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MAP Archaeological Practice

Lincolnshire Lakes
land east of M181 and north of Burringham Road Scunthorpe

MAP 5.04.22
Planning Reference-PA/2023/1124
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NLMS Archaeology Site Code: BURAH

Archaeological Evaluation by Trial Trenching

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MAP Archaeological Practice

Client	Keepmoat Homes
Work Type	Archaeological Evaluation by Trial Trenching
Address	Land east of M181 and north of Burringham Road Scunthorpe
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NGR	SE 86261 08611
Planning Ref	PA/2023/1124
NLMS Archaeology Site Code	BURAH
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Site Code	05.04.22
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Lincolnshire Lakes

Land east of M181 and north of Burringham Road

Scunthorpe

PA/SCR/2022/1

05.04.22

Archaeological Evaluation by Trial Trenching

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Non-technical Summary

An Archaeological Evaluation by Trial Trenching and associated Geoarchaeological work was carried out by MAP Archaeological Practice Ltd. and York Archaeology, on Land east of M181 and north of Burringham Road, Scunthorpe from November 2023 to January 2024. The work was undertaken to inform the Historic Environment Officer at North Lincolnshire County Council of the archaeological potential of the site and to allow a reasoned decision to be made regarding the need for further archaeological work, in advance of residential development. The work was undertaken on behalf of Keepmoat Homes.

The evaluation consisted of the excavation of 48no trial trenches with additional geoarchaeological machined and hand-excavated test pitting undertaken in order to identify any possible archaeological features, deposits and finds present across the site. Each trench was specified to have a single machined geoarchaeological test pit and a further five hand-excavated, 1m test pits. After the commencement of the works, and in consultation with the HEO, the number of hand-excavated test pits was reduced to two.

Several archaeological features were identified across the site, all of which are believed to be Post-Medieval in date. These included field boundary ditches visible on Ordnance Survey mapping from 1885 through to 1946 and possible warping channels or drains connected to the improvement of the farmland likely within the same time period. The machine excavated geoarchaeological test pits revealed sequences characterised broadly by a stratigraphy of blown coversands, peat and warp, underlying the modern topsoil. The deepest recorded test pit reached three metres below the present ground level (before they became unstable). The hand excavated test pits and sieved material produced a number of small flint fragments which were examined by Dr Frederick Foulds who affirmed their natural origin.

1. Introduction & Planning History

1.1 This report sets out the results of the Archaeological Evaluation by Trial Trenching and associated Geoarchaeological work carried out for Keepmoat Homes from November 2023 to January 2024.

1.2 Planning permission has been applied for, for the development of 599 No. dwellings and lakes, along with associated infrastructure, including landscaping, public open space and play area, pedestrian and cycle links, pumping station and sub-station (planning reference PA/2023/1124).

1.3 A consultation response from Historic Environment Officer (henceforth HEO) at North Lincolnshire County Council highlights the need for pre-application field evaluation. A staged programme of pre-application field evaluation is required, in order to inform the preparation of the planning application and the determination of permission by the planning authority in accordance with the National Planning Policy Framework. During initial discussions between MAP, York Archaeology and the HEO, it was decided that the site should not be subject to Geophysical Survey due to the likely presence of extensive warping deposits which have the potential to affect the results of such surveys.

1.4 The work was carried out in accordance with the recommendations Chapter 16 (Conserving and enhancing the historic environment) of the National Planning Policy Framework (2023) and according to the Written Scheme of Investigation that was prepared by MAP Archaeological Practice Ltd in collaboration with the Head of Geoarchaeology at York Archaeology and approved by the HEO (Appendix 8).

1.5 MAP adhered to the principles of both the CIfA '*Code of Conduct*' (2022) and '*Standard for Archaeological Field Evaluation*' and '*Universal guidance for archaeological field evaluation*' (2023) throughout the project.

1.6 All maps within this report have been produced with permission of the Controller of His Majesty's Stationary Office (© Crown copyright. License AL50453A). With additional mapping data derived from OpenStreetMap (https://www.openstreetmap.org/copyright).

2. Site Description

2.1 The site, which measures approximately 24.95ha, is located 2.5km south-west of Scunthorpe and is bounded to the west by the M181 motorway, to the south by Burringham Road and by Carisbrook

Manor to the east. (Centred SE 86261 08611) The site consists of two arable fields, which were under stubble at the time of the evaluation (Plate 1).

2.2 The site, which lies at approximately 2m AOD, is relatively flat and sits on bedrock geology of the Mercia Mudstone Formation which is overlaid by quaternary deposits (BGS. 2024). Deep deposits of coversands are present within the site boundary.

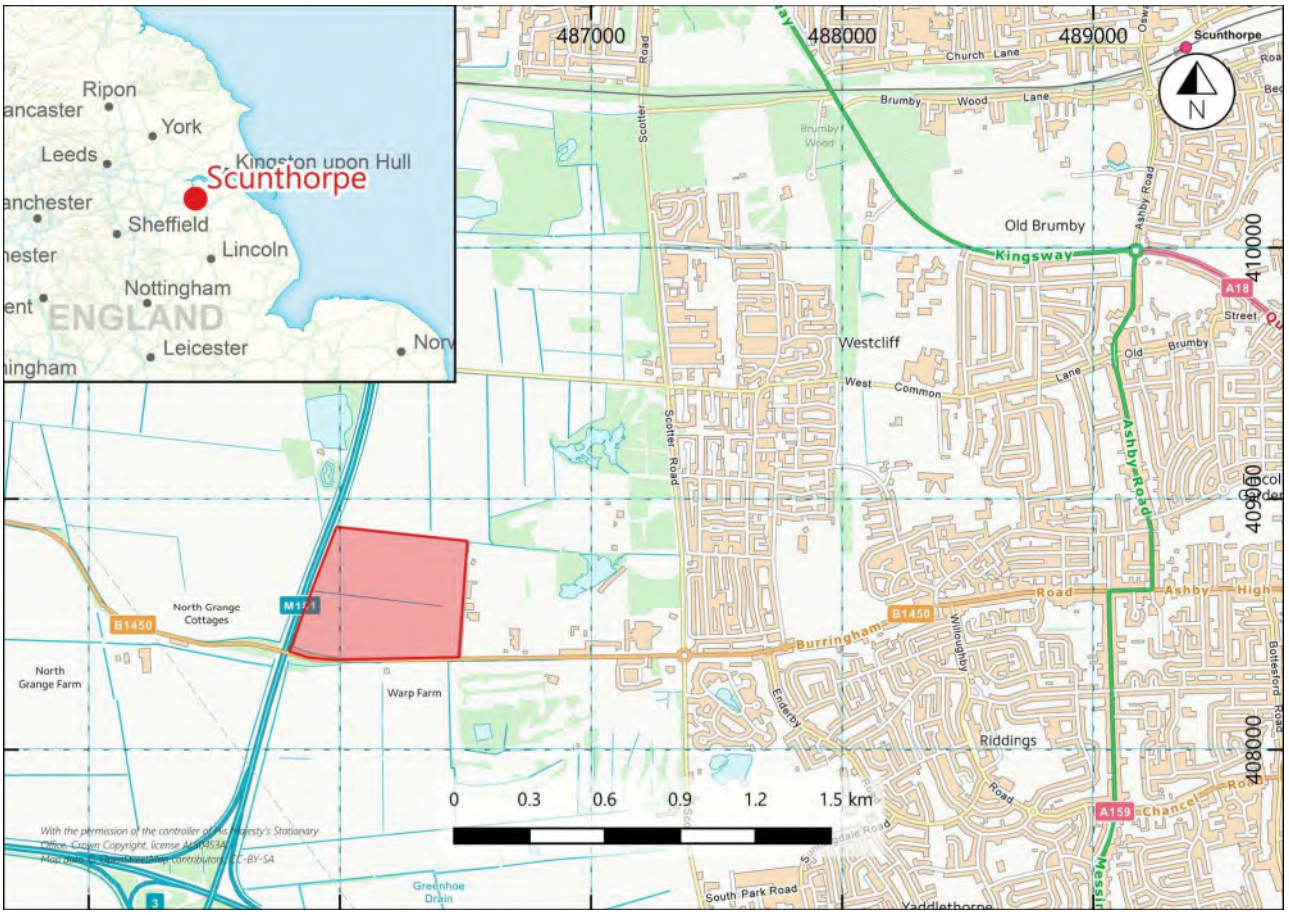

Figure 1: Site Location

3. Archaeological and Historical Background

3.1 The site is located in an area of known archaeological activity with prehistoric features and landforms likely to be present in the vicinity; appearing to be weighted towards the use of wetland margins. Paleoenvironmental evidence for the area is concerned primarily with the occurrence of peat formation and episodic depositions of sands, as a product of pre/historical variances of sea/river levels in the wider landscape (MAP. 2023).

3.2 A potential Bronze Age barrow has been identified some 750m north of the site (MLS 25906). The feature, which has a diameter of approximately 25m, was identified in the results of a Geophysical Survey (Pringle. 2015).

3.3 Substantial warping drains were recorded by the Scunthorpe and its Environs Air Photo and LiDAR Mapping Project as being present within the site boundary (HER ID MLS22492). The drains first presented as a double ditched cropmark which was identified through aerial photography in 1984 and were later identified in a Lidar assessment in 2016, when the features were seen to continue into the site boundary from the west. The drains are believed to be branches of Healey's Drain which runs west to east from the River Trent and along the southern side of Burringham Road (HER ID 26991). Shorter, more fragmentary ditches have also been identified to the west of the M181 and north of Burringham Road.

3.4 During the previous minor evaluation of the site by AOC in 2017, a single gully (MLS 26107) was identified in the southern region of the site. The feature, which measured 0.16m wide and 0.20m deep (Morris & Potten. 2017) contained no material to suggest a date or purpose. Evidence of warping within the site boundary was also identified (MLS 26106). Two warping drains were identified close to the southern end of the proposed lake. The features were interpreted as shallow warp drains which had been excavated in order to channel fertile sediments from the River Trent, across the site (Ibid).

4. Geoarchaeological and Paleoenvironmental Investigations

4.1 The area surrounding the site has undergone many phases of archaeological and palaeoenvironmental assessment. Three boreholes and four test pits were carried out as part of geoenvironmental site investigations in 2015 (FWS. 2015). The work identified three distinct phases of deposition: an '*upper sand unit*' containing interleaved silts and peat lenses (referred to as Warp); an '*intermediate clay*'; and a '*lower sand unit*' devoid of any organic material.

4.2 In 2016 and 2017 AOC Archaeology excavated a total of 13 trenches in respect of the application for the excavation of a lake, the southern half of which will be located down the western side of the site. Six of the 13 trial trenches fall within the current site. The trenches were machine excavated to a depth of 1m with sondages excavated at each end to a total depth of 2m. Auguring beyond this 2m depth suggested that peat horizons were present to a depth of approximately 3m below existing

ground level. A detailed palaeoenvironmental assessment (AOC 2017b) was carried out including pollen, diatoms, ostracods and forams, insects, plant macrofossils, radiocarbon dating and XRF core scanning (ITRAX). The peat in the northern half of the site recorded Mesolithic age determinations (c.7726-6309 BP), with a single Bronze Age date from Trench 4. The preservation of pollen and ostracods/forams were good, although diatoms were only variably preserved. The ostracods provided some suggestion that potentially earlier deposits, possibly from an interglacial may be preserved at the site although this hypothesis remains to be tested.

4.3 Work carried out to the north at Brumby Common (York Archaeology on behalf of ASWYAS, 2021) recorded peat deposits within a natural depression in the sands (0.80-1.90mbgl) which demonstrated accumulation from the Mesolithic into the Bronze Age. The pollen assemblage was dominated by tree and shrub taxa, represented by birch and pine with insects representing heathland environments on the higher and drier ground. The sample site was located at the edge of the wider Lower Trent Valley wetland and would have been subject to seasonal fluctuations in water levels.

4.4 Although the peat deposits discussed above appeared in stratigraphic sequence, this was not the case to the north of the site where the deepest identified peat produced the youngest date. It is clear that deposits are not uniform across the site, suggested to be likely as a result of warping and possibly post-depositional reworking.

5. Aims and Objectives

5.1 The aims of the evaluation were:

- To determine the presence/absence, nature, date, quality of survival and importance of archaeological and paleoenvironmental deposits to enable an assessment of the potential and significance of the archaeology and paleoenvironment to be made;
- To establish the chronology of the sediment sequence, particularly with reference to the peat development at the site;
- To determine the potential for the underlying sands to preserve archaeological remains and land surfaces.

5.2 The objectives of the work were:

- To undertake trial trenching across the site and to make a record of any archaeological features/deposits;

- To recover dateable artefacts and environmental samples to characterise the activity at the site;
- To undertake test pitting to record the lithology of the underlying sands/peat deposits;
- To recover samples for paleoenvironmental assessment and scientific dating;
- To create a deposit model and archaeological framework for the site using the results of the test pitting and previous phases of work;
- To present the results of the fieldwork, deposit modelling and any palaeoenvironmental assessment in a report.
- To inform the requirement for and scope of any archaeological mitigation including further archaeological works which may be required.

5.3 In addition this site has the potential to address the following East Midlands Research Agenda topics (http://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/Main):

- *2 MESOLITHIC (c.9500 - c.4000 cal BC)*
    - *2A - Enhance understanding of the environmental background to Mesolithic activity: 'By comparison with some other areas of the country, the Mesolithic environment of the East Midlands is little known… There is a need to obtain more closely dated pollen sequences from upland, riverine and coastal peat deposits and to extend the investigation of ancient environments to include isotope studies of the organic fractions of coastal and riverine sediments.' (Knight et al 2012, 36)*
    - *2.6.1 What can analyses of cave deposits, palaeochannel fills, upland peats and other deposits with potential for preserved pollen, charcoal and other organic remains contribute to studies of the earliest stages of woodland clearance and plant domestication?*
    - *2.6.2 How can we maximise the potential of palaeochannels, upland or coastal peats and other organically rich deposits as sources of data on Early Holocene landscapes and changes in subsistence strategies and diet?*
    - *2H - Investigate the transition from the Mesolithic to Neolithic: 'The issue of changing subsistence strategies and the relationship between Mesolithic and Neolithic lifeways can be addressed in part by consistent sampling of organic material preserved in palaeochannels and other waterlogged or wetland contexts spanning the transition period.' (Knight et al 2012, 43)*
- *NEOLITHIC AND EARLY TO MIDDLE BRONZE AGE (c.4000–c.1150 cal BC)*

- *3E - Target sites with Late Mesolithic and Early organic remains: '…significantly more organically rich contexts of this period need to be targeted for environmental analysis and radiocarbon dating to elucidate patterns of landscape change during this key transitional period. Particular attention should be focused upon sites preserving organic remains that may be threatened by dewatering, while the information gained from sites under threat from development should be maximised.' (Knight et al 2012, 52).*
- *3.2.3 How may environmental sampling strategies assist in elucidating the transition from later Mesolithic to earlier Neolithic economies?*
- *3.7.2 What ceremonial or ritual roles may rivers or other watery locations have performed and how may this have varied regionally and over time?*

5.4 In addition, the site can build on the work undertaken by the Lincolnshire Coversands Project which recommended a number of key considerations for future work in the area (McIlwaine and McDonell 2006). These included elucidating the extent, depth and topography of the coversands. Recent work in the development of the Mesolithic Research and Conservation Framework highlights the targeting of research on sites at risk such as wetlands where peat is drying out (Blinkhorn and Milner 2013, 30). Key themes were identified in relation to prospection of sites:

S2.2: Broader use of fieldwalking, test-pitting and other low-impact techniques is needed, especially within a developer-led context.

S2.4: Novel methodologies to evaluate the locations of Mesolithic activity should be sought and successes in the field appropriately communicated across all sectors. For instance, these might be grounded in geoarchaeological modelling, or the application of borehole, coring and sieving strategies.

6. Methodology

6.1 Forty-eight trenches were excavated, positioned in such a way that an even spread across the site was achieved, in combination with the previously excavated six trenches (Fig. 2). All trenches measured 50m x 1.80m and were positioned to an accuracy of +/- 100mm of the specified trench location using survey grade Trimble GPS. All excavation of archaeological features was carried out by hand as governed by the WSI.

Figure 2: Trench Location

6.2 All topsoil was carefully removed by mechanical excavator using a wide toothless blade, under archaeological supervision, in level spits of no more than 100mm until either the top of the first archaeological horizon, or undisturbed natural deposits were encountered.

6.3 A total of forty-eight machine excavated test pits were undertaken by YA, at one end of each trench to make a lithological record of the underlying deposits. All deposits encountered were recorded by the geoarchaeologist from YA, using the Troels-Smith (1955) system of sediment classification (Appendix 6).

6.4 Shovel testing was used within each trench to establish the presence of lithics. After the commencement of the works this methodology was altered in consultation with the HEO, to include two hand-excavated test pits in each trench rather than five. All excavation and recording were otherwise carried out in line with the methodology stated in the WSI.

7. Results

7.1 All 48no trenches and geoarchaeological test pits revealed a singular deposit of topsoil that consisted of a dark grey brown sandy clay. Generally, topsoil was seen to overlay deposits of warping and coversands into which all archaeological features were cut.

7.2 A total of 101no hand excavated test pits were completed across the 48no trenches. This included five test pits in trenches 14 and 51, a single test pit in trench 23 due to flooding (as agreed with HEO), and two test pits in all other trenches. The strata revealed in each trench is summarised in Appendix 5. The test pits were excavated to a depth of 0.50m-0.60m below the trench surface where the water table allowed. A general sequence of the strata uncovered included warping deposits, overlying a narrow peaty organic horizon, over coversand deposits. A number of variations in this sequence were revealed, highlighting the potential for localised deposition.

7.3 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 coversand deposits (Foulds. 2024).

7.4 Archaeological features were encountered in trenches 15, 16, 24, 30, 39, 40, 59, 60 and 61.

7.5 An east to west oriented ditch was identified in trenches 15, 16 and 30. The ditch, excavated as segments [1508], [1611] and [3008] ranged from 0.58m – 0.76m in depth and between 2.45m – 2.70m in width with a V shaped profile. The ditch was filled by deposits of brown and grey brown silty sands along with some darker more organic sands towards the base of the feature. Deposit (3004) the uppermost fill of ditch [3008] contained a single frogged and stamped brick of 20th century date.

7.6 In trenches 16 and 30, a second east to west feature ran parallel to the ditch described above, 1-2m south of it. This feature took the form of a shallow gully ([1606], [3010]) with irregular edges and base, possibly representing a grubbed-out hedgerow. It varied from 1.34m – 2.30m in width and from 0.16m – 0.18m in depth and was filled by a single deposit of mid grey brown clayey sand. Deposit (1605), the fill of gully [1606] contained a single fragment a clat tobacco pipe stem of 18th or 19th century date and a single sherd of white earthenware which dated to the 19th or early 20th century.. An environmental sample taken from the same deposit contained a small quantity of highly crushed charcoal, although nothing was identifiable and it was deemed to be residual, having entered the

feature through bioturbation (Aldritt. 2024). A sample was also taken from segment [3010] which contained a small quantity of possible burnt root (Ibid).

7.7 In the northeast of the site, trench 24 contained a northeast to southwest aligned, shallow, linear feature. Gully [2404] measured 2.98 in width, 0.28m in depth with a wide, flat-bottomed profile. It was filled by a light yellow brown, mixed clayey sand deposit which contained a small deposit of heather stems.

7.8 Trench 40 contained two features including gully [4005] and ditch [4009]. Both were aligned approximately north to south. Gully [4005] measured 1.35m in width and 0.26m in depth and may represent a continuation of feature [2404]. Ditch [4009] measured 1.50m wide and 0.21m deep and had been recut by the insertion of a ceramic field drain [4007]. Both features were filled by deposits of mid grey brown, silty sand which contained no identifiable organic remains.

7.9 Trench 39 contained a possible continuation of ditch [4009], as feature [3906]. The ditch, which was aligned north to south and measured 1.52m wide and 0.38m deep, was filled by a deposit of mid brown sandy silt and had also been truncated by the insertion of a ceramic field drain [3904].

7.10 Trench 59 contained two shallow north to south aligned linear features. Feature [5904] in the east of the trench measured 1.01m wide and 0.07m in depth with a wide flat-bottomed profile. It was filled by a deposit of light orange yellow, sandy silt. West of this feature [5906] measured 2.15m in width and 0.09m deep and was filled by deposits of brownish yellow clayey sand.

7.11 In the southeast of the site trench 60 contained another north to south aligned feature. Feature [6004] measured 2.15m wide and was greater than 0.30m in depth. Its full depth could not be investigated due to the persistently high water table. It was filled by a deposit (6003) a mid grey brown sand which contained a single fragment of 19th or 20th pottery and a small amount of unidentifiable degraded charcoal.

7.12 Trench 61 contained a shallow northeast to southwest aligned feature. Gully [6104] measured 1.50m wide and 0.20m in depth with a flat-bottomed profile. The gully contained a deposit of light yellow grey, clayey, sandy silt, and may represent another shallow warping drain.

8. Conclusions and Recommendations

8.1 The evaluation was successful in confirming the presence of archaeological features. In trenches 15,16 and 30 these appeared to correspond with former field boundaries depicted in historical mapping (Ordnance Survey 1885 through to 1946) and were associated with the use of the area as agricultural fields. The feature revealed in trench 60 may also represent a field boundary of historical date, although it does not correspond to any boundaries depicted on mapping.

8.2 The features encountered in trenches 24, 40, 39, 59 and 61 might be best understood when the warping history of the site is considered. The area is known to have been subject to warping in the mid-late 1800s and other warping features have been seen in geophysical survey of the area (Allen Archaeology. 2015) and excavation (AOC. 2017). Warping channels or drains were excavated to spread flood waters between fields. Here, the wide and shallow profiled features encountered appear to correspond well with suspected warping channels seen in the previous fieldwork. Furthermore, warping channels may have been necessary, particularly in the east of the site in order to restrict the spread of flood waters. To the east of the site Carisbrooke Manor (previously Warren House, as depicted on OS 1885) sits on only slightly elevated ground, suggesting that the property may have required a level of protection during the warping events.

8.3 Environmental data collected from the excavated features is limited, with trace amounts of carbonised remains likely being residual as a result of bioturbation, although it is noted that the identified material may be suggestive of low level burning activity within the vicinity of the trenches (Alldritt. 2024). It is considered that, perhaps with the exception of the vicinity of trench 24, further excavation within the site boundary has a low potential to produce significant quantities of carbonised plant remains (Ibid).

8.4 The program of hand-excavated test pits across the site revealed no clear artefactual evidence of prehistoric activity within the deposits tested. Retained flint was visually observed by Dr Frederick Foulds (2024) who confirmed that they were '*small, rolled fragments from gravel deposits as opposed to being worked. Only one shows any sign of a flake scar, but probably results from chipping due to taphonomic processes, as opposed to be anthropogenic in origin*'. This could indicate there is low potential for prehistoric activity across the site, although work to the north has indicated potential for cryoturbation of the deposits through the action of warping and episodic flooding. This should be considered with the formation of the lake area and the reuse of the material to raise the construction level of the site within the flood management plan. The current drawing provided by

the developer (Proposed Lake Section - Alternate Shallow Lake Option) shows the proposed lake will be excavated to approximately 1.60m below ground level

8.5 The full Geoarchaeological is appended to this document for reference. The earliest deposit identified during the excavation of the machine-dig test pits consisted of a fine sand, within which peat was recorded in 44 of the 53 trenches (YA. 2024). The peat generally presented as a single unit, other than in trenches 20 and 32-34) in which two units were recorded. The peat was deemed to be moderately to very well humified, with little in the way of identifiable organic inclusions (Ibid). warping deposits consisting of a dark grey silty clay was identified in trenches 42, 43, 46, 48, 52, 55 and 57 (all within the southern half of the site). The results of the geoarchaeological work supports previous work carried out within the wider area which suggests that '*although the deposits identified within the site have the potential to contain and overlie archaeological remains, no such remains were encountered*' (Ibid).

8.6 Any further archaeological work should be at the agreement of Historic Environment Officer at North Lincolnshire County Council and will be subject to a separate Written Scheme of Investigation.

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Plates

Plate 1: General view of site. Facing northwest

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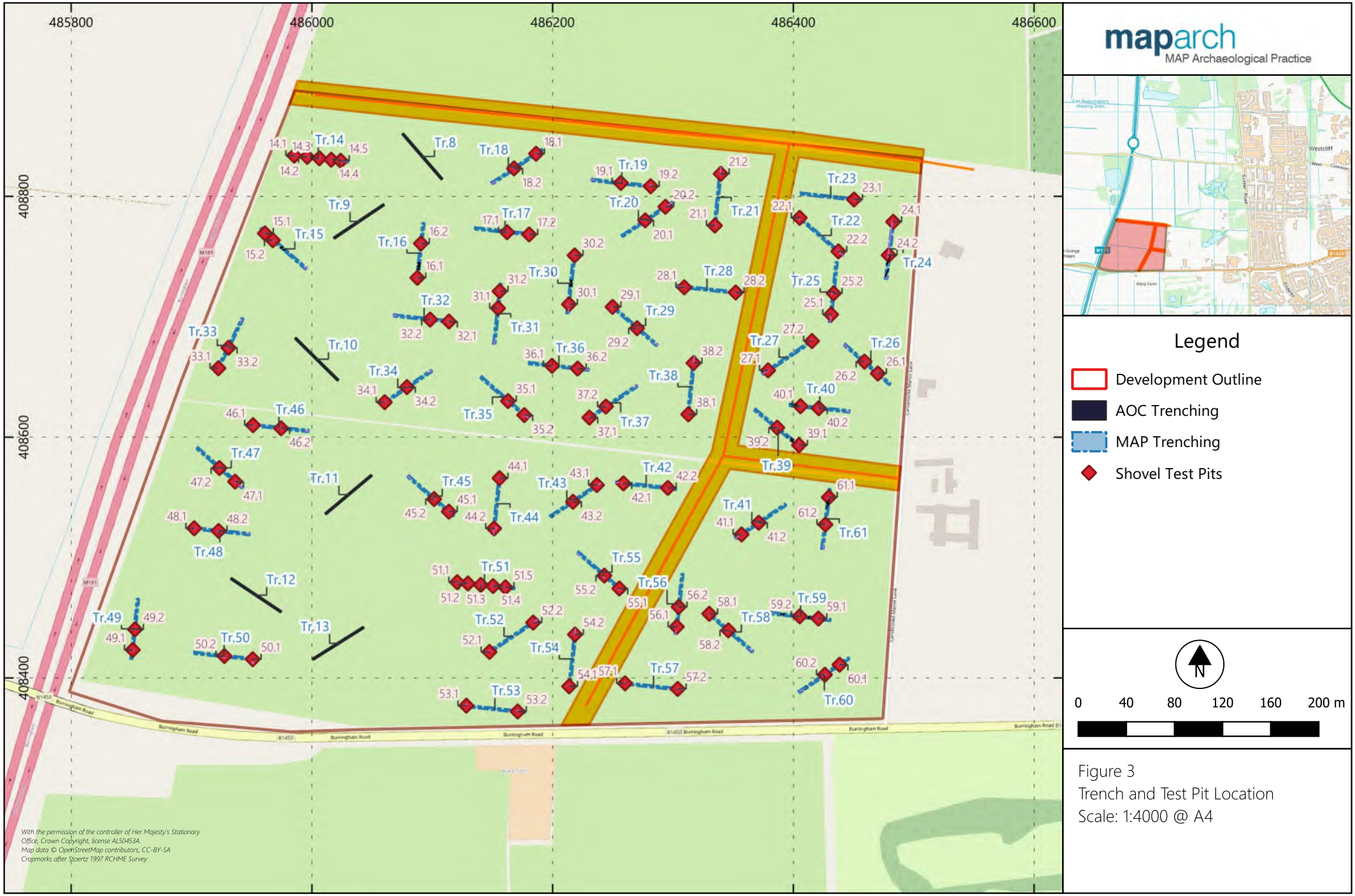
Plate 13: North facing section of shallow gully [5904]. Facing south, 1m scale.

Plate 14: Northwest facing section of gully [6104]. Facing southwest, 1m scale.

Plate 15: North facing section of ditch [6004]. Facing south, 1m scale.



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Legend

- Development Outline
- AOC Trenching
- MAP Trenching
- Shovel Test Pits

N

0 40 80 120 160 200 m

Figure 3
Trench and Test Pit Location
Scale: 1:4000 @ A4

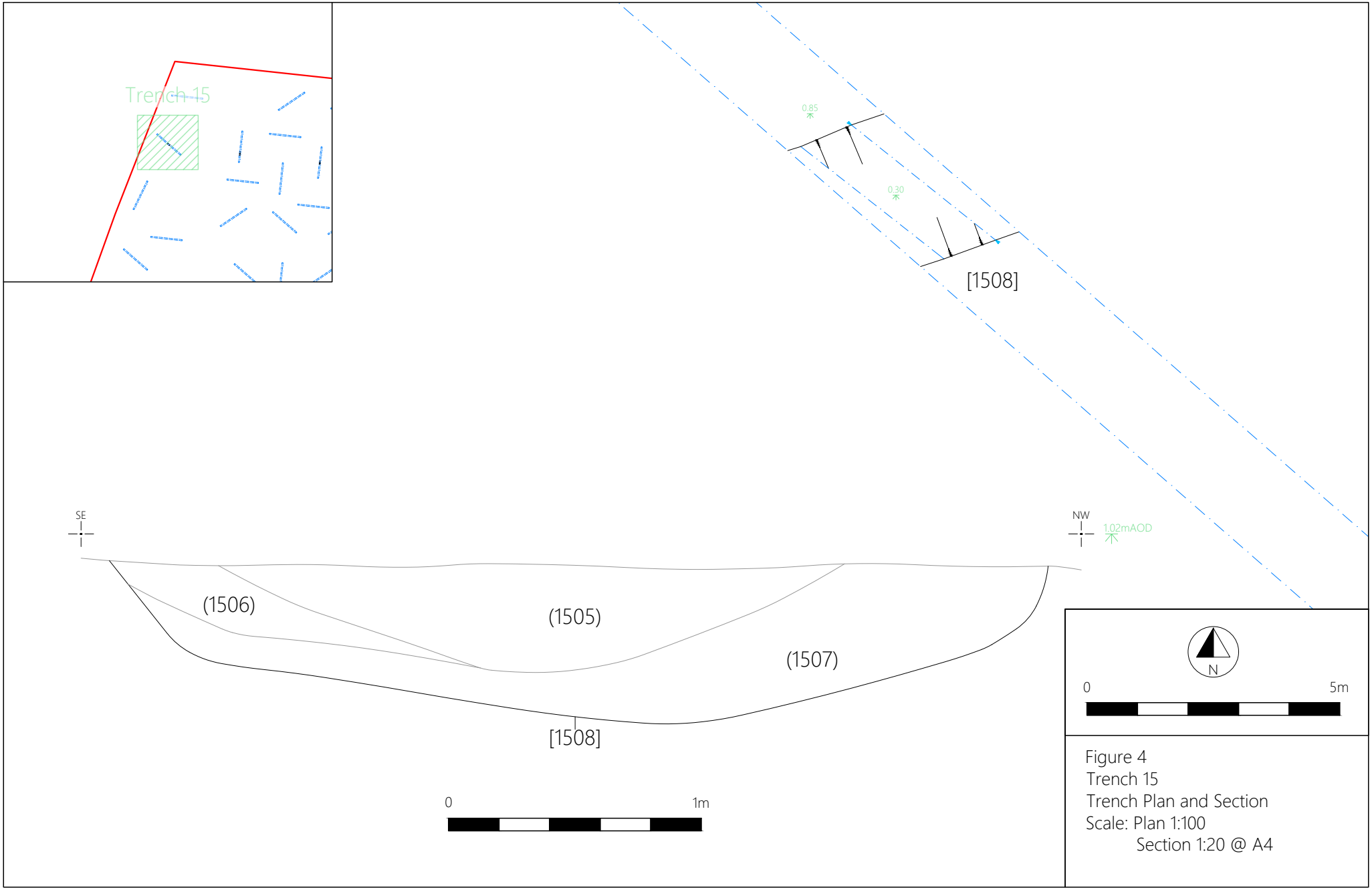

Figure 4
Trench 15
Trench Plan and Section
Scale: Plan 1:100
Section 1:20 @ A4

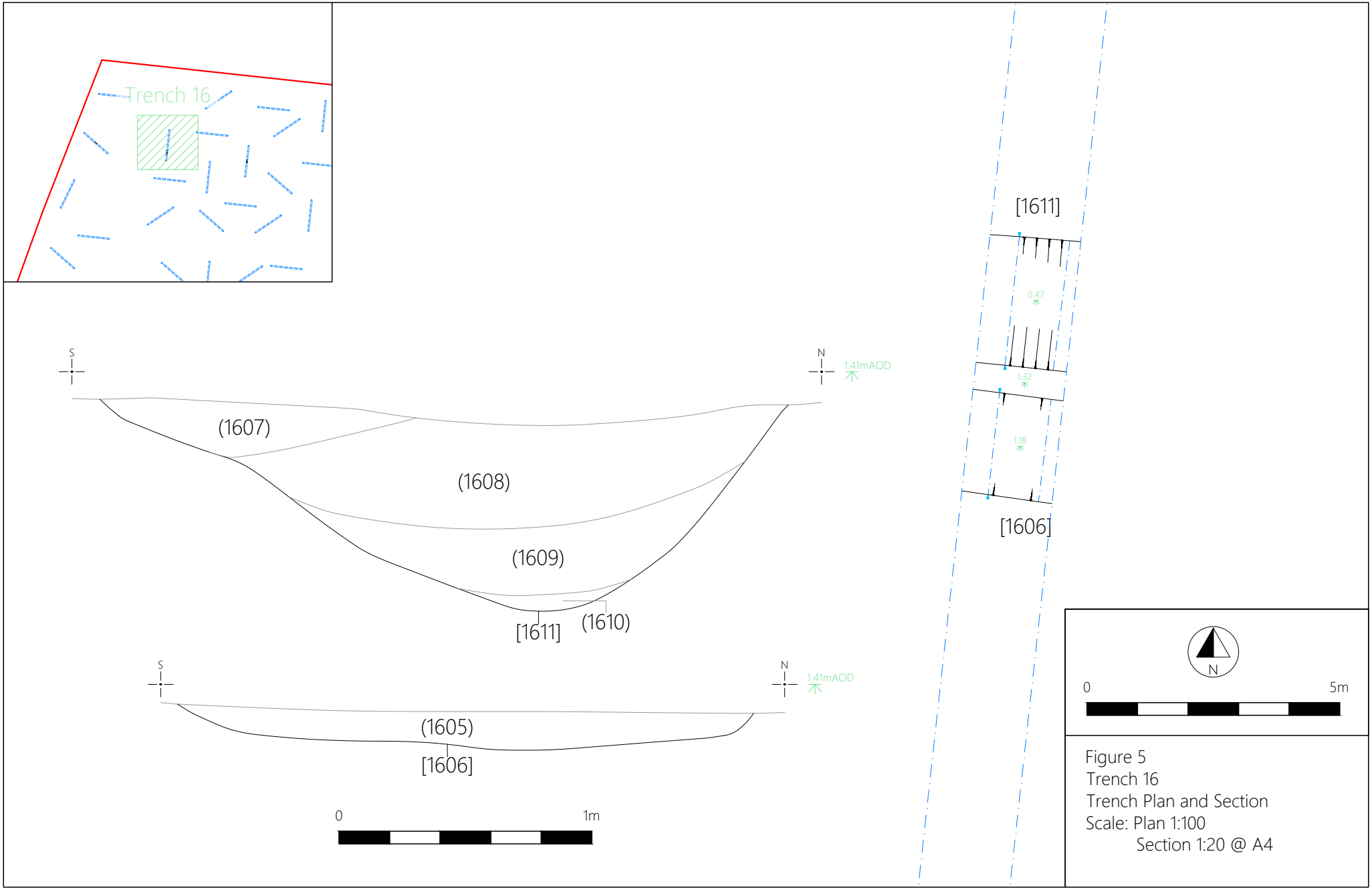

Figure 5
Trench 16
Trench Plan and Section
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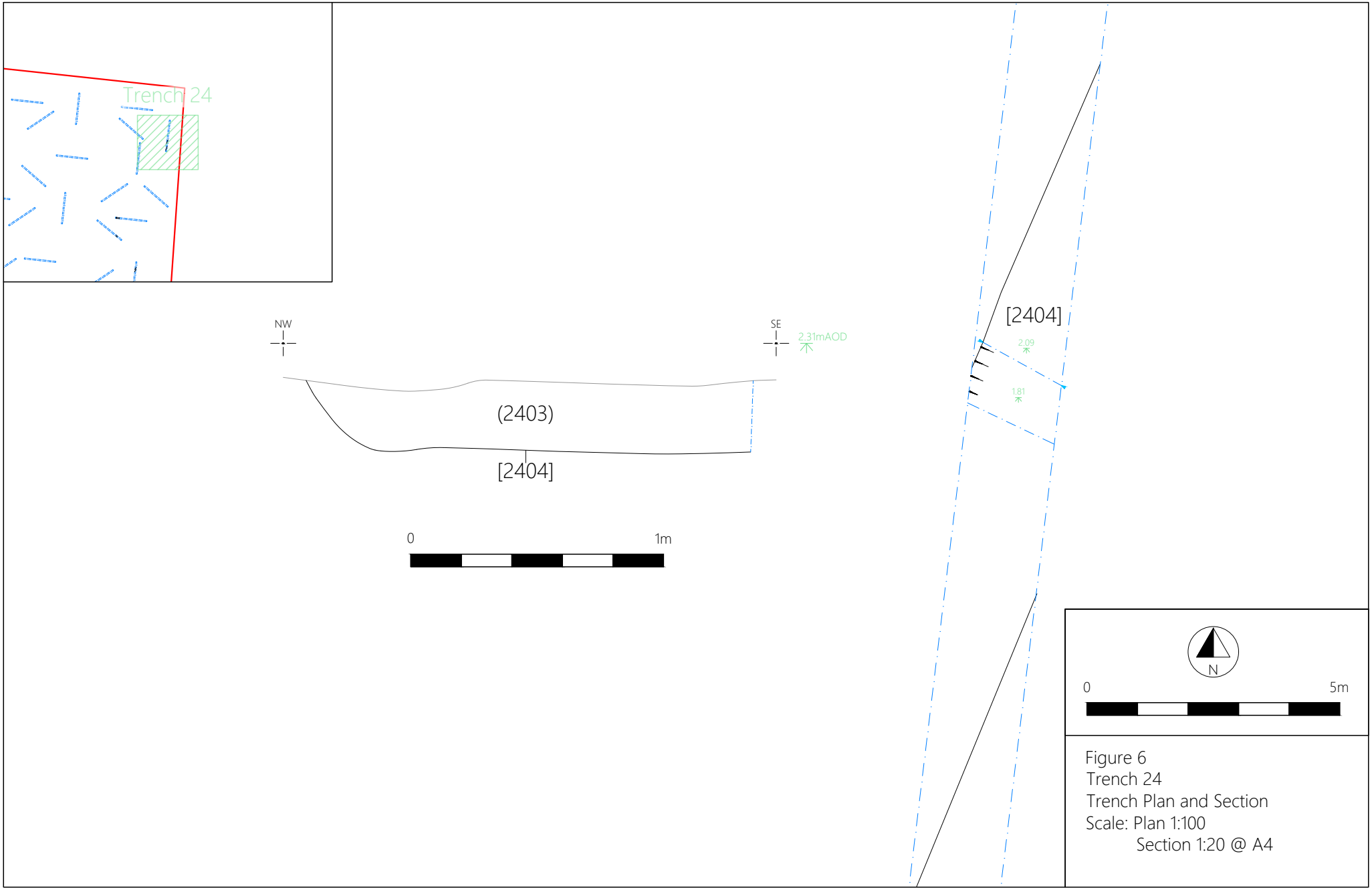

Figure 6
Trench 24
Trench Plan and Section
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Section 1:20 @ A4

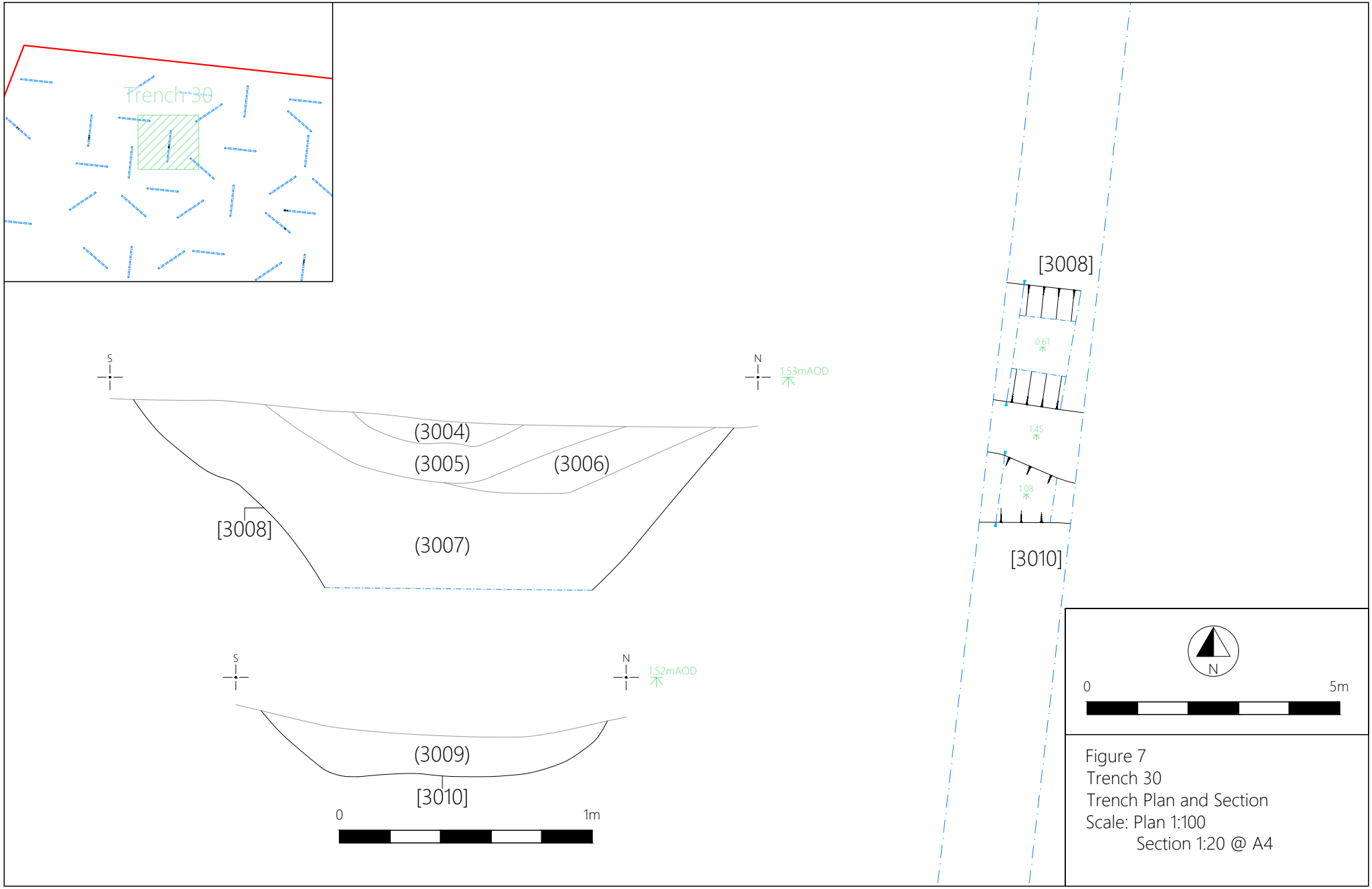

Figure 7
Trench 30
Trench Plan and Section
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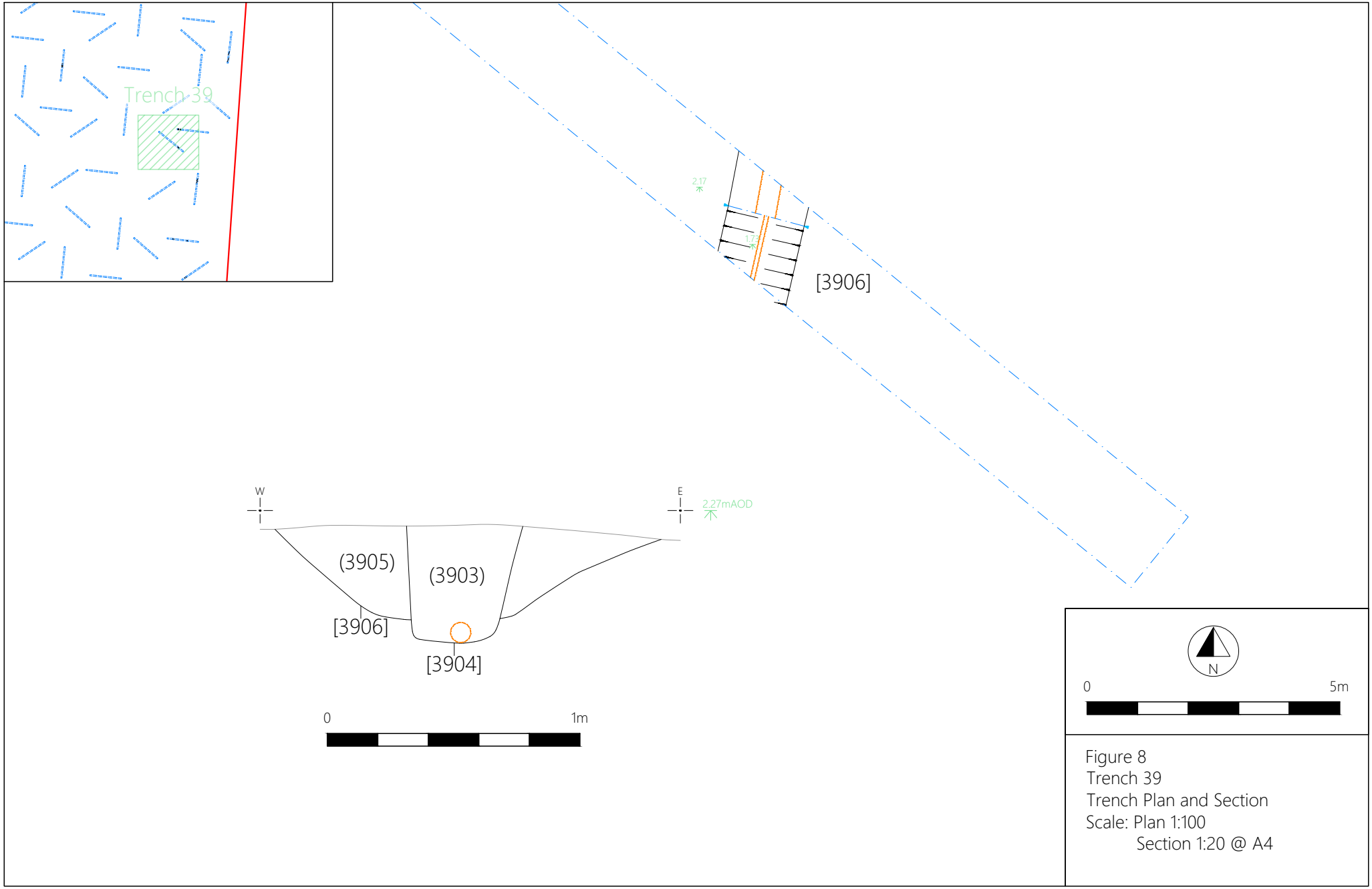

Figure 8
Trench 39
Trench Plan and Section
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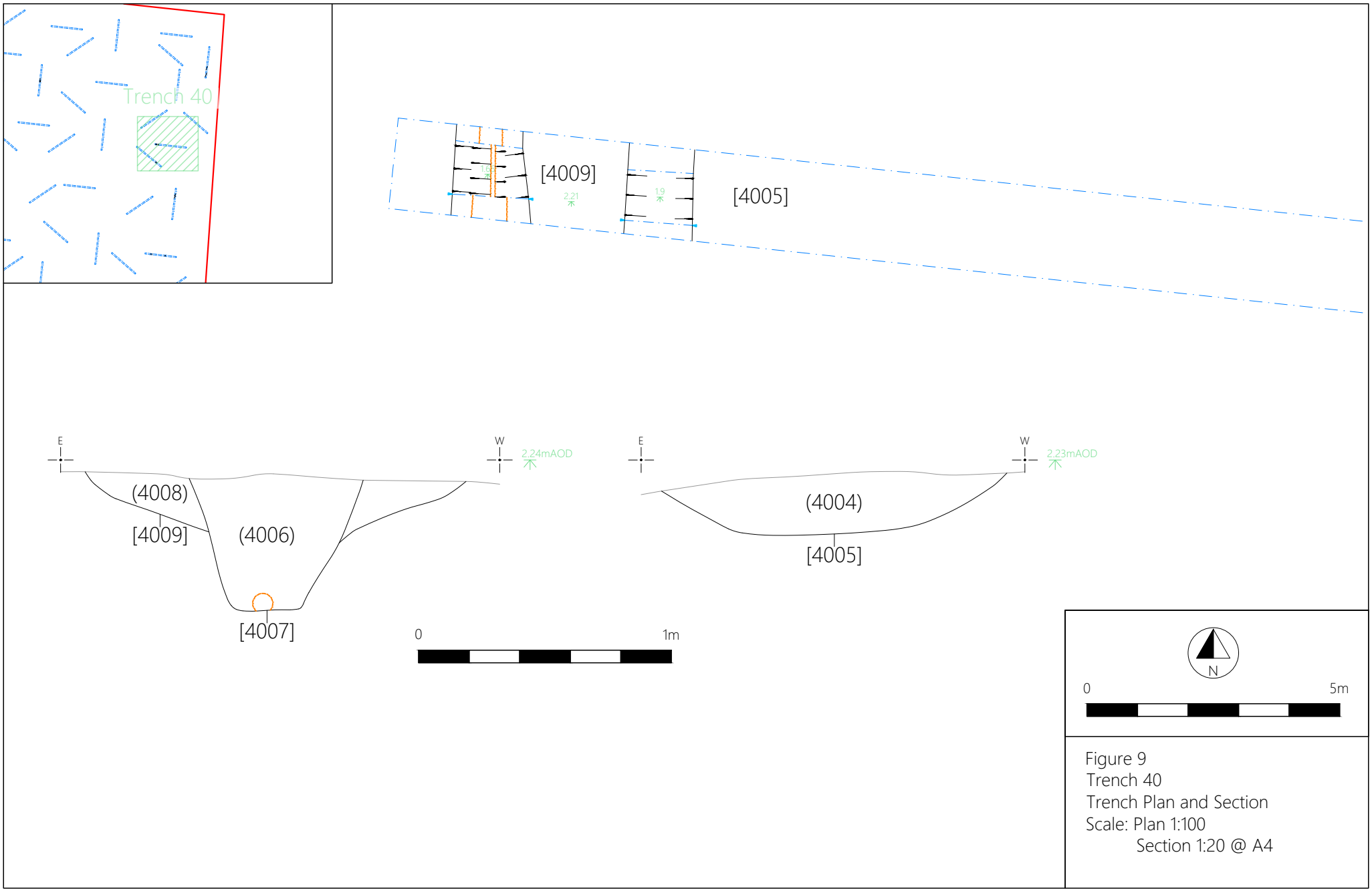

Figure 9
Trench 40
Trench Plan and Section
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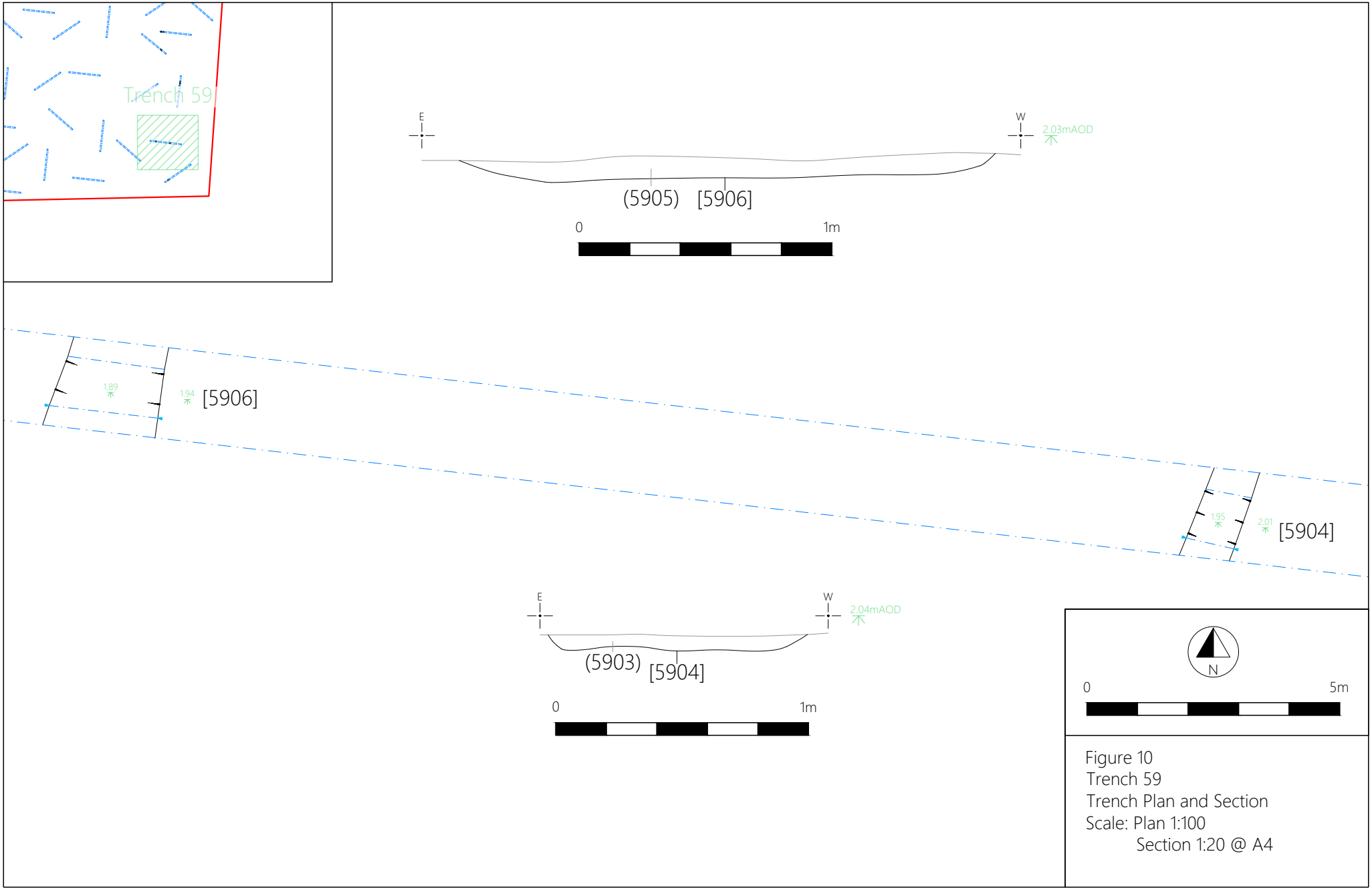


Figure 10
Trench 59
Trench Plan and Section
Scale: Plan 1:100
Section 1:20 @ A4

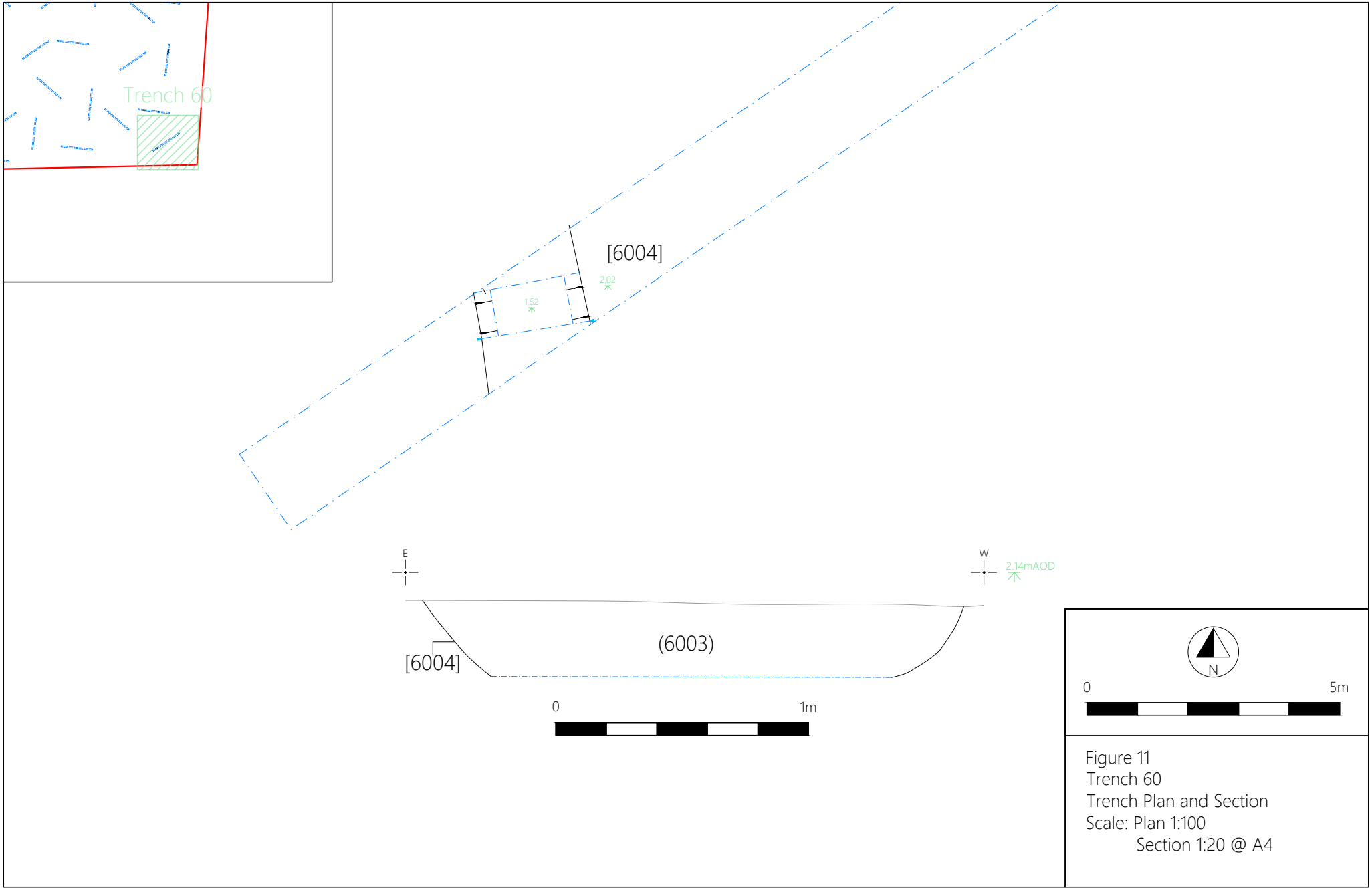
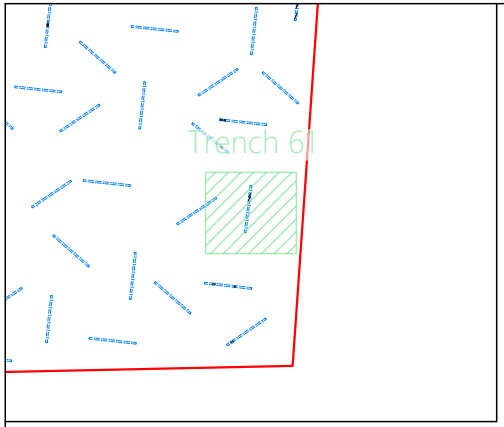
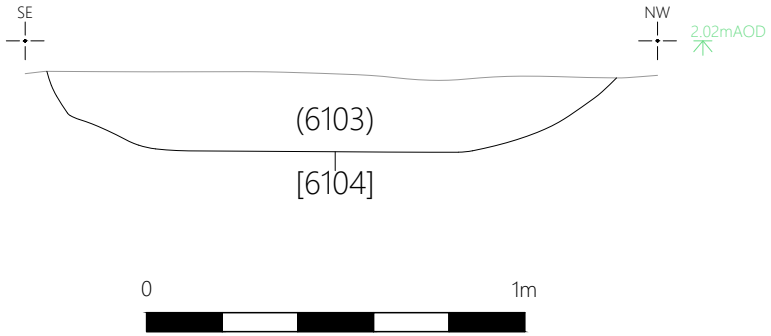
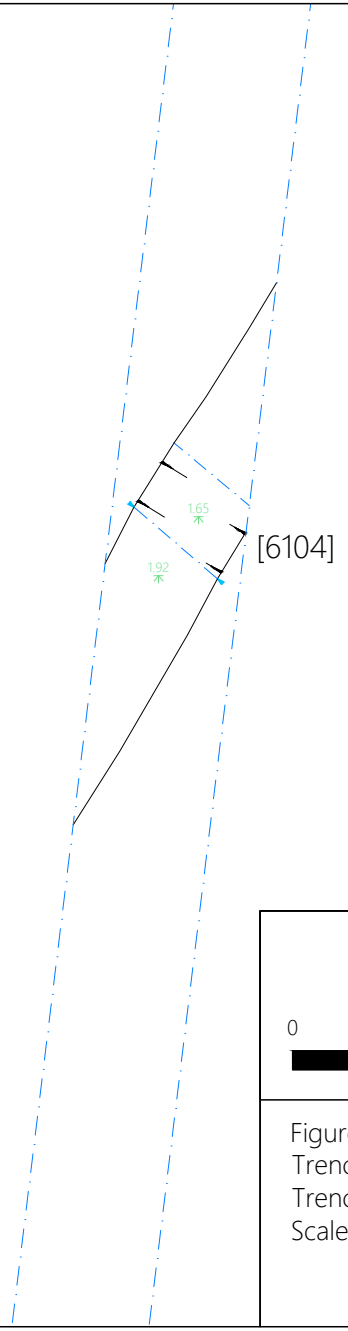


Figure 11
Trench 60
Trench Plan and Section
Scale: Plan 1:100
Section 1:20 @ A4







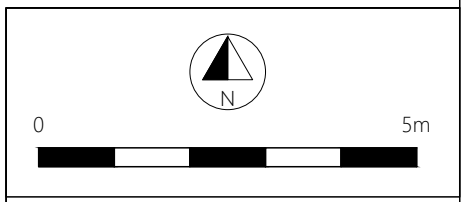


Figure 12
Trench 61
Trench Plan and Section
Scale: Plan 1:100
Section 1:20 @ A4

APPENDIX 1

Context Listing

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
1401	Layer			14	Topsoil of Trench 14 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 14
1402	Layer			14	Warping deposit of Trench 14 Colour: mid greyish brown Composition: medium clayey sand Compaction: moist, firm	Warping deposits in Trench 14
1403	Layer			14	Peat of Trench 14 Colour: dark black Composition: peat Compaction: waterlogged, friable	Organic layer below warping deposits in Trench 14
1404	Layer			14	Windblown sand of Trench 14 Colour: light yellowish grey Composition: medium sand Compaction: moist, loose	Windblown sand deposit in Trench 14
1501	Layer			15	Topsoil of Trench 15 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 15
1502	Layer			15	Warping deposits of Trench 15 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Warping deposit in Trench 15 Appears to become thicker to NW
1503	Layer			15	Peat layer of Trench 15 Colour: dark black Composition: peat Compaction: waterlogged, friable	Organic horizon below warping deposits in Trench 15
1504	Layer			15	Windblown sand of Trench 15 Colour: light yellowish grey Composition: medium sand Compaction: moist, loose	Windblown sand layer in Trench 15
1505	Fill	Ditch	1508	15	Fill of ditch [1508] Colour: mid greyish brown Composition: fine silty sand Compaction: wet, loose	Main fill of ditch - natural accumulation
1506	Fill	Ditch	1508	15	Fill of ditch [1508] Colour: dark brownish grey Composition: fine silty sand Compaction: wet, loose	Slumping fill of ditch - naturally deposited

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
1507	Fill	Ditch	1508	15	Fill of ditch [1508] Colour: mid brownish yellow Composition: silty sand Compaction: wet, loose	Lower fill of ditch - naturally accumulated
1508	Cut	Ditch		15	Cut of NE-SW ditch Shape in plan: regular, linear Break at top: sharp Sides: moderate, concave Break at base: gradual Base: uneven	Cut of large ditch running NE - SW across site Possible boundary
1601	Layer			16	Topsoil of Trench 16 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 16
1602	Layer			16	Warping deposit of Trench 16 Colour: mid yellowish brown Composition: clayey sand Compaction: moist, firm	Warping deposits in Trench 16
1603	Layer			16	Peat of Trench 16 Colour: dark greyish black Composition: peat Compaction: waterlogged, friable	Organic deposit underlying warping layer in Trench 16
1604	Layer			16	Windblown sand of Trench 16 Colour: mid brownish orange Composition: medium sand Compaction: wet, loose	Layer of natural sand under the warping layer and organic layer
1605	Fill	Gully	1606	16	Fill of gully [1606] Colour: mid brownish grey Composition: sandy clay Compaction: wet, friable	Fill of a possible hedge row, due to natural accumulation
1606	Cut	Gully		16	Cut of E-W gully Shape in plan: linear Break at top: gradual Sides: shallow, concave Break at base: gradual Base: flat	Cut of a possible E-W hedgerow with one natural fill Runs parallel to ditch [1611]
1607	Fill	Ditch	1611	16	Fill of ditch [1611] Colour: mid brownish grey Composition: sandy clay Compaction: wet, friable	Upper fill of Ditch possibly due to natural accumulation
1608	Fill	Ditch	1611	16	Fill of ditch [1611] Colour: dark greyish brown Composition: sandy clay Compaction: moist, loose	Fill of ditch due to natural accumulation
1609	Fill	Ditch	1611	16	Fill of ditch [1611] Colour: light brownish grey Composition: sandy clay Compaction: wet, friable	Fill of Ditch possibly due to natural accumulation

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
1610	Fill	Ditch	1611	16	Fill of ditch [1611] Colour: strong black Composition: peat Compaction: wet, friable	Lower peat layer - naturally accumulated
1611	Cut	Ditch		16	Cut of E-W ditch Shape in plan: linear Break at top: gradual Sides: steep, concave Break at base: gradual Base: rounded	Cut of large ditch running E-W with four natural accumulated fills
1701	Layer			17	Topsoil of Trench 17 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 17
1702	Layer			17	Warping deposit of Trench 17 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 17
1703	Layer			17	Peat of Trench 17 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat in trench 17
1801	Layer			18	Topsoil of Trench 18 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of Trench 18
1802	Layer			18	Warping deposit of Trench 18 Colour: mid greyish brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 18
1803	Layer			18	Peat of Trench 18 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat in Trench 18
1901	Layer			19	Topsoil of Trench 19 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 19
1902	Layer			19	Warping of Trench 19 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Warping deposit in Trench 19
1903	Layer			19	Peat of Trench 19 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat deposit under warping in Trench 19

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
2001	Layer			20	Topsoil of Trench 20 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 20
2002	Layer			20	Warping deposits of Trench 20 Colour: mid orangey brown Composition: fine sandy clay Compaction: moist, firm	Warping deposit in Trench 20
2003	Layer			20	Peat of Trench 20 Colour: dark black Composition: peat Compaction: waterlogged, friable	Organic deposit below warping in Trench 20
2101	Layer			21	Topsoil of Trench 21 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 21
2102	Layer			21	Warping deposit of Trench 21 Colour: mid orangey brown Composition: fine sandy clay Compaction: moist, firm	Warping deposit in Trench 21
2103	Layer			21	Peat of Trench 21 Colour: dark black Composition: sandy peat Compaction: waterlogged, friable	Peaty organic layer seen at north end of trench 21
2104	Layer			21	Windblown sand of Trench 21 Colour: light brownish grey Composition: coarse clayey sand Compaction: wet, loose	Windblown sands in Trench 21
2201	Layer			22	Topsoil of Trench 22 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 22
2202	Layer			22	Warping deposit of Trench 22 Colour: mid orangey brown Composition: fine sandy clay Compaction: moist, firm	Warping deposit in Trench 22
2203	Layer			22	Peat of Trench 22 Colour: dark black Composition: fine peat Compaction: waterlogged, friable	Peat or organic horizon in Trench 22
2204	Layer			22	Windblown sand of Trench 22 Colour: mid brownish grey Composition: medium sand Compaction: waterlogged, loose	Windblown sand layer in base of trench 22

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
2301	Layer			23	Topsoil of Trench 23 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 23
2302	Layer			23	Windblown sand of Trench 23 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand of Trench 23
2401	Layer			24	Topsoil of Trench 24 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 24
2402	Layer			24	Windblown sand of Trench 24 Colour: mid yellowish orange Composition: fine sand Compaction: moist, loose	Windblown sand of Trench 24
2403	Fill	Ditch	2404	24	Fill of gully [2404] Colour: light brown Composition: fine clayey sand Compaction: waterlogged, loose	Single fill of ditch Mottled windblown sand Deposit appear to contain more clay to the north and south Might suggest a warping drain
2404	Cut	Ditch		24	Cut of NE-SW gully Shape in plan: regular, linear Break at top: gradual Sides: shallow, concave Break at base: sharp Base: flat	Cut of modern shallow gully May represent a warping drain
2501	Layer			25	Topsoil of Trench 25 Colour: dark greyish brown Composition: silty clay Compaction: wet, friable	Topsoil in Trench 25
2502	Layer			25	Warping deposit of Trench 25 Colour: mid orangey brown Composition: fine sandy clay Compaction: moist, firm	Warping deposit Trench 25
2503	Layer			25	Peat of Trench 25 Colour: dark black Composition: fine peat Compaction: waterlogged, friable	Peat or organic deposit in Trench 25
2504	Layer			25	Organic sand of Trench 25 Colour: dark brown Composition: medium peaty sand Compaction: waterlogged, loose	Sandy organic layer in Trench 25

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
2505	Layer			25	Windblown sand of Trench 25 Colour: mid brownish grey Composition: medium sand Compaction: waterlogged, loose	Windblown sand deposit in Trench 25
2601	Layer			26	Topsoil of Trench 26 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 26
2602	Layer			26	Windblown sand of Trench 26 Colour: mid greyish brown Composition: fine sand Compaction: moist, loose	Windblown sand in Trench 26
2603	Layer			26	Organic deposit of Trench 26 Colour: dark brownish black Composition: medium peaty sand Compaction: wet, firm	Buried organic deposit in Trench 26
2604	Layer			26	Windblown sand of Trench 26 Colour: mid greyish brown Composition: medium sand Compaction: waterlogged, loose	Cover sand deposit in Trench 26
2701	Layer			27	Topsoil of Trench 27 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 27
2702	Layer			27	Warping deposit of Trench 27 Colour: mid brownish grey Composition: sandy clay Compaction: moist, loose	Warping deposit in Trench 27
2703	Layer			27	Organic sand of Trench 27 Colour: mid blackish grey Composition: fine sand Compaction: waterlogged, loose	Organic sand in Trench 27
2801	Layer			28	Topsoil of Trench 28 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 28
2802	Layer			28	Warping deposit of Trench 28 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in Trench 28
2803	Layer			28	Peat of Trench 28 Colour: dark black Composition: sandy peat Compaction: waterlogged, friable	Organic layer below warping in Trench 28

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
2901	Layer			29	Topsoil of Trench 29 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 29
2902	Layer			29	Warping deposit of Trench 29 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 29
2903	Layer			29	Windblown sand deposit of Trench 29 Colour: light yellowish grey Composition: medium sand Compaction: moist, loose	Windblown sand deposit in Trench 29
2904	Layer			29	Organic layer of Trench 29 Colour: dark greyish black Composition: sandy peat Compaction: wet, loose	Organic peaty layer in Trench 29 between two deposits of windblown sand
2905	Layer			29	Windblown sand of Trench 29 Colour: light yellowish grey Composition: medium sand Compaction: waterlogged, loose	Lower windblown sand deposit
3001	Layer			30	Topsoil of Trench 30 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 30
3002	Layer			30	Warping deposits of Trench 30 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 30
3003	Layer			30	Peat of Trench 30 Colour: dark black Composition: fine peat Compaction: waterlogged, friable	Peaty organic deposit below warping deposits
3004	Fill	Ditch	3008	30	Fill of ditch [3008] Colour: dark greyish black Composition: silty clay Compaction: wet, friable	Upper fill of Ditch, more than likely natural accumulation with the possibility of human action of a brick, having been placed or thrown into the ditch
3005	Fill	Ditch	3008	30	Fill of ditch [3008] Colour: light greyish brown Composition: silty clay Compaction: wet, friable	Fill of ditch, centralised possible due to gradual accumulation
3006	Fill	Ditch	3008	30	Fill of ditch [3008] Colour: dark greyish brown Composition: silty clay Compaction: wet, friable	Natural slumping from the Northern edge of the fill certainly after the lower fill of (3007) has accumulated The fillnwas quite mottled

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
3007	Fill	Ditch	3008	30	Fill of ditch [3008] Colour: mid greyish brown Composition: silty clay Compaction: waterlogged, malleable	Lowest fill noticeable due to not bottoming the ditch due to the water table and slumping of the edges being quite high This fill is possible of natural accumulation over a gradual period
3008	Cut	Ditch		30	Cut of E-W ditch Shape in plan: regular, linear Break at top: sharp Sides: moderate	Cut of a EW linear ditch, possible used as a boundary ditch to split farming field systems
3009	Fill	Gully	3010	30	Fill of gully [3010] Colour: mid greyish brown Composition: fine clayey sand Compaction: wet, loose	Single fill of gully / placement for a hedge Naturally deposited windblown silty sand with patches of clay Patchy on the surface and in
3010	Cut	Gully		30	Cut of E-W gully Shape in plan: regular, linear Break at top: gradual Sides: shallow, concave Break at base: gradual Base: flat	Cut of possible gully or the placement of a hedge
3101	Layer			31	Topsoil of Trench 31 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 31
3102	Layer			31	Warping deposit of Trench 31 Colour: light yellowish orange Composition: sandy clay Compaction: moist, friable	Warping deposits in Trench 31
3201	Layer			32	Topsoil of Trench 32 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 32
3202	Layer			32	Warping deposit of Trench 32 Colour: mid greyish brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 32
3203	Layer			32	Peat of Trench 32 Colour: dark black Composition: fine peat Compaction: waterlogged, friable	Peat deposit in Trench 32
3204	Layer			32	Windblown sand of Trench 32 Colour: light greyish white Composition: fine sand Compaction: moist, loose	Windblown sand deposit in Trench 32

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
3301	Layer			33	Topsoil of Trench 33 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of Trench 33
3302	Layer			33	Warping deposit of Trench 33 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Warping deposit in Trench 33
3303	Layer			33	Peat of Trench 33 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat in Trench 33
3304	Layer			33	Windblown sand of Trench 33 Colour: light brownish white Composition: silty sand Compaction: moist, loose	Windblown sand deposit of Trench 33
3401	Layer			34	Topsoil of Trench 34 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 34
3402	Layer			34	Warping deposit of Trench 34 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Warping deposit in trench 34
3403	Layer			34	Peat of Trench 34 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat in Trench 34
3404	Layer			34	Windblown sand of Trench 34 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand in Trench 34
3501	Layer			35	Topsoil of Trench 35	Topsoil of trench 35
3502	Layer			35	Warping deposit of Trench 35 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits on Trench 35
3503	Layer			35	Peat of Trench 35 Colour: dark greyish black Composition: sandy peat Compaction: waterlogged, friable	Organic peaty layer in Trench 35
3504	Layer			35	Windblown sand of Trench 35 Colour: light yellowish grey Composition: medium sand Compaction: moist, loose	Windblown sand layer only seen in TP35 1

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
3505	Layer			35	Windblown sand of Trench 35 Colour: mid orange Composition: coarse sand Compaction: waterlogged, cemented	Windblown sand, only seen in TP35 2 Not bottomed
3601	Layer			36	Topsoil of Trench 36 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 36
3602	Layer			36	Warping deposit of Trench 36 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in Trench 36
3603	Layer			36	Peat of Trench 36 Colour: dark black Composition: fine peat Compaction: waterlogged, friable	Peat & organic deposit in Trench 36
3604	Layer			36	Windblown sand of Trench 36 Colour: light yellowish grey Composition: medium sand Compaction: moist, loose	Windblown sand in Trench 36
3701	Layer			37	Topsoil of Trench 37 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 37
3702	Layer			37	Warping deposit of Trench 37 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping layer in Trench 37
3703	Layer			37	Peat of Trench 37 Colour: mid blackish grey Composition: sandy peat Compaction: waterlogged, friable	Sandy organic deposit below warping in Trench 37
3704	Layer			37	Windblown sand of Trench 37 Colour: light grey Composition: medium sand Compaction: moist, loose	Windblown sand in Trench 37
3801	Layer			38	Topsoil of Trench 38 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 38
3802	Layer			38	Warping of Trench 38 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in Trench 38

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
3803	Layer			38	Peat of Trench 38 Colour: mid blackish grey Composition: sandy peat Compaction: waterlogged, friable	Organic deposit in Trench 38
3804	Layer			38	Windblown sand of Trench 38 Colour: mid yellowish grey Composition: medium sand Compaction: wet, firm	Cover sands Distinctly more clayey than nearby trenches
3901	Layer			39	Topsoil of Trench 39 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 39
3902	Layer			39	Windblown sand of Trench 39 Colour: light yellowish brown Composition: medium sand Compaction: moist, loose	Windblown sand in Trench 39
3903	Fill	Field drain	3904	39	Fill of field drain [3904] Colour: mid brown Composition: sandy silt Compaction: wet, friable	Fill of field drain cut
3904	Cut	Field drain		39	Cut of field drain Shape in plan: regular, linear Break at top: sharp Sides: steep, straight Break at base: sharp Base: flat	Cut to insert ceramic field drain
3905	Fill	Ditch	3906	39	Fill of ditch [3906] Colour: mid brown Composition: sandy silt Compaction: moist, loose	Fill of probable post med field ditch
3906	Cut	Ditch		39	Cut of N-S ditch Shape in plan: regular, linear Break at top: sharp Sides: moderate, straight Break at base: gradual Base: flat	Possible field boundary or ditch Recut by ceramic field drain
4001	Layer			40	Topsoil of Trench 40 Colour: mid brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 40
4002	Layer			40	Warping deposit of Trench 40 Colour: light yellowish brown Composition: sandy clay Compaction: wet, firm	Warping deposit Only present at west end of Trench 40
4003	Layer			40	Windblown sand of Trench 40 Colour: light brown Composition: fine silty sand Compaction: moist, loose	Windblown sand in Trench 40

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
4004	Fill	Ditch	4005	40	Fill of ditch [4005] Colour: mid greyish brown Composition: sandy silt Compaction: moist, loose	Fill of shallow linear feature Possible channel or warping drain
4005	Cut	Ditch		40	Cut of N-S ditch Shape in plan: regular, linear Break at top: sharp Sides: shallow, concave Break at base: gradual Base: flat	Cut of linear feature Possible warping channel or drain
4006	Fill	Field drain	4007	40	Fill of field drain [4007] Colour: mid greyish brown Composition: sandy clay Compaction: wet, firm	Fill of field drain cut
4007	Cut	Field drain		40	Cut of N-S field drain Shape in plan: regular, linear Break at top: sharp Sides: steep, straight Break at base: sharp Base: flat	Cut to insert a ceramic field drain Recuts a backfilled ditch
4008	Fill	Ditch	4009	40	Fill of ditch [4009] Colour: mid greyish brown Composition: sandy clay Compaction: wet, firm	Fill of probable post med field ditch
4009	Cut	Ditch		40	Cut of N-S ditch Shape in plan: regular, linear Break at top: sharp Sides: shallow, concave Break at base: gradual Base: flat	Cut of probable post med field ditch Recut by insertion of ceramic field drain [4007]
4101	Layer			41	Topsoil of Trench 41 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 41
4102	Layer			41	Warping of Trench 41 Colour: mid greyish brown Composition: sandy clay Compaction: wet, malleable	Warping deposit from 18-19th century farming activity
4103	Layer			41	Sandy organic of Trench 41 Colour: strong black Composition: fine silty sand Compaction: moist, friable	Organic sand deposit below warping deposit
4104	Layer			41	Windblown sand of Trench 41 Colour: mid greyish brown Composition: fine silty sand Compaction: moist, loose	Windblown sand in Trench 41

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
4201	Layer			42	Topsoil of Trench 42 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 42
4202	Layer			42	Warping deposit of Trench 42 Colour: mid brownish grey Composition: silty clay Compaction: moist, firm	Deposit of warping material overlying coversand (4403)
4203	Layer			42	Windblown sand of Trench 42 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand layer in Trench 42 Shown in TP42 2 at East end of trench to be 0 42m in thickness and overlie a narrow band of organic material Thinner at west end of trench in TP42 1, where it is covered by warping deposit (4202)
4204	Layer			42	Peat of Trench 42 Colour: dark greyish black Composition: sandy loam Compaction: wet, malleable	Narrow organic band in Trench 42 Resembles peat, but may represent a buried ground surface
4205	Layer			42	Windblown sand of Trench 42 Colour: mid grey Composition: medium sand Compaction: waterlogged, loose	Deposit of windblown / cover sands in Trench 42 Lies under organic / peat deposit (4203)
4301	Layer			43	Topsoil of Trench 43 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 43
4302	Layer			43	Windblown sand of Trench 43 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand layer in Trench 43 Excavated in two yest pits and not bottomed
4401	Layer			44	Topsoil of Trench 44 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 44
4402	Layer			44	Warping deposit of Trench 44 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in Trench 44
4403	Layer			44	Peat of Trench 44 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat below warping deposits

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
4404	Layer			44	Windblown sand of Trench 44 Colour: light yellowish grey Composition: medium sand Compaction: waterlogged, loose	Windblown sand in Trench 44
4501	Layer			45	Topsoil of Trench 45 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil for trench 45
4502	Layer			45	Warping layer of Trench 45 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in Trench 45
4503	Layer			45	Peat of Trench 45 Colour: dark greyish black Composition: fine sandy peat Compaction: wet, loose	Peat or buried ground surface in Trench 45
4504	Layer			45	Windblown sand of Trench 45 Colour: light yellowish grey Composition: medium silty sand Compaction: moist, loose	Windblown sand of Trench 45
4601	Layer			46	Topsoil of Trench 46 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil for trench 46
4602	Layer			46	Warping deposit of Trench 46 Colour: mid orangey brown Composition: clay Compaction: moist, firm	Warping deposits in Trench 46
4603	Layer			46	Organic layer of Trench 46 Colour: dark greyish black Composition: sandy peat Compaction: wet, loose	Thin organic horizon beneath warping deposits and above sands in Trench 46 Some mixing with sands
4604	Layer			46	Windblown sand of Trench 46 Colour: light whitish grey Composition: medium sand Compaction: moist, loose	Windblown sand in Trench 46
4701	Layer			47	Topsoil of Trench 47 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 47
4702	Layer			47	Warping deposit of Trench 47 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Warping deposit in trench 47

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
4703	Layer			47	Peat of Trench 47 Colour: dark black Composition: peat Compaction: waterlogged, friable	Peat in trench 47
4704	Layer			47	Windblown sand of Trench 47 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand deposit in Trench 47
4801	Layer			48	Topsoil of Trench 48 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of Trench 48
4802	Layer			48	Warping deposit of Trench 48 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Warping deposit in Trench 48
4803	Layer			48	Windblown sand of Trench 48 Colour: light yellowish white Composition: fine sand Compaction: moist, loose	Windblown sand in Trench 48
4901	Layer			49	Topsoil of Trench 49 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of Trench 49
4902	Layer			49	Warping deposit of Trench 49 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposit in Trench 49
4903	Layer			49	Windblown sand of Trench 49 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand of Trench 49
4904	Layer			49	Clay of Trench 49 Colour: mid greyish brown Composition: clay Compaction: moist, firm	Clay layer directly above peat
4905	Layer			49	Peat of Trench 49 Colour: strong black Composition: sandy loam Compaction: moist, spongey	Peat-like deposit in Trench 49
4906	Layer			49	Windblown sand of Trench 49 Colour: light yellowish grey Composition: fine sand Compaction: moist, loose	Windblown sand below peat deposit in Trench 49

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
5001	Layer			50	Topsoil of Trench 50 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 50
5002	Layer			50	Warping deposit of Trench 50 Colour: mid orangey brown Composition: sandy clay Compaction: moist, firm	Warping deposits in trench 50
5003	Layer			50	Windblown sand of Trench 50 Colour: light yellowish orange Composition: fine silty sand Compaction: moist, loose	Windblown sand of Trench 50
5101	Layer			51	Topsoil of Trench 51 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 51
5102	Layer			51	Warping deposits of Trench 51 Colour: mid brown Composition: medium clayey sand Compaction: wet, malleable	Deposit of warped material in west of Trench 51
5103	Layer			51	Windblown sand of Trench 51 Colour: light orangey yellow Composition: fine sand Compaction: moist, friable	Windblown sand layer in Trench 51 Different to sand layer in nearby trenches, much softer and less clayey, very mottled mix of black, brown, orange, yellow and grey
5104	Layer			51	Peat of Trench 51 Colour: dark greyish black Composition: sandy peat Compaction: wet, loose	Deposit of peat or buried ground surface in Trench 51
5105	Layer			51	Windblown sand of Trench 51 Colour: light grey Composition: medium sand Compaction: wet, loose	Deposit of cover sands / windblown sands in Trench 51
5201	Layer			52	Topsoil of Trench 52 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 52
5202	Layer			52	Warping deposits of Trench 52 Colour: mid brownish orange Composition: sandy clay Compaction: moist, malleable	Warping deposits in Trench 52
5203	Layer			52	Peaty sand of Trench 52 Colour: dark greyish black Composition: sandy peat Compaction: wet, loose	Black organic peaty sand in Trench 52

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
5204	Layer			52	Windblown sand of Trench 52 Colour: light grey Composition: medium sand Compaction: wet, loose	Grey windblown sand at SW end of trench 52
5205	Layer			52	Windblown sand of Trench 52 Colour: dark brownish black Composition: coarse sand Compaction: waterlogged, firm	Lower dark sand in TP52 1
5301	Layer			53	Topsoil of Trench 53 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 53
5302	Layer			53	Warping deposit of Trench 53 Colour: mid brownish orange Composition: fine sandy clay Compaction: moist, malleable	Warping deposits in Trench 53
5303	Layer			53	Peat of Trench 53 Colour: very dark black Composition: sandy peat Compaction: wet, friable	Peaty organic sand deposit in Trench 53
5304	Layer			53	Windblown sand of Trench 53 Colour: mid orangey brown Composition: medium sand Compaction: waterlogged, loose	Windblown sand deposit in trench 53
5401	Layer			54	Topsoil of Trench 54 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 54
5402	Layer			54	Warping deposits of Trench 54 Colour: mid brownish orange Composition: medium clayey sand Compaction: moist, loose	Warping deposits in Trench 54
5403	Layer			54	Peat of Trench 54 Colour: dark black Composition: peat Compaction: wet, loose	Organic peat layer below warping deposits in Trench 54
5404	Layer			54	Windblown sand of Trench 54 Colour: mid yellowish grey Composition: medium sand Compaction: waterlogged, loose	Windblown sands in Trench 54
5501	Layer			55	Topsoil of Trench 55 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 55

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
5502	Layer			55	Windblown sand of Trench 55 Colour: light orangey yellow Composition: fine sand Compaction: moist, friable	Windblown sand layer in Trench 55 Same colouring and consistency as 5102 TP55 1 reached base of deposit 0 40m below excavated level TP55 2 in centre of trench did not bottom deposit at 0 40m below excavated level
5503	Layer			55	Peat of Trench 55 Colour: dark brownish black Composition: sandy loam Compaction: waterlogged, spongey	Deposit of peat below cover sands in Trench 55 Quite fine material with some organic content surviving
5601	Layer			56	Topsoil of Trench 56 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil of trench 56
5602	Layer			56	Windblown sand of Trench 56 Colour: light orangey yellow Composition: fine sand Compaction: moist, friable	Windblown sand in trench 56
5701	Layer			57	Topsoil of Trench 57 Colour: dark greyish brown Composition: sandy clay Compaction: moist, malleable	Topsoil in Trench 57
5702	Layer			57	Warping deposit of Trench 57 Colour: mid brownish orange Composition: medium clayey sand Compaction: moist, loose	Warped deposit in Trench 57
5703	Layer			57	Organic sand of Trench 57 Colour: dark greyish black Composition: medium sand Compaction: wet, loose	Black organic sand in Trench 57
5704	Layer			57	Windblown sand of Trench 57 Colour: mid yellowish orange Composition: sand Compaction: waterlogged, loose	Windblown sands in Trench 57
5801	Layer			58	Topsoil of Trench 58 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 58

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
5802	Layer			58	Warping of Trench 58 Colour: mid brownish orange Composition: medium clayey sand Compaction: moist, loose	Warping deposits in Trench 58
5803	Layer			58	Windblown sand of Trench 58 Colour: mid grey Composition: medium silty sand Compaction: moist, loose	Windblown sand tr 58
5804	Layer			58	Peat of Trench 58 Colour: dark greyish black Composition: sandy peat Compaction: wet, loose	Sandy organic horizon in Trench 58
5901	Layer			59	Topsoil of Trench 59 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 59
5902	Layer			59	Windblown sand of Trench 59 Colour: mid orangey brown Composition: fine silty sand Compaction: moist, friable	Windblown sand in Trench 59
5903	Fill	Gully	5904	59	Fill of gully [5904] Colour: light orangey yellow Composition: sandy silt Compaction: wet, loose	Fill of linear feature [5904] Possible shallow warping drain Material appears silty and laminated
5904	Cut	Gully		59	Cut of N-S gully Shape in plan: regular, linear Break at top: gradual Sides: shallow, straight Break at base: gradual Base: uneven	Shallow north to south linear Possibly a truncated warping drain Fill (5903) appears to be warping silts and sands
5905	Fill	Gully	5906	59	Fill of gully [5906] Colour: brownish yellow Composition: medium clayey sand Compaction: wet, loose	Fill of possible warping channel [5906] in Trench 59
5906	Cut	Gully		59	Cut of N-S gully Shape in plan: regular, linear Break at top: gradual Sides: shallow, straight Break at base: gradual Base: uneven	Cut of shallow or possibly highly truncated linear feature Laminated deposits suggest possible warping channel
6001	Layer			60	Topsoil of Trench 60 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 60

Context no.	Type	Feature	Cut no.	Trench	Description	Interpretation
6002	Layer			60	Windblown sand of Trench 60 Colour: mid yellowish brown Composition: fine silty sand Compaction: moist, loose	Windblown sand in Trench 60
6003	Fill	Ditch	6004	60	Fill of ditch [6004] Colour: mid greyish brown Composition: fine sand Compaction: waterlogged, very loose	Natural accumulation of sand from the surrounding area Fill was very mottled throughout Post med pottery suggests recent field ditch or drain
6004	Cut	Ditch		60	Cut of N-S ditch Shape in plan: regular, linear Break at top: gradual Sides: moderate, concave	Cut of a linear feature with one natural fill Feature not bottomed due to waterlogging Shape suggests field boundary ditch Single piece of pottery in fill suggests 18th -19th century backfilling
6101	Layer			61	Topsoil of Trench 61 Colour: dark greyish brown Composition: silty clay Compaction: moist, friable	Topsoil in Trench 61
6102	Layer			61	Windblown sand of Trench 61 Colour: mid greyish brown Composition: fine silty sand Compaction: moist, loose	Windblown sand in Trench 61
6103	Fill	Gully	6104	61	Fill of gully [6104] Colour: light yellowish grey Composition: clayey silt Compaction: moist, friable	Single fill of linear gully [6104] Natural accumulation
6104	Cut	Gully		61	Cut of NE-SW gully Shape in plan: regular, linear Break at top: gradual Sides: 1) NW: shallow, concave 2) SE: moderate, concave Break at base: imperceptible Base: flat	Cut of linear gully with single fill (6103) in Trench 61 Cut into windblown sand layer (6102)

APPENDIX 2

Drawing Listing

Drawing No.	Sheet no.	Type	Description	Facing	Scale
1	1	Section	Gully [5904]	N	1:10
2	1	Plan	Gully [5904]		1:50
3	2	Section	Ditch [6004]	N	1:10
4	2	Plan	Ditch [6004]		1:50
5	2	Section	Gully [6104]	NE	1:20
6	2	Plan	Gully [6104]		1:50
7	1	Section	Gully [5906]	N	1:20
8	1	Plan	Gully [5906]		1:50
9	1	Section	Relationship of field drain [3904], ditch [3906]	S	1:20
10	1	Plan	Relationship of field drain [3904], ditch [3906]		1:50
11	1	Section	Ditch [4005]	N	1:20
12	1	Plan	Ditch [4005]		1:50
13	1	Section	Relationship of field drain [4007], ditch [4009]	N	1:20
14	1	Plan	Relationship of field drain [4007], ditch [4009]		1:50
15	3	Section	Gully [2404]	SW	1:20
16	3	Plan	Gully [2404]		1:20
17	3	Section	Ditch [3008]	E	1:20
18	3	Plan	Ditch [3008]		1:20
19	3	Section	Gully [3010]	E	1:20
20	3	Plan	Gully [3010]		1:20
21	4	Section	Gully [1606]	E	1:20
22	4	Plan	Gully [1606]		1:50
23	4	Section	Ditch [1508]	SW	1:20
24	4	Plan	Ditch [1508]		1:50

APPENDIX 3

Photo Listing

Shot no.	Trench	Description	Direction	Scale
1	18	Trench shot of Trench 18	SW	1 m
2	18	Trench shot of Trench 18	SW	1 m
3	18	Trench shot of Trench 18	NE	1 m
4	18	Trench shot of Trench 18	NE	1 m
5	19	Trench shot of Trench 19	E	1 m
6	19	Trench shot of Trench 19	E	1 m
7	19	Trench shot of Trench 19	W	1 m
8	19	Trench shot of Trench 19	W	1 m
9	19	Machine test pit Trench 19	SW	-
10	19	Machine test pit Trench 19	SW	-
11	19	Machine test pit Trench 19	SW	-
12	19	Machine test pit Trench 19	SW	-
13	21	Trench shot of Trench 21	N	1 m
14	21	Trench shot of Trench 21	N	1 m
15	21	Trench shot of Trench 21	S	1 m
16	21	Trench shot of Trench 21	S	1 m
17	28	Trench shot of Trench 28	W	1 m
18	28	Trench shot of Trench 28	E	1 m
19	20	Trench shot of Trench 20	SW	1 m
20	20	Trench shot of Trench 20	NE	1 m
21	38	Trench shot of Trench 38	S	1 m
22	38	Trench shot of Trench 38	N	1 m
23	29	Trench shot of Trench 29	SE	1 m
24	29	Trench shot of Trench 29	SE	1 m
25	29	Trench shot of Trench 29	SE	1 m
26	29	Trench shot of Trench 29	SE	1 m
27	29	Trench shot of Trench 29	SE	1 m
28	29	Trench shot of Trench 29	NW	1 m
29	29	Trench shot of Trench 29	NW	1 m
30	29	Trench shot of Trench 29	NW	1 m
31	29	Trench shot of Trench 29	NW	1 m
32	29	Trench shot of Trench 29	NW	1 m
33	37	Trench shot of Trench 37	SW	1m
34	37	Trench shot of Trench 37	SW	1m
35	37	Trench shot of Trench 37	SW	1m
36	37	Trench shot of Trench 37	SW	1m
38	37	Trench shot of Trench 37	SW	1m
39	14	Shot of Trench 14 TP14.1	N	1m
40	14	Shot of Trench 14 TP14.1	N	1m
41	14	Shot of Trench 14 TP14.1	W	1m
42	14	Shot of Trench 14 TP14.1	W	1m
43	14	Shot of Trench 14 TP14.1	NW	1m

Shot no.	Trench	Description	Direction	Scale
44	14	Shot of Trench 14 TP14.1	NW	1m
45	14	Shot of Trench 14 TP14.1	NW	1m
46	14	Shot of Trench 14 TP14.1	NW	1m
47	14	Shot of Trench 14 TP14.1	NW	1m
48	37	Trench shot of Trench 37	NE	1m
49	37	Trench shot of Trench 37	NE	1m
50	37	Trench shot of Trench 37	NE	1m
51	37	Trench shot of Trench 37	NE	1m
52	37	Trench shot of Trench 37	NE	1m
53	37	Trench shot of Trench 37	NE	1m
54	36	Trench shot of Trench 36	W	1m
55	36	Trench shot of Trench 36	W	1m
56	36	Trench shot of Trench 36	W	1m
57	36	Trench shot of Trench 36	W	1m
58	36	Trench shot of Trench 36	W	1m
59	36	Trench shot of Trench 36	E	1m
60	36	Trench shot of Trench 36	E	1m
61	36	Trench shot of Trench 36	E	1m
62	36	Trench shot of Trench 36	E	1m
63	30	Trench shot of Trench 30	S	1m
64	30	Trench shot of Trench 30	S	1m
65	30	Trench shot of Trench 30	S	1m
66	30	Trench shot of Trench 30	N	1m
67	30	Trench shot of Trench 30	N	1m
68	30	Trench shot of Trench 30	N	1m
69	30	Trench shot of Trench 30	N	1m
70	35	Trench shot of Trench 35	SE	1m
71	35	Trench shot of Trench 35	SE	1m
72	35	Trench shot of Trench 35	NW	1m
73	35	Trench shot of Trench 35	NW	1m
74	34	Trench shot of Trench 34	SW	1m
75	34	Trench shot of Trench 34	SW	1m
76	34	Trench shot of Trench 34	NE	1m
77	34	Trench shot of Trench 34	NE	1m
78	14	Shot of Trench 14 TP14.2	N	1m
79	14	Shot of Trench 14 TP14.2	N	1m
80	14	Shot of Trench 14 TP14.2	NW	1m
81	14	Shot of Trench 14 TP14.2	W	1m
82	14	Shot of Trench 14 TP14.2	W	1m
83	16	Trench shot of Trench 16	S	1m
84	16	Trench shot of Trench 16	S	1m
85	16	Trench shot of Trench 16	N	1m
86	16	Trench shot of Trench 16	N	1m
87	32	Trench shot of Trench 32	E	1m
88	32	Trench shot of Trench 32	E	1m
89	32	Trench shot of Trench 32	W	1m

Shot no.	Trench	Description	Direction	Scale
90	32	Trench shot of Trench 32	W	1m
91	32	Trench shot of Trench 32	W	1m
92	31	Trench shot of Trench 31	N	1m
93	31	Trench shot of Trench 31	N	1m
94	31	Trench shot of Trench 31	S	1m
95	31	Trench shot of Trench 31	S	1m
96	31	Trench shot of Trench 31	S	1m
97	17	Trench shot of Trench 17	W	1m
98	17	Trench shot of Trench 17	W	1m
99	17	Trench shot of Trench 17	E	1m
100	17	Trench shot of Trench 17	E	1m
101	17	Trench shot of Trench 17	E	1m
102	15	Trench shot of Trench 15	NW	1m
103	15	Trench shot of Trench 15	NW	1m
104	15	Trench shot of Trench 15	NW	1m
105	15	Trench shot of Trench 15	SE	1m
106	15	Trench shot of Trench 15	SE	1m
107	15	Trench shot of Trench 15	SE	1m
108	32	Trench shot of Trench 32	W	1m
109	32	Trench shot of Trench 32	W	1m
110	32	Trench shot of Trench 32	E	1m
111	32	Trench shot of Trench 32	E	1m
112	33	Trench shot of Trench 33	S	1m
113	33	Trench shot of Trench 33	S	1m
114	33	Trench shot of Trench 33	N	1m
115	47	Trench shot of Trench 47	SE	1m
116	47	Trench shot of Trench 47	SE	1m
117	47	Trench shot of Trench 47	NW	1m
118	47	Trench shot of Trench 47	NW	1m
119	33	Trench shot of Trench 33	N	1m
120	33	Trench shot of Trench 33	N	1m
121	33	Trench shot of Trench 33	S	1m
122	33	Trench shot of Trench 33	S	1m
123	14	Shot of Trench 14 TP14.3	W	1m
124	14	Shot of Trench 14 TP14.3	W	1m
125	14	Shot of Trench 14 TP14.3	W	1m
126	14	Shot of Trench 14 TP14.3	W	1m
127	14	Shot of Trench 14 TP14.3	NW	1m
128	14	Shot of Trench 14 TP14.3	NW	1m
129	14	Shot of Trench 14 TP14.3	NW	1m
130	48	Trench shot of Trench 48	E	1m
131	48	Trench shot of Trench 48	E	1m
132	48	Trench shot of Trench 48	W	1m
133	48	Trench shot of Trench 48	W	1m
134	49	Trench shot of Trench 49	NW	1m
135	49	Trench shot of Trench 49	NW	1m

Shot no.	Trench	Description	Direction	Scale
136	49	Trench shot of Trench 49	SE	1m
137	49	Trench shot of Trench 49	SE	1m
138	49	Trench shot of Trench 49	SE	1m
139	14	Shot of Trench 14 TP14.4	W	1m
140	14	Shot of Trench 14 TP14.4	W	1m
141	14	Shot of Trench 14 TP14.4	N	1m
142	14	Shot of Trench 14 TP14.4	NE	1m
143	14	Shot of Trench 14 TP14.5	S	1m
144	14	Shot of Trench 14 TP14.5	S	1m
145	14	Shot of Trench 14 TP14.5	W	1m
146	14	Shot of Trench 14 TP14.5	W	1m
147	14	Shot of Trench 14 TP14.5	W	1m
148	46	Trench shot of Trench 46	E	1m
149	46	Trench shot of Trench 46	W	1m
150	45	Trench shot of Trench 45	SE	1m
151	45	Trench shot of Trench 45	NW	1m
152	50	Trench shot of Trench 50	W	1m
153	50	Trench shot of Trench 50	E	1m
154	44	Trench shot of Trench 44	N	1m
155	44	Trench shot of Trench 44	S	1m
156	15	Shot of Trench 15 TP15.1	NE	1m
157	15	Shot of Trench 15 TP15.1	NE	1m
158	15	Shot of Trench 15 TP15.1	SE	1m
159	15	Shot of Trench 15 TP15.1	SE	1m
160	15	Shot of Trench 15 TP15.1	SE	1m
161	15	Shot of Trench 15 TP15.1	SE	1m
162	51	Trench shot of Trench 51	E	1m
163	51	Trench shot of Trench 51	E	1m
164	51	Trench shot of Trench 51	W	1m
165	51	Trench shot of Trench 51	W	1m
166	52	Trench shot of Trench 52	SW	1m
167	52	Trench shot of Trench 52	SW	1m
168	52	Trench shot of Trench 52	SW	1m
169	52	Trench shot of Trench 52	NE	1m
170	52	Trench shot of Trench 52	NE	1m
171	53	Trench shot of Trench 53	E	1m
172	53	Trench shot of Trench 53	E	1m
173	53	Trench shot of Trench 53	W	1m
174	53	Trench shot of Trench 53	W	1m
175	54	Trench shot of Trench 54	N	1m
176	54	Trench shot of Trench 54	N	1m
177	54	Trench shot of Trench 54	S	1m
178	54	Trench shot of Trench 54	S	1m
179	43	Trench shot of Trench 43	SW	1m
180	43	Trench shot of Trench 43	SW	1m
181	43	Trench shot of Trench 43	NE	1m

Shot no.	Trench	Description	Direction	Scale
182	43	Trench shot of Trench 43	NE	1m
183	55	Trench shot of Trench 55	SE	1m
184	55	Trench shot of Trench 55	SE	1m
185	55	Trench shot of Trench 55	NW	1m
186	55	Trench shot of Trench 55	NW	1m
187	42	Trench shot of Trench 42	E	1m
188	42	Trench shot of Trench 42	E	1m
189	42	Trench shot of Trench 42	W	1m
190	42	Trench shot of Trench 42	W	1m
191	51	Shot of Trench 51 TP51.1	NE	1m
192	51	Shot of Trench 51 TP51.1	NE	1m
193	51	Shot of Trench 51 TP51.1	SW	1m
194	51	Shot of Trench 51 TP51.1	SW	1m
195	51	Shot of Trench 51 TP51.1	SE	1m
196	51	Shot of Trench 51 TP51.1	SE	1m
197	51	Shot of Trench 51 TP51.1	S	1m
198	51	Shot of Trench 51 TP51.1	S	1m
199	23	Trench shot of Trench 23	W	1m
200	23	Trench shot of Trench 23	W	1m
201	23	Trench shot of Trench 23	E	1m
202	23	Trench shot of Trench 23	E	1m
203	22	Trench shot of Trench 22	SE	1m
204	22	Trench shot of Trench 22	SE	1m
205	22	Trench shot of Trench 22	NW	1m
206	22	Trench shot of Trench 22	NW	1m
207	24	Trench shot of Trench 24	N	1m
208	24	Trench shot of Trench 24	N	1m
209	24	Trench shot of Trench 24	S	1m
210	24	Trench shot of Trench 24	S	1m
211	25	Trench shot of Trench 25	S	1m
212	25	Trench shot of Trench 25	S	1m
213	25	Trench shot of Trench 25	N	1m
214	25	Trench shot of Trench 25	N	1m
215	51	Shot of Trench 51 TP51.2	E	1m
216	51	Shot of Trench 51 TP51.2	E	1m
217	51	Shot of Trench 51 TP51.2	E	1m
218	51	Shot of Trench 51 TP51.2	S	1m
219	51	Shot of Trench 51 TP51.2	S	1m
220	27	Trench shot of Trench 27	NE	1m
221	27	Trench shot of Trench 27	NE	1m
222	27	Trench shot of Trench 27	SW	1m
223	27	Trench shot of Trench 27	SW	1m
224	26	Trench shot of Trench 26	SE	1m
225	26	Trench shot of Trench 26	SE	1m
226	26	Trench shot of Trench 26	NW	1m
227	26	Trench shot of Trench 26	NW	1m

Shot no.	Trench	Description	Direction	Scale
228	40	Trench shot of Trench 40	W	1m
229	40	Trench shot of Trench 40	W	1m
230	40	Trench shot of Trench 40	E	1m
231	40	Trench shot of Trench 40	E	1m
232	39	Trench shot of Trench 39	SE	1m
233	39	Trench shot of Trench 39	SE	1m
234	39	Trench shot of Trench 39	NW	1m
235	39	Trench shot of Trench 39	NW	1m
236	51	Shot of Trench 51 TP51.3	N	1m
237	51	Shot of Trench 51 TP51.3	N	1m
238	51	Shot of Trench 51 TP51.3	NE	1m
239	51	Shot of Trench 51 TP51.3	NE	1m
240	51	Shot of Trench 51 TP51.3	E	1m
241	51	Shot of Trench 51 TP51.3	E	1m
242	51	Shot of Trench 51 TP51.3	E	1m
243	51	Shot of Trench 51 TP51.3	SE	1m
244	51	Shot of Trench 51 TP51.3	SE	1m
245	51	Shot of Trench 51 TP51.4	N	1m
246	51	Shot of Trench 51 TP51.4	N	1m
247	51	Shot of Trench 51 TP51.4	NE	1m
248	51	Shot of Trench 51 TP51.4	E	1m
249	51	Shot of Trench 51 TP51.4	E	1m
250	51	Shot of Trench 51 TP51.4	SE	1m
251	41	Trench shot of Trench 41	NE	1m
252	41	Trench shot of Trench 41	NE	1m
253	41	Trench shot of Trench 41	SW	1m
254	41	Trench shot of Trench 41	SW	1m
255	61	Trench shot of Trench 61	S	1m
256	61	Trench shot of Trench 61	S	1m
257	61	Trench shot of Trench 61	N	1m
258	61	Trench shot of Trench 61	N	1m
259	41	Trench shot of Trench 41	SW	1m
260	41	Trench shot of Trench 41	SW	1m
261	51	Shot of Trench 51 TP51.5	N	1m
262	51	Shot of Trench 51 TP51.5	N	1m
263	51	Shot of Trench 51 TP51.5	E	1m
264	51	Shot of Trench 51 TP51.5	E	1m
265	51	Shot of Trench 51 TP51.5	NE	1m
266	51	Shot of Trench 51 TP51.5	NE	1m
267	42	Shot of Trench 42 TP42.1	N	1m
268	42	Shot of Trench 42 TP42.1	N	1m
269	42	Shot of Trench 42 TP42.1	E	1m
270	42	Shot of Trench 42 TP42.1	E	1m
271	42	Shot of Trench 42 TP42.1	NE	1m
272	42	Shot of Trench 42 TP42.1	NE	1m
273	60	Trench shot of Trench 60	SW	1m

Shot no.	Trench	Description	Direction	Scale
274	60	Trench shot of Trench 60	SW	1m
275	60	Trench shot of Trench 60	NE	1m
276	60	Trench shot of Trench 60	NE	1m
277	59	Trench shot of Trench 59	W	1m
278	59	Trench shot of Trench 59	W	1m
279	59	Trench shot of Trench 59	E	1m
280	59	Trench shot of Trench 59	E	1m
281	58	Trench shot of Trench 58	NW	1m
282	58	Trench shot of Trench 58	NW	1m
283	58	Trench shot of Trench 58	SE	1m
284	58	Trench shot of Trench 58	SE	1m
285	58	Trench shot of Trench 58	SE	1m
286	41	Trench shot of Trench 41	NE	1m
287	41	Trench shot of Trench 41	NE	1m
288	42	Shot of Trench 42 TP42.2	E	1m
289	42	Shot of Trench 42 TP42.2	E	1m
290	42	Shot of Trench 42 TP42.2	SE	1m
291	42	Shot of Trench 42 TP42.2	N	1m
292	42	Shot of Trench 42 TP42.2	N	1m
293	42	Shot of Trench 42 TP42.2	N	1m
294	42	Shot of Trench 42 TP42.2	NW	1m
295	42	Shot of Trench 42 TP42.2	NW	1m
296	56	Trench shot of Trench 56	S	1m
297	56	Trench shot of Trench 56	S	1m
298	56	Trench shot of Trench 56	N	1m
299	56	Trench shot of Trench 56	N	1m
300	57	Trench shot of Trench 57	W	1m
301	57	Trench shot of Trench 57	W	1m
302	57	Trench shot of Trench 57	E	1m
303	57	Trench shot of Trench 57	E	1m
304	43	Shot of Trench 43 TP43.1	SW	1m
305	43	Shot of Trench 43 TP43.1	SW	1m
306	43	Shot of Trench 43 TP43.1	S	1m
307	43	Shot of Trench 43 TP43.1	NE	1m
308	43	Shot of Trench 43 TP43.1	NE	1m
309	43	Shot of Trench 43 TP43.1	W	1m
310	43	Shot of Trench 43 TP43.2	SE	1m
311	43	Shot of Trench 43 TP43.2	SE	1m
312	43	Shot of Trench 43 TP43.2	S	1m
313	43	Shot of Trench 43 TP43.2	S	1m
314	43	Shot of Trench 43 TP43.2	SW	1m
315	43	Shot of Trench 43 TP43.2	SW	1m
316	43	Shot of Trench 43 TP43.2	W	1m
317	43	Shot of Trench 43 TP43.2	W	1m
318	55	Shot of Trench 55 TP55.1	SW	1m
319	55	Shot of Trench 55 TP55.1	SW	1m

Shot no.	Trench	Description	Direction	Scale
320	55	Shot of Trench 55 TP55.1	SW	1m
321	55	Shot of Trench 55 TP55.1	S	1m
322	55	Shot of Trench 55 TP55.1	W	1m
323	55	Shot of Trench 55 TP55.2	SW	1m
324	55	Shot of Trench 55 TP55.2	SW	1m
325	55	Shot of Trench 55 TP55.2	SW	1m
326	55	Shot of Trench 55 TP55.2	SW	1m
327	56	Shot of Trench 56 TP56.1	E	1m
328	56	Shot of Trench 56 TP56.1	E	1m
329	56	Shot of Trench 56 TP56.1	E	1m
330	56	Shot of Trench 56 TP56.2	E	1m
331	56	Shot of Trench 56	E	1m
332	59	Gully [5904]	S	1m
333	59	Gully [5904]	S	1m
334	59	Gully [5904]	S	1m
335	60	Ditch [6004]	S	1m
336	60	Ditch [6004]	S	1m
337	58	Shot of Trench 58 TP58.1	NE	1m
338	58	Shot of Trench 58 TP58.1	NE	1m
339	58	Shot of Trench 58 TP58.1	NE	1m
340	59	Gully [5906]	S	1m
341	59	Gully [5906]	S	1m
342	58	Shot of Trench 58 TP58.2	NE	1m
343	58	Shot of Trench 58 TP58.2	NE	1m
344	58	Shot of Trench 58 TP58.2	NE	1m
345	61	Gully [6104]	SW	1m
346	61	Gully [6104]	SW	1m
347	59	Shot of Trench 59 TP59.2	S	1m
348	59	Shot of Trench 59 TP59.2	S	1m
349	59	Shot of Trench 59 TP59.2	S	1m
350	59	Shot of Trench 59 TP59.1	S	1m
351	59	Shot of Trench 59 TP59.1	S	1m
352	59	Shot of Trench 59 TP59.1	S	1m
353	60	Shot of Trench 60 TP60.2	SE	1m
354	60	Shot of Trench 60 TP60.2	SE	1m
355	60	Shot of Trench 60 TP60.2	SE	1m
356	60	Shot of Trench 60 TP60.1	SE	1m
357	60	Shot of Trench 60 TP60.1	SE	1m
358	60	Shot of Trench 60 TP60.1	SE	1m
359	60	Shot of Trench 60 TP60.1	SE	1m
360	60	Shot of Trench 60 TP60.1	SE	1m
361	61	Shot of Trench 61 TP61.2	E	1m
362	61	Shot of Trench 61 TP61.2	E	1m
363	61	Shot of Trench 61 TP61.2	E	1m
364	61	Shot of Trench 61 TP61.2	E	1m
365	61	Shot of Trench 61 TP61.1	E	1m

Shot no.	Trench	Description	Direction	Scale
366	61	Shot of Trench 61 TP61.1	E	1m
367	61	Shot of Trench 61 TP61.1	E	1m
368	39	Shot of Trench 39 TP39.1	SW	1m
369	39	Shot of Trench 39 TP39.1	SW	1m
370	39	Shot of Trench 39 TP39.2	NE	1m
371	39	Shot of Trench 39 TP39.2	NE	1m
372	40	Shot of Trench 40 TP40.1	N	1m
373	40	Shot of Trench 40 TP40.1	N	1m
374	40	Shot of Trench 40 TP40.2	N	1m
375	40	Shot of Trench 40 TP40.2	N	1m
376	26	Shot of Trench 26 TP26.1	SW	1m
377	26	Shot of Trench 26 TP26.1	SW	1m
378	39	Relationship of field drain [3904], ditch [3906]	N	1m
379	39	Relationship of field drain [3904], ditch [3906]	N	1m
380	39	Relationship of field drain [3904], ditch [3906]	N	1m
381	39	Relationship of field drain [3904], ditch [3906]	N	1m
382	39	Relationship of field drain [3904], ditch [3906]	N	1m
383	26	Shot of Trench 26 TP26.2	NE	1m
384	26	Shot of Trench 26 TP26.2	NE	1m
385	26	Shot of Trench 26 TP26.2	NE	1m
386	40	Ditch [4005]	S	1m
387	40	Ditch [4005]	S	1m
388	40	Ditch [4005]	S	1m
389	24	Shot of Trench 24 TP. 24.1	E	1m
390	24	Shot of Trench 24 TP. 24.1	E	1m
391	24	Shot of Trench 24 TP. 24.1	E	1m
392	24	Shot of Trench 24 TP. 24.1	E	1m
393	24	Shot of Trench 24 TP. 24.2	E	1m
394	24	Shot of Trench 24 TP. 24.2	E	1m
395	24	Shot of Trench 24 TP. 24.2	E	1m
396	24	Shot of Trench 24 TP. 24.2	E	1m
397	40	Relationship of field drain [4007], ditch [4009]	S	1m
398	40	Relationship of field drain [4007], ditch [4009]	S	1m
399	40	Relationship of field drain [4007], ditch [4009]	S	1m
400	38	Shot of Trench 38 TP38.1	W	1m
401	38	Shot of Trench 38 TP38.1	W	1m
402	38	Shot of Trench 38 TP38.1	W	1m
403	29	Shot of Trench 29 TP29.2	NE	1m
404	29	Shot of Trench 29 TP29.2	NE	1m
405	41	Shot of Trench 41 TP41.2	SE	1m
406	41	Shot of Trench 41 TP41.2	SE	1m
407	41	Shot of Trench 41 TP41.1	NW	1m
408	41	Shot of Trench 41 TP41.1	NW	1m
409	44	Shot of Trench 44 TP44.1	W	1m
410	44	Shot of Trench 44 TP44.1	W	1m
411	44	Shot of Trench 44 TP44.2	E	1m

Shot no.	Trench	Description	Direction	Scale
412	44	Shot of Trench 44 TP44.2	E	1m
413	44	Shot of Trench 44 TP44.2	E	1m
414	45	Shot of Trench 45 TP45.1	SW	1m
415	45	Shot of Trench 45 TP45.1	SW	1m
416	45	Shot of Trench 45 TP45.1	SW	1m
417	45	Shot of Trench 45 TP45.1	SW	1m
418	45	Shot of Trench 45 TP45.2	SW	1m
419	45	Shot of Trench 45 TP45.2	SW	1m
420	50	Shot of Trench 50 TP50.1	S	1m
421	50	Shot of Trench 50 TP50.1	S	1m
422	50	Shot of Trench 50 TP50.1	S	1m
423	50	Shot of Trench 50 TP50.2	S	1m
424	50	Shot of Trench 50 TP50.2	S	1m
425	49	Shot of Trench 49 TP49.1	E	1m
426	49	Shot of Trench 49 TP49.1	E	1m
427	49	Shot of Trench 49 TP49.1	E	1m
428	49	Shot of Trench 49 TP49.2	W	1m
429	49	Shot of Trench 49 TP49.2	W	1m
430	48	Shot of Trench 48 TP48.1	S	1m
431	48	Shot of Trench 48 TP48.1	S	1m
432	48	Shot of Trench 48 TP48.1	S	1m
433	48	Shot of Trench 48 TP48.2	N	1m
434	48	Shot of Trench 48 TP48.2	N	1m
435	47	Shot of Trench 47 TP47.1	NE	1m
436	47	Shot of Trench 47 TP47.1	NE	1m
437	47	Shot of Trench 47 TP47.2	SW	1m
438	47	Shot of Trench 47 TP47.2	SW	1m
439	47	Shot of Trench 47 TP47.2	SW	1m
440	46	Shot of Trench 46 TP46.1	N	1m
441	46	Shot of Trench 46 TP46.1	N	1m
442	46	Shot of Trench 46 TP46.2	N	1m
443	46	Shot of Trench 46 TP46.2	N	1m
444	33	Shot of Trench 33 TP33.1	W	1m
445	33	Shot of Trench 33 TP33.1	W	1m
446	33	Shot of Trench 33 TP33.2	W	1m
447	33	Shot of Trench 33 TP33.2	W	1m
448	33	Shot of Trench 33 TP33.2	W	1m
449	34	Shot of Trench 34 TP34.1	NW	1m
450	34	Shot of Trench 34 TP34.1	NW	1m
451	34	Shot of Trench 34 TP34.2	NW	1m
452	34	Shot of Trench 34 TP34.2	NW	1m
453	32	Shot of Trench 32 TP32.1	N	1m
454	32	Shot of Trench 32 TP32.1	N	1m
455	32	Shot of Trench 32 TP32.2	S	1m
456	32	Shot of Trench 32 TP32.2	S	1m
457	16	Shot of Trench 16 TP16.1	W	1m

Shot no.	Trench	Description	Direction	Scale
458	16	Shot of Trench 16 TP16.1	W	1m
459	16	Shot of Trench 16 TP16.2	W	1m
460	16	Shot of Trench 16 TP16.2	W	1m
461	18	Shot of Trench 18 TP18.2	SE	1m
462	18	Shot of Trench 18 TP18.2	SE	1m
463	18	Shot of Trench 18 TP18.1	SE	1m
464	18	Shot of Trench 18 TP18.1	SE	1m
465	17	Shot of Trench 17 TP17.1	S	1m
466	17	Shot of Trench 17 TP17.1	S	1m
467	17	Shot of Trench 17 TP17.2	S	1m
468	17	Shot of Trench 17 TP17.2	S	1m
469	17	Shot of Trench 17 TP17.2	S	1m
470	17	Shot of Trench 17 TP17.2	S	1m
471	31	Shot of Trench 31 TP31.1	E	1m
472	31	Shot of Trench 31 TP31.1	E	1m
473	31	Shot of Trench 31 TP31.2	E	1m
474	31	Shot of Trench 31 TP31.2	E	1m
475	36	Shot of Trench 36 TP36.2	S	1m
476	36	Shot of Trench 36 TP36.2	S	1m
477	36	Shot of Trench 36 TP36.1	S	1m
478	36	Shot of Trench 36 TP36.1	S	1m
479	35	Shot of Trench 35 TP35.1	SW	1m
480	35	Shot of Trench 35 TP35.1	SW	1m
481	35	Shot of Trench 35 TP35.2	SW	1m
482	35	Shot of Trench 35 TP35.2	SW	1m
483	37	Shot of Trench 37 TP37.1	NW	1m
484	37	Shot of Trench 37 TP37.1	NW	1m
485	37	Shot of Trench 37 TP37.1	NW	1m
486	37	Shot of Trench 37 TP37.2	NW	1m
487	37	Shot of Trench 37 TP37.2	NW	1m
488	37	Shot of Trench 37 TP37.2	NW	1m
489	29	Shot of Trench 29 TP29.1	SW	1m
490	29	Shot of Trench 29 TP29.1	SW	1m
491	38	Shot of Trench 38 TP38.2	W	1m
492	38	Shot of Trench 38 TP38.2	W	1m
493	30	Shot of Trench 30 TP30.2	E	1m
494	30	Shot of Trench 30 TP30.2	E	1m
495	28	Shot of Trench 28 TP28.1	N	1m
496	28	Shot of Trench 28 TP28.1	N	1m
497	28	Shot of Trench 28 TP28.2	N	1m
498	28	Shot of Trench 28 TP28.2	N	1m
499	28	Shot of Trench 28 TP28.2	N	1m
500	28	Shot of Trench 28 TP28.2	N	1m
501	27	Shot of Trench 27 TP27.1	NW	1m
502	27	Shot of Trench 27 TP27.1	NW	1m
503	27	Shot of Trench 27 TP27.1	NW	1m

Shot no.	Trench	Description	Direction	Scale
504	27	Shot of Trench 27 TP27.2	NW	1m
505	27	Shot of Trench 27 TP27.2	NW	1m
506	25	Shot of Trench 25 TP25.1	W	1m
507	25	Shot of Trench 25 TP25.1	W	1m
508	25	Shot of Trench 25 TP25.2	W	1m
509	25	Shot of Trench 25 TP25.2	W	1m
510	25	Shot of Trench 25 TP25.2	W	1m
511	25	Shot of Trench 25 TP25.2	W	1m
512	22	Shot of Trench 22 TP22.1	NE	1m
513	22	Shot of Trench 22 TP22.1	NE	1m
514	57	Shot of Trench 57 TP57.2	N	1m
515	57	Shot of Trench 57 TP57.2	N	1m
516	57	Shot of Trench 57 TP57.1	N	1m
517	57	Shot of Trench 57 TP57.1	N	1m
518	57	Shot of Trench 57 TP57.1	N	1m
519	57	Shot of Trench 57 TP57.1	N	1m
520	54	Shot of Trench 54 TP54.1	W	1m
521	54	Shot of Trench 54 TP54.1	W	1m
522	54	Shot of Trench 54 TP54.1	W	1m
523	54	Shot of Trench 54 TP54.2	E	1m
524	54	Shot of Trench 54 TP54.2	E	1m
525	54	Shot of Trench 54 TP54.2	E	1m
526	54	Shot of Trench 54 TP54.2	E	1m
527	52	Shot of Trench 52 TP52.2	SE	1m
528	52	Shot of Trench 52 TP52.2	SE	1m
529	52	Shot of Trench 52 TP52.2	SE	1m
530	52	Shot of Trench 52 TP52.1	NW	1m
531	52	Shot of Trench 52 TP52.1	NW	1m
532	52	Shot of Trench 52 TP52.1	NW	1m
533	53	Shot of Trench 53 TP53.1	N	1m
534	53	Shot of Trench 53 TP53.1	N	1m
535	53	Shot of Trench 53 TP53.1	N	1m
536	53	Shot of Trench 53 TP53.1	N	1m
537	53	Shot of Trench 53 TP53.2	W	1m
538	53	Shot of Trench 53 TP53.2	W	1m
539	53	Shot of Trench 53 TP53.2	W	1m
540	21	Shot of Trench 21 TP21.1	E	1m
541	21	Shot of Trench 21 TP21.1	E	1m
542	21	Shot of Trench 21 TP21.2	E	1m
543	21	Shot of Trench 21 TP21.2	E	1m
544	21	Shot of Trench 21 TP21.2	E	1m
545	20	Shot of Trench 20 TP20.2	NW	1m
546	20	Shot of Trench 20 TP20.2	NW	1m
547	20	Shot of Trench 20 TP20.2	NW	1m
548	20	Shot of Trench 20 TP20.1	NW	1m
549	20	Shot of Trench 20 TP20.1	NW	1m

Shot no.	Trench	Description	Direction	Scale
550	20	Shot of Trench 20 TP20.1	NW	1m
551	19	Shot of Trench 19 TP19.1	N	1m
552	19	Shot of Trench 19 TP19.1	N	1m
553	19	Shot of Trench 19 TP19.2	N	1m
554	19	Shot of Trench 19 TP19.2	N	1m
555	19	Shot of Trench 19 TP19.2	N	1m
556	22	Shot of Trench 22 TP22.1	SW	1m
557	22	Shot of Trench 22 TP22.1	SW	1m
558	22	Shot of Trench 22 TP22.1	SW	1m
559	23	Shot of Trench 23 TP23.1	S	1m
560	23	Shot of Trench 23 TP23.1	S	1m
561	23	Shot of Trench 23 TP23.1	S	1m
562	24	Gully [2404]	NE	1m
563	24	Gully [2404]	NE	1m
564	24	Gully [2404]	NE	1m
565	30	Ditch [3008]	W	1m
566	30	Ditch [3008]	W	1m
567	30	Ditch [3008]	W	1m
568	30	Gully [3010]	W	1m
569	30	Gully [3010]	W	1m
570	30	Gully [3010]	W	1m
571	16	Ditch [1611]	E	1m
572	16	Gully [1606]	SW	1m
573	16	Gully [1606]	W	1m
574	15	Ditch [1508]	NE	1m
575	15	Ditch [1508]	NE	1m
576	15	Ditch [1508]	NE	1m
577	15	Ditch [1508]	NE	1m
578	15	Ditch [1508]	NE	1m
579	38	Shot of Trench 38 TP38.2	W	1m
580	38	Shot of Trench 38 TP38.2	W	1m


IMG_00001


IMG_0001


IMG_00002


IMG_0002


IMG_00003


IMG_0003


IMG_0004


IMG_0005


IMG_0006


IMG_0007


IMG_0008


IMG_0009


IMG_0010


IMG_0011


IMG_0012


IMG_0013


IMG_0014


IMG_0015


IMG_0016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IMG_0018


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IMG_0024


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IMG_0026


IMG_0027


IMG_0028


IMG_0029


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IMG_0031


IMG_0032


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APPENDIX 4

Sample Listing

Sample no.	Context no.	Feature	Fill of	Trench	Reason
1	6003	Ditch	6004	60	Bulk Sample
2	3905	Ditch	3906	39	Bulk Sample
3	4004	Ditch	4005	40	Bulk Sample
4	4008	Ditch	4009	40	Bulk Sample
5	2403	Gully	2404	24	Bulk Sample
6	3007	Ditch	3008	30	Bulk Sample
7	3009	Gully	3010	30	Bulk Sample
8	1605	Gully	1606	16	Bulk Sample
9	1609	Ditch	1611	16	Bulk Sample
10	1507	Ditch	1508	15	Bulk Sample

APPENDIX 5

Trench	Tr.14	Tr.15	Tr.16	Tr.17	Tr.18	Tr.19	Tr.20	Tr.21
Trench Orientation–Elevation	West–1.82mAOD East–1.71mAOD	North-west–1.54mAOD South-east–1.56mAOD	North–1.68mAOD South–1.86mAOD	West–1.97mAOD East–2.01mAOD	North-east–1.97mAOD South-west–1.85mAOD	West–2.03mAOD East–2.12mAOD	North-east–2.21mAOD South-west–2.10mAOD	North–2.18mAOD South–2.29mAOD
Trench Depth (BGL)	0.38m-0.57m	0.36m-0.69m	0.29m-0.33m	0.33m-0.45m	0.37m-0.43m	0.35m-040m	0.35m-0.40m	0.36m-0.41m
Thinkness -Topsoil	0.32m-0.37m	0.28m-0.42m	0.30m-0.33m	0.21m-0.34m	0.13m-0.33m	0.28m-0.36m	0.18m-0.30m	0.21m-0.39m
Warping	0.33m-0.45m	0.24m-0.39m	0.25m-0.38m	0.48m-0.53m	0.32m-0.35m	0.40m-0.53m	0.58m-0.62m	0.17m-0.39m
Peat	0.05m-0.12m	0.04m-0.12m	0.04m-0.22m	0.04m-	0.02m-	0.01m-	0.02m-	0.07m-0.11m
Organic Sand								
Sand	0.08m-	0.06m-	0.24m-0.35m					0.30m-
Clay								
Peat								
Sand								
Organic Sand								
TP Depth	4 x 0.50m	0.50m / 0.40m	0.50m / 0.50m	0.50m / 0.53m	0.50m / 0.55m	0.50m / 0.53m	0.60m / 0.60m	0.50m / 0.50m

APPENDIX 5

Trench	Tr.22	Tr.23	Tr.24	Tr.25	Tr.26	Tr.27	Tr.28	Tr.29
Trench Orientation–Elevation	North-west–2.15mAOD South-east–2.26mAOD	West–2.04mAOD East–2.25mAOD	North–2.36mAOD South–2.39mAOD	North–2.27mAOD South–2.24mAOD	North-west–2.33mAOD South-east–2.75mAOD	North-east–2.19mAOD South-west–2.35mAOD	North-east–2.04mAOD South-west–2.11mAOD	North-west–2.04mAOD South-east–2.24mAOD
Trench Depth (BGL)	0.40m-0.55m	0.38m-0.42m	0.30m-0.36m	0.40m-0.52m	0.30m-0.40m	0.42m-0.56m	0.37m-0.42m	0.31m-0.51m
Thinkness -Topsoil	0.32m-0.42m	0.13m-0.34m	0.22m-0.30m	0.24m-0.43m	0.23m-0.30m	0.20m-0.35m	0.32m-0.36m	0.24m-0.42m
Warping	0.05m-0.18m			0.00m-0.20m		0.18m-0.52m	0.18m-0.26m	0.14m-0.26m
Peat	0.03m-00.9m			0.07m-0.09m			0.02m-	
Organic Sand				0.05m-0.20m		0.12m-		
Sand	0.22m-0.30m	0.50m-	0.50m-	0.10m-0.30m	0.50m			0.07m-0.19m
Clay								
Peat					0.00m-0.30m			0.03m-0.10m
Sand					0.15m-			0.05m-
Organic Sand								
TP Depth	0.30m / 0.55m	0.50m	0.30m / 0.50m	0.30m / 0.30m	0.40m / 0.50m	0.12m / 0.22m	0.18m / 0.28m	0.50m / 0.70m

APPENDIX 5

Trench	Tr.30	Tr.31	Tr.32	Tr.33	Tr.34	Tr.35	Tr.36	Tr.37
Trench Orientation–Elevation	North–2.09mAOD South–2.06mAOD	North–1.84mAOD South–2.01mAOD	West–1.71mAOD East–1.88mAOD	North–1.60mAOD South–1.87mAOD	North-east–1.87mAOD South-west–1.94mAOD	North-west–1.84mAOD South-east–2.03mAOD	West–2.00mAOD East–2.19mAOD	North-east–2.22mAOD South-west–2.14mAOD
Trench Depth (BGL)	0.32m-0.48m	0.31m-0.47m	0.33m-0.42m	0.34m-0.47m	0.34m-0.40m	0.36m-0.77m	0.33m-0.40m	0.37m-0.40m
Thinkness -Topsoil	0.32m-0.45m	0.21m-0.29m	0.24m-0.38m	0.22m-0.34m	0.34m-0.40m	0.36m-0.46m	0.33m-0.40m	0.37m-0.40m
Warping	0.48m-0.52m	0.70m-	0.23m-0.30m	0.28m-0.45m	0.34m-0.42m	0.29m-0.32m	0.39m-0.45m	0.26m-0.37m
Peat	0.03-		0.03m-0.17m	0.07m-0.10m	0.06m	0.07m-0.35m	0.05m-0.10m	
Organic Sand								0.06m-0.15m
Sand			0.12m-0.20m	0.14m-0.31m	0.18m-	0.05m-0.35m	0.09m-0.13m	0.06m-0.17m
Clay								
Peat								
Sand						0.10m-		
Organic Sand								
TP Depth	0.50m / 0.50m	0.50m / 0.70m	0.50m / 0.50m	0.50m / 0.50m	0.50m / 0.50m	0.30m / 0.50m	0.50m / 0.54m	0.50m / 0.50m

APPENDIX 5

Trench	Tr.38	Tr.39	Tr.40	Tr.41	Tr.42	Tr.43	Tr.44	Tr.45
Trench Orientation–Elevation	North–2.30mAOD South–2.30mAOD	North-west–2.33mAOD South-east–2.63mAOD	West–2.57mAOD East–2.83mAOD	North-east–2.18mAOD South-west–2.48mAOD	West–2.05mAOD East–2.34mAOD	North-east–2.00mAOD South-west–2.05mAOD	North–1.69mAOD South–1.73mAOD	North-west–1.80mAOD South-east–1.83mAOD
Trench Depth (BGL)	0.28m-0.35m	0.38m-0.58m	0.35m-0.43m	0.36m-0.48m	0.37m-0.44m	0.33m-0.43m	0.38m-0.51m	0.37m-0.43m
Thinkness -Topsoil	0.28m-0.35m	0.29m-0.41m	0.12m-0.37m	0.28m-0.40m	0.28m-0.40m	0.28m-0.40m	0.28m-0.32m	0.29m-0.34m
Warping	0.05m-0.30m		0.00m-0.15m	0.27m-0.42m	0.00m-0.14m		0.29m-0.35m	0.18m-0.27m
Peat	0.08m-0.13m						0.08m-0.14m	0.07m-0.11m
Organic Sand				0.10m-0.12m				
Sand	0.30m-	0.40m-	0.40m-	0.10m-	0.18m-0.42m	0.40m-	0.30m-0.35m	0.17m-0.20m
Clay								
Peat					0.04m-0.16m			
Sand					0.14m-			
Organic Sand								
TP Depth	0.30m / 0.50m	0.30m / 0.40m	0.40m / 0.40m	0.50m / 0.50m	0.40m / 0.50m	0.40m / 0.40m	0.40m / 0.50m	0.40m / 0.50m

APPENDIX 5

Trench	Tr.46	Tr.47	Tr.48	Tr.49	Tr.50	Tr.51	Tr.52	Tr.53
Trench Orientation–Elevation	West–1.66mAOD East–1.77mAOD	North-west–1.27mAOD South-east–1.64mAOD	West–1.63mAOD East–1.62mAOD	North–2.17mAOD South–1.61mAOD	West–1.73mAOD East–2.16mAOD	West–2.16mAOD East–2.20mAOD	North-east–2.25mAOD South-west–2.22mAOD	West–2.05mAOD East–2.02mAOD
Trench Depth (BGL)	0.44m-0.61m	0.31m-0.51m	0.32m-0.43m	0.22m-0.36m	0.44m-0.51m	0.38m-0.44m	0.36m-0.50m	0.36m-0.45m
Thinkness -Topsoil	0.35m-0.53m	0.26m-0.33m	0.25m-0.36m	0.17m-0.30m	0.35m-0.43m	0.30m-0.39m	0.27m-0.42m	0.31m-0.44m
Warping	0.28m-0.39m	0.25m-0.28m	0.24m-0.42m	0.17m-0.34m	0.40m-0.45m	0.00m-0.44m	0.03m-0.39m	0.16m-0.40m
Peat	0.04m	0.10m					0.05m-0.12m	
Organic Sand	0.50m-	0.38m-						0.07m-0.34m
Sand			0.22m-	0.05m-0.12m	0.15m	0.05m-0.45m	0.08m-0.12m	0.15m-0.26m
Clay				0.01m-0.03m				
Peat				0.07m-0.12m		0.04-0.14m		
Sand				0.07m-		0.20m-	0.28m-0.36m	
Organic Sand								
TP Depth	0.20m / 0.50m	0.35m / 0.50m	0.50m / 0.50m	0.50m / 0.50m	0.50m /0.50m	4 x 0.50m	0.50m / 0.50m	0.50m / 0.50m

APPENDIX 5

Trench	Tr.54	Tr.55	Tr.56	Tr.57	Tr.58	Tr.59	Tr.60	Tr.61
Trench Orientation–Elevation	North–2.33mAOD South–2.27mAOD	North-west–2.04mAOD South-east–2.26mAOD	North–2.28mAOD South–2.43mAOD	West–2.67mAOD East–2.21mAOD	North-west–2.41mAOD South-east–2.43mAOD	West–2.38mAOD East–2.43mAOD	North-east–2.56mAOD South-west–2.50mAOD	North–2.52mAOD South–2.45mAOD
Trench Depth (BGL)	0.34m-0.49m	0.31m-0.52m	0.34m-0.43m	0.43m-0.62m	0.41m-0.49m	0.35m-0.49m	0.24m-0.53m	0.37m-0.57m
Thinkness -Topsoil	0.30m-0.37m	0.31m-0.52m	0.23m-0.32m	0.32m-0.53m	0.20m-0.32m	0.26m-0.37m	0.22m-0.48m	0.29m-0.42m
Warping	0.20m-0.46m			0.00m-0.02m	0.00m-0.18m			
Peat	0.05m-0.09m							
Organic Sand			0.40m	0.24m-0.33m				
Sand	0.11m	0.42m-0.55m		0.09m-0.12m	0.05m-0.16m	0.30m-	0.30m-	0.30m-
Clay								
Peat		0.05m-						
Sand								
Organic Sand					0.22m-			
TP Depth	0.30m /0.35m	0.40m / 0.40m	0.30m / 0.40m	0.30m / 0.30m	0.40m / 0.40m	0.30m / 0.30m	0.30m / 0.30m	0.15m / 0.30m

Lincolnshire Lakes TT 05-04-22

Carbonised Plant Macrofossils and Charcoal

Diane Alldritt

1: Introduction

Five environmental sample flots taken during archaeological trial trenching on land at Lincolnshire Lakes (05-04-22), were examined for carbonised plant macrofossils and charcoal. Samples were taken from a series of ditch features in trenches 24, 40 and 60 and from gully features in trenches 16 and 30.

2: Methodology

The bulk environmental samples were processed by MAP using a Siraf style water flotation system (French 1971). The samples were from 20litres to 40litres in volume. The flots were dried before examination under a low power binocular microscope typically at x10 magnification. All identified plant remains including charcoal were removed and bagged separately by type.

Wood charcoal was examined using a high powered Vickers M10 metallurgical microscope at magnifications up to x200. The reference photographs of Schweingruber (1990) were consulted for charcoal identification. Plant nomenclature utilised in the text follows Stace (1997) for all vascular plants apart from cereals, which follow Zohary and Hopf (2000).

3: Results

The environmental samples produced small quantities of carbonised remains <2.5ml to 5ml in volume, which consisted of trace finds of heather stems together with crushed fragments of charcoal <0.5cm in size and below the level of identification. Modern material was present at <2.5ml mostly root detritus indicating bioturbation was taking place.

Results are given in table 1 and discussed below.

4: Discussion

Trench 16

Gully [1606] fill 1605 produced a small quantity of highly crushed charcoal with nothing identifiable, likely to be residual bioturbated remains.

Trench 24

Ditch [2404] fill 2403 contained a small deposit of *Calluna* (heather) stems, which could suggest a domestic waste deposit from cutting peat or heathy turves for fuel. Potentially this could indicate settlement related burning activity taking place nearby.

Trench 30

Gully [3010] fill 3009 had a small quantity of charred fragments, possibly burnt root material, with nothing identifiable.

Trench 40

Ditch [4005] fill 4004 contained trace charred detritus with nothing identifiable.

Trench 60

Ditch [6004] fill 6003 had a few trace fragments of charred remains probably residual degraded charcoal, with nothing identifiable.

5: Conclusion

The samples produced trace amounts of carbonised remains indicating low levels of burning activity were taking place across the trial trenching area, suggesting mostly residual and bioturbated scatters. Ditch [2404] produced a small deposit of heather stems which were possibly a by-product of peat being burnt for fuel and could indicate nearby domestic settlement.

Further excavation has a low potential to produce any significant quantities of carbonised plant remains except perhaps in the vicinity of trench 24.

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APPENDIX 6

Carbonised Remains

Context	1605	2403	3009	4004	6003
Sample	8	5	7	3	1
Feature	gully	ditch	gully	ditch	ditch
Cut	[1606]	[2404]	[3010]	[4005]	[6004]
Radiocarbon Y/N	N	N	N	N	N
Sample Volume (litres)	40	40	20	40	40
Total CV	2.5ml	2.5ml	5ml	<2.5ml	<2.5ml
Modern	<2.5ml	<2.5ml	<2.5ml	<2.5ml	<2.5ml
Carbonised Plant Remains					
Calluna stems (Heather)		5 (0.04g)			

Lincolnshire Lakes, Scunthorpe

Lincolnshire

(05-04-22)

Finds Assessment

POTTERY

A rim sherd of a brown glazed earthenware bowl was recovered from context 6003 and dated to the 19th or early 20th century and a sherd of white earthenware of 19th or early 20th century date was recovered from context 1605.

A fragment of 19th/20th century plant pot was recovered from Test Pit 39.2 (20-30cm spit).

CLAY TOBACCO PIPE

A clay tobacco pipe stem fragment was found in context 1605. The fabric and bore-size suggest an 18th/ 19th century date.

CERAMIC BUILDING MATERIAL

A complete brick was recovered from context 3004 19th ot . This is a frogged brick, impressed 'NOSTELL'. The Nostell brickworks was in operation from 1875 to as late as the early 21st century, this brick being consistent with a 20th century date.

RECOMMENDATIONS

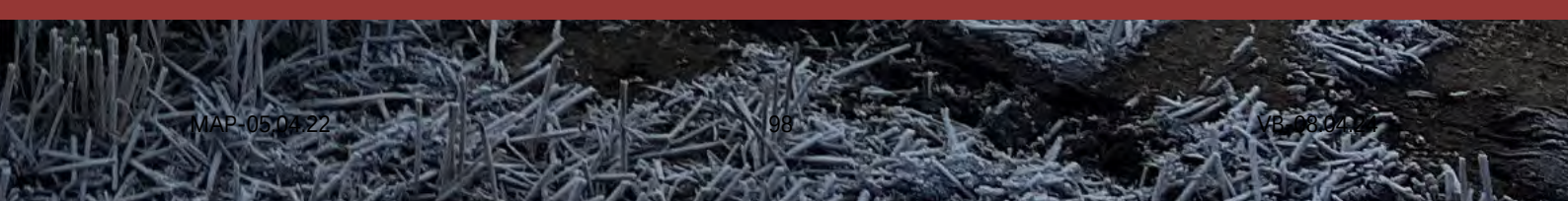
No further additional analysis or reporting is required for this finds assemblage.

York Archaeology

Keepmoat, Scunthorpe: Geoarchaeological Assessment

By Luke Parker

YA Assessment Report 2024/054 February 2024



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KEY PROJECT INFORMATION

Project Name	Keepmoat, Scunthorpe: Geoarchaeological Assessment
YA Project Code	3105
Report status	Draft
Type of Project	Geoarchaeological Assessment
Client	MAP Archaeological Practice
Planning Reference	PA/2023/1124
OASIS ID	
NGR	SE 86168 08608
Authors	Luke Parker
Illustrations	Luke Parker
Editor	Kristina Krawiec
Report Number	YA/2024/054
Version and Filename	3105_Keepmoat_GA_V1.2

Abstract

York Archaeology (YA) were commissioned by MAP Archaeological Practice to undertake geoarchaeological recording of machine-dug test pits between December 2023 and January 2024. This report presents the fieldwork results across the Keepmoat site, Scunthorpe, a proposed development of housing and an artificial lake. The Keepmoat site forms the first part of the overall Lincolnshire Lakes development which will eventually consist of 2500 dwellings, a village centre, school, healthcare facility and recreational lakes.

Recording of machine-dug test pits within evaluation trenches demonstrated that the site was dominated by aeolian sand deposits which are mapped regionally by the BGS as the Sutton Sand Formation. Within the upper portion of this sand were deposits of peat which were present immediately beneath either the top/sub-soil or silty clay warping deposits. The peat recorded during the investigation is similar to that which has been recorded by previous geoarchaeological investigations at the wider Lincolnshire Lakes site; where it is likely a series of relatively small, discrete peat deposits which formed locally within coversand depressions over a wide variety of time periods. The warp deposits had a very diffuse boundary with the subsoil, which likely represents the truncated, ploughed remnants of the warp. Recent agricultural activity throughout the site had led to extensive intrusion of modern organic material into the underlying sediment; primarily rooting from extant agricultural crops.

The stratigraphic data from these interventions was integrated along with all other previous investigations undertaken at the wider Lincolnshire Lakes site to produce the most comprehensive geoarchaeological deposit model yet developed for the site. This model demonstrates the highly irregular distribution of peat throughout the Lincolnshire Lakes site at a variety of elevations from around 2.50m OD to 0.20m OD. Radiocarbon dates recovered from the peat as part of previous investigations have also been collated and demonstrate the peat deposits throughout the site accumulated across wide range of periods; from up to 7000 BC until around 1500 BC.

Modelling of warp deposits throughout the Lincolnshire Lakes site has also enabled further insights to be developed as to its distribution and formation. The warping deposits recorded at the Keepmoat site likely reflect warping associated Healey's Drain which demarcates the southern boundary of the site and was excavated in 1842 by local landowner Henry Healey. Throughout the remainder of the site, warp deposits were modelled as present predominantly to the west of the site; with the drainage channel Earl Beauchamp's Drain (mapped by both historic mapping and Lidar) forming the eastern boundary for the majority of the warping deposits. This drain formed part of a process of warping that was initiated at least twenty to thirty years after Henry Healey by the Earl of Beauchamp. A further band of warp deposits were recorded to the east alongside Brumby Common Lane where a warping drain connected into the larger Earl Beauchamp's Drain.

1. INTRODUCTION

1.1 Site background

1.1.1 York Archaeology (YA) were commissioned by MAP Archaeological Practice to undertake geoarchaeological recording of machine-dug test pits at the prospective development site of Lincolnshire Lakes, Scunthorpe (NGR SE 86168 08608; Figure 1). In total, fifty-three machine-dug test pits were recorded within archaeological evaluation trenches carried out by MAP. These new interventions were integrated alongside the results of previous investigations at the broader Lincolnshire Lakes site to produce a combined deposit model and overall interpretation for the scheme.

1.1.2 The proposed development which this report relates to involves the construction of up to 600 homes, open spaces and landscaping, drainage and a recreational lake (PA/SCR/2022/1). This development forms the first part of the larger, overall Lincolnshire Lakes development which has received outline planning permission (PA/2015/0396) for the erection of up to 2500 dwellings, a village centre, a school, healthcare facility, wildlife habitats and lakes.

1.1.3 This investigation followed the geoarchaeological methodology established within the archaeological Written Scheme of Investigation (WSI) that was produced by YA and MAP (MAP, 2022).

1.2 Geology and Topography

1.2.1 The site is located at the western edge of the town of Scunthorpe, centred approximately at NGR SE 86168 08608 (Figure 1). It is situated at the eastern margin of the Trent floodplain and west of the Scunthorpe escarpment. At the time of investigations, the Site comprised uncultivated, ploughed agricultural fields.

1.2.2 The M181 motorway forms the western boundary of the Site whilst Burringham Road forms the southern boundary. The eastern boundary is demarked by Carisbrooke Manor Lane and the north is formed by a field boundary.

1.2.3 The following geological information has been taken from the previous York Archaeology geoarchaeological monitoring project which was undertaken as part of the Lincolnshire Lakes development and located to the immediate north of the site (YA, 2023a).

1.2.4 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; see Tables 1-3 below). The north-eastern margin of the Site at the foot of the Scunthorpe escarpment is mapped as Penarth Group mudstone.

1.2.5 The superficial deposits of the area are likely to be complex comprising warp, Alluvium, Peat and Sutton Sand Formation.

1.2.6 Detailed palaeoenvironmental survey has been carried out in close proximity to the Site to the south of Flixborough, *c.* 5.50km north of the site; this work, undertaken as part of the Humber Wetlands Survey, encompassed the entirety of the Trent Valley floodplain (Lille, 1998).

1.2.7 Three open-access BGS boreholes are located within the site boundary (Figures 2 and 3; Tables 1, 2 and 3).

BGS Interpretation	Simplified Description	Depth Top (m BGL)	Depth Base (m BGL)	Thickness (m)	Elevation Top (m OD)	Elevation Base (m OD)
Soil	-	0.00	1.00	1.00	2.52	1.52
Warp	Silt and clay	1.00	1.40	0.40	1.52	1.12
Peat	Peat	1.40	2.50	1.10	1.12	0.02
Blown Sand	Coarse to fine sand,	2.50	6.00	3.50	0.02	-3.48
Glaciofluvial Deposits	Clay and silty sand	6.00	10.00	4.00	-3.48	-7.48
Sand and Gravel	Coarse to fine sand and gravel	10.00	15.95	5.95	-7.48	-13.43
Mercia Mudstone	Mudstone	15.95	/	/	-13.43	/

Table 1: BGS borehole SE80NE26

BGS Interpretation	Simplified Description	Depth Top (m BGL)	Depth Base (m BGL)	Thickness (m)	Elevation Top (m OD)	Elevation Base (m OD)
Topsoil	Black, silty	0.00	0.20	0.20	2.70	2.50
Blown Sand	Fine sand, well rounded	0.20	9.10	8.90	2.50	-6.40
Glaciofluvial Deposits	Silty clay, laminated in parts	9.10	10.90	1.80	-6.40	-8.20
Sand and Gravel	Medium to fine sand	10.90	14.00	3.10	-8.20	-11.30
Mercia Mudstone	Mudstone	14.00	/	/	-11.30	/

Table 2: BGS borehole SE80NE70

BGS Interpretation	Simplified Description	Depth Top (m BGL)	Depth Base (m BGL)	Thickness (m)	Elevation Top (m OD)	Elevation Base (m OD)
Topsoil	Black, silty	0.00	0.50	0.50	3.27	2.77
Blown Sand	Medium and fine sand	0.50	7.30	6.80	2.77	-4.03
Glaciofluvial Deposits	Calcareous silty clay	7.30	8.85	1.55	-4.03	-5.58
Glaciofluvial Deposits	Medium and fine sand	8.85	9.60	0.75	-5.58	-6.33
Glaciofluvial Deposits	Soft brown silty calcareous clay	9.60	10.00	0.40	-6.33	-6.73

BGS Interpretation	Simplified Description	Depth Top (m BGL)	Depth Base (m BGL)	Thickness (m)	Elevation Top (m OD)	Elevation Base (m OD)
Glaciofluvial Deposits	Firm brown silty calcareous clay	10.00	10.35	0.35	-6.73	-7.08
Sand and Gravel	Medium and fine sand with gravel	10.35	15.10	4.75	-7.08	-11.83
Mercia Mudstone	Mudstone	15.10	/	/	-11.83	/

Table 3: BGS borehole SE81SE31/A

1.2.8 The BGS boreholes indicate that a suite of deposits overly the mudstone bedrock. These appear to comprise of a basal sand with some gravel, which may be fluvial or glaciofluvial in origin. These deposits are overlain by a sequence of silts, sands and clays, which have been also been interpreted in the logs as being glaciofluvial. However, within the locale of the Site, very little work has been done to corroborate the origin of these deposits, largely owing to their depth of burial and lack of exposure. The uppermost sediments within the boreholes comprise a mixture of aeolian sands, peats and warp; whilst the first two are natural accumulations, the latter (warp) is an anthropogenic sediment deposited across such low-lying landscapes in order to improve soil fertility (Lillie, 1997, 1998).

1.3 Planning Background

1.3.1 Developments of this nature, and their impact upon the historic environment, are addressed by the revised 2023 '*National Planning Policy Framework*' (NPPF) published by the Ministry of Housing, Communities and Local Government (MHCLG), and the NPPF Planning Practice Guide '*Conserving and Enhancing the Historic Environment*' (DCLG, 2014).

1.3.2 Section 16 of NPPF, paragraph 198 states:

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:

a) assess the significance of heritage assets and the contribution they make to their environment; and

b) predict the likelihood that currently unidentified heritage assets, particularly Sites

of historic and archaeological interest, will be discovered in the future.

1.3.3 In addition, paragraph 200, 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 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.

1.3.4 Furthermore, paragraphs 205 and 211 of the NPPF state:

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.

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. GEOARCHAEOLOGICAL BACKGROUND

2.1.1 The following geoarchaeological and archaeological background has been taken from the earlier geoarchaeological monitoring project (YA, 2023a):

2.1.2 The most extensive deposit 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.

2.1.3 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. 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.

2.1.4 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 2023a, YA 2023b).

2.1.5 The results of the radiocarbon age estimates from investigations undertaken by ASWYAS (Archaeological Service West Yorkshire Archaeological Service) and AOC are provided in Table 4 using information replicated from the initial evaluation and post-excavation assessment reports (AOC 2017a; AOC 2017b; YA 2021).

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

Table 4: Radiocarbon age estimates from AOC (2017a&b) core 1, trenches 1, 4, and 7, and ASWYAS Trench 12. The dates are displayed in descending order of elevation. Note, no laboratory references numbers were provided in the AOC reports and the sample types, sample depths, and elevations have been reproduced using the information contained within the reports. All sub-samples from which material was dated derives from peat deposits.

2.1.6 Table 4 outlines radiocarbon age estimates from previous locations within the Lincolnshire Lakes 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.

2.1.7 Recent geoarchaeological monitoring and deposit modelling (YA, 2023a) identified that peat was buried and interbedded within the sands, particularly within the upper 2.00m of stratigraphy, however, could be occasionally encountered deeper. 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 dates from previous excavations (Table 4).

2.1.8 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.

2.1.9 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. 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-east half 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).

2.1.10 The BGS have mapped warping deposits across much of the site (Figure 3) and they were recorded in all the test pits monitored by Allen Archaeology (2015a) in the southern half of the site, with the exception of TP6, TP13 and TP14 where Sutton Sand Formation was recorded immediately underlying the topsoil (Figure 2). Warping deposits were recorded as sealing peat or Sutton Sand Formation deposits in all trenches and boreholes undertaken as part of the works by AOC (2017a and 2017b) in the south-west corner of the site. Warping deposits were also recorded in all the test pits and trenches excavated by ASWYAS within the boundary to the east of the M181 (Figure 2). Approximately 0.40m of warp is also recorded in BGS borehole SE80NE26 but are absent in the two additional boreholes located within the site boundary (see Tables 1-3).

2.1.11 There was a complete absence of warping deposits in a recent evaluation to the north-east of the site (YA, 2023b), despite the area being mapped as having such deposits. Likewise, the recent geoarchaeological monitoring (YA, 2023a) recorded that warp deposits were discontinuous and associated with specific infilled warping drains, including Earl Beauchamp's Drain, which had been mapped from a combination of Lidar, aerial photography, and HER datasets.

2.2 Archaeological context

MESOLITHIC (*c*.9500 – *c*.4000 cal BC)

2.2.1 Peat dating from the Later Mesolithic (Table 4) has been recorded in previous investigations within the Lincolnshire Lakes site boundary. This is indicative of a Mesolithic land surface which has been subsequently masked by post-medieval warp deposits. No Mesolithic findspots are known from within the site boundary, but this is unsurprising given the blanket of warp covering the majority of the site. It is possible that further to the east, where warp deposits are less likely to be present, that peat and/or Sutton Sand Formation may be present below topsoil.

NEOLITHIC AND EARLY TO MIDDLE BRONZE AGE (*c*.4000–*c*.1150 cal BC)

2.2.2 Peat accumulations appear to have continued from the Mesolithic into the Neolithic (Table 4). No Neolithic findspots are located within the immediate site boundary, however chance findspots have been located within 0.50km to the north-east of the site (HER 1914, 1915). These represent localised and isolated finds and are confined to higher ground where warp accumulations are not present to mask prehistoric land surfaces.

2.2.3 Accumulations of peat have also been demonstrated to continue into the Early Bronze Age within the site boundary (Table 4). Additionally, a potential ring ditch (HER 25906) is located at SE 8646 0957 within the Lincolnshire Lakes site boundary, to the immediate west of the main warping drain having been identified and interpreted through geophysical survey (Pringle, 2015). There is currently no further evidence to demonstrate the location or extent of Bronze Age settlement within the site.

EARLY MEDIEVAL (*c*. AD 410–1066)

2.2.4 Brumby derives its name from the Old Norse personal name of 'Bruni' and the Old Norse term 'by', meaning farmstead (Institute for Name-Studies, 2023). The Scandinavian settlement in Lincolnshire took place after over-wintering of the Viking 'Great Army' at Torksey in AD 872 and Repton in AD 873, and their control of Lincoln from AD 876.

HIGH MEDIEVAL (AD 1066–1485)

2.2.5 In the AD 1086 Domesday Survey, Brumby is recorded as '*Brunebi*', located in the hundred of Manley, with 14 freemen, 3 men's plough teams and 80 meadow acres to its land and resources (Foster and Longley, 1942, 20).

2.2.6 During the later medieval period the site formed part of the Brumby Common with the site record as being 'Heathland' by the North Lincolnshire Historic Landscape Characterisation (HLC) record. This would indicate that the land within the site was utilised for livestock grazing as opposed to arable uses.

2.2.7 A feature named '*Brumby caucee*' was recorded in a Lindsey Court roll in AD 1446 (Peacock, 1889, 101). A '*caucee*' or 'causey' was a route "over boggy land, that has been made by raising a bank above the level of the water as it stands in flood time" (Peacock 1889, 100). In that case, *Brumby Caucee* may have been a name for the part of Frodingham Causeway (HER 25905), which ran within the Manor of Brumby. Should that be the case, the AD 1446 reference would be the earliest documentary evidence for activity within the site

POST-MEDIEVAL (AD 1485–1750)

2.2.8 An AD 1558 inquisition of Sewers record of 'Brumby causey' states that this feature had "dikes to either side" (quoted in Peacock 1889, 102). This may support the suggestion

that Brumby Causeway was Frodingham Causeway, as the part of the causeway identified in the south-western part of the site during the 2015 geophysical survey has ditches to either side of the raised bank (Allen Archaeology, 2015c, 6-7). Should this be correct, this would indicate that the ditches of Frodingham Causeway remained open in the mid-16th century. The AD 1558 inquisition ordered that the 'dikes' were to be "*sufficiently scowred and cleansed*" (quoted in Peacock 1889, 102). As such, these works may have removed any earlier materials that would have been deposited within the ditches.

MODERN (AD 1750 TO PRESENT)

2.2.9 As previously discussed, the wider landscape around the site started to undergo warping in the early 19th century to transform and elevate the previously waterlogged, low-lying landscape for arable agriculture.

2.2.10 Around AD 1863, further warping works were undertaken, with a large, canalised warping drain being constructed along what is now the site's northern boundary (HER 24682). Part of this large warping drain continues in the north-eastern half of the site, extending into the southern half of the site. In addition, there are two further buried probable warping drains in the southern half of the site (HER 25977 and HER 24683). These works are likely to form part of the wider warping network (Figure 4).

2.2.11 Monitoring of two test pits (TP9 and TP10) by Allen Archaeology (2015a) observed features interpreted as a continuation of the large warping drain in the southern half of the site. It was therefore possible that similar features will be encountered during the monitoring of the proposed test pits across the site.

3. PROJECT AIMS AND OBJECTIVES

3.1.1 The aims and objectives of the project were established within the archaeological WSI (MAP, 2022):

3.1.2 The aims of the work were to:

- To determine the presence/absence, nature, date, quality of survival and importance of archaeological and paleoenvironmental deposits to enable an assessment of the potential and significance of the archaeology and paleoenvironment to be made;
- To establish the chronology of the sediment sequence, particularly with reference to the peat development at the site;
- To determine the potential for the underlying sands to preserve archaeological remains and land surfaces

3.1.3 The main objectives of the work were as follows:

- To undertake test trenching across the site and to make a record of any archaeological features/deposits;
- To recover dateable artefacts and environmental samples to characterise the activity at the site;
- To undertake test pitting to record the lithology of the underlying sands/peat deposits;
- To recover samples for paleoenvironmental assessment and scientific dating;

- To create a deposit model and archaeological framework for the site using the results of the test pitting and previous phases of work;

- To present the results of the fieldwork, deposit modelling and any palaeoenvironmental assessment in a report;

- To inform the requirement for and scope of any archaeological mitigation including further archaeological works which may be required.

Research Questions

3.1.4 The aims and objectives described above for this site have the potential to address the following topics identified within the East Midlands Research Agenda (http://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/Main):

2 MESOLITHIC (c.9500 - c.4000 cal BC)
2A - Enhance understanding of the environmental background to Mesolithic activity: 'By comparison with some other areas of the country, the Mesolithic environment of the East Midlands is little known… There is a need to obtain more closely dated pollen sequences from upland, riverine and coastal peat deposits and to extend the investigation of ancient environments to include isotope studies of the organic fractions of coastal and riverine sediments.'
2.6.1 What can analyses of cave deposits, palaeochannel fills, upland peats and other deposits with potential for preserved pollen, charcoal and other organic remains contribute to studies of the earliest stages of woodland clearance and plant domestication?
2.6.2 How can we maximise the potential of palaeochannels, upland or coastal peats and other organically rich deposits as sources of data on Early Holocene landscapes and changes in subsistence strategies and diet?
2H - Investigate the transition from the Mesolithic to Neolithic: 'The issue of changing subsistence strategies and the relationship between Mesolithic and Neolithic lifeways can be addressed in part by consistent sampling of organic material preserved in palaeochannels and other waterlogged or wetland contexts spanning the transition period.'
NEOLITHIC AND EARLY TO MIDDLE BRONZE AGE (c.4000–c.1150 cal BC)
3E - Target Sites with Late Mesolithic and Early organic remains: '…significantly more organically rich contexts of this period need to be targeted for environmental analysis and radiocarbon dating to elucidate patterns of landscape change during this key transitional period. Particular attention should be focused upon Sites preserving organic remains that may be threatened by dewatering, while the information

gained from Sites under threat from development should be maximised.'
3.2.3 How may environmental sampling strategies assist in elucidating the transition from later Mesolithic to earlier Neolithic economies?
3.7.2 What ceremonial or ritual roles may rivers or other watery locations have performed and how may this have varied regionally and over time?

3.1.5 The *Lincolnshire Coversands Project* recommended a number of key considerations for future work in the area (McIlwaine and McDonell, 1996). These included elucidating the extent, depth and topography of the coversands.

3.1.6 Additionally, recent work in the development of the national *Mesolithic Research and Conservation Framework* highlights the targeting of research on sites at risk such as wetland sites where peat is drying out (Blinkhorn and Milner, 2013, 30). Key themes were identified in relation to prospection of sites:

S2.2: Broader use of fieldwalking, test-pitting and other low-impact techniques is needed, especially within a developer-led context.

S2.4: Novel methodologies to evaluate the locations of Mesolithic activity should be sought and successes in the field appropriately communicated across all sectors. For instance, these might be grounded in geoarchaeological modelling, or the application of borehole, coring and sieving strategies.

4. GEOARCHAEOLOGICAL METHODOLOGY

4.1 Fieldwork Methodology

4.1.1 All works were undertaken in accordance with the WSI as approved by the County Council Planning Archaeologist and to standards defined by CIfA Guidelines for Recording of Archaeological Sites (2019; 2020a; 2020b).

4.1.2 Archaeological evaluation trenches were located by a MAP archaeologist using a survey-grade GPS. Overburden, topsoil and subsoil was removed by a mechanical excavator using a toothless blade under supervision in level spits of <100mm until the upper surface of the superficial geology was encountered. At one end of each evaluation trench, a geoarchaeologically monitored test pit was excavated using a mechanical excavator in 100mm-spits down to around 3.00m BGL, or up to test pit side collapse.

4.1.3 The lithology of the geoarchaeological test pits was recorded using the sediment classification system of Troels Smith (1955). Although the machine-dug test pit within each evaluation trench was monitored, the numbering is the same as the evaluation trenches (e.g. Tr04). The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Sicc) and the sharpness of the upper sediment boundary (UB). A summary of the sedimentary and physical properties classified by Troels-Smith (1955) is provided in Appendix 1.

4.1.4 The descriptive logs (Appendix 2) were supplemented by digital photography carried out using a DSLR with a minimum sensor size of 10 megapixels. All photography adhered to Historic England guidance for *Digital Image Capture and File Storage* (HE 2015b). Graduated metric scales of appropriate lengths were used, ensuring the use of vertical scales used against deep sections in combination with horizontal scales. Digital photographs intended for archive purposes will comply with AAF and ADS guidance (i.e. high quality non-proprietary raw files (DNG) or TIFF images).

4.1.5 The sampling followed procedures set out within the Historic England Guidance for *Environmental Archaeology* and *Geoarchaeology* (HE 2011 and HE 2015a). Should waterlogged wood be encountered species identification was carried out with reference to Schweingruber (1990) and Schoch (2004). The consideration of preservation within the deposits was made with specific reference to Historic England's Guidance document for *Preserving Archaeological Remains* (HE 2016).

4.1.6 A deposit model was constructed using the results of the monitoring, as well as all previous investigations which had been undertaken at the site (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021). The modelling followed procedures set out within the Historic England Guidance for *Deposit Modelling and Archaeology* (HE 2020). Based on the inputted stratigraphic data, modelled surfaces were created to aid visualisation using ArcGIS incorporating available Lidar data as digital terrain models with multi-directional hillshading and/or local relief modelling used to aid interpretation.

4.1.7 The data is archived in an excel spreadsheet.

4.2 Fieldwork constraints

4.2.1 Due to the sandy composition of the superficial strata, the test pits were very unstable and frequently collapsed shortly after 2.00m BGL. This frequently prevented test pit excavation up to the maximum 3.00m depth.

5. RESULTS

5.1 Lithology

5.1.1 The earliest deposits recorded during test pit and monitoring were fine sands, which occasionally contained a minor medium sand component. These sands were pale yellow or grey throughout much of the sequence, though infrequently they were of a more orange colour towards the upper part of the sequence; this colour change may reflect increased oxidation as a result of recent agricultural activity. The fine sand formed the large majority of all recorded sequences and often composed the entirety of the lithological sequence underlying recent topsoil.

5.1.2 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.

5.1.3 The four test pits which recorded a second peat layer were Tr20, Tr32, Tr33, and Tr34. The second peat layer within these trenches was at 2.50-2.70m BGL (Tr20), 2.70-2.85m BGL (Tr32 andTr33), and 2.50-2.75m BGL (Tr34). The peat within Tr20, Tr33 and Tr34 was a moderately humified woody peat with a slight sandy component, whereas within Tr32 the peat was well-humified with few identifiable organic inclusions. The woody inclusions consisted predominantly of pieces of roundwood with the occasional larger piece which frequently recorded bark.

5.1.4 Overlying the fine sand and/or peat within seven of the monitored test pits (Tr42, Tr43, Tr46, Tr48, Tr52, Tr55, and Tr57) was a relatively firm dark grey, occasionally silty, clay recorded around 0.30m BGL (1.40-2.00m OD). This (silty) clay was interpreted as a warp deposit resulting from deliberate flooding during the 19th century.

5.1.5 The warp deposits were overlain by topsoil and subsoil. The subsoil had a very diffuse lower boundary with the warp deposits, where present suggesting it may be the truncated, ploughed remnants of the warp. Recent agricultural activity throughout the site had led to extensive intrusion of modern organic material into the underlying sediment; primarily rooting from extant agricultural crops.

5.2 Deposit Modelling and Historic Mapping

5.2.1 A Lidar model for the Keepmoat site boundary as well as the rest of the Lincolnshire Lakes site was developed which illustrated the variation in elevation levels throughout the Site (Figure 02). There is a broad trend of the north and eastern portions of the site being at around 3.00m OD and sloping very gradually down to the south and west up to around 1.60-2.00m OD. The Keepmoat site is distinctive in that in contrast with the remainder of the Lincolnshire Lakes site, it has a complete lack of apparent topographic features. The remainder of the site has a number of infilled warping channels; particularly in the fields between Brumby Common Lane and Burringham Road, and in the fields to the east of Brumby Common Roundabout (Figure 06).

5.2.2 Surface models were developed in QGIS for the peat and warp to illustrate both the location of these deposits and the elevation (OD) of their upper boundaries (Figures 03 and 04). These surface models incorporate data from all previous investigations at the Lincolnshire Lakes site (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021) to generate models which present a more holistic and accurate representation of the superficial geology for the site, and better illustrates the spatial extent of the peat and warp deposits.

5.2.3 The warp deposits are focused particularly towards the west of the Lincolnshire Lakes site; with a secondary band following the course of Brumby Common Lane (Figure 03) and a smaller area within the southern portion of the Keepmoat site boundary. The elevation of the upper warp surface was broadly around 1.70-2.20m OD for the majority of the site, however the warp surface within the Keepmoat site boundary was somewhat lower in elevation, closer to 1.00m OD. It should be noted that although the model (Figure 03) suggests lower elevation for the warp towards the edges of its extent, this is an artefact of the modelling and not a true representation of the warp surface.

5.2.4 The model of the peat upper surface demonstrates a much more widespread distribution of peat than the warp, with it being present throughout the majority of the Lincolnshire Lakes site (Figure 04). The model illustrates the variation in elevation for the peat, where it was present at all depths from 2.50m OD in the north-east of the site

and around 0.20m OD within the Keepmoat site boundary in the south. This trend, though also likely reflecting genuine variability in peat elevation, also reflects the broad topographic trend with higher ground in the north and east, and lower ground in the south and west (Figure 02). The concentration of high-elevation peat in the north-east of the model is not a genuine presence of peat and is instead a reflection of the absence of data points within and around Brumby Common Wood.

5.2.5 Comparing the distribution of interventions where warp was recorded with historic mapping demonstrated a clear correlation with warp presence and 19th century land modification. Warp deposits were modelled to be present primarily within the west of the Lincolnshire Lakes site (Figure 03) and comparing the location of these deposits with the 1885 OS map illustrates that the limit of warp-containing interventions coincides with drainage features (Figure 06). These features are clearly observable on Lidar (Figure 02), and have been mapped and superimposed onto the 1885 OS map (Figure 06). Of the mapped drainage channels, the channel mapped as Earl Beauchamp's Drain forms the primary boundary of the modelled warp extent (Figure 06), with the remainder following to the south of a road ran east-west from Brumby to Burringham in a similar position and alignment to the present Brumby Common Lane. The historic mapping (Figure 06) suggests a drain located alongside this road and emptied into Earl Beauchamp's drain which intersects the road and runs to the northwest. A further warping drain, Healey's Drain, is present in the mapping demarking the southern boundary of the Keepmoat site, though there is a less clear correlation with warping deposits and this drain than with Earl Beauchamp's Drain in the north and centre of the Lincolnshire Lakes site.

5.3 Radiocarbon Dating

5.3.1 No new radiocarbon dates have been acquired as part of the Keepmoat project, however further efforts have been made to integrate previous work undertaken at the site. This has recovered further radiocarbon dates beyond what are included within Table 04. Table 05 below comprehensively details all dates which have been produced from all work at the Lincolnshire Lakes site:

Core / Trench	Sample	C14 Elevation (m OD)	C14 Sample Depth (m OD)	Radiocarbon Age (BP)	Calibrated Date (95.4%)	Historical Period
AOC Core 1A4	Macroplant	-1.03	3.43	6951 ± 31	5902 - 5741 cal BC	Mesolithic
Brumby Common Trench 12	Peat (Humin Acid)	0.27	1.76-1.80	8170 ± 30	7317 -7065 cal BC	Mesolithic
Brumby Common Trench 12	Peat (Humic Acid)	0.27	1.76-1.80	6700 ± 30	5670 - 5556 cal BC	Mesolithic
AOC Core 1A3	Peat (Humic Acid)	0.3	2.1	6723 ± 28	5707 - 5568 cal BC	Mesolithic
AOC Trench 8	Peat (Humic Acid)	0.35	1.61	7726 ± 31	6631 - 6479 cal BC	Mesolithic

Core / Trench	Sample	C14 Elevation (m OD)	C14 Sample Depth (m OD)	Radiocarbon Age (BP)	Calibrated Date (95.4%)	Historical Period
AOC Core 1A2	Peat (Humic Acid)	0.5	1.9	5785 ± 25	4707 - 4555 cal BC	Mesolithic
AOC Trench 7	Peat (Humic Acid)	0.56	1.6	7515 ± 33	6451 - 6261 cal BC	Mesolithic
AOC Trench 4	Peat (Humic Acid)	0.71	1.69	1434 ± 33	568 - 657 cal AD	Early medieval
AOC Trench 9	Peat (Humic Acid)	0.72	1.15	6309 ± 31	5352 - 5218 cal BC	Mesolithic
AOC Core 1A2	Macroplant	0.76	1.64	268 ± 27	1521 - 1798 cal AD	Post-medieval
Brumby Common Trench 12	Peat (Humin Acid)	0.77	1.26-1.30	4040 ± 30	2663 - 2459 cal BC	Neolithic
Brumby Common Trench 12	*Maloideae* roundwood	0.97	1.06	3710 ± 30	2023 - 1983 cal BC	Neolithic
AOC Core 2A1	Peat (Humic acid)	1.15	0.89	?	1521 - 1798 cal BC	Early Bronze Age
AOC Trench 11	Peat (Humic Acid)	1.21	0.66	3827 ± 31	2456 - 2148 cal BC	Neolithic
AOC Trench 1	Peat (Humic Acid)	1.41	0.67	4676 ± 33	3624 - 3367 cal BC	Neolithic
AOC Core 3A3	Wood	1.65	0.27	?	2346 - 2143 cal BC	Neolithic/Early Bronze Age
AOC Core 2A3	Macroplant	1.73	0.31	?	5880 - 5735 cal BC	Mesolithic
Scotter Road TP07	Roundwood-*Pinus sylvestris*	2.00	0.30-0.44	6930 ± 30	5887 - 5731 cal BC	Mesolithic

Table 05. Radiocarbon dates acquired for the Lincolnshire Lakes site shown in order of elevation (m OD). Dates in red are likely intrusive and dates in grey have suspect elevations that do not correspond to the Lidar elevation for that intervention. Dates in yellow have only had calibrated dates recorded within the report. AOC cores/trenches are from AOC (2017a & b); Brumby Common trenches are from Trent and Peak (2021); Scotter Road is from YA (2023b).

5.3.2 The radiocarbon dates highlighted in red (Table 05) are likely the result of intrusive material due to the dates being notably younger than the rest. The date in grey may have an incorrect elevation as the reported elevation of the intervention (and sample) differs from the Lidar elevation at the intervention location. The yellow dates have only had their calibrated (95.4% probability) dates reported within the original reports (AOC 2017a & b) and their radiocarbon ages were absent. Also, the coordinates and elevations for these interventions were not reported and were acquired through georeferencing site plans and extrapolating the elevations from Lidar.

5.3.3 The radiocarbon dates from Table 05 further demonstrate the very wide spread of ages which have been acquired from the peat throughout the Lincolnshire Lakes site. Most of the radiocarbon dates are from the western portion of the site; other than the Scotter Road date in the north (Figure 07). The dates recovered from the peat span a range from around 7000 cal BC up to around 1500 cal BC. There is no correlation between elevation of the sample (m OD) and the calibrated date. There is no clear spatial pattern to the radiocarbon dates (Figure 07). Although there seems to be a dominance of Mesolithic dates which suggests the underlying sands are early-mid Mesolithic in age. There seems to then be renewed peat accumulation in the late Neolithic and into the Bronze Age, with later accumulations presumably truncated away by later agricultural activity.

6. DISCUSSION AND CONCLUSIONS

6.1 Overview of lithological sequence

6.1.1 The test pits which were monitored and recorded as part of the Keepmoat investigation recorded sub-surface stratigraphy identical to what was recorded elsewhere by previous investigations at the Lincolnshire Lakes site (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021).

6.1.2 The lowermost deposit recorded in all test pits was a fine sand which extended beyond the maximum excavated depth. These fine sands are interpreted as Sutton Sand Formation deposits, which corroborates BGS mapping across the Site. These sands, which are of aeolian origin, form extensive deposits throughout the Lincolnshire area known as coversand deposits and have been demonstrated to be up to 9m thick locally.

6.1.3 Overlying fine sands within 44 of the test pits was peat; predominantly present as a single layer, though within four test pits was present as two layers, with the lower being within the aeolian sand. The peat was recorded relatively close to the present-day surface at between 0.40-1.00m BGL; or around 0.24-1.60m OD. These peats were mostly well-humified and frequently containing a moderate sandy content. The lower peat, present within four test pits, was somewhat less well-humified and often contained woody inclusions including roundwood and larger fragments which possessed bark.

6.1.4 Overlying the fine sand and/or peat within seven of the monitored test pits was a relatively firm dark grey, occasionally silty, clay interpreted as being warping deposits resulting from deliberate flooding during the 19th century. There deposits were concentrated towards the southern half of the Keepmoat site and were recorded at around 0.30m BGL (1.40-2.00m OD).

6.2 Deposit survival and existing impacts

6.2.1 Throughout the Keepmoat site there was evidence of extensive agricultural activity which had impacted sub-surface deposits. The warp deposits that were recorded were close to the present-day ground surface and had experienced truncation through ploughing. It is possible that the subsoil which was recorded throughout the Keepmoat site derives from ploughed, truncated, warping deposits.

6.2.2 The peat deposits which were frequently recorded throughout the Keepmoat site were well-humified and relatively high in sandy content. These deposits are likely to have not been consistently saturated and were preserved instead through irregular seasonal

groundwater saturation; with groundwater able to fluctuate rapidly owing to the very sandy sub-surface superficial geology. The peat deposits recorded as a second, lower deposit within four test pits (Tr20, Tr32, Tr33, and Tr34) were clearly less well-humified, with a clear observable macrofossil content reflecting more consistent water saturation.

6.3 Discussion of deposits

Sutton Sands

6.3.1 The results of this assessment concur with the findings of earlier investigations at the same site (Allen Archaeology 2015; AOC 2017a; AOC 2017b; Trent and Peak 2021; YA 2023a & b), with sand-dominated sequences interleaved with peat and warp towards the top of the sequence. These sands represent Sutton Sand Formation coversands, which are present in significant thicknesses throughout the region spanning an area of around 400km^2 (McIlwaine and McDonnell, 2005). Scunthorpe Edge (*aka* the Lincoln Cliff or Lincolnshire Edge) which is at the western edge of the town and around 2km east of the site, forms a natural barrier to these aeolian deposits, which thin out significantly eastwards of this landform. To the west of the Scunthorpe Edge, where the site is located, these sands are demonstrated to be up to c.9.00m thick, whereas east of Scunthorpe Edge the sands have a mean thickness of 3.70m (James, 1976).

6.3.2 These wind-blown sands were initially deposited around 11,000 BP based on OSL dating at Willow Holt Quarry, Flixborough (McIlwaine and McDonnell, 2006) or around 12,500 BP (note that these are uncalibrated dates) based on OSL dating at nearby Cove Farm, Westwoodside (Bateman *et al*., 2005). OSL dating of the sands at Keadby immediately underlying peat deposits, located around 3.5km west of the Lincolnshire Lakes site, returned mid-Mesolithic dates of 7270-5490 cal BC (YA, 2022). Although these coversands were probably once formed as a continuous sheet (McIlwain and McDonnell, 2006) they have subsequently undergone repeated and extensive reworking until well into the later Holocene, both as a result of natural climatic fluctuations and anthropogenic impacts.

6.3.3 These reworked sands have also been demonstrated to overlie archaeological remains, including material of Mesolithic, Neolithic and Bronze Age date (McIlwain and McDonnell, 2006). However, neither this investigation nor any previous investigations at or close to the site has demonstrated any such remains to be present.

Peat

6.3.4 Peat deposits were recorded in the Keepmoat test pits overlying aeolian sands within 44 test pits (Figure 04) and of these four test pits demonstrated two, discrete peat layers. Peat is present throughout the wider Lincolnshire Lakes site at variable elevations and with a considerably undulating subsurface topography. This peat is unlikely to represent a single continuous spread and likely developed as relatively small, localised deposits within depressions in the aeolian sands throughout the area. The deposits accumulated at the very edge of the wider Trent floodplain which would be sensitive to seasonal fluctuations in saturation.

6.3.5 Modelling of peat deposits from the wider Lincolnshire Lakes site (Figure 04; Section 5.2.4) illustrates a wide (if irregular) distribution throughout most of the site. These deposits were present at varied elevations from 2.50m OD to 0.20m OD with the lower end of this range being the elevation which most of the Keepmoat peat was recorded

at. This varied elevation reflects partly a broad topographic descent from the north-east to the south-west where the Keepmoat site was located, though it also reflects a genuine variability that was present in peat elevation beyond topography.

6.3.6 One of these deposits (Brumby Common Trench 12; Table 05), has been assessed for palaeoenvironmental potential and demonstrated that pollen preservation and abundance within the peat was good, though diversity was somewhat limited (Trent and Peak, 2021). The pollen assessment suggested an initially very waterlogged, open aquatic setting surrounded by sedges, grasses, birch and willow. This transitions towards alder and hazel, though still within a waterlogged environment; likely an alder carr, which existed for much of the depositional history of the peat unit. Insect remains were poorly preserved and limited in extent, though those present suggested the area was characterised by slow-flowing and stagnant waters (Trent and Peak, 2021). Radiocarbon dating of both humic and humin fractions from the lower part of this sequence returned dates of 5670-5609 cal BC and 7194-7226 cal BC respectively; with the former date preferred as most reliable. Dating of the upper part of this sequence returned a radiocarbon date of 2632-2651 cal BC, suggesting that the deposit had formed over a prolonged period of around 3000 years.

6.3.7 Beyond the chronology described above, a total of eighteen radiocarbon dates have been acquired from the peat deposits throughout the Lincolnshire Lakes site; with two being deemed intrusive (Table 05). These were a very wide range of dates, with the oldest being around 7000 cal BC and the youngest around 1500 cal BC. There is no clear spatial pattern to the radiocarbon dates (Figure 07). Although there seems to be a dominance of Mesolithic dates which suggests the underlying sands are early-mid Mesolithic in age. There seems to then be renewed peat accumulation in the late Neolithic and into the Bronze Age, with later accumulations presumably truncated away by later agricultural activity. These episodes of peat accumulation may correlate with wider patterns of climatic change in the later prehistoric period, although higher resolution data would be required to confirm this.

6.3.8 To date there have been no archaeological finds or features dating to the prehistoric period recorded within the wider Lincolnshire Lakes site. Although given that these remains may be Mesolithic in date, this is perhaps not surprising. Other remains may relate to votive deposition of bronze artefacts, such as the hoard and weapons recovered from Burrington Common in the 19th century, which are also notoriously difficult to prospect for. The peat deposits themselves have not so far recorded evidence for waterlogged archaeological material but this still remains a possibility, especially in the areas of Bronze Age accumulation.

Warp

6.3.9 Modelling of warp deposits demonstrates that the presence of warp is associated with mapped drainage features (Figures 03 and 06). Both Lidar mapping and the 1885 OS map show warping drains which coincide with the limit of warp deposits (Figure 06), with the drain named as Earl Beauchamp's Drain being a particularly prominent feature that demarcates warping limits. A band of warp was also modelled as following a road in the same location as the course of Brumby Common Lane (Figure 03).

6.3.10 Warp deposits were modelled to be present primarily within the west of the Lincolnshire Lakes site (Figure 03) and comparing the location of these deposits with the 1885 OS map illustrates that the limit of warp-containing interventions coincides with drainage features (Figure 06). These features are clearly observable on Lidar (Figure 02),

and have been mapped and superimposed onto the 1885 OS map (Figure 06). Of the mapped drainage channels, the channel mapped as Earl Beauchamp's Drain forms the primary boundary of the modelled warp extent (Figure 06), with the remainder following to the south of a road ran east-west from Brumby to Burringham. The historic mapping (Figure 06) suggests a drain which was located alongside this road and emptied into Earl Beauchamp's drain which intersects the road and continues to the northwest. A further warping drain, Healey's Drain is present in the mapping demarcating the southern boundary of the Keepmoat site, though there is less clear spatial correlation with warping deposits and this drain than with Earl Beauchamp's Drain in the north and centre of the Lincolnshire Lakes site.

6.3.11 The history and progress of agricultural development, particularly of the practice of warping within this region, is excellently documented by Smith (2014) from whom the following historical information has been taken from. Although initially Parliamentary commissioners met with locals at a number of public venues between 1801 to 1809, agricultural improvements within the broader Trent-side parishes that made up what is now Scunthorpe town and region were slow. After the commissioners run out of patience and declared the process incomplete in 1809, it wasn't until almost 20 years later that the process truly began.

6.3.12 Warping had begun within the Burringham/Brumby area, within which the site is located, by around 1824 by Henry Healey. A local landowner who, upon inheriting his uncle's estate began a vigorous programme of enlargement and improvement of the Healey estate. It was during this time that Healey's drain, which demarcates the southern extent of the Keepmoat site (Figure 06), was created. At considerable expense, including several thousand pounds in compensation to nearby landowners whose land he unintentionally flooded, the process was completed by around 1842. Henry was by far the wealthiest landowner within the Burringham, Frodingham and Ashby parishes and so was mostly responsible for the creation of the warped landscape which exists within, at least, the Keepmoat portion of the Lincolnshire Lakes site.

6.3.13 To the north of the Keepmoat site, within the broader Brumby West Common area, which encompassed the remainder of the Lincolnshire Lakes site, the landscape remained unwarped even after 1842. This was largely due to a local landowner, Mrs Sally Smith, who resisted the process until her land passed to the Earl of Beauchamp at which point, in 1867, the land was improved. This extensive process involved the creation of Beauchamp's Drain which is located to the north of the Lincolnshire Lakes site, and has a large channel which was excavated south-east through the Lincolnshire Lakes site (Figure 06). Unlike the warp within, at least, the Keepmoat site, warp associated with Beauchamp's drain was deposited separately around 20-30 years later.

6.3.14 Although warp deposits such as these can cover archaeological remains and significant underlying deposits, no archaeological deposits were encountered within this assessment; neither have they been encountered within any previous investigation within the broader Lincolnshire Lakes site.

6.4 Potential impact on deposits

6.4.1 The proposed development for both the Keepmoat site, as well as the Lincolnshire Lakes site as a whole will be extensive. This will involve significant residential construction, infrastructure development, and the creation of artificial lakes. Impacts on the

underlying superficial geology and any associated archaeological remains are likely to encompass at least the majority of the site boundary.

6.4.2 Developments that will directly impact the site are foundation construction, infrastructure development, and piling. The artificial lake is proposed to be at least 2.20m deep and will involve significant truncation of sub-surface superficial stratigraphy. All sub-surface deposits, including all organic-rich sediments within the artificial lake impact depth, will be removed by this development. However, secondary impacts will also likely be created through affecting the sub-surface hydrology of the site by piling and the remodelling of surface topography as part of flood mitigation strategies and SuDS (Sustainable Drainage System). The peat deposits, located close to the present-day surface and which are likely preserved through irregular water saturation, will be particularly sensitive to the impacts to sub-surface hydrology. In an area surrounding the artificial lake well point dewatering will be required, which will significantly impact the sub-surface hydrology for a large area.

6.4.3 Warp and reworked coversands have the potential to overlie and mask deposits of archaeological significance, which make prospection through traditional archaeological prospection techniques problematic. However, no such remains have been encountered either at the Keepmoat site, or the Lincolnshire Lakes site as a whole, despite at least seven previous investigations including this one (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021). However, the area still retains the potential to preserve such remains given the large scale of the development area in relation to the investigations carried out.

6.4.4 Organic deposits (peats) have been demonstrated to be present throughout the site (Sections 5.1.2 and 5.1.3) and at a range of depths, including relatively close to the current ground surface (within 1.00m BGL, Appendix 2). These deposits are present as intermittent, discrete deposits within the aeolian sands at a variety of elevations and are unlikely to represent a continuous single unit mappable across the site. Radiocarbon dating undertaken during previous studies has demonstrated that these organic remains span at least the Mesolithic into the later Bronze Age (Table 05). Previous palaeoenvironmental studies have demonstrated that these deposits can provide insights into past vegetation change, climate and potentially land use (Section 6.3.5); given the range of radiocarbon dates these deposits have the potential to provide palaeoenvironmental data over a prolonged period.

6.4.5 The warp and reworked aeolian sands have the potential to overlie deposits of archaeological significance, making them relatively invisible to traditional techniques of archaeological prospection (e.g. fieldwalking, aerial 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).

6.5 Consideration of research aims

6.5.1 This investigation has developed a greater understanding of the survival and extent of archaeological and palaeoenvironmental deposits which are present at the Keepmoat site. Additionally, this investigation has collated and built upon the numerous previous investigations which have been undertaken at the broader Lincolnshire Lakes site (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021).

6.5.2 This investigation presents the most comprehensive model and analysis yet undertaken for the wider Lincolnshire Lakes site; comprising over 260 separate interventions encompassing hand dug and machine-dug test pits, augering, evaluation trenches, and window-sampled and percussion cable boreholes. This deposit modelling then illustrates the extent of peat and warp deposits throughout the Lincolnshire Lakes site, enabling more accurate interpretations to be developed. Additionally, all previous radiocarbon dating undertaken at the Lincolnshire Lakes project has been collated within this report (Section 5.3; Table 05).

6.5.3 Through this more comprehensive and extensive modelling of warp deposits for the Lincolnshire Lakes site, this project has further addressed research aims within the East Midlands Regional Research Framework beyond those which were included in the original research questions in Section 3.1.4. These aims are within the 'Modern' portion of the research agenda (https://researchframeworks.org/emherf/research-agenda/9-modern/) and are as follows:

- 9.6.1 What was the impetus for the development of estate farming and rural agricultural industries, and what has been the landscape impact?
- 9.6.2 How did Parliamentary enclosure and other agricultural improvements (e.g. water management) impact upon the rural landscape?

6.6 Conclusions

6.6.1 This assessment has demonstrated a sediment sequence for the Keepmoat site which matched that which has been recorded by the numerous, previous Lincolnshire Lakes investigations (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021). This sequence was an aeolian sand-dominated Sutton Sand Formation (aka coversand) stratigraphy which spans almost the entirety of the sub-surface stratigraphy for the site. Overlying or within these sands were deposits of organic-rich sediment which were present at a variety of elevations and underlay either the modern topsoil/subsoil or warp. Four interventions recorded peat as two separate deposits within the sequence, separated by aeolian sands; a phenomenon noted by previous investigations elsewhere at the wider Lincolnshire Lakes site (YA 2023a).

6.6.2 Through compiling stratigraphic data from all previous archaeological investigations which have occurred throughout the wider Lincolnshire Lakes site (AOC 2017a & b; Allen Archaeology 2015; YA, 2023a & b; Trent and Peak 2021) this investigation presents the most comprehensive deposit modelling undertaken for the area. This results the most accurate and extensive illustration of both the distribution of peat and warp deposits. Peat has been shown to be present throughout the majority of the site at a variety of elevations, between 2.50 and 0.50m OD, reflecting both natural topographic trends as well as genuine variation in peat deposition elevation.

6.6.3 Additionally, modelling of warp deposits throughout the Lincolnshire Lakes site enabled a greater understanding of artificially deposited material throughout the area which could be related to 19th century agricultural development (Sections 6.3.10-6.3.12). Warping drains which were recorded both in historic mapping and observed on Lidar visualisations have been shown to define the limits of warping deposits at the Lincolnshire Lakes site, though those at the Keepmoat site were not so easily associated with mapped drains.

6.6.4 Although the deposits identified within the site have the potential to contain and overlie archaeological remains, no such remains were encountered. This supports the

conclusions drawn by previous investigations at the Site (Allen Archaeology, 2015; AOC, 2017a; AOC, 2017b; Trent and Peak, 2021; YA, 2023a).

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8. APPENDIX 1 – TROELS-SMITH

Darkness	
nig.4	black
nig.3	
nig.2	
nig.1	
nig.0	white

Degree of Stratification	
strf.4	well stratified
strf.3	
strf.2	
strf.1	
strf.0	no stratification

Degree of Elasticity	
elas.4	very elastic
elas.3	
elas.2	
elas.1	
elas.0	no elasticity

Degree of Dryness	
sicc.4	very dry
sicc.3	
sicc.2	
sicc.1	
sicc.0	water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 &> 0.5mm
lim.2	< 2.0 &> 1.0mm
lim.1	< 10.0 &> 2.0mm
lim.0	> 10.0mm

	Sh	Substantia humosa	Humous substance, homogeneous microscopic structure
I Turfa	Tb	T. bryophytica	Mosses +/- humous substance
	Tl	T. lignosa	Stumps, roots, intertwined rootlets, of ligneous plants
	Th	T. herbacea	Roots, intertwined rootlets, rhizomes of herbaceous plants
II Detritus	Dl	D. lignosus	Fragments of ligneous plants >2mm
	Dh	D. herbosus	Fragments of herbaceous plants >2mm
	Dg	D. granosus	Fragments of ligneous and herbaceous plants <2mm >0.1mm
III Limus	Lf	L. ferrugineus	Rust, non-hardened. Particles <0.1mm
IV Argilla	As	A.steatodes	Particles of clay
	Ag	A. granosa	Particles of silt
V Grana	Ga	G. arenosa	Mineral particles 0.6 to 0.2mm
	Gs	G. saburralia	Mineral particles 2.0 to 0.6mm
	Gg(min)	G. glareosa minora	Mineral particles 6.0 to 2.0mm
	Gg(maj)	G. glareosa majora	Mineral particles 20.0 to 6.0mm
	Ptm	Particulaetestaemolloscorum	Fragments of calcareous shells

Physical and sedimentary properties of deposits according to Troels-Smith (1955)

9. APPENDIX 2 – BOREHOLE AND TEST PIT LOGS

Borehole Number	Depth (m) upper	Depth (m) lower	Da	St	El	Sicc	UB	Troels-Smith Texture	Description
Tr14	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr14	0.32	0.94	2	4				Ga4, Ag+	Pale yellow fine sand
Tr14	0.94	1.56	4	1	2			Dl4	Black very woody peat. Abundant branches and wooden fragments. Birch bark and branches very common
Tr14	1.56	3	2	4				Ga4, Ag+	Pale grey fine sand
Tr16	0	0.42	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr16	0.42	0.56	2	4				Ga4, Ag+	Pale yellow fine sand
Tr16	0.56	0.76	4	1	2			Dl4	Black very woody peat. Abundant branches and wooden fragments
Tr16	0.76	2.85	2	4				Ga4, Ag+	Pale grey fine sand
Tr18	0	0.34	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr18	0.34	0.72	2	4				Ga4, Ag+	Pale yellow fine sand
Tr18	0.72	0.84	4	1	2			Dh4	Black well humified peat
Tr18	0.84	3	2	4				Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr19	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr19	0.32	0.72	2	4				Ga4, Ag+	Pale yellow fine sand
Tr19	0.72	0.96	4	1	2			Dh2, Ga2	Black well humified sandy peat. Lower boundary well mixed with underlying sand deposit
Tr19	0.96	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand

Tr20	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr20	0.32	0.92	2	4				Ga4, Ag+	Pale yellow fine sand
Tr20	0.92	1.1	4	1	2			Dh2, Ga2	Black well humified sandy peat. Lower boundary well mixed with underlying sand deposit
Tr20	1.1	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr20	2.5	2.7	4	1	2			Dh2, Dl2	Black humified peat with abundant woody inclusions of twigs and small branches
Tr20	2.7	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr21	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr21	0.32	0.72	2	4				Ga4, Ag+	Pale yellow fine sand
Tr21	0.72	0.76	4	1	2			Dh2, Ga2	Black well humified sandy peat. Lower boundary well mixed with underlying sand deposit
Tr21	0.76	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr22	0	0.34	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr22	0.34	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr23	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr23	0.32	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr24	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil

Tr24	0.32	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr25	0	0.42	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr25	0.42	0.52	4	1	2			Dh2, Ga2	Black well humified sandy peat
Tr25	0.52	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr26	0	0.38	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr26	0.38	1.6	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr27	0	0.4	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr27	0.4	0.48	4	1	2			Dh2, Ga2	Black well humified sandy peat. Lower boundary well mixed with underlying sand deposit. Tree/hedge roots preseny
Tr27	0.48	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr28	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr28	0.32	0.38	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr28	0.38	0.46	4	1	2			Dh2, Ga2	Black well humified sandy peat
Tr28	0.46	1.4	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr29	0	0.34	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr29	0.4	0.46	4	1	2			Dh2, Ga2	Black well humified sandy peat
Tr29	0.46	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand

Tr30	0	0.24	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr30	0.24	0.4	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr30	0.54	0.68	4	1	2			Dh2, Ga2	Black well humified sandy peat.
Tr30	0.46	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr31	0	0.18	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr31	0.18	0.92	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr31	0.92	1.1	4	1	2			Dh2, Ga2	Black well humified sandy peat.
Tr31	1.1	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr32	0	0.42	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr32	0.42	0.56	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr32	0.56	0.62	4	1	2			Dh2, Ga2	Black well humified sandy peat.
Tr32	0.62	2.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr32	2.7	2.85	5	2			4	Ga2, Sh2	Very sandy very well humified peat
Tr32	2.85	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr33	0	0.34	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr33	0.34	0.56	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr33	0.56	0.78	4	1	2			Dh2, Ga2	Black well humified sandy peat.
Tr33	1.1	2.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr33	2.7	2.85	5	2			4	Dl2, Sh1, Ga1	Very dark brown-black moderately humified woody peat

Tr33	2.85	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr34	0	0.48	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr34	0.48	0.62	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr34	0.62	0.74	4	1	2			Dh2, Ga2	Black well humified sandy peat. Heavily mixed with sand
Tr34	0.74	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr34	2.5	2.75	5	2			4	Dl2, Sh1, Ga1	Very dark brown-black moderately humified woody peat
Tr34	2.75	2.9	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr36	0	0.18	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr36	0.18	0.4	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr36	0.4	0.52	4	1	2			Dh2, Ga2	Black well humified sandy peat. Heavily mixed with sand
Tr36	0.52	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr37	0	0.22	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr37	0.22	0.4	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr37	0.4	0.46	4	1	2			Dh2, Ga2	Black well humified sandy peat
Tr37	0.46	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr38	0	0.3	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr38	0.3	0.42	4	1	2			Dh2, Ga2	Black well humified peat. Heavily mixed with fine sand

Tr38	0.3	3	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr39	0	0.3	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr39	0.3	1.4	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr40	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr40	0.3	1.4	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr41	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr41	0.28	0.78	2	4				Ga4, Ag+	Pale yellow fine sand
Tr41	0.78	0.86	4	1	2		5	Dh2, Ga2	Black well humified sandy peat
Tr41	0.86	2.8	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr42	0	0.28	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr42	0.28	0.4	4	4			4	As3, Ag1	Dark grey silty clay. Warp
Tr42	0.4	0.46	2	4				Ga4, Ag+	Pale yellow fine sand
Tr42	0.46	0.62	4	1	2		5	Dh2, Ga2	Black well humified sandy peat
Tr42	0.62	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr43	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr43	0.32	0.44	4	4			4	As3, Ag1	Dark grey silty clay. Warp
Tr43	0.44	0.5	2	4				Ga4, Ag+	Pale yellow fine sand
Tr43	0.5	0.62	4	1	2		5	Dh2, Ga2	Black well humified sandy peat
Tr43	0.62	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand

Tr44	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr44	0.32	0.74	2	4				Ga4, Ag+	Pale yellow fine sand
Tr44	0.74	0.82	4	1	2		5	Dh2, Ga2	Black well humified sandy peat
Tr44	0.82	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr45	0	0.36	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr45	0.32	0.74	2	4				Ga4, Ag+	Pale yellow fine sand
Tr45	0.74	0.8	4	1	2		5	Dh2, Ga2	Black well humified sandy peat
Tr45	0.8	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr46	0	0.32	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr46	0.32	0.76	4	4			5	As4, Ag+	Dark grey clay. Warp
Tr46	0.76	0.84	5	3			5	Sh2, Ga2	Black very well humified sandy peat
Tr46	0.84	2.1	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand.
Tr46	2.1	2.4	5	3			4	Th3, Sh1	Black herbaceous peat. Rootlets and reed fragments common
Tr46	2.4	2.6	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand.
Tr47	0	0.38	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr47	0.78	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand. Upper boundary contains very well humified peat mixed into deposit

Tr48	0	0.26	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr48	0.28	0.78	4	4			5	As4, Ag+	Firm dark grey clay. Warp.
Tr48	0.78	2	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr52	0	0.28	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr52	0.28	0.68	3	4			4	Ga2, Ag2	Dark brownish orange sandy silt. Warp
Tr52	0.68	0.86	5	3			4	Sh2, Ga2	Black well humified sandy peat
Tr52	0.86	2.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr53	0	0.38	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr53	0.38	0.6	5	3			4	Sh2, Ga2	Black well humified sandy peat
Tr53	0.6	2.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr54	0	0.4	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr54	0.4	0.68	5	3			4	Sh2, Ga2	Black well humified sandy peat
Tr54	0.68	2.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr55	0	0.28	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr55	0.28	0.78	2	4			2	Ga4, Ag+	Pale yellow fine sand
Tr55	0.78	1.02	4	4			4	As3, Ga1	Firm grey sandy clay. Warp
Tr55	1.02	2.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand

Tr56	0	0.28	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr56	0.28	1.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr57	0	0.34	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr57	0.34	0.68	4	4			3	As3, Sh1	Dark grey clay mixed with humified peat. Warp
Tr57	0.68	1.5	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr58	0	0.4	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr58	0.4	0.48	3	4			4	Ga3, Sh1	Pale yellow fine sand with very well humified peat mixed into the deposit
Tr58	0.48	1.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr59	0	0.4	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr59	0.4	0.68	3	4			4	Ga3, Sh1	Pale yellow fine sand with very well humified peat mixed into the deposit
Tr59	0.68	1.58	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr60	0	0.36	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil
Tr60	0.36	1.7	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand
Tr61	0	0.36	3	3				Ga2, Ag2, As+	Dark brown sandy loam agricultural topsoil with pale brown sandy loam subsoil

Tr61	0.36	0.48	3	4			4	Ga3, Sh1	Pale yellow fine sand with very well humified peat mixed into the deposit
Tr61	0.48	2.8	2	4			2	Ga4, Ag+	Pale yellow, becoming pale grey fine sand

APPENDIX 3 – Selected photographs

Plate 1. Post-excavation shot of TR18

Plate 2. Post-excavation shot of TR19

Plate 3. Post-excavation shot of Tr24

Plate 4. Post-excavation shot of Tr28

Plate 5. Post-excavation shot of Tr38

Plate 6. Post-excavation shot of Tr40

Plate 7. North-west facing site photo

Plate 8. West-facing site photo

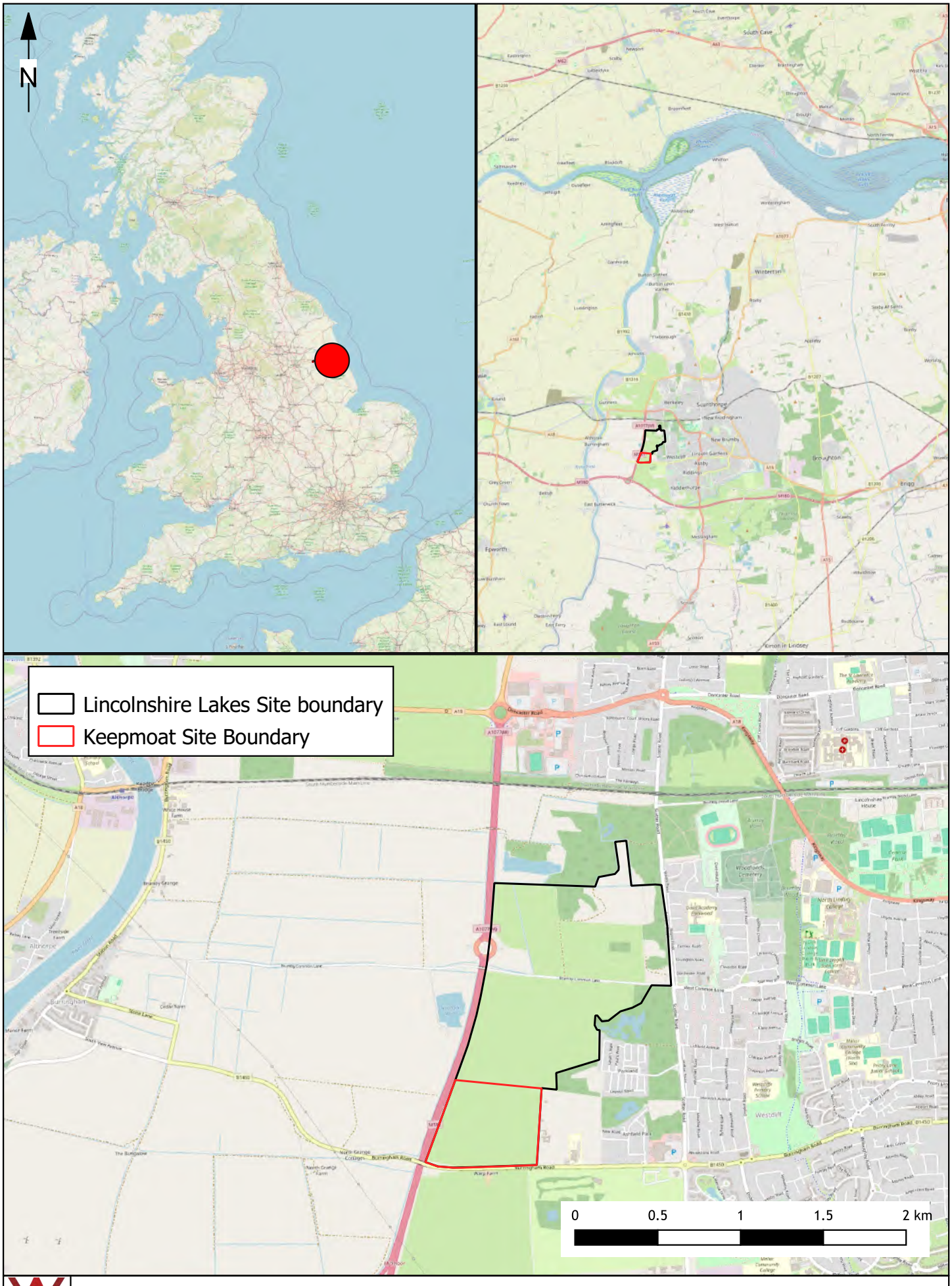

Figure 01 - Site location

Keepmoat, Scunthorpe geoarchaeological assessment

Scale at A4 - Varies

Drawn by: LP

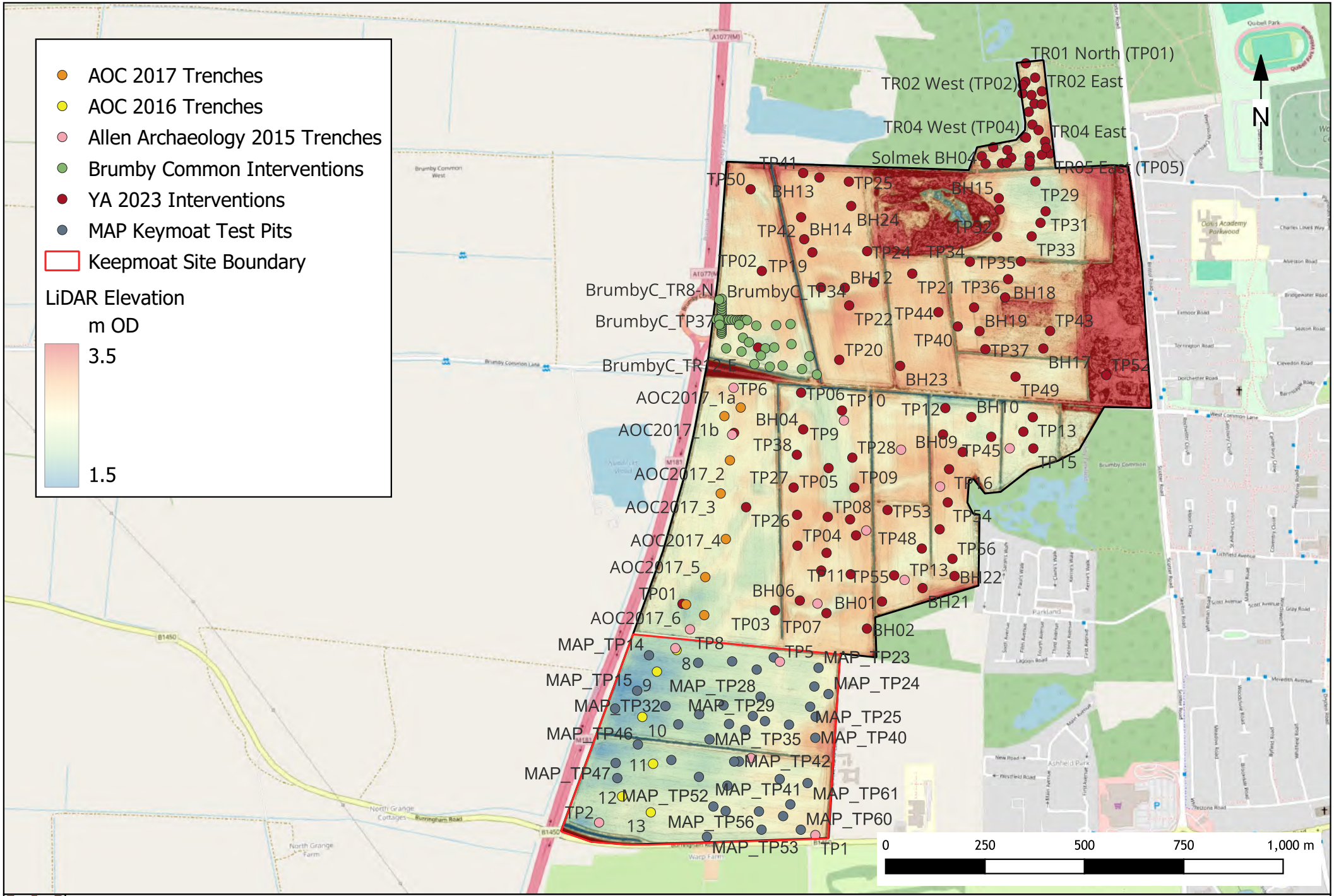

Figure 02 - Intervention Locations

Scale at A4 - 1:12000

MAY-05.04.22

VB-08.04.24

Drawn by: LP

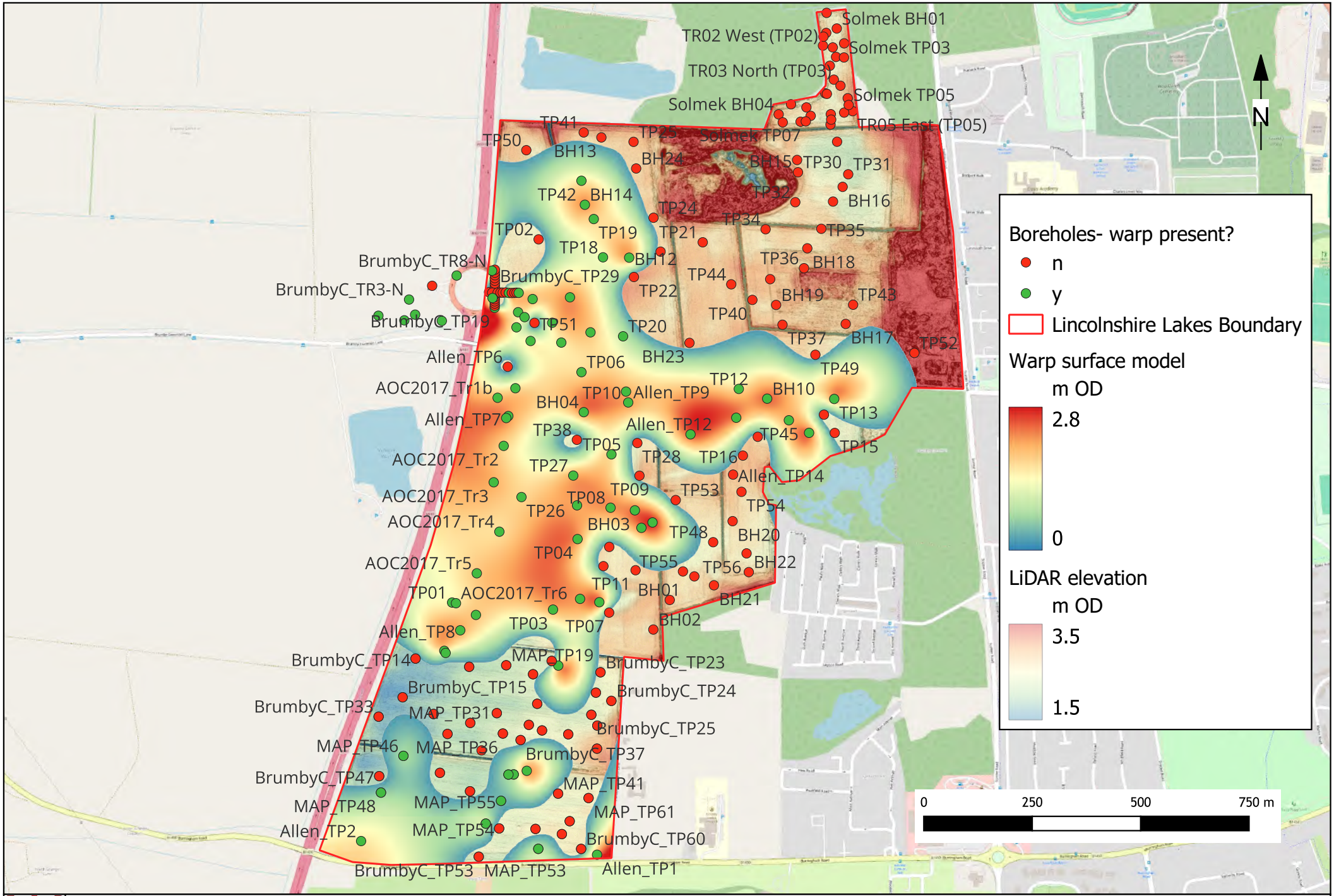

Figure 03 - Warp surface model

Scale at A4 - 1:11000

Map output: Scunthorpe

VB-08.04.22

Drawn by: LP

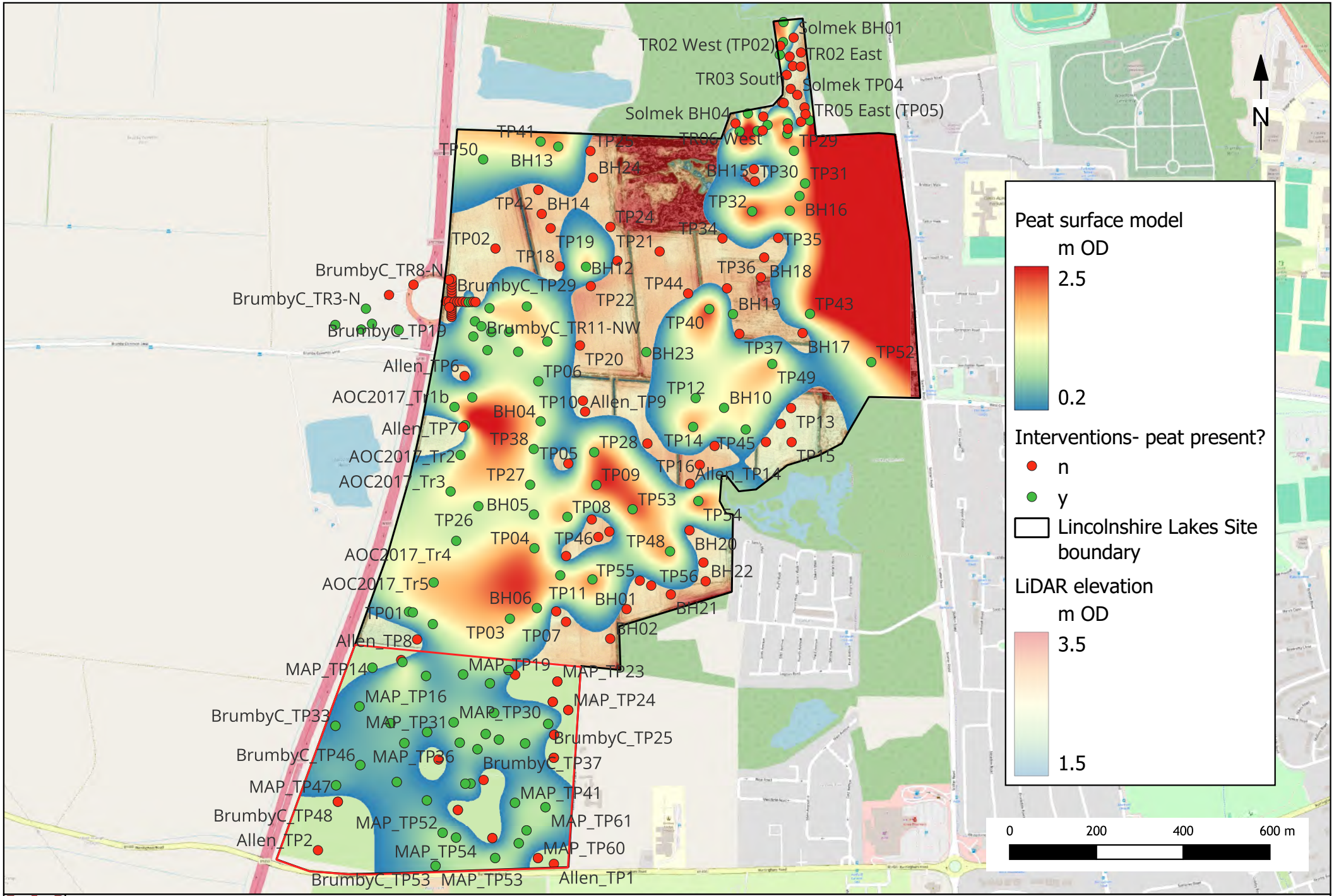

Figure 04 - Peat surface model

Map output: Scunthorpe

Scale at A3 - 1:11000

Drawn by: LP

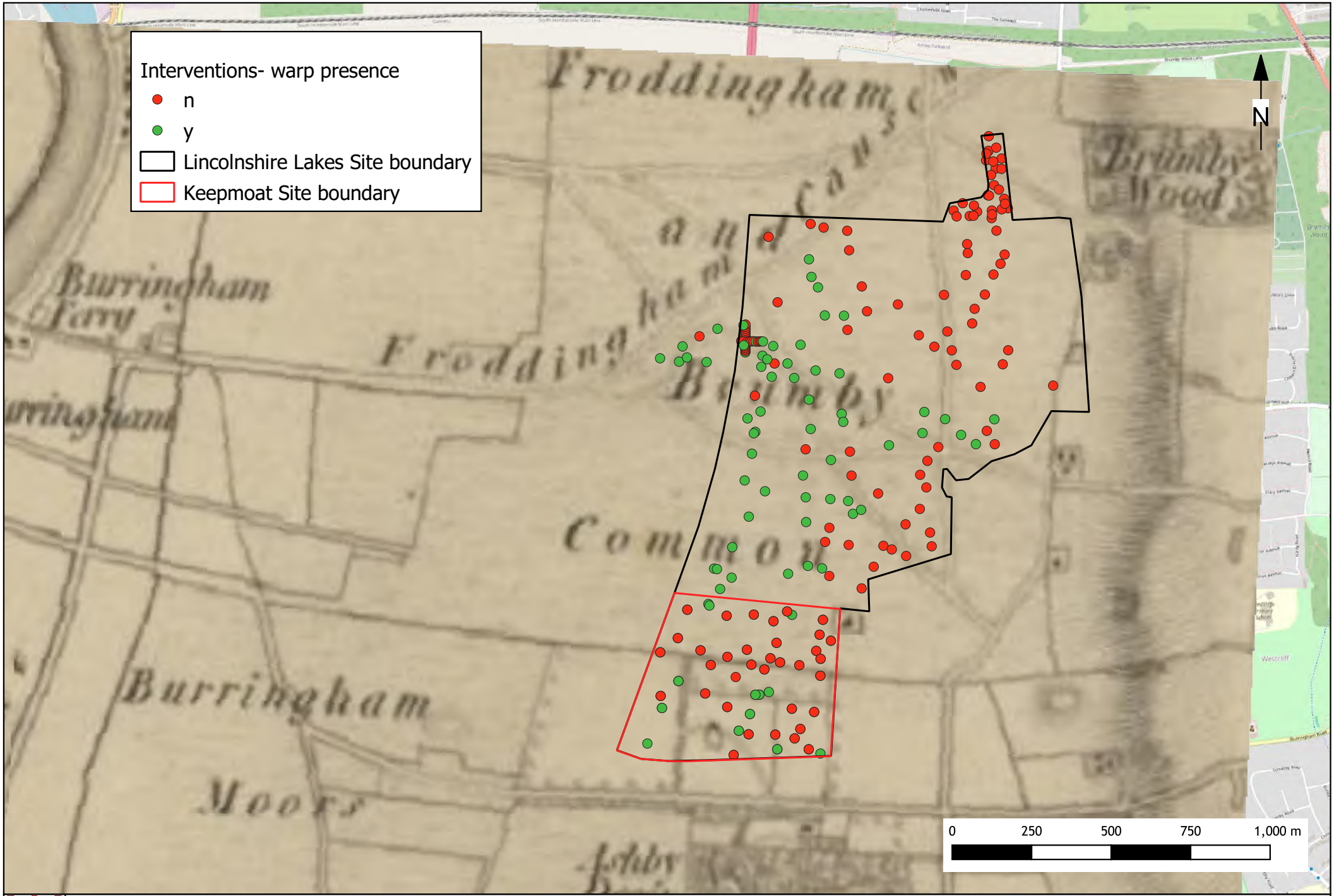

Figure 05 - 1805-1845 Historic Mapping

Scale at A4 - 1:15000

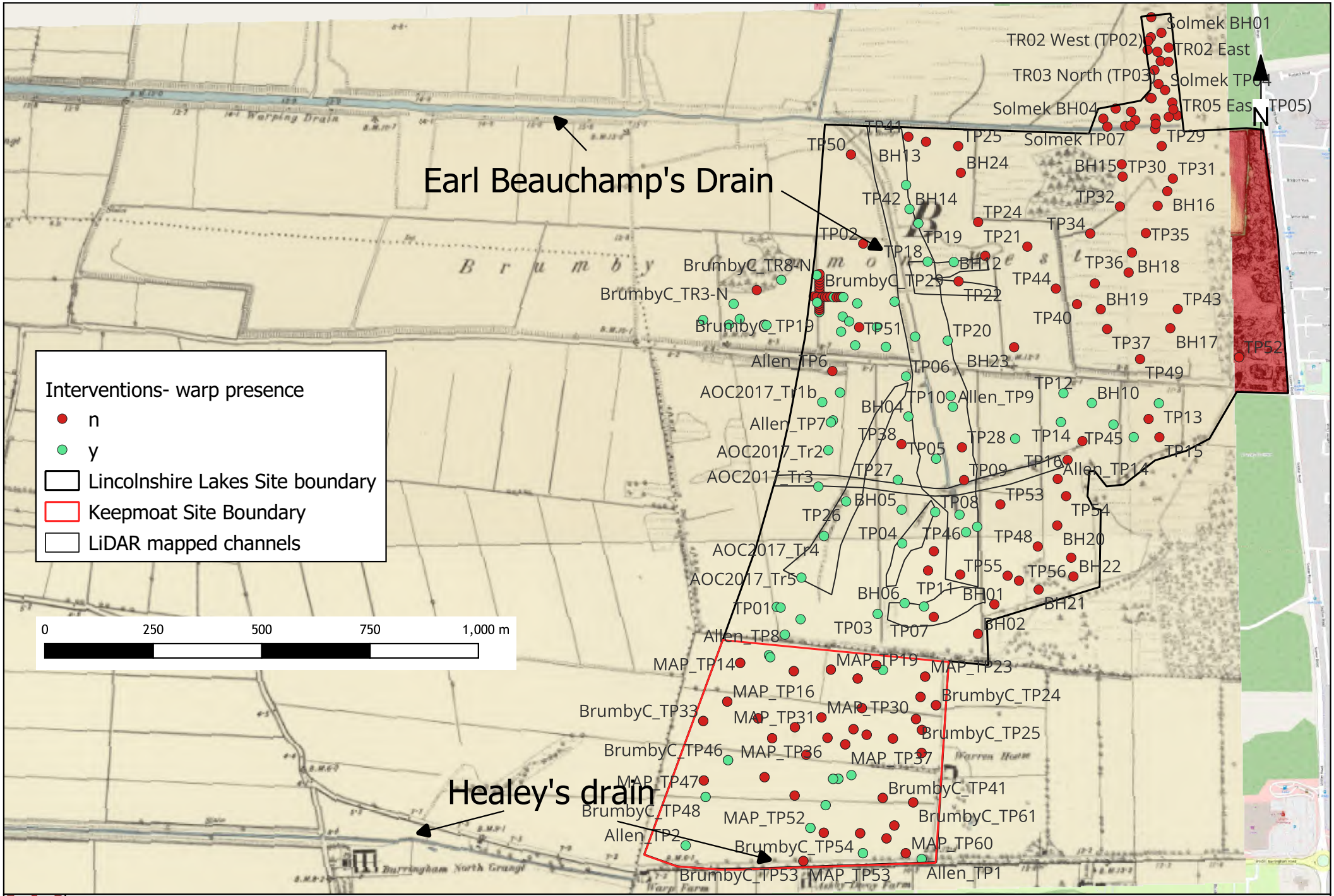

Figure 06 - 1885 OS historic mapping

Scale at A4 - 1:11000

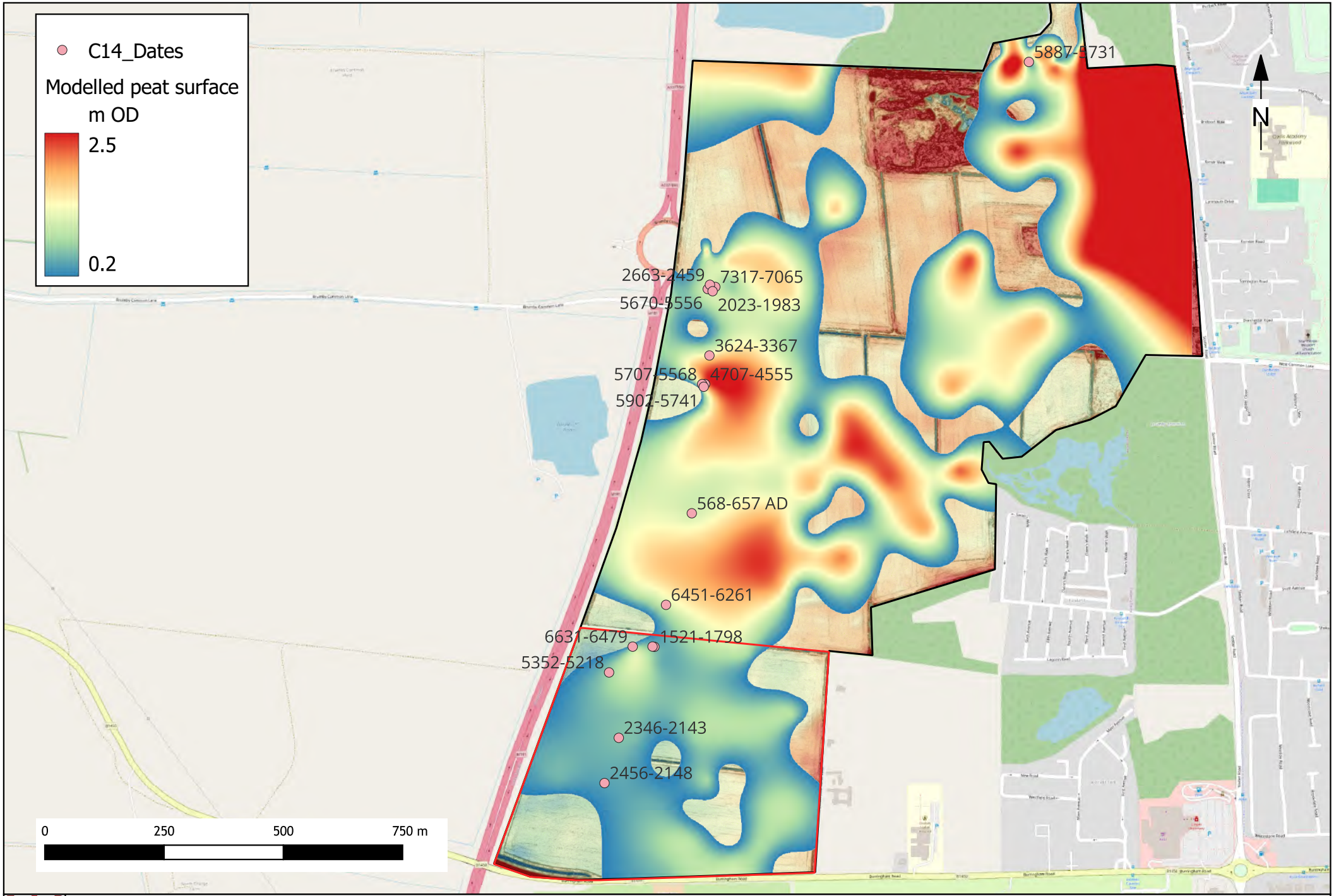

Figure 07 - Radiocarbon dates w/peat surface model

Scale at A4 - 1:10000

Map output: Scunthorpe

Drawn by: LP

mapparch

MAP Archaeological Practice

Lincolnshire Lakes
land east of M181 and north of Burringham Road
Scunthorpe

Written Scheme of Investigation
Archaeological Trial Trenching

MAP 05.04.22

OASIS ID: maparcha1-506854

NLMS Archaeology Site Code: BURAH

Read by	Revision	Company/Position	Initial and Date

Lincolnshire Lakes
Land east of M181 and north of Burringham Road
Scunthorpe

WRITTEN SCHEME OF INVESTIGATION:
Archaeological Trial Trenching

CONTENTS PAGE

Lincolnshire Lakes
Land east of M181 and north of Burringham Road
Scunthorpe

Written Scheme of Investigation
Archaeological Trial Trenching

1 Summary

1.1 This document, which has been produced in collaboration with the Head of Geoarchaeology at York Archaeology, sets out the details for the archaeological work required on land at Lincolnshire Lakes, Near Scunthorpe (SE 86261 08611) in order to inform the Historic Environment Officer at North Lincolnshire County Council (NLHEO), of the archaeological potential of the site, prior to the commencement of a residential development consisting 599no. dwellings and lake, along with associated infrastructure, including landscaping, public open space and play area, pedestrian and cycle links, pumping station and sub-station. The results of the evaluation are required to inform the preparation of the planning application and the determination of permission by the planning authority in accordance with the National Planning Policy Framework.

1.2 In accordance with the recommendations of the National Planning Policy Framework (2021) on 'Archaeology and Planning' a staged scheme of archaeological work is proposed. The results of the Trial Trenching will be summarised in a report and an appropriate mitigation strategy will be formulated if necessary.

1.3 Local planning policy relevant to the archaeological requirements of the site are discussed conditions attached to the Outline planning permission (see 2.4) however the following documents are also relevant to the application.

- Core Strategy DPD (2011)
- Housing and Land Allocations DPD (2016)
- Saved Policies of the Local Plan (2003)
- Lincolnshire Lakes Area Action Plan (2016)

2 Site Description and Planning Background

2.1 The site, which measures approximately 24.95ha is located some 2.5km south-west of Scunthorpe and is bounded to the west by the M181 motorway, to the south by Burringham Road and by Carisbrook Manor to the east. (Centred SE 86261 08611).

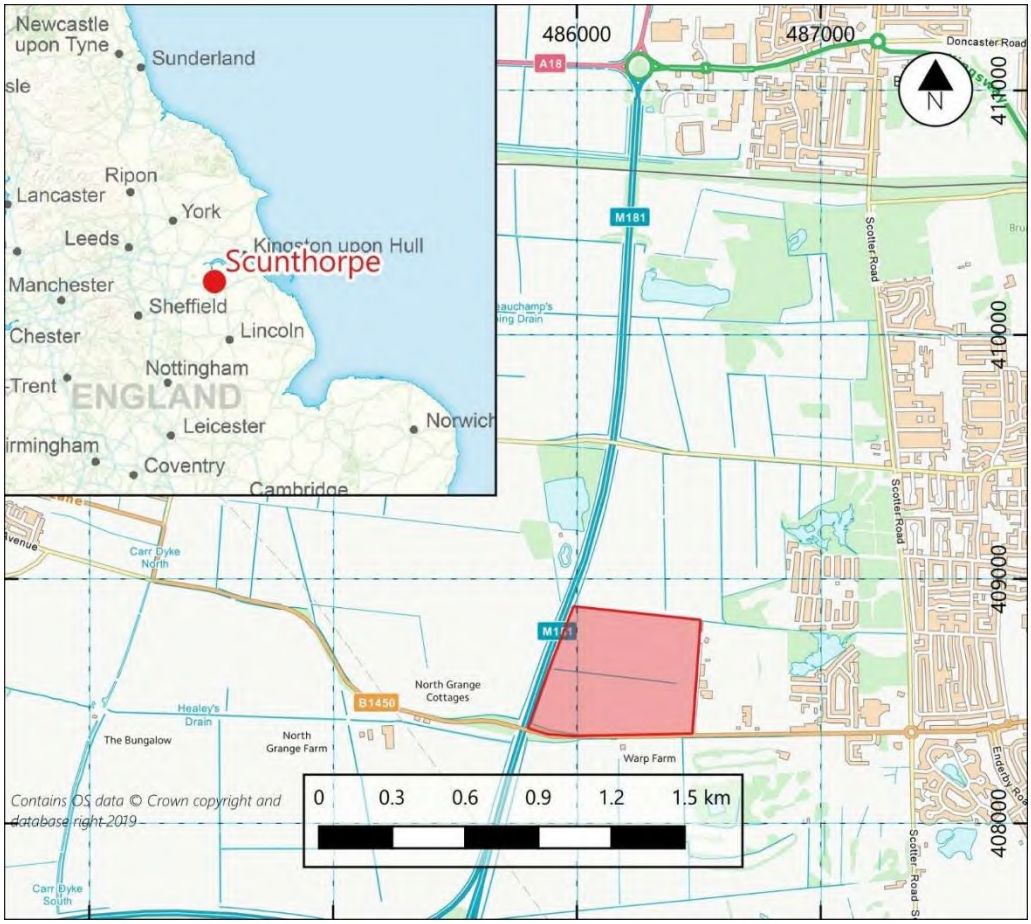

Figure 1. Site Location.

2.2 The site, which lies at approximately 2m AOD is relatively flat and lies on bedrock geology of the Mercia Mudstone Formation which is overlaid by quaternary deposits (BGS. 2022). Deep deposits of windblown sands are present within the site boundary. The site currently consists of two agricultural fields.

2.3 An EIA screening request was made to North Lincolnshire Council, relating to the erection of 599no. dwellings and lake, along with associated infrastructure, including landscaping, public open space and play area, pedestrian and cycle links, pumping station and sub-station (PA/SCR/2022/1).A subsequent Screening Opinion (May 2022) states that the '*the development would not comprise EIA development*' A consultation response from Historic Environment Officer at North Lincolnshire County Council highlights the need for pre-application field evaluation. A staged programme of pre-application field evaluation is required, in order to inform the preparation of the planning application and the determination of permission by the planning authority in accordance with the National Planning Policy Framework.

2.4 Outline planning permission has previously been granted, by North Lincolnshire Council, for the erection of up to 2500 dwellings and a village centre including a school, healthcare facility, wildlife habitats and waterbodies (planning reference PA/2015/0396). The current site lies within this wider Outline area. Conditions 28-33 attached to the approval state that;

28. Prior to the submission of the first Reserved Matters application the submitted Archaeological Framework Strategy shall be updated to include the

results of archaeological evaluation which shall include but not be limited to the following surveys as appropriate:

- *Geoarchaeological and palaeo-environmental assessment*
- *Geophysical survey*
- *Trial trench excavation*

Each stage of archaeological evaluation shall be undertaken in accordance with a written scheme of investigation that has been submitted to and agreed in writing by the Planning Authority at least 15 working days in advance of commencement of proposed fieldwork. Written reports for each stage shall be submitted to the Planning Authority.

Reason: As the application has been submitted in outline form, it is essential to ensure that adequate assessment of the significance of any heritage assets is completed during the design stage to inform a well-planned development that takes full account of the significance of heritage assets, including the potential for nationally important sites, and to inform further decision making in accordance with paragraphs 184 - 202 of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

29. Prior to or concurrent with the submission of the first Reserved Matters application, and prior to subsequent submission for future Phases of the development, as described within the approved Phasing Plan submitted pursuant to condition 7 or any future update that shall be agreed in writing, the updated Archaeological Framework Strategy shall be submitted and

approved in writing by the Local Planning Authority. The Strategy shall include the following:

- *Details of proposed construction works including but not limited to site preparation, installation of infrastructure, foundation designs,*
- *An Archaeological Impact Assessment Report*
- *Mitigation proposals for preservation in situ, or for the investigation, recording and recovery of archaeological and palaeo-environmental remains, post-excavation assessment and analysis, and the publishing and archiving of result, including plans that define the areas for archaeological mitigation.*

Reason As the application has been submitted in outline form, it is essential to ensure that satisfactory assessment of all impacts of the development on the significance of any heritage assets, including those of potential national importance, is undertaken in order that appropriate mitigation is agreed prior to any works commencing on site and that the details of the development are satisfactory to the Local Planning Authority in view of the nature and scale of the development proposed, in accordance with paragraphs 184-202of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

30. No development shall commence on each Phase, as described within the approved Phasing Plan submitted pursuant to condition 7 or any future update that shall be agreed in writing, until the applicant, or their agents or successors in title, has secured the implementation of the programme of archaeological work set out in the approved updated Archaeological Framework Strategy, and until detailed written schemes of investigation for site and post-excavation assessment works have been submitted to, and

approved in writing by, the Local Planning Authority at least 15 working days in advance of commencement of proposed fieldwork. The written scheme of investigations shall include the following:

(i) measures to ensure the preservation in situ, or the preservation by record, of archaeological features of identified importance

(ii) methodologies for the recording and recovery of archaeological remains including artefacts and ecofacts

(iii) post-fieldwork methodologies for assessment and analyses including production of an updated project design

(iv) report content and arrangements for dissemination, and publication proposals

(v) archive preparation and deposition with recognised repositories

(vi) a timetable of works in relation to the proposed development, including sufficient notification and allowance of time to ensure that the site work is undertaken and completed in accordance with the strategy

(vii) monitoring arrangements, including the notification in writing to the North Lincolnshire historic Environment Record Office of the commencement of archaeological works and the opportunity to monitor such works

(viii) a list of all staff involved in the implementation of the strategy, including subcontractors and specialists, their responsibilities and qualifications

Reason To ensure the satisfactory standard of archaeological work in accordance with paragraphs 184–202 of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

31. The archaeological evaluation and mitigation strategies shall be carried out in accordance with the approved details and timings, subject to any variations submitted in writing to and agreed in writing by the Local Planning Authority. The approved updated Archaeological Framework Strategy shall be reviewed and updated as necessary upon the results of each completed stage of archaeological evaluation and mitigation fieldwork.

Reason To ensure the satisfactory standard of archaeological work in accordance with paragraphs 184–202 of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

32. The final Phase of the development hereby approved by this permission shall not be occupied or brought into use until the site investigation and post investigation assessment has been completed in accordance with the programme set out in the updated Archaeological Framework Strategy and until the applicant, or their agents or successors in title, has secured the implementation of an updated project design providing for the analysis, publication and dissemination of results and archive deposition that has been submitted to, and approved in writing by, the Planning Authority.

Reason To ensure that the results of the archaeological investigations are publicly accessible in a timely manner to advance the understanding of the significance of heritage assets within the application site in accordance with paragraphs 184–202 of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

33. A copy of any analysis, reporting, publication or archiving required as part of the mitigation strategy shall be deposited at the North Lincolnshire Historic Environment Record within one year of the date of completion of the development hereby approved by this permission or such other period as may be agreed in writing by the Local Planning Authority.

Reason To ensure that the results of the archaeological investigations are publicly accessible in a timely manner to advance the understanding of the significance of heritage assets within the application site in accordance with paragraphs 184–202 of the National Planning Policy Framework, policy CS6 of the North Lincolnshire Core Strategy, policies HE8 & HE9 of the North Lincolnshire Local Plan and the Lincolnshire Lakes Area Action Plan sustainability assessment.

2.5 Permission was granted in 2016 for the excavation of a lake within the site boundary, as part of the wider Lincolnshire Lakes proposal (planning reference PA/2016/1736). Condition 20 attached to this application stated that

No development hall take place until the applicant, or their agents or successors in title, has secured the implementation of an archaeological mitigation strategy, as defined in written scheme of investigation, which has been submitted to and approved by the local planning authority. The written scheme of investigation shall include details of the following

i. A programme of paleoenvironmental analysis in accordance with the recommendations of the Post-Excavation Assessment Report for Lane L1, Lincolnshire Lakes, Scunthorpe, North Lincolnshire, prepared by AOC Archaeology Group, 2017;

ii. *Measures to identify and assess the significance of archaeological remains during the excavation of the lake*

iii. *Measures to ensure the preservation in situ, or by record, of archaeological features of identified importance*

iv. *Methodologies for the recording and recovery of archaeological remains including artefacts and ecofacts*

v. *Post-fieldwork methodologies for for assessment and analyses*

vi. *Report content and arrangements for dissemination, and publication records*

vii. *Archive preparation and deposition with recognised repositories including the North Lincolnshire Museum Service and the ADS (Archaeological Data Service);*

viii. *A timetable of works in relation to the proposed development, including sufficient notification and allowance of time to ensure that the site work is undertaken and completed in accordance with the strategy*

ix. *Monitoring arrangements, including the notification in writing to the North Lincolnshire Historic Environment Record Office of the commencement of archaeological works and the opportunity to monitor such works;*

x. *A list of all staff involved in the implementation of the strategy, including sub-contractors and specialists, their responsibilities and qualifications.*

Reason: To comply with NPPF 141, policy CS6 of the Core Strategy and policy HE9 of the North Lincolnshire Local plan, because deposits of proven paleoenvironmental significance furthering local, regional and national

agendas will be destroyed during the excavation of the lake and undiscovered archaeologically significant material may also be destroyed.

2.6 In agreement with the Historic Environment Officer at North Lincolnshire County Council and following discussion with a geoarchaeologist, a variation in the methodology of evaluation, as stipulated in condition 29 of the Outline planning permission is proposed (see section 6). Owing to the presence of warped sands across the site and the potential for Geophysical Survey to identify modern anomalies, this stage of evaluation will not be carried out. Instead, forty-eight trenches will be excavated, allowing for a larger sample, and offering an even spread across the site.

Geology

2.7 The underlying geology as mapped by the British Geological Survey (BGS) comprises the Mercia Mudstone Group (located at approximately 15.95m Below Ground Level (BGL) at the site location). The superficial depositional sequences at the site are likely to be complex which has been demonstrated during detailed palaeoenvironmental survey conducted to the south of Flixborough, c. 5.50km north of the site across the width of the Trent Valley floodplain (Lille, 1998).

The Mercia Mudstone Formation is recorded as being overlain by 5.95m of sand and gravel, itself overlain by 4.00m of glaciofluvial deposits and an additional 3.50m of blown sand (Sutton Sand Formation).

2.8 The Sutton Sand Formation is concentrated in an area between York and Lincoln and is characterised as aeolian in origin. These sands were originally deposited in the Devensian although no precise chronology exists with regards to the retreat of the Vale of York ice front (Bateman et al. 2015).

However, organic sediments underlying the Sutton Sand Formation at Sutton on the Forest, some 60.00km northwest 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 sands range from 1.50-7.30m in thickness and are likely to have been extensively reworked in the Holocene (McIlwaine and McDonnell, 2006). Detailed investigations as part of the North Lincolnshire Coversands Research Project (McIlwaine and McDonnell, 2006) at Willow Holt Quarry, Flixborough, indicate that the 'cover sands' have been accumulating and reprofiling since c.11,000 BP. These have the potential to seal former landsurfaces and contain archaeological remains such as lithic scatters.

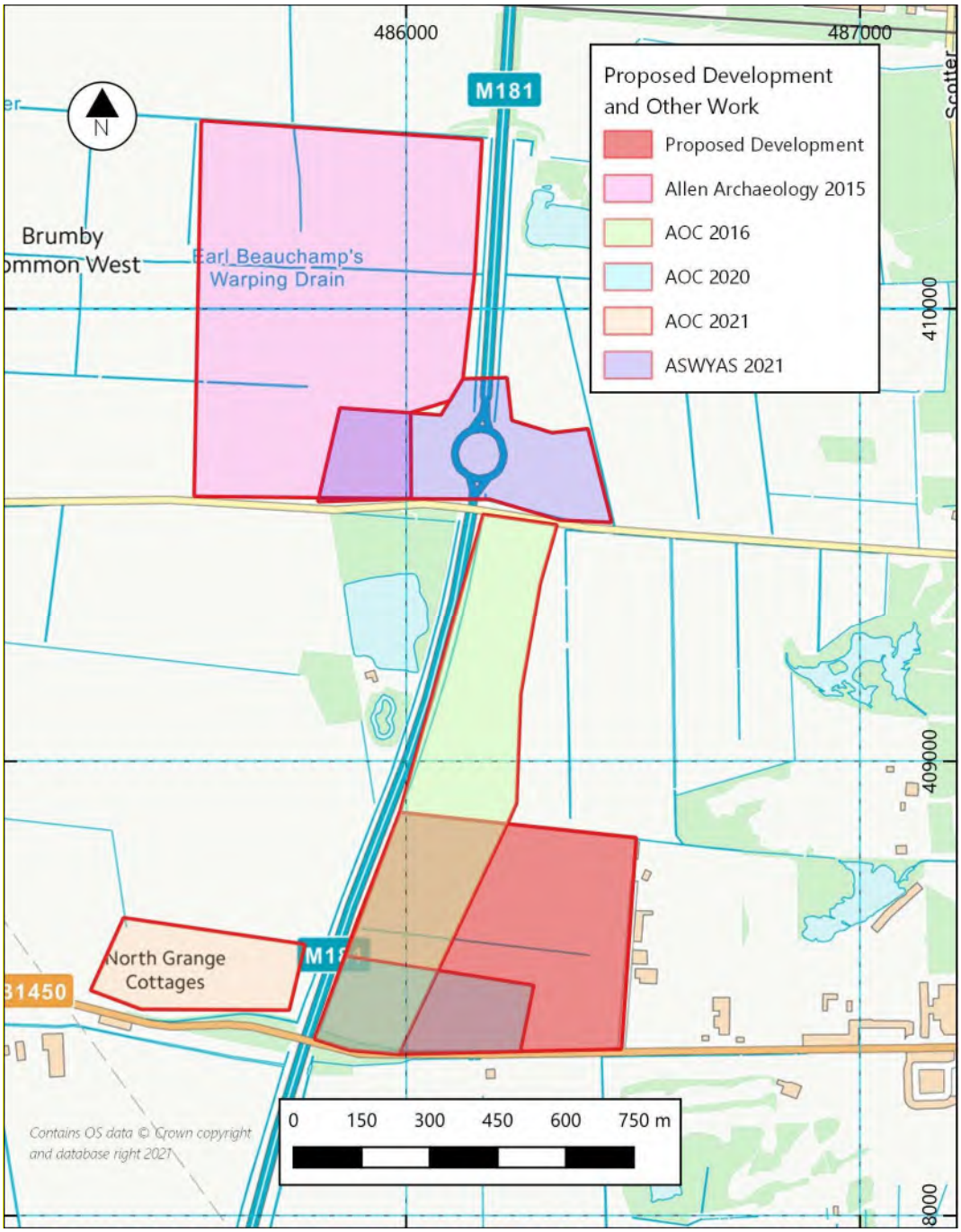

Figure 2: Archaeological work in the vicinity of the site.

2.9 The BGS mapped geology indicates Sutton Sand Formation outcrops at the surface to the east, but within the site Warp deposits seal the sands. Recently the depositional sequence has been investigated by a number of contractors with evaluations carried out by Allen Archaeology (2016c), ASWYAS (2020) and AOC (2017a, b) in the vicinity of the site (Figure 2). In all cases the surface

of the sands undulate and within these undulations are accumulation of peat, which have been observed both to the north (Allen 2015c) and within the site (AOC 2017a, b) of the site. Peat accumulations recorded within the site by AOC have been dated from c.6700-3000 BP (c. 5600-1500 cal BC). In the more recent ASWYAS investigations, the peat was confined to a large depression at the southern end of the site suggesting accumulation from the late Mesolithic to the Early Bronze Age, within a seasonally wet acidic heathland environment (YA 2020 for ASWYAS). A simple chronological model was proposed which requires further refinement (Table 1):

Core / Trench	Sample	C14 Elevation (m OD)	C14 Sample Depth (m BGL)	Radiocarbon Age (BP)	Calibrated Date (95.4%)
Trench 1	Peat (Humic Acid)	1.41	0.67	4676 ± 33	3624-3367 cal BC
ASWYAS Trench 12 <1211> / 1204	*Maloideae* roundwood	0.97	1.06	3710±30	2201 to 2024 and; 1993 to 1983 cal BC
ASWYAS Trench 12 <1211> / 1204	Peat (Humin Acid)	0.77	1.26-1.30	4040±30	2632 to 2469 and: 2663 to 2651 cal BC
Core 1A2	Macroplant	0.76	1.64	268 ± 27	1521-1798 cal AD
Core 1A2	Peat (Humic Acid)	0.50	1.90	5785 ± 25	4707-4555 cal BC
Core 1A3	Peat (Humic Acid)	0.30	2.10	6723 ± 28	5707-5568 cal BC
ASWYAS Trench 12<1211> / 1204	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<1211> / 1204	Peat (Humic Acid)	0.27	1.76-1.80	6700±30	5670 to 5605 and; 5600 to 5556 and; 5708 to 5609 cal BC
Core 1A4	Macroplant	-1.03	3.43	6951 ± 31	5902-5741 cal BC

Table 1: Radiocarbon age estimates from AOC 2017 Core 1 and Trench 1, and ASWYAS Trench 12 shown in order of descending elevation (m OD; GL = 2.08m OD).

2.10 The peat deposits are sealed by Warp which comprises finely laminated clays and silts deposited by deliberate inundation, and are mapped across the site. Warping was undertaken within the Lower Trent Valley for two principal reasons: to make unproductive peaty and acidic soils workable and to reduce the impact of seasonal inundations and waterlogging by artificially raising the ground surface level (Lillie, 1998). This process was largely achieved by

the deliberate 'flood-warping' of areas, with material (silts and clays) carried in suspension being allowed to settle and accumulate throughout areas where warping was desirable.

2.11 The extent of warping is summarised as, 'most of the (Trent) floodplain south of Neap House (*3.70km north of the site*) is occupied by flood-warp, which was allowed to run from the levee slopes eastwards to the rising blown sand outcrops' (cf Gaunt, 1976: 419 in Lille 1998b). Specifically, the land south of Crosby (the Great Common), some 2.00km north-north west of the site, underwent warping from 1808 with 243ha of ings, common and moor warped until c.1832 (Lille, 1998b: 110). A substantial warping drain is located c.450m north of the site (Earl Beauchamp's Warping Drain). These deposits can seal former land surfaces in addition to smoothing out any subsurface topographic variation.

3. Archaeological and Historical Background

3.1 The site is located in an area of known archaeological activity with prehistoric features and landforms likely to be present in the vicinity; appearing to be weighted towards the use of wetland margins. Paleoenvironmental evidence for the area is concerned primarily with the occurrence of peat formation and episodic depositions of sands, as a product of pre/historical variances of sea/river levels in the wider landscape.

3.2 A potential Bronze Age barrow has been identified some 750m north of the site (MLS25906). The feature, which has a diameter of approximately 25m, was identified in the results of a Geophysical Survey carried out in 2015.

3.3 A gully (MLS 26107) was identified in the southern region of the site. The feature, which measured 0.16m wide and 0.2m deep (Morris & Potten. 2017) contained no material to suggest a date or purpose. Evidence of warping within the site boundary has also been identified (MLS26106). Two warping drains were identified close to the southern end of the proposed lake. The features were interpreted as shallow warp drains which had been excavated in order to channel fertile sediments from the River Trent, across the site (Ibid).

Geoarchaeological and palaeoenvironmental investigations

3.4 The area surrounding the site has undergone many phases of archaeological and palaeoenvironmental assessment. Three boreholes and four test pits were carried out as part of geoenvironmental site investigations in 2015 (FWS. 2015). The work identified three distinct phases of deposition: an *'upper sand unit'* containing interleaved silts and peat lenses (Warp); an *'intermediate clay'* and a *'lower sand unit'* devoid of any organic material.

3.5 in 2016 AOC Archaeology excavated a total of 13 trenches in respect of the application for the excavation of a lake, the southern half of which will be located down the western side of the site. Six of the 14 trial trenches fall within the site. The trenches were machine excavated to a depth of 1m with sondages excavated each end excavated to a total depth of 2m. Auguring beyond this 2m depth suggested that peat horizons were present to a depth of approximately 3m below existing ground level. A detailed palaeoenvironmental assessment (AOC 2017b) was carried out including, pollen, diatoms, ostracods and forams, insects, plant macrofossils, radiocarbon dating and XRF core scanning (ITRAX). The peat in the northern half of the site recorded Mesolithic age determinations (c.7726-6309 BP),

with a single Bronze Age date from Trench 4. The preservation of pollen and ostracods/forams were good, although diatoms were only variably preserved. The ostracods provided some suggestion that potentially earlier deposits, possibly from an interglacial may be preserved at the site although this hypothesis remains to be tested.

3.6 Work carried out to the north at Brumby Common (York Archaeology on behalf of ASWYAS 2021) recorded peat deposits within a natural depression in the sands (0.80-1.90mbgl) which demonstrated accumulation from the Mesolithic into the Bronze Age. The pollen assemblage was dominated by tree and shrub taxa, represented by birch and pine with insects representing heathland environments on the higher and drier ground. The sample site was located at the edge of the wider Lower Trent Valley wetland, and would have been subject to seasonal fluctuations in water levels.

3.7 Although the peat deposits discussed above appeared in stratigraphic sequence, this was not the case to the north of the site where the deepest identified peat produced the youngest date. It is clear that deposits are not uniform across the site, likely as a result of warping and possibly post-depositional reworking

4. Aims and Objectives

4.1 The aim of the Archaeological Trial Trenching is;

- To determine the presence/absence, nature, date, quality of survival and importance of archaeological and paleoenvironmental deposits to enable an assessment of the potential and significance of the archaeology and paleoenvironment to be made;

- To establish the chronology of the sediment sequence, particularly with reference to the peat development at the site;
- To determine the potential for the underlying sands to preserve archaeological remains and land surfaces.

4.2 The objectives of the work are:

- To undertake trial trenching across the site and to make a record of any archaeological features/deposits;
- To recover dateable artefacts and environmental samples to characterise the activity at the site;
- To undertake test pitting to record the lithology of the underlying sands/peat deposits;
- To recover samples for paleoenvironmental assessment and scientific dating;
- To create a deposit model and archaeological framework for the site using the results of the test pitting and previous phases of work;
- To present the results of the fieldwork, deposit modelling and any palaeoenvironmental assessment in a report.
- To inform the requirement for and scope of any archaeological mitigation including further archaeological works which may be required

4.3 In addition this site has the potential to address the following East Midlands Research Agenda topics (http://archaeologydataservice.ac.uk/researchframeworks/eastmidlands/wiki/Main).

2 MESOLITHIC (c.9500 - c.4000 cal BC)
2A - Enhance understanding of the environmental background to Mesolithic activity:

'By comparison with some other areas of the country, the Mesolithic environment of the East Midlands is little known… There is a need to obtain more closely dated pollen sequences from upland, riverine and coastal peat deposits and to extend the investigation of ancient environments to include isotope studies of the organic fractions of coastal and riverine sediments.' (Knight et al 2012, 36)
2.6.1 What can analyses of cave deposits, palaeochannel fills, upland peats and other deposits with potential for preserved pollen, charcoal and other organic remains contribute to studies of the earliest stages of woodland clearance and plant domestication?
2.6.2 How can we maximise the potential of palaeochannels, upland or coastal peats and other organically rich deposits as sources of data on Early Holocene landscapes and changes in subsistence strategies and diet?
2H - Investigate the transition from the Mesolithic to Neolithic: 'The issue of changing subsistence strategies and the relationship between Mesolithic and Neolithic lifeways can be addressed in part by consistent sampling of organic material preserved in palaeochannels and other waterlogged or wetland contexts spanning the transition period.' (Knight et al 2012, 43)
NEOLITHIC AND EARLY TO MIDDLE BRONZE AGE (c.4000–c.1150 cal BC)
3E - Target sites with Late Mesolithic and Early organic remains: '…significantly more organically rich contexts of this period need to be targeted for environmental analysis and radiocarbon dating to elucidate patterns of landscape change during this key transitional period. Particular attention should be focused upon sites preserving organic remains that may be threatened by dewatering, while the information gained from sites under threat from development should be maximised.' (Knight et al 2012, 52).
3.2.3 How may environmental sampling strategies assist in elucidating the transition from later Mesolithic to earlier Neolithic economies?
3.7.2 What ceremonial or ritual roles may rivers or other watery locations have performed and how may this have varied regionally and over time?

4.4 In addition, the site can build on the work undertaken by the Lincolnshire Coversands Project which recommended a number of key considerations for future work in the area (McIlwaine and McDonell 2006). These included elucidating the extent, depth and topography of the coversands. Recent work in the development of the Mesolithic Research and Conservation Framework highlights the targeting of research on sites at risk such as

wetlands where peat is drying out (Blinkhorn and Milner 2013, 30). Key themes were identified in relation to prospection of sites:

S2.2: Broader use of fieldwalking, test-pitting and other low-impact techniques is needed, especially within a developer-led context.

S2.4: Novel methodologies to evaluate the locations of Mesolithic activity should be sought and successes in the field appropriately communicated across all sectors. For instance, these might be grounded in geoarchaeological modelling, or the application of borehole, coring and sieving strategies.

5 Compliance

5.1 MAP will adhere to the general principles of the CIfA Code of Conduct (CIfA 2021) throughout the project and to the CIfA 'Standards and Guidance for Archaeological Field Evaluations' (CIFA 2020).

5.2 All work will be carried out in accordance with chapter 16 of the National Planning Policy Framework (2021) on 'Archaeology and Planning'.

5.3 The work will be monitored under the auspices of the Historic Environment Officer at North Lincolnshire County Council, who will be consulted before the commencement of site works.

5.4 All maps within this report have been produced from the Ordnance Survey with the permission of the Controller of Her Majesty's Stationery Office, Crown Copyright. License No. AL 50453A and also data derived from Open Street Map (https://www.opennstreetmap.org/copyright).

5.5 If human remains are encountered during the course of this evaluation it is considered best practice to not remove the remains at this stage, however, this should be considered at a site-specific level. If it is deemed necessary to remove human remains, this will be carried out under the conditions of licences for the removal of human remains (issued by the Ministry of Justice) and in accordance with the Burial Act (1857) and 'Guidelines to the Standards for Recording Human Remains' (Brickley & McKinley. 2004) to ensure that they are treated with due dignity.

5.6 MAP Archaeological Practice is an ISO 9001 accredited organisation (certificate number GB2005425). The award of the ISO 9001 certificate, independently audited by the British Standards Institution (BSI), demonstrates MAP's commitment to providing a quality service to our clients. ISO (the International Organisation for Standardisation) is the most recognised standards body in the world, helping to drive excellence and continuous improvement within businesses.

6 Fieldwork Methodology

Excavation and Recording

6.1 Forty-eight trenches are proposed, positioned in such a way that an even spread across the site is achieved, in combination with the previously excavated six trenches. (Fig. 2). All measure 50m x 2m. A total of forty-eight test pits will be excavated at one end of each trench to make a lithological record of the underlying deposits.

6.2 Trenches will be positioned to an accuracy of +- 100mm of the specified trench location using survey grade GPS or equivalent metric-survey equipment

6.3 All overburden, topsoil and any subsequent subsoils will be carefully removed by mechanical excavator using a wide toothless blade, under archaeological supervision, in level spits of no more than 100mm until either the top of the first archaeological horizon, or undisturbed natural deposits are encountered. Excavated topsoil will be redeposited in bunds around the edge of the site, or at an alternative location, to be determined in agreement with the client. Topsoil and subsoils will be stored separately, and all spoil will be stored and managed in line with the standards of the Construction Code of Practice for Sustainable Use of Soils on Construction Sites (DEFRA 2009).

6.4 Shovel testing will take place within each trench to establish the presence of lithics. The equivalent of a 5% sample by area (equating to five x one metre squares) of each 100mm spit will be passed through a 5mm sieve, in order to retrieve artefactual evidence such as prehistoric flint artefacts and flint-working debris. A record will be made of the location of each sample area and spit and any lithics and other artefacts noted and retained for processing and analysis. The shovel test areas are to be located at equal intervals along the trench including at each end.

6.5 All excavation of archaeological features, concentrations of artefacts and deposits carried out will be by hand. Areas of intensive modern disturbance will be given a low priority in excavation. Where practicable, the fills of these features will be removed by mechanical excavator.

6.6 All archaeological deposits and features will be recorded using Diggit Archaeology, a digital recording system which is compatible with the MoLAS recording system. All indices will be produced using MAP's pro forma sheets. The MAP recording manual will be used on site where necessary.

6.7 The stratigraphy of trenches will be recorded even if no archaeology is found. The test pits will be recorded by a geoarchaeologist using the Troels-Smith (1955) system of sediment classification (Appendix 1). The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Sicc) and the sharpness of the upper sediment boundary (UB). A summary of the sedimentary and physical properties classified by Troels-Smith (1955) and a stratigraphic breakdown of the deposits will be recorded on proforma log sheets. The logs will be supplemented by digital photography.

6.8 The excavation sampling policy will be :

a. A 100% sample of stakeholes

b. An initial 50% sample will be taken of all postholes, but where they are part of a building these will be 100% excavated

c. A 50% sample of pits with a diameter up to 1.5m (where justified, these will be 100% excavated,

d. A minimum 25% sample of all pits over 1.5m in diameter, but this will include a complete section across the pit to record a full profile (where justified, these will be 100% excavated)

e. linear features will be sampled a minimum of 10% along their length (each sample section to be not less than 1m), or a minimum of a 1m sample section, if the feature is less than 5m long.

f. All junctions/intersections and corners of linear features will be investigated and their stratigraphic relationships determined – if necessary, using box sections and all ditch terminals will be examined,

g. Funerary contexts, buildings and industrial features will be subject to sufficient excavation to establish the objectives of the evaluation but no archaeological deposit will be entirely removed unless this is unavoidable to meet the aims of the fieldwork.

6.8 In certain cases, the use of mechanical excavation equipment may also be appropriate for removing deep intrusions (e.g modern brick and concrete floors or footings), or for putting sections through major features after partial excavation (e.g ditches), or through deposits to check that they are of natural origin. Under no circumstances will any deposits be removed by machine without the prior agreement of the North Lincolnshire Historic Environment Officer.

6.9 A full written, drawn and photographic record will be made of all material revealed during the course of the evaluation. Plans will usually be completed at a scale of 1:50 or 1:20 (as appropriate) whilst section drawings will be at a scale of 1:10. All sections, plans and elevations will include spot-heights related to Ordnance Datum in metres as correct to two decimal places High resolution (minimum 12-megapixel resolution) digital photography will be used to for the basis of the photographic archive following the advice of the Archaeological Data Service (ADS 2011).

6.10 A sampling strategy for the recovery for environmental remains has been formulated in accordance with an Environmental Strategy written by an Environmental Consultant (Diane Aldritt, appendix 1) and York Archaeology. The strategies also follows the guidance of the Association for Environmental Archaeology (1995) and Historic England Guidance for Environmental Archaeology and Geoarchaeology (2011 and 2015).

6.11 Soil samples will be taken from all securely stratified deposits using a strategy which combines systematic and judgement sampling, but which also follows the methodologies outlined in the English Heritage (2011) 'Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (Second Edition) guidance. Positive features will also be sampled; retention of structural material such as bricks will be implemented where necessary. Sampling will also be considered for those features where dating by other methods (for example pottery and artefacts) is uncertain. Animal bones will be hand collected, and bulk samples collected from contexts containing a high density of bones. Spot finds of other material will be recovered where applicable. Flotation samples and samples taken for coarse-mesh sieving from dry deposits will be processed at the time of the fieldwork wherever possible, partly to permit variation of sampling strategies, if necessary, but also because processing at a later stage could cause delays.

6.12 Waterlogged deposits will be sampled using kubiena tins from open sections where possible, with measured 20L bulk samples taken alongside the tin. Samples of roundwood for radiocarbon dating and species identification may also be recovered, and all locations will be recorded on hand drawn sections, with digital photography and using GNSS. If suitable deposits are

encountered, i.e undisturbed sand, OSL samples will be recovered. Kubiena samples will be subsampled at York Archaeology facilities for the assessment of macrofossil remains (pollen, diatoms, ostracods). Bulk waterlogged samples will be wet sieved for the recovery of plant macrofossil and insect remains. Material of post-glacial date will be submitted for radiocarbon AMS dating, single entity macrofossils and identifiable small diameter roundwood will be selected where possible. If no such remains are encountered, then bulk sediment will be submitted for dating.

6.13 If human remains are encountered during the course of this evaluation and it is deemed necessary to remove the remains, this will take place under the conditions of licences for the removal of human remains (issued by the Ministry of Justice, to ensure that they are treated with due dignity). The preferred option would be for them to be adequately recorded before lifting, and then carefully removed for scientific study, and long-term storage with an appropriate museum; however, the burial licence may specify reburial or cremation as a requirement.

6.14 A finds recovery and conservation strategy will be discussed with the Historic Environment Officer and recipient museum in advance of the project commencing, and a policy for finds recording should be agreed and submitted to the Historic Environment Officer, before commencement of site works. Any recording, marking and storage, materials will be of archive quality, and recording forms and manuals will be submitted to the Historic Environment Officer, prior to the commencement of on-site works, if these have not been supplied previously. Allowance will be made for preliminary

conservation and stabilisation of all objects and an assessment of long-term conservation and storage needs.

6.15 All finds (artefacts and ecofacts) visible during excavation will be collected and processed, unless variations in this principle are agreed with the Local Authority. Finds will be appropriately packaged and stored under optimum conditions, as detailed in the RESCUE/UKIC publication First Aid for Finds. In accordance with the procedures outlined in MoRPHE, all iron objects, a selection of non-ferrous artefacts (including all coins), and a sample of any industrial debris relating to metallurgy will be X-radiographed before assessment.

6.16 We will make provision within our excavation strategies, where necessary, for use of shoring, pumps or artificial lighting. Such strategies will also allow for sampling for radiocarbon, archaeomagnetic and/or dendrochronological determinations, as appropriate: where in situ timbers are found to survive in good condition, samples will be taken for dendrochronological assay, following procedures set out in Historic England Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood, (2018).

6.17 Arrangements for site access and reinstatement are to be agreed with the commissioning body.

6.18 Health and safety will take priority over archaeological matters. All archaeologists undertaking fieldwork must comply with all Health and Safety Legislation, this includes the preparation of a Risk Assessment.

6.19 All archaeological staff and visitors to the site will comply with current government guidance regarding COVID-19. All precautions, including those concerning social distancing will be outlined in MAP's risk and method statement.

6.20 'The North Lincolnshire HEO will be responsible for monitoring the archaeological work on behalf of the local planning authority. A minimum of 15 days' notice of the commencement of fieldwork must be given so that arrangements for monitoring can be made. She will be kept regularly informed about developments both during the site works and subsequent post-excavation work.

6.21 Necessary precautions should be taken over underground services and overhead lines.

6.22 All on site staff hold valid CSCS cards. All Project Officers and Project Managers hold a valid First Aid at Work Certificate and Site Supervisor Safety Training qualifications.

6.23.1 MAP will provide evidence of all necessary insurances, including Employer's Liability, Professional Liability and Public Liability Cover.

7. Post Excavation Assessment

7.1 Upon completion of the evaluation, the artefacts, soil samples and stratigraphic information will be assessed as to their potential and significance for further analysis.

7.2 A rapid scan of all excavated material will be undertaken by conservators and finds researchers in collaboration. Material considered vulnerable will be selected for stabilisation after specialist recording.

7.3 Where intervention is necessary, consideration will be given to possible investigative procedures (e.g glass composition studies, residues in or on pottery, and mineral preserved organic material).

7.4 Allowance will be made for preliminary conservation and stabilisation of all objects and an assessment of long term conservation and storage needs.

7.5 Assessment of artefacts will include inspection of X-radiographs of all iron objects, a selection of non-ferrous artefacts (including coins), and a sample of any industrial debris relating to metallurgy.

7.6 Once assessed, all material will be packed and stored in optimum conditions, as described in First Aid for Finds.

7.7 Waterlogged organic materials will be dealt with, following Historic England documents, Guidelines for the care of waterlogged archaeological leather, and guidelines on the recording, sampling, conservation and curation of waterlogged wood.

7.8 Processing of all samples collected for biological assessment, or subsamples of them, will be completed. Bulk and site-riddled samples from dry deposits will have been processed during excavation, where possible.

7.9 The preservation state, density and significance of material retrieved will be assessed, following methods presented in Environmental Archaeology (Historic England, 2011). Unprocessed sub-samples will be stored in conditions specified by the appropriate specialists.

7.10 Assessments for any technological residues will be undertaken. Samples for dating will be submitted to laboratories promptly, so as to ensure that results are available to aid development of specifications for subsequent mitigation strategies.

7.11 The following Specialists have been contacted as are available to work on the project:

Pottery - T G Manby (Prehistoric),

M R Stephens (medieval and Post-medieval)

P A Ware (Roman)

Flint - P Makey

Animal Bone – Jane Richardson

Environmental Sampling – Diane Alldritt

Conservation – York Archaeological Trust

Human Remains – York Osteology

Ceramic Building Material – Dr Phil Mills

Clay Tobacco Pipe - M R Stephens

Geoarchaeology- Kristina Krawiec (York Archaeology)

Pollen Dr Tom Hill (independent)

Diatoms Dr Tom Hill (independent)

Ostracods Dr John Whittaker (independent)

OSL Dr Phil Toms (University of Gloucester)

Plant macrofossils Stacey Adams (York Archaeology)

Insects Dr David Smith (University of Birmingham)

8. Reporting

8.1 Within two weeks of the completion of the fieldwork, a brief interim report will be issued to the North Lincolnshire Historic Environment Officer presenting the findings of these investigations.

8.2 On completion of the post-excavation assessment, a site assessment report will be prepared within 12 weeks of the completion of fieldwork, subject to specialist availability, to include the following;

a) A non-technical summary of the results of the work, Introduction and aims and objectives.

b) An introduction which will include

- the site code/project number
- planning reference number
- dates when fieldwork took place
- grid reference
- North Lincolnshire Museum Site Code
- Oasis reference

c) An account of the methods and results of the evaluation, describing structural data and associated finds and/or environmental data recovered.

d) Interpretation, including phasing of the site sequence and spot-dating of ceramics (Descriptive material will be clearly separated from interpretive statements). This will be supported by the use of photographs and drawings, to include an overall plan of the site accurately identifying the location of trenches, accurately tied in to the National Grid; individual trench plans as excavated indicating the location of archaeological features, with at least one section detailing the stratigraphic sequence of deposits within each trench

and sections of archaeological features. All plans and sections will include accurate scales and hights relative to Ordnance Datum correct to two decimal places.

e) A specialist assessment of the artefacts recovered with a view to their potential for further study.

f) A specialist assessment of environmental samples taken, with a view to their potential for subsequent study.

g) The results of the geoarchaeological assessment will be included in the evaluation report and will include an updated deposit model, a description of deposit formation processes and depositional conditions including a full lithological description and incorporating the results of specialist assessment and dating, and description of the sub-surface topography and characterisation of sediments present on site. Recommendations for the potential of samples taken from environmental reconstruction will be made as appropriate.

h) The results from investigations in archaeological sciences will be included in the Site Archive and presented in the Evaluation Report. Reports will include sufficient detail to permit assessment of potential analysis. They will include tabulation of data in relation to site phasing and contexts, and will include non-technical summaries. The objective presentation of data will be clearly separated from interpretation. Recommendation for further investigation (both on samples already collected, and at future excavations) will be clearly separated from the results and interpretation.

i) An assessment of the archaeological and paleoenvironmental significance of the deposits identified, in relation to other sites in the region cross-referenced to the regional research framework.

j) A conclusion with recommendations for further post-excavation work, if required.

k) Detailed archive location and destination.

l) Appendices and figures, as appropriate

m) References and bibliography of all sources used

n) A copy of the OASIS summary report form

8.3 Copies of the evaluation report will be submitted to the commissioning body, the Local Planning Authority and the North Lincolnshire Historic Environment Record within 12 weeks and subject to any contractual requirements on confidentiality

8.4 The report and a summary of findings will be lodged with OASIS, following the completion of work. OASIS Id: maparcha1-506854

9. Copyright, Confidentiality and Publicity

9.1 Unless the individual/organisation commissioning the project wishes to state otherwise, the copyright of any written, graphic or photographic records and reports rests with MAP.

9.2 MAP undertake public engagement for all appropriate projects. This will be offered in numerous ways to reflect the nature of the archaeological works.

7.1 Upon completion of the evaluation, the artefacts, soil samples and stratigraphic information will be assessed as to their potential and significance for further analysis.

7.2 A report will be prepared to include the following:

e) A non-technical summary of the results of the work, Introduction and aims and objectives.

f) An introduction which should include

- the site code/project number
- planning reference number and SMR Casework number
- dates when fieldwork took place
- grid reference

An account of the methods and results of the evaluation

10. Archive Preparation and Dissemination

10.1 The requirements for archive preparation and deposition will be addressed and undertaken in a manner agreed with North Lincolnshire Museum Service. The recipient museum has been contacted during the production of this WSI and will be contacted before commencement of fieldwork. The Museum Site code for the work is NLMS Archaeology Site Code : BURAH.

10.2 A site archive should be prepared in accordance with the specification outlined in *Management of Archaeological Projects* (MoRPHE (Lee, E, 2006). See also *Towards an Accessible Archaeological Archive, the Transfer of Archaeological Archives to Museums: Guidelines for use in England, Northern Ireland, Scotland and Wales* Society of Museum Archaeologists 1995.

10.3 The site archive, including finds and environmental material, subject to the permission of the relevant landowners, will be labelled, conserved and stored according to the United Kingdom Institute for Conservation (UKIC)'s. Provision will be made for the stable storage of paper records and their long term storage on a suitable medium, such as microfilm. An index to the

contents of the archive together with details of its date and place of deposition should be lodged with the HER.

10.4 Archive deposition will be arranged in consultation with the recipient museum and Historic Environment Officer and will take account of the requirements of the recipient museum and the relevant guidelines (see above) relating to the preparation and transfer of archives. The timetable for deposition shall be agreed on completion of the site archive and narrative.

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mapparch
MAP Archaeological Practice

Legend

Development Outline

Trenching

Completed

Proposed

N

0 40 80 120 160 200 m

Trench Location Plan
Scale: 1:4000 @ A4
Version: A-290622
Client: Keepmoat Homes

APPENDIX 1

Conservation Strategy By Ian Panter of York Archaeological Trust

Artefacts from all categories and all periods will be recovered as a matter of routine during the excavation. When retrieved from the ground finds will be kept in a finds tray or appropriate bags in accordance with First Aid for Finds. Where necessary, a conservator may be required to recover fragile finds from the ground depending upon circumstances.

If waterlogged conditions are encountered a wide range of organic materials may be recovered, including wood, leather and textiles. Advice will be sought from a conservator to discuss optimum storage requirements before any attempt is made to retrieve organic finds and structural timbers from the ground.

After the completion of the fieldwork stage, a conservation assessment will be undertaken which will include the X-radiography of all the ironwork (after initial screening to separate obviously modern debris), and a selection of the non-ferrous finds (including all coins). A sample of slag may also be X-rayed to assist with identification and interpretation. Wet-packed material, including glass, bone and leather will be stabilised and consolidated to ensure their long-term preservation. All finds will be stored in optimum conditions in accordance with First Aid for Finds and Guidelines for the Preparation of Excavation Archives for Long-Term Storage (Walker, 1990).

Waterlogged wood, including structural elements will be assessed following the English Heritage guidelines, Waterlogged wood: sampling, conservation and

curation of structural wood (Brunning 1996). The assessment will include species identification, technological examination and potential for dating.

The conservation assessment report will include statements on condition, stability and potential for further investigation (with conservation costs) for all material groups. The conservation report will be included in the updated project design prepared for the analysis stage of the project.

References

Brunning, R. and Watson, J. *Guidelines on Recording, Sampling, Conversation and Curation of Waterlogged Wood*. Swindon: English Heritage (2010). http://www.english-heritage.org.uk/publications/waterlogged-wood/waterlogged-wood.pdf

Karsten, A., Graham, K., Jones, J., Mould, Q. and Walton Rogers, P. (2012) *Waterlogged Organic Artefacts: Guidelines on Their Recovery, Analysis and Conservation*. Swindon: English Heritage. http://www.english-heritage.org.uk/publications/waterlogged-organic-artefacts/woa-guidelines.pdf

Walker, K. 1990 *Guidelines for the preparation of excavation archives for long-term storage*, Archaeology Section of the United Kingdom Institute for Conservation.

Watson, J., Fell, V. and Jones, J. (2008) *Investigative Conservation: Guidelines on How the Detailed Examination of Artefacts from Archaeological Sites can Shed Light on their Manufacture and Use*. Swindon: English Heritage. http://www.english-heritage.org.uk/publications/investigative-conservation/investigative-conservation.pdf

Watkinson, D. and Neal, V. 1998 First Aid for Finds *(3rd edition), RESCUE and the Archaeology Section of the United Kingdom Institute for Conservation.*

Institute for Archaeologists. (2008) *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials*. Reading: Institute for Archaeologists. http://www.archaeologists.net/sites/default/files/node-files/ifa_standards_materials.pdf

APPENDIX 2

Environmental Strategy By Diane Alldrit

The on-site environmental sampling strategy will systematically seek to recover a representative sample of botanical, molluscan (both terrestrial and aquatic), avian and mammalian evidence from the full range of contexts encountered during the excavation. This will enable, at the assessment stage, the possibility for radiocarbon dating material to be obtained, and for an initial analysis of the economic and environmental potential of the site. In order to achieve this, a bulk sample (BS, Dobney *et al* 1992) comprising an optimum size of 40litre of sediment (where possible) should be taken from every stratigraphically secure and archaeologically significant context. In practice it may not always be possible to obtain 28l of sediment from certain features during the assessment stage, for instance from partially excavated pits or post-holes, in which case a single bucket sample, c.10 to 14litre should be taken at the site supervisors discretion. Deposits of mixed origin, for instance topsoil, wall fills and obvious areas of modern contamination, should be avoided where possible, as these will contain intrusive material and not provide secure radiocarbon dates.

All buckets and other sampling equipment must be clean and free of adherent soil in order to prevent cross-contamination between samples. If dry soil is to be stored for any length of time it should be kept in cool, dry conditions, and away from strong light sources. However, it is preferable to process samples as soon as possible after excavation.

Bulk soil samples shall be processed using an Ankara-type water flotation machine (French 1971) for the recovery of carbonised plant remains and charcoal. The

flotation tank should contain a >1mm mesh for collection of the retent or 'residue' portion of the sample (which may contain pottery, lithics and animal / bird bone, in addition to the heavier fragments of charcoal which do not float). The 'flot' portion of the sample, which may include carbonised seeds, cereal grain, charcoal and sometimes mollusc shell, should be captured using a nest of >1mm and >300micron Endicot sieves. Flotation equipment, including sieves, meshes, brushes and so forth must be meticulously cleaned between samples in order to prevent contamination of potential radiocarbon dating material. All material resulting from flotation will be dried prior to microscopic examination. Flotation is not suitable for the recovery of pollen or for processing waterlogged samples, which shall be discussed below.

Where there is potential for waterlogged preservation, shown for instance by the presence of wood and other organic or wet material, then a 5 to 10litre size sample should be taken (GBA sample, Dobney *et al* 1992). This material is to be retained for later processing using laboratory methods to enable the recovery of waterlogged plant material and insects. For assessment purposes a 1litre sub-sample of the organic sediment from each potential waterlogged sample shall be processed using laboratory wash-over methods, and once processed kept wet. All waterlogged samples awaiting processing should be kept damp, preferably stored in plastic sealable tubs, and in cool conditions. Where large waterlogged timbers are recovered these should be stored under refrigerated conditions and an appropriate conservator consulted.

There is the possibility that the waterlogged deposits may require parasite egg analysis. It is proposed that the 'squash' technique is adapted, this would require small lumps of raw sediment approximately 3mm in diameter taken from three separate points from within the sample and homogenised in a little water by shaking. After allowing coarse particles to settle for a few moments, a drop of the

supernatant was removed. This work would be undertaken by either John Carrott or Harry Kenwood if necessary.

If sediment suitable for pollen analysis is encountered, for instance rich organic peaty deposits, or deep ditch sections with organic preservation, the archaeobotanical specialist is to be consulted prior to any sampling taking place. These deposits would require sampling with large kubiena tins and require the specialist to be on-site. Pollen analysis, even at assessment level, would subsequently impose a considerable cost implication should it be carried out.

The specialist is available to provide consultation and advice on the environmental sampling strategy throughout the course of the excavation and during post-excavation processing if required.

References

Dobney, K. D., Hall, A. R., Kenward, H. K. and Milles, A. 1992 A working classification of sample types for environmental archaeology. *Circaea* 9 24-26.

French, D. H. 1971 An Experiment in Water Sieving. *Anatolian Studies 21* 59-64.

Appendix 3 Physical and sedimentary properties of deposits according to Troels-Smith (1955)

Darkness	
nig.4	black
nig.3	
nig.2	
nig.1	
nig.0	white

Degree of Stratification	
strf.4	well stratified
strf.3	
strf.2	
strf.1	
strf.0	no stratification

Degree of Elasticity	
elas.4	very elastic
elas.3	
elas.2	
elas.1	
elas.0	no elasticity

Degree of Dryness	
sicc.4	very dry
sicc.3	
sicc.2	
sicc.1	
sicc.0	water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 &> 0.5mm
lim.2	< 2.0 &> 1.0mm
lim.1	< 10.0 &> 2.0mm
lim.0	> 10.0mm

	Sh	*Substantia humosa*	Humous substance, homogeneous microscopic structure
I Turfa	*Tb*	*T. bryophytica*	Mosses +/- humous substance
	Tl	*T. lignosa*	Stumps, roots, intertwined rootlets, of ligneous plants
	Th	*T. herbacea*	Roots, intertwined rootlets, rhizomes of herbaceous plants
II Detritus	*Dl*	*D. lignosus*	Fragments of ligneous plants >2mm
	Dh	*D. herbosus*	Fragments of herbaceous plants >2mm
	Dg	*D. granosus*	Fragments of ligneous and herbaceous plants <2mm >0.1mm
III Limus	*Lf*	*L. ferrugineus*	Rust, non-hardened. Particles <0.1mm
IV Argilla	*As*	*A.steatodes*	Particles of clay
	Ag	*A. granosa*	Particles of silt
V Grana	*Ga*	*G. arenosa*	Mineral particles 0.6 to 0.2mm
	Gs	*G. saburralia*	Mineral particles 2.0 to 0.6mm
	Gg(min)	*G. glareosa minora*	Mineral particles 6.0 to 2.0mm

	Gg(maj)	*G. glareosa majora*	Mineral particles 20.0 to 6.0mm
	Ptm	*Particulaetestaemolloscorum*	Fragments of calcareous shells

Appendix 4
Digital Data Management Plan

Project Administration	
Project Name	Lincolnshire Lakes, Land east of M181 and north of Burringham Road
Site Code	05.04.22
Project Description (Eg, number of trenches, area of excavation)	Excavation of forty-eight 50m x 2m treches including geoarchaeological test pitting
OASIS ID	maparcha1- 506854
Museum Name & Accession code (where applicable)	North Lincolnshire Museum BURAH.
Client/ Landowner (where applicable)	Keepmoat
Project Lead	Alistair Cross
Project Manager	Charlie Puntorno (MAP) & Kristina Krawiec (York Archaeology)
Date & Version	C 22.05.23

Data Collection

Data to be Collected/ Created (to be updated throughout duration of project)		
Type	Format	Volume
GIS	ESRI Shapefile (.shp & .shx & .dbf, plus associated files) (Metadata to be deposited as .csv)	WSI- 2x shapefile
CAD	.dwg, .dxf (Metadata to be deposited as .csv)	
Spreadsheets & databases	Excel (.xlsx) Access (.accdb) (to be deposited as .csv)	Inc (Context Register / Finds & Samples Register / Photo Register / Drawing Register / Specialist data tables x 6 / Metadata tables)
Images	.jpg, .raw (to be deposited as .tiff)	WSI- 2x .Jpg
Text/ Documents	Word (.docx) PDF (.pdf)	WSI- 3x word doc, 1x PDF

- All data will be collected in line with the project specific Written Scheme of Investigation, *Guides to Good Practice* produced by the ADS and MAP's

guidance on the *Creation and Treatment of Documentary, Digital and Material Archives*.

- The digital archive will be stored in an appropriately named project specific folder which will be regularly backed up. All data raw data will be stored in the appropriate folder. Version control will be maintained throughout the project.

Documentation and Metadata

- Data collected will include standard formats which maximise opportunities for use and reuse in the future

- Data documentation will meet the requirement of the Museum Deposition Guidelines, Digital Repository Guidelines and the methodology described in the Written Scheme of Investigation. Following the completion of the project all paper-based material will be digitised and included within the archive.

- A metadata form consistent with ADS examples will be completed for each dataset and included within the final archive. As a minimum the metadata will include a file name, keywords & dates, creator & date of creation, copyright holder, location (site address or coordinates as appropriate), software and version

- An archive catalogue documenting both physical and digital archive products will be maintained and submitted with both the Museum and Trusted Digital Repository (ADS).

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- By depositing an archive with an HER or museum MAP gives permission for the material presented to be used by the recipient, in perpetuity, although MAP retains the right to be identified as the author of all project documentation and reports as specified in the Copyright, Designs and Patents Act 1988 (Chapter IV, section 79).

- All relevant licences and permissions to reproduce external data are discussed in the site-specific Written Scheme of Investigation and all subsequent reporting, including Desk Based Assessment. Where site specific licences are required (i.e. for the removal of human remains), licence numbers and dates will also be included within site reports and a copy of the licence held within the archive.

Data Security: Storage and Backup

- MAP's current IT infrastructure is divided between SharePoint for documents and an NAS (Network Attached Storage) drive for larger data files (acting as back up of locally held files on work laptops). Both require username and password intrinsic to the individual users.

- Digital Recording, which is currently on trial (June 2022), is provided by DiggitArchaeology.com, who provide access to the app and web versions by email and password. The backup of this material is provided by Diggit's use of the three point server system with automatic backups working in tandem. At the close of the site material will be downloaded and stored using SharePoint.

- In regard to filing within the SharePoint and NAS, a folder template sets out the associated locations of files; these folders should be appropriately named and populated with file names for field data stored on the NAS. See section on "Naming Conventions"

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Selection and Preservation

- A selection strategy and the DMP for each project will be considered from the inception of the work. The process of selection should be devised in consultation with LPA frameworks, guidance and individual stakeholders, reviewed by the Appointed Project Manager at each milestone of a project's lifespan; inclusive a peer review and appropriate consultation with stakeholders to provide quality assurance.

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Data Sharing

- A summary of the site will be made available at the earliest opportunity, latterly curated and adapted at each major milestone to reflect most up to date information regarding the site.

- All reports relevant to the site will also be curated and added to the OASIS record, updated at pertinent milestones of the project; the final report must be lodged with the HER in the first instance.

- Any archive material must be authorised for dissemination by the relevant stakeholders, primarily this is likely to be the client; though any such action will only be temporary, and usually as a result of planning issues.

Responsibilities

- The appointed Project Manager shall ensure the DMP is correctly followed, reviewed and adapted (where appropriate) at each milestone. In the unlikely event that the project changes hands, the responsibility will ultimately rest with the Managing Director, who will ensure the needs of the DMP are addressed and properly handed over to the next Project Manager.

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Naming Conventions

- Files and Folders should be named consistently throughout the project folder. The use of an _ (underscore) should be used to separate words instead of spaces e.g. use Pott_Asmnt instead of Pottery Assessment. File names vary according to the content of the file, the _ rule still applies here.
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  - Naming Examples.

    - Reports and digitised registers

    Should follow the structure of: Site Code, Type of Work (Adding excavation Phase if required), Component, Version. Varied slightly for digitised registers as per example:

    e.g. 05-08-20-TT_FINALReport_A210622

    05-26-19-EXC_PhsB_App01_CtxtListing

    - Digital Photographs and Black & White Photographs

    Should include the Site Code, Type of Work (Adding excavation Phase if required), and Frame No, varied slightly for B&W film:

    e.g. 05-08-20-TT_Digi_001

    05-26-19-EXC_PhsB_BW_FLM01-001

    NB be aware that jpegs and raw (as well as selected archive tiff's) should be in separate folders and be concurrent with each other

- Scanned Site Registers

Should be scanned in pdf format and be formatted as: Site Code, Type of Work (Adding excavation Phase if required), Register Name.

e.g. 05-08-20-TT_CtxtReg

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- Scanned Context Sheets & other site sheets

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List of Abbreviations

Registers

Ctxt

Drw

Digi

BW

Env

SF

Specialist Reports

Pott Pottery

ABn Animal Bone

FeR Iron Waste Residues

Crbn Carbonised Plant Remains

Cnsrv Conservation

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