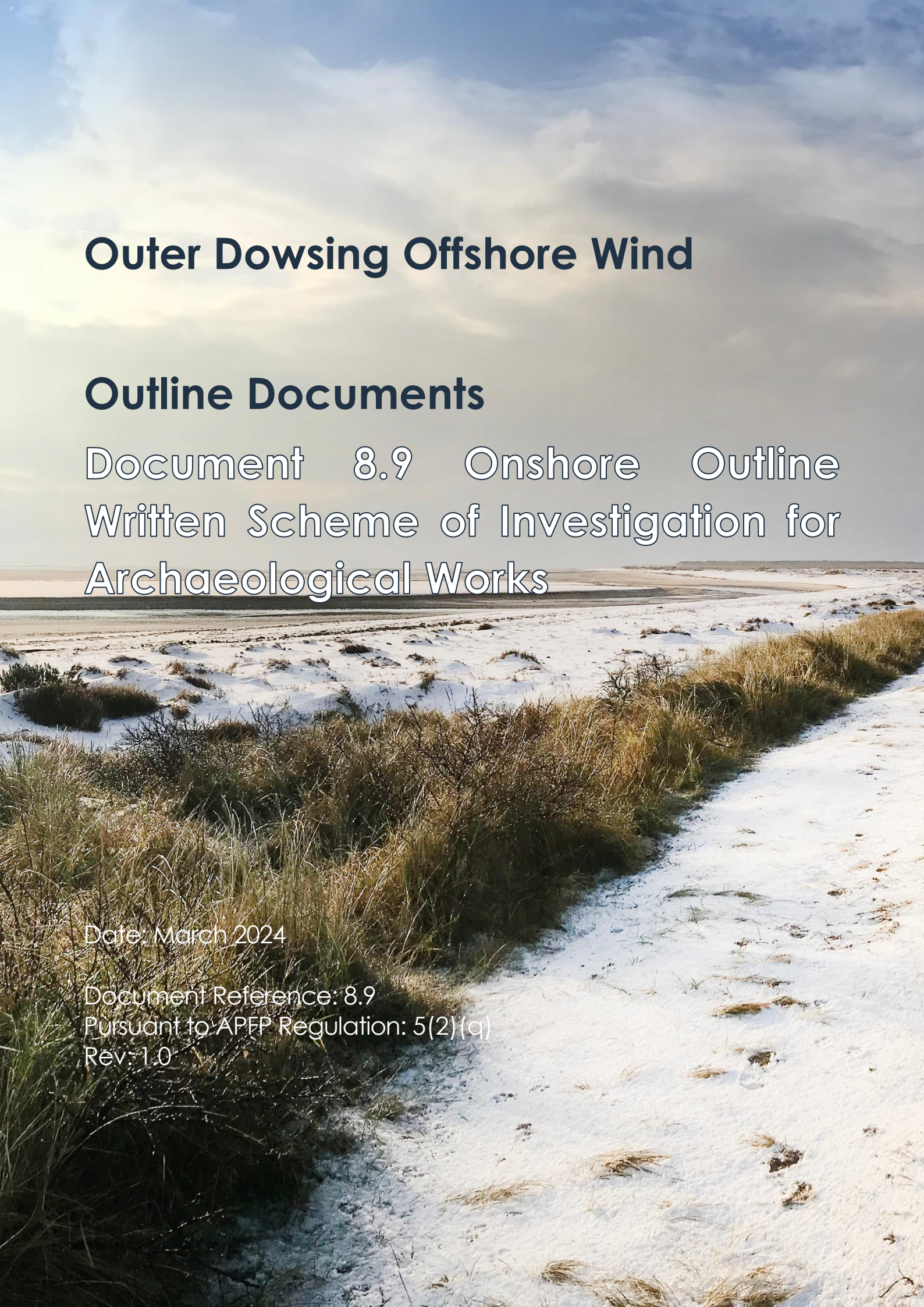

Outer Dowsing Offshore Wind

Outline Documents

Document 8.9 Onshore Outline Written Scheme of Investigation for Archaeological Works

Date: March 2024

Document Reference: 8.9
Pursuant to APFP Regulation: 5(2)(q)
Rev: 1.0

Company:	**Outer Dowsing Offshore Wind**	Asset:	**Whole Asset**
Project:	**Whole Wind Farm**	Sub Project/Package:	Whole Asset
Document Title or Description:	8.9 Outline Onshore Written Scheme Investigation for Archaeological Works		
Internal Document Number:	PP1-ODOW-DEV-CS-REP-0105	3rd Party Doc No (If applicable):	N/A

Rev No.	Date	Status / Reason for Issue	Author	Checked by	Reviewed by	Approved by
1.0	March 2024	DCO Application	SLR	SLR	Sheperd and Wedderburn	Outer Dowsing Offshore Wind

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Acronyms & Terminology

Acronyms

Acronym	Expanded name
AAI	Area of Archaeological Interest
AOP	Area of Potential
BC	Before Christ
BGL	Below ground level
CAT	Cable Avoidance Tool
CIFA	Chartered Institute for Archaeologists
DBA	Desk Based Assessment
DCO	Development Consent Order
DMV	Deserted Medieval Village
DTM	Digital Terrain Model
ECC	Export Cable Corridor
EIA	Environmental Impact Assessment
ES	Environmental Statement
GIS	Geographic Information System
HDD	Horizontal Directional Drilling
HE	Historic England
HER	Historic Environment Record
LCC	Lincolnshire County Council
LiDAR	Light, Detections and Ranging
LPA	Local Planning Authority
MoRPHE	Management of Research Projects in the Historic Environment
NGR	National Grid Reference
NHLE	National Heritage List for England
NMP	National Mapping Programme
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
ODOW	Outer Dowsing Offshore Wind
OnSS	Onshore Substation
ORCP	Offshore Reactive Compensation Platform
OSS	Offshore Substation
OWSI	Outline Written Scheme of Investigation
PAS	Portable Antiquities Scheme
PPG	Planning Policy Guidance
PXA	Post-Excavation Assessment
SI	Site Investigation
TJB	Transition Join Bay
UKIC	United Kingdom Institute for Conservation of Historic & Artistic Works
UPD	Updated Project Design
WWII	World War II

Terminology

Term	Definition
400kV cable corridor	The 400kV cable corridor is the area within which the 400kV cables connecting the onshore substation to the NGSS will be situated.
The Applicant	GT R4 Ltd. The Applicant making the application for a DCO. The Applicant is GT R4 Limited (a joint venture between Corio Generation, TotalEnergies and Gulf Energy Development (GULF)), trading as Outer Dowsing Offshore Wind. The project is being developed by Corio Generation (a wholly owned Green Investment Group portfolio company), TotalEnergies and GULF.
Baseline	The status of the environment at the time of assessment without the development in place.
Connection Area	An indicative search area for the NGSS.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for a Nationally Significant Infrastructure Project (NSIP).
Effect	Term used to express the consequence of an impact. The significance of an effect is determined by correlating the magnitude of the impact with the sensitivity of the receptor, in accordance with defined significance criteria.
EIA Regulation	Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Statement (ES).
Environmental Statement (ES)	The suite of documents that detail the processes and results of the EIA.
Export cables	High voltage cables which transmit power from the Offshore Substations (OSS) to the Onshore Substation (OnSS) via the Offshore Reactive Compensation Platform (ORCP) if required, which may include one or more auxiliary cables (normally fibre optic cables).
Haul Road	The track within the onshore Export Cable Corridor (ECC) which the construction traffic would use to facilitate construction.
Impact	An impact to the receiving environment is defined as any change to its baseline condition, either adverse or beneficial.
Joint Bays	An excavation formed with a buried concrete slab at sufficient depth to enable the jointing of high voltage power cables.
Landfall	The location at the land-sea interface where the offshore export cable will come ashore.
Mitigation	Mitigation measures, or commitments, are commitments made by the Project to reduce and/or eliminate the potential for significant effects to arise as a result of the Project. Mitigation measures can be embedded (part of the project design) or secondarily added to reduce impacts in the case of potentially significant effects.

Term	Definition
Offshore Export Cable Corridor (ECC)	The Offshore Export Cable Corridor (Offshore ECC) is the area within the Order Limits within which the export cable running from the array to landfall will be situated.
Offshore Reactive Compensation Station (ORCP)	Platforms located outside the array area which house electrical equipment and control and instrumentation systems. They also provide access facilities for work boats and helicopters.
Onshore Export Cable Corridor (ECC)	The Onshore Export Cable Corridor (Onshore ECC) is the area within which the export cable running from the landfall to the onshore substation will be situated.
Onshore Infrastructure	The combined name for all onshore infrastructure associated with the Project from landfall to grid connection.
Onshore substation (OnSS)	The Project's onshore substation, containing electrical equipment to enable connection to the National Grid
Outer Dowsing Offshore Wind (ODOW)	The Project
Pre-construction and post-construction	The phases of the Project before and after construction takes place.
The Project	Outer Dowsing Offshore Wind including proposed onshore and offshore infrastructure tr
Receptor	A distinct part of the environment on which effects could occur and can be the subject of specific assessments. Examples of receptors include species (or groups) of animals or plants, people (often categorised further such as 'residential' or those using areas for amenity or recreation), watercourses etc.
Transition Joint Bay (TJBs)	The offshore and onshore cable circuits are jointed on the landward side of the sea defences/beach in a Transition Joint Bay (TJB). The TJB is an underground chamber constructed of reinforced concrete which provides a secure and stable environment for the cable.
Trenchless Technique	Trenchless technology is an underground construction method of installing, repairing and renewing underground pipes, ducts and cables using techniques which minimize or eliminate the need for excavation. Trenchless technologies involve methods of new pipe installation with minimum surface and environmental disruptions. These techniques may include Horizontal Directional Drilling (HDD), thrust boring, auger boring, and pipe ramming, which allow ducts to be installed under an obstruction without breaking open the ground and digging a trench.

Reference Documentation

Document Number	Title
6.1.3	Project Description
6.1.20	Onshore Archaeology and Cultural Heritage
6.3.20.1	Onshore Archaeology and Cultural Heritage Desk-Based Assessment

1 Introduction

1. Outer Dowsing Offshore Wind (ODOW) is a Nationally Significant Infrastructure Project (NSIP). An Environmental Impact Assessment (EIA) has been undertaken, the findings of which are presented within an Environmental Statement (ES), which accompanies the Development Consent Order (DCO) application under the Planning Act, 2008.
2. GT R4 Ltd (trading as Outer Dowsing Offshore Wind), hereafter referred to as the 'Applicant', is proposing to develop the Project. The Project will include both offshore and onshore infrastructure including an offshore generating station (windfarm) located approximately 54km from the Lincolnshire coastline, export cables to landfall, onshore cables, an onshore substation, connection to the electricity transmission network, and ancillary and associated development (see Volume 1, Chapter 3: Project Description for full details) (document reference 6.1.3).
3. SLR Consulting was commissioned by GoBe Consultants Ltd, whom has been instructed by GT R4 Limited (trading as Outer Dowsing Offshore Wind) (the Applicant) on behalf of ODOW, to undertake a suite of archaeological surveys of those relevant parts of the Project site that may be affected by the construction, operation and maintenance, and decommissioning of the onshore aspects of the Project.
4. This document provides an Outline Written Scheme of Investigation (OWSI) for archaeological works to be undertaken post consent and relating to the onshore works and should be read in conjunction with the following ES documents:
   - Chapter 3 (document reference 6.1.3);
   - Volume 1, Chapter 20 Onshore Archaeology and Cultural Heritage (document reference 6.1.20); and
   - Volume 3, Appendix 20.1 Onshore Archaeology and Cultural Heritage Desk-Based Assessment (document reference 6.3.20.1).
5. The archaeological works referenced within the ES documents comprise geotechnical investigation monitoring and deposit modelling, LiDAR and aerial photographic assessment and the geophysical survey undertaken for the purposes of the EIA. Other works undertaken post EIA comprised additional geophysical survey, targeted trial trenching and geoarchaeological boreholes. The works implemented within this OWSI will be informed by these previous archaeological works.
6. The purpose of this OWSI is to provide a framework for post consent archaeological works including a suite of mitigation solutions which includes preservation in situ. All post consent works would be undertaken in accordance with this OWSI and will be subject to the approval of subordinate WSIs prepared by an Archaeological Contractor.
7. The results from the archaeological investigatory works undertaken during and post EIA will inform on the implementation of fieldwork strategies as presented within this OWSI, which, it is noted, provides for preservation in situ in respect to remains of national importance.

8. Preservation in situ could be achieved through the implementation of construction techniques which could be applied within the onshore ECC and 400Kv cable corridor (excluding the OnSS and TJB) . Where remains of national importance are anticipated from archaeological evaluation preservation in situ could be achieved through the micro-siting of launch and receive pits within cable installation compounds, trenchless construction techniques to avoid an open cut and easement stripping for cable installation and no-dig methods at compounds and temporary haul roads where standoffs or bog matting could be utilised respectively.
9. The option for preservation in situ along the onshore ECC and 400kV cable corridor is secured by submission documents which reference flexible construction methods. These are referenced on submission document Figure 3.4 (document reference 6.2.3.4) and in the Schedule of Mitigation (document reference 8.13) which reiterates the text of paragraph 8 above.
10. Another specific commitment is to avoid known remains of potential high importance associated with a Deserted Medieval Village by trenchless techniques and micro siting of the launch and receive pits.
11. Final construction parameters referencing the above trenchless and no-dig methods would be informed by the works set out here and confirmed within a detailed design which would be prepared post DCO.
12. All subordinate WSIs prepared in accordance with this OWSI and will be subject to the approval of the Historic Environment Officer for Lincolnshire County Council in consultation with the relevant LPA and Historic England.

2 Standards and Guidance

13. Standards and guidance from the Chartered Institute for Archaeologists (CifA) relevant to the evaluation programme include:
    - Code of Conduct (CifA 2014; Revised October 2021);
    - Standard and guidance for archaeological field evaluation (CifA 2023a 2023d);
    - Standard and guidance for archaeological monitoring and recording (CifA 2023b 2023c);
    - Standard and guidance for archaeological excavation (CifA 2023e 2023f);
    - Standard and guidance for the collection, documentation, conservation and research of archaeological materials (CifA 2020);
    - Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives (CifA 2020c);
    - Standard and guidance for historic environment desk-based assessment (CifA 2020d); and
    - Updated Guidelines to the Standards for Recording Human Remains (CifA, 2017).

14. LCC has an online archaeology handbook for contractors –
    - https://www.lincolnshire.gov.uk/downloads/file/2204/archaeology-handbook-pdfa

15. Of further relevance is the following non-exhaustive list of publications from Historic England (HE, formerly English Heritage):
    - Mitigation of Construction Impact on Archaeological Remains (English Heritage 2004);
    - Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (2nd Edition) (English Heritage 2011);
    - Management of Research Projects in the Historic Environment (MoRPHE: Historic England 2015a);
    - Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record (Historic England 2015b);
    - Preserving Archaeological Remains: Decision-taking for Sites under Development (Historic England 2016);
    - Organic Residue Analysis and Archaeology: Guidance for Good Practice (Historic England 2017a);
    - Understanding the Archaeology of Landscapes (Historic England 2017b); and
    - The Role of the Human Osteologist in an Archaeological Fieldwork Projects (Historic England 2018).

3 Aims and Objectives

3.1 Aims

16. The aims of the programme of archaeological works are as follows.

- Determine the necessity of the following construction techniques along the onshore ECC and 400kV cable corridor, providing for preservation in situ, which would be set out post the consent of the DCO within a detailed design -
    - micro-siting of launch and receive pits,
    - trenchless techniques for cable installation and
    - no dig methods for haul roads and compounds.
- Determine the necessity for archaeological mitigation providing for preservation by record - such as
    - strip map and sample or
    - watching brief.
- Ensure the works are consistent with relevant planning policy guidance.
- Ensure all works are conducted safely and are compliant with industry standards and guidance, as well as all specific local guidance.
- Preserve archaeological remains in record or, where required, in situ.

3.2 Objectives

17. The objectives of archaeological works are to:

- record the depth, extent, character, condition, and date of any archaeological remains revealed;
- recover and record a proportionate sample of any artefacts and palaeo-environmental remains revealed;
- compile a suitably detailed report to inform post excavation works and archaeological mitigation works;
- compile a material and documentary archive for transfer to the post excavation Contractor (with eventual deposition with a suitable repository);
- if appropriate, and as per the OWSI, contribute to local and regional research strategies as outlined in the East Midlands Historic Environment Research Framework (see **Appendix A**).

4 Project Administration

18. Details of Archaeological Contractor(s) would be provided to the Historic Environment Officer at LCC and Historic England by SLR Consulting during the preparation of subordinate WSIs and prior to the commencement of fieldwork.
19. The Archaeological Consultant is based at –

    SLR Consulting

    15 Middle Pavement

    Nottingham

    NG1 7DX

20. The Historic Environment Officer at LCC is based at --

    Historic Places Team

    Lincolnshire County Council

    County Offices

    Newland

    Lincoln

    LN1 1YL

21. The Historic England contact is based at –

    Historic England

    The Foundry

    82 Granville Street

    Birmingham

    B1 2LH

22. The relevant Coroner would be based at -

    HM Coroner's Service

    The Myle Cross Centre

    92 Macaulay Drive

    Lincoln

    LN2 4E

23. The relevant Historic England Regional Science Advisor is based at -

    Historic England (Midlands)

    The Foundry

    82 Granville Street

Birmingham

B1 2LH

24. The relevant Finds Liaison Officer is based at -

Lancaster House

Orchard Street

Lincoln

Lincolnshire

LN1 1XX

Work T: 07741806562

5 Communication & Progress Reporting

25. Throughout the duration of fieldwork, communication and information will be provided by the Archaeological Contractor to the Archaeological Consultant in the form of:
    - a weekly progress meeting, possibly on-site, to discuss site progress;
    - a virtual monthly high level progress meeting between the Contractor and the Archaeological Consultant to discuss progress of deliverables and programme, chaired and minutes taken by the Archaeological Consultant;
    - a virtual monthly commercial meeting between the Contractor and the Employer, chaired and minutes taken by the Employer or the Archaeological Consultant;
    - additional meetings with the Archaeological Consultant/Employer as and when required.
26. Site meetings would also be anticipated to be attended by the Historic Environment Officer and/or Historic England with a view to obtaining permission to backfill trenches/excavations or vary the approach as set out within this OWSI.
27. The Employer will be included in all stakeholder communications. A record will be kept by the Archaeological Consultant of all formal communications, negotiations and discussions. This record will be managed by the Archaeological Consultant and sent to the Employer regularly.

6 Site Context

6.1 Overview

28. The ES references the Project's 'Order Limits'. Onshore it reflects an typically 80m wide corridor around a centre line totalling approximately 70km in length in reference to the footprint of the onshore ECC, the OnSS, and a typically 60m wide corridor approximately 4km in length for the 400 kV cable corridor which connects the OnSS to the Connection Area.
29. The onshore ECC and 400kV cable corridor is shown in Volume 1 Chapter 3, Project Description (document reference 6.1.3). The onshore ECC extends from the Transition Joint Bays (TJBs) at the landfall, located at Wolla Bank (NGR TF 552,754) to the OnSS at Surfleet Marsh (NGR TF 281 315), with the 400kV cable corridor then running from the OnSS to the Connection Area at Weston Marsh, Lincolnshire.
30. Due to the linear footprint of the Project and to assist with the interpretation and explanation of the associated data, the onshore Order Limits have been split into segments. The extent of these segments has been aligned with key geographical features such as roads or rivers which cross the Order Limits.
31. As shown on Figure 3.1 in Volume 2, Chapter 3: Project Description (document reference 6.2.3.1) the Order Limits is divided into a number of segments as follows:
    - ECC1 - Landfall to A52 – Hogsthorpe;
    - ECC2 - A52 – Hogsthorpe to Marsh Lane;
    - ECC3 - Marsh Lane to A158 - Skegness Road;
    - ECC4 - A158 Skegness Road – Low Road;
    - ECC5 – Low Road to Steeping River;
    - ECC6 – Steeping River to Fodder Dike Bank/Fen Bank;
    - ECC7 – Fodder Dyke Bank to Broadgate;
    - ECC8- Broadgate to Ings Drove;
    - ECC9 – Ings Drove to Church End Lane.
    - ECC10 - Church End Lane to The Haven;
    - ECC11 - The Haven to Marsh Road;
    - ECC12 - Marsh Road to Fosdyke Bridge;
    - ECC13 - Fosdyke to Surfleet Marsh OnSS/Marsh Drove; and
    - ECC 14: Surfleet Marsh OnSS/Marsh Drove to the Connection Area.

6.2 Geology and Topography

32. The location of the Order Limits on a coastline which has seen significant periods of marine transgression and regression has resulted in complex and thick sequences of interchanging alluvium and peat, covering deeply buried ancient land surfaces.
33. A geoarchaeological deposit model prepared by AOC Archaeology sets out the geological stratigraphy of the Order Limits and identifies zones of archaeological potential (AOP), (Volume 3, Appendix 20.1, Annex 18 Figures 47-49). In respect to the bedrock geology of the Order Limits, the deposit model identifies two specific AOPs where geologies beneath overlying mudflats may have provided potential for greater drainage of the overlying mudflats resulting in more accessible areas within an otherwise wetland/wet zone. These are recorded as AOP D (glaciofluvial deposits) and AOP E (till). However, the southern-most area of AOP D is noted to be within an area which was on the inter-tidal limit at the start of the Neolithic period and permanently under water/tidal from the Bronze Age through to the later periods.
34. Warming and episodes of sea flooding since the end of the Mesolithic into the medieval period have deposited substantial deposits of mud flats across the entirety of the Order Limits (AOP A1 and A2). The first period of mudflat deposition occurred during the prehistoric period (A1) when the high-water mark became established 5-10km west of the current coastline (Green 2023). This coastline moved in and out with further episodes of sea transgression and regression.
35. A notable period of regression occurring in the Roman period when the coastline retracted quite substantially. This placed some of the Project footprint onto dry land once more. A later phase of mudflat deposition (A2), likely post Roman in date, was potentially deposited during sea flooding into the Anglo Saxon and medieval periods. This caused the high-water mark to move west again, pushing much of the Project footprint into more marginal conditions once more with areas of salt marsh extending across large parts.
36. These dramatic depositional events from the prehistoric period onwards evened out the land surface across the Project footprint. The mud deposits are noted to include interleaving deposits of peat which formed in periods when the depositional environment was less energetic (AOP B).
37. The location of the Order Limits on a coastline which has seen significant periods of marine transgression and regression has resulted in complex and thick sequences of interchanging alluvium and peat, covering deeply buried prehistoric and later land surfaces.

6.3 Archaeological Potential

38. The reader is referred to the Archaeology and Cultural Heritage Desk-Based Assessment (document reference 6.3.20.1). from which the following summaries are taken.
39. The location of the Order Limits on a coastline which has seen significant periods of marine transgression and regression has resulted in complex and thick sequences of interchanging alluvium and peat, covering deeply buried prehistoric and later land surfaces.

40. Episodes of sea flooding since the end of the Mesolithic into the medieval period have deposited substantial deposits of mud flats across the entirety of the Order Limits. The first period of mudflat deposition occurred during the prehistoric period when the high-water mark became established 5-10km west of the current coastline (Green 2023). This coastline subsequently moved in and out with further episodes of sea transgression and regression which are anticipated to have affected all of the Order Limits at some point, with the southern part of the Order Limits under water or tidal from the late Mesolithic onwards.
41. A notable period of regression occurred in the Iron Age/Roman period when the high-water mark is known to have moved eastwards, placing some of the Order Limits which had been marshland or tidal since the Neolithic period, into dry land once more. However, the southern end of the Order Limits remained tidal or under water. A later phase of mud deposition, likely post Roman in date, is anticipated to have occurred when sea flooding into the Anglo Saxon and medieval periods caused the high-water mark to move west again.
42. These sequences of dramatic depositional events have buried earlier archaeology at some significant depth across much of the Order Limits footprint with some areas, such as the southern end of the Order Limits being under water or tidal conditions from the Mesolithic to the Post Medieval period.
43. Medieval activity was made possible through the construction of sea walls with extant earthworks or below ground potential for seawalls identified in segments ECC1 & ECC11-13. None would be breached by the proposals. These would have contributed to bringing the whole of the Order Limits into possible agricultural or pastoral activity apart from the southern extremity which was likely within the footprint of the Bicker Haven – ECC13/14. Settlement is known to have become established at extant historic villages within the vicinity of the Order Limits at this time and evidence for some deserted settlement extending within the Order Limits is known at ECCC2, ECC3 and ECC6. Evidence for significant moated sites is provided by two scheduled examples comprising Abbey Hills moated site (NHLE 1016044) adjacent to ECC7 and Multon Halll moated site (NHLE 1018584) located 100m west of ECC11.
44. Post medieval activity references land reclamation and agricultural activity across the entirety of the Order Limits. This includes some potential for remains of demolished farmsteads and other agricultural buildings. This period likely saw the first occupation of the southern parts of the route, specifically ECC13/14.

6.3.1 Prehistoric (up to 750 BC)

45. Only at isolated and specific locations within the Order Limits would the Proposals have the potential to disturb stratigraphy of possible early prehistoric date. At these discrete locations worked flint of Palaeolithic and Mesolithic and possible short term features date may be present. These areas are at locations where the proposals have the potential to breach the base of the earliest mud flat deposit. This may occur at the following locations and assumes project parameters as set out above.

    - Trenchless entry and exit pits in

- ECC1 (part of)
- ECC2
- ECC3 (part of)
- ECC5 (part of)
- ECC6 (part of)
- ECC7
- ECC8
- ECC9 (part of)
- ECC10 (part of)
- ECC11 (part of)
- ECC13 (part of)
- ECC14 (part of)

- Joint bays
    - ECC7 (part of)
    - ECC8 (part of)
- Open cut trench
    - ECC7 (part of)
    - ECC8 (part of)
    - ECC10 (part of)
- OnSS - piled foundations in excess of 10.5 BGL

46. Later prehistoric worked flint and wooden artefacts such as fishtraps and jetties may survive within the waterlogged stratigraphy of the earlier mudflat. These artefacts would represent episodes of transient activity from the Mesolithic period onwards. These may be present where the works could breach the later mud deposit and potentially affect stratigraphy of the earlier mud flat deposit. This may occur at the following locations and assumes project parameters as set out in paragraph 55.
    - TJB in ECC1.
    - OnSS in ECC13.
    - Open cut trench in –
        - parts of ECC1, 9, 12, 13.
        - all of ECC2, 3, 4, 5, 6, 7, 8, 10, 11
    - Joint bays in –
        - parts of ECC1, 2, 9, 13, 14
        - all of ECC3, 4, 5, 6, 7, 8, 10, 11, 12.

- Trenchless entry and exit pits in –
    - parts of ECC9, 13, 14
    - all of ECC1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12.

Iron Age and Roman (750 BC to c.AD 410)

47. Iron Age occupation/agricultural activity may be present sealed by the later mudflat and could be exposed where the works may breach the base of the later mudflat deposit. Based on the results of baseline assessment including the results of geophysical survey and the variable location of the Order Limits in relation to the high-water mark at this time, it is anticipated that Iron Age occupation or agricultural activity could be present where the later mudflat could be breached by the following works in AOP A2 of the deposit modelling (document reference 20.1 Annex 18).

- Open cut trench in –
    - parts of ECC1
    - all of ECC2, 3, 4, 5, 6
        - this includes area of archaeological interest 2 in ECC2
- Joint bays in –
    - parts of ECC1, 2
        - this includes area of archaeological interest 2 in ECC2
    - all of ECC 3, 4, 5, 6
- Trenchless entry and exit pits in –
    - all of ECC1, 2, 3, 4, 5, 6
        - this includes area of archaeological interest 2 in ECC2

48. Potential Roman occupation and agricultural activity may extend into the footprint of the Order Limits in segments ECC1-ECC10 reflecting marine regression which pushed the high-water mark east in the northern and central parts of the Order Limits. On the premise that these are covered by the later mudflats, these would be affected where the works could breach the later mudflat in areas where the Roman high-water mark is anticipated to the east of the Order Limits. With regard to baseline assessment including the results of the geophysical survey this would potentially be restricted to works within the footprint of the following.

- Open cut trench in –
    - parts of ECC1, 9.
    - all of ECC2, 3, 4, 5, 6, 7, 8, 10
    - this includes area of archaeological interest 2 in ECC2 & area of archaeological interest 8 in ECC6.
- Joint bays in –

- parts of ECC1, 2, 9.
- this includes area of archaeological interest 2 in ECC2
- all of ECC3, 4, 5, 6, 7, 8, 10.

- This includes area of archaeological interest 8 in ECC6.
- Trenchless entry and exit pits in –
  - all of ECC1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
    - this includes area of archaeological interest 2 in ECC2, area of archaeological interest 8 in ECC6 and area of archaeological interest 12 in ECC8.

49. Iron Age/Roman salterns could be possible within the footprint of the order Limits in segments ECC1-14. On the premise that these are covered by the later mudflats these would be within deposits breached by the following Project parameters. This includes AOP A1 of the deposit modelling plus areas north of this where the early tidal mud flat may be breached. With regards to the results of baseline assessment including the results of geophysical survey, salterns could be present at the following locations:

    - TJB in ECC1
    - OnSS in ECC13.
    - Open cut trench in –
      - parts of ECC1, 9, 12, 13, 14.
      - all of ECC2, 3, 4, 5, 6, 7, 8, 10, 11.
        - this includes areas of archaeological interest 2 & 4 in ECC2, areas of archaeological interest 6 & 7 in ECC5 and other specific anomalies in ECC3.
    - Joint bays in –
      - parts of ECC1, 9, 13, 14.
      - all of ECC2, 3, 4, 5, 6, 7, 8, 10, 11, 12.
        - this includes area of archaeological interest 2 in ECC2 and areas of archaeological interest 6 & 7 in ECC5 and other specific anomalies in ECC3.
    - trenchless entry and exit pits in –
      - parts of ECC9, 13, 14.
      - all of ECC1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12.
        - this includes area of archaeological interest 2 in ECC2 and areas of archaeological interest 6 & 7 in ECC5 and other specific anomalies in ECC3.

6.3.2 Anglo Saxon (c.AD410 – 1066)

50. A wetter character to the central and northern parts of the route is likely to have returned during the Anglo-Saxon period when the sea levels encroached once more. This likely rendered the majority of the Order Limits marginal with settlement favouring slightly elevated land which does not appear to have extended into the Order Limits. Some potential for agricultural/pastoral activity may extend to segments ECC2, 7, 8 & 9. Salterns may be present in segments ECC1-14.

6.3.3 Medieval (1066-1485)

51. Areas identified through geophysical survey which could include medieval activity comprise areas of archaeological interest 1 (ECC1), 2 (ECC2), 3 (ECC2), 4 (ECC2), 5 (ECC3), 6 (ECC5), 8 (ECC5/6), 9 (ECC7), 10 (ECC6), 11 (ECC9/10) and 12 (ECC8). Conditions would have allowed the continued presence of salterns along tidal creeks in most of the Order Limits except potentially segments ECC2-4. Saltern geophysical anomalies which could be of medieval date are located in areas of archaeological interest 6 (ECC5) & 7 (ECC5). Other geophysical anomalies in area of archaeological interest 11 (ECC10) could reference salt making of this date.

6.3.4 Post Medieval (1485-modern)

52. Post medieval activity references land reclamation and agricultural activity across the entirety of the Order Limits. This includes some potential for remains of demolished farmsteads and other agricultural buildings. This period likely saw the first occupation of the southern parts of the route, specifically ECC13/14. Areas identified through geophysical survey which could include post medieval remains comprise areas of archaeological interest 1 (ECC1) and 8 (ECC6).

6.3.5 Peat and Palaeochannels

53. Also, of note, are the potential deposits of peat which could be present between the tidal mudflats or interleaved within them. Peat deposits could potentially be present within the Project parameters bar the haul roads and the compounds across the Order Limits. The deposit modelling identifies particularly thick areas of peat deposits (see document reference 20.1 - Annex 18 Figure 47-49). The thickness of these deposits likely infers where the most stable wetland habitats were located. These areas are where the potential for organic preservation may be greater. Thinner deposits located elsewhere may infer less stable areas or areas where erosion caused by inter-tidal process has affected the accumulation and survival of peat. The electromagnetic geophysical survey may be useful in indicating areas where the preservation of organic material in areas of peat is most likely.
54. The peat has the potential to hold the same artefacts discussed for the waterlogged deposits of mud, namely fishtraps, jetties and trackways but also (alongside the waterlogged deposits in general) deposits with paleoenvironmental potential which could inform on past landscapes and environments. The thicker areas of peat referencing more stable areas of wetland not affected by more energetic tidal or fluvial processes would hold a greater potential. The deposits associated with the palaeochannels across the Order Limits could also inform on landscape change over time and depositional sequences from the prehistoric period onwards.

7 Project Parameters

55. With regard to understanding the necessary depths for archaeological intrusive evaluation, the Project's maximum construction depths are detailed in Table 7.1. These are a worst-case scenario. It is anticipated that final engineering solutions may prevent disturbances to these depths. The depth of entry and exit pits for trenchless works are particularly noted to be worst case with shallower excavations c.2.5m anticipated.
56. Any alteration to project parameters affecting evaluation will be notified to the Archaeological Consultant and conveyed to the Historic Environment Officer and Historic England such that deviation from the OWSI and any contractor WSIs can be approved in full.
57. At the time of writing, current project parameters are as stated in Table 7.1 below.

Table 7.1 Anticipated maximum depths for onshore project elements

Project Element	Maximum depth Below Ground Level (BGL)
Transition Joint Bays (TJBs)	6m
Trenchless Crossing exit pits	5m
Trenchless Crossing entry pits	6m
Open Cut Installation	3m
Joint Bays	2.5m
Haul Road & Construction Accesses	0.4m
Compounds	0.4m
External attenuation ditch	2m
Internal drainage	1.6m
Foundation formation (mass concrete)	1m
Piling (if required)	14m
Landscaping associated with the OnSS	Whips (young tree seedlings) planted no deeper than 0.4m – 0.5m
Land Drainage installation associated with landscaping	1m BGL

58. Depths of intrusive works will have regard to the potential depth of horizons of archaeological potential within the above parameters. It being noted that deposits of later prehistoric/Roman period will be present at the base of the later mud deposits. These could potentially be in excess of 1.5m below ground level in a number of areas. Deposits of earlier prehistoric potential would be buried below an earlier mud deposit and be at depths which may not be affected by the shallower parameters set out above. Anglo Saxon, medieval and post medieval deposits would be within or cut into the later mudflat.

59. With reference to the project parameters, the basal depths of trial trenches will be unlikely to extend to the depth of potential/relevant project parameters in all cases. Overall, archaeological trial trench depths would not be expected to extend to depths in excess of c.2.1m bgl (where stepping is possible for example within the stiff clays present to the north of Wainfleet St Mary).
60. Test pits, slit trenches/sondages or auguring will be utilised within archaeological trial trenches or instead of archaeological trial trenches to achieve evaluation to necessary depths where the instability of soils effects the practicality of standard archaeological trial trenching. This is most likely in the southern part of the Order Limits.
61. It is noted that where potential archaeological horizons may be present beneath the project parameters that a sensible buffer to evaluate the presence/absence of remains which could be affected by indirect physical impacts should be considered. In-particular the loading associated with compounds and haul roads will necessitate consideration of excavation in excess of 0.3m. In this instance an excavation limit of 0.5m is recommended. Other sensible buffers should be employed as necessary in the field but excavation in excess of the parameters cited above should be minimal.

8 Soil Management and Surface Water Strategy

8.1 Soil Management General Principles

62. It is noted in the Outline Soil Management Plan (document reference 8.1.3) that soils south of Burgh le Marsh and within Grade 1 Agricultural land quality areas are the most likely to be unstable and may be characterised by 'running sand' at a depth of 1.2m bgl.
63. The approved WSI will follow industry guidance and best practice and will reference the recommendations set out within section 5 of the Outline Soil Management Plan (document reference 8.1.3). It is understood that input from an Agricultural Liaison Officer and a Soil Clerk of Works may be necessary.
64. With adherence to the Outline Soil Management Plan (SMP), general principles for intrusive works including trial trenching and excavation are as follows:

- With reference to the project parameters, an excavator will remove overburden down to a level at which any significant archaeological deposits are first identified or down to natural deposits, whichever is first. All subsequent excavation will be carried out by hand unless agreed otherwise with LCC.
- Topsoil and subsoil will be stockpiled separately.
- All spoil will be compacted and managed appropriately to avoid excessive saturation by water or the creation of dust.
- Spoil will be stored at least 10m from any watercourse to minimise run-off of silt.
- Care should be taken in stockpiling to ensure that any variation in stripped soil type within a stripped area is allowed for, i.e. clay soils will be reinstated at point of origin, sandy soils will be reinstated at point of origin.
- Spoil will be stockpiled at a suitable distance from a trial trench edge in order to accommodate any stepping or overcutting which may be required.
- Spoil will be stockpiled at a suitable distance from excavation areas to allow for the extension of excavation areas if necessary.
- The ends of each trial trench and excavation areas shall be 'battered'[1] to effect safe entry and exit and to allow any animals (e.g., badgers) to escape from the trenches.
- Where deep excavation is possible within the varied soil profiles of the Order Limits, provision will be made for 'stepping'[2] trial trenches and excavation areas in order to safely record the full archaeological sequence.
- Trial trenches will not be opened more than 7 days in advance of hand digging commencing. Features should be dug straight after the removal of overburden as much as possible to prevent any potential erosion.

[1] Cut at 45 degrees

[2] Sides of trenches stepped at intervals

- The trial trenches and excavation areas will be backfilled upon the conclusion of the work, unless otherwise specified, and upon approval of the Historic Environment Officer/Historic England.

65. It is anticipated that no trial trench or geoarchaeological test pit would be open for more than 14 days.

8.2 Water Management General Principles

66. Water management would be undertaken in accordance with the Outline Surface Water and Drainage Strategy (document reference 8.1.5).
67. The ground within the Order Limits is characterised by naturally shallow groundwater (document reference 8.1.3).
68. With reference to the Outline Surface Water Drainage Strategy (document reference 8.1.5) the following may apply:

- Surface water flowing into work areas and excavated trenches during the construction period will be pumped out via settling tanks or ponds to remove sediment and potential contaminants, before being discharged into local ditches or drains via temporary interceptor drains.

8.3 Waste Management Principles

69. Works should also adhere to any requirements around waste disposal set out within the Outline Code of Construction Practice (document reference 8.1).

9 Post DCO Works/ Mitigation Works

9.1 Introduction

70. The archaeological works referenced within the ES documents comprise geotechnical investigation monitoring and deposit modelling, LiDAR and aerial photographic assessment and the geophysical survey undertaken for the purposes of the EIA. The works implemented in response to this OWSI will be informed by these works and by further geophysical survey, targeted trial trenching and geoarchaeological boreholes works to be undertaken post EIA.
71. The requirement for mitigation works will be appropriate and proportionate in scale with the level of significance of potential archaeological remains and will be formally agreed with the Historic Environment Officer at LCC in consultation with Historic England and the relevant LPA, and set out within subordinate WSIs.

9.2 Trial Trenching

72. Trial trenching will be undertaken in line with a subordinate WSI which will be in accordance with this OWSI, to be agreed in advance with the Historic Environment Officer at LCC in consultation with Historic England and the relevant LPA,
73. Test pits, slit trenches/sondages or auguring will be utilised within archaeological trial trenches or instead of archaeological trial trenches to achieve evaluation to necessary depths where the instability of soils effects the practicality of standard archaeological trial trenching. This is most likely in the southern part of the Order Limits.

9.2.1 Trench Parameters

74. The standard width and length of the proposed trial trenching is set at 1.8m x 30m. However, due to the nature of the deposits within the Order Limits, larger than standard trenches may be necessary or alternative intrusive investigation through a combination of standard archaeological trial trenches, slit trenches, test pits and sondages may be more appropriate.
75. The differing soil characteristics and general archaeological potential of an area will determine the profile of archaeological trial trenches and deviation to slit trenches or test pits.
76. The stepping of trial trenches to depths of greater than 1m is not proposed unless soil conditions allow. The stepping of trenches is most likely in areas north of Wainfleet St Mary where stiff clays are more prevalent. In these areas trenches could be stepped to achieve a basal depth of greater than 1m but not anticipated to be greater than c.2.1m. Trenches to this depth would be expected to reveal deposits of Iron Age/Roman date; the periods holding the greatest level of potential in most instances.
77. In either case, sondages and auguring is proposed alongside trench wide excavation to achieve the necessary evaluation depths, see Section 7. Sondages may be undertaken at trench ends whilst auguring could be more targeted.

9.2.2 Trial Trenching Method

78. A broad method is provided below but all work should be undertaken in accordance with the standard and guidance prepared by the Chartered Institute for Archaeologists (2023a and 2023b) and a subordinate WSI based on this document and approved by the Historic Environment Officer at LCC and Historic England.

9.2.2.1 Setting Out

79. The trench locations will be identified using survey-grade Differential GPS equipment, with either end of each trench marked out on the ground using either marker spray, wooden stakes and/or survey flags, ahead of excavation.

80. Where it transpires that unanticipated Site conditions/constraints such as un-mapped services prohibit the excavation of a given trench in its proposed location, then a reasonable alternative location/orientation will be sought for the trench, within the context of the investigation aims and objectives.

81. It is noted that modern established cultivation strips may be substantial and orientated against the alignment of a planned trench. Where trenches are not targeting geophysical anomalies or mapped historic farmsteads it is anticipated that a trench axis can be re-orientated, but this should not be done if it affects overall coverage and should be approved by the Historic Environment Officer.

9.2.2.2 Service scanning

82. Ahead of any excavation taking place, the length of each trench, as set out, will be scanned using an industry standard Cable Avoidance Tool (CAT) and Signal Generator (Genny) system. The scan will be performed by a suitably qualified operator.

9.2.2.3 Trial trench excavation

83. Each trial trench will be machine-excavated:

- Using a suitably sized 360° mechanical excavator fitted with a toothless ditching/grading bucket;
- Under the full supervision and control of a suitably qualified and experienced archaeologist; and
- To the depth of agreed excavation or the upper-most archaeological horizon (whichever is encountered first), ss Section 7.

9.3 Set-Piece Excavation

84. Set-Piece Excavation (SPE) is an invasive form of archaeological mitigation whereby the site area will be mechanically stripped of topsoil/subsoil down to the archaeological horizon, and the exposed archaeology excavated and recorded according to a sample strategy set out in a subordinate WSI.

85. SPE is an appropriate form of mitigation where an area of known archaeology of potential significance has been identified, and which cannot be mitigated through micro-siting or avoidance (see 10.7).
86. The results of the excavation will require a post-excavation assessment (PXA) in accordance with Historic England guidance *Management of Research Projects in the Historic Environment* (MoRPHE). The PXAs will feed into the preparation of an Updated Project Design (UPD), which will set out the proposals and timetables for further post-excavation analysis, publication, and archiving.
87. Due to the potential scale and significance of archaeology requiring SPE, and the variables that may affect programme estimates (for example, unexpected levels of complex archaeology, or poor ground conditions and weather), excavation should be conducted as far in advance of construction activity as possible so as to not impact the construction programme.

9.4 Strip, Map and Sample

88. Strip, Map and Sample (SMS) is a form of archaeological mitigation similar to SPE but more appropriate in areas where archaeological remains are thought to be present, but the extent and complexity of which are unclear, or the scale and significance of the remains are not thought to be high enough to warrant a full SPE.
89. As with SPE, SMS will commence with the stripping of topsoil/subsoil down to the archaeological horizon. The surface will be cleaned back, and archaeological features identified and mapped. The resulting site plan will be used to identify an appropriate and proportionate excavation sample strategy, including which features require excavation, the location of excavation, and the percentage of features required to be excavated. The sample strategy for each SMS area will be agreed on a case-by-case basis with the Historic Environment Officer at LCC following receipt of the site plan. It may be appropriate to present a generic excavation sample strategy within the subordinate WSI which can be agreed in advance of the commencement of works, and then refined as required once the site plan has been generated.
90. As with SPE, the excavation of SMS sites will likely result in a PXA and contribution towards a UPD (See Section 10.3).
91. The nature of SMS sites is as such that they are anticipated to dovetail as the work progresses, and it may be possible, where appropriate, to conduct these works closer to the construction programme than advised for an SPE site. The benefits of this may include the ability to potentially build the SMS sites into the construction programme, utilising the plant machinery of the main works contractor, and avoiding the need to backfill and reinstating soil before handing the site over. This approach would be determined on a site-by-site basis would be approached collaboratively between all relevant stakeholders.

9.5 Earthwork Survey

92. The Order Limits have been assessed to identify potential upstanding archaeological remains as part of the Desk-Based Assessment (DBA, Environmental Statement Volume 3, Appendix 20.1). Potential for earthwork survey may extend to HER references MLI86838 and MLI98639. These assets both reference medieval enclosures in ECC2 where a walkover recorded possible shallow earthworks. Any earthwork surveys would need to be undertaken ahead of the construction schedule to inform subsequent restoration.
93. Any earthworks survey will aim to identify and record the survival, extent, form, date, condition, and importance, of any above ground heritage assets within the target survey area. The survey area will be systematically walked in transects where possible, with features recorded through photography, record, and GIS as to the standard of a Level 2 survey as defined in *Understanding the Archaeology of Landscapes* (Historic England 2017b).
94. The results of any earthwork survey will be presented within a report for discussion with the Historic Environment Officer at LCC and may warrant some form of subsequent mitigation. This may include the need to investigate potential archaeological features through trial trenching (or proceed straight to a further stage of mitigation such as SPE/SMS as appropriate). As such, any additional earthwork survey should be conducted, where possible, at an early stage in the mitigation programme to allow the time for further work as required.

9.6 Watching Brief (Archaeological Monitoring)

95. A Watching Brief consists of the monitoring of intrusive grounds works during the construction phase that may have the potential to disturb buried archaeological remains. A Watching Brief is an appropriate form of mitigation where there is the potential for construction work to impact buried archaeology but where that archaeology is not thought to be of great enough extent or significance to warrant pre-construction mitigation such as SMS or SPE.
96. Ground-breaking activity will require monitoring by at least one experienced archaeologist per machine / excavation. Mechanical excavation will, where possible, be undertaken using a toothless ditching bucket and under constant archaeological supervision. Where practicable and without causing unreasonable delay to the construction programme, works may be temporarily halted whilst targeted archaeological investigations are carried out.
97. If any archaeological features are identified, they will be defined by hand-cleaning as necessary and recorded in plan. Avoidance will be sufficient to satisfy the aims and objectives of the work if the feature(s) can be avoided through micro-siting. If avoidance is not possible the groundworks must be halted until mitigation is completed. Isolated and simple features will be excavated and sampled by the monitoring archaeologist, though complex archaeology may require a discussion with the Historic Environment Officer at LCC as to an appropriate strategy that allows for the sufficient excavation or protection of archaeological remains while not causing unreasonable delays to the construction programme.
98. The watching brief will be maintained throughout initial excavations and will be concluded when, in consultation with the Employer and the Historic Environment Officer at LCC, it is clear

that the potential for archaeological remains to be exposed has been exhausted, or additional mitigation requirements have been determined. A report will be compiled which will include post-excavation assessment, where required, and contribution towards the UPD where necessary.

9.7 Preservation In Situ

99. Opportunities exist during the post-DCO and construction stages to protect archaeological remains that are deemed significant enough or well-preserved enough to warrant preservation *in situ* where possible.

100. Preservation in situ could be achieved through the implementation of construction techniques which could be applied within the onshore ECC and 400Kv cable corridor (excluding the OnSS and TJB). Where remains of national importance are anticipated from archaeological evaluation preservation in situ could be achieved through the micro-siting of launch and receive pits within cable installation compounds, trenchless construction techniques to avoid an open cut and easement stripping for cable installation and no-dig methods at compounds and temporary haul roads where standoffs or bog matting could be utilised respectively

101. Opportunities to preserve archaeological features will be considered on a case-by-case, site-by-site, and area-by-area basis in further discussion and agreement with the Historic Environment Officer at LCC.

102. During subsequent construction works, further opportunities may arise to preserve *in situ* archaeological remains uncovered during ground works. As with the post-consent detailed design phase, consideration for preservation *in situ* will be on a case-by-case basis and will require agreement between the Client, Principal Contractor and the Historic Environment Officer at LCC. Invasive works undertaken in proximity to archaeology that is to be preserved *in situ* need to be undertaken in a considerate way that will not impact the archaeology, and measures may need to be put in place to ensure protection of archaeology (demarcation of preservation areas etc.). The approach to preservation *in situ* will follow the principles set out in HE's (2016) *Preserving Archaeological Remains.*

10 General

103. The following will apply to all works where relevant.

10.1 Investigation and Sampling Strategy

104. Any identified archaeological features/potential features will be hand-investigated, consistent with the Lincolnshire Archaeology Handbook. 3

105. Archaeological features will be sampled sufficiently to characterise, date them and determine their significance i.e. 10% of fills of linear features (unless the linear features are substantial in which case an alternative sampling strategy will be discussed with the Historic Environment Officer at LCC) and 50% of pit fills. Smaller discrete features such as postholes will be 100% sampled.

106. Measures will be taken to protect particularly significant, valuable, or sensitive archaeological remains from exposure, accidental damage and/or theft.

10.2 Recording

107. Recording will likely include:

- A pro-forma context record for each stratigraphic unit revealed; [4]
- A record of any areas identified as being devoid of archaeological remains and of any features investigated and confirmed to be of natural origin;
- A 'Harris Matrix' diagram to elucidate any complex stratigraphic sequences;
- Site plans, either Differential GPS-recorded, or hand-drawn at a scale of 1:100, and depicting:
- The extent of the areas investigated, tied into the Ordnance Survey National Grid and located on a 1:2,500 scale plan;
- The extent of all stratigraphic units revealed; and
- Appropriate detail identified within stratigraphic units;
- Plans of stratigraphic units at a minimum scale of 1:20, unless specific circumstances dictate an optimal scale;
- Segments of stratigraphic units at an appropriate scale. Unless specific circumstances dictate an optimal scale, then this should be a minimum of 1:20. For areas of detailed, significant or complex stratigraphy the scale used should be a minimum of 1:10;5

[3] https://www.lincolnshire.gov.uk/downloads/file/2204/archaeology-handbook-pdfa

[4] *Typically, this would relate to any individual 'context' identified within a single archaeological intervention. However, there may be occasions where a context evidently recurs within multiple interventions, most commonly in relation to linear features. In such instances, it may optimise the intelligibility of the information derived, and aid in its interpretation, for a single context record to be compiled.*

[5] *All scale drawings will include spot heights relative to the Ordnance Datum in metres, correct to two decimal places.*

- A photographic record comprising recognised industry-quality digital SLR photographs, with a minimum resolution of 10 mega-pixels and saved as high-quality .jpg files;
- Numerical indices of all context records, drawings, photographs, samples and small finds, checked and cross-referenced as necessary; and
- A diary record of the progress of the archaeological work, including details of liaison and monitoring meetings, site visits, and a record of staff on site.

108. All of the above records will form part of the eventual Project archive, to be deposited with a suitable repository upon completion of the Project or the Contractor.

109. All archaeological recording will be undertaken in accordance with industry best practice, including the Standard and guidance for archaeological field evaluation (CIfA, 2023).

10.3 Human Remains

110. Should human remains be encountered, they will initially be left in situ, suitably covered and secured, in compliance with industry best practice. The Archaeological Contractor will notify the Coroner and the Archaeological Consultant who will then inform the Project and the Historic Environment Officer at LCC.

111. Following this initial consultation, the removal of human remains, if required, will only take place in accordance with a Ministry of Justice exhumation license, the appropriate Environmental Health regulations and the Burial Act 1857.

112. The Archaeological Contractor will be responsible for applying for an exhumation license from the Ministry of Justice, and, once in receipt, for ensuring that the provisions of that license are complied with.

10.4 Finds Recovery and Processing

113. All finds will be processed promptly following the completion of the fieldwork. Retained finds will be washed (where appropriate, see below), marked, bagged and recorded within a database (e.g. MS Access or GIS DBASE), and will include the location from which they were recovered in National Grid and Ordnance Datum, accurate to two decimal places. Finds that have the potential for preserved residues should not be washed, as recommended in HE's 'Organic Residue Analysis and Archaeology: Guidance for Good Practice' (2017).

114. The finds assemblage will be treated, labelled, and stored in accordance with the appropriate HE guidance documentation, all relevant local authority guidelines and the United Kingdom Institute for Conservation of Historic & Artistic Works (UKIC) guidelines.

115. In accordance with English Heritage (HE) (2011), environmental samples will be '*Processed as part of the data collection and recovery stage of a project, so that the specialist can clearly see the full range of material and judge its potential to meet project aims and objectives*' (p7)

116. Samples will be stored in a cool dark environment, and processed as soon as possible after being taken, to limit the risk of decay to organic remains.

117. The Contractor will ensure that the processing of all assemblages recovered is also undertaken in accordance with the requirements of the agreed repository.

118. Where appropriate, each category of find, or each material type, will be examined by a suitably qualified archaeologist or specialist, with the results of that analysis incorporated into the fieldwork report.

10.5 Treatment of Treasure

119. The Treasure Act 1996 (the "Treasure Act") sets out the precious metal content required for a find to qualify as treasure.

120. Should any treasure (defined under the Treasure Act 1996) be discovered, it will be removed, if possible, to a secure location. Where removal is not practical on the same working day as the discovery, suitable security measures will be put in place to protect the find from damage, loss and theft.

121. Seven categories of object are now classed as treasure:

- any object other than a coin which is at least 10% silver or gold by weight and more than 300 years old;
- any coins that are at least 10% silver or gold by weight and come from a single find, provided the find contains at least two coins with a gold or silver content of at least 10%. The coins must be at least 300 years old at the time of discovery. Where finds consist of coins that are less than 10% gold or silver by weight, there must be at least 10 coins in the find and they must be at least 300 years old at the time of discovery for the find to be considered treasure;
- any object that contains metal, is at least 200 years old, and meet a specified threshold of historical archaeological, or cultural significance;
- any object, of whatever, composition, that is found in the same place as, or that had previously been together with, another object that is treasure;
- any object (other than a coin), any part of which is base metal, which, when found is one of at least two base metal objects in the same find which are of prehistoric date;
- any object, (other than a coin) which is of prehistoric date, and any part of which is gold or silver; and
- any object that would previously have been treasure trove but does not fall within the specific categories given above.

122. Upon discovery of any treasure, the Contractor will immediately inform the Employer (through the Archaeological Consultant), the local coroner, and the Portable Antiquities Finds Liaison Officer for LCC. Upon discovery of any treasure, the local coroner must be informed within fourteen days of discovery, in accordance with The Treasure Act 1996 Code of Practice and its amendment.

10.6 Paleoenvironmental Sampling

123. A detailed strategy for the sampling and recording can be anticipated to follow Historic England guidelines and a broad strategy set out below.

124. Palaeo-environmental samples will be taken from appropriate representative deposits (such as occupation and midden deposits, or ditch and pit fills) and submitted for assessment. Particular attention will be paid to the recovery of samples from any waterlogged deposits present. Where appropriate, samples will be taken for floatation for the purpose of recovering material including charred plant remains, charcoal, and small mammal and fish bones. Samples for floatation will consist of 40-60 litres or 100% of smaller features.

125. Recovery and sampling of environmental remains will be in accordance with guidelines set out in HE's 2011 '*Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation*', and the sampling strategy provided by the specialist and agreed with HE RSA, as required.

126. Samples will be:

- recovered from cleaned surfaces, using clean tools and placed in clean containers;
- appropriately recorded and labelled, and a register of all samples recovered maintained;
- appropriately labelled with fade-resistant labels; and
- stored safely in a sufficiently secure location prior to their delivery to the appropriate specialist.

127. Any sampling would be undertaken in accordance with Historic England's '*Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record*' (2015a). Geoarchaeological survey strategies will be agreed with the Historic England Regional Science Advisor.

128. Secure contexts will be sampled for dating purposes as appropriate (whether on-site or as sub-samples of processed bulk samples). This will include C14 dating, archaeomagnetic dating and dendrochronological dating. Any concentrations of charcoal or other carbonised material recovered will usually be retained. Where suitable stratified sequence deposits (peat, dark earths, large feature occupation deposits) are encountered, monolith samples will be taken in addition to bulk samples. Peats and carbon-rich fills with significant pottery will be sampled for radiocarbon dating. Where deposits with significant ecofactual, industrial or agricultural processing potential are encountered, sampling will be directed by a specialist. Samples for archaeomagnetic dates will be taken on-site by the relevant specialist (English Heritage, now HE, 2006). Samples for dendrochronological dates would be taken either on-site or from recovered timbers by the relevant specialist in accordance with published guidelines (English Heritage, now HE, 1998). Samples would typically be processed after the initial post-excavation assessment, however sampling for spot-dating during fieldwork may inform on-site strategies.

129. Where significant remains are revealed, additional detailed recording, specialist environmental sampling, and/or scientific dating may be required. The scope of and methodology for any such detailed recording would be agreed in advance between the Employer (and the Employer's Archaeological Consultant), and Historic England. A sample strategy for significant remains, informed by English Heritage (now HE) (2011) could consist of:

- large samples (20lts) from waterlogged/anoxic deposits for the purpose of recovering plant and invertebrate remains, as well as small vertebrates and marine molluscs;
- monolith/Kubiena samples for the analysis of pollen, spores, diatoms and foraminifera;
- core samples to be taken where monolith and section samples are not possible, for the recovery of microfossils; and
- small samples taken from individual contexts, 10-50g for ostracod and geoarchaeological analysis, and 10-20mm² for pollen and spore analysis.

130. It may become appropriate to process samples on-site or locally to inform and assist the ongoing environmental sampling strategy. The results of contemporaneous sampling would feed into the discussions on targeted sampling, and the potential for the discarding of low potential samples, all of which would be agreed between the Contractor, the Employer, and Historic England. The Contractor would take responsibility for the organisation and management of local sampling.

131. Should any palaeo-environmental deposits of particular interest be revealed, the HE RSA will be contacted, and their advice sought in respect of an appropriate further sampling strategy.

10.7 On-Site Protocol for Waterlogged Wood

132. The following general principles are taken from the Historic England (formerly English Heritage) publication "*Waterlogged wood guidelines on the recording, sampling, conservation and curation of waterlogged wood*" (Historic England 2010).

- Where an anthropogenic origin has been established as little as possible of any waterlogged wood should be exposed at any one time to avoid desiccation.
- Any uncertainty over a natural or anthropogenic origin should trigger a site visit by a wood specialist.
- All wood should be sampled for species identification and woodland management.
- All artefacts should be kept intact and not sampled on site.
- Sharp edged tools should be avoided, with hands or plastic tools used wherever possible.
- Any surfaces exposed to desiccation or excavation damage should be marked with a stainless steel or brass pin with a coloured head to avoid later confusion.
- Techniques to keep wood damp on site may include a garden sprinkler or leaky hose and water-soaked polyether foam covered with black plastic sheeting regularly sprayed with water. Also, clingfilm wrapping directly onto wood.

- Waterproof labelling should be attached with stainless corrosion resistant pins and sealed in waterproof polythene.
- Lifting should be done under the direction of a conservator and directly onto a surface to be used for transportation to storage.
- Packing should be done in accordance with anticipated storage conditions – for example heat sealed in polythene tubing or bags with as little air as possible where cold storage is anticipated.

10.8 On-Site Protocol for WWII Aircraft Sites

133. No crash sites are recorded within the Order Limits or its vicinity. In the event that a crash site is exposed, the identified area should be cordoned off and all works within that areas should cease with due regard to the Protection of Military Remains Act (1986) and until advice has been sought from an Explosive Ordnance Disposal expert.

10.9 Reporting

134. Geoarchaeological and Archaeological reporting shall be carried out by suitably qualified and experienced staff, who must be apprised of the project design before commencing work.

135. Reporting will be carried out by the Archaeological Contractor in accordance with CIfA guidance. The Archaeological Contractor will be responsible for the following tasks associated with assessment.

- processing and initial reporting of any Bulk Finds;
- processing and initial reporting of any Registered/Small Finds;
- any bulk environmental samples processing and initial reporting;
- any C14 sampling and dating;
- any X-radiography of metal artefacts;
- creating a task list for analysis which can be brought together into an overarching UPD for later phases of work;
- purchase of archive materials (boxes, consumables etc.); and
- the temporary storage of archives.

136. All techniques must be demonstrably fit for the defined purpose and comply with relevant legislation. All data generated as a result of the analysis phase should be included in the project archive.

137. In addition to specific requirements set out in relevant sections the Archaeological Contractor(s) will be required to produce an assessment report. This shall include the following:

- a non-technical summary including the basis for the work, its aims, and results;
- site codes/project numbers, dates of fieldwork, and National Grid References (to at least eight figures);

- an account of the background to the project and circumstances of work;
- aims and purpose of the work;
- methodologies;
- a description of the significant results, presented in phase order;
- a description of soils and sediments where needed;
- an interpretive discussion of the results, placing them in a local and regional context;
- quantifications, identifications and assessments of any artefacts and ecofacts, carried out by suitable specialists;
- a statement of potential for further analysis for each data category as appropriate (stratigraphic, artefacts, ecofacts);
- a statement on the need for retention, condition, stability and future conservation/storage needs for any artefacts/samples;
- a statement of potential for the dataset as a whole, including specific questions that can be answered and the potential;
- value of the data to local, regional and national research priorities;
- supporting illustrations and plans, including phase plans, suitably captioned at appropriate scales;
- archive inventory, details of archive location and accession number;
- context/deposit inventory; and
- copy of the individual Site OASIS record.

138. Analysis work may be deferred as part of a consolidating analysis once all evaluation (and potentially mitigation works) have been completed. Any analysis would be undertaken according to an Updated Project Design (UPD) and must be confirmed by all relevant parties in writing.

10.10 Archive Preparation and Deposition

139. All digital data and archiving will be managed according to a data management plan set out by the Archaeological Contractor(s) at the outset of works.

140. The compilation of the project archive is the responsibility of the Contractor. The compilation of an integrated and ordered project archive will be undertaken in accordance with the provisions of the following:

- CIfA (2020d) guidance;
- HE's MoRPHE guidance;
- the requirements of the chosen repository; and
- the OWSI for intrusive evaluation.

141. As a minimum the archive will include:

- appropriate documentation produced or published during the project;
- all recovered artefacts and significant samples (material archive);
- all written, drawn, photographic and other records generated during the fieldwork (site archives);
- all digital data, including that which is digital in origin, and any digital copies made of the primary site records[3], including images;
- all scientific samples that are suitable for curation and their associated documentation;
- an index to the archive; and
- a list of contents of the archive.

142. The Archaeological Contractor(s) will be responsible for the preservation and security of potential archive material throughout the project, including during fieldwork. This will include the provision of a secure location for the storage of any material and will mitigate for any factors that have the potential to damage finds, samples (including labels) or documentation (e.g. damp).

143. Once prepared, the Archaeological Contractor(s) will store the archive in a suitable and secure location prior to its deposition. It is the responsibility of the Contractor to prepare and suitably package all material for collection by any post-excavation contractor.

144. With regard to archiving costs, the Archaeological Contractor will be required to work out how many boxes are to be deposited so this can be appropriately costed. Responsibility and obligations of care of the archive materials shall not be removed from the Archaeological Contractor until acceptance has been provided by The Employer. The archive will be accessible to The Employer at all times and the Archaeological Contractor shall enable access upon request.

10.11 Health and Safety

145. The Archaeological Contractor will prepare and submit site-specific Risk Assessments and Method Statements before the commencement of fieldwork for approval by the Employer, the focus of which will be on Health, Safety and Environment considerations.

References

CIFA (2019) Code of Approved Conduct for the Regulation of Arrangements in Field Archaeology, Chartered Institute for Archaeologists, Reading.

CIFA (2020) Standard and Guidance for the collection, documentation, conservation and research of archaeological materials, Chartered Institute of Field Archaeologists, Reading.

CIfA (2020b) Updated October 2020 Standard and guidance for the collection, documentation, conservation and research of archaeological materials

CIfA (2020c) Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives

(CIfA 2020d) Standard and guidance for historic environment desk-based assessment

CIFA. (2023a) Standard for archaeological field evaluation, Chartered Institute for Archaeologists, Reading.

CIFA. (2023b) Universal Guidance for archaeological monitoring and recording, Chartered Institute for Archaeologists, Reading

CIFA. (2023c) Standard for archaeological monitoring and recording, Chartered Institute for Archaeologists, Reading.

CIFA. (2023d) Universal Guidance for archaeological field evaluation, Chartered Institute for Archaeologists, Reading

CIFA. (2023e) Universal Guidance for archaeological excavation, Chartered Institute for Archaeologists, Reading

CIFA. (2023f) Standard for archaeological excavation, Chartered Institute for Archaeologists, Reading.

David, A., Linford, N., Linford, P. and Martin, L., 2008. Geophysical survey in archaeological field evaluation: research and professional services guidelines (2nd edition). Historic England.

Green, C. 2023. Land on the edge the landscape volution of the Lincolnshire coastline

Historic England (2015a) *Management of Research Projects in the Historic Environment (MoRPHE)*.

Swindon: Historic England.

Historic England formerly English Heritage (1991) Management of Archaeological Projects (MAP2), English Heritage, London

Historic England (2010) *Waterlogged wood guidelines on the recording, sampling, conservation and curation of waterlogged wood*

Historic England formerly English Heritage (2011) Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation, English Heritage, London

Historic England (2015) Management of Research Projects in the Historic Environment, Historic England, London

Historic England (2015b) *Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record*. Swindon: Historic England.

Historic England (2016) *Preserving Archaeological Remains: Decision-taking for Sites under Development*. Swindon: Historic England.

Historic England (2017a) *Organic Residue Analysis and Archaeology: Guidance for Good Practice*. Swindon: Historic England.

Historic England (2018) *The Role of the Human Osteologist in Archaeological Fieldwork Projects*. Swindon: Historic England.

Jones, A.P., Tucker, M.E., Hart, K.E., 1999. 'Guidelines and recommendations', in Jones, A.P., Tucker, M.E. and Hart, J., eds., The Description and Analysis of Quaternary Stratigraphic Field Sections., Quaternary Research Association Technical Guide, Quaternary Research Association: London, 27–76

Lincolnshire County Council (2019) Archaeological handbook

Olsen, N., Toffner-Clausen, L., Sabaka, T.J., Brauer, P., Merayo, J.M.G., Jorgensen, J.L., Leger, J.M., Nielsen, O.V., Primdahl, F., and Risbo, T., 2003. Calibration of the Orsted vector magnetometer. Earth Planets Space 55: 11-18.

Perrin, K et al. (2014) A Standard and Guidance to Best Practice for Archaeological Archiving in Europe, EAC Guidelines 1, Europae Archaeologia Consilium: Namur

Robinson, D. (1981) The book of the Lincolnshire seaside

Schmidt, A. and Ernenwein, E., 2013. Guide to good practice: geophysical data in archaeology. (2nd edition). Oxbow Books: Oxford.

Schmidt, A., Linford, P., Linford, N., David, A., Gaffney, C., Sarris, A. and Fassbinder, J., 2015. Guidelines for the use of geophysics in archaeology: questions to ask and points to consider. EAC Guidelines 2. European Archaeological Council: Belgium.

Tröels-Smith, J. 1955 Karakterisering af løse jordater (Characterisation of unconsolidated sediments), Danm. Geol. Unders., Ser IV 3, 73.

Tucker, M.E., 2003. Sedimentary Rocks in the Field, John Wiley & Sons.

UKIC (1990) Guidelines for the preparation of Excavated archives for long-term storage, United Kingdom Institute for Conservation of Historic and Artistic Works, London

Appendix A: East Midlands Research Framework

1. The East Midlands Historic Environment Research Framework sets out a framework for research aims and objectives to be considered for the various fieldwork techniques set out within this document. 6
2. Relevant overarching themes to consider are as follows.

Environment

- Pleistocene and Holocene climatic change (as evidenced, for example, by paleochannel deposits) - All periods;
- Changes in sea level, the configuration of sea and land, the drainage network and the spatial extent of wetlands - All periods;
- The impact of human activity upon woodland clearance and other changes in the regional vegetation - All periods except Palaeolithic;
- The impact of human activity upon soil development and geomorphic processes (notably alluviation, colluviation and aeolian deposition – All periods but Palaeolithic and Mesolithic; and
- Exploitation and settlement of diverse ecological zones - All periods.

Settlement

- Distribution, density and character of hunter-gatherer open sites - Palaeolithic, Mesolithic, and Neolithic-Middle Bronze Age; and
- Development of agriculturally- based settlement patterns - Neolithic to Modern.

Food Procurement Strategies

- Hunter-gatherer subsistence strategies and mobility patterns - Palaeolithic to Middle Bronze Age;
- Transition from hunter-gatherer to agricultural subsistence strategies - Mesolithic to Middle Bronze Age;
- Developments in crop and animal husbandry and changes in diet and health - Neolithic to Modern; and
- The Agricultural Revolution and the industrialisation of agriculture - Post Medieval to Modern.

The Rural Landscape

- The development of fields and field systems - Late Bronze Age to Modern;
- The development of parks, gardens, and estates - Post Medieval to Modern; and

[6] https://researchframeworks.org/emherf/

- Development of monastic estates and post-Dissolution developments - Romano-British to Post-Medieval.

Communications

- The role of rivers as movement corridors, sources of power and socio-political boundaries - All periods;
- The role of coastwise routeways - All periods but Palaeolithic;
- Constructed routeways; wooden or brushwood trackways, roads, canals, tramways and railways - Neolithic to Modern; and
- Riverine and maritime waterborne transport - Neolithic to Modern

Social, Religious, And Political Structures

- Development of prehistoric monument complexes - Neolithic to Iron Age; and
- Development of funerary monuments and changing burial and memorial practices - Neolithic to Modern

3. Period specific research objectives which may be relevant are set out further below.

Palaeolithic (c.950/850kya-c.9500 cal BC)

4. Strategic Objective 1A Refine knowledge of the earliest hominin activity in the region (Pre-Anglian: Cromerian complex of period 1)

'The East Midlands is located astride the former Bytham River, which prior to obliteration of the established drainage networks by Anglian glaciation around 425,000 years ago would have flowed eastwards to East Anglia and hence is critically situated to provide information relating to the earliest (pre-Anglian) hominid activity in Britain. It is recommended that wherever possible resources be focused on during developer- funded work upon the identification and characterisation of cultural remains contained within deposits associated with the Bytham River…'.

This may be relevant to the very southern segments south of Boston given the approximate route of the pre-Anglian Bytham which lies to the southwest near Castle Bytham.

This should enhance studies of the distribution of character of early hominin activity, including migration routes, and might identify distinctions within artefact assemblages that could elucidate spatial and chronological variability'.

'Fieldwork should focus upon the retrieval of associated organic remains with the aim of elucidating the variety of ecological zones exploited by early hunter-gatherers (see Objective 1G).

Strategic Objective 1B Test the hypothesis that hominines may have been absent from the East Midlands during Period 2 (Pre-Levallois Lower Palaeolithic)

'Despite abundant data from southern England, convincing evidence for hunter-gatherer activity in the East Midlands following retreat of the Anglian ice remains elusive'.

'It is recommended, therefore, that priority be accorded to the identification of deposits attributable to temperate stages of this period, followed by prospection for associated cultural material…The strategy should aim to confirm the presence or absence of Period 2 deposits, and, if these are found to be present, evaluate the potential for evidence of hominin activity.'

5. Strategic Objective 1C Confirm the extent and nature of early hominin activity during Period 4 (Mousterian)

The East Midlands is one of few areas of Britain to have yielded a dataset for this period, albeit acquired principally by antiquarian explorations of limestone caves to the north and west of the region and has significant potential for elucidating this poorly known period of prehistory.

'…targeted excavations of sites likely to preserve significant stratified deposits with associated artefacts and environmental remains' is recommended. 'Faunal or botanical data would sharpen our picture of the regional environment'. The lowland potential of deposits including sand and gravels along with palaeochannels should be considered and 'appropriate deposits should be identified and investigated prior to quarrying or other developments that might impact upon remains of Mousterian activity'.

6. Strategic Objective 1D Further investigate Upper Palaeolithic open-air sites

'Recent archaeological investigation in the region have located several nationally important open-air sites dating from the Early and Late Upper Palaeolithic…These sites represent the open-air equivalents of the Derbyshire and Nottinghamshire cave sites (Objective 1E), and analyses of lithic artefacts from the ploughzone and buried contexts may shed important light upon hunter-gatherer movements (Objective 1F) and in particular the relationship between open-air and cave locations. Trace element analysis of flints from Farndon Fields, for example indicates that at least some of the material may have derived from a source over 200km to the south, which has profound implications for the reconstruction of mobility patterns'.

7. Strategic Objective 1F Investigate annual patterns of movement of Late Upper Palaeolithic hunter-gatherers

The wide variety of evidence from the East Midlands for Late Upper Palaeolithic activity , including open-air sites, caves and rock shelters raises the possibility of exploring settlement patterns, mobility and hunting strategies in ways that are possible in few other regions of the country…Trace element analysis may well be useful as a technique for unravelling the annual patterns of movement of hunter-gatherers within and beyond the East Midlands, and could potentially be extended to sites of the Early Upper Palaeolithic and other periods where we can be confident that the observed pattern of finds reflects the original distribution of activity foci. This technique might be augmented by isotopic studies of human bone to elucidate the

movement of people and their diets, and of animal bone to shed light upon their migration routes.

8. Strategic Objective 1G Elucidate from terrestrial sources the changing Pleistocene environment of the East Midlands

Further mapping and visualisation of the Pleistocene landscape is recommended in order to elucidate further the relationship between human populations and changes in climate, vegetation and landscape...There is significant scope in the East Midlands for further investigation of the changing environment, especially from the evidence of palaeochannels…Organic deposits associated with the Bytham drainage system also provide a critical resource for reconstructing the environment of the earliest hominin colonisers, as demonstrated by…discoveries of organic deposits and associated cultural remains from sites distributed widely across the Midlands and eastern England.

Mesolithic (c.9500-c.4000 cal BC)

9. Strategic Objective 2A Enhance understanding of the environmental background to Mesolithic activity

'By comparison with some other areas of the country, the Mesolithic environment of the East Midlands is little known. In particular there is little evidence to indicate the extent to which tree cover may have been manipulated to encourage the development of vegetation suites for hunting and foraging'.

'There is a need to obtain more closely dated pollen sequences from upland, riverine and coastal peat deposits and to extend the investigation of ancient environments to include isotope studies of the organic fractions of coastal and riverine sediments'.

'Coversand deposits…also merit special mention. Recent work suggests reworking of some late Devensian coversands in the Early Holocene as a result possibly of Mesolithic clearance and/or climatic change. Additionally, optically stimulated luminescence (OSL) dating of coversands and pollen analysis may be recommended to elucidate further the chronology of coversand reworking and the history of vegetation change'.

10. Strategic Objective 2B Characterise the regional and local evidence for Mesolithic activity

'The East Midlands is notable for the broad range of environments from which Mesolithic lithic artefacts have been recovered, yet this information has generally not informed national syntheses and has yet to be fully exploited in regional research. Early investigations of limestone caves and rock shelters in Derbyshire and Nottinghamshire yielded Mesolithic stone artefacts, while later work has revealed surface finds and sometimes deeply stratified collections of lithic artefacts across a wide variety of landscapes. These extend from the Pennine spine to the eroding coastal peats of Lincolnshire'.

'Further investigation by excavation has been very limited, however, while the detail of the surface scatters is often not known. It is important to identify the extent, size and shape of artefact distributions and investigate possible associations with sub-surface features in order to characterise these, and field methodologies should be adapted appropriately. Curatorial

briefs should highlight areas where there has been little or no surface collection and should recognise the potential for wet sieving to recover artefacts and the role of geophysical prospection. The nature and chronology of the lithic material from the region merits separate consideration (Objectives 2C, 2D and 2E), but it is clear that further review of the surface evidence, together with associated excavation, has much to contribute to our understanding of Mesolithic activity in the region'.

11. Strategic Objective 2C Investigate further the earlier Mesolithic lithic resource

'The East Midlands region is notable for the range and extent of distribution of lithic material, but much of this remains little studied… The lithic artefact resource of the East Midlands thus offers significant scope for investigating the potential size of earlier Mesolithic hunting territories and key issues such as the relationship of upland lithic scatters to those of the lowlands or of cave to open-air sites'.

12. Strategic Objective 2D Identify changing patterns of lithic artefact use in the later Mesolithic

'The opportunity exists, therefore, to refine knowledge of East Midlands later Mesolithic assemblages and to attempt definition of chronological, functional and cultural traits'.

13. Strategic Objective 2G Investigate the topographic locations of activity foci

'More attention should be paid to the topographical attributes of Mesolithic activity foci, which have been recorded in a wide variety of locations. Prominent or elevated sites seem often to have been favoured for open-air sites, including hilltops and, in regions of subdued topography, subtle ridges and sand islands. Proximity to wetland resources may have been important, to judge by sites such as Misterton Carr and the many lithic scatters spread across river terraces, and many more sites may lie buried beneath alluvium, colluvium, coversands or peat. Fieldwalking and test-pitting surveys have also retrieved material from a wide range of other topographic zones across the region, and there is much to be learnt about locational strategies during this period. There are significant opportunities to identify associations between specific activities and distinctive topographies, although many questions remain regarding the prevailing vegetation cover. Consideration should also be given to the nature of Mesolithic activity in locations attracting Neolithic settlement or burial. There may be differences between the two periods: Mesolithic finds at Lismore Fields, for example, spread across a low plateau that was later a focus of Neolithic settlement, while the chambered cairn at Whitwell occupied a site that, in common with other cairn locations, yielded no trace of Mesolithic activity'.

14. Strategic Objective 2H Investigate the transition from the Mesolithic to Neolithic

'Once it seemed easy: whatever the precise mechanics of the conversion, the Mesolithic was characterised by hunter-gatherers, while the Neolithic was populated by settled farmers. Hard and fast distinctions between the Mesolithic and Neolithic are now increasingly difficult to maintain, although the question of the extent to which societies were 'Mesolithic' or 'Neolithic' still seems valid. Key issues of concern include the continuity of essentially Mesolithic lifeways beyond the fifth millennium BC and the degree to which Early Neolithic populations engaged in agriculture. With notable exceptions such as Lismore Fields, evidence

for arable farming in the form of querns or cereal grains of undoubted Early Neolithic date remains rare in the East Midlands. Nevertheless, discoveries of early faunal remains indicate a new interest in domesticating animals and the processing of animal products in different ways. In addition, the building of funerary and other ritual or ceremonial monuments, alongside the development of pottery and changes in lithic industries to encompass flake core artefacts and shaped arrowheads at the expense of bladelet types, suggests that becoming Neolithic may have been a spiritual conversion as well as a socio-economic or technological one. The issue of changing subsistence strategies and the relationship between Mesolithic and Neolithic lifeways can be addressed in part by consistent sampling of organic material preserved in palaeochannels and other waterlogged or wetland contexts spanning the transition period. Close examination of the occasional features found associated with Mesolithic and Early Neolithic lithic scatters should also be a priority, and should be combined wherever possible with radiocarbon dating and environmental sampling of associated deposits'.

Neolithic and Early to Middle Bronze Age(c.4000-c.1150 cal BC)

15. Strategic Objective 3C Develop fieldwalking strategies and guidelines for landscape zones

Synthesis of the results of fieldwalking should enable the development of more refined strategies for locating and interpreting the lithic scatters that provide crucial evidence for early prehistoric activity. There is a pressing need to investigate further the lithic signatures of monument types, as this may assist the interpretation of finds scatters. In addition, building upon projects in areas such as the Fens, the Nene and Ouse catchments around Raunds and the Peak District, and upon smaller-scale surveys such as Elmton in Derbyshire, it would be useful if further surveys could be conducted across a wide spectrum of landscape zones. This would permit a more informed assessment of variations in the density and character of settlement and comparison of the lithic evidence with earthwork, cropmark and other remote sensing data across a wide range of geological and topographic zones. It should also provide a secure foundation for the development of guidelines specific to particular landscape zones and aid identification of methodologies capable of detecting sites that are not easily located. A review of the excavation record may also illuminate the nature of lithic assemblages recovered by fieldwalking.

16. Strategic Objective 3E Target sites with Late Mesolithic and Early Neolithic organic remains

'*Environmental remains attributable to the Late Mesolithic or Early Neolithic have been retrieved from a variety of contexts across the region, including rare examples of settlements spanning this transition period, upland peat bogs and organic palaeochannel deposits, notably along the Trent Valley at Bole Ings, Girton and Staythorpe in Nottinghamshire and in the Nene Valley at the Northamptonshire sites of Wellingborough, Wollaston and Stanwick. However, significantly more organically rich contexts of this period need to be targeted for environmental analysis and radiocarbon dating to elucidate patterns of landscape change during this key transitional period. Particular attention should be focused upon sites preserving organic remains that may be threatened by de-watering, while the information gained from sites under threat from development should be maximised…more sites of this*

period with the potential for preserved organic remains need to be sampled and carried through to publication if we are to unravel the transition from nomadic to semi-sedentary and sedentary communities and the impact of these changes upon the landscape'.

17. Strategic Objective 3F Identify monument complexes and prioritise for curatorial action

'Neolithic and Bronze Age monument complexes are poorly known by comparison with areas such as Wessex, but there is compelling evidence nonetheless for landscapes of equal complexity. Impressive earthwork complexes survive on the Derbyshire uplands, notably around the henge at Arbor Low and on Stanton Moor, but lowland complexes must be deduced principally from cropmarks. It is important to identify surviving examples, establish the variety of monuments and ensure that appropriate curatorial decisions can be made concerning their preservation. This is particularly urgent in lowland areas such as the Nene Valley and Tame-Trent confluence, where quarrying and other pressures pose major challenges for the management of landscapes that in terms of their complexity rival the great Wessex monument complexes. Much remains to be done on establishing the chronology and components of monument complexes, locational preferences and intra-regional variability in monument associations. Spatial variability is particularly difficult to demonstrate, but is indicated, for example, by the tight focus of cursus-based complexes in the Middle Trent and Soar Valleys and a propensity in the Lincolnshire Wolds for long funerary enclosures to be associated with mounds of various shapes'.

18. Strategic Objective 3H Recover and analyse human remains

'Rare discoveries of human bone in Mesolithic contexts and more frequent discoveries on Neolithic to Middle Bronze Age sites highlight both their potential for analysis and the inadequacies of the current data set. Mesolithic material is especially sparse, and is best represented in the region by the discovery of a female femur associated with animal bone preserving evidence of butchery in the fill of a palaeochannel at Staythorpe in Nottinghamshire. This remarkable find was dated by radiocarbon to 5740-5620 cal BC (Beta-14401; 95% probability) and was shown by stable isotope analysis to derive from an individual heavily reliant on animal protein, with a surprising dearth of plant foods and no influence of coastal food resources. Neolithic and Bronze Age remains have been retrieved more frequently, particularly from funerary and watery contexts, but interpretation is seriously restricted by the limited scope of most analyses. It is recommended that more emphasis be placed upon appropriate sampling strategies and analyses, with the development of further ground-breaking programmes such as the isotopic analysis of Beaker skeletal remains that is currently being undertaken at the University of Sheffield, alongside detailed studies of burial contexts, dentition and skeletal remains. Radiocarbon dating of human remains should be conducted as a matter of routine, with appropriate application of Bayesian modelling (Objective 3A)'.

19. Strategic Objective 3I Investigate the development and intensification of agriculture

'Although traditionally seen as a period of agricultural innovation, evidence for a transition from a hunter-gatherer to an agricultural economy has proved stubbornly absent…To clarify further the development of farming communities, additional targeted sampling of palaeochannels,

peat bogs and other locations likely to preserve environmental remains of these periods is recommended. It is suggested that this be combined with studies of soil micromorphology and geochemistry, which may provide valuable information on the extension of cultivation and agricultural intensification. Special emphasis should be placed on the recovery of large assemblages of animal bone from excavations'.

20. Strategic Objective 3J Foster relevant artefact studies

'Considerable advances in artefact studies have been made in recent years, but further research would be particularly welcome on the dating of ceramic and lithic artefacts, the production and distribution of pottery, stone tools and metalwork, and residue analyses of pottery. Resources could usefully be focused upon radiocarbon dating of carbonised accretions on pottery and of stratified lithic assemblages associated with pots preserving accretions datable by radiocarbon or short-life carbonised material. Petrographic analyses of lithic artefacts and pottery have demonstrated complex exchange networks…Further scientific analyses are recommended to refine our understanding of the production and distribution of these materials…Particular attention should also be paid to analyses of the surface and absorbed organic residues preserved in pottery, as these may provide important insights into vessel functions, the materials processed in pottery vessels, and the wider economy. This potential is illustrated by analyses of Neolithic pottery from Willington in Derbyshire, where lipid analysis revealed traces of ruminant dairy and porcine fats'.

Late Bronze Age and Iron Age (c.1150calBC-AD43)

21. Strategic Objective 4B Refine first millennium BC ceramic chronology by additional radiocarbon dating and typological analyses

'There is also considerable scope for refining the regional ceramic typology and developing an East Midlands ceramic type series as guidance for ceramic specialists, excavators and other researchers. This should be accompanied by a systematic programme of radiocarbon dating, with particular emphasis upon the carbonised residues that occur commonly on the inner and outer faces of first millennium BC domestic pottery. It is recommended that major published assemblages, with well-ordered archives including details of vessels preserving carbonised residues appropriate for radiocarbon dating, should be targeted initially. It is proposed that dating programmes focus upon typologically diagnostic vessels such as Scored Ware and pottery embellished with curvilinear and rectilinear designs inspired by the La Tène ornamental style. In addition, sites with well-stratified ceramic assemblages should be accorded a high priority in future excavation programmes'.

22. Strategic Objective 4E Assess the evidence for the evolution of settlement hierarchies

It is recommended that the character of Late Bronze Age and Iron Age settlement be assessed to identify sites that on the basis of landscape situation, structural remains or finds may represent sites of higher socio-economic status, and to investigate sub-regional variability. Potential higher status settlements include the Late Iron Age 'nucleated settlements' of Lincolnshire, many of which have yielded large quantities of metalwork, coins, mint debris and high quality pottery…Cropmark studies, combined with analyses of surface scatters of

metalwork, coins and other artefacts recorded during fieldwalking and metal detecting may highlight high status settlement foci. This may guide further targeted investigation by detailed geophysical survey and excavation…'.

23. Strategic Objective 4F Investigate intra-regional variations in the development of fields and linear boundary systems

'Extensive Bronze Age field systems are known in some upland and lowland areas of the region, including…the Lincolnshire Fen Edge, but these are very unevenly distributed… Further information on the spatial extent of these boundary systems should be recovered from air photography, lidar and other remote sensing techniques, but only targeted excavation can hope to unravel the development of field systems and their relationship to other linear boundaries'.

24. Strategic Objective 4H Characterise placed deposits and sites of shrines or temples

'A wide range of ritual activities may be implied by discoveries of metalwork and other artefacts that appear to have been deliberately deposited in riverside and other watery locations…Further evidence for ritual activity may be provided by the discovery in pits and other occupation features of human and animal remains and artefacts such as pots or querns that appear to have been deliberately placed. Further work is required to characterise the variety of placed deposits, analyse their spatial and chronological distribution and review their relationship to settlements and other sites. The relatively common discoveries of metalwork in watery contexts contrast with the apparent paucity of deliberately placed human and animal remains and may suggest specific regional characteristics'.

25. Strategic Objective 4J Investigate the settlement and environmental resource of the Witham Valley

'*The Witham Valley is well-known as a focus of activity from Mesolithic and Neolithic times, but has yielded an especially impressive battery of evidence for the exploitation of this wetland zone during the Late Bronze Age and Iron Age periods An exceptional collection of riverine metalwork is rivalled in quantity only by finds from the Thames. The region has also yielded logboats later Bronze Age ritual and ceremonial sites such as Washingborough and, most remarkable of all, the Iron Age timber causeway with associated votive finds at Fiskerton. A valley-wide palaeo-environmental research design has been published by the Witham Valley Archaeology Research Committee and provides a valuable springboard for studies of landscape change during the first millennium BC and beyond. Other key themes include the development of later Bronze Age and Iron Age rural settlement, the changing agricultural economy, the role of the river as a focus for ritual activity, trade and transport and, in view particularly of the proximity of Roman Lincoln, the impact of the Roman Conquest upon the rural landscape'.*

26. The mouth of the River Witham lies at Boston and is mapped by Green in segments WM8 and WM9 (2022).

Romano-British (AD43-c.410)

27. Strategic Objective 5B Support the dissemination and synthesis of information on Roman finds

'Opportunities should be taken to encourage appropriate recording and typological and scientific analyses of pottery, metalwork, coinage, querns and other finds derived from fieldwalking and metal-detecting, including finds deposited in museums, and the wider dissemination of this information. This has particular potential for enhancing our understanding of regional exchange networks and wider social issues such as eating and drinking and the development of social identities'.

28. Strategic Objective 5C Promote the systematic application of scientific dating techniques to sites of the Roman period

'The chronology of the Roman period is fairly well established, although complicated for the non-specialist by inconsistencies in dating terminology and hindered by an over-reliance upon pottery, imprecise dating of much metalwork and a continuing reluctance to embrace scientific dating methods…Radiocarbon dating has particular potential for refining chronologies, especially through the application of Bayesian analysis, and despite calibration difficulties in the late Roman period, systematic programmes of dating should be encouraged. Resources should also be targeted upon dendrochronology, which has significant potential for dating the waterlogged wood recovered from deeply stratified urban contexts and rural sites with favourable conditions of preservation. These and other scientific techniques such as archaeomagnetic or rehydroxylation dating are especially relevant for the late Roman period, which, with the cessation of Roman coin supply from around AD402, loses an important dating tool and have particular potential for elucidating the tradition of late and post-Roman inhumations lacking associated grave-goods'.

29. Strategic Objective 5D Support the application of scientific analysis to human remains

'Despite the excavation of a number of moderately extensive Roman cemeteries in the region and of isolated burials on and around settlements, sometimes in boundary features, there has been little analysis of skeletal remains of this period…It is recommended, in view of the potential research value of such remains, that adequate provision for appropriate scientific analysis be included as a standard requirement in archaeological schemes of treatment relating to sites likely to yield evidence of Roman activity'.

30. Strategic Objective 5E Promote the integration of specialist studies of material relating to subsistence, diet and health

Excavations have generated a substantial body of data that may be applied to studies of intra-regional and temporal variations in subsistence and diet, and hence to assessment of the impact of Roman cultural traditions upon the dietary preferences of native communities. The full potential of this information may only be realised by ensuring adequate dialogue between specialists and by promoting the integration of disparate specialist data in site reports and regional syntheses…Scientific analyses with significant potential for the reconstruction of ancient diet and health, exemplified by residue analyses of ancient pottery and stable isotope analyses of human remains, need to be encouraged as routine practice. There is also considerable scope for enhancing the palaeo-environmental record – notably

by encouraging regular sieving for fish bones and by ensuring that bulk samples are large enough to yield sufficient floral and faunal data to permit meaningful analysis'.

31. Strategic Objective 5H Investigate the landscape context of rural settlements

'Fieldwalking, metal detecting, cropmark plotting, geophysical survey, lidar and targeted excavation all have important parts to play in mapping and interpreting these landscapes. Appropriate survey programmes, building upon and enhancing earlier investigations in areas such as the Lincolnshire Fens…In addition, appropriate environmental sampling strategies need to be encouraged to accumulate botanical and faunal data that will provide a secure foundation for studies of changing landscape context and site location strategies (5E)'.

Early Medieval (c.AD410-1066)

32. Strategic Objective 6B Assess the landscape settings of Anglo-Saxon burial sites

'Recent palaeochannel surveys of the Lincolnshire Fens…provide useful frameworks for analyses of the relationship of cemeteries to contemporary watercourses, and the collection and analysis of appropriate palaeo-environmental data from these and other wetland environments should be encouraged'.

33. Strategic Objective 6G Elucidate the development of the parochial system

The origin of this most basic building block of the medieval landscape remains poorly understood, yet there is significant potential for further multi-disciplinary enquiry into the landscape, archaeological, sculptural and documentary evidence for these units….This should be accompanied by further field investigations of landscape features associated with parish boundaries, which may identify relationships with datable archaeological features such as former Roman roads and prehistoric linear earthworks and highlight opportunities for targeted excavations to investigate stratigraphic relationships between features and retrieve material suitable for dating'.

High Medieval (1066-1485)

34. Strategic Objective 7D Investigate further the role of markets, fairs and ports and trading routes

'Coastal and inland ports and fairs performed broadly similar functions to markets and provided foci for communal economic and social activity on a regular basis. There is a need to focus inquiry on fairs and ports, which have generally been accorded little attention, and in particular upon such regionally important sites as…the inland port at Boston in Lincolnshire. There needs to be more targeting of deposits yielding environmental remains (particularly fish bones, which are especially poorly represented in the archaeological record). Excavations and landscape assessments could usefully be carried out alongside metal-detecting programmes, since port and fair sites in particular have traditionally served as foci for metal-detecting. In addition, further scientific analyses of pottery and other traded commodities such as building stone from quarries…may shed further important light upon trading networks in Britain and beyond and assist in the identification of exchange foci'.

35. Strategic Objective 7E Investigate the morphology of rural settlements

'The East Midlands preserves evidence of a complex landscape, including zones dominated by a hierarchy of nucleated villages, hamlets and farmsteads, mainly in Northamptonshire, Lincolnshire, eastern Derbyshire and southern and eastern parts of Leicestershire and Nottinghamshire. Away from these zones, landscapes are characterised by dispersed farmsteads and hamlets, notably…the coastal marshes and fenlands of Lincolnshire. This spatial complexity has yet to be fully characterised or explained, and priorities for further work include assessment of the date of establishment of nucleated settlement, the date of origin of the region's many planned villages, and the factors underlying observed variations in settlement morphology. Nucleated settlement appears to have developed, in some areas at least, no later than the ninth century, but the date of establishment of the more obviously planned villages remains unclear…They particularly merit further detailed investigation by techniques such as test-pitting in gardens and open spaces in village cores…'.

36. Strategic Objective 7F Investigate the development, structure and landholdings of manorial estate centres

Regional manorial centres, whether secular or lay, remain poorly investigated and merit further systematic study. The East Midlands preserves a rich resource of manorial sites, ranging in status from castles and granges to more modest establishments that, relative to neighbouring regions, are comparatively rarely moated. Moated sites have received the greatest attention from researchers, and where excavated may preserve elaborate structural remains…The silted ditches of moated enclosures may also preserve waterlogged artefactual and environmental remains with significant potential for the reconstruction of past environments. Non-moated sites have proved less attractive to archaeologists, with occasional exceptions…The landholdings associated with these establishments have seldom been examined by excavation, although earthworks often survive well and in many cases have been the subject of field survey. It is recommended that the results of survey should in selected instances be tested by excavation. It is hoped that this will confirm the identity of features and clarify the chronology of manorial development, which in some instances may have roots in the pre-Conquest period'.

37. Strategic Objective 7I Investigate the development of the open-field system and medieval woodland management

'The origins of the open-field system have long attracted discussion, and are nowhere better addressed than in the East Midlands. Large areas of the lowland zone were dominated in this period by unhedged open fields rotating between arable and pasture… Fieldwalking, targeted excavation, and earthwork, geophysical, air photographic and lidar surveys can elucidate the origins and development of field systems and their relationship to earlier systems of land allotment, and should be encouraged. There is also much potential for further investigations of woodland, including hunting parks, by documentary research, earthwork surveys and remote sensing. Studies have been undertaken of… Lincolnshire woodlands. Building upon these, further work should aim to integrate documentary and landscape evidence, with emphasis upon the evidence for former management and

exploitation, access and changing boundaries. There is also a need to compare and contrast the information on woodland management and exploitation in the Champion lands with that in less favoured upland areas. Woodlands offer particular opportunities for a wide range of local fieldwork…'.

38. Research Objective 7J Research the regional communications infrastructure

The medieval period is important for the study of communication routes, which may well have varied in importance from one time to another and intra-regionally. The physical infrastructure, comprising roads, rivers and related appurtenances such as bridges and wharfs, and associations of these with landscape features, are under-investigated. In addition, the evidence that pottery and other artefacts can provide for the use of inland and coastal waterways such as the Trent and Nene has also not been maximised… Landscape features, such as hollow-ways, fords and bypassed stretches of major and minor highways, also remain little researched, while roads are seldom accorded archaeological excavation'.

Post Medieval (1485-1750)

39. Strategic Objective 8E Identify agricultural improvements of the sixteenth to eighteenth centuries

Enclosure of the open fields, waste and commons took place increasingly from the sixteenth century, along with reclamation of the Lincolnshire Fens and other marshy areas and the development of water meadows, although physical evidence of these changes is not always clearly visible until the late eighteenth and early nineteenth centuries. Additional investigations are required to shed further light upon the development of early enclosures, water meadows, fenland drainage schemes and other landscape evidence of the agricultural improvements that characterised this period – and the extent of intra-regional variability. Environmental analyses of palaeobotanical and faunal assemblages should be encouraged as means of enhancing our knowledge of changes in crop and animal husbandry, including identification of the famously large sheep of the region that have so far eluded detection in archaeological excavations. A variety of other direct and indirect evidence for agricultural improvement may also be expected, and should be sought for'.

Modern (1750 to present)

40. Strategic Objective 9B Before the grid: examine the early development of utilities

'The industrialisation of town and country and advances in public health and quality of life were accelerated by the provision from the nineteenth century of piped water, gas, electricity and sewerage facilities... However, the massive scale of later provision has obliterated much early evidence, which it is suggested should be located and recorded to elucidate the earliest phases of development. Water was provided in the eighteenth century from wells, pumps, streams and ponds, sometimes via semi-culverted courses that may have served both people and animals, and piped water supplies and associated structures only developed from the mid-nineteenth century, together with sewerage facilities. Local gasworks, which provided power principally for domestic and street lighting, emerged in towns from the 1820s, often

close to the railway that brought the coal supplies. The major rivers of the East Midlands enabled large-scale production of electricity from the 1890s, augmented by electricity from gasworks; this provided power to urban areas, but many rural areas did not have electricity until the National Grid was established in 1947. It is recommended that surviving physical evidence for the earlier phases of utility provision be identified and recorded in order to clarify the early history of utilities and to permit assessment of variations between town and country and across the region'.