeological Contractor's project team to actively input to the design of strategies for the SSWSIs, the public archaeology and community engagement elements, and to advise throughout the fieldwork and post-excavation stages. Regular communication between specialist members of the archaeological team and the fieldwork Project Manager and field staff will be ensured through off-site planning meetings, site visits and progress meetings as required.
- 5.5.6 Archaeological staff (part of the Archaeological Contractor's site team) supervising the investigative works shall be highly experienced in directing machine stripping/ hand stripping of archaeological sites, with direct experience in and knowledge of the archaeological character of the area in general. The staff member(s) shall be familiar with the content of the results of the relevant previous phases of work, including the aerial photographic and LiDAR analysis, geophysical surveys and trial trenching [EN010118/APP/APP-058 to APP-064].

5.6 Iterative development of the mitigation strategy

- 5.6.1 Where required, an iterative site strategy for excavation, artefact recovery and for sampling will be agreed with the ACoW, the Archaeological Contractor and the Curators.
- 5.6.2 The mitigation strategy will (where required), be responsive to the works taking place on site. For example, if a site is not answering the expected research due to a lack of information, then the extent and scope of works should be reviewed. Similarly, sites producing more environmental evidence could have a more intensive sampling strategy than that previously agreed. Unexpected remains (see Section 5.2 above) will also be considered. Consultation must be undertaken with the Curators at meetings or onsite discussions.

5.7 Stages of work

- 5.7.1 There are three stages of construction: the Advanced Works (AW), the Enabling Works (EW) and the Main Works (MW). Archaeological evaluation will be carried out as part of the AW and EW stages. Archaeological mitigation will be undertaken in all stages of work. The majority of the archaeological mitigation will be undertaken during the EW stage. Where site conditions prevent archaeological mitigation at the EW stage, archaeological fieldwork may be required during the MW stage.

6. Site specific written schemes of investigation

6.1 Contents

- 6.1.1 The Archaeological Contractor shall produce a SSWSI for each site requiring intervention, detailing the exact scope of the archaeological fieldwork or protection. Each SSWSI must be agreed by the ACoW prior to it being submitted to the Curators. Once agreed by the ACoW, it will be sent by the ACoW to the Curators, who will review the relevant SSWSIs within four weeks of receipt and approve the final document.
- 6.1.2 The SSWSI should include the following sections as a minimum (see ClfA Standard and Guidance for Archaeological Evaluations (Ref 11) and ClfA Standard and guidance for Archaeological Excavation (Ref 12) for further information):
- A statement on the technical, research and ethical competences of the project team, including relevant professional accreditation.
 - Site location (including map) and descriptions.
 - The event number and accession number obtained from ECC. These should be shown on all records, finds and samples.
 - Context of the site.
 - Geological and topographical background.
 - Archaeological and historical background.
 - General and specific research aims of the site, with reference to Regional Research Frameworks, as well as earlier phases of work.
 - Methods.
 - Collection and disposal strategy for artefacts, ecofacts, and all paper, graphic and digital materials.
 - Arrangements for immediate conservation of artefacts.
 - Post-fieldwork assessment and analysis of project data.
 - Report preparation (including details of the section headings). The Archaeological Contractor will be required to prepare reports in time to inform the submission of the DCO application.
 - Publication and dissemination proposals, as required.
 - Copyright.
 - Details of finds storage. The Archaeological Contractor shall include details of how the finds will be packaged for storage.
 - Data Management Plan for digital archiving.
 - Methods for preparation of the physical archive, including accession numbers.
 - Timetable.

- Staffing. Details on the expertise of the project team is also required. The project manager should be a named Member of the Chartered Institute for Archaeologists (MCI(A) who is adequately qualified to manage the required archaeological work or who can demonstrate an equivalent level of competence. The composition and experience of the project team should be described. Specialists should be identified in line with the list detailed in Section 5.4 (e.g. for finds and environmental work). The availability of the environmental specialists (and laboratory) to do analysis for inclusion within the SSWSI should be stated. Note: Specialists should be able to demonstrate a relevant qualification and track record of at least three years continuous relevant work (or equivalent) and appropriate publication. The laboratory should be ready and equipped to do analysis on all samples to fulfil the obligations within the timescale. In appropriate circumstances, less experienced staff may conduct work under the supervision of well-established and widely recognised specialists.
- A statement on compliance with relevant professional ethical and technical standards (including data standards).
- Health and Safety considerations, including details of relevant insurance.
- Environmental protection considerations.

7. Monitoring

7.1 Site monitoring

- 7.1.1 The ACoW will liaise with the Archaeological Contractor and the Principal Contractor (as relevant) to monitor progress and compliance with the requirements of the SSWSIs. This will include (but not be limited to):
- Monitoring of all aspects of archaeological fieldwork.
 - Monitoring of the installation and removal of protective measures, such as temporary fencing, and at sites where preservation of archaeological remains is required.
- 7.1.2 The ACoW will act as coordinator in respect of access and monitoring arrangements with the Client's Representative and the Curators. This will include oversight of engagement between the Archaeological Contractor and the relevant heritage stakeholders, including the Regional Science Advisor (East of England), to ensure the timely provision of on-site advice to the fieldwork team.
- 7.1.3 The archaeological mitigation works will be subject to ongoing monitoring by the ACoW, who will have unrestricted access to the sites, site records or any other information as may be required. The work will be inspected to ensure that it is being carried out to the required standard and that it will achieve the desired aims and objectives.
- 7.1.4 Site meetings will be held as necessary throughout the archaeological programme to allow implementation of the works to be monitored to ensure adherence to approved SSWSIs, effective decision making where required and to support timely 'sign-off' of archaeological completion. The Client's Representative and the Curators will be invited to attend site meetings in accordance with their roles.
- 7.1.5 The Curators will be afforded access to the sites through regular site meetings (see below); specific visits to access site records and any other information will be arranged as necessary and required through the ACoW.
- 7.1.6 It is anticipated that progress and consultation meetings will be held at least monthly during fieldwork. Additional meetings and site visits will be held as appropriate. The frequency of meetings will be determined by the work taking place on site. The meetings would include on-site monitoring visits to review site progress, review of work in line with the SSWSIs, and the strategy for the following period. This will ensure that programming details and changes are communicated rapidly and efficiently and will ensure that appropriate resources are available and can be deployed where they are required. Weekly reporting will also be issued (see Section 11.2 below).

7.2 Sign off procedures

- 7.2.1 It is acknowledged that the programme of works will require authentication of completion and the following approach is proposed.

- 7.2.2 Each of the sites identified above, and any other site where mitigation is required following the result of trial trenching, will have a SSWSI prepared by the Archaeological Contractor.
- 7.2.3 Each SSWSI will include a programme for the required work. Once the Archaeological Contractor determines the fieldwork to be completed, a review will be undertaken. At this time the Archaeological Contractor will make available by site visit or remote presentation (e.g. online video meetings) the results of the work. All parties will have been prepared for this review, by the distribution of a weekly site report on the progress of work (see Section 11.2 below for more detail).
- 7.2.4 Sites that have been completed (approved by the ACoW in consultation with the Client's Representative and the appropriate Curator) will be subject to a formal signing off procedure. The Archaeological Contractor will submit a completion statement to the ACoW. The ACoW will submit the accepted completion statement to the Client's Representative and the appropriate Curator for confirmation (in consultation with Historic England where required) that the relevant works have been completed in compliance with the relevant SSWSIs.
- 7.2.5 In the event of disagreement between the Archaeological Contractor, the ACoW, the relevant Curator and/or the Client's Representative on the progress, strategy or completion of work, a form of arbitration will be proposed.

8. Methodology for Detailed Excavation

8.1 Introduction

- 8.1.1 Detailed Excavation will be carried out at the locations identified above. All excavation will be carried out in accordance with the SSWSIs, and any further instructions from the Client's Representative and the ACoW.

8.2 Machine excavation

- 8.2.1 All machine excavation will be undertaken under constant archaeological supervision.
- 8.2.2 The excavation areas will be set out using electronic survey equipment by the Principal Contractor. The extent of the stripped excavations will be clearly demarcated and secured with appropriate barrier fencing (such as Heras fencing) to ensure that persons or vehicles cannot inadvertently traverse the areas of investigation while archaeological works are in progress. The fencing (to be provided by the Principal Contractor unless otherwise agreed) will be regularly inspected and maintained by the Principal Contractor until archaeological investigations in the area have been completed, inspected, approved and signed off by the Curators.
- 8.2.3 No archaeological work should commence without a Permit to Dig. This should include confirmation that the locations of any services are marked, along with any environmental or ecological constraints, and that any additional safety measures required to ensure that each area is safe prior to commencement of mitigation work are in place.
- 8.2.4 The machine excavation will be undertaken using an appropriate 360° mechanical excavator fitted with a toothless ditching bucket. A toothed bucket or breaker may only be used temporarily if concrete, tarmac or other hard standing is encountered. A toothless bucket is to be used at all other times.
- 8.2.5 Upon removal of the topsoil, the underlying subsoil shall be removed by mechanical excavator until either the top of the first archaeological horizon or undisturbed natural deposits are encountered. Particular attention should be paid to achieving a clean and well-defined horizon with the machine. Topsoil and subsoil will be stockpiled separately. The mechanical excavator will not traverse any stripped areas.
- 8.2.6 The machined surface will be hand cleaned if necessary, and inspected for archaeological features, and all identified features should be marked on the ground to ensure that they are not "lost" during the mapping stage. Pre-excavation planning will be undertaken to record all identified archaeological features. The pre-excavation plan will form the basis for discussion on site to inform the strategy for excavation of the archaeological remains. The pre-excavation plan will be made available to the Client's Representative, the ACoW and the Curators.
- 8.2.7 The Archaeological Contractor shall not excavate any area beyond those scheduled for the proposed works. Should archaeological features revealed within the excavation area continue outside of the area and are likely to be subject to construction impact, the excavation area may need to be extended

to sufficiently characterise the material. This will only be undertaken with the agreement of the Client's Representative, the ACoW and the Principal Contractor, in consultation with the Curators.

- 8.2.8 Hand excavation, recording and sampling will proceed in accordance with the methodology outlined in this OWSI and confirmed in the Archaeological Contractor's SSWSI, in order to meet the aims and objectives of each excavation.
- 8.2.9 Areas will be recorded on a suitable digital base map/development plan and the stratigraphy and depth of excavation will be recorded. Details on recording procedures where significant archaeology is discovered are detailed in the section below.

8.3 Hand excavation

- 8.3.1 Archaeological deposits will be excavated and recorded stratigraphically in accordance with a recording system detailed in the Archaeological Contractor's SSWSI and approved by the Curators. All relationships between features or deposits will be investigated and recorded in order to achieve suitable preservation by record and to fulfil the aims and objectives of the project.
- 8.3.2 Hand excavation will be initially focussed to provide information on the form, function and date of the archaeological features. Information on the character, nature, contents and significance of features should also be obtained.
- 8.3.3 Machine-assisted excavation may be permissible if large deposits are encountered but only after agreement with the relevant Curators. The Archaeological Contractor will include a sampling strategy for machine-assisted excavation in their SSWSI.
- 8.3.4 A sufficient sample of deposits/features will be investigated through hand excavation to record the horizontal and vertical extent of the stratigraphic sequence, to the level of undisturbed natural deposits.
- 8.3.5 All features identified following soil stripping will be scanned by a metal detector. Spoil from the excavated features will also be scanned with a metal detector to locate any metallic objects.
- 8.3.6 The Archaeological Contractor will make provision for appropriate archaeological specialists to visit the site or attend meetings upon request in order to advise on the excavation strategy. The Archaeological Contractor will prepare a list of appropriate archaeological specialists with relevant local experience who are likely to be involved in the project and will include this in their SSWSI.
- 8.3.7 Unless it is agreed otherwise at the pre-excavation site meeting, the following excavation strategy will be employed for Intrinsic Value Sites:
- **Linear features:** A minimum sample in length not less than 1m long, where the depositional sequence is consistent along the length. Linear features with complex variations of fill type will be sampled sufficiently in order to understand the sequence of deposition - a minimum of 25% along the length of features associated with settlement and a minimum of 10% along the length of features associated with field systems. If

appropriate all intersections will be investigated to determine the relationships between features. All termini will be investigated.

- **Discrete features:** Pits, post-holes and other isolated features will normally be half-sectioned. If large pits or deposits (over 1.5m diameter) are encountered then the sample excavated should be sufficient to define the extent and maximum depth of the feature and to achieve the objectives of the sampling, but should not be less than 25%. Stake-holes will be fully excavated but only a reasonable proportion will be sampled.
- **Structures:** These features should be subject to a minimum of 100% excavation. Each structure will be sampled sufficiently to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the excavation. All intersections will be investigated to determine the relationship(s) between the component features. The remains of all upstanding walls will be hand cleaned sufficient to understand their dimensions, extent, composition, sequence and relationships and must be excavated to 100%.
- **Special or burnt features:** These features should be the subject of 100% excavation. Such features will be identified during pre-excavation planning to enable the input and advice of appropriate archaeological specialists. Where in situ burning is identified no excavation shall take place until the possible recovery of samples for scientific dating has been considered.
- **Artefact scatters:** These should be the subject of 100% excavation. Where associated with buried land surfaces, in situ flint scatters will require hand cleaning and will need to be spatially defined in three-dimension to determine the limits of the scatter within the area of investigation. All lithic artefacts with a Maximum Linear Dimension (MLD) of 10mm will require three-dimensional plotting prior to recovery and individually bagged and recorded as registered finds. Non-tool fragments of less than the MLD should be bagged according to an appropriate spatial recording system consistent with context.
- **Human remains:** During excavation human remains will be 100% excavated, recorded in situ and subsequently lifted, labelled and packed to the standard established by Excavation and post-excavation treatment of cremated and inhumed human remains (Ref 27) and Updated guidelines to the standards for recording human remains (Ref 28). Environmental samples will be recovered from grave fills and specific locations such as the abdominal cavity for specialist analysis. Site inspection will be made by a recognised specialist who will advise on the excavation and sampling strategy following guidelines on The Role of the Human Osteologist in an Archaeological Fieldwork Project (Ref 29). The location of each grave, inhumation/cremation and any associated grave goods will be recorded three dimensionally using metric survey-grade equipment (or its equivalent). The exhumation of any human remains will only be undertaken in accordance with current UK legislation and good practice (refer to Appendix A) and any local environmental health requirements. Further detail is contained in paragraph 8.9.1 above.

- **Tree throws:** Where features are identified as tree throws or hollows a sample will be hand excavated to confirm the interpretation. Features where this interpretation is unclear should be treated as non-structural discrete features and investigated in accordance with the strategy set out above.
- **Ridge and furrow:** Ridge and furrow will only be recorded during pre-excavation to note its alignment. Excavation of furrows may be required where the relationship with earlier features is unclear, or where they share the alignment of earlier ditches. Where relevant, environmental samples of the furrows may be taken if palaeoenvironmental data and/or dateable material is likely to survive.

8.3.8 Archaeological recording will proceed in accordance with the specification outlined in this mitigation strategy and accepted national, regional and professional standards and guidance (Appendix A).

8.4 Scientific analysis

8.4.1 To further examine the landscape, past environments, and to provide a more holistic approach to the investigations, scientific analysis should be undertaken. In the first instance, this should comprise the analysis of phosphates. The methodology should normally be as follows. However, the Archaeological Contractor's geoarchaeological team should develop suitable strategies for the scientific study of past land use on a case by case basis:

- To identify and investigate activity areas and depositional practices, a grid (10-20m) should be applied, reducing to a smaller (1-2m) grid across structures.

8.4.2 While some indicative sample intervals are provided above, the SSWSIs should detail the exact requirements for each site and should be guided by the Archaeological Contractor's geoarchaeologist and guidance from the Historic England Scientific Advisor. The results from one site may also inform the use of the technique in additional areas, by means of a change to the sampling interval. Local geochemistry should also be taken into account. A two-stage approach may be undertaken with an initial appraisal of a broad spread of samples to establish the degree of variability and presence of any 'hot' spots on occupation surfaces. The soil phosphorus analysis should follow guidance contained within Historic England's 'Geoarchaeology' (Ref 30).

8.4.3 Where required, alternative scientific techniques could be used, depending on the evolving nature of the research questions being asked. Example techniques could include faecal lipid biomarkers, soil micromorphology and geochemical analysis of a range of chemicals using a hand-held portable X-ray spectrometer. This latter technique is only relatively recently being used for archaeological survey, and has been used for assessment as part of HS2 (Finch, pers. comm.). This technique can also allow a more rapid assessment of phosphorus than traditional techniques. However, the use of other scientific techniques will need to be agreed with the ACoW, the Client's Representative and the Curators, including the Historic England Scientific Advisor, and should be tailored to the research questions of each site. Blanket use of these techniques is not expected.

8.5 Recording

- 8.5.1 All archaeological remains shall be recorded to good practice standards including the ClfA Standard and Guidance for Archaeological Excavation (Ref 12).
- 8.5.2 To minimise the use of paper resources recording would, in the first instance, be undertaken on a suitable digital device, such as an iPad or tablet, using the appropriate software. Recording would be in a format accessible to the relevant parties and will be outlined in the Archaeological Contractor's SSWSI. Where required, hand drawn plans may be required for detailed drawings of specific features (e.g. human remains, kilns etc.).
- 8.5.3 Archaeological recording is to include as a minimum:
- A full written (on appropriate pro-forma recording sheets), drawn and photographic record will be made for each element of the excavation works, even where no archaeological features are identified. Where the stratigraphic sequence or inter-cutting features are complex the relationships between contexts shall also be compiled as 'Harris matrix' diagrams (Ref 12).
 - Plans and sections of features will be produced at an appropriate scale (normally 1:20 for plans and 1:10 for sections). All plans and sections will include spot heights relative to Ordnance Datum in metres, correct to two decimal places.
 - Photography will be taken in line with current industry good practice and the requirements of the local authority. In addition to records of archaeological features, a number of general site photographs will also be taken to give an overview of the site including photographs of areas prior to and upon completion of fieldwork. Particular attention should be paid to obtaining shots suitable for displays, exhibitions and other publicity.
 - Indices of context records, drawings samples and photographs will be maintained and checked. These will form part of the project archive. These indexed registers will be fully cross-referenced.
- 8.5.4 All photographs of features must include an appropriate scale, a north arrow, and a photo-board. Graduated metric scales of appropriate lengths should be used, ensuring the use of appropriate vertical scales against deep sections in combination with horizontal scales. Photo-boards must be positioned in such a way that the writing is legible and as a minimum include the context number and site code. Photo-boards should also not obscure the archaeological feature that is being recorded. The photographic record must consist of high-quality digital uninterpolated images of at least 10 megapixels taken using a camera with an APS-C or larger sensor. Digital photographs intended for archive purposes must comply with good practice available at the current time – i.e. high quality non-proprietary raw files (DNG) or TIFF images. The incorporation of clear digital images within ensuing reports, to augment the drawn record, is expected. JPG images and images taken using iPads and/or phones must not be used for archiving purposes.
- 8.5.5 On completion of the field project the site archive will be consolidated, checked to ensure it is internally consistent and ordered as a permanent archive.

- 8.5.6 During the course of the fieldwork, the Archaeological Contractor is to make all digital records available to the Principal Contractor, the Client's Representative, the ACoW and the Curators, ensuring it is compatible with their systems. The updated digital record will be provided at agreed intervals, the maximum being one month.

8.6 Artefact recovery

- 8.6.1 Artefacts will be collected, stored and processed in accordance with standard methodologies and national guidelines (refer to Appendix A) and in line with local authority requirements. All artefacts recovered on site must be bagged and recorded at the time of recovery to ensure they are appropriately stored. Bulk finds from feature fills of deposits will be collected and recorded by context. Each 'significant find' will be recorded three dimensionally. Similarly, if artefact scatters are encountered each individual artefact should be recorded three dimensionally and individually bagged and recorded as registered finds.
- 8.6.2 Except for modern artefacts all finds will be collected and retained. The Archaeological Contractor will clarify in their SSWSI their site-specific Selection Strategy and will ensure that it is in-line with ClfA (Ref 12) and local authority guidelines.
- 8.6.3 Where necessary the artefacts will be stabilised, conserved and stored in accordance with the guidelines of the UKIC (United Kingdom Institute of Conservators) (refer to Appendix A). If necessary, a conservator will visit the site to undertake 'first aid' conservation treatment. If waterlogged organic materials are encountered and appropriate cold storage facilities are not available onsite, the project manager will arrange the removal of the finds to nearby suitable facilities.
- 8.6.4 Artefacts will be stored in appropriate materials and conditions and monitored to minimise further deterioration.

8.7 Environmental sampling

- 8.7.1 The Archaeological Contractor's environmental specialist will outline an appropriate sampling strategy for the archaeological excavation to be included in their SSWSI, which will need to be agreed with the Curators and, where appropriate, the Historic England Science Advisor.
- 8.7.2 Environmental sampling will be targeted to answer the questions laid out in the Site-specific aims and the regional research agendas.
- 8.7.3 Provision will also be made for the recovery of material suitable for scientific dating. An appropriate dating specialist with a background in chronological modelling will be consulted in advance of and throughout the fieldwork and will be available to advise on the ongoing strategy.
- 8.7.4 Any samples taken must come from securely stratified deposits using the methodologies outlined by Historic England in Environmental Archaeology; A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (Ref 31).
- 8.7.5 Any samples should be taken during feature excavation from appropriately cleaned surfaces, be collected with clean tools and be placed in clean

containers. They will be adequately recorded and labelled, and a register of all samples will be kept. Once the samples have been obtained, they should be stored appropriately in a secure location prior to being sent to the appropriate specialist. All samples will be processed, unless otherwise agreed with the Archaeological Contractor's paleoenvironmental advisor, Client's Representative, the ACoW and the Curators.

8.7.6 Provision will be made for the ongoing processing and initial assessment of sampled material, concurrent with the archaeological excavations, in order to provide timely feedback regarding the quality of preservation and the significance of specific deposits during the excavation and to inform the ongoing strategy. As a consequence, consideration must be given to processing on site, or in a nearby compound/facility, of environmental samples to provide dynamic feedback on the environmental content of features, to enable additional sample excavation and processing to be undertaken.

8.7.7 Samples will be taken from stratified, dateable deposits, with a low risk of contamination.

8.8 Environmental sampling

8.8.1 The Archaeological Contractor's environmental specialist will outline an appropriate sampling strategy for the archaeological excavation to be included in their SSWSI, which will need to be agreed with the Curators and, where appropriate, the Historic England Science Advisor. A provisional environmental sampling strategy is presented in Table 8-1.

8.8.2 Environmental sampling will be targeted to answer the questions laid out in the Site specific aims and the regional research agendas.

8.8.3 Provision will also be made for the recovery of material suitable for scientific dating. An appropriate dating specialist with a background in chronological modelling will be consulted in advance of and throughout the fieldwork and will be available to advise on the ongoing strategy.

8.8.4 Any samples taken must come from securely stratified deposits using the methodologies outlined by Historic England in Environmental Archaeology; A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (Ref 31).

8.8.5 Any samples should be taken during feature excavation from appropriately cleaned surfaces, be collected with clean tools and be placed in clean containers. They will be adequately recorded and labelled, and a register of all samples will be kept. Once the samples have been obtained, they should be stored appropriately in a secure location prior to being sent to the appropriate specialist. All samples will be processed, unless otherwise agreed with the Archaeological Contractor's paleoenvironmental advisor, Client's Representative, the ACoW and the Curators.

8.8.6 Provision will be made for the ongoing processing and initial assessment of sampled material in order to provide timely feedback regarding the quality of preservation and the significance of specific deposits during the excavation and to inform the ongoing strategy. As a consequence, consideration must be given to processing on site, or in a nearby compound/facility, of environmental samples to provide dynamic feedback on the environmental content of

features, to enable additional sample excavation and processing to be undertaken.

8.8.7 Samples will be taken from stratified, dateable deposits, with a low risk of contamination.

Table 8-1 Provisional environmental sampling strategy for archaeological excavation

<i>Potential data</i>	<i>Method</i>	<i>Context type</i>	<i>Sample size (ltr)</i>	<i>Excavated feature sample</i>
CPR	Bulk	Structural/occupation features	40	100%
		Pits (prehistoric)	40	50%
		Pits (Roman)	40	50%
		Pits (medieval)	40+	50%
		Pits (post-medieval)	40	50%
		Gully/ditch (settlement)	40	10%
		Gully/ditch (outfield)	40	5-10%
Waterlogged and organic remains	Bulk	All contexts	10-20	Layer (N/A)
Small bones	Bulk	All contexts	40	50
Molluscs	Incremental	Deposit sequence	As advised by specialist	N/A
Pollen	Monolith	Deposit sequence	As advised by specialist	N/A

8.8.8 If large deposits of animal bone are encountered, the advice of the project specialist will be sought regarding recording and sampling. Animal bone groups (i.e. articulated animal remains) will be assigned a number and documented using a suitable animal bone group sheet following Historic England guidance (Ref 32) and will be fully excavated as far as is practicable. Assessment of biological remains will follow standard assessment procedures as laid out in Historic England guidance (Ref 29; Ref 30; Ref 32).

8.8.9 The finds and samples will be processed (cleaned and marked) as appropriate. Each category of find or environmental/industrial material will be examined by a suitably qualified archaeologist or specialist and the results incorporated into the fieldwork report.

8.9 Finds processing

8.9.1 Initial processing of finds (and if appropriate other samples) will be carried out concurrent with the fieldwork. The Archaeological Contractor should consider

the option of initial processing to be undertaken on site or in a nearby compound/facility. Finds suitable for pop-up displays or posting on social media should be identified during excavation. Finds which may contain residues should be retained unwashed until analysis is complete. In addition, both Braintree Museum and Chelmsford Museum should be consulted during finds processing.

- 8.9.2 The ClfA finds Toolkit (Ref 33) should be utilised to develop a selection strategy. This strategy should be developed for each site to ensure the appropriate methodology is applied to each site. This will follow the strategy to be agreed with both Braintree Museum and Chelmsford Museum and should be advised by the specialists.
- 8.9.3 The processing of finds will be finished shortly after completion of the investigations, the finds will be retained (according to the Selection Strategy), washed, marked, bagged and logged on a MS Access or GIS database (or equivalent), together with their locations according to the requirements set out in the Collection Policy (e.g. 'significant finds' will be recorded on the OS National Grid (eastings, northings) and Ordnance Datum (height) to two decimal places).
- 8.9.4 The finds assemblage will be treated, labelled and stored in accordance with the appropriate Historic England guidance documents, local authority guidelines (if appropriate) and the Institute of Conservation guidelines (refer to Appendix A). The Archaeological Contractor will ensure that the processing of the assemblage is in accordance with the requirements of the recipient museum.
- 8.9.5 If appropriate, each category of find or each material type will be examined by a suitably qualified archaeologist or specialist and the results incorporated into the fieldwork report.
- 8.9.6 All finds will be retained, unless otherwise agreed with the Client's Representative, the ACoW and the Curators, for further analysis during the reporting phase of the archaeological mitigation of the main construction phase.

8.10 Human remains

- 8.10.1 If human remains are discovered during the course of the fieldwork the remains shall provisionally, in accordance with current good practice, be covered and protected and left in situ. The removal of human remains will only take place in accordance with the procedure set out in article 56 of the Development Consent Order [APP-011], with a Ministry of Justice licence, and under the appropriate Environmental Health regulations and the Burial Act 1857 (Ref 34). In the event of the discovery of human remains the Archaeological Contractor will contact H.M. Coroner.
- 8.10.2 Excavation of human remains will be undertaken as per the strategy outlined in Section 8.3.7f. The requirement for a Ministry of Justice licence will be laid out in the SSWSIs.

8.11 Treasure

- 8.11.1 Any artefacts which are recovered that fall within the scope of the Treasure Act 1996 and Treasure (Designation) Order 2002 (Ref 35 and Ref 36) will be

reported to the Client's Representative, the ACoW and the Principal Contractor immediately. The Curators and the relevant Portable Antiquities Scheme Finds Liaison Officer will also be informed. Artefacts that are defined as Treasure according to the above legislation will be vested in the franchisee (e.g. The Duke of Cornwall is franchisee for Cornwall), or if none, the Crown. The Archaeological Contractor will contact H.M. Coroner, and will ensure that the Treasure regulations are enforced and that all the relevant parties are kept informed. A list of finds that have been collected that fall under the Treasure Act and related legislation will be included in the fieldwork report.

- 8.11.2 Artefacts that are classified as 'treasure' will be removed to a safe place but where removal cannot be achieved on the same working day as the discovery, suitable security measures must be taken to protect the finds from damage or unauthorised removal.

9. Methodology for Trial Trench Evaluation

9.1 Introduction

- 9.1.1 Archaeological trial trenching will be carried out in advance of construction where extensive intrusive activities are planned as per the Scheme's detailed design. Trenching of the solar panel areas is not required where the only impact to the archaeological resource would arise from piled foundations. Where more extensive impacts are expected, trial trenching is required.
- 9.1.2 Prior to the commencement of fieldwork, the Archaeological Contractor will familiarise themselves with the results of the geophysical survey and other archaeological investigations in the immediate area surrounding the Scheme.
- 9.1.3 All excavation will be carried out in accordance with the SSWSIs, and any further instructions from the Client's Representative and the ACoW.

9.2 Machine Excavation

- 9.2.1 The Principal Contractor will agree access for plant, and the location of temporary parking and welfare facilities with the Archaeological Contractor.
- 9.2.2 The evaluation areas will be set out using electronic survey equipment by the Principal Contractor. The extent of the trial trenches will be clearly demarcated and secured with appropriate barrier fencing (such as Heras fencing) to ensure that persons or vehicles cannot inadvertently traverse the areas of investigation while archaeological works are in progress. The fencing (to be provided by the Principal Contractor unless otherwise agreed) will be regularly inspected and maintained by the Principal Contractor until archaeological investigations in the area have been completed, inspected, approved and signed off by the Curators.
- 9.2.3 No archaeological work should commence without a Permit to Dig. This should include confirmation that the locations of any services are marked, highlight any environmental or ecological constraints, and that any additional safety measures required to ensure that each area is safe prior to commencement of the evaluation work are in place.
- 9.2.4 The machine excavation will be undertaken using an appropriate 360° mechanical excavator fitted with a toothless ditching bucket. A toothed bucket or breaker may only be used temporarily if concrete, tarmac or other hard standing is encountered. A toothless bucket is to be used at all other times.
- 9.2.5 Upon removal of the topsoil, the underlying subsoil shall be removed by mechanical excavator until either the top of the first archaeological horizon or undisturbed natural deposits are encountered. Particular attention should be paid to achieving a clean and well-defined horizon with the machine. Topsoil and subsoil will be stockpiled separately. The mechanical excavator will not traverse any stripped areas.
- 9.2.6 The machined surface will be hand cleaned if necessary, and inspected for archaeological features, and all identified features should be marked on the

ground to ensure that they are not “lost” during the mapping stage. Pre-excavation planning will be undertaken to record all identified archaeological features. The pre-excavation plan will form the basis for discussion on site to inform the strategy for excavation of the archaeological remains within each evaluation trench. The pre-excavation plan will be made available to the Client’s Representative, the ACoW and the Curators.

- 9.2.7 The Archaeological Contractor shall not excavate any area beyond those scheduled for the proposed works. Should archaeological features revealed within the evaluation trench continue outside of the area and are likely to be subject to construction impact, the evaluation trench may need to be extended to sufficiently characterise the material. This will only be undertaken with the agreement of the Client’s Representative, the ACoW and the Principal Contractor, in consultation with the Curators.
- 9.2.8 Hand excavation, recording and sampling will proceed in accordance with the methodology outlined in this OWSI and confirmed in the Archaeological Contractor’s SSWSI, in order to meet the aims and objectives of the evaluation.
- 9.2.9 Areas will be recorded on a suitable digital base map/development plan and the stratigraphy and depth of excavation will be recorded. Details on recording procedures where significant archaeology is discovered are detailed in the section below.
- 9.2.10 Excavated material will be retained on site and stored within the confines of the trench fencing, adjacent to each trench (within a safe working distance) and will be prevented from entering any drainage system or water course. The Archaeological Contractor must ensure that the edges of the trenches are protected against falling materials and collapsing sides. This must be done in accordance with HSE recommendations. Toe boards will be provided where necessary.

9.3 Hand Excavation

- 9.3.1 Archaeological deposits will be excavated and recorded stratigraphically in accordance with a recording system detailed in the Archaeological Contractor’s SSWSI and approved by the Curators. All relationships between features or deposits will be investigated and recorded in order to achieve suitable preservation by record and to fulfil the aims and objectives of the project.
- 9.3.2 Hand excavation will be initially focussed to provide information on the form, function and date of the archaeological features. Information on the character, nature, contents and significance of features should also be obtained.
- 9.3.3 Machine-assisted excavation may be permissible if large deposits are encountered but only after agreement with the relevant Curators. The Archaeological Contractor will include a sampling strategy for machine-assisted excavation in their SSWSI.
- 9.3.4 A sufficient sample of deposits/features will be investigated through hand excavation to record the horizontal and vertical extent of the stratigraphic sequence, to the level of undisturbed natural deposits.

- 9.3.5 All features identified following soil stripping will be scanned by a metal detector. Spoil from the excavated features will also be scanned with a metal detector to locate any metallic objects.
- 9.3.6 The Archaeological Contractor will make provision for appropriate archaeological specialists to visit the site or attend meetings upon request in order to advise on the evaluation strategy. The Archaeological Contractor will prepare a list of appropriate archaeological specialists with relevant local experience who are likely to be involved in the project and will include this in their SSWSI.
- 9.3.7 Unless it is agreed otherwise at the pre-excavation site meeting the following sampling strategies will be employed for the evaluation:
- **Linear features:** A minimum sample in length not less than 1m long, where the depositional sequence is consistent along the length. Linear features with complex variations of fill type will be sampled sufficiently in order to understand the sequence of deposition.
 - **Discrete features:** Pits, post-holes and other isolated features will normally be half-sectioned. If large pits or deposits (over 1.5m diameter) are encountered then the sample excavated should be sufficient to define the extent and maximum depth of the feature and to achieve the objectives of the sampling, but should not be less than 25%. Stake-holes will be fully excavated but only a reasonable proportion will be sampled.
 - **Structures:** Each structure will be sampled sufficiently to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the evaluation. All intersections will be investigated to determine the relationship(s) between the component features. The remains of all upstanding walls will be hand cleaned sufficient to understand their dimensions, extent, composition, sequence and relationships.
 - **Special or burnt features:** These features will be sampled sufficiently to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the evaluation.
 - **Artefact scatters:** These features will be sampled sufficiently to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the evaluation. Where these are associated with buried land surfaces, they will require hand cleaning and three-dimensional plotting prior to recovery.
 - **Tree throws:** Where features are identified as tree throws or hollows a sample will be hand excavated to confirm the interpretation. Features where this interpretation is unclear should be treated as non-structural discrete features and investigated in accordance with the strategy set out above.
 - **Ridge and furrow:** Ridge and furrow will only be recorded during pre-excavation to note its alignment. Excavation of furrows may be required where the relationship with earlier features is unclear, or where they share the alignment of earlier ditches.

- 9.3.8 Archaeological recording will proceed in accordance with the specification outlined in this evaluation strategy and accepted national, regional and professional standards and guidance (Appendix A).
- 9.3.9 The methodology for recording, artefact recovery, environmental sampling, finds processing, human remains and treasure should follow the methodology detailed in Section 8 above.

10. Methodology for preservation of archaeological remains

10.1 Introduction

- 10.1.1 Although no sites have been identified thus far which require preservation in situ, this may be required pending the results of the archaeological trial trenching.

10.2 Protective fencing

- 10.2.1 In order to demarcate those sites that require preservation of archaeological remains and to avoid unintentional damage during construction, secure timber fencing will be installed during site set-up. The fencing will be installed by a fencing contractor under the supervision of the Archaeological Contractor. Signs will inform all parties of the protected designation of the site and to “keep out”.
- 10.2.2 The location and type of fencing for each site for preservation of archaeological remains will be set out in a Scope of Works prepared by the ACoW. The Principal Contractor and their ACoW will be responsible for regularly monitoring the condition of the fencing and will be responsible for its maintenance until either construction work in that area is complete or at Scheme opening, at which time the removal of the fencing will be monitored by the ACoW.
- 10.2.3 Notices prohibiting works will be attached to the fencing, detailing the purpose of the fenced off area. This is to ensure that no impacts are made to the remains which are being protected. Should these areas be required for scheme works, a SSWSI must be prepared for each area and it is likely that full archaeological excavation would be required at each location.

10.3 Preservation of archaeological remains beneath fill or concrete pad

- 10.3.1 At a number of locations along the Scheme, suitable fill material or concrete pad foundations (for solar panels) on top of a protective barrier membrane as identified in the SSWSI will be used to bury sensitive archaeological remains, to ensure that they are not disturbed during construction and to preserve them for future generations (refer to Appendix B). Sites will be temporarily buried beneath fill to enable specific construction requirements, e.g. soil storage, compounds or temporary roads.
- 10.3.2 The Archaeological Contractor will include in the SSWSI methods that they intend to use to protect sensitive buried archaeological remains, including measures to prevent damage (such as deep rutting) caused by vehicles or plant. This will include detail on the effects of compression and loading (whether dynamic or static) and site-specific protective measures, including the extent of the area to be protected, the depth of fill or concrete pad required and the type of fill. The SSWSIs will set out suitable methodologies for filling or covering areas without disturbing or impacting sensitive archaeological remains, and also for removing the fill or concrete pad at the end of construction.

- 10.3.3 The preservation methodology in the SSWSI will be developed in line with the principles of Historic England's 'Preserving Archaeological Remains' guidance (Ref 38) in consultation with the Client's Representative, the ACoW and the Curators. At each site, measures will be put in place to avoid rutting or the compaction of soft ground (topsoil and fill) until or unless adequate protection is provided (vehicles will be restricted or prohibited from traversing sensitive areas prior to fencing, the laying of a protective membrane and fill deposits/vehicle running surface, and at decommissioning).
- 10.3.4 The ACoW will give Toolbox Talks to inform all site personnel of the archaeological and historic environment constraints on site, recognition of archaeological deposits, the protection measures that are required and their obligations under the SSWSI, and generally to ensure that these are put in place and complied with. Following construction, the protective fill material will be removed by the Principal Contractor, under supervision by the Archaeological Contractor, leaving the sites in their original condition.
- 10.3.5 Where concrete pad foundations are used, these are to remain in place until the Scheme is decommissioned. Arrangements shall be undertaken to avoid damage to the archaeological resource during decommissioning. This would include, at a minimum, removing the base of the pad under archaeological supervision.

11. Reporting

11.1 Introduction

- 11.1.1 Separate reports shall be submitted for the archaeological evaluation and mitigation fieldwork. The evaluation report will include the trial trenching and will inform the design of SSWSIs for mitigation. A single post-excavation report will be submitted for all areas of archaeological mitigation.
- 11.1.2 Following the completion of the fieldwork, all finds and samples will be processed (cleaned and marked). Each category of find or environmental/industrial material will be examined by a suitably qualified specialist so that the results can be included in the evaluation and post-excavation reports.
- 11.1.3 Where significant remains are identified by the archaeological evaluation which are likely to require further mitigation, the specialist analysis should be sufficient to inform the scope and aims of the mitigation. Final analysis of these remains can be completed as part of that additional mitigation.

11.2 Weekly reports

- 11.2.1 Weekly written progress reports will be provided by the Archaeological Contractor and submitted to the ACoW during each phase of fieldwork, to be issued via e-mail each Friday, and to be received no later than 14.30 hrs. This should include details of each area where archaeological work has taken place in the previous week, along with details of any archaeological features located, highlighting significant finds and discoveries and progress against the programme. In addition, the Principal Contractor and Archaeological Contractor will inform the ACoW and/or the Client's Representative on the progress of the fieldwork verbally upon request. The ACoW will e-mail the weekly reports to the relevant Curators.
- 11.2.2 It is anticipated that regular progress meetings will be held on site with the Curators during the course of the fieldwork. If appropriate, the Historic England Regional Science Advisor, shall be invited to attend. These meetings will be arranged by the ACoW; monitoring meetings will also be held during the post-excavation phase of the project if appropriate. A programme of monitoring visits/meetings will be agreed prior to the commencement of fieldwork.
- 11.2.3 Use should be made of GIS systems as an interactive tool during site monitoring and as part of the reporting process.

11.3 Interim statements

- 11.3.1 Interim statements will be prepared and submitted by the Archaeological Contractor to the ACoW and the Client's Representative. The ACoW will submit these interim statements to the relevant Curators. The purpose of each interim statement is to provide a basic account of the results of the investigations at each site to inform the progress meetings. Interim statements will be prepared within a set time frame following completion of fieldwork at the relevant site. This time frame will be decided by the ACoW, the Client and the Archaeological Contractor prior to the commencement of the post-excavation work. The interim statement will include:

- A brief summary of the results.
- A draft or preliminary site plan of each archaeological area or site.
- A quantification of the primary archive including finds and samples.
- Identify any issues that have arisen during the course of the fieldwork to ensure that there is integration across the Scheme between sites and phases.
- A programme of work and schedule for the completion of the PEAR.

11.4 Post-Excavation Assessment

- 11.4.1 The Archaeological Contractor will meet the set time frames in order that the post-excavation assessment, analysis and publication phases can be programmed and resourced properly, and so that the completion date for all construction and post-excavation works can be met. It is envisaged that the final publication report will be submitted by the date the Scheme has been completed. The final programme for the post-excavation work shall be agreed between the Archaeological Contractor, ACoW and the Client, in consultation with the Curators.
- 11.4.2 While each individual site will have its own post-excavation assessment, the results from all fieldwork interventions will be combined and treated as one project for the purposes of the updated project design. The results from earlier investigations (evaluation surveys and any advance archaeological works) will also be assessed/reviewed by the Archaeological Contractor, where it contributes to an understanding of the site and addresses the research questions and aims and objectives of the SSWSIs. The assessment reports should also reflect the previous archaeological work at nearby sites, so that lessons learnt regarding the usefulness of specific techniques can be applied. Following the completion of the post-excavation assessment, the original project objectives will be reviewed to determine the scope of any analysis and publication.
- 11.4.3 The preparation of the project archive, post-excavation assessments and subsequent analysis and publication phases will be undertaken in accordance with the SSWSIs and Historic England guidelines (Ref 9), and other relevant archaeological standards and national guidelines (see Appendix A). The different phases will be completed within a set time frame following completion of fieldwork, as agreed between the Archaeological Contractor, ACoW and the Client in consultation with the Curators.
- 11.4.4 The precise format of the reports is dependent upon the findings of the investigations, but the post-excavation assessment reports will contain the following:
- A non-technical summary.
 - Site location.
 - Brief archaeological, historical and project background.
 - Methodology.
 - Aims and objectives.

- Results – factual data statements (stratigraphic, artefactual, environmental, initial scientific dating results).
- Statements of potential (stratigraphic, artefactual, environmental).
- Statements regarding immediate and long-term storage and curation.
- Review of original aims and objectives.
- Statement of the significance of the results in their local, regional, national and international context.
- Archaeological Research Design (ARD) that sets out how the research aims and objectives of the SSWSIs can be addressed at the analysis stage.
- Post-excavation analysis method statements.
- Recommendations for analysis, reporting and publication (including a synopsis of the proposed contents).
- Proposed resources and programming (task list linked to key personnel, time required and key research questions that the task will answer or facilitate and programme cascade chart).
- General and detailed plans showing the location of the investigation areas accurately positioned on an OS base with grid co-ordinates and a plan of the identified archaeological remains (to a known scale).
- Detailed plans and sections/profiles, deposit models etc., to support the narrative.
- Detailed stratigraphic matrix for each area excavated and how the areas interlink.
- Photographs and illustrations, including any 3D models.
- Bibliography.
- A cross-referenced index to the project archive and summary of contexts.
- Appendices containing specialist reports.

11.4.5 The post-excavation assessment reports and Updated Project Design (UPD) will be submitted to the ACoW and the Client for review and comment. The Archaeological Contractor will address any comments that they may have. The ACoW will issue the revised draft report to the Curators for comment. In finalising the report, the Archaeological Contractor will take account of the comments of the Curators.

11.4.6 The scope of the analysis and publication report will be dependent upon the assessment and future discussions to be held with the ACoW, the Client and the Curators. The analysis stage will be undertaken in accordance with the UPD and will lead to the compilation of a research archive and the production of integrated report texts and illustrations for publication.

11.5 Outline publication and dissemination proposals

11.5.1 A comprehensive publication and dissemination programme that also considers the context of the investigations will be developed in parallel with

the strategy for Public Archaeology and Community Engagement (see Appendix C).

- 11.5.2 The format and structure of the publication (headings, word counts, figures and photographs) will be informed by the post-excavation assessment and will be decided by the Archaeological Contractor in consultation with the ACoW and the relevant Curators and Historic England. It is envisaged that interim reporting related to mitigation will be published on the Archaeology Data Service archive.
- 11.5.3 Fieldwork updates would be published annually in fieldwork roundups in appropriate local and period journals. Fieldwork data would be fed into Essex HER. Discussions should be held with the HER Officer to ensure all relevant data is provided.
- 11.5.4 The Braintree Museum and Chelmsford Museum should be consulted during the publication and dissemination phases of the Scheme, as recipients of the project archive.
- 11.5.5 It is anticipated that academic publications would take the form of either a multi-period monograph, a series of thematic or chronological monographs, with further reports in the Archaeological Data Service, and/or topic-, theme-, period-, or object-specific articles in appropriate journals. Production of more accessible and popular publications should align with the aims of the Public Archaeology and Community Engagement (PACE) strategy (Appendix C).
- 11.5.6 The final scope and publication outlet/format for the popular and academic publications associated with the Scheme have not yet been decided. However, it is anticipated that these would be print publications also accessible online as open-access publications. Digital publication, dissemination and stable online archiving via the Archaeology Data Service archive would be prepared/arranged by the Archaeological Contractor.

12. Archives

12.1 Archive security and storage

- 12.1.1 Archaeological material recovered from fieldwork is irreplaceable. The finds, records and data generated by the fieldwork will be removed from site at the end of each working day and will be kept secure at all stages of the project (Ref 37 and Appendix A). The Archaeological Contractor will be responsible for the care of the site archive (records and finds) in their possession and should ensure that adequate resources are in place at the start of the fieldwork, including the materials necessary for long-term storage and access to an archaeological conservator. Arrangements should be made for the proper cataloguing and storage of the archive during the project life-cycle (it may be appropriate to liaise with an archive specialist).
- 12.1.2 Specialist data and reports will clearly state the research potential of the collections, highlighting these for the accessioning museum, as this will ensure that the potential of the collections can be promoted to researchers following deposition.

12.2 Archive consolidation

- 12.2.1 The Archaeological Contractor should compile a Data Management Plan in line with ClfA guidelines (Ref 14) and include details within their SSWSIs. The Braintree Museum and Chelmsford Museum are stakeholders in this process and should be consulted during the creation of the Data Management Plan.
- 12.2.2 The Site records and assemblages (list of fieldwork interventions, notebooks/diaries, context records (including digital records), feature records, structure records, site geomatics (drawings), photographs and films, finds records and associated data files) will constitute the primary Site archive. This is the key archive of the fieldwork project and the raw data upon which all subsequent assessment and analysis and future interpretation will be based. The archive will therefore not be altered or compromised and the Archaeological Contractor is expected to show due diligence and compliance with the digitisation of data.
- 12.2.3 The Site archive should be quantified, ordered, indexed and made internally consistent, and in line with current good practice (refer to Appendix A but with particular reference to Ref 37). All finds and coarse-sieved, and flotation samples will have been processed and stored under appropriate conditions. The archive will also contain a site matrix, a summary of key findings and descriptions of artefactual and environmental assemblages. The content of an outline structure for a fieldwork archive is presented in MoRPHE, Appendix 1, Product P1 and Product P3 (Ref 9).
- 12.2.4 The Archaeological Contractor will, prior to the start of fieldwork, liaise with the Braintree Museum and Chelmsford Museum to obtain agreement in principle to accept the physical, documentary, digital and photographic archive for long-term storage. This will include the agreement of a retention and disposal policy that is consistent and compliant with both archives. The Archaeological Contractor will be responsible for identifying any specific requirements,

archiving costs or policies of the recipient repository in respect of the archive, and for adhering to those requirements.

- 12.2.5 Discussions are currently ongoing with the Curators and receiving museums archive officers for the process for the deposition of a digital archive via ADS. This is not yet resolved, but pertains to a non-paper archive of records from sites. Consideration must be given by the Archaeological Contractor to how the digital archive will be dealt with.
- 12.2.6 Each archaeological mitigation area will have its own unique accession number, which will be obtained from Braintree Museum, Chelmsford Museum and Essex HER office by the Archaeological Contractor in advance of the fieldwork, to ensure that the project is recorded in accordance with the requirements of the local authority. The unique accession number will be recorded in the Archaeological Contractor's SSWSIs.
- 12.2.7 The archive of finds and records generated during the fieldwork will be removed from the Site at the end of each day and kept secure at all stages of the project until it is deposited with the Braintree Museum and Chelmsford Museum. The archive will be produced to current national standards (refer to Appendix A).
- 12.2.8 The deposition of the archive forms the final stage of this project. The Archaeological Contractor shall provide the Client's representative and the ACoW with copies of communication with the accredited repository and written confirmation of the deposition of the archive.

13. Health and safety

- 13.1.1 The works fall within the definition of Construction Work as defined under the Construction Design and Management (CDM) Regulations. The Archaeological Contractor will be appointed by the Principal Contractor who will act as Principal Contractor at all stages of the archaeological site works.
- 13.1.2 All staff employed by the Archaeological Contractor shall attend the Principal Contractor's site induction. The Archaeological Contractor shall prepare Risk Assessment(s), and a project specific Health and Safety Plan and submit these to the Principal Contractor for approval prior to starting on site.
- 13.1.3 The Archaeological Contractor's site supervisor will be qualified to Site Managers Safety Training Scheme (SMSTS) level. All other staff involved in the fieldwork should hold the applicable Construction Skills Certification Scheme (CSCS) qualification and be qualified to a minimum standard of 'Archaeologist Technician'. Staff CVs should include SMSTS and CSCS qualifications and expiry dates.
- 13.1.4 The Principal Contractor will provide the Archaeological Contractor with the results of recently conducted service and utility searches. No archaeological works should commence without a Permit to Dig issued by the Principal Contractor. This should include confirmation that the locations of any services are marked, environmental and ecological constraints and that any additional safety measures required to ensure that each area is safe prior to commencement of mitigation work are in place.
- 13.1.5 The Archaeological Contractor shall at all times maintain a safe working distance from the overhead and buried services/utilities. In addition, the Archaeological Contractor shall be responsible for any requirements with regard to work in the vicinity of watercourses.
- 13.1.6 The Archaeological Contractor's Risk Assessment(s) and project Health and Safety Plan shall make reference to relevant guidance and good practice (for example: Health and Safety Executive SEGS6 – Avoidance of Danger from Overhead Lines; HS(G)47 – Avoiding Danger from Underground Services; Energy Networks Association The Safe Use of Mechanical Plant in the Vicinity of Electricity Overhead Lines; PAS 128 – Specification for underground utility detection, verification and location; and Model Procedures for the Management of Land Contamination, CLR 11).
- 13.1.7 The Archaeological Contractor's site supervisor will maintain a record of site attendance and attend the Principal Contractor's daily briefing at the start of work for each day.
- 13.1.8 All site personnel will wear personal protective equipment (PPE) as defined by the Archaeological Contractor's approved risk assessment undertaken in accordance with mandatory requirements. Any visitors to the investigations will require a site induction in accordance with the Principal Contractor's Health and Safety requirements, and will have read the appropriate Archaeological Contractor's site-specific Risk Assessment and Method Statement. All equipment that is used in the course of the fieldwork must be

'fit for purpose' and be maintained in a sound working condition that complies with all relevant Health and Safety regulations and recommendations.

13.1.9 As a minimum, PPE shall consist of a hard hat, steel toe-capped boots with mid-sole protection, a high visibility jacket or vest with sleeves, high visibility trousers, safety glasses and gloves. Additional PPE will be issued by the Archaeological Contractor as required, e.g. ear defenders, masks etc. In addition, site personnel will ensure that any visitors to the excavation are equipped with suitable PPE prior to entry to the site.

13.1.10 The Archaeological Contractor will assure the provision and maintenance of adequate, suitable and sufficient welfare and sanitary facilities at appropriate locations for the duration of the works. The locations for the temporary site welfare facilities and vehicle parking will be agreed with the Principal Contractor prior to the start of the works. Facilities, roles and responsibilities shall adhere to the provisions of The Construction (Design and Management) Regulations 2015 and related Health and Safety Executive guidance.

13.1.11 All staff and visitors involved in the fieldwork should be suitably qualified. Visitors to the site (including, but not limited to, the Curators, specialists etc) must abide by the Principal Contractor's visitor protocols and induction process. All regular visitors to the site must have undertaken the full induction process or access to site will not be permitted.

13.1.12 All site personnel will familiarise themselves with the following:

- Site emergency and evacuation procedures.
- The site's health & safety coordinator.
- The first aider.
- The location of the nearest hospital and doctor's surgery.
- The supervisor will maintain a record of site attendance for each day that there is a team in the field.

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Appendix B Archaeological mitigation action areas

Scheme impact

The site would be permanently affected by the construction of the BESS. The construction of the Scheme would have a moderate adverse significance of effect on this site.

Mitigation

Detailed Excavation

Research objectives

Prehistoric

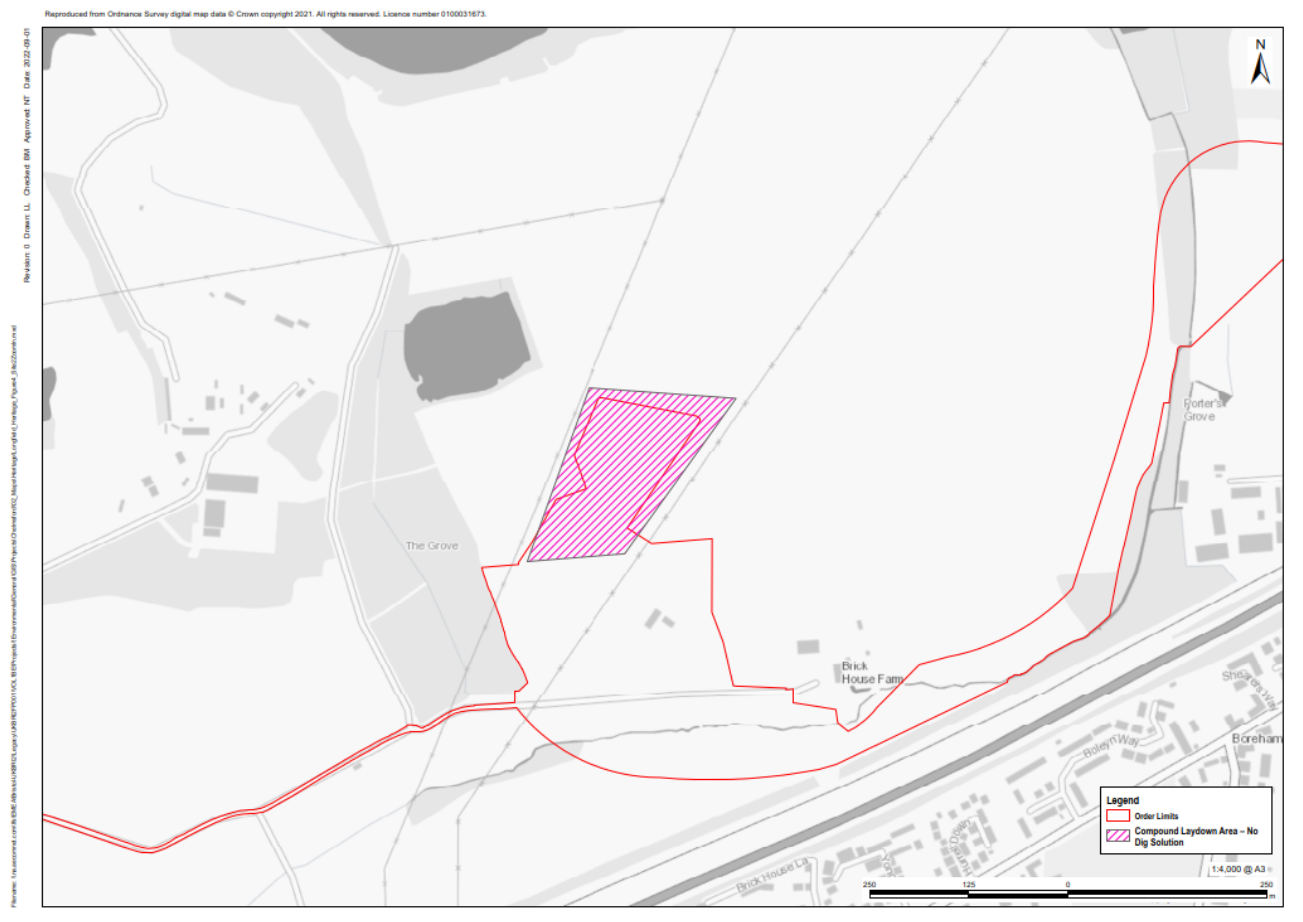
Rural Settlements and landscapes

Dating

Agrarian Economy, field systems, and the area between them

Clayland settlement exploitation

Site 2	
Designation:	Non-designated
Field Number:	Bulls Lodge Substation
Reference IDs:	None
Location (NGR):	575146 , 210708
Site area (approximate):	2.3 ha



Description

A number of cropmarks are visible from aerial photographs, which indicate the presence of a number of rectilinear enclosures and a large curvilinear enclosure with two bisecting linear features through its centre along a paleochannel. These have not been investigated.

Scheme impact

A large laydown area will be used to enable the construction of the Bulls Lodge Substation, parts of which will overlie these cropmarks.

Mitigation

No-dig solution for the laydown area, such as track matting to be secured in the CEMP.

Research objectives

N/A

Appendix C Public archaeology and community engagement strategy

Introduction

This Public Archaeology and Community Engagement (PACE) Strategy presents the overarching strategy for the outreach and engagement programme associated with the proposed Longfield Solar Farm Scheme.

The Strategy includes potential site-based activities, initiatives to be undertaken while site work is ongoing, and activities to be undertaken throughout the post-excavation phase.

The initiatives aim to maximise the potential influence and learning opportunities resulting from the archaeological works, providing information to the widest variety of audiences, ranging from members of the public living in the vicinity of the Scheme to visitors to the area.

It is acknowledged that the events and activities proposed often attract the same group of people every time, generally including those who would frequent local museums and heritage attractions. Efforts should be made to reach those who would not usually engage with archaeology or community heritage in the wider area, to create a lasting legacy to the archaeological and other heritage works undertaken as part of the Scheme.

The post-excavation phase will focus on making information available in more permanent formats, such as exhibitions, printed and pdf format booklets and web-based media. Lectures could be provided to groups with a specific interest in the archaeology of the area during this phase, though it is noted that this form of outreach is self-selecting and not especially effective in reaching significant audiences: resources are better focused on more general information provision.

The Archaeological Contractor will prepare a Scheme specific PACE Strategy, detailing the targeted audiences and the activities to be undertaken. This will include a programme of activities throughout the project lifecycle.

Aims and objectives

Key research objectives have been identified for the mitigation phase of the Longfield Solar Farm Scheme, to ensure that research is focused on the principal questions that the Scheme has the potential to contribute to or answer. The evidence from these sites also has wider implications for the archaeology of the East of England region.

The aim of the PACE Strategy will be to raise awareness of the significance of the archaeological landscape, to provide a lasting legacy of the archaeological works, and to encourage the enjoyment, interaction and engagement with the archaeological process and discoveries arising from the mitigation works undertaken along the Scheme.

The objectives of the PACE programme will be:

- Engagement and appreciation: Encouraging engagement with and appreciation of the archaeological landscape.

- Knowledge about archaeology within and in the vicinity of the Scheme: Advancing public understanding and stimulating interest and public curiosity about archaeology within the Scheme.
- Public understanding of developer-led archaeology: Making the archaeological process more understandable for the public, particularly in relation to a major Solar Farm Scheme, explaining why the sites selected for investigation have been chosen while others have not.
- Accessible learning: Creating accessible learning opportunities for people to be involved in actively discovering more about their past.
- Disseminating fieldwork information: Disseminating information about the archaeology within the Scheme to schools, the local community, local societies and groups with a keen interest in history and archaeology, and the academic community via a variety of platforms.
- Sharing research: Showcasing the research impact of development-led archaeological fieldwork and how it can inform our understanding of the past with local and regional audiences, including academic interest.
- Inclusive participation: Encouraging engagement with those that may not normally engage with archaeology or local history.

Target Audience

A successful PACE Strategy must consider both who the audience is and the activities they want to partake in. The Strategy should be tailored to meet the needs of the identified audience and provide engaging activities to add enjoyment. Outreach has traditionally been focused on a similar range of activities, such as public talks and site tours, but consideration should be given to other activities to widen the audience.

The PACE Strategy is likely to predominantly focus on those communities directly impacted by the Scheme, or in its immediate vicinity, specifically those people living and working within or adjacent to the Scheme, and those passing through it via local historic lanes. The academic community at relevant universities may also be targeted, through activities such as presentations at conferences, along with the promotion of events or exhibits that may engage with or encourage those who do not normally engage with those targeted by these sorts of events. This will increase the impact of the outreach and the overall project legacy.

Audiences could comprise:

- Local communities, particularly those in villages close to the Scheme, including, but not limited to Terling, Fuller Street, Great Leighs, Little Leighs, Hatfield Peveral, Boreham and Chelmsford.
- Primary and secondary school pupils and teachers.
- Local history groups, both within the Scheme area and the wider area, including history groups in other villages in the wider area.
- Members of local archaeology, history and civic societies.
- Council for British Archaeology (CBA) Young Archaeology Clubs, CBA regional groups.
- Higher education students, including archaeology students.

- Academic archaeologists and members of subject and period specialist societies.
- Relevant elected members.
- Interest-focused and period-focused archaeological research groups.
- Visitors to the area and people travelling through the landscape.

Other groups should not be discounted at this stage.

Activities

A range of outreach and public archaeology activities should be proposed. These need to be tailored to the wants and needs of the differing audiences to maximise benefit.

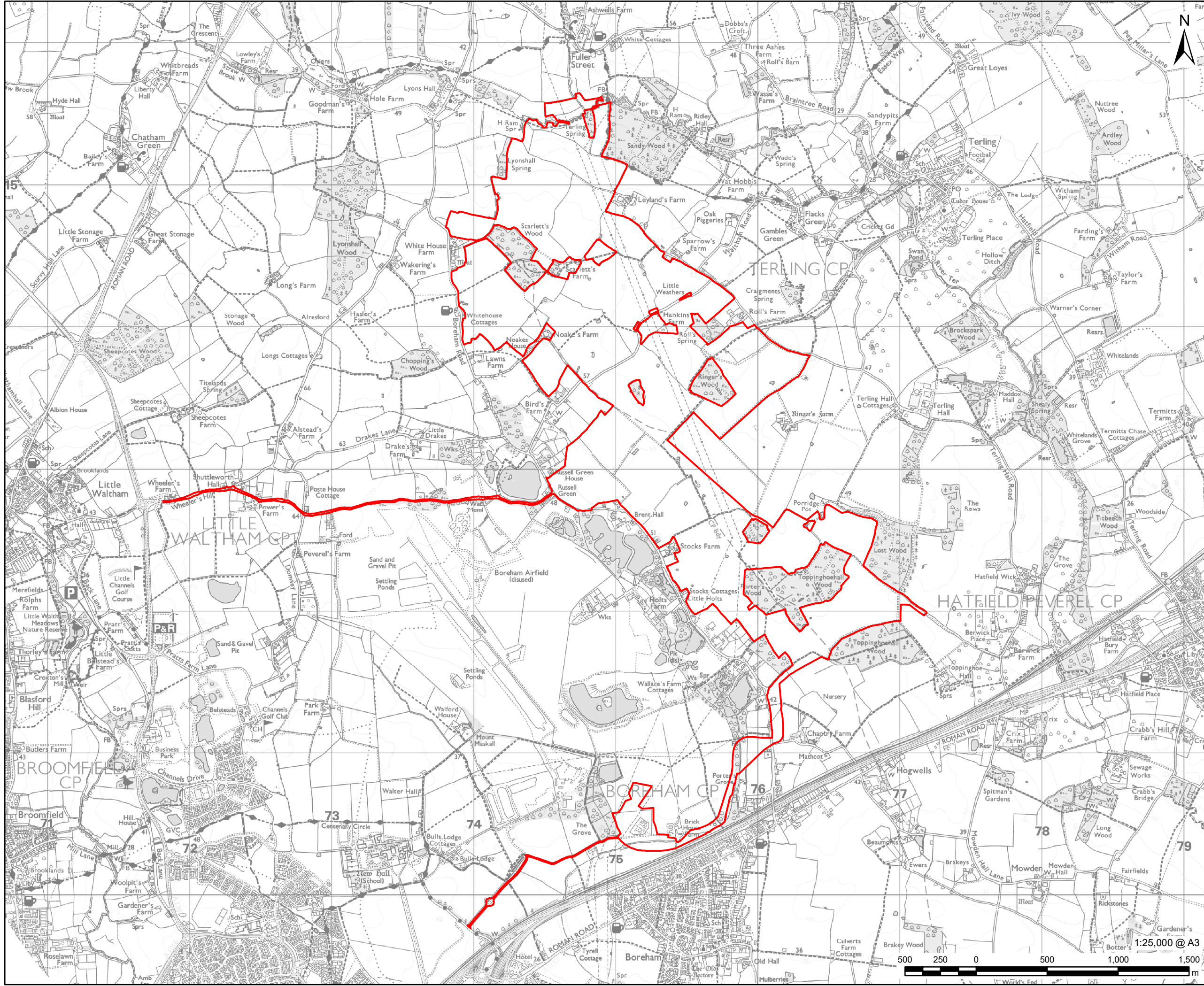
Activities should be split across the different phases of archaeological work, including excavation and post-excavation. It is not anticipated that trial trench evaluation would form a suitable phase for public engagement unless specifically designed to engage a target audience. Later phases of work will provide different types of activity, although there will be some overlap (such as talks to local groups).

At all stages the research questions of the Scheme should be considered, to ensure that the knowledge gained from the Scheme is disseminated to the public.

The following list of suggested activities may not all take place, and other activity types may be more appropriate.

- A series of presentations to local groups and communities, both during excavation and post-excavation.
- Site tours during excavations.
- Community excavation or other fieldwork event (subject to suitable sites, access and health and safety).
- Liaison with local schools, including educational events, talks and finds handling, continuing to participate in STEM (Science, technology, engineering, and mathematics) events as well as the provision of teaching materials.
- Project website including information such as dig diaries, key finds, videoblogs from site, post-excavation analysis etc.
- Provision of information via social media platforms.
- Reaching a new audience. Activities and displays focused around popular non-heritage events. This strategy minimises the requirement for marketing, as it would make use of existing events that have their own promotional scheme in place. For example, a stall at local food festival could introduce participants to the weird and wonderful world of Roman foods - with information boards, finds from the sites, and food preparation exhibits. Tailored to location.
- Attendance at local history, archaeology or other heritage events.
- Pop-up displays of artefacts and information at community hubs or museums.

- Permanent information panels at suitable locations. This could include displayed QR codes which refer to a website or virtual reproduction.
- Production of a popular publications, on the Scheme as a whole, or covering thematic topics. A booklet for children could be considered.
- Mapping of features from historic maps.
- Contribution to academic and professional conferences (such as ClfA) and publication of papers.
- Artefact handling sessions.
- Volunteer involvement in off-site post-excavation, such as finds cleaning, processing and recording, subject to regulations regarding the use of volunteers on development-led archaeological projects.



PROJECT
LONGFIELD SOLAR FARM, ESSEX
CLIENT



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LEGEND
 Order Limits

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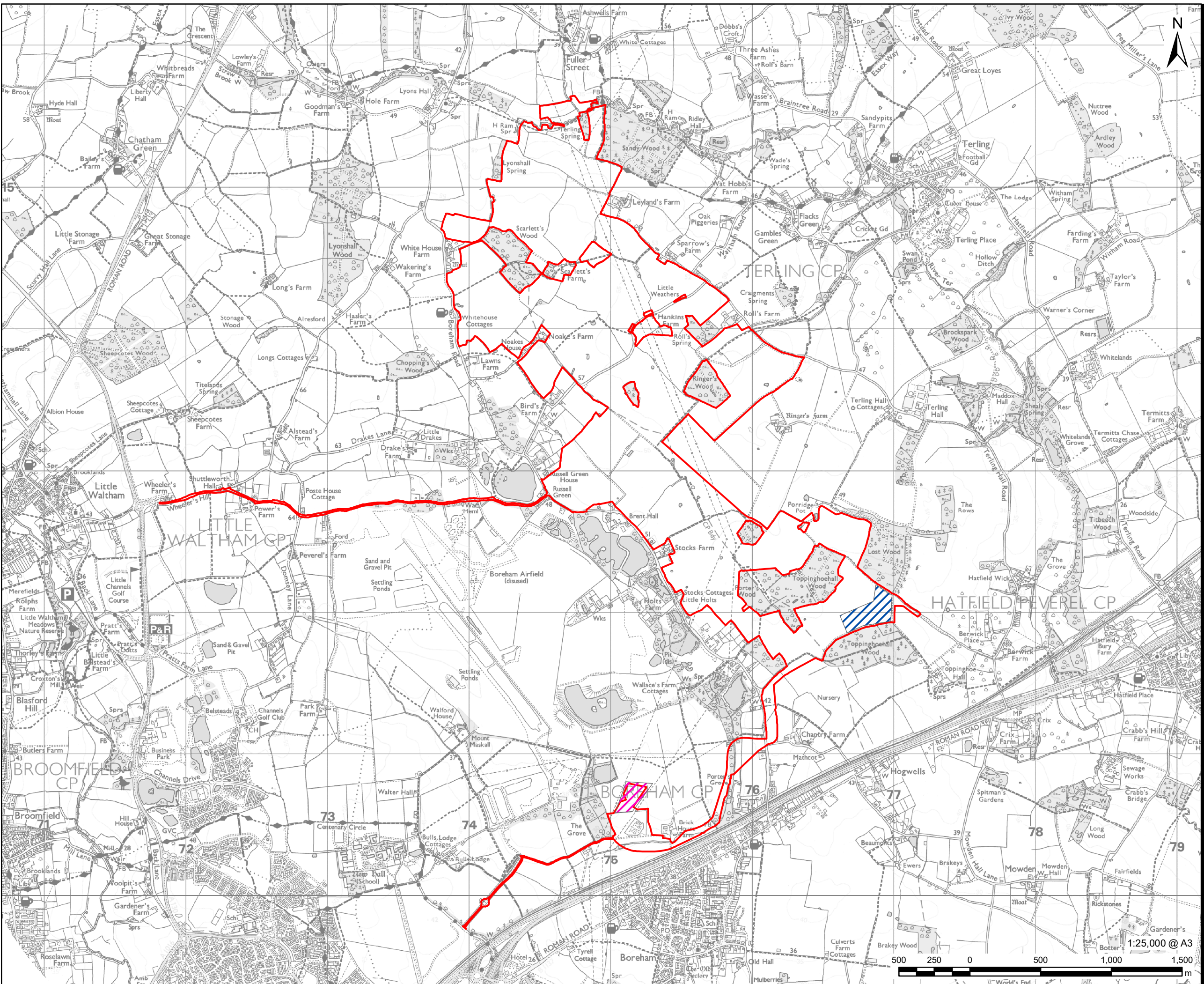
ISSUE PURPOSE
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Project Code
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FIGURE TITLE
 Site Location

FIGURE NUMBER
 Figure 1

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LEGEND

- Order Limits
- Archaeological Mitigation Area Boundary
 - Site 1
 - Site 2

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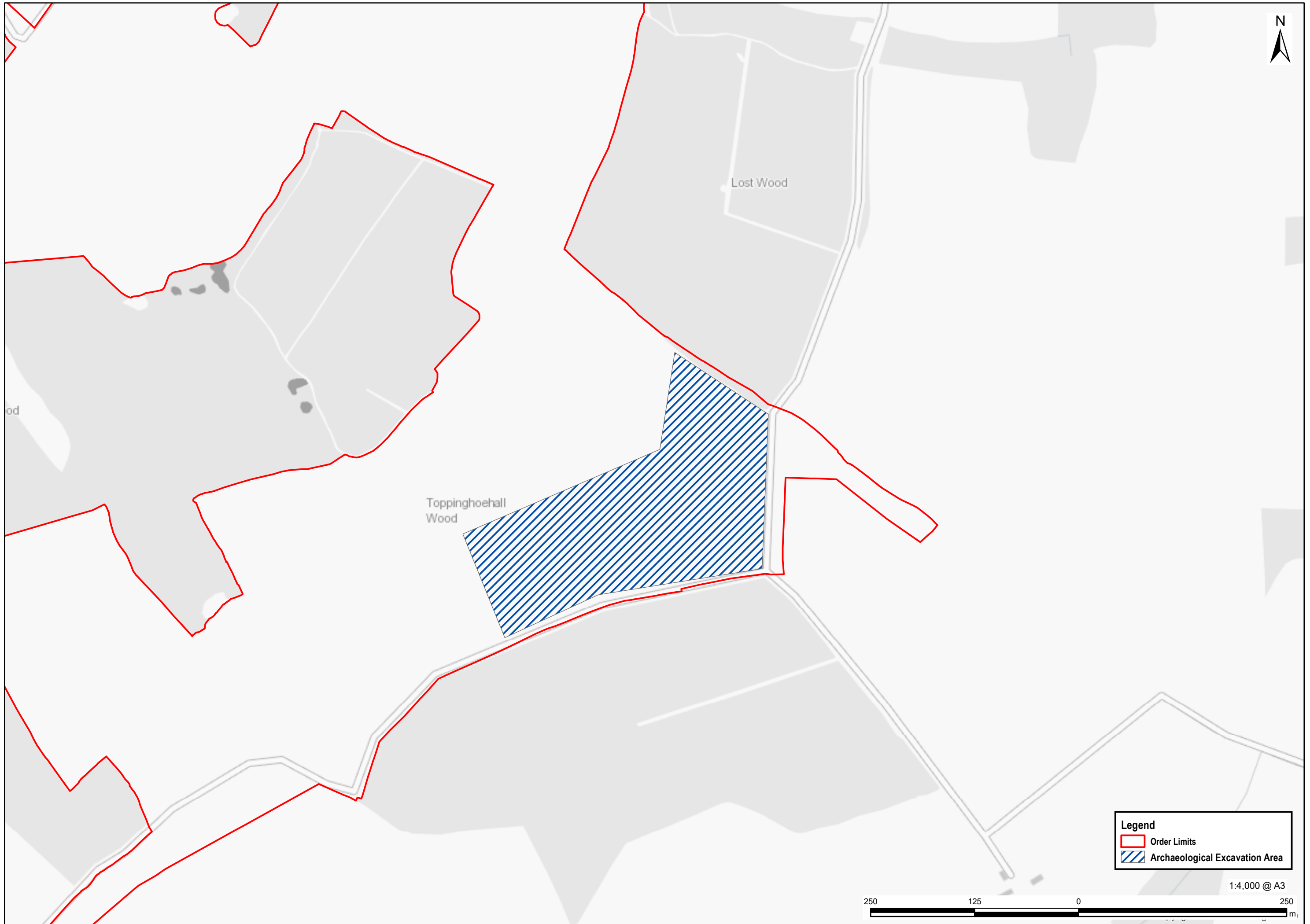
FIGURE TITLE
Archaeological Mitigation Areas

FIGURE NUMBER
Figure 2



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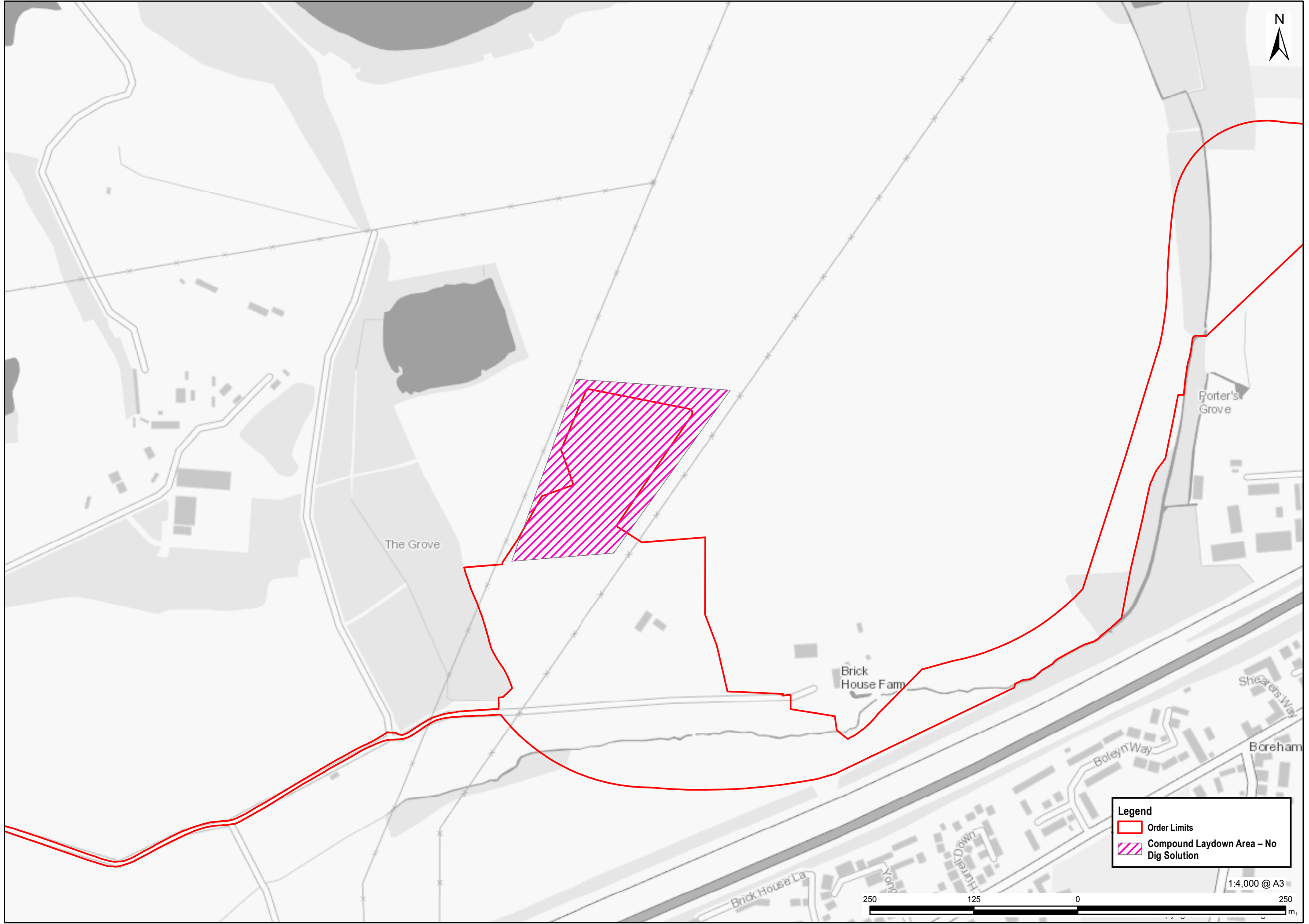


Legend



-  Order Limits
-  Archaeological Excavation Area

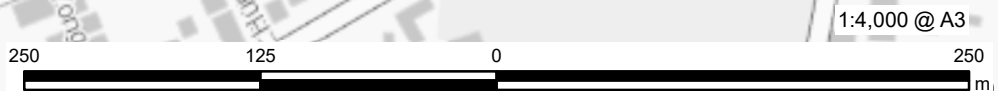


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Legend

-  Order Limits
-  Compound Laydown Area - No Dig Solution



1:4,000 @ A3