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HERITAGE

Hargreaves Land Limited
Planning Application 1 at Lincolnshire Lakes (North) Scunthorpe

Heritage Statement (incl. Desk Based Archaeological Assessment & Geophysical Survey)

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Scunthorpe
Heritage Statement

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1. INTRODUCTION

1.1 BWB Consulting Limited (BWB) was instructed by Hargreaves Land Limited to prepare a Heritage Statement including a Desk Based Archaeological Assessment and Geophysical Survey in respect of planning application 1 for a residential-led mixed us development ('the Proposed Development') at Lincolnshire Lakes, Scunthorpe ('the Site').

1.2 The purpose of the report is to assess the significance of any recorded heritage assets within a 1km study area of the Site boundary and assess the potential for archaeological remains to be present within the Site. The assessment also considers any potential impacts on heritage assets and the potential archaeological resource, in line with the requirements of National Planning Policy Framework (NPPF).[1]

Site Location and Topography

1.3 The Site boundary is irregular and is shown on Figure 1. The Site is located at the western edge of the town of Scunthorpe, centred approximately at NGR SE 86699 09528. It is situated at the eastern margin of the Trent Floodplain and west of the Scunthorpe Escarpment.

1.4 The Site is situated at a height of approximately 4.8m Above Ordnance Datum (AOD). The datum of the Site slopes to 3m in the north-west to 4.2m in the south-east.[2]

1.5 The Site comprises large agricultural fields, separated by deep, incised dykes. A small part of the Site to the west is overgrown with an area of hard standing and disturbed ground. Located centrally within the Site, on an east-west orientation , is a single-track lane called Brumby Common Lane. The Site is located either Side of Brumby Common Lane which runs east to west. Areas of development are located to the north, with areas allocated as borrows pits to the south (Appendix 5, Plate 1 to Plate 12).

1.6 To the north and east, the Site is bound by field boundaries, hedges and dykes, with some small areas of tree cover present. The southern boundary is bounded by agricultural land and Brumby Lane which bisect the Site. The M181/A1077(M) forms the western boundary of the Site.

[1] Ministry of Housing, Communities & Local Government, 2012 (as amended 2024), *National Planning Policy Framework*, Chapter 16, paragraph 194.
[2] Free Map Tools, *Elevation Finder*, https://www.freemaptools.com/elevation-finder.htm.

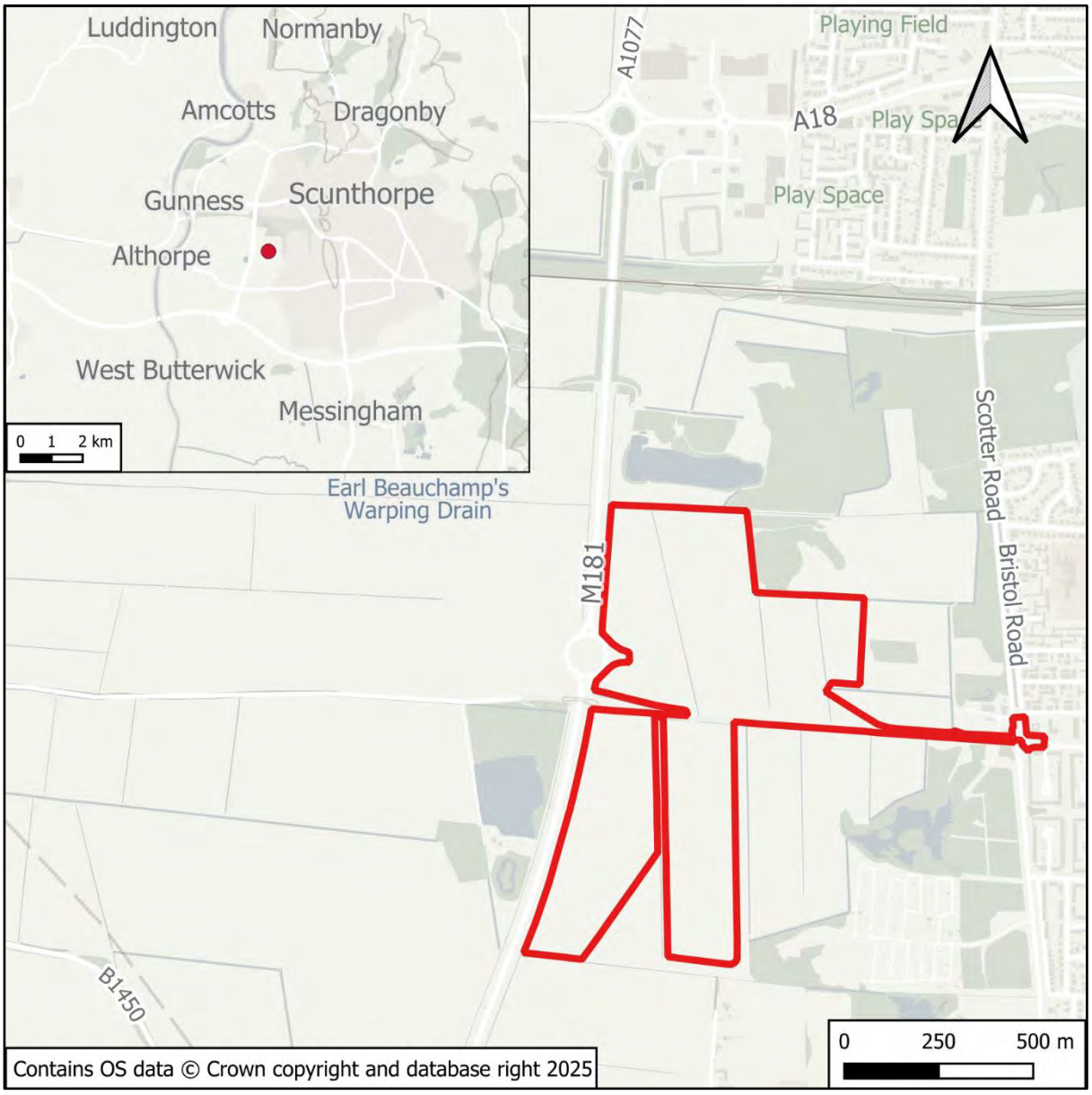

Figure 1: Site Location

Geology and Soils

1.7 The underlying geology of the Site as mapped by the British Geological Survey (BGS) is that of the Triassic Mercia Mudstone Group. Of the three open-access BGS boreholes located within the Site boundary, the bedrock is recorded between depths of 14.00 to 15.95m Below Ground Level (bgl) (-11.30 to -13.43m OD). The north-eastern margin of the Site at the foot of the Scunthorpe escarpment is mapped as Penarth Group mudstone. The superficial deposits of the area are likely to be complex comprising Warp, Alluvium, Peat and Sutton Sand Formation.

1.8 The soil is described as loamy and clayey soil of coastal flats with naturally high groundwater [3]

Proposed Development

1.9 The Proposed Development comprises a hybrid planning application as detailed below:

- Full planning application for the construction of a new vehicular access off the M181/A1077(M) roundabout, a pedestrian and cycle link to Scotter Road, a foul pumping station, earthworks and 'off-plot' drainage, ecological and associated landscaping and infrastructure works.
- Outline planning application, with all matters reserved, for the development of up to 550 residential dwellings (Use Class C3), a local centre (Use Class E) and associated 'on-plot' landscaping, drainage and other infrastructure works.

1.10 It is proposed that there is approximately a 400mm site wide strip within the red line boundary and an additional 1m dig within the BG4/AB3 and HA6/HA7. Where ground investigations mention subsoil, they will also encompass warp deposits.

[3] LandIS - Land Information System - Soilscapes soil types viewer [last accessed December 2024]

2. PLANNING BACKGROUND

National Planning Policy Framework (NPPF)[4]

2.1 Chapter 16 of the NPPF Paragraph 202 states, '*Heritage assets range from sites and buildings of local historic value to those of the highest significance, such as World Heritage Sites which are internationally recognised to be of Outstanding Universal Value. These assets are an irreplaceable resource and should be conserved in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of existing and future generations.*'

2.2 Chapter 16, paragraph 203 states that '*Plans should set out a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats. This strategy should take into account:*

a) the desirability of sustaining and enhancing the significance of heritage assets, and putting them to viable uses consistent with their conservation;

b) the wider social, cultural, economic and environmental benefits that conservation of the historic environment can bring;

c) the desirability of new development making a positive contribution to local character and distinctiveness; and

d) opportunities to draw on the contribution made by the historic environment to the character of a place.'

2.3 Paragraph 205 of the NPPF states that '*Local planning authorities should maintain or have access to a historic environment record. This should contain up-to-date evidence about the historic environment in their area and be used to:*

e) assess the significance of heritage assets and the contribution they make to their environment: and

f) predict the likelihood that currently unidentified heritage assets, particularly sites of historic and archaeological interest, will be discovered in the future'.

2.4 Paragraph 206 states that '*Local planning authorities should make information about the historic environment, gathered as part of policy-making or development management, publicly accessible'*.

2.5 Chapter 16, paragraph 207, of the NPPF states that '*In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage*

[4] *National Planning Policy Framework*, Chapter 16.

assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation'.

2.6 Paragraphs 208 states that '*Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal*'.

2.7 Paragraph 210 states that '*in determining applications, local planning authorities should take account of:*

a) the desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;

b) the positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and

c) the desirability of new development making a positive contribution to local character and distinctiveness'.

2.8 Paragraph 212 states that '*When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance'*.

2.9 Paragraph 213 states that '*any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:*

a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional;

b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional'*.

2.10 Paragraph 214 states that '*Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*

a) the nature of the heritage asset prevents all reasonable uses of the site; and

b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and

c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and

d) the harm or loss is outweighed by the benefit of bringing the site back into use'.

2.11 Paragraph 215 states that '*Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use'.*

2.12 Paragraph 216 states that '*the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset*'.

2.13 Paragraph 217 states that '*Local planning authorities should not permit the loss of the whole or part of a heritage asset without taking all reasonable steps to ensure the new development will proceed after the loss has occurred'.*

2.14 Paragraph 218 states that '*Local planning authorities should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted'.*

2.15 Paragraph 219 states that '*Local planning authorities should look for opportunities for new development within Conservation Areas and World Heritage Sites, and within the setting of heritage assets, to enhance or better reveal their significance. Proposals that preserve those elements of the setting that make a positive contribution to the asset (or which better reveal its significance) should be treated favourably'.*

2.16 Paragraph 220 states that '*not all elements of a Conservation Area or World Heritage Site will necessarily contribute to its significance. Loss of a building (or other element) which makes a positive contribution to the significance of the Conservation Area or World Heritage Site should be treated either as substantial harm under paragraph 207 or less than substantial harm under paragraph 208, as appropriate, taking into account the relative significance of the element affected and its contribution to the significance of the Conservation Area or World Heritage Site as a whole'.*

2.17 Paragraph 221 states that '*Local planning authorities should assess whether the benefits of a proposal for enabling development, which would otherwise conflict with planning policies but which would secure the future conservation of a heritage asset, outweigh the disbenefits of departing from those policies.*'

Local Policy

North Lincolnshire Local Development Framework[5]

2.18 The Site is located within the administrative area of North Lincolnshire Council (NLC). The current adopted Development Plan comprises the North Lincolnshire Local Development Framework, adopted in June 2011 and LL AAP (2016) and Saved Policies of Local Plan (2003). This sets out the overall vision and objectives for North Lincolnshire until 2026 and contains the following policy of relevance to heritage:

LC13 – Parks, Gardens and Landscapes of Special Historic Interest

'The character and features of parks and gardens of historic or landscape interest will be preserved and enhanced. Development within or adjacent to those listed in the Register of Parks and Gardens of Special Historic Interest, which is maintained by English Heritage, will not be permitted if this would adversely affect their special historic character and appearance or their setting.

Where development is permitted the use of conditions or planning obligations to ensure the protection and enhancement of special features will be sought.'

North Lincolnshire Local Plan[6]

2.19 The current North Lincolnshire Local plan was adopted in May 2003 and contains the following policy relevant to archaeology:

'14. 4 North Lincolnshire is rich in archaeological remains indicative of past settlement and land use, burial sites, and of farming and industrial activities. Archaeological sites are sometimes visible as upstanding remains or standing structures, but are often buried or invisible. Sites in North Lincolnshire date from all periods and represent many different site types. Finds of stone implements of prehistoric hunter gatherers and the first farmers are especially well known from the sandy warrens around Scunthorpe. Remains from the Iron Age and Romano-British periods are particularly prolific on the limestone edge and also occur along the chalk Wolds; well known settlements of this date are located at Dragonby and Kirmington. Roman Ermine Street runs through North Lincolnshire to the Humber and there are Roman small towns at Old Winteringham and Hibaldstow and a number of important villas.'

2.20 The following policy guidance also relates to archaeology:

HE9 - Archaeological Evaluation Where development proposals affect sites of known or suspected archaeological importance, an archaeological assessment to be submitted prior to the determination of a planning application will be required. Planning permission will not be granted without adequate assessment of the nature, extent and significance of the remains present and the degree to which the proposed development is likely to affect them. Sites of known archaeological importance will be protected. When development affecting such sites is acceptable in principle, mitigation of damage must be ensured and the preservation of the remains in situ is a preferred solution. When in

[5] North Lincolnshire Council, *North Lincolnshire Local Development Framework*.
[6] North Lincolnshire Council. Saved Policies of the North Lincolnshire Local Plan 2003 (Updated October 2024)

situ preservation is not justified, the developer will be required to make adequate provision for excavation and recording before and during development.

2.21 Paragraph 14.39 states; 'In accordance with PPG16, the planning authority will require sufficient information from applicants to assess the potential impact of their proposals on any archaeological remains and their settings. This will enable informed planning decisions to be taken. In some cases, an archaeological assessment will be required which may comprise a desk-based study, or fieldwork, including geophysical survey and limited trial trenching'.

2.22 Paragraph 14.41 states; 'Where development sites are shown to contain significant archaeological remains which would be adversely affected, the planning authority will need to be satisfied that adequate mitigation measures will be implemented. The preferred option for important archaeological remains is preservation in situ; this may be achieved by modification of proposals, where appropriate, for example changes in site layout or redesign of foundation construction'.

2.23 Paragraph 14.42 states; 'Where the preservation of the site in situ is not feasible, evidence will be required to demonstrate that the developer has made appropriate and satisfactory provision for the recording of the remains, in consultation with officers of the SMR who will advise the planning authority. Preservation by record can take place either in advance of or during development and may involve full excavation followed by post-excavation analysis and publication of results. Planning conditions or legal agreements will be used to secure this work'.

Lincolnshire Lakes Area Action Plan (adopted May 2016)[7]

2.24 In regard to archaeology, the Action Plan states, 'the Lincolnshire Lakes AAP area has the potential for well-preserved archaeology to be buried below the floodplain deposits and later warped soils which could be negatively impacted by construction works. Waterlogged remains and palaeo-environmental deposits may also be adversely affected by changes to the drainage and hydrology of the site'.

[7] North Lincolnshire Council, Lincolnshire Lakes Area Action Plan (adopted May 2016)

3. INFORMATION SOURCES

3.1 The following sources of information have been reviewed in order to meet the requirements of the assessment and are in line with guidelines laid down by the Chartered Institute for Archaeologists.[8]

- Historic England's National Heritage List for England (NHLE) Database was reviewed for relevant designated assets within the study area[9];
- Information on previous archaeological finds and investigations within the study area was obtained from a search of the North Lincolnshire Historic Environment Record (NLHER) on the 21st November 2024;
- A review of relevant and available online historic mapping was undertaken using the National Library of Scotland (NLS) Online Map Images.[10] Other internet sources, including the Historic England Aerial Photo Explorer,[11] Historic England Aerial Archaeology Mapping Explorer[12] and Google Earth Pro[13] were also reviewed; and
- A Geophysical Survey was undertaken by Magnitude Surveys in 2024[14]; and
- Input into the geoarchaeological baseline, significance and impact section of this assessment was provided Geoarchaeological Specialists from York Archaeology Trust (YAT) managed by Kristina Krawiec.

Walkover Survey

3.2 A site visit was conducted on the 18th November 2024. Photographs from the site visit are presented as plates in Appendix 5 (Plates 1 to 12) to support the assessment.

[8] Chartered Institute for Archaeologists, 2020, *Standard and Guidance for Historic Environment Desk-based Assessment*.
[9] Historic England, *The National Heritage List for England*, https://historicengland.org.uk/listing/the-list.
[10] National Library of Scotland Map Finder (last accessed November 2024).
[11] Historic England. Aerial Photo Explorer (last accessed November 2024).
[12] Historic England Aerial Archaeology Mapping Explorer (Last accessed November 2024).
[13] Google Earth Pro (last accessed November 2024).
[14] Magnitude Surveys, 2024, Geophysical Survey Report: Lincolnshire Lakes.

4. ASSESSMENT METHODOLOGY

4.1 An assessment of the importance of heritage assets within a 1km study area of the Site has been undertaken. Scheduled Monuments, Grade I and II* Listed Buildings, Registered Parks and Gardens, Registered Battlefields and World Heritage Sites are assessed to be of *high importance*.

4.2 The basis for assessing impacts on the historic environment is an understanding of the heritage assets that might be affected by a proposal. Planning policy and guidance emphasise the need to understand the cultural significance of heritage assets, including their setting, reflecting that the primary purpose is to preserve significance rather than no change. The process of gaining this understanding can be broken down into three distinct stages:

- Description: Research leading to a preliminary factual statement that establishes the location, nature and setting of the asset;
- Cultural significance: Analysis of what we value about the asset and the contribution made by its setting, leading to a statement of cultural significance. Cultural significance is not scaled but can be expressed in terms of four key 'heritage values' (see Table 4.1), as outlined in Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment[15]; and
- Importance: A conclusion regarding the level of protection or consideration that the asset merits in planning policy and cultural heritage legislation. A judgement on importance is scaled and can therefore be expressed in terms of the criteria set out within Table 4.2.

Table 4.1: Heritage Values

Value	Description
Evidential	The potential of a place to yield evidence about past human activity. Sites of evidential value will include those which have archaeological interest.
Historical	The ways in which past people, events and aspects of life can be connected through a place to the present. Heritage assets can either illustrate, or be associated with, past people and events
Aesthetic	The ways in which people draw sensory and intellectual stimulation from a place. Aesthetic value can arise from conscious design or fortuitously from the way the heritage asset has evolved.
Communal	The meanings of a place for the people who relate to it, or for whom it figures in their collective experience or memory

[15] English Heritage, 2008, *Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment*.

Table 4.2: Importance of Heritage Assets Criteria

Importance	Examples
Very High	World Heritage Sites; and Places of international importance due to their 'outstanding universal value'.
High	Scheduled Monuments; Grade I or II* Listed Buildings; Grade I or II* Registered Parks and Gardens; Battlefields; Places or structures of national importance; and Non-designated heritage assets of equivalent national importance or potential to contribute significantly to national research objectives.
Medium	Grade II Listed Buildings; Grade II Registered Parks and Gardens; Conservation Areas; and Non-designated assets of regional or high local importance with potential to contribute significantly to regional and local research objectives. This includes assets which have particular regional associations or may have important associations at a local level (e.g. they have significance to local population or embody something of the special identity of a locality).
Low	Locally Listed Buildings; and Non-designated assets which are relatively poorly preserved or have limited importance at a local level and low potential to add to local and regional research objectives.
Negligible	Assets that have very limited or no archaeological, historical or cultural importance.
Uncertain	Sites where there is evidence that a heritage asset may exist, but where there is insufficient information to determine its nature, extent and degree of survival given current knowledge.

4.3 Having understood cultural significance, the next step is to understand the proposed change(s) and the impact they would have on cultural significance. The process of evaluating the consequences of change can be usefully broken down into three distinct analytical stages:

- Change: A factual statement of how a proposal would change an asset or its setting including physical, visual appearance, scale, nature and duration;
- Impact: An assessment of the degree to which any changes would increase or decrease the cultural significance of an asset. Impact is scaled and the magnitude of impact is a reflection of the extent to which the cultural significance of an asset is changed by a proposal. A judgement of magnitude of impact can be made based criteria set out within Table 4.3; and
- Effect: A conclusion regarding whether an impact matters or not, reflecting the importance of the affected heritage asset. The effect is the measure that brings

together the magnitude of the impact and the heritage asset's importance. This a critical stage of the assessment process as this determines the weight that should be given to the matter in either influencing the design of the proposal or ultimately in the test as to whether the proposal will be acceptable and permitted. The effect can be articulated through the use of a matrix which brings together the importance of an asset and the magnitude of impact on the asset's significance (see Table 4.4). Where there are two options for a level of effect, it is a matter of professional judgement which should be articulated in the text description as to the level of effect appropriate.

Table 4.3: Magnitude of Impact

Impact	Criteria
Major Negative	Causes total destruction or change to most key elements of the asset that results in substantial loss of integrity and cultural significance. Comprehensive change to the setting of the asset which is a critical aspect of the asset's cultural significance. Any such change would not normally be reversible.
Moderate Negative	Causes change to, or loss of many key elements which results in a moderate loss of integrity and cultural significance of the asset. Moderate changes to the setting of the asset where this makes an important contribution to the cultural significance of the asset.
Minor Negative	Change to some elements which lead to a limited loss of integrity and cultural significance of the asset. Change to the setting of the asset where this makes a limited contribution to the cultural significance of the asset.
Negligible / No change	No appreciable change to the cultural significance of the asset or its setting.
Minor Positive	Change to some elements which leads to limited improvement in integrity and cultural significance of the asset, or arrests decline. Change to the setting of the asset where this makes a limited contribution to the cultural significance of the asset.
Moderate Positive	Causes change to many key elements which result in a moderate enhancement to integrity and cultural significance of the asset or reverses decline. Moderate changes to the setting of the asset where this makes an important contribution to the cultural significance of the asset.
Major Positive	Causes significant change to most key elements of the asset that results in substantial enhancement of cultural significance. Comprehensive change to the setting of the asset which is a critical aspect of the asset's cultural significance.

Table 4.4: Effect Matrix

Importance of Asset	Magnitude of Impact			
	Major	Moderate	Minor	Negligible / No Change
Very High	Very Large	Very Large/Large	Large/Moderate	Slight/Neutral
High	Very Large/Large	Large/Moderate	Moderate/Slight	Slight/Neutral
Medium	Large/Moderate	Moderate	Slight	Neutral
Low	Moderate/Slight	Slight	Slight/Neutral	Neutral

5. BASELINE ASSESSMENT

5.1 The following outlines the archaeological and historical background of the study area and is compiled from a review of the relevant HER data, as well as available secondary sources that can aid in interpreting the development of the Site and inform the archaeological potential.

5.2 The assessment considers in detail the archaeological baseline within a 1km study area. Tabulated gazetteers summarising pertinent information for individual assets are presented in Appendix 2 (Tables 1 and 2). Within Appendix 3, Figure 2 depicts the locations of non-designated heritage assets and Figure 3 depicts the location of previous archaeological events. Figures 4a to 4e have been provided by YAT to support the geoarchaeological baseline. Appendix 4 contains the historic maps used during the map regression (Figures 5 to 7). Appendix 5 contains photographs taken during the site visit presented as plates (Plate 1 to Plate 12).

5.3 Where heritage assets and events are mentioned in the text, the relevant NLHER or NHLE list entry number is given.

Designated Heritage Assets

5.4 The study area contains no World Heritage Sites, Scheduled Monuments, Conservation Areas, Registered Battlefields, Registered Parks and Gardens, or Listed Buildings.

Archaeological and Historical Background

5.5 Geoarchaeological remains, including peat deposit are presented in this text for completeness. The geoarchaeological baseline will be discussed in more detail under a separate sub-heading later in this section.

Prehistoric

5.6 The NLHER contains records of five Prehistoric assets within the study area. This includes scientifically dated peat deposits (MSL26765) north of Brumby Common Lane which lies outside of the Site boundary. These deposits were encountered in 2020 during a programme of archaeological evaluation and mitigation comprising seventeen trial trenches and seventy dug test pits in advance of construction of roundabout on the M181 west of Scunthorpe. The paleoenvironmental assessment and C14 results demonstrated that accumulation in a depression sampled by Trench 12, were Late Mesolithic. This accumulation continued until at least the Early Bronze Age. The plant and insect remains demonstrated poor preservation with indicators for waterside vegetation such as sedges and willow, with areas of heathland. The pollen assemblage provides information on the development of the vegetation at the site.

5.7 A possible Ring Ditch (MSL25906) was detected during a geophysical survey in 2015 by Allen Archaeology (ELS4180). It was interpreted as the remains of a potential Bronze Age round barrow and is located centrally within the Site boundary (Appendix 3, Figure 2). The survey in 2015 recorded a curvilinear response, in the former location of the Earl Beauchamp Warp Drain. This undermines the interpretation of the anomaly as a barrow.

The interpretation of the anomaly was prior to more detailed deposit modelling in the area (YAT 2024) and the latest geophysical survey[14] undertaken at the Site. The geophysical survey, which covered the whole Site unlike the strip geophysical survey conducted in 2015, clearly depicts a water management feature (the former Earl Beauchamp Warp Drain) in this location as well as secondary warping drains in the area. The previously interpreted anomaly interpreted as a barrow in 2015, is not present on the 2024 survey, despite the obvious presence of the former warp drain, indicating it was superficial anomaly and probably been removed by ploughing since that time.

5.8 Outside of the Site boundary, there are four records (MSL1914, MSL1915, MSL1957 and MSL7767) that relate to historic findspots including retouched flint scrapers (found in 1931), beaker sherds and unspecified flints. A Bronze Age arrowhead (MSL10340) was found 900m to the east of the Site in 1985.

Iron Age and Romano British

5.9 The NLHER records no assets dating to the Iron Age and Romano British periods within the study area.

Early Medieval and Medieval

5.10 The Church of the Reconciliation (MSL25990) is located 211m east of the Site and is a medieval church within a housing estate to the east of Bristol Road.

Post-medieval and 19th Century

5.11 There are three entries for Post-medieval ridge-and-furrow cultivation recorded in the study area (MSL24690, MSL27014 and MSL27019). The latter is located on the north-west boundary of the Site. The Scunthorpe and its Environs Air Photo and LiDAR Mapping Project recorded a block of possible ridge and furrow visible as cropmarks on historical air photos. These features cut across levelled warping remains, indicating they date to the late post-medieval period. There is no evidence on the surface of any relict cultivation furrow and these remains have been ploughed out, although relict furrows may be present within warp deposits.

5.12 There are 16 entries related to warping, most of which are warping drains with four of these located within the Site boundary (MSL25977, MSL27021, MSL24683 and MSL27026) (Appendix 2; Figure 2). The Historic England funded *Scunthorpe, and its Environs Air Photo and LiDAR Mapping Project* surveyed multiple areas, recording features from the 1886 Edition Ordnance Survey (OS) maps. Air photographs show broad, straight cropmarks representing a post-medieval warping drain complex. These drains improved land by bringing sediment-laden water from the River Trent. These maps show an embankment enclosing land north-west of Parklands. Historical air photos reveal sections of this embankment as disturbed earthworks and cropmarks along field edges. Aerial photography of the southern section of the site reveals a series of warping drains and drainage ditches that align with the historic mapping from the 1844 Tithe Map.

5.13 The 2024 geophysical survey[14] of the Site recorded multiple channels related to warping. In the north-west of the Site, it recorded the continuation of Earl Beauchamps Warping Drain (MLS24682) as it branches from outside the Site to the west and heads south-east

through the Site. The drain continues beyond Brumby Common Lane and continues to head south through the proposed borrow pit area to the southern Site boundary. Both MLS25977 and MLS24683 are also depicted within the survey data. The continuation of Earl Beauchamps Drain is clearly visible as crop mark on Google Earth imagery. The drain formed a warping compartment (c. 70ha) to the south of Brumby Common Lane, with a catchment area that includes the proposed borrow pit area. MLS25977 and MLS24683 are probably secondary and 'lesser ditches'[16].

5.14 The Scunthorpe Infectious Disease Hospital and the (Site of) Viaduct Planation (MSL22174) is located 117m north of the Site boundary. The hospital was built in 1905 with the purpose of treating diphtheria.

Modern

5.15 Sand Pit on Brumby Common (MSL27067) is located to the south-east of the Site boundary. This sand pit is visible as earthworks on historical air photos and LiDAR imagery, though it is mostly obscured by trees on conventional air photos. Further Sandpits (MSL26951, MSL26953 and MSL26954) were recorded 1km southeast if of the Site. Further Sandpits (MSL26951, MSL26953 and MSL26954) were recorded 1km south-east of the Site. The Woodlands Crematorium (MSL22624), located 500m north-east of the Site, was built in 1964 for the former Scunthorpe Borough Council.

Undated

5.16 The NLHER records 15 undated assets including six ditches and clay pits recorded by the *Historic England funded Scunthorpe and its Environs, Air Photo and LiDAR Mapping Project* (MSL27018, MSL27020, MSL27021, MSL27029, MSL27068, MSL27174 and MSL27174). Within the Site boundary, a ditch is recorded in the northern section of the Site within the areas of Brumby Common West (MSL27020). The 2024 Geophysical Survey recorded water management features in this location and this can now be interpreted as one of those features, probably a secondary or 'lesser' warping ditch.

5.17 Two undated linear features (MSL26107 and MSL26764) were recorded outside of the Site boundary. A former wood on Brumby Common West (MSL27018) was located 70m west of the Site. This wood, on a small area of wind-blown sand, had most of its trees removed by 1947. The land was later cultivated, and LiDAR imagery suggests it is now slightly lower than the surrounding ground, indicating possible sand removal.

5.18 Peat Deposits (MSL26766) are recorded 190m west of the Site. In 2020, a geoarchaeological evaluation west of Scunthorpe found undated peat deposits and relic river valleys from the Late Glacial to Early Holocene period. These valleys were later infilled and covered by up to 2 meters of silty sand to clay. Furthe peat deposits (MSL27291) are also recorded 291m to the west of the Site. A geoarchaeological test pit survey west of Scotter Road, found an undated peat unit within fine, well-sorted sands, likely from the wind-blown Sutton Sand Formation.

[16] Historic England, 2024, Scunthorpe and its Environs; Air Photo and lidar mapping and interpretation. Research Report Series 33/2024.

Cartographic Analysis

5.19 Cartographic depictions of the Site have been used to assess how the Site has developed since the 19th century. The Site boundary has been superimposed on historic maps for ease of interpretation. (Appendix 4, Figures 5 to 7).

5.20 The Site is depicted on the Parish of Frodingham's Tithe mapping from 1844 (Figure 5), which depicts a rural landscape. The Site is shown to be bisected by drainage ditches on a west-east orientation. By the 1886 Edition OS map (Figure 6), the area of the Site is depicted as subdivided by field boundaries. Many of these are still present within the Site. The Site is bisected by four warping drains (MSL25977, MSL27021, MSL24683 and MSL27026). The depiction includes earthworks associated with Earl Beauchamps Warping Drain. A footbridge is depicted to the north-west of the Site crossing this warp drain. By the 1950 Edition OS map (Figure 7), the Site is mostly unchanged, except for the depiction of more field boundaries. Earl Beauchamps Warping Drain is still visible as are some of the earthworks.

Aerial Photographs

5.21 The Historic England Aerial Photo Explorer contains a number of publicly accessible images depicting the Site (not reproduced).[17] A photograph from 1947[18] shows the Site and confirms its layout as depicted in the 1950 OS Edition (Figure 7). The warping drains are visible, as is the area of woodland within the north of the Site, and Brumby Grove.

5.22 Google Earth Pro contains a number of publicly accessible satellite images of the Site[19]. Imagery from 2003 to 2024 confirms the agricultural nature of the Site, with images showing the Site under plough. Otherwise, the Site remains unchanged in this period. Images from 2015 and 2019 in particular show the former warping drain, with Earl Beauchamps Warping Drain being very prominent. Other 'lesser' drains, including those present within the NLHER are also present.

Historic Landscape Characterisation

5.23 The Site lies within the 'CON3: The Axholme Fens' Historic Landscape Characterisation (HLC) area. It is described as:

'*The zone is made up of drained fen and marshland resulting in a flat arable landscape with broad views across long distances. These views are mostly unrelieved by vertical intrusions, as there is little woodland to be found in the zone. Field boundaries are predominantly formed by the hierarchy of drainage ditches, or by the long, straight roads that traverse the landscape.*

The wetland heritage of the zone is still very much in evidence. There are numerous long, straight drainage ditches, which feed into purpose-built drains, straightened rivers or canals, before flowing into the Trent. There are also many nature reserves in the zone, including a new area of wetland that has been created at Alkborough Flats.

[17] Historic England Aerial Photo Explorer (last accessed 28 March 2024).
[18] Historic England Aerial Photo Explorer, *RAF/CPE/UK/2042*.
[19] Google Earth Pro (last accessed 14/04/2023)

Although the historic wetland character of the zone has been largely swept away by drainage and other processes, the landscape of today is a direct descendent of it. In order to create the modern arable landscape, the historic fen was drained by means of a hierarchy of ditches, many of which remain in their original form. Despite the loss of boundaries in the twentieth century, enough remain that the landscape retains a strong rectilinear character. There are also extensive areas of surviving drainage landscape throughout the character zone that appear to be unchanged from the nineteenth century.'[20]

Previous Archaeological Investigations

5.24 The NLHER records 53 previous archaeological events within the study area, ten of which are located within or on the Site boundary. Events, ELS773, ELS808, ELS922, ELS2787 are aerial photographs of the Site and do not contribute any additional information. Events ELS2568, ELS2577-82 represent the centre of each 2km^2 survey grid from a LiDAR topographical survey (Appendix 2; Figure 3).

Investigations Within Site

5.25 Trial trenching and window sample borehole monitoring encountered fine sands containing peat deposits at varying depths (ELS4775). Peat was recorded within 30 of the 56 interventions, and were recorded within a trial pit, the peat was predominantly present as a single unit. In TP38, where two peat units were recorded the lower peat was moderately humified, relatively sandy peat with frequent woody fragments, and was recorded between 2.20m and 2.60m BGL (0.03m- - 0.37m OD). In BH12 the lower peat was moderately humified, though was distinctly more clay-rich than that from TP38 and contained frequent natural wood inclusions and twigs. It demonstrated a very graduated upper boundary with the overlying sand; likely reflecting gradual aeolian deposition encroaching onto the peat. This lower peat within BH12 was located between 2.88m and 3.00m BGL (- 0.15- -0.27m OD).

5.26 Event, ELS4182 identified a former river channel infilled with peat meandering through three borehole transects of the investigation, and was flanked by silty peats and alluvium, likely to represent natural alluviation as well as more recent warping. The channel was considered to have a high potential for retaining important palaeo-environmental indicators, as possible preserved organic archaeological structures and artefacts, such as log boats, jetties and pontoons.

5.27 The transects revealed a largely similar pattern, with mudstone bedrock overlain by older river sands and gravels and blown sand and river terrace deposits. These layers were sealed by 25 foot drift - glacial silts and clays. This assessment highlighted that the depth of deposits may greatly limit the effectiveness of standard archaeological techniques, such as geophysical survey and trial trenching.

5.28 During trial trenching archaeological features or finds were recorded in three of the seventeen trenches (ELS4601). Two gullies and two parallel plough scars were located in Trench 4, ceramic material was recorded in Trench 6 and a substantial linear feature was present in Trench 7. All features were 'sealed' by a soft, dark black-brown silty-sand topsoil with an average depth of 0.38m in the western field and 0.33m in the eastern

[20] Lord, J., MacIntoch, A., (2011), *The Historic Landscape of the County of Lincolnshire.*

field. This was covered by a firm, mid-orange sandy-clay subsoil / warp deposit with an average depth of 0.43m in the western field and 0.34m in the eastern field. The linear archaeological features identified are likely connected to modern agricultural activities or warping activities and the larger linear feature identified in Trench 7 could be related to the construction of the M181.

5.29 Monolith sampling, palaeo-environmental assessment and Radiocarbon dating (ELS4603), concluded that pollen microfossils in particular, were well-preserved and the data recorded provided a good understanding of the character of the landscape in this area of the site. The poor preservation of other proxies indicated less than favourable conditions to preserve more delicate macrofossils.

5.30 During excavation of fifteen trial holes and geotechnical pits (ELS4251), a sequence of deposits was uncovered that was broadly consistent over the Site. Due to the depth of the pits and the unstable nature of the soil, no access to the excavated pits was permitted. Modern topsoil, overlay thin layers of warping deposits and wind-blown sands of the Sutton Sand Formation. Trial Pits 9 and 10 exposed a linear feature running broadly north to south and was interpretated as a continuation of Earl Beauchamps Warping Drain. The 2024 Geophysical Survey[14] recorded the remains of this warping drain within its data. Possible buried soil horizons were exposed in Trial Pits 2 and 10, potentially reflecting episodes of greater stability within the repeatedly shifting blown sand layers.

5.31 During a second phase of archaeological trial trenching and augering in 2017 (ELS4334), seven trenches were excavated across the northern half of the Site following the excavation of six trenches to the south in 2016. A palaeo-environmental auger survey to determine the depth of peat accumulation at the Site was undertaken during the trenching by probing the centre of each of the evaluation trenches.

5.32 The 2017 evaluation (Trenches 1-7) produced similar results as the earlier the evaluation carried out in 2016 (Trenches 8-13). A relatively consistent depositional sequence was recorded. In general, the sequence of deposits from the earliest to latest consisted of sands lying below peat deposits of varying thickness, followed by a silty clay buried soil which was sealed by 19th century flood deposits associated with warping. The earlier sands at the bases of the trenches, at the lower levels recorded by auger and at the bases of the machine excavated sondages (some up to 2.2m below the existing ground level) appear to be associated with the river terrace to the east of the Trent, lying just beyond the reach of its floodplain. Above these sands, in Trenches 2-7, single bands of peat were recorded with variable depths ranging from 0.18m to 0.60m. The peat became thicker in Trenches 4 to 7 at the southern end of the site (depths of between 0.4m and 0.6m), whilst in Trenches 2 and 3 the peat was shallower (0.2m – 0.3m deep). The variable depth of the peat deposits indicates the quantity of vegetation that decomposed and accumulated as the peat formed.

5.33 Coring identified samples from three locations within the Site (ELS4335), to give an insight into the underlying topography and accumulation of material on-site. A detailed assessment of the sediment cores from Core Location 1 was carried out to determine the character of the deposits, approximate age range of the material and potential for palaeo-ecological analysis. The cores were analysed and assessed under the following categories; Pollen analysis; Microscopic charcoal; Macroplant; Diatoms; Ostracods and foraminifera; Insects; XRF Core Scanning; Magnetic Susceptibility; Particle Size Analysis.

Seven samples were selected for radiocarbon dating using wood, macroplants and humic acid fraction. The dating was undertaken by SUERC. The NLHER does not contain any further information on the dates.

5.34 The excavation of test pits (ELS4602) did not identify any archaeological features or finds, and a similar stratigraphically sequence was seen in all, characterised by layers of topsoil, warp / subsoil, peat and Aeolian sands. The environmental samples were mostly found to be sterile of carbonised plant remains with no identifiable material present indicating very little burning activity of archaeological interest was taking place in the vicinity of the deposits.

2024 Geophysical Survey

5.35 In 2024 Magnitude Surveys assessed the subsurface archaeological potential of the Site. The survey[14] did not identify any anomalies clearly suggestive of archaeological activity. The survey primarily identified anomalies related to the post-medieval water management of the site. These anomalies align with earthworks and drainage channels directly connected to the warping drain running to the north of the Site. This type of water management might have contributed to the varied magnetic background caused by the deposition of clays and silts. Further agricultural anomalies, relating to former field boundaries and drainage regimes were also identified, in addition to anomalies of an undetermined origins (Appendix 7).

Geo-Archaeological Background[21]

5.36 The most extensive deposit in the vicinity of the Site as mapped by the BGS is the Sutton Sand Formation, sometimes referred to as Blown Sand on earlier maps and adjacent (BGS map) sheets, as well as coversands in other publications. These deposits are principally mapped across the northern, eastern, and southern margins of the Site, representing accumulations of aeolian material against the Scunthorpe escarpment (Figures 4a-4e).

5.37 Deposits of the Sutton Sand Formation are concentrated in an area between York and Lincoln and were originally deposited towards the end of the last glaciation during the Last Devensian, although no precise chronology exists with regards to the retreat of the ice front within the Vale of York and wider Humberhead region (Bateman et al. 2015). However, organic sediments underlying the Sutton Sand Formation at Sutton on the Forest, some 60km north-west of the Site, have been dated to 12,879 +/- 168 cal yr BP indicating that the ice sheet front must have retreated to the north of this location by the Late Devensian (Bateman et al. 2015). Locally, west of Scunthorpe, borehole data have shown that the aeolian sands range from 1.50m to 9.00m in thickness and are likely to have been extensively reworked in the Holocene (McIlwaine and McDonnell, 2006), a conclusion supported by multiple Sites regionally (Baker et al., 2013; Bateman et al., 2000). Detailed investigations as part of the 'North Lincolnshire Coversands Research Project' (McIlwaine and McDonnell, 2006) at Willow Holt Quarry, Flixborough, indicate that the 'coversands' have been accumulating and reactivating since c.11,000 BP.

[21] York Archaeology (2024) Lincolnshire Lakes, Scunthorpe: DBA Contribution Assessment Report 2024/314

Such reprofiling of the sands has the potential to bury and seal former land surfaces, which may include multi-period archaeological remains including lithic scatters.

Previous Geo-Archaeological Investigations

5.38 The Sutton Sand Formation deposits are complicated by the presence of peat underlying, interbedded, and overlying the sand accumulations. This has been demonstrated to various degrees from previous investigations as part of recent archaeological / geoarchaeological work in adjacent areas, some of which overlap with the Site boundary (YA 2021, YA 2023).

5.39 The results of the radiocarbon age estimates from investigations undertaken by Archaeological Service West Yorkshire Archaeological Service (ASWYAS) and AOC Archaeological Group are provided in Table 6.1 using information replicated from the initial evaluation and post-excavation assessment reports (AOC 2017a; AOC 2017b; YA 2021).

5.40 Table 6.1 outlines radiocarbon age estimates from previous locations within the Site boundary. Those dates highlighted in dark grey are likely to be the result of intrusive elements and are therefore deemed unreliable. The single result from AOC Trench 7 in light grey may also be unreliable given that the radiocarbon age / calibrated date does not correspond with the sample elevations. Once these unreliable dates are excluded, the chronological model for the Site appears fairly simple at this stage, though it requires refining in order to test the reliability of the dating. Despite this, it appears apparent that organic accumulations and deposition in the wider area of the Site is consistent with a broad Mesolithic to Early Bronze Age date. Stratigraphically, it should be noted that all the peat deposits recorded in the AOC trenches and cores were sealed by warp. The depth of the samples retrieved are below 1m in depth bgl and increase to around 2m BGL, with a single sample recovered at 3m bgl.

Table 6.1: Summary of Geoarchaeological Interventions

Core / Trench	Sample	C14 Elevation (m OD)	C14 Sample Depth (m BGL)	Radiocarbon Age (BP)	Calibrated Date (95.4%)
AOC Trench 1	Peat (Humic Acid)	1.41	0.67	4676 ± 33	3624-3367 cal BC
ASWYAS Trench 12	Maloideae roundwood	0.97	1.06	3710±30	2201 to 2024 and; 1993 to 1983 cal BC
ASWYAS Trench 12	Peat (Humin Acid)	0.77	1.26-1.30	4040±30	2632 to 2469 and: 2663 to 2651 cal BC
AOC Core 1A2	Macroplant	0.76	1.64	268 ± 27	1521-1798 cal AD
AOC Trench 4	Peat (Humic Acid)	0.71	1.69	1434 ± 33	568-657 cal AD
AOC Core 1A2	Peat (Humic Acid)	0.50	1.90	5785 ± 25	4707-4555 cal BC
AOC Trench 7	Peat (Humic Acid)	0.56	1.60	7515 ± 33	6451-6261 cal BC
AOC Core 1A3	Peat (Humic Acid)	0.30	2.10	6723 ± 28	5707-5568 cal BC
ASWYAS Trench 12	Peat (Humin Acid)	0.27	1.76-1.80	8170±30	7194 to 7065 and; 7317 to 7266 and; 7261 to 7226 cal BC
ASWYAS Trench 12	Peat (Humic Acid)	0.27	1.76-1.80	6700±30	5670 to 5605 and; 5600 to 5556 and; 5708 to 5609 cal BC
AOC Core 1A4	Macroplant	-1.03	3.43	6951 ± 31	5902-5741 cal BC

5.41 Recent geoarchaeological monitoring and deposit modelling (YA, 2023a) identified peat buried and interbedded within the sands, particularly within the upper 2.00m of stratigraphy, although it could be occasionally encountered at deeper elevations. The peat was present throughout most of the Site, other than the central-northern portion. Deposit modelling carried out across the area has illustrated the variation in depth (m OD) for the peat, where in the south-west it was encountered at c.0.50m OD, whereas in the southern and eastern parts of the site it was as high as 2.00m to 2.50m OD.

5.42 These peats were interpreted as being formed in relatively small, discrete deposits rather than as a continuous, single unit of sediment due to their broad altitudinal variation as well as range of radiocarbon age determinations from previous excavations (Table 6.1). This was achieved through the archaeological monitoring of ground investigations, comprising test pits and boreholes (YA2023, Figure 2 to Figure 7) (Appendix 6).

5.43 Peat was also recorded within the broader area, on the left bank of the Trent (YA, 2022) where mid-Mesolithic reworked sands were overlain by Neolithic to Early Bronze Age peat at elevations between 0.28 to 0.67m OD.

5.44 The upper sequence of superficial deposits is further complicated by the presence of warp. Warp consists of fine clays and silts, representing a blanketing deposit which was formed within the Lower Trent Valley by deliberate tidal inundation of the low-lying landscape for two principal reasons: (1) to make unproductive peaty and acidic soils workable, and; (2) to reduce the impact of natural seasonal inundations and waterlogging by artificially raising the ground surface level (see Lille, 1997, 1998). This process was largely achieved by the deliberate 'flood-warping' of areas, with material (silts and clays) carried in tidal suspension being allowed to settle and accumulate throughout areas where warping was desirable.

5.45 The extent of warping is summarised by BGS mapping; 'most of the (Trent) floodplain south of Neap House (to the north-west of the Site) is occupied by flood-warp, which was allowed to run from the levee slopes east towards to the rising blown sand outcrops' (cf Gaunt 1976, 419, in Lille 1998b). Specifically, the land south of Crosby (the Great Common) to the north of the Site, underwent warping from 1808, with 243 ha of ings, common and moor warped until c. 1832 (Lille 1998, 110). A substantial warping drain is located within the north-eastern part of the Site, continuing to the north / north-west, as well as forming part of the Site's northern boundary (Earl Beauchamp's Warping Drain). Elsewhere within the Lower Trent Valley and Humberhead region, warping deposits have been demonstrated to seal former land surfaces, in addition to smoothing out any subsurface topographic variation (see Lillie, 1997, 1998).

5.46 Modelling of warp deposits recorded during previous geoarchaeological assessment (YA 2023) suggested that these deposits were broadly focused within the western portion of the Site in addition to a band in the north-western part of the Site which coincide with the locations of Lidar-mapped warping channels. To the south-west a number of channels intersect the area, including Earl Beauchamp's Drain. Three open-access BGS boreholes are located within the Site boundary (Figures 2 and 3; Tables 1, 2 and 3). Peat was encountered in one intervention at 1.4m to 2.5m BGL.

Deposit Modelling

5.47 Deposit modelling was utilised from the results of the previous geoarchaeological assessment which used the results of the monitoring, existing British Geological Survey records and other GI works undertaken at the Site (Allen Archaeology 2015; AOC 2017a; AOC 2017b; Trent and Peak 2021). The modelling followed procedures set out within the Historic England Guidance for Deposit Modelling and Archaeology (HE 2020). Surfaces were created to aid visualisation using ArcGIS incorporating available Lidar data as digital terrain models with multi-directional hill shading and/or local relief modelling used to aid interpretation.

5.48 Four transects were created within the impact areas, with transects A and B in the northern area, and C and D in the south. Sections were created along these transects to include the present day surface, the modelled peat and warp surfaces created during the earlier geoarchaeological assessment (YA 2023a), and the proposed impact depths within each area.

6. ASSESSMENT OF SIGNIFICANCE AND ARCHAEOLOGICAL POTENTIAL

Assessment of Significance and Archaeological Potential

6.1 Modelling of warp deposits recorded during previous geoarchaeological assessment (YA, 2023) indicates that topsoil removal north of Brumby Common Lane will not affect sub-surface warp or peat deposits. However, borrow pit activities will likely remove these deposits entirely. While the aim is to avoid peat removal, soil removal may still impact the upper surface of the peat. Peat deposits, spanning from the Mesolithic to the Iron Age, have shown potential for preserving waterlogged remains, though no significant archaeological finds have been recorded within the extensive interventions so far. Warp deposits, while not archaeologically significant themselves, may conceal underlying archaeological features, though none have been found at the Site despite extensive excavations (Allen Archaeology, 2015; AOC, 2017a; AOC, 2017b; Trent and Peak, 2021; YA, 2023a; YA, 2023b, YA, 2024).

6.2 Geoarchaeological remains hold evidential value and have Low to Medium importance depending on the preservation of palaeo-environmental information that can inform regional research objectives. The extensive research that has been done so far, including evaluation trenching within the Site as well as geoarchaeological investigation including test pit and the archaeological monitoring of ground investigation work indicates this preservation can be variable and that the recovery of artefacts has been very limited.

6.3 The potential for remains related to warping in the later Post-medieval period is High. Warping drains have been mapped in the Site through geophysics, cropmark analyses and historical maps. These include Earl Beauchamps Warping Drain and 'lesser' drains. Remains of warping sluices may also be present. The warping process is well understood, therefore any contribution made by the evidential value of features related warping within the Site will be limited. The features have Low importance.

7. IMPACT ASSESSMENT

Impacts on Recorded Heritage Assets

7.1 The Proposed Development has the potential to impact the sub-surface remains associated with Earl Beauchamps Warping Drain which is a subsurface feature within the north and south of the Site. The ridge-and-furrow recoded in the north-west of the Site on the NLHER (MLS27019) has been 'ploughed out' and is no longer present and is not depicted in the 2024 geophysical survey data[14]. Asset MLS27020 also probably relates to a water management feature. It correlates closely with a geophysical anomaly in the 2024 survey.

7.2 In the borrow pit area, there are two other warping drains (MLS25977 and MLS24683) will also be impacted by the excavation of borrow pits. There are also banks and ditches alongside Brumby Common Lane (MLS27021). In addition to these assets on the NLHER, there are also other lesser drains and post-medieval water management features not on the NLHER but are depicted as anomalies in the geophysical survey data. An undetermined anomaly in the north-east corner of the eastern borrow pit is also depicted. It is likely this is associated with sluice or other water management feature. A square anomaly is present in the western borrow at the 'head' of a warping channel.

7.3 The geoarchaeological data reveals no additional anomalies of archaeological interest. While the history and processes of warping in the region hold evidential value, the warp deposits themselves lack archaeological significance or research potential.

7.4 The impacts on these remains, through the excavation of the borrow pit would be Major Negative. These assets have Low importance. The significance of effect would be Slight.

7.5 There is potential for a Major Negative impact on remains associated with Earl Beauchamps Warping Drain and other 'lesser' drains and water management features (MLS27020) depending on the depth of the features. The assets have Low importance and a Major Negative magnitude of impact would result in Slight significance of effect. If remains are below the formation level of development there is potential for preservation in-situ which would reduce or remove the impacts entirely. The impacts would be on evidential value. The section of Earl Beauchamps Warping Drain to the west outside the Site would be unaffected by the Proposed Development.

7.6 The NLHER has an entry that relates to a possible barrow (MLS25906). This is based on a geophysical anomaly from a survey in 2015. The latest survey in 2024 has shown the anomaly was in the location of Earl Beauchamps Warping Drain and it was not present on the latest survey, indicating it was not of antiquity and has been ploughed out.

Geoarchaeological Remains

Impact Depths from Deposit Modelling

7.7 Utilising the peat and warp surface models, which were developed during the earlier geoarchaeological assessment for the Site (YA 2023a), the proposed impacts have been assessed relative to these surfaces. The proposed impacts can be separated into

two broad forms. The first is a general topsoil strip which will be up to c.0.43m bgl (Figure 4a) and the second will be a further subsoil strip of up to c.1.00m bgl within an area to the south of Brumby Common Lane for borrow pits (Figure 4b). This will result in a total maximum excavated depth within this second area of around 1.50m bgl.

Topsoil Removal

7.8 Modelling of the maximum 0.43m bgl topsoil removal impact depth has been undertaken across Transects A and B (Figure 4a) within the northern area alongside the peat surface model developed from the earlier geoarchaeological assessment (YA 2023a). It should be noted that the modelling technique does not allow for a 'null value' where the deposit is not present, therefore although the peat surface is modelled as a continuous deposit, there are points between which it is has been confirmed to be absent and this has been illustrated on the transects. The model demonstrates that the impact depth of topsoil removal will not reach the elevation where peat may be encountered (~2.00-0.50m OD). The maximum depth of topsoil removal will likewise not reach the upper surface of the warp deposits which were modelled to be at around 0.80-1.40m OD (Figure 4c).

Borrow Pits

7.9 Within the subsoil removal area in the south of the Site, the impact of c. 1m will be in addition to around 0.43m of topsoil removal, resulting in a maximum impact depth of up to c.1.50m bgl. In contrast to the northern part of the Site, this proposed work will impact the upper surface of the peat throughout the majority of the southern area (red line in Figure 2).

7.10 The borrow pits will also heavily truncate the warp deposits which were modelled along Transects C and D (Figure 4b). This truncation is assessed to be c.0.6m bgl throughout both transects. Given that the warp at the Site was recorded during the earlier geoarchaeological assessment (YA 2023a) as being around 0.4m thick, it will likely be truncated in its entirety.

Geoarchaeological Summary

7.11 The deposit modelling has determined that the topsoil removal within the area to the north of Brumby Common Lane will not impact sub-surface deposits of warp or peat and will be at a higher elevation than the upper surfaces of these deposits. The borrow pit impacts will truncate both the peat and warp; with the latter likely being removed in its entirety.

7.12 The stated aim for the borrow pit works is to explicitly remove topsoil and subsoil, and not remove peat. However, as the model demonstrates the maximum depth of soil removal in the borrow pit area will encounter whilst removing these soils the upper surface of the peat. Although the truncation will aim to be halted at the top of the warp, the waterlogged surface will be exposed and may still be impacted.

7.13 It is unclear whether warp deposits are included within the definition of subsoil. If so, then they will be removed in their entirety. If they are not then they will not be truncated, however will likely have their upper surface affected by subsoil removal.

7.14 The buried peat deposits have been demonstrated to be a discontinuous spread of deposits which were formed throughout a broad span of time from the Mesolithic to the Iron Age (Section 2.2.3; YA 2023a). These deposits represent the potential for preserving waterlogged archaeological remains, as well as being a record of past environmental change. However, despite extensive work within the area no archaeological remains have ever been recorded within these peat deposits (AOC 2017a; YA 2022; 2023a; 2024). Where archaeological remains may be present, they would be of low density and sparsely distributed. Palaeo-environmental remains have been recovered throughout the site, in the form of relatively poorly preserved waterlogged wood fragments. To the north of the site at Gallagher Retail Park these waterlogged wood remains have been demonstrated to be highly sensitive to changes in the sub-surface hydrological regime caused by developments; however, they are not of apparent archaeological origin (YA 2024).

7.15 The warp deposits themselves are not of archaeological or geoarchaeological significance; however, they have the potential to overlie deposits of archaeological potential, making them relatively invisible to traditional techniques of archaeological prospection (e.g. fieldwalking, air photography, test pitting). However, no such deposits have been encountered at the Site despite numerous previous archaeological excavations (Allen Archaeology, 2015; AOC, 2017a; AOC, 2017b; Trent and Peak, 2021; YA, 2023a; YA, 2023b).

Recommendations

7.16 The depth of warp means that 'standard' trial trenching in places will not reach the archaeological horizon and will remain within post-medieval warping deposits, which have no archaeological value in themselves. Trial trenches beyond 1m in depth cannot be accessed without stepping or battering the excavation. The geophysical survey[14] shows that cut features, such as enclosures and field systems, are not present. If present, trial trenching, would be the correct archaeological method for evaluating these features.

7.17 As the archaeological potential and importance of the deposits is generally limited to geoarchaeological and paleo-environmental remains an appropriate strategy should be agreed with the Archaeological Advisor to NLC which may include trenching, further test pitting and window sampling followed by specialist analyses where required.

7.18 The archaeological potential and significance have been determined through archaeological works already undertaken in the Site and in the surrounding area therefore the strategy can be implemented as mitigation rather than further evaluation. This can be achieved through an appropriately worded pre-commencement archaeological condition.

8. CONCLUSION

8.1 The assessment has considered the available and relevant information sources with an aim of determining the presence of archaeological remains within the Site and, where possible, to determine and assess any potential impacts on their significance. To inform the baseline, the assessment has considered relevant NLHER entries within a 1km study area, as well as other secondary sources. The assessment has also been informed by a site visit.

8.2 There will be no impact on the setting or significance of any designated heritage assets.

8.3 This assessment has benefitted from specialist input from geoarchaeologists and has concluded that topsoil removal north of Brumby Common Lane will not affect sub-surface warp or peat deposits. The excavation of borrow pits will probably remove these deposits entirely. Peat deposits, spanning from the Mesolithic to the Iron Age, have shown potential for preserving waterlogged remains, though no significant archaeological finds have been recorded within the extensive interventions so far. Warp deposits, while not archaeologically significant themselves, may conceal underlying archaeological features, though none have been found at the Site despite extensive excavations. The extensive research that has been done so far, including evaluation trenching within the Site as well as geoarchaeological investigation including test pit and the archaeological monitoring of ground investigation work indicates this preservation can be variable and that the recovery of artefacts has been very limited.

8.4 The deposit modelling has determined that the topsoil removal within the area to the north of Brumby Common Lane will not impact sub-surface deposits of warp or peat and will be at a higher elevation than the upper surfaces of these deposits. The borrow pit impacts will truncate both the peat and warp; with the latter likely being removed in its entirety. The buried peat deposits have been demonstrated to be a discontinuous spread of deposits which were formed throughout a broad span of time from the Mesolithic to the Iron Age. These deposits have the potential for preserving waterlogged archaeological remains, as well as being a record of past environmental change. Despite extensive work within the area, no archaeological remains have ever been recorded within these peat deposits.

8.5 The potential for remains related to warping in the later Post-medieval period is High. Warping drains have been mapped in the Site through geophysics, cropmark analyses and historical maps. These include Earl Beauchamps Warping Drain and 'lesser' drains MLS25977, MLS27021, MLS24683). Remains of warping sluices may also be present. The warping process is well understood, therefore any contribution made by the evidential value of features related warping within the Site will be limited. The features have Low importance. The warp deposits themselves have no archaeological significance or research potential. The impact on these remains through the excavation of the borrow pits would be Major Negative. The significance of effect would be Slight.

8.6 There is potential for a Major Negative impact on remains associated with Earl Beauchamps Warping Drain and other 'lesser' drains and water management features (MLS27020) depending on the depth of the features. The assets have Low importance and a Major Negative magnitude of impact would result in Slight significance of effect. If remains are below the formation level of development there is potential for

preservation in-situ which would reduce or remove the impacts entirely. The impacts would be on evidential value.

8.7 The NLHER has an entry that relates to a possible barrow (MLS25906) based on a geophysical anomaly from a survey in 2015. The Geophysical Survey in 2024[14] has shown the anomaly was in the location of Earl Beauchamps Warping Drain and it was not present on the latest survey, indicating it was not of antiquity and has been ploughed out.

8.8 The depth of warp deposits means standard trial trenching may not reach the archaeological horizon and will remain within post-medieval deposits, which lack archaeological value. Geophysical surveys indicate no cut features like enclosures or field systems. If such features were present, trial trenching would be appropriate. Given the limited archaeological potential, a strategy involving trenching, test pitting, and window sampling, followed by specialist analyses, should be agreed with the Archaeological Advisor. The archaeological potential and significance have been assessed through previous works, allowing the strategy to serve as mitigation rather than further evaluation, implemented via a pre-commencement archaeological condition.

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APPENDICES

APPENDIX 1: Masterplan

Rev	Description	Date	Drn	Chd
P1	FIRST ISSUE	05.02.25	TD	CG

Status
PLANNING

SMR
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Project
LINCOLNSHIRE LAKES

Client
Hargreaves Land

Drawing Title
LINCOLNSHIRE LAKES PA#1 - ILLUSTRATIVE MASTERPLAN

Proj Ref	Origin	Zone	Level	Type	Role	Num	Status	Rev
7730	SMR	00	ZZ	DR	A	2030	S3	P1

SMR Job Ref	Sheet	Scale	Drawn
7730-00-2030	A0	1 : 1500	TD

APPENDIX 2: Gazetteer of Heritage Assets and Archaeological Events

APPENDIX 2

Catalogue entries for heritage assets and archaeological events recorded on the North Lincolnshire Historic Environment Record (HER), and those identified as part of this assessment, are provided below. Each entry includes a National Grid Reference (NGR) and the relevant List Entry or HER reference numbers.

Table 1: Gazetteer of Non-designated Assets

REF (HER)	NAME	GRID REF	DESCRIPTION
1914	Flint Implements, Quibell Park Sports Ground, Brumby	SE 8750 1040	Flint point, scrapers, flakes (some retouched); SM, BM AG. Site developed as sports ground.
1915	Flint Scraper, West Of Scotter Road, Brumby	SE 8714 1020	Flint scraper.
1957	Flints, Beaker Sherds, Brumby	SE 8745 0960	Flint flakes, scrapers, Beaker sherds with cord-impressed trellis patterns and diagonal "maggots" on raised bands, and a possible Beaker sherd with internal bevel and bead rim. Finds came from a "sand patch" since covered with tarmac, 1968.
4041	Ashby Decoy, Scunthorpe Golf Course	SE 8656 0807	Ashby duck decoy was listed by Payne-Gallwey in his 1886 book on the subject. It includes a plan showing a 4-pipe decoy and a decoyman's hut. At that time, 95,836 birds had been caught over the previous 35 years. Constructed in 1833 and worked until at least 1918, Ashby Decoy was the last duck decoy pond to go out of use in Lincolnshire. Its importance is heightened by the survival of full records of the decoy's first 36 years of working life. It is described in Payne Gallwey's 1886 "Book of Duck Decoys" and again in a 1900 article by Audas in the Trans. Hull Science and Field Naturalists Club which includes three photographs of the decoy pipes. The decoy pond is now in an area of woodland being managed as a nature reserve in the middle of (the) Golf Club. The pond has been recently dredged with considerable quantities of sand spread in a wide area around the pond raising the ground surface by up to a metre. The positions of the four pipes can still be located, although some parts of these appear to have been infilled. The original shape of the pond may also have been altered by the dredging operation.
7767	Flints, Brumby Common	SE 8600 0999	Unspecified flints were found on Brumby Common (Burringham parish) at some time before 1931.
8828	Former Barnsley To Barnetby Railway	SE 8938 1135	The Trent, Ancholme and Grimsby Railway line received the Queen's assent in July 1861, although the line was already under construction. It continued from the South Yorkshire Railway at Keadby, which had opened in September 1859. It ran through Frodingham

REF (HER)	NAME	GRID REF	DESCRIPTION
			to Wrawby Junction near Barnetby and included railway stations at Appleby and Elsham. The line also included two branches to Gunness and Gunness Wharf on the Trent. The line later became part of the Manchester, Sheffield and Lincolnshire Railway, which in turn was renamed the Great Central Railway. As part of the G.C.R., it was known as the Barnsley to Barnetby line.
10340	Bronze Age Arrowhead, Brumby	SE 8819 0929	A complete Early Bronze Age barbed and tanged arrowhead was donated to Scunthorpe Museum in 1985.
10812	Warping Drain	SE 8592 1022	The east-west cropmarks were visible on 'Bird's Eye' oblique aerial photographs, taken 2010. They were slightly sinuous, possibly natural channels. They were crossed by two straight north-south ditches or field boundaries, c. 140m apart.
20574	Parallel Linear Ditches, S Of Railway Line	SE 8588 1062	Two parallel linear ditches are visible as cropmarks on an aerial photograph taken in 1989. The northern ditch is visible for approximately 60 metres, running in a NE-SW direction immediately south of the railway line. A parallel ditch runs about 8m to its south for a shorter distance, perhaps 30 metres.
21097	Warping Drain, North Grange Farm	SE 8480 0808	A broad, double ditched linear cropmark, visible on an aerial photograph to the south west of North Grange Farm. A probable 19th century warping drain.
22174	Scunthorpe Infectious Disease Hospital (Site Of), Viaduct Plantation, Brumby	SE 8713 1019	Site of an infectious disease hospital built in 1905 on the west side of Brumby. The Scunthorpe Infectious Diseases Hospital has a cubicle block of eight beds available for the treatment of diphtheria and serves an urban and rural population of approximately 60,000. During the past six years the incidence of diphtheria in the area has been low, but there have been a few outbreaks of a localized character occurring in different parts, with comparatively high mortality.
22491	Warping Drain	SE 8573 0907	A warping drain and a possible warping compartment, visible on aerial photographs.
22492	Warping Drains, east of Burringham	SE 8580 0886	Warping drains, visible as cropmarks to the east of Burringham. Likely associated warping channels encountered during trial trench evaluations in 2016-17 and 2023-24.
22624	Woodlands Crematorium	SE 8778 1020	Woodlands Crematorium was built in 1964 for the former Scunthorpe Borough Council. It was designed by Eirikur Walton, assisted by Claire Tomlinson and supervised by F J Bowyer. One of only a few crematoria to be mentioned in Pevsner's 'Buildings of England'. The building has a distinctive bowed chapel roof and sweeping porte-cochere. It is built of brick, with some green, rough slate cladding and wooden planking. The building incorporates a stained-glass window designed by William

REF (HER)	NAME	GRID REF	DESCRIPTION
			Mitchell. Woodlands Crematorium won the Natural Death Centre award for best crematorium in 2000.
24681	Warping Drains (Site Of), Warp Farm	SE 8632 0793	Soilmarks of a large 19th century warping drain, visible on aerial photographs in the Warp Farm area, extending towards what is now Scunthorpe Golf Course.
24682	Earl Beauchamp's Warping Drain	SE 8522 1011	The remnants of a large 19th century warping drain, partly extant on Ordnance Survey mapping. Triple-ditched sections are visible as soilmarks on aerial photographs, Brumby Common West area.
24683	Probable Warping Drains (Site Of), Brumby Common	SE 8664 0929	Soilmarks of a straight channel, extending WSW-ENE across Brumby Common. The channel was perpendicular to Earl Beauchamp's Warping drain, so was probably part of the 19th century warping drain network.
24690	Medieval Ridge & Furrow, Manor Park	SE 8793 0853	Earthworks of a medieval ridge and furrow field system, visible on air photographs taken in April 1984. The main area was centred to SE88030856, although the south-eastern part had been destroyed by recent disturbance. The furrows were orientated NE-SW, parallel to Burringham Road.
24693	Warping Drains (Site Of)	SE 8645 1086	A series of broad, straight cropmarks, visible on air photographs taken in June 1976. They represented a post-medieval warping drain complex. These drains were used for land improvement by bringing in sediment-laden water from the River Trent.
24709	Palaeochannel	SE 8613 1013	A curvilinear channel, visible on air photographs and Lidar data. The channel described above appears to be part of a system of post medieval warping drains. These drains are visible as cropmarks and shallow earthworks on air photos and LiDAR imagery.
24739	Brumby Grove Farmstead	SE 8722 0950	Brumby Grove was not shown on the 1871 Brumby Commons Enclosure map but had been built by 1887. The northern range of what was a courtyard farm was extant in 2014, although derelict. It was described as a substantial farm building, showing evidence for structural alterations and additions.
25438	North Grange Farm (Burringham North Grange), Burringham	SE 8516 0837	North Grange Farm (Burringham North Grange), Burringham. Partially extant 19th century unlisted farmstead. Regular courtyard of E plan. The farmhouse is detached from the main working complex. There has been significant loss (greater than 50%) of traditional buildings. Isolated location. Large modern sheds are located to the side of the site.

REF (HER)	NAME	GRID REF	DESCRIPTION
25516	Manor Cottage (Warren House), Ashby Parkland	SE 8651 0857	Manor Cottage (Warren House), Ashby Parkland. Partially extant 19th century unlisted farmstead. Regular courtyard of U plan. The farmhouse is attached to a range of working buildings. There has been a partial loss (less than 50%) of traditional buildings. Isolated location.
25517	Warp Farm, Ashby Parkland	SE 8617 0832	Warp Farm, Ashby Parkland. Partially extant 19th century unlisted farmstead. Parallel. The farmhouse is detached from the main working complex. There has been a partial loss (less than 50%) of traditional buildings. Isolated location. Large modern sheds are located to the side of the site.
25518	Site Of Ashby Decoy Farm, Ashby Parkland	SE 8580 0833	Site of Ashby Decoy Farm, Ashby Parkland. Demolished 19th century unlisted farmstead. Loose courtyard with L-plan range plus detached buildings to the third side of the yard. The farmhouse is attached to a range of working buildings. Isolated location.
25905	Frodingham Causeway (Site Of)	SE 8654 1012	'Froddingham Causeway' printed and shown as parallel pecked lines on the Ordnance Survey 2" surveyors plan of 1822, and the 1" published map of 1824.
25906	Ring Ditch, Brumby Common West	SE 8646 0957	A ring ditch was detected during a geophysical survey on Brumby Common West, 2014-15. It was interpreted as the remains of a potential Bronze Age round barrow.
25977	Warping Drain	SE 8627 0922	A slightly sinuous channel revealed by high resolution Lidar survey. Interpreted as a former warping drain.
25990	Church Of The Reconciliation, West Common Lane	SE 8750 0949	The Anglican church of The Reconciliation, West Common Lane.
26076	Scientifically Dated Peat Deposits, East Of M181, 'Lake 1', Lincolnshire Lakes	SE 8609 0885	Shallow peat lenses and organic clays were identified in test pits and boreholes during geotechnical investigation at Lincolnshire Lakes in 2015 & 2016, and during archaeological trenching, augering and coring in 2016 and 2017.
26106	Warping Drains, North Of B1450, Burringham Road	SE 8602 0854	Two warping drains were identified during trial trench excavations associated with a proposed lake in 2016. The channels were uncovered in trench 11 towards the southern end of the proposed lake, approximately 190m north of the Burringham Road overbridge, 160m east of the M181 motorway.
26107	Undated Linear Feature, North Of B1450, Burringham Road	SE 8602 0854	An undated linear feature was identified during trial trench excavations associated with a proposed lake in 2016. The ditch was recorded in trench 11 towards the southern

REF (HER)	NAME	GRID REF	DESCRIPTION
			end of the proposed lake, approximately 190m north of the Burringham Road overbridge, 160m east of the M181 motorway.
26764	Linear Features, North Of Brumby Common Lane, West Of M181	SE 8612 0968	Linear features of probable modern agricultural or warping activities encountered during an evaluation in 2020. The more substantial feature adjacent to the M181 may represent the Frodingham Causeway.
26765	Scientifically Dated Peat Deposits North Of Brumby Common Lane	SE 8633 0960	In 2020, peat deposits were encountered during a programme of archaeological evaluation and mitigation comprising the excavation of seventeen trial trenches and seventy hand dug test pits in advance of the construction of a new roundabout on the M181 west of Scunthorpe known as the 'Northern Junction'. The paleoenvironmental assessment and C14 results demonstrated that accumulation in the depression sampled by Trench 12, began in the Late Mesolithic. This continued until at least the Early Bronze Age. The plant and insect remains demonstrated poor preservation with indicators for waterside vegetation such as sedges and willow, with areas of heathland. The pollen assemblage provides more nuance to the development of the vegetation at the site.
26766	Peat Deposits, North Of Burringham Road	SE 8602 0963	Undated peat deposits were recorded during a geoarchaeological evaluation in 2020 in connection with proposed development west of Scunthorpe. The evaluation consisted of seven boreholes drilled to a maximum of 4m bgl and the extraction and retention of the cored samples. The boreholes were aligned in a roughly west to east transect. The borehole evaluation revealed the low-lying surface of the presumed Sutton Sand (below 1.5m OD) that forms a single meandering or three separate Late Glacial to Early Holocene relic river valleys. The valleys were then infilled, signalling more stable periods of vegetated wetland development within the wider more active fluvial regime. The organic deposits are overlain by up to 2m of silty sand to clay representing natural overbank deposition or human induced floodplain accretion (Warp).
26951	Sandpits Around North Farm	SE 8758 0816	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A swathe of shallow sand pits are visible as earthworks on historical air photos. These working probably started in the early 20th century and they were still being worked in the middle of the century. Some of the pits have been filled in and relandscaped but some are incorporated as water bodies in recent housing developments.

REF (HER)	NAME	GRID REF	DESCRIPTION
26953	Former Sand Pit In Manor Park	SE 8783 0868	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A large sand pit is visible as earthworks on air photos taken in 1947, it appears to be working at that time. This ground was later levelled and relandscaped and it is now part of Manor Park.
26954	Sand Pit East Of Westcliffe Primary School	SE 8801 0885	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A small post medieval sand pit is visible as and earthwork on historical air photos and on LiDAR imagery. It is depicted and labelled 'Sand Pit' on the OS map of 1886 and it is cut into the scarp slope west of Westcliff Primary School.
26973	Ridge And Furrow Between West Common Lane And Priory Lane	SE 8831 0929	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. Blocks of medieval and/or post medieval ridge and furrow are visible as earthworks on historical air photos. The LiDAR imagery shows that these earthworks have now been built over.
26990	Possible Warping Drain From Station Road To Near Frodingham Grange	SE 8563 1076	The OS map of 1886 shows a broad water channel between Station Road to a point to the south of Frodingham Grange, some earthworks that may be associated with this feature are visible on the air photos and LiDAR imagery. This is likely to be a post medieval warping drain (land improvement drain).
26991	Healey's Drain, A Warping Drain Between Poplars And Ashby Decoy Farm	SE 8428 0848	A warping drain is depicted and labelled as such on the Burringham Tithe map of 1841, it is visible in various forms on historical and recent air photos and on LiDAR imagery.
27009	Warping Drain At Frodingham Grange	SE 8667 1097	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A post medieval warping drain (land improvement drain) is visible as earthworks and cropmarks on historical air photos. This ditch and bank run north to south close to Frodingam Grange. They are depicted on the OS map of 1886; sections of the ditch are shown holding water, perhaps deliberately dammed to form ponds. This map and the air photos indicate that the ditch was fed by the warping drain that led to Ironstone Wharfe (MLS26990). The LiDAR imagery shows that this area has now been developed and these features have been levelled and filled in.
27014	Ridge And Furrow 400m South Of Gunness Junction	SE 8564 1026	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A block of post medieval ridge and

REF (HER)	NAME	GRID REF	DESCRIPTION
			furrow is visible as cropmarks on historical air photos. This ridge and furrow flanks a warping drain and is on land identified as warp on the 1976 British Geological Survey map 1:10 560 scale map. From this it can be inferred that this ridge and furrow is of late post medieval origin.
27015	Ditch And Bank South Of Frodingham Viaduct	SE 8666 1044	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A short section of narrow ditch flanked by a bank is visible as earthworks on LiDAR imagery. This feature cuts east to west across a low spread of windblown sand and lies on the eastern edge of the flood plain. The British Geological Survey map of DATE ETC, does record warp deposits just 160m of this feature but it is not certain that this ditch and bank are associated with the warping process. They are how likely to be of post medieval date.
27018	Former Wood On Brumby Common West	SE 8607 0973	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. The location of a former wood is visible as a shallow earthwork on historical air photos and on LiDAR imagery. This wood stood on a small area of wind blown sand that stood slightly higher than the surrounding warp deposits. Most of the trees had been removed by 1947 but the ground had not yet been ploughed. It was later taken into cultivation but the LiDAR imagery suggests it is now slightly low than the surrounding ground so sand may have been removed from the site.
27019	Ridge And Furrow On Brumby Common	SE 8621 0993	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A block of possible ridge and furrow is visible as cropmarks on historical air photos. These remains appear to cut across the levelled remains of substantial warping features. As such these ploughing remains must be of late post medieval date.
27020	Ditches On Brumby Common West	SE 8651 0986	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. Short ditches are visible as cropmarks on various air photos. These remains are located to the east of the southward arm of Earl Beauchamp's Warping Drain (MLS24682). The British Geological Survey does record warp this side of the drain so it is possible that these ditches are associated with this process, they likely helped spread the silt ladened water across the warping compartment.

REF (HER)	NAME	GRID REF	DESCRIPTION
27021	Banks And Ditch Alongside Brumby Common Lane	SE 8569 0961	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. Banks and ditches are visible as cropmarks and mutilated earthworks along the northern edge of Brumby Common Lane. These features are visible between SE8489 0958 to the point where the lane intersections the southward arm of Earl Beauchamp's Warping Drain (MLS24682) at 8644 0951. Another narrow bank runs north to south between Earl Beauchamp's Warping Drain and the lane. This survives as earthwork. These earthworks are depicted on the OS map of 1886, and with another section of embankment to the west, they enclose a large rectilinear are. These banks may mark the edges of a warping compartment.
27026	Warping Compartment Embankment North-West Of Parkland	SE 8652 0922	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. The OS maps of 1886 shows that an area of land to the north-west of Parklands was enclosed by an embankment. Some sections of this embankment are visible as disturbed earthworks and cropmarks along the field edges on the historical air photos. The sections running across the sands were better preserved at that time but have mostly now been built over.
27029	Ditch West Of Ashby Decoy	SE 8660 0809	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A narrow straight ditch of likely post medieval date is visible as a cropmark on historical air photos. This ditch runs north to south and appears to cut across a substantial warping drain, which suggests it is more recent than the drain. A slight kink in this ditch mirrors a simple kink in the extant boundary that runs along the western edge of the Ashby Decoy Golf Club.
27067	Sand Pit On Brumby Common	SE 8701 0919	The following feature was recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A mid-20th century sand pit is visible as earthworks on historical air photos and on LiDAR imagery. This feature is located on Brumby Common and obscured by trees on most conventional air photos.
27068	Clay Pits In Brumby Wood	SE 8796 1014	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. A series of post medieval clay pits are visible as earthworks on LiDAR imagery. These features are located in the strip of Brumby Wood that survives on the scarp slope at the edge of the river floodplain. These features are depicted on the OS map of 1886 and most are labelled 'Old Clay Pit'.

REF (HER)	NAME	GRID REF	DESCRIPTION
27174	Short Ditches North Of Brumby Grove	SE 8715 1000	The following features were recorded by the Historic England funded Scunthorpe and its Environs Air Photo and LiDAR Mapping Project. Two short and narrow ditches are visible as earthworks on historical air photos. They were oriented north to south and cut the windblown sands that drift against the edge of the flood plain. The function of these ditches is not known but they are likely to be of post medieval date. The LiDAR imagery indicates that these ditches have now been filled in.
27291	Peat Deposits, Land At Scotter Road	SE 8695 1016	An undated peat unit found within fine, well-sorted sands (likely the wind-blown Sutton Sand Formation) by excavated geoarchaeological test pit survey on land west of Scotter Road, Scunthorpe.

Table 2: Gazetteer of Archaeological Events

REF (HER)	NAME	GRID REF	DESCRIPTION
ELS1736	Geophysical Survey, North Lindsey College, 2002	SE 8813 0992	Fluxgate gradiometer survey undertaken in advance of proposed development in area of potential prehistoric/Romano-British occupation, revealed no anomalies consistent with an archaeological origin.
ELS2568	LIDAR survey flights, 2001	SE 8699 1100	Lidar topographical surveys, carried out by the Environment Agency in multiple sorties in North Lincolnshire in 2001. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2577	LIDAR survey flights, 2000	SE 8699 1100	Lidar topographical surveys, carried out by the Environment Agency in multiple sorties in North Lincolnshire in 2000. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2578	LIDAR survey flights, 2002	SE 8500 0900	Lidar topographical surveys, carried out by the Environment Agency in multiple sorties in North Lincolnshire in 2002. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2579	LIDAR survey flights, 2003	SE 8500 0900	Lidar topographical surveys, carried out by the Environment Agency in multiple sorties in North Lincolnshire in 2003. NB the point data for this event represents the centre of each 2km x 2km survey grid.

REF (HER)	NAME	GRID REF	DESCRIPTION
ELS2580	LIDAR survey flights, 2004	SE 8500 0900	Lidar topographical surveys, carried out by the Environment Agency in two sorties in North Lincolnshire in 2004. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2581	LIDAR survey flights, 2005	SE 8699 1100	Lidar topographical surveys, carried out by the Environment Agency in multiple sorties within North Lincolnshire in 2005. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2582	LIDAR survey flights, 2006	SE 8500 0900	Lidar topographical surveys, carried out by the Environment Agency in several sorties in North Lincolnshire in 2006. NB the point data for this event represents the centre of each 2km x 2km survey grid.
ELS2787	Aerial photographic sorties during 1977	SE 8719 0880	Aerial photography carried out by Mike Felcey during 1977. Precise dates not known, only the processing dates of the resulting colour slides.
ELS3452	MPP evaluation visit, Ashby Decoy	SE 8658 0804	Visit by Eric Instone of English Heritage, in order to evaluate Ashby Decoy for the Monuments Protection Plan. Recent dredging and alteration were noted; no further scheduling action was recommended.
ELS3593	Westcliffe primary school, Dryden Road, Scunthorpe	SE 8788 0883	Fluxgate gradiometer survey using a Bartington Grad-601 Dual Fluxgate Gradiometer in a zigzag traverse with readings taken every 0.25m along 1m wide traverses.
ELS3745	Brumby Common Quarry, Resource Assessment, Lincolnshire Aggregates Landscape Project, 2006	SE 8676 0992	An archaeological assessment carried out on active aggregate quarries as part of the Lincolnshire Aggregates Landscape Project. It was not intended to undertake a fully detailed desk-based assessment and impact assessment for each quarry site. The assessments represent a summary characterisation of the archaeological resource in order to distil the potential to contribute to the project's Research Agenda and are not designed to be used as definitive descriptions of the archaeological potential of each quarry site.
ELS3771	Site visit to Ashby Decoy	SE 8659 0805	Site visit in connection with a current HLS application. Alison Williams, Andrew Taylor, Mike Hemblade, Alice Beasley (Bradford University placement). A complete circumference of the decoy pond was walked in good weather and clear light. There were no leaves on the trees, and passage through bracken and bramble undergrowth was possible. Sandy earth upcast was visible at several locations from the restoration of the

REF (HER)	NAME	GRID REF	DESCRIPTION
			pond c. 1998. SW pipe location - semicircular projection from the main pond - no coherent remains of the pipe were visible. SE pipe - good preservation, a deep curving ditch, with the fragmentary remains of iron hoops. NE pipe - semicircular projection, no coherent remains. NW pipe - relatively well preserved, some ironwork visible. 25 digital images taken (see library link). A booklet on the history of the course was seen in the clubhouse, containing a good, illustrated summary of the working life of the decoy. It included photographs taken at the time of restoration, showing that major earthmoving took place within the main part of the pond.
ELS4015	Trent Valley alluvium depth and character modelling	SE 8522 0957	Alluvium depths were investigated from borehole data held by the British Geological Survey and mineral operators.
ELS4074	Archaeological desk-based assessment, Land off Burringham Road Scunthorpe	SE 8713 0832	The report concluded that the site lies within an area of fairly low archaeological activity with Iron Age and Roman settlement located on the raised ridge to the east. The area of the site is likely to have been used as fields associated with the settlement, which due to the low-lying level may have been prone to seasonal flooding. Archaeological remains that may be anticipated on the site are likely to be limited to ditched field boundaries designed to control livestock.
ELS4097	Archaeological Evaluation at Burringham Road	SE 8713 0834	Archaeological Research Services Ltd was commissioned to undertake an archaeological evaluation at land off Burringham Road, Scunthorpe, prior to proposed residential development. Four trenches were excavated. Each trench was originally intended to measure 50m in length by 2m in width, however due to the nature of the site Trenches 1, 2 and 3 had to be altered from their intended positions slightly in order to avoid large tree stumps or areas of waterlogged ground. In addition, Trench 3 had to be shortened by 21m in length and ultimately measured 29m in length, in order to avoid an area of waterlogged and boggy ground. Trench 4 was able to be excavated to its full length and in its original intended position. Trenches 1, 3 and 4 revealed no finds or features of archaeological significance. One shallow pit was observed in Trench 2 along with an east/west aligned linear feature, thought to be an obsolete field boundary, which contained pottery dating to the 19th?20th centuries.

REF (HER)	NAME	GRID REF	DESCRIPTION
ELS4107	Aerial photographic assessment & transcription	SE 8612 0813	Assessment and transcription of b/w vertical aerial photographs in the Development Management collection, primarily from CUAC and Meridian Airmaps surveys. These images can be georeferenced to an accuracy of c.10 pixels without preliminary rectification. Cropmark/soilmark features then transcribed directly to Cropmarks. TAB and copied to Cmsketchplots.
ELS4112	Aerial photographic survey	SE 8600 0859	Meridian Airmaps Survey, commissioned or purchased by Humberside County Council. High quality black & white vertical photographs.
ELS4125	Aerial photographic survey	SE 8710 1069	High quality air photo survey, carried out by Hunting Surveys Ltd. The black & white prints indicate a height of 6,000 ft.
ELS4135	Desk Assessment - Lincolnshire Lakes, Scunthorpe	SE 8558 0995	The report identified the potential for this area to contain significant archaeological and palaeoenvironmental deposits from Neolithic to modern times. Two heritage assets additional to HER data were identified.
ELS4174	Fieldwalking and Metal Detecting, Lincolnshire Lakes Project	SE 8520 0969	Fieldwalking and metal detecting survey of an area approximately 100 hectares was carried out by Allen Archaeology Ltd subcontracted to AC Archaeology Ltd, on behalf of the Lucent Group. This supported a planning application for a large new community development to the west of Scunthorpe. The collection sample comprised a minimum of 20% of the areas available for survey, and this was achieved by means of a series of 2m wide collection traverses at 10m spacing. A closer interval collection policy (40% coverage) was reserved for dense concentrations of finds but this was not required during survey. A total of only 88 finds of post-medieval to modern date were collected. The effects of warping appear to have extended across these fields sealing former ground surfaces beneath substantial alluvial silt layers and windblown sand deposits. The underlying deposits may contain earlier remains but ploughing does not appear to have disturbed them, hence they were not detectable by surface fieldwalking.
ELS4180	Geophysical survey by Magnetometry, Lincolnshire Lakes	SE 8596 0985	A possible prehistoric round barrow was identified just to the east of Earl Beauchamps Warping Drain. Numerous other linear features were recorded across the site representing boundaries and warping drains shown on historic mapping of the area of the 19th and 20th centuries, as

REF (HER)	NAME	GRID REF	DESCRIPTION
			well as a small number of modern services and areas of geological variation.
ELS4182	Geoarchaeological and Palaeoenvironmental assessment, Lincolnshire Lakes	SE 8644 0904	The known boreholes were collated into three broadly east-west transects across the site. The transects revealed a largely similar pattern, with mudstone bedrock overlain by older river sands and gravels and blown sand and river terrace deposits. These layers were sealed by 25 foot drift - glacial silts and clays. A former river channel, infilled with peat, was identified meandering through all three transects, and was flanked by silty peats and alluvium, likely to represent natural alluviation as well as more recent warping. The channel was considered to have a high potential for retaining important palaeoenvironmental indicators, as possible preserved organic archaeological structures and artefacts, such as log boats, jetties and pontoons. This assessment highlighted that the depth of deposits may greatly limit the effectiveness of standard archaeological techniques, such as geophysical survey and trial trenching.
ELS4201	Geophysical Survey, Scunthorpe United FC Stadium Project	SE 8582 1024	The geophysical survey recorded a number of anomalies related to field boundaries and warping drains shown on 19th and 20th century historic mapping. Much of the survey area was also characterised by geological variation or waterlogging. A few linear positive anomalies across the two fields that may not relate to former field boundaries or palaeochannels, may represent former ditches, tracks or pits that pre-date historic mapping. There are a number of amorphous positive anomalies that may represent pits, ponds or soil-filled hollows.
ELS4203	Heritage Assessment - Lincolnshire Lakes, Scunthorpe, N Lincolnshire	SE 8543 0849	The report concluded that there was moderate potential for finds from the prehistoric period buried at some depth below existing ground levels associated with peat deposits that have been identified beneath alluvium. The potential for archaeological remains was considered to be low for the Roman to medieval periods, when the development area would probably have been too wet to sustain any human occupation. This area of the Trent floodplain was warped from the early 19th century to improve agricultural productivity. The report stated that there had been no archaeological investigation of the site and there was insufficient information to

REF (HER)	NAME	GRID REF	DESCRIPTION
			adequately assess the impact of the proposed development on potential remains.
ELS4210	Stage 1 Palaeoenvironmental Survey, proposed Scunthorpe United Football Ground	SE 8599 0968	This survey recorded glacial sands sealed by a thin palaeosol (former ground surface). This was sealed in the deeper boreholes by a peat horizon which became thicker to the west, representing the accretion of peats across the lower areas of the former ground surface as sea levels rose during prehistory. The peat was mostly sealed with laminated silts and sands likely to represent the documented process of warping. Windblown sands at the northeast and southeast of the site may represent the ancient land surface but these are likely to have been severely truncated by modern ploughing and sand extraction. A possible stream channel running towards the Trent may have separated these two area of higher ground. The survey identified the potential for the survival of prehistoric ground surfaces buried at depth across the site, as well as peats of some palaeoenvironmental potential, which may have been forming from the Neolithic period until sealed by warping deposits in the 19th century. Settlement activity of prehistoric and later date may be encountered on the higher ground along the eastern margins of the site, where peats did not accumulate, but this is likely to have been truncated to the southeast by recent sand extraction.
ELS4251	Archaeological watching brief: geotechnical pits, Brumby Common Lane	SE 8623 0950	15 trial holes were monitored on the site of a proposed lake, part of the wider Lincolnshire Lakes Project. Each trial pit was excavated using a wheeled JCB 3CX excavator, fitted with a toothless ditching bucket. Due to the depth of the pits and the unstable nature of the soil, no access to the excavated pits was permitted. The sequence of deposits was broadly consistent over the site. Modern topsoil, overlay thin layers of warping deposits and wind-blown sands of the Sutton Sand Formation. Trial Pits 9 and 10 exposed a linear feature running broadly north – south, and likely to represent the continuation of Earl Beauchamps Warping Drain, a 19th century feature associated with the warping of the land. Possible buried soil horizons were exposed in Trial Pits 2 and 10, potentially reflecting episodes of greater stability within the repeatedly shifting blown sand layers.

REF (HER)	NAME	GRID REF	DESCRIPTION
ELS4277	Geo-Environmental Investigations, Lincolnshire Lakes Area V2 and Lake 1	SE 8644 0836	Geo-environmental site investigation to provide outline information for the design of a large residential and amenity development including the excavation of 'Lake 1'. The results from a series of test pits and boreholes revealed the presence of peat deposits in TP4, TP6, TP7, TP8, TP9 at depths between 1.0 - 2.0m, and in BH3, BH5, BH6, BH7 up to 4.0m; mainly thin lenses 0.10-0.20m thick but in BH6 0.50m and TP8 they were 0.70m thick. NB these observations conflict with archaeological monitoring of the same ground investigations by AAL, who recorded no peat.
ELS4333	Trial Trenching and augering, Lake 1, Lincolnshire Lakes, 2016	SE 8604 0878	Six trenches measuring 50m x 2m were excavated within the southern half of a proposed lake. Deep sondages 5m long were dug in each trench and auger cores were extracted from the base of the trenches. Interleaved peat and sand deposits of varying thickness were recorded below a buried soil and upper warp deposits in all six trenches. Monolith samples were extracted from the exposed peaty deposits.
ELS4334	Trial Trenching and augering, Lake 1, Lincolnshire Lakes, 2017	SE 8610 0897	A second phase of archaeological trial trenching was undertaken to complete the evaluation of a proposed lake. Seven trenches were excavated across the northern half of the site following the excavation of six trenches to the south in 2016. A palaeoenvironmental auger survey to determine the depth of peat accumulation at the site was undertaken during the trenching, probing the centre of each of the evaluation trenches. The 2017 (Trenches 1-7) evaluation produced similar results as the earlier part of the evaluation carried out in 2016 (Trenches 8-13). A relatively consistent depositional sequence was recorded across the central and northern part of the proposed development site. In general the sequence of deposits from the earliest to latest consisted of sands lying below peat deposits of varying thickness, followed by a silty clay buried soil which was sealed by 19th century flood deposits associated with warping. The most recent deposits were topsoil and subsoil. The earlier sands at the bases of the trenches, at the lower levels recorded by auger and at the bases of the machine excavated sondages (some up to 2.2m below the existing ground level), appear to be associated with the river terrace to the east of the Trent, lying just beyond the reach of its floodplain. Above these sands, in Trenches 2-7, single bands of peat were recorded with variable depths

REF (HER)	NAME	GRID REF	DESCRIPTION
			ranging from 0.18m to 0.60m. The peat became thicker in Trenches 4 to 7 (contexts 405, 504, 603 and 703) at the southern end of the site (depths of between 0.4m and 0.6m), whilst in Trenches 2 and 3 (contexts 204 and 306) the peat was shallower (0.2m – 0.3m deep). The variable depth of the peat deposits indicates the quantity of vegetation that decomposed and accumulated as the peat formed. The greater depths of peat in the vicinity of Trenches 4-7 lie towards the central part of the proposed Lake L1.
ELS4335	Coring, Lake 1, Lincolnshire Lakes, 2017	SE 8623 0940	Three coring locations were identified on site, within the Lake L1 area, based on the previous assessment and review of SI information. These coring locations are concentrated adjacent to Trench 1, Trench 8 and Trench 10 in the northern half and centre of the site. Three cores were extracted using a Premier 110 tracked drilling rig in 1m plastic core liners within a metal barrel. The cores were suitably wrapped before being transported to AOC premises for environmentally controlled storage prior to recording, sub-sampling and assessment. Due to sampling requirements, two sediment columns were extracted from each coring location. The first set of samples was extracted in standard translucent liners and wrapped in clear plastic lining to allow on-site assessment and recording. A second set of samples were extracted and immediately wrapped in black opaque liners to provide material suitable for Optically Stimulated Luminescence (OSL) dating, should this dating option be deemed necessary. Four x 1m cores were extracted from core locations 1 and 3, and three x 1m cores from location 2. A detailed assessment of the sediment cores from core location 1 was carried out to determine the character of the deposits, approximate age range of the material and potential for palaeoecological analysis. Once in the laboratory the cores were extracted from their perspex casing and transferred into plastic guttering to allow easy access for recording and subsampling. Prior to laboratory analysis all cores were cleaned to remove any contamination that may have occurred during extraction, this involves cleaning away a small amount of the surface material from the core in a systematic manner. The cores were analysed and assessed under the following categories; Pollen analysis; Microscopic charcoal; Macroplant; Diatoms; Ostracods and foraminifera; Insects; XRF Core Scanning; Magnetic Susceptibility; Particle

REF (HER)	NAME	GRID REF	DESCRIPTION
			Size Analysis; Radiocarbon Dating Seven samples were selected for radiocarbon dating using wood, macroplants and humic acid fraction. The dating was undertaken by SUERC. The samples were selected for dating from across the three coring locations and varying core sections, to give an insight into the underlying topography and accumulation of material on site.
ELS4499	Borehole Survey, Geoarchaeological Evaluation, M181 Terminal Junction, Lincolnshire Lakes, North Lincolnshire	SE 8526 0848	A geoarchaeological survey, review, and assessment as part of a programme of archaeological mitigation at M181 Terminal Junction, Lincolnshire Lakes, North Lincolnshire, undertaken by AOC Archaeology Group on behalf of Fortynine Design. The aims of the evaluation were to assess the impact of development on any surviving archaeological remains within the site. The evaluation consisted of seven boreholes drilled to a maximum of 4m bgl. The boreholes were aligned in a roughly west to east transect. The borehole evaluation revealed the low-lying surface of the presumed Sutton Sand (below 1.5m OD) that forms a single meandering or three separate Late Glacial to Early Holocene relic river valleys. The valleys were then infilled, signalling more stable periods of vegetated wetland development within the wider more active fluvial regime. The organic deposits are overlain by up to 2m of silty sand to clay representing natural overbank deposition or human induced floodplain accretion (Warp).
ELS4500	LiDAR Assessment, Lincolnshire Lakes, Scunthorpe, North Lincolnshire	SE 8562 0843	A LiDAR assessment conducted in order to assess the presence of earthworks within the site boundary of the Lincolnshire Lakes development and their relationship to the wider landscape. The LiDAR-derived digital terrain model demonstrates the subtle changes in topography across the Study Area from the lower-lying west and south to the higher eastern margins of the Study Area. Subtle changes in topography were observed from the lower-lying west and south to the higher eastern margins of the study area. It was unclear whether any of this was directly attributable to human intervention (i.e. warping) as the margins are generally irregular and ill-defined, with the exception of the area south of North Grange Farm where the elevated area appears to be related to (or at least bounded by) linear features. A series of straight linear features was observed around the margins, and intruding into the south-west of, the Study Area. These

REF (HER)	NAME	GRID REF	DESCRIPTION
			were presumed to relate to warping and/or drainage but are aligned differently to the extant field pattern and presumably date to an earlier period. Most of the remaining visible earthwork features within the Study Area were parallel to extant boundaries and likely to represent former subdivisions of the current field layout. Parallel ridging is visible within a number of land parcels, a remnant of post-medieval agricultural practices.
ELS4501	Historic Environment Desk-Based Assessment, M181 Terminal Junction	SE 8582 0846	A Historic Environment Desk-Based Assessment undertaken by AECOM and commissioned by Highways England accompany a planning application for a terminal junction linking the M181 and the local road network to the east of Scunthorpe. The report was entirely desk-based and no site visit was undertaken.
ELS4597	Geophysical Survey (Magnetometry), North Lincolnshire Green Energy Park, West of Scunthorpe	SE 8612 1101	The geophysical survey has demonstrated the presence of a number of anomalies of potential archaeological interest. These are predominantly located in Area 4. Two large enclosures have been identified in the south-eastern portion of Area 4. Also in Area 4, numerous linear and curvilinear anomalies have been identified spanning almost the entire survey area. These could evidence settlement activity, although a natural origin cannot be ruled out. Numerous weakly positive discrete anomalies are tentatively considered evidence of possible extraction or refuse pits. However, this interpretation is not confident as these anomalies could equally be natural in origin. A number of further anomalies thought to indicate natural variation in the underlying geological deposits have been identified throughout Area 3 and 4. In Area 3 anomalies thought to indicate localised variation in the magnetic susceptibility of the probable superficial deposits have been identified. In Area 4, evidence of underlying natural fissures has been widely identified in the form of weakly positive interconnected sinuous anomalies.
ELS4601	Trial Trench Evaluation, Northern Junction, M181/Brumby Common Lane, Scunthorpe	SE 8643 0955	Archaeological features or finds were recorded in three of the seventeen trenches. Two gullies and two parallel plough scars were located in trench 4; ceramic material in trench 6 and a substantial linear feature in trench 7. All features were sealed by a soft, dark black-brown silty-sand topsoil presenting an average depth of 0.38m in the western field and 0.33m in the eastern field, and a firm, mid-orange sandy-clay subsoil/warp deposit

REF (HER)	NAME	GRID REF	DESCRIPTION
			presenting an average depth of 0.43m in the western field and 0.34m in the eastern field. The underlying geology comprised light orangey brown firm sandy clay. The linear archaeological features identified are likely connected to modern agricultural activities or warping activities and the larger linear feature identified in Trench 7 could be related to the construction of the M181. A geological assessment was carried out by Trent & Archaeology on the deposit sequence. A monolith column was taken through a peat deposit accumulated in a depression from Trench 12 for further assessment and radiocarbon dating.
ELS4602	Test Pits, Northern Junction, M181/Brumby Common Lane, Scunthorpe	SE 8629 0967	No archaeological features or finds were identified in any of the pits and a similar stratigraphically sequence was seen in all, characterised by layers of topsoil, warp/subsoil, peat and Aeolian sands. A soil sampling programme was undertaken consisting of bulk soil samples for the identification of plant macro-fossils, small animal bones and other small artefacts. Five bulk samples from the test pits were processed and examined for carbonised plant macrofossils and charcoal. No charred material was recovered from the retained portions of the samples. The environmental samples were mostly found to be sterile of carbonised plant remains with no identifiable material present indicating very little burning activity of archaeological interest was taking place in the vicinity of the deposits.
ELS4603	Monolith Sampling, Palaeoenvironmental Assessment and Radiocarbon Dating, Northern Junction, M181/Brumby Common Lane, Scunthorpe	SE 8628 0958	The paleaoenvironmental assessment has recorded a sequence of local significance. The pollen microfossils in particular were well-preserved and the data recorded has provided a good understanding of the character of the landscape in this area of the site. The poor preservation of other proxies indicates less than favourable conditions to preserve more delicate macrofossils.
ELS4606	Geoarchaeological Assessment, Northern Junction, M181/Brumby Common Lane, Scunthorpe	SE 8603 0964	The evaluation trenching and test pitting was able to demonstrate considerable variation in the underlying sub-surface topography, which suggest areas of intermittent deep sedimentation rather than a single blanket peat deposit. This was able to be visualised in the basic deposit model produced for the site, showing two pronounced depressions in the surface of the Sutton Sands. Radiocarbon dating demonstrated that

REF (HER)	NAME	GRID REF	DESCRIPTION
			accumulation in the depression sampled by Trench 12, began in the Late Mesolithic. This continued until at least the Early Bronze Age. The palaeoenvironmental assessment evidenced the sample site is located at the edge of the wider wetland associated with the Lower Trent Valley. This location is likely to have been located at the margins of the wetland and therefore subject to seasonally fluctuating water levels. The radiocarbon dates were compared with the other results in close proximity on the 'Lake 1' site to the southeast. Several discrepancies between the datasets were noted.
ELS4608	Watching Brief on GI test pits, M181 Terminal Junction, North of Burringham Road, Scunthorpe	SE 8577 0852	No features were recorded or finds recovered.
ELS4609	Geoarchaeological Assessment, M181 Terminal Junction, North of Burringham Road, Scunthorpe	SE 8557 0848	A geoarchaeological assessment was undertaken following archaeological monitoring of 52 ground investigation test pits to a maximum depth of c. 3m bgl. No features were recorded or finds recovered as part of the trial pit watching brief, and no samples were retained for geoarchaeological purposes. The watching brief results supplemented existing data from the site for assessment and deposit modelling purposes including that from previous archaeological works and ground investigations.
ELS4657	Geophysical Survey Report, Land at Scotter Road, Scunthorpe	SE 8699 1018	The geophysical survey did not detect any anomalies of potentially archaeological origin, although one linear anomaly of undetermined origin was identified. Natural variation in the underlying superficial deposits have been identified as weak, amorphous enhancements in the centre of the survey area, potentially obscuring weaker anomalies in the area.
ELS4658	Desk-based assessment, land west of Scotter Road, Scunthorpe	SE 8699 1020	A walkover survey was undertaken on 14/7/2022 to establish the condition of the site, and to identify any cultural heritage assets or evidence for previous ground disturbance. Recording comprised digital photography (at a resolution of 12 MP) and annotated plans.
ELS4667	Trial Trenching and Geoarchaeological Test Pits, Land at Scotter Road, Scunthorpe	SE 8688 1010	Above the substratum, a silty-peat subsoil was present. It was moderately humified with broken down woody remains, displaying root activity within the layer. At the interface between the topsoil and subsoil in all trenches, very fine sand deposits were identified. No evidence of lamination or of silt

REF (HER)	NAME	GRID REF	DESCRIPTION
			or clay could be identified within this sand lens, and thus the evidence does not suggest this deposit is derived from warping. It is more likely to be aeolian (of the wind) in origin. No physical evidence could be identified of the Frodingham Causeway (HER 25905) within the areas covered by the trenches. A total of fourteen sediment lithology recordings were taken from each end of the seven trenches, in addition to seven test pits, to characterise the subsurface deposits of the Site area. The pits identified a sequence of commencing with fine, well-sorted sands, likely the wind-blown Sutton Sand Formation. Above the sand was an undated shallow peat layer, seen across much of the Site (0.26-0.58m below ground level, or BGL). A column sample of the peat has been retained from TR07 should palaeoenvironmental analysis be commissioned.
ELS4690	Aerial Investigation and Mapping at Scunthorpe, North Lincolnshire, Air Photo and Lidar Mapping Project	SE 8662 0903	An Historic England funded project to map, analysis and record from existing air photos and lidar data for an area of 165km2 centred on the town of Scunthorpe, North Lincolnshire. This project examined a broad range of aerial imagery including historical air photos, recent specialist aerial reconnaissance, Google Earth and similar imagery and visualisations generated from the Environment Agency's LiDAR data. It recorded archaeological and historical monuments, that were visible as cropmarks, soilmarks, earthworks and some standing building. It encompassed monuments of all periods up to the middle of the 20th century.
ELS4764	Desk-based assessment, Burringham Road, Scunthorpe	SE 8663 0865	A desk-based assessment report prepared by Hampton Heritage Design & Consultancy ltd for Gleeson Regeneration Ltd covering a 2km search area centred on land north of Burringham Road, west of Lindsey Lodge Hospice and Healthcare and east of Carlsbrooke Manor.
ELS4765	Geophysical Survey, Burringham Road, Scunthorpe	SE 8665 0875	Modern disturbance was identified throughout the survey area caused by a scrapyard electric/wire fencing, caravans and cars. Ferrous debris was also identified throughout the survey area. The impact of modern disturbance may have obscured any potential anomalies of an archaeological origin, if present.

REF (HER)	NAME	GRID REF	DESCRIPTION
ELS4773	Trial trenching and test pitting, Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe	SE 8600 0883	A limited assemblage of small flint fragments were recovered from the hand excavated and sieved test pits. All appear to be naturally formed and naturally deposited within the covers and deposits.
ELS4774	Geoarchaeological test pits, Lincolnshire Lakes, land east of M181 and north of Burringham Road, Scunthorpe	SE 8642 0850	The earliest deposits recorded during test pit and monitoring were fine sands, which occasionally contained a minor medium sand component. Within this fine sand in 44 of the 53 monitored test pits was peat which was recorded at varying depths. This peat was predominantly present as a single unit, however within four test pits (Tr20, Tr32, Tr33, and Tr34) peat was recorded as two units, each separated by fine sand. Within most test pits the peat was recorded at between 0.40-1.00m BGL, or 0.24-1.60m OD. The peat which was found as a single unit between 0.24-1.60m OD was consistently very well-humified with few apparent organic inclusions present. This peat was also generally relatively sandy, with fine sand being mixed into the upper or lower boundaries of the unit.
ELS4775	Geoarchaeological monitoring and assessment, Lincolnshire Lakes, land east of M181 and north of Brumby Common Lane, Scunthorpe	SE 8641 1004	The earliest deposits recorded during trial pit and WS borehole monitoring were fine sands, which occasionally contained a minor medium sand component. Within this fine sand, peat deposits were recorded at varying depths. Peat was recorded within 30 of the 56 interventions. Where recorded within a trial pit, peat was predominantly present as a single unit. However, within BH12 and TP38, two peat units were recorded. In TP38 this lower peat was a moderately humified, relatively sandy peat with frequent woody fragments, and was recorded between 2.20m and 2.60m BGL (0.03m- - 0.37m OD). In BH12 the lower peat was moderately humified, though was distinctly more clay-rich than that from TP38 and contained frequent natural wood inclusions and twigs. It demonstrated a very graduated upper boundary with the overlying sand; likely reflecting gradual aeolian deposition encroaching onto the peat. This lower peat within BH12 was located between 2.88m and 3.00m BGL (- 0.15- -0.27m OD)
ELS773	Aerial photographic sortie	SE 8620 1020	No description.
ELS808	Aerial photographic sortie	SE 8609 0900	No description.
ELS922	Aerial photographic survey	SE 8670 0789	Carried out by Jasair for Humberside County Council.

APPENDIX 3: Figures