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MAP Archaeological Practice

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

Planning Reference- PA/2023/1124
MAP Site Code- 05-04-22
OASIS ID: maparcha1- 524562
NLMS Archaeology Site Code: BURAH

Written Scheme of Investigation
Archaeologically Controlled Excavation, Trenching & Watching Brief

MAP Archaeological Practice

Client	Keepmoat Homes
Work Type	Archaeologically Controlled Excavation, Trenching & Watching Brief
Address	Lincolnshire Lakes East, Burringham Scunthorpe
LPA Archaeologist	Richard Goddard- Historic Environment Officer
NGR	SE 86261 08611
Planning Ref	PA/2023/1124
Oasis Ref	maparcha1-524562
Site Code	05-04-22
Project Manager	Charlie Puntorno
Project Team	TBC

Version History	Edited/QA by
A260424	Max Stubbings
B081024	Max Stubbings- following comments from Alison Williams
C040325	Charlie Puntorno- to reflect updated excavation methodology
D141025	Max Stubbings- to reflect updated methodology
E231025	Max Stubbings- to reflect comments made by R. Goddard

Lincolnshire Lakes

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Scunthorpe

05-04-22

Archaeologically Controlled Excavation, Targeted Trenching & Watching Brief

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1. Background

1.1 The site is located some 2.5km south-west of Scunthorpe, bounded to the west by the M181 motorway, to the south of Burringham Road and by Carisbrook Manor to the east (NGR SE 86261 08611, Fig. 1).

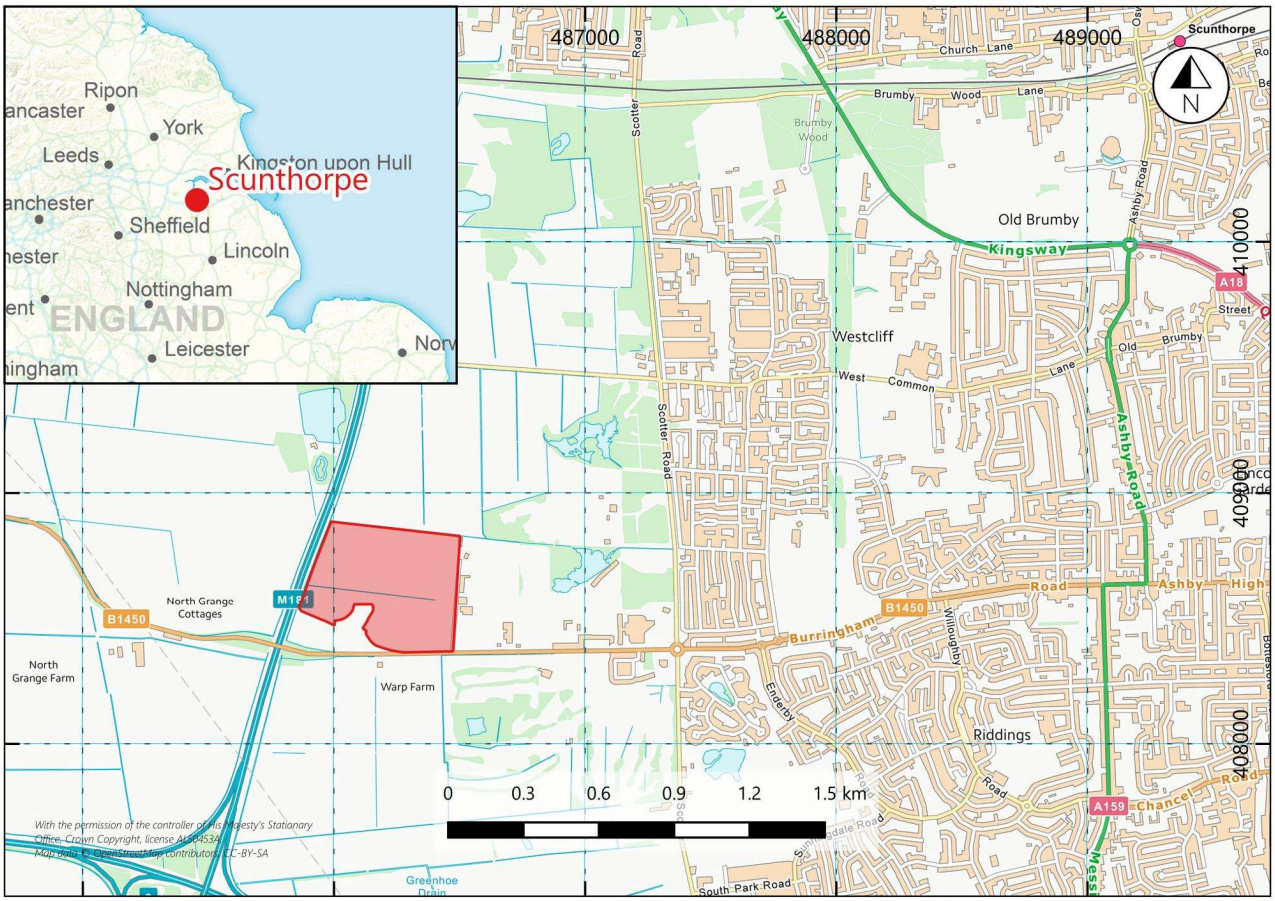

Figure 1: Site Location

1.2 An application has been made, to North Lincolnshire Council, for the erection of 593 No. dwellings and a local store, and also the excavation of lakes, along with associated infrastructure, (planning reference PA/2023/1124).

1.3 A consultation response from Historic Environment Officer (henceforth the Curator) at North Lincolnshire County Council highlighted the need for pre-application field evaluation. A staged programme of pre-application field evaluation was 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. The work was carried out in late 2023/early 2024 and is further discussed in section 2.3. Following the work it was recommended, by the Curator that a programme of mitigation should be carried out in order to ensure the identification, recording and recovery of archaeological, geoarchaeological and palaeoenvironmental evidence. Following discussions between MAP and the Curator it was decided that the mitigation work should take the form of an archaeologically controlled excavation of the proposed lake area, targeted trenching within areas of recognised peat deposits, and a Watching Brief across the wider development.

1.4 The Archaeologically Controlled Excavation, Trenching and Watching Brief will be monitored under the auspices of the Curator, who will be consulted at least three weeks before the commencement of site works. Where necessary the regional Science Advisor at Historic England may also be contacted about the work.

1.5 Archaeological remains are protected by primary legislation, including the Ancient Monuments and Archaeological Areas Act 1979, and the National Planning Policy Framework (2024), which sets out the national policy for the consideration of heritage assets, within chapter 16.

1.6 MAP will adhere to the principles of the CIfA Code of Conduct (CIfA. 2022) throughout the project and to the CIfA '*Universal Guidance for Archaeological Excavations*' (CIfA. 2023). All work associated with archaeological material will be carried out in respect of the *'Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials'* (CIfA 2020).

1.7 The project will be continuously reviewed in order to monitor the projects progress towards meeting its aims and objectives. As a minimum the results of the excavation will be assessed during the fieldwork is taking place, to allow for any necessary changes to the agreed methodology. Any deviance from the methodology outlined in this document must be agreed by the Historic Environment Officer and an updated document will be produced. At the reporting stage of the project discussions will be held with the Curator regarding the need for additional post-excavation analysis.

2. Site Information

2.1 *Land Use, Topology and Geology*

2.1.1 The site, which measures approximately 24.95ha currently consists of two arable fields, bisected by an agricultural dyke.

2.1.2 The site, which lies at approximately 2m AOD, is relatively flat. The underlying bedrock as mapped by the British Geological Survey is the Mercia Mudstone Formation (BGS. 2024). This is overlain by Peat, deep deposits of Sutton Sands coversands and Warp.

2.1.3 Within this sequence 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.

2.1.4 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. It should be noted that despite numerous previous studies within the area (AOC 2017a, 2017b, 2020, 2021; YA 2024), including the earlier evaluation (MAP 2024) where the methodology specifically targeted lithic scatters, no such remains have been found in the area.

2.1.5 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 (YA 2021, YA 2023a, YA 2023b; YA 2024b; MAP 2024). Radiocarbon dating of these deposits demonstrated that that organic accumulations and deposition in the wider area of the site occurred over a variety of timescales and was consistent with a broad Mesolithic to Early Bronze Age date. The wide spread of dates and relative variation in recorded elevation throughout the area, led to the interpretation of peat formation to be one of scattered, discrete peat deposits which formed within undulations in the Sutton Sand Formation. These peat deposits formed independently of one another and potentially over a prolonged period.

2.1.6 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 inundation 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 (Lille 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. The extent of warping is summarised as 'most of the (Trent) floodplain south of Neap House (to the far 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). Warping deposits have been demonstrated to seal former land surfaces, in addition to smoothing out any subsurface topographic variation.

2.1.7 Geoarchaeological deposit modelling of warp deposition nearby demonstrated a clear correlation between warp deposition and proximity to warping drains; with major warping drains forming key delimiters of warp sediment extent (YA, 2024b).

3. Archaeological Potential

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 which formed within depressions in the underlying aeolian sands.

3.2 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.

3.3 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).

3.4 In 2016 and 2017 AOC Archaeology excavated a total of 13 trenches in respect of a previous 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.

3.5 Recent archaeological and geoarchaeological evaluation has taken place within the site boundary (MAP. 2014 & York Archaeology. 2024). 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.

Several 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. No earlier archaeological material was recovered from the hand excavated test pits. The machine excavated geoarchaeological test pits revealed sequences characterised broadly by a stratigraphy of blown coversands, peat and warp, underlying the modern topsoil (MAP. 2024).

3.6 Based on the results of the aforementioned evaluation, it was noted by the Curator that the site had the presence of peat deposits within the site boundary raised the potential for waterlogged archaeological remains to be present, along with material being present within the sands. Furthermore, it was noted that, although no archaeological remains were identified during the evaluation, it is possible that archaeological material or features may be present in areas not targeted by trenching.

3.7 Based on the development plan, the area concerned with the proposed lake was identified as the area of highest potential archaeological impact and as such mitigation in the form of an Archaeologically Controlled Excavation and Targeted Trenching was proposed. A Watching Brief will also be maintained in areas outside of the lake which require excavation beyond the depths observed within the trenches, particularly along the lengths of roads and drainage.

4. Project Details

4.1 *Aims and Objectives*

4.1.1 The aims of the Archaeologically Controlled Excavation are to:

- To seek a better understanding of the depositional environment, particularly within the coversands, and the relationship with multi-period archaeological remains
- To identify and record archaeological remains preserved within the footprint of the planned lake
- To investigate and define the discrete areas of peat accumulation and the potential for wetland archaeological remains;
- To analyse and interpret the results of the excavation and disseminate them

4.1.2 The objectives of the Archaeologically controlled excavation are to:

- Undertake stripping of topsoil, subsoil and, if possible, warp deposits

- To undertake archaeological recording of features where present
- To record sub-surface sedimentary stratigraphy
- To recover further samples from uncovered peat deposits for palaeoenvrionmental assessment and radiocarbon dating

4.2 The aim of the targeted trenching is to:

- To allow, aided by a programme of dewatering, for the identification, investigation and sampling of targeted peat deposits which exist beneath the water table

4.3 The objectives of the Trenching are to:

- Identify any human interaction with identified peat deposits, particularly in areas which may be considered to be periphery to wetland areas
- To recover further samples from uncovered peat deposits for paleoenvironmental assessment and radiocarbon dating

4.3.1 The aim of the Watching Brief is to:

- To monitor excavation outside of the lake area, in particular during the insertion of roads and sewers.
- Allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;
- to provide an opportunity, if needed, for the Attending Archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the Watching Brief itself are not sufficient to support treatment to a satisfactory and proper standard

4.3.2 The objectives of the Watching Brief are to:

- Periodically monitor, as required, the groundworks undertaken as part of the Keepmoat development
- Excavate and record archaeological remains where encountered
- Further recovery of palaeoenvironmental samples from organic-rich deposits were deemed appropriate, with consideration of what was recovered during the Archaeologically Controlled Excavation

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

Mesolithic (c9500-c4000 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 late Bronze Age

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?

4.5 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.*

4.6 *Excavation Rationale*

4.6.1 Whilst this Written Scheme of Investigation is intended to discuss the scheme in its entirety, it is recognised that, at the time of writing, a temporary basin is proposed in the first instance (see Fig. 2) and as such, the work outlined within this document is likely to be carried out in a staged approach.

4.6.2 The area of Archaeologically Controlled Excavation and Targeted Trenching will be carried out across the area of the proposed lake, whilst the Watching Brief will be maintained in areas of highest impact associated with the development, for example the excavation of drainage runs andy plot foundations.

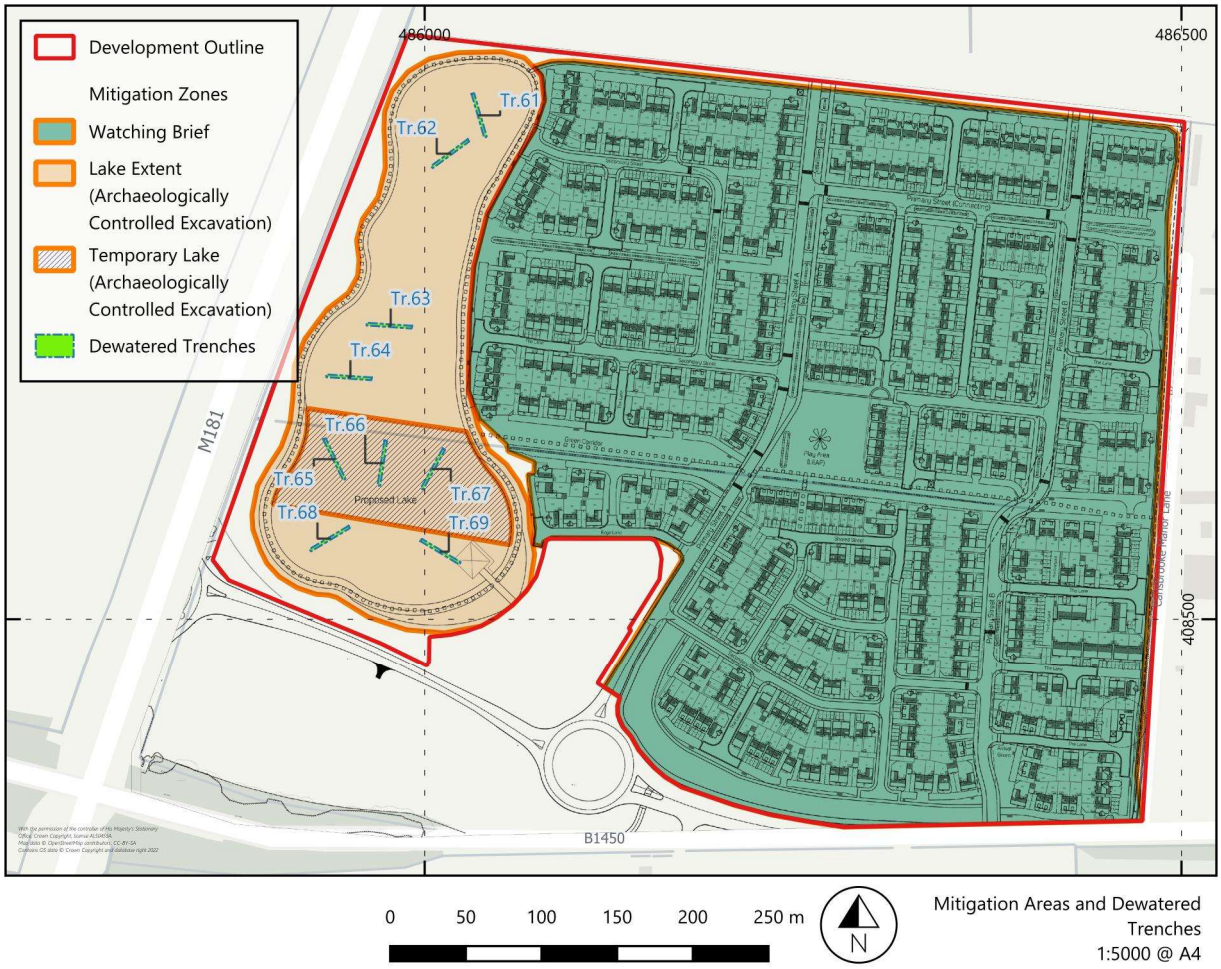

Figure 2: Location of Archaeologically Controlled Excavation, Targeted trenching & Watching Brief Areas

4.7 *Output and Dissemination*

4.7.1 It is anticipated that the project will produce the following output

Data type	Detail
Physical Archive	• Drawn plans and sections- permatrace • Site indices (context, photograph, drawing, samples) • Finds collected during the mitigation • Environmental material retained from samples collected during the mitigation
Digital Archive	• Diggit derived data (PDF context sheets and indices. .xlsx indices) • GIS ESRI Shapefile (.shp & .shx & .dbf, plus associated files) • Photographs .raw (to be deposited as .tiff). to include all photographs taken during the project • Reports (.docx & PDF). WSI, mitigation report and all associated specialist reports
Reports	• Printed assessment report

4.7.2 All digital data will be curated in line with the attached Data Management Plan.

4.7.3 MAP undertake public engagement for all appropriate projects. This will be offered in numerous ways to reflect the nature of the archaeological works. It is likely that public engagement will be via site notices and discussions with the public during the duration of the fieldwork. A copy of the mitigation report will be submitted to the North Lincolnshire Historic Environment Record for public access.

5. Fieldwork Methodology

5.1 *Excavation Methodology (Archaeologically Controlled Excavation)*

5.1.1 The below methodology has been established in consultation with the Project Manager of Land & Water, who will be carrying out the excavation of the lake, York Archaeology and the Curator. All excavation will be carried out under close archaeological and geoarchaeological supervision.

5.1.2 Prior to the commencement of works a Toolbox Talk will be delivered by the Lead Archaeologist to all on site personnel. It will be outlined that no plant movement will be allowed on any stripped area until it has been inspected and signed off by an archaeologist.

5.1.3 All overburden, topsoil and any subsoils will be carefully removed by mechanical excavator using a wide toothless blade (ditching bucket), under archaeological supervision, to the top of the first archaeological horizon or archaeological perceived natural, whichever is encountered first. Based on deposits encountered during MAP's previous phase of Trial Trenching, topsoil depths are expected to be between 0.22m and 0.53m, shallowing slightly within the lakes central region, beneath which warped sands are expected.

5.1.4 Beyond the warped sands, the removal of material will continue to be carried out under archaeological conditions to approximately 0m AOD where the water-table is expected to be encountered.

5.1.5 Geoarchaeological consultation from York Archaeology will be sought where organic-rich deposits or other geoarchaeologically significant deposits are encountered.

5.1.6 Spoil will be scanned for metal artefacts using a metal detector capable of discriminating between metals, and operated by an experienced user, to enhance recovery of artefacts.

5.1.7 Any archaeological deposits identified above the water table will be cleaned and excavated by hand using appropriate tools.

5.1.8 The excavation sampling policy is:

- An initial half section of all discrete features. Where justified further excavation may be deemed necessary;
- 50% sample of pits with a diameter up to 1.5m (where justified, these should be 100% excavated);
- A minimum 25% sample of all pits over 1.5m in diameter, but this should include a complete section across the pit to record a full profile (where justified, these should be 100% excavated);
- Linear features will be sampled at 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;
- All junctions/intersections and corners of linear features will be investigated, and their stratigraphic relationships determined – if necessary, using box sections. All termini will be examined;
- All funerary contexts, all buildings and all industrial features will be subject to 100% excavation. As noted above, postholes and the enclosing ditches around barrows and roundhouses would be first subject to sample excavation, sectioning and recording, but then will be fully excavated;
- Any in situ building remains will be fully recorded for the extent that they are exposed. Brick and stone samples may be taken if potentially diagnostic of date or function.

5.2 *Targeted Trenching Methodology*

5.2.1 Targeted trenching is required below the ground water level to allow identified peat deposits to be investigated and sampled, whilst reducing the amount of large-scale dewatering required due to external constraints.

5.2.2 Due to the nature of the excavation and dewatering of the trenches, health and safety considerations will take precedence over all archaeological matters.

5.2.3 Nine trenches are proposed across the lake, with three within the area of the temporary basin. Each trench measures 30m by 2m.

5.2.4 The position of trenches have been determined based on a recently updated deposit model, produced by York Archaeology. The deposit model has drawn on a number of data sets inclusive of previous archaeological and geotechnical interventions (see figures 3-5). The trenches have been positioned in areas within peat deposits have been recorded to exist beneath the current water table.

5.2.5 Trenches will be positioned to an accuracy of +/- 10mm of the specified trench location using survey grade GPS.

5.2.6 Trenches will be excavated in spits of c.350mm or to the top of peat deposits or perceived former land surfaces, whichever is encountered soonest, under close archaeological and geoarchaeological supervision.

5.2.7 A visual inspection will be made of each spit to allow for the identification, recording and recovery of any archaeological or geoarchaeological material, which may include but is not limited to worked flints or preserved timbers.

5.2.8 The sampling of peat deposits will follow the methodology set out in section 5.5.

5.2.9 Excavation will cease at 2.5m AOD, which represents the total depth of the lake. With current ground level at approximately 1.8m AOD, groundwater is currently recorded at 0.0m AOD.

5.3 *Watching Brief Methodology*

5.3.1 The Watching Brief will consist of an archaeologist from MAP Archaeological Practice Ltd observing all groundworks across the site.

5.3.2 The Watching Brief will be carried out by the archaeologist in a manner that allows the contractor to proceed with their construction programme without unreasonable interference or delay. The contractor must inform the Lead Archaeologist of the schedule for any groundwork which falls under the remit of the Watching Brief and must allow the Attending Archaeologist reasonable access and resources to implement this archaeological scheme of investigation.

5.3.3 The Attending Archaeologist will record the presence or absence of archaeological features and deposits and make all appropriate written, drawn and photographic records of any archaeological deposits which are revealed; all burials must be recorded and removed by the archaeologist; a Home Office burial licence must be obtained for this procedure.

5.3.4 Where structures, finds, soil features and layers of archaeological interest are exposed or disturbed by construction works, the Attending Archaeologist should be provided with the opportunity to observe, clean, assess, excavate by hand where appropriate, sample and record these features and finds. If the contractors or plant operators notice archaeological remains, they should immediately tell the archaeologist. The sampling of deposits for environmental evidence should be a standard consideration, and arrangements should be made to ensure that specialist advice and analysis are available if appropriate.

5.3.5 Heavy plant should not be operated in the near vicinity of archaeological remains until they have been recorded, and the Attending Archaeologist has allowed operations to recommence at that location. Given the sites potential for interbedded peats and warping sands which may cover buried

soil horizons and archaeological remains, the Watching Brief should be maintained until such a point that the total depth of required excavation has been reached.

5.4 *Recording Methodology*

5.4.1 The location of all archaeological features across all areas of the site will be recorded will be positioned to an accuracy of +/- 10mm using survey grade GPS or equivalent metric-survey equipment.

5.4.2 The stratigraphy of trenches 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.

5.4.3 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.

5.4.4 A full written, drawn, and photographic record will be made of all material revealed during the course of the Archaeologically Controlled Excavation, Targeted Trenching and Watching Brief. Plan and section drawings will be hand drawn to a scale appropriate to the excavated feature (no less than 1:50 for plans and 1:20 for sections). All levels will be captured by Trimble GPS.

5.4.5 Digital photography will be undertaken in accordance with standards set by Historic England and the recipient archive. All digital photography will be undertaken using a high quality camera recommended to have no less than an APS-C or DX size sensor of 10 megapixels and to be capable of generating images in RAW format., latterly selected and processed for archiving. All photography will adhere to Historic England guidance for Digital Image Capture and File Storage (HE 2015b). Appropriately sized scales will be used in all photography.

5.5 *Environmental Sampling Strategy*

5.5.1 A sampling strategy for the recovery for environmental remains from archaeological features has been formulated in accordance with an Environmental Strategy written by an Environmental

Consultant (Diane Aldritt, Appendix 3). The sampling will follow procedures set out within the Historic England Guidelines for Environmental Archaeology and Geoarchaeology (HE 2011 and HE 2015a).

5.5.2 Where organic-rich deposits are encountered, bulk samples will be recovered for palaeoenvironmental assessment and acquisition of material suitable for radiocarbon dating. At least one 10L bulk sample will be recovered from each organic horizon recorded on site. As it has been identified that organic formation has likely occurred within discrete depressions in the underlying aeolian coversands, efforts will be made to identify where discrete deposits exist and sample a subset individually.

5.5.3 Waterlogged organic-rich deposits will be sampled using kubiena tins by a qualified geoarchaeologist 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 may be recovered where deemed appropriate. All dating will follow Historic England guidance for Radiocarbon dating and Chronological Modelling (HE 2022).

5.5.4 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

5.5.5 Where waterlogged wood is encountered, advice will be sought to determine whether the wood is of archaeological or natural provenance. Where the wood is believed to be archaeological, the strategy established in Appendix 3 will be followed.

5.5.6 Sampling will also be considered for those features where dating by other methods (for example pottery and artefacts) is uncertain. Such sampling may be carried out at the request of the Curator or following advice form the Historic England Science Advisor and may include, but is not restricted to, radiocarbon dating, dendrochronological dating, luminescence dating and archaeomagnetic dating

5.6 *Human Remains*

5.6.1 Given the geological conditions of the site, it is highly unlikely that any human remains will be encountered during the work, however should any inhumation or cremation burials be encountered, their extent, number and state of preservation will be established, and the Historic Environment Officer will be notified to discuss an appropriate strategy for their management. Remains should not be removed or chased beyond the existing limits of excavation prior to agreement with the Curator.

5.6.2 The removal of human remains will be carried out under the conditions of the licence for the removal of human remains (issued by the Ministry of Justice) and in accordance with the Burial Act (1857), *'Updated Guidelines to the Standards for Recording Human Remains'* (Brickley & McKinley. 2017), CIfA guidelines *'Excavation and Post-Excavation Treatment of Cremated and Inhumed Human Remains'* (McKinley & Roberts 1993), and all Historic England and Advisory Panel on the Archaeology of Burials in England (APABE) guidance, 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.

5.7 *Artefact recovery*

5.7.1 All stratified archaeological finds will be collected, except for modern (mid-20th century or later) finds from topsoil and subsoil contexts unless it is determined that they are of archaeological interest. All artefacts will be bagged and labelled by type and context.

5.7.2 Removal, packaging, and labelling of finds will be undertaken in accordance with *'First Aid for Finds'* and specific Historic England guidance as required.

5.7.3 Artefacts defined as treasure under the Treasure Act 2023 will be treated in accordance with the Treasure Act Code of Practice. All finds of treasure must be reported to the local coroner within 14 days of discovery. In the first instance, it is recommended that details of the find are provided to the local Portable Antiquities Scheme Finds Liaison Officer to confirm that it constitutes treasure; they will be able to apply for a Treasure Reference Number and declare the find to the coroner on your behalf. The Curator should also be notified. A short Treasure Report will be compiled for submission to the coroner.

5.7.4 Where recovery of treasure cannot be undertaken on the same working day as the discovery, suitable security measures will be taken to protect the finds from theft.

5.7.5 The excavation and subsequent recording and analysis of any waterlogged timber will be carried out in line with Historic England's '*Guidelines on the recording, sampling, conservation and curation of waterlogged wood*' (2010). Given that a wood specialist will not be consistently on site, it is anticipated that, should relevant material be encountered, Excavation Method 1 (minimal recording and total retention) as outlined in the aforementioned document will be employed, in consultation with the appropriate specialist who will be afforded the opportunity to make a site visit and will advise on the appropriate excavation, lifting and sampling of timbers. As a minimum excavation will be carried out using plastic tools and information on orientation, inclination and relationships with other timbers will be recorded. Samples for radiocarbon dating and/or dendrochronological spot dating will be taken.

5.7.6 Should waterlogged organic artefacts be encountered, their recovery and analysis will be carried out in line with relevant Historic England guidelines (Historic England. 2018) and in consultation with relevant specialists, dependant on the nature of the find.

6. Post-Investigation Assessment, Analysis and Reporting

6.1 Due to the nature and longevity of the development, and the varying levels of archaeological input, the results of the Archaeologically Controlled Excavation and Targeted Trenching will be the subject of a post-completion statement. This statement will encompass all of the below elements of assessment & analysis and, dependant on the results, may inform areas and/or depths of priority for the Watching Brief.

6.2 *Assessment & Analysis*

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

6.2.2 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.

6.2.3 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).

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

6.2.5 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

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

6.2.7 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.

6.2.8 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.

6.2.9 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.

6.2.10 Basic stratigraphic information will be supplied to the project specialists outlines in section 7.

6.2.11 Recording of ceramic assemblages will be carried out in a manner compatible with existing typological series in local pottery reference collections.

6.3 *Reporting*

6.3.1 A brief, interim report may be required, for each phase of work shortly after the completion of fieldwork.

6.3.2 On completion of the post-excavation assessment, an assessment report will be prepared, to include the following as a minimum:

- An introduction including background information (with planning application details, where appropriate);
- The original research aims and objectives and rationale for selected area of investigation;
- An archaeological and historical baseline;
- A description of results;
- A report of all finds and sample categories to assessment level, by appropriate specialists, including their research potential;
- The results of any scientific dating;
- A discussion of the results including a phased interpretation of the site;

- A summary of the results in their local, regional, and national context, and the extent to which the work has addressed the project aims and objectives;
- An assessment of the effectiveness of the mitigation strategy, including earlier stages of work and a critique of results;
- Recommendations for any further investigation, specialist analysis or conservation, recording and/or preservation of in situ archaeological remains, to be determined in consultation with the Historic Environment Officer;
- Supporting illustrations, including as a minimum:
    - A detailed location map;
    - A detailed site plan showing all areas as excavated;
    - Plans for all Archaeologically Controlled Excavation areas and trenches where archaeological features were identified;
    - Detailed plans of archaeological features;
    - Detailed sections of archaeological features;
    - An overall (phased) site plan showing all archaeological features recorded;
- Selection of photographs of work in progress;
- Select artefact illustrations and/or photographs;
- Supporting tables of data;
- Archive index

6.3.3 Where an updated WSI is necessary, the updated document should contain:

- Any changes to the aims and objectives of the project;
- The requirement and content of the final analysis report;
- Any changes to the archive arrangements, including details of proposed specialist conservation;
- Any updates to the Selection Strategy and Data Management Plan.
- Proposals for appropriate publication

6.3.4 Copies of the report will be submitted to the commissioning body, the Local Planning Authority and the Historic Environment Officer within 3 months of the completion of the mitigation, unless an alternative timescale is agreed.

6.3.5 We will provide a physical and digital copy of the report to the North Lincolnshire Historic Environment Record. A digital copy will also be lodged with OASIS.

6.3.6 Printed copies of reports will be included with the physical archive to the recipient museum (see section 6).

6.3.7 Where results warrant it, and following discussion with the Historic Environment Officer, full analysis and/or formal publication may be required. This will be discussed at the mid-point review. All further work which may be deemed necessary by any specialist (see section 7), or the Curator will be the subject of an Updated Project Design. The Updated Project Design will discuss each recommendation and the scope of further work in detail, and will also contain information about timeframes, financial considerations and all associated personnel.

6.3.8 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.

7. Archive *Working Archive*

7.1.1 All material (whether digital or physical) recovered or generated through the duration of the field mitigation project will be appropriately and securely stored in a working project archive. This will be undertaken in accordance with the selection strategy and digital data management plan set out at the commencement of the project (appendices 1 & 2).

7.1.2 All physical documents or drawings will be indexed, collated, and stored in a secure location when not in use.

7.1.3 Digital security copies will be made of physical and born digital records at regular intervals, to be stored and backed up in a secure location. Documents and drawings will be scanned at an appropriate resolution (see appendix 2).

7.2 *Archive Deposition*

7.2.1 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.

7.2.2 The museum will also be contacted during a mid-point review of the project during which information will be passed to the museum regarding the archive and the proposed timescale for deposition and following the completion of work.

7.2.3 Guidance set out in the CIfA Toolkit for Selecting Archives (2019) will be followed, prior to the commencement of fieldwork in order to establish project-specific strategies for the retention or discarding of material. The retention of material will also be discussed with the North Lincolnshire Museums Service with regards to the significance and research potential of the archive.

7.2.4 Archive deposition will be arranged in consultation with the museum with their deposition policy relating to the preparation and transfer of archives. The timetable for deposition shall be agreed on completion of the site archive and narrative

7.2.5 The digital archive will be deposited with the Archaeology Data Service (ADS) at the University of York. A link to the final digital archive will be provided to the North Lincolnshire Historic Environment Record.

8. Staffing & Timetabling

8.1 At the time of writing the field work team is to be confirmed however as a minimum the following contacts will be relevant for the duration of the project.

- Charlie Puntorno- MAP Project Manager
  Telephone- 07879 791369
  Email- charlie@maparchltd.co.uk

- Richard Goddard- Historic Environment Officer
  Telephone- 01724 29700
  Email- Richard.Goddard@northlincs.gov.uk

- Matthew Nicholas -Historic England Science Advisor
  Telephone- 07342062544
  Email- matthew.nicholas@historicengland.org.uk

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

- Geoarchaeology – Luke Parker (York Archaeology)
- Prehistoric pottery – M. Stephens (MAP)
- Medieval & Post-medieval pottery - M. Stephens (MAP)
- Roman pottery – P Ware (MAP)
- Flint – Frederick Foulds
- Small Finds – Elizabeth Foulds
- Animal Bone – Jane Richardson

- Environmental Sampling – Diane Alldritt
- Conservation – York Archaeology
- Human Remains – York Osteoarchaeology
- Ceramic Building Material – Dr David Griffith
- Clay Tobacco Pipe – M. Stephens (MAP)
- Waterlogged timber – Steve Allen (York Archaeology)
- Dendrochronology – Nottingham Tree-ring Dating Laboratory
- Radiocarbon dating – SUREC
- OSL Dating – University of Gloucestershire

9. Health and Safety & Insurances

9.1 The safety and welfare of MAP staff and other contractors takes precedence over all other matters on site, irrespective of obligations laid out within this document.

9.2 All MAP staff are qualified archaeologists who will hold the requisite and available Health and Safety accreditation for their profession, and will be inducted to the site either by MAP or the Principal Contractor as needed. The vast majority of staff also hold First Aid at Work qualifications. The Attending Archaeologist, who will be overseeing the site work will also hold a valid SSSTS qualification.

9.3 All work will be carried out in accordance with site specific RAMS which will be produced and disseminated to all parties before the commencement of fieldwork. The RAMS will be read by all members of the site team who will be inducted to the site, and any required updates will be communicated with MAP's health & safety advisor and the Project Manager.

9.4 MAP hold all appropriate insurances, copies of which can be provided on request.

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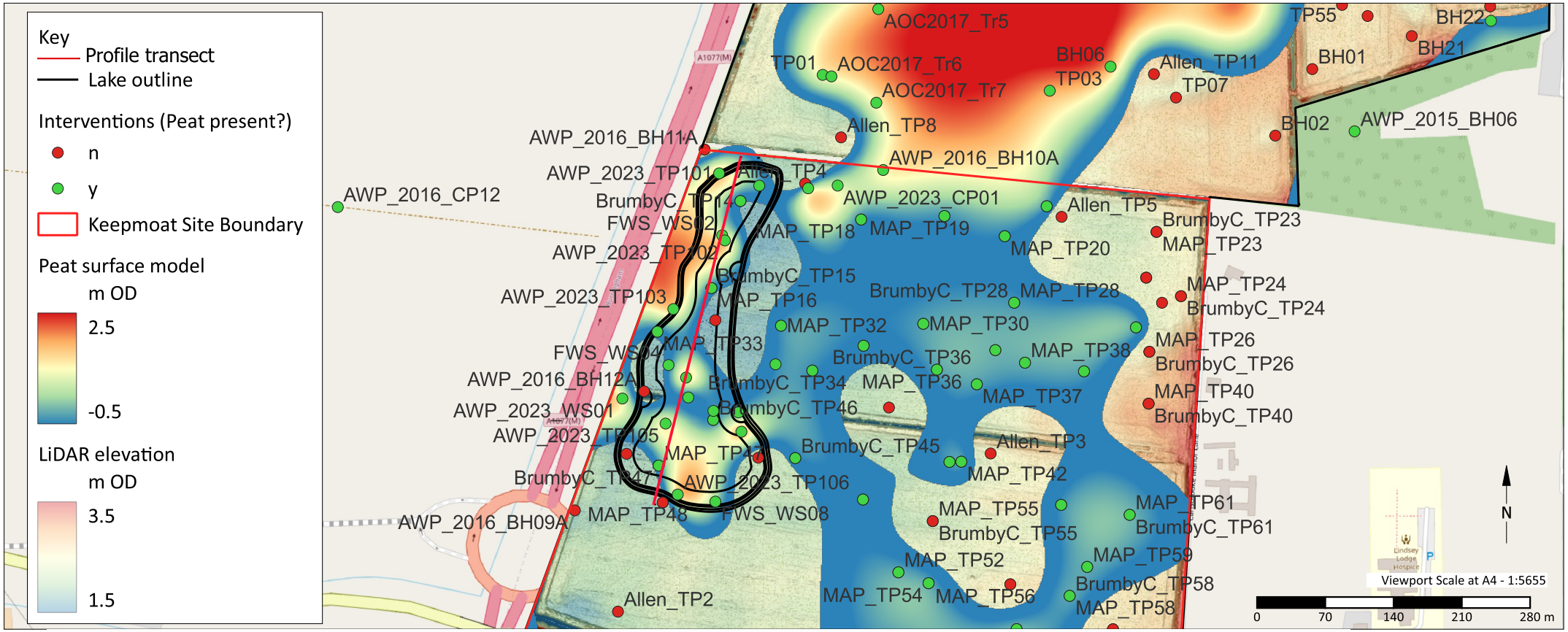
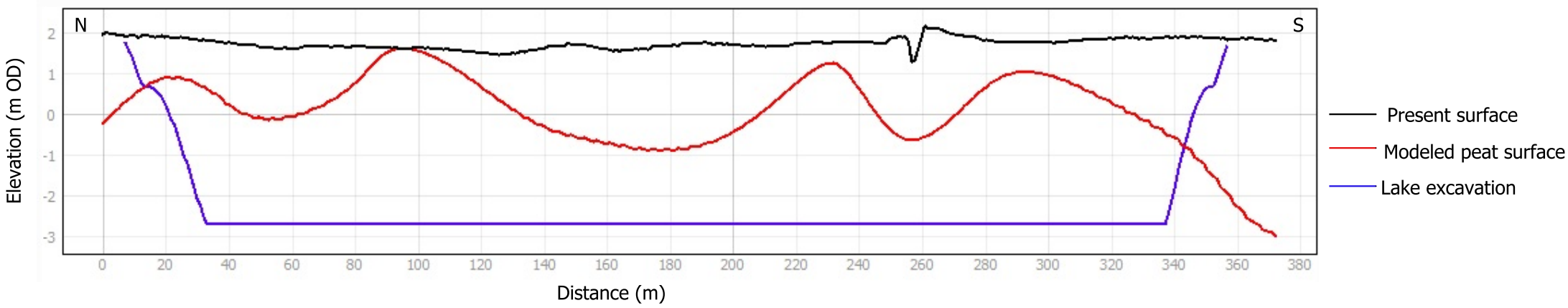
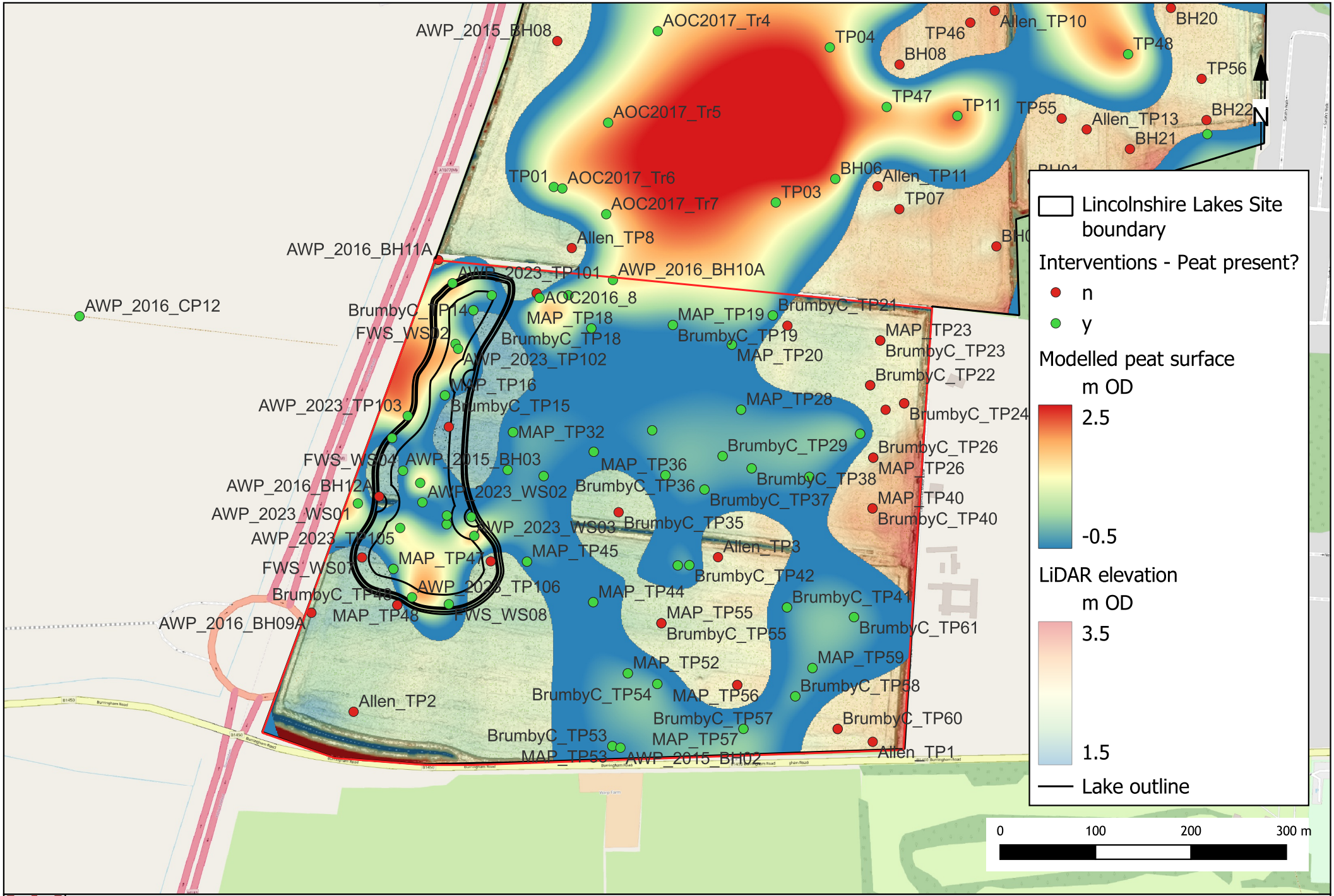




Illustrator: Luke Parker

Modeled transect section
Keepmoat, Scunthorpe



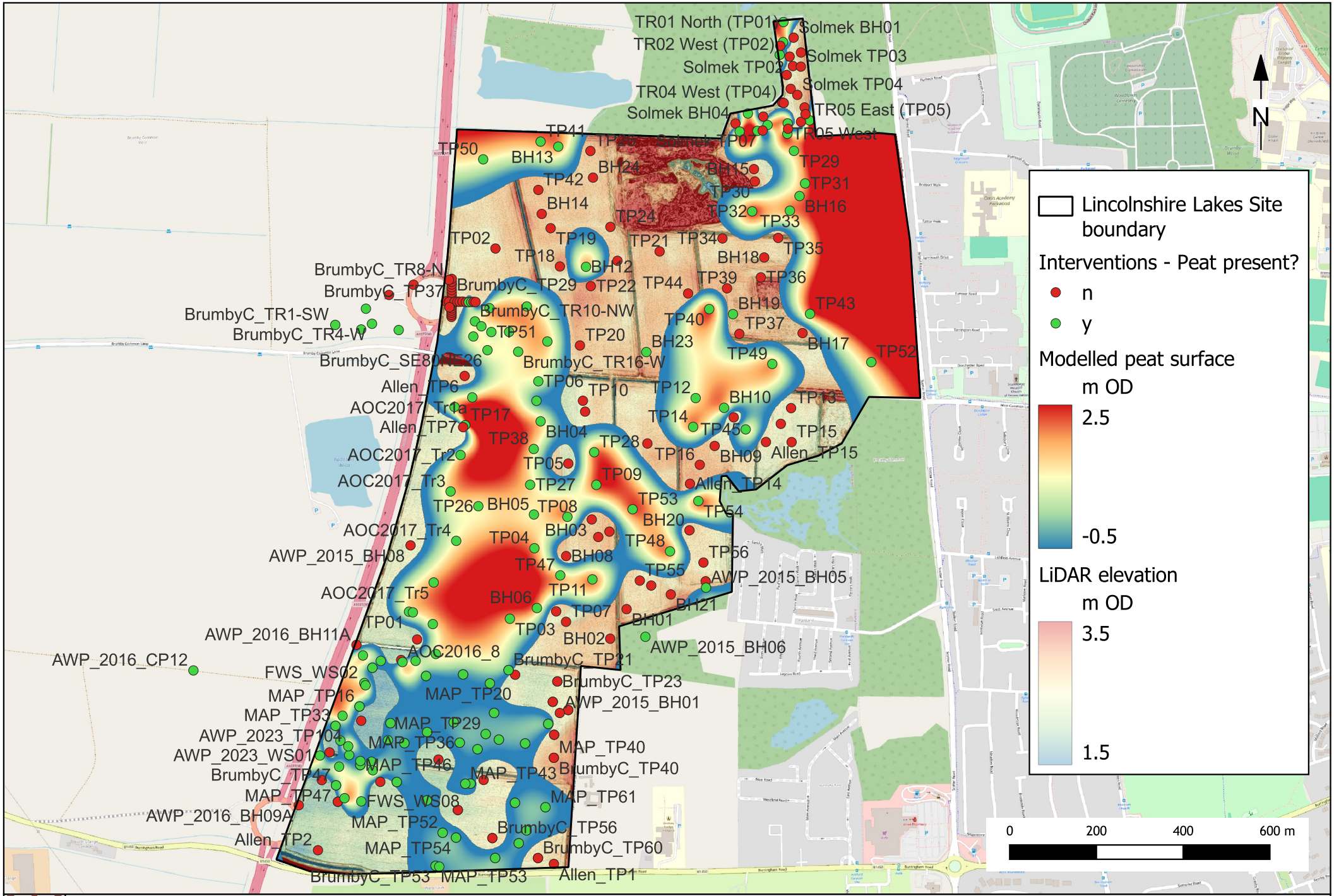
Updated peat surface model

Report at Scunthorpe

28

Scale at A4 - 1:11000

Drawn by: LP



Updated peat surface model

Report for Scunthorpe

PW-2023-124

29

Scale at A4 - 1:11000

VE-23105

Drawn by: LP

Appendix 1

Digital Data Management Plan

Project Administration	
Project Name	Lincolnshire Lakes East, Burringham
Site Code	05-04-22
Project Description **(E.g., number of trenches, area of excavation)**	Archaeologically Controlled Excavation area of 4.38ha and wider Watching Brief
OASIS ID	maparcha1-524562
Museum Name & Accession code (where applicable)	NLMS Archaeology Site Code: BURAH
Client/ Landowner (where applicable)	Keepmoat Homes
Project Lead	TBC
Project Manager	Charlie Puntorno
Date & Version	A-141015

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= 2 shapefiles
CAD	.dwg, .dxf (Metadata to be deposited as .csv)	
Spreadsheets & databases	Excel (.xlsx) Access (.accdb) (to be deposited as .csv)	
Images	.jpg, .raw (to be deposited as .tiff)	WSI=1 .jpg
Text/ Documents	Word (.docx) PDF (.pdf)	WSI = 3.docx & 5 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).

Ethics and Legal Compliance

- MAP staff must only participate in work which conforms to accepted ethical standards and which they are able to competently preform. Where there is any doubt, which should be raised with management.
- MAP places an emphasis on internal peer review of documents and the discussion of results. All Written Schemes of Investigations are reviewed by the relevant Local Authority Archaeologists prior to submission. Where confidentiality is requested by a client, this is strictly upheld by MAP.
- The project archive will include the names of all individuals who contributed to the project unless it is requested otherwise. No personal data will be held within the project archive.
- MAP have a GDPR compliant Privacy Policy underpins the management of all personal data. Such data is not retained in project specific folders and is not accessible to unauthorised staff nor will it be shared with any third-party companies.
- Unless otherwise agreed at the inception of a project, the copyright of all data collected throughout the project belongs to MAP. The inclusion of data derived from external specialists and/or contractors is secured at the point of agreement of their participation on the project.
- 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 is currently provided by DiggitArchaeology.com, who provide access to their mobile app and web app via email and password login. The backup of recorded material is provided by Diggit's use of the three-point server system with automatic backups working in tandem. Diggit's data is encrypted in transit and stored and backed up on a MongoDB Atlas server cluster of 3 replicate nodes in the Republic of Ireland (in the GDPR-compliant EEA). In the rare event that one server is down, a replicate node instantly replaces it with no perceptible change in behaviour or functionality. These servers are backed up daily, and the datacentres housing them are accredited to ISO 27001 (2005) or higher. In the very unlikely scenario that data must be restored from a backup, we estimate the Recovery Time Objective (RTO) for restoring this data to be approximately 10 minutes of downtime. 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"
- SharePoint is maintained/delivered under licence by Practical Networks with in-house maintenance by the Commercial Director. The NAS drive is a WD PR2100 and is maintained by the Archaeology and Geomatics Manager with weekly backups and checks of the data; field data such as photographs and survey data to be uploaded weekly by the Project Officer.
- Field and in-house access to the SharePoint and the NAS drive is limited/restricted by user email and password.
- Files such as databases, tables and documents required by the external specialists and in-house post-excavation team will be distributed using the SharePoint system. Any further data such as photographs, AutoCAD files, QGIS projects etc will be distributed via secure alternative means (WeTransfer or similar) to protect the integrity of the NAS Drive.

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.
- The strategy should dictate which parts of the archive, both digital and analogue, are relevant and would provide future generations with a soundly curated archive. Documents and Data should be quality assured prior to deposition, checking for consistency and following any deposition guidance of the eventual repository
- All costs relating to the digital archiving have been factored into the original quote and intended repository will be notified. At each milestone costing considerations must be undertaken to ensure that deposition is not out of pocket or unexpectedly above factored levels.

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.
- Curation of the field data, data synthesis/analysis, quality assurance should be the responsibility of senior figures of the project team, usually the Project Officer/Supervisor. They will make sure that all data is stored correctly and backed up to minimise any loss of integrity of the archive.
- Reports both internal and external shall be subject to MAP's ideal naming preferences of project files. It is the responsibility of each department to ensure their curated report/work is correct, quality assured and seek clarification from the authors (external or otherwise) of any document which contains errors.

- All work will be latterly audited by the Project Manager working towards creating an archive and level of reporting which is both ethically sound, accurate and reliable for future use by anyone internal or external to the company.

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.
- There should be no spaces in any file naming
- No symbols (e.g., #?,) should be used as they are not ADS compliant
- Full stops in file names are not accepted, except between file name and file type
- Abbreviate where possible, losing extraneous vowels and consonants, as file paths are cumulative and cannot exceed a certain number of characters
- 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

  05-26-19-EXC_PhsB_DrawReg

- Scanned Context Sheets & other site sheets

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

e.g., 05-08-20-TT_Ctxt-0001-0050

05-26-19-EXC_PhsB_Ctxt0001-0050

- Site Drawings and Plans

Should be scanned as TIFF's and be formatted as: Site Code, Type of Work (Adding excavation phase if required), Drw, Sheet No

e.g., 05-08-20-TT_Drw_Sh-001

05-26-19-EXC_PhsB_Drw_Sh-001

NB. The phase of work or field numbers may only be relevant at the time the work was undertaken, if work is part of a larger continuing outline, check where the next tranche of numbers will start and bare that in mind or check with PM prior to archiving reports.

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

APPENDIX 2

Environmental Strategy By Diane Alldritt

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

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.