

A585 Windy Harbour to Skippool Improvement Scheme

TR010035

7.30 Draft Archaeological Mitigation Strategy and Preliminary WSI

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The Infrastructure Planning
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Procedure) Regulations 2009

**A585 Windy Harbour to Skippool
Improvement Scheme**
Development Consent Order 20[]

**DRAFT ARCHAEOLOGICAL MITIGATION STRATEGY AND PRELIMINARY
WSI**

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1 INTRODUCTION

1.1 Overview

- 1.1.1 This Draft Archaeological Mitigation Strategy and Preliminary Written Scheme of Investigation (WSI) (hereafter referred to as the 'draft strategy') outlines the proposed mitigation for cultural heritage (archaeological remains and built heritage) receptors which would be impacted by the construction of the proposed A585 Windy Harbour to Skippool Improvement Scheme (hereafter referred to as 'the Scheme'). This draft strategy has been written by Arcadis (UK) Consulting, on behalf of Highways England, and submitted into the examination process for this Nationally Significant Infrastructure Project (NSIP); Planning Inspectorate reference TR010035.
- 1.1.2 An Environmental Impact Assessment was undertaken for the Scheme and an Environmental Statement (ES) submitted as part of the application for a development consent order (DCO) (document reference TR010035/APP/6.1-6.19). ES Chapter 7: Cultural Heritage (document reference TR010035/APP/6.7 – Rev 1) provides the impact assessment undertaken for cultural heritage which was also informed by fieldwork. A summary is provided in section 2 of this draft strategy.
- 1.1.3 The purpose of this document is to present an overarching draft archaeological mitigation strategy for the Scheme, incorporating a preliminary WSI. This document provides the approach and methodology for mitigating impacts to archaeology arising from the construction of the Scheme and has been consulted with the Archaeological Advisor to Lancashire County Council (LCC).
- 1.1.4 This document will be used by the appointed archaeological contractor, to produce a detailed WSI for each phase of mitigation. The detailed WSI will be submitted to and discussed with the Archaeological Advisor to LCC prior to the commencement of archaeological mitigation works for the Scheme. No development work or demolition work for an area of the Scheme requiring archaeological mitigation, can be undertaken until the necessary WSI has been produced and consulted LCC.
- 1.1.5 For continuity, this document uses project identifiers assigned to assets/receptors attributed in previous cultural heritage assessments for the Scheme. These are presented in brackets and the number in bold. This document should also be read in conjunction the following documents:
- Arcadis, March 2019, A585 Windy Harbour to Skippool Improvement Scheme, Advanced Archaeological Works Project Design (HE548643-ARC-HER-A585-RP-LH-3233)
 - Arcadis, May 2019 (Revision 1), A585 Windy Harbour to Skippool Improvement Scheme Environmental Statement, Volume 6, Chapter 7, Appendix 7.1: Cultural Heritage Desk Study (document reference TR010035/APP/6.7.1 – Rev 1)
 - Headland Archaeology, 2018, A585 Windy Harbour to Skippool Improvement Scheme Environmental Statement, Volume 6, Chapter 7, Appendix 7.2: Archaeological Geophysical Survey (document reference TR010035/APP/6.7.2)
 - Highways England, May 2019 (Revision 1), A585 Windy Harbour to Skippool Improvement Scheme Environmental Statement, Volume 6, Chapter 7: Cultural Heritage (document reference TR010035/APP/6.7 – Rev 1)

- Oxford Archaeology North (OAN), 2018, A585 Windy Harbour to Skippool Improvement Scheme Environmental Statement, Volume 6, Chapter 7, Appendix 7.3: A585 Geoarchaeological Assessment (document reference TR010035/APP/6.7.3)
- Oxford Archaeology North (OAN), 2019, Interim Report 1: A585 Windy Harbour to Skippool Improvement Scheme Archaeological Evaluation, (Appendix A of this document)

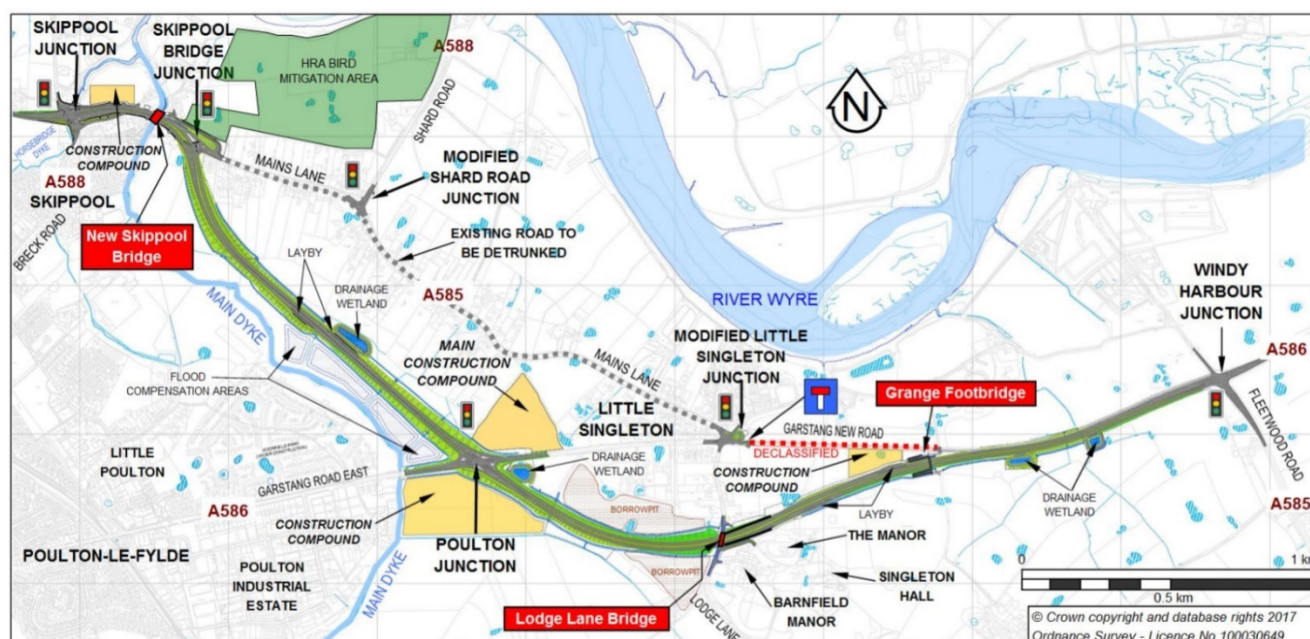
1.2 The Scheme

1.2.1 Highways England is proposing an A585 Windy Harbour to Skippool Scheme which is to provide an improvement to 4.86km of the existing single carriageway A585 trunk road route that extends in a generally north west direction for approximately 19km between M55 Junction 3 and the port of Fleetwood at the northern end of the Fylde Peninsula.

1.2.2 The general arrangement of the Scheme is shown on document 2.5 (document reference TR010035/APP/2.5) – a summary is provided in Figure 2 1. The Scheme consists of:

- A 4.85km (3 miles) long dual 2-lane carriageway bypass from Windy Harbour Junction to the Skippool Junction
- Four new junctions including: conversion of Skippool Junction to a traffic signal-controlled crossroads with A588 Breck Road and B5412 Skippool Road; Skippool Bridge Junction in the form of a three-arm traffic signal-controlled junction with the existing Mains Lane; Poulton Junction in the form of a signal-controlled crossroads connecting the new bypass to A586 Garstang Road East and modification to Little Singleton Junction (also known as Five Lane Ends) to accommodate U-turning traffic including buses. Between Skippool Bridge Junction and Poulton Junction the bypass is on embankment. East of Poulton Junction through to east of Lodge Lane the bypass is mostly in cutting
- Three new major structures including: replacement of Skippool Bridge; Lodge Lane Bridge and Grange Footbridge
- Alterations to the existing road network on completion of the bypass include: detrunking the A585 between Skippool Bridge Junction and the end of Garstang New Road east of Little Singleton; applying a reduction in speed limit to 30mph and providing a combined footway/cycleway along Mains Lane between Shard Road Junction and Little Singleton; altering Garstang New Road east of Little Singleton to allow restricted access to farmers' fields and provide a shared footway/cycleway route between Windy Harbour Junction and Little Singleton; applying a reduced speed limit of 30mph along Garstang Road East between the proposed Poulton Junction and Little Singleton and upgrading the lighting along Mains Lane and Garstang Road East

Plate 1: The Scheme



1.3 Structure of this Document

1.3.1 This document includes the following sections:

- **Section 2** - presents the background and previous archaeological investigations undertaken to assess the baseline conditions for the Scheme. This includes the preliminary results of a phase of evaluation conducted in August/September 2019. These are summarised in Appendix A.
- **Section 3** - presents the draft archaeological mitigation strategy for the Scheme.
- **Section 4** – presents the preliminary WSI for delivery of this draft archaeological mitigation strategy.
- **Section 5** - References used throughout this document are presented in alphabetical order by author within section 5.

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Archaeological Investigations Undertaken to date

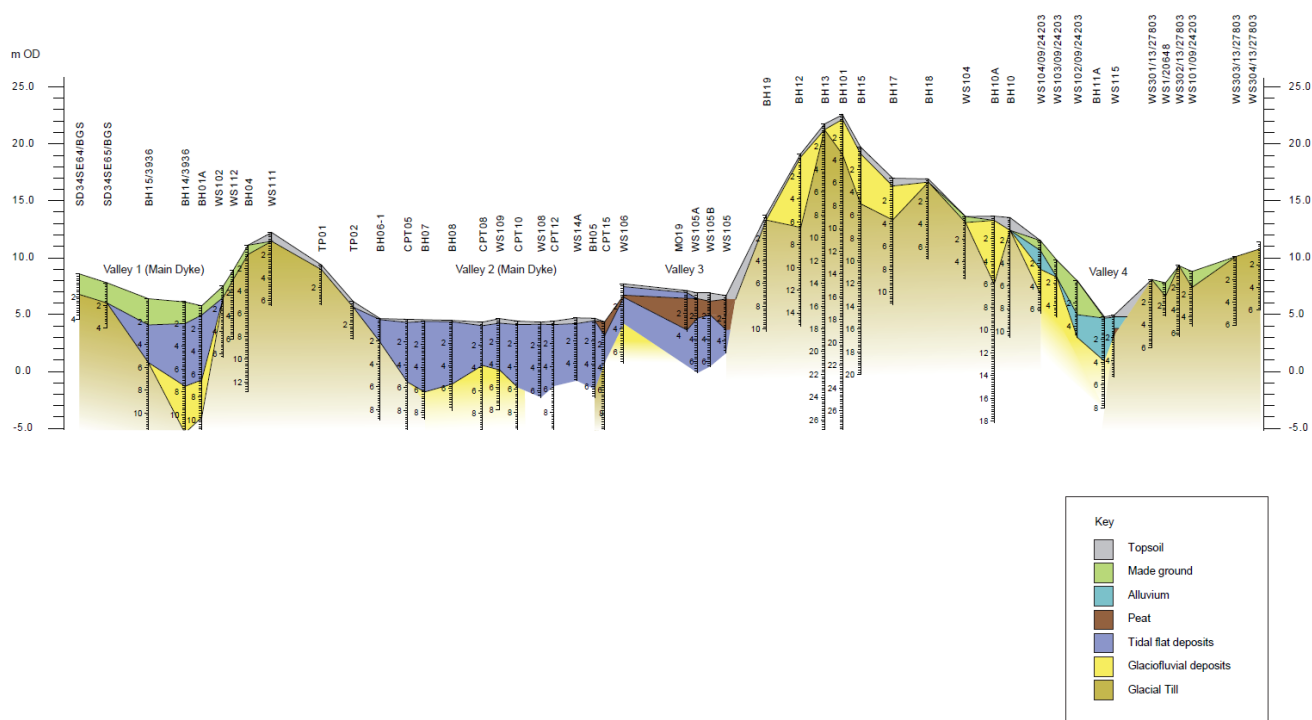
Desk Based Study

- 2.1.1 A Cultural Heritage desk study for the Scheme was submitted as part of the DCO application for the Scheme in October 2018. An updated desk study was then submitted to the Planning Inspectorate in May 2019 (document reference TR010035/APP/6.7.1 – Rev 1).
- 2.1.2 The Cultural Heritage desk study identified the preliminary baseline conditions for the Scheme within a 1km study area of the draft order limits. A total of 12 designated heritage assets and 118 known non-designated heritage assets were identified.
- 2.1.3 A walkover survey and assessment of LiDAR, aerial photography and cartographic sources identified an additional 33 heritage assets within or close to the draft order limits. The baseline conditions for the Scheme predominately identified heritage assets of an agricultural or industrial nature within the draft order limits. The majority of the non-designated heritage assets are considered of low value, with the known Romano-British settlement activity at Moorfield Park (**112/193**) and known peat deposits for their potential to contain archaeological remains (**196**) being of medium value.
- 2.1.4 An overall medium potential for unrecorded archaeological remains to be present within the draft order limits was assessed; with a higher likelihood for these assets to date to either the Prehistoric, Roman or Post-medieval periods.
- 2.1.5 The Cultural Heritage desk study provided the baseline for ES Chapter 7: Cultural Heritage (document reference TR010035/APP/6.7 – Rev 1).
- 2.1.6 A total of 77 heritage receptors (assets) were identified for potential impact by the Scheme; located either within the draft order limits or zone of theoretical influence. Only impacts to the setting of the Grade II listed Icehouse at Singleton Hall (**LB8**) and direct impacts to peat deposits (**196**) and potential archaeological remains associated to the Romano-British settlement at Moorfield Park (**112/193**), were assessed to have a moderate significance of effect; and therefore, considered significant. Potential impacts by the Scheme to other heritage receptors are considered to be slight adverse or neutral.

Geoarchaeological Deposit Modelling (July 2018)

- 2.1.7 Oxford Archaeology North (OAN) conducted a geoarchaeological deposit model assessment of existing borehole data, drilled during Ground Investigations conducted as part of the Scheme's assessment (document reference TR010035/APP/6.7.3). The assessment further enhanced the understanding of the high archaeological interest and significance of the extensive peat deposits (**196**) known to be within the draft order limits (OAN, 2018).
- 2.1.8 The geoarchaeological assessment also identified the location of four valley margins (plate 2) present across the Scheme (OAN, 2018). These valley margins are considered to hold archaeological interest through the potential to yield evidence of early historic human activity (OAN, 2018).

Plate 2: Valley locations as identified in the geoarchaeological deposit model. Image taken from the geoarchaeological assessment (document reference: TR010035/APP/6.7.3)



- 2.1.9 Consequently, an advanced archaeological project design (Arcadis, 2019) and written scheme of investigation (OAN, 2019) have aimed to define and complete the geoarchaeological deposit model and further characterise the peat deposits and valley margins within the draft order limits.

Geophysical Survey (August 2018)

- 2.1.10 An archaeological magnetometry geophysical survey of land within the draft order limits was conducted by Headland Archaeology in August 2018. The survey was limited due to land access arrangements, covering a total of 49 hectares to provide further information of the archaeological potential of the Scheme (Headland Archaeology, 2018).
- 2.1.11 The survey did not identify anything of definite or possible archaeological potential. Anomalies that were identified were interpreted as being consistent with the agricultural landscape such as former boundaries, field drains and ploughing (Headland Archaeology, 2018).
- 2.1.12 Consultation with the Archaeological Advisor to LCC has highlighted the unreliability of geophysical surveys across Lancashire. For example, geophysical survey techniques failed to identify the extensive Romano-British settlement, including hearths, to the west of the draft order limits at Moorfield Park (**112/193**). Consequently, it was agreed that trial trench evaluation would target 'blank areas' devoid of heritage assets, within the Scheme, to further assess the accuracy of this geophysical survey in addition to areas of archaeological potential.

Evaluation (July to September 2019)

- 2.1.13 Oxford Archaeology North (OAN) has conducted a phase of evaluative archaeological investigations across the Scheme between July and September 2019. This phase of evaluation has been conducted as per the scope outlined in the advanced archaeological project design (Arcadis, 2019) and methodology detailed in a WSI (OAN, 2019).
- 2.1.14 The evaluation has included the excavation of an initial 50 trial trenches, with a contingency allowance for additional trenches where appropriate and dependent on in field observations and results by the OAN team. Trench locations are presented on Figure 1 of the advanced archaeological project design (Arcadis, 2019).
- 2.1.15 A second geoarchaeological focused electromagnetic conductivity geophysical survey was also conducted, with the aim of identifying areas of historically higher and or drier ground, along the previously identified valley margins (OAN, 2018). Geoarchaeological led boreholes are to be excavated across the Scheme to confirm the reading of the geophysical survey (locations shown on Figure 4 of Appendix A).
- 2.1.16 This second geophysical survey helped to define several zones of potential archaeological significance, including a probable paleochannel, flowing south-east/north-west towards the north-eastern edge of the route corridor and a possible island within this area (OAN, Appendix A). The survey also helped to identify margins between former wetlands and drier ground; environments which attracted activity in Prehistory and therefore holds archaeological potential (OAN, Appendix A).
- 2.1.17 Based on the results of this geophysical survey, further environmental testing, boreholes and test-pits have also been conducted to further characterise the significance and potential of geoarchaeological deposits and valley locations across the Scheme. This approach has been agreed in consultation with Historic England's North West Scientific Advisor and the Archaeological Advisor to LCC, respectively. An updated trench and borehole location plan are detailed in Figures 4, 5 and 6 of Appendix A.
- 2.1.18 Due to availability of resources and land access arrangements, the time frame of the evaluation has prevented all the information being available for inclusion in this document (September 2019). OAN has, however, provided a summary of findings from the evaluation and this is presented at Appendix A. Most of the analysis of the archaeological finds and samples recovered during the evaluation requires detailed laboratory testing and or analysis by a specialist. Consequently, a detailed draft report of the evaluation work or complete geoarchaeological deposit model will unlikely be available until the end of 2019 / early 2020.
- 2.1.19 In summary, the following understanding of the Scheme's archaeological resource has been ascertained through the archaeological evaluation conducted by OAN (Appendix A).
- 2.1.20 Evidence for focused Prehistoric activity, spot dated to the early Neolithic (c 3800-3600 cal BC) has been identified to the north of Garstang Road East. This activity is concentrated along the wetland margins of Valley 2, as identified in the 2018 geoarchaeological assessment (document reference TR010035/APP/6.7.3). Excavations here identified deposits of organically rich waterlogged peat up to 1m in depth; some burning activity has also been identified in these waterlogged deposits. Lithic and pottery finds (plate 3 and 4) provide an early Neolithic spot date but there

is the potential for earlier Mesolithic or late Neolithic material to be present. If there is evidence of transitional periods between the Mesolithic and Neolithic periods at the site, this would be nationally significant (OAN, Appendix A).

- 2.1.21 This activity is reflected to the south of Garstang Road East within the margins of Valley 3, as identified in the 2018 geoarchaeological assessment (document reference TR010035/APP/6.7.3). Trenching has confirmed the presence of peat with a thickness of 3m and capped by a yellow-brown alluvium layer of 0.2m thick, beneath the topsoil (OAN, Appendix A). Flint, along with charcoal inclusion deposits, have also encountered. This area continues to hold potential for early Prehistoric activity to be present. The organic material in Valley 3 could represent a different freshwater ecotone environment to the tidal environment experienced in Valley 2 to the north, however this understanding would require further laboratory testing to ground truth (OAN, Appendix A).

Plate 3: Image of Carinated Bowl rim, dated to the Early Neolithic (Image OAN, Appendix A).



Plate 4: Range of flaked lithics recovered from the evaluation (Image OAN, Appendix A).



- 2.1.22 The deposits of peat have been characterised in an area 80m wide within Valleys 2 and 3 (See figure 4 of Appendix A) before transitioning upslope to the north-east into sands and silts, which the evaluation has characterised as buried soils. These soils extend a further 20m to the east of the peat edge and represent an area which has not been permanently waterlogged but still hold the potential to yield early Prehistoric activity on these wetland edges (OAN, Appendix A).
- 2.1.23 While the trenching has only provided a minimal number of artefactual finds, it is acknowledged such finds are difficult to identify in evaluative trenches. The amount and concentration of finds represent the potential for a large amount of material to be retrievable, particularly through detailed methodological approaches which would could include on-site sieving and additional laboratory analysis. The density of finds indicates an intensive use of the landscape in the early Neolithic period (OAN, Appendix A).
- 2.1.24 A series of undated ditches were excavated to the east of the Valley 3 margin activity, west of Lodge Lane. These ditches were not identified through earlier geophysical survey (document reference TR010035/APP/6.7.2) and are not identifiable on historic mapping. These may represent enclosure ditches or agricultural activity dating as early as late Prehistory or possibly later (OAN, Appendix A).
- 2.1.25 No evidence of 'cultural' activity was identified in trenches 14, 15, 16, 17, 18, 20, 21, 22, 29 or 30. Firstly, this indicates a lack of archaeological interest within the central and western areas of the Scheme, between the A585 Mains Lane and moving down towards and south of the A586 Garstang Road. These trenches were located to test the potential continuation of Romano-British Settlement Activity (**112/193**) into the Scheme and to test a potential rectilinear enclosure (**190**) identified through aerial photography; the later proven to be a change in peat deposits.
- 2.1.26 Deposits of made ground and Post-medieval refuse were encountered in trenches 1

to 3 and therefore hold negligible archaeological interest. Similarly, the bank identified through walkover survey (**161**) was tested through trench 8 and identified as modern made ground of very little archaeological interest.

2.2 Updated Archaeological Baseline Conditions

- 2.2.1 Based on the preliminary results of the archaeological evaluation of the Scheme, the following update of the Scheme's archaeological baseline conditions can be made.
- 2.2.2 A series of previously identified archaeological receptors have been proven to be of a natural geological origin and therefore removed from any further assessment. This includes a possible former structure (**189**) and a potential rectilinear enclosure (**190**) both identified through aerial photography and the potential for continued Romano-British settlement activity from Moorfield Park (**112/193**) which has not materialised in the evaluation. Trenches 1-3 placed to target any remains associated with rectilinear enclosures identified through historic mapping (**187**) identified late made ground deposits and Post-Medieval refuse. Furthermore, during the examination period, a building has been developed within the location of the Bronze Age Pottery findspot (**145**) removing any archaeological survey opportunities in the vicinity of the asset.
- 2.2.3 The speculative Roman road (**139**) believed to cross the 1km study area of the Scheme, is representatively drawn by the HER with no direct evidence for its route. The evaluation has not provided any indication of the road's presence within the Scheme. Furthermore, the representative area where the road crosses the draft order limits at the existing Skippool roundabout, has been subject to modern road works in the late 20th century which will have more than likely removed any associated archaeological remains. Furthermore, work as part of the proposed Scheme in this area will be limited to above ground works, which would afford no opportunity for archaeological intervention. Therefore, this receptor (**139**) is not considered further.
- 2.2.4 The identification of extensive lithic scatters within trial trenches excavated to the north and south of the A586 Garstang Road, gives weight to the potential for additional Prehistoric artefactual activity to be associated with the identified Prehistoric finds scatter (**159**) located to the east of the Valley 3 peat locations. The potential relationship between this flint scatter and undated ditches located in trenches 35-37, in this area, is currently unknown.
- 2.2.5 The known peat deposits (**196**) have been further understood through evaluation. Evidence has suggested the peat is rich in organic material, with the potential to yield information of early Prehistoric activity, currently dated to the Early Neolithic. The highest potential for Prehistoric activity has been identified as the wetland edges, previously recognised as the margins of Valleys 2 and 3 but not fully understood in the geoarchaeological assessment (document reference TR010035/APP/6.7.3).
- 2.2.6 Consequently, the following cultural heritage receptors, stated in Table 1, are considered for archaeological mitigation due to potential impact by the Scheme.

Table 1: An updated list of Cultural Heritage Receptors to be mitigated as part of the Scheme.

Project ID	Name	Heritage Value
LB8	Grade II Icehouse at Singleton Hall	Medium
12	Skippool Mill	Low
38, 104, 132, 135	Cluster of built heritage assets in Singleton Park	Low
62	Field boundaries south of Garstang Road	Low
65, 66, 67 68, 69, 70, 71	Clay Pits	Low
140	Main Dyke	Low
151	Singleton Park	Low
159	Flint Scatter potentially associated with peat activity (196)	Low to Medium
160	Derelect structure identified during walkover survey	Low
166	Former quarry pit south west of Shard Road	Low
167	Covered Viaduct	Low
168	Earthwork Platform, Singleton Park, identified during walkover survey	Low
169	Former clay pits identified through walkover survey	Low
179, 181, 184	Range of receptors identified through LiDAR analysis	Low
186	Quarry scoop located south of Mains Lane	Low
191	A former pond in Singleton Park	Low
196	Peat deposits and buried surfaces with associated Prehistoric activity- identified through Geoarchaeological Assessment and Evaluation.	Medium to High
198	Milestone identified On 1911 OS map	Low

2.3 Future Baseline Conditions

- 2.3.1 The results of the evaluation presented in Appendix A and summarised in section 2.1 of this report are preliminary. At the point of writing, evaluation works were still taking place for both trial trenching and additional geoarchaeological assessment. Furthermore, a limited number of environmental samples and or artefacts, recovered in the evaluation have been examined by specialists and most results represented within this document has come from on-site spot dating and analysis.
- 2.3.2 Consequently, later detailed analysis of the material recovered from the evaluation could alter the current understanding of the archaeological conditions, as presented in Appendix A.
- 2.3.3 Later analysis of the samples and cores, taken during this further geoarchaeological assessment of the site should look to establish the hydrological and geochemical

value of the organic archaeological deposits as a future baseline understanding. This would help model the predicted changes to the geochemical composition of these deposits and therefore impact by the Scheme; allowing for appropriate mitigation to be devised in the detailed WSI.

- 2.3.4 However, it should be noted that the findings presented in Appendix A represent the current best understanding of the archaeological conditions of the Scheme. This is the understanding of the OAN field team who have experienced the site through intrusive archaeological investigations; building on their previous study of the Scheme's landscape through the earlier geoarchaeological assessment (document reference TR010035/APP/6.7.3) and extensive knowledge of excavating Lancashire wetlands. Areas of archaeological activity and therefore interest have been further defined and provides the foundations for a mitigation strategy to appropriately define areas of further work where archaeological resources would be best focused.
- 2.3.5 The draft mitigation strategy (section 3) provides areas (Figure 1) for further targeted study, to mitigate impacts by the proposed Scheme on the archaeological resource as currently understood. A revision of the current baseline, should the understanding of the archaeological resource change through further assessment of the material recovered during the evaluation, should be made in a draft of the detailed WSI. Any changes to the approach will build on the content of this document and be reflected in a detailed WSI and consulted with the Archaeological Advisor to LCC.

3 DRAFT ARCHAEOLOGICAL MITIGATION STRATEGY

3.1 Background

- 3.1.1 The following section presents a draft archaeological mitigation strategy for the Scheme. The archaeological mitigation strategy outlines the archaeological mitigation measures to be carried out in advance of construction; should the DCO be granted by the Secretary of State for Transport.
- 3.1.2 It is noted, that due to the interim status of the results of the archaeological evaluation, presented in Appendix A, that this is a draft of the archaeological mitigation strategy. Detailed laboratory testing and specialist analysis of samples and artefacts recovered during the evaluation in August/September 2019 is not anticipated to be complete until December 2019. Consequently, these results may alter the current understanding of the archaeological baseline of the Scheme, through new information and or absolute dating/identification of artefacts or geoarchaeological material.
- 3.1.3 Therefore, the draft archaeological mitigation strategy may be subject to change based on any significant archaeological findings, which come to light as a result of analysis of the material recovered from the evaluation. Changes to the mitigation strategy would be consulted with the Archaeological Advisor to LCC, by the Scheme's archaeological contractor/consultant. If appropriate, Historic England may also be consulted due to the nature and significance of some of the known archaeological remains identified in the evaluation. This would be done at the discretion of the Archaeological Advisor to LCC.
- 3.1.4 All archaeological investigations will be carried out in accordance with the Chartered Institute for Archaeologists (CIFA) standards and guidance (CIFA, 2014a; CIFA, 2014b) and by a suitably qualified and experienced archaeological contractor. Historic England guidance on Geoarchaeology (2015) and other guidance, as appropriate should also be considered by the archaeological contractor.
- 3.1.5 The areas of archaeological mitigation are presented below and are illustrated on Figure 1. The areas marked on Figure 1 highlight areas where archaeological mitigation is required.
- 3.1.6 As noted in ES Chapter 7: Cultural Heritage (documents reference TR010035/APP/6.7 - Rev 1) and the advanced archaeological project design (Arcadis, 2019), receptors identified as ridge and furrow will not be subject to any further archaeological investigations or mitigation as part of this Scheme. Ridge and furrow as a receptor type is well understood and defined nationally and no further information will be gained through their additional study than that identified in the desk study (document reference TR010035/APP/6.7.1 Rev 1). This has been agreed with the Archaeological Advisor to LCC.
- 3.1.7 A quarry scoop (**186**) located south of the A585 Mains Lane is truncated by the draft order limits and would, in part, be impacted. The northern section which would experience impact has been altered by the location of a modern pond. Based on the proportionate level of impact to the receptor's significance, no mitigation is now proposed. Similarly, a clay pit (**65**), also located as part of a modern pond, has been impacted by this later activity. No mitigation is therefore proposed at this location.

3.2 Aims and Objectives

3.2.1 The overall aim for the archaeological mitigation strategy is to reduce the impact of the Scheme's development on the archaeological resource through a programme of archaeological investigation and recording. The programme of investigation and recording will aim to:

- Investigate and secure or "preserve by record" the significant aspects or evidential value of the archaeological remains located within the draft order limits of the Scheme
- Or where practical and feasible, or where remains of national importance, to physically preserve in situ specific areas of high value archaeology within the draft order limits of the Scheme
- Analyse and disseminate the archaeological information from the Scheme to the professional archaeological audience, adding to the corpus of archaeological knowledge and interpretation of Lancashire, with a focus to the wetland archaeology of Lancashire
- Disseminate the archaeological information from the Scheme to public and lay audiences
- Ensure that a full archive, including written, drawn and photographic records (digital and hard copies), as well as artefacts and environmental material, is deposited in an appropriate repository and that it is available for future research. An appropriate repository should be approached prior to the start of the works and preferably during the production of the WSI to ensure the security of the future archive.

3.2.2 In addition to these aims, the mitigation of the Scheme has the potential to contribute to the research agenda for the region as outlined in the Archaeological Research Framework for North West England, Volume 2 (edited Brennand, 2007). This would include but not limited to:

- Following up the North West Wetland Survey's assessment, which identified receptor 159, of the wetland resource with targeted sampling and investigation of the most important waterlogged sites;
- Testing of evaluative excavation with larger area excavations in appropriate circumstances and the use of non-invasive techniques such as geophysical survey as a means of identifying Prehistoric activity;
- Development of methods for excavating areas of peat to extract chronologies, artefactual remains and organic material as well as understanding their significance;
- Implement a suitable sampling strategy as part of the detailed WSI to contribute to the shortage of information specifically around subsistence economies of the Prehistoric in the north west;
- Potential to identify a currently unknown and uncharacterised site of Neolithic human activity, buried beneath/within the peat, and therefore contributing to the need to rebalance the known activity sites of the Neolithic and Bronze Age within the region; and

- Study the transition of human activity between the Mesolithic and Neolithic periods within the north west.

3.2.3 It is anticipated that a revised Archaeological Regional Research Framework for the North West will have been completed and launched in 2020; prior to any proposed programme for the mitigation of the Scheme. Future revisions of the detailed WSI should take into account any relevant objectives in this updated framework, when published and tailor the methodology to appropriately collect samples or data to meet these objectives.

3.3 Built Heritage Mitigation

3.3.1 A phase of mitigation will be required to mitigate impacts to eight built heritage assets, located within the Scheme or within proximity to the Scheme.

3.3.2 A derelict structure (**160**) (Plate 5) was identified on the southern edge of the A585 Mains Lane, during the desk study's walkover survey of the Scheme (document reference TR010035/APP/6.7.1 Rev 1). The structure would require demolition prior to construction, to allow for the new junction between the existing A585 and the proposed bypass.

Plate 5: Derelict Structure (160), identified during the desk study's walkover survey of the Scheme, looking North.



3.3.3 As detailed in section 7.6.15 of the ES Chapter 7: Cultural Heritage (document reference TR010035/APP/6.7 - Rev 1), the derelict structure will be preserved by record prior to demolition. This recording will comprise a level 2 building survey, as

defined by Historic England (Historic England, 2016) and will meet the standards of CIFA (2019).

- 3.3.4 As outlined in section 3.5 of this report and section 7.6.15 of the ES Chapter 7: Cultural Heritage (document reference TR010036/APP/6.7 - Rev 1), the ground under the derelict structure (**160**) will be archaeologically monitored by an archaeological watching brief during construction stripping, to also record any foundational remains and artefactual recovery; with the view to provide information on the structure's use during its operation and earliest date.
- 3.3.5 An individual detailed WSI for the building recording of the derelict structure will be devised by the archaeological contractor, appointed to undertake the survey. The archaeological monitoring of the ground under the derelict structure will be undertaken as per the detail of the preliminary WSI, section 4 of this document.
- 3.3.6 The Icehouse at Singleton Hall (**LB8**) was assessed to receive a moderate significance of effect to the receptor's setting from the construction and operation of the proposed Scheme. Mitigation to maintain the immediate isolated setting of the Icehouse has been added into the design of the Scheme. This will take the form of additional woodland planting and acoustic fencing within the vicinity of the Scheme's location in Singleton Park.
- 3.3.7 The mitigatory design elements for the operational mitigation of the Scheme are detailed in the Environmental Masterplan (document reference TR010035/APP/6.19 - Rev 3). The mitigation measures for the Grade II Icehouse at Singleton Hall (**LB8**) have been agreed with Historic England within a Statement of Common Ground (document reference TR010035/APP/8.6).
- 3.3.8 Several non-designated built heritage receptors, located within Singleton Park (**38, 104, 132, 135**) would experience visual impacts due to the proximity of the proposed road, as would the character of the northern portion of Singleton Park (**151**). Tree planting and screening within the area of the Scheme in Singleton Park would reduce the visual impacts to these non-designated receptors. Furthermore, planting around the Scheme within Singleton Park would maintain the characteristic blocks of woodland present within the parkland, thus maintaining the intermittent views between the northern and southern areas of the Park; along with maintaining an overall green nature. This mitigation is detailed in the Environmental Masterplan (document reference TR010035/APP/6.19 - Rev 3).
- 3.3.9 A milestone (**198**) is located on the northern edge of the A585 Mains Lane. Construction of the Scheme would result in the removal of this built asset from its original position. Prior to the relocation of the milestone, the asset should be recorded in situ, prior to its removal and temporary storage. This record should include a photographic record.
- 3.3.10 Design of the Scheme should accommodate the relocation of the milestone to a position as close as possible to its current location. At present, the milestone is masked by dense shrubbery and hedgerow; its relocation would likely be an enhancement of its significance as a heritage asset by becoming a functional milestone again through its visibility to pedestrians and motorists.

3.4 Archaeological Watching Brief

- 3.4.1 A series of low value archaeological receptors would be impacted due to construction activity for the proposed Scheme. An archaeological watching brief (appropriate

archaeological supervision and recording) will monitor the initial topsoil strip as part of construction activity. Should archaeological remains be encountered, then sufficient time and resources will be made available to allow for excavation and recording of the remains. As soon as the recording is finished and under the approval of the Archaeological Advisor to LCC, the area will be immediately released for construction activity to continue.

3.4.2 The following receptors will be archaeologically monitored during the initial construction strip:

- Field boundaries south of Garstang Road (**62**)
- Potential deposits associated with the construction of Main Dyke (**140**) and the associated covered viaduct (**167**). Proposed this can be achieved in the same location
- Clay pits (**66, 67, 68, 69, 70, 71**)
- The associated archaeological remains of the derelict structure (**160**) (see section 3.3)
- Former quarry pit south west of Shard Road (**166**)
- Quarry pits identified through walkover survey to the south of Garstang Road East (**169**)
- A former pond in Singleton Park (**191**)

3.4.3 Potential impacts to archaeological remains may occur from the stripping of land for a proposed temporary construction compound to the north of the A586 Garstang Road. Constraints have limited archaeological evaluation here. The land is east of the defined buried soils and therefore potential continuation of prehistoric activity is limited. However, there is the potential for these deposits to continue into the temporary construction compound. An initial strip of topsoil material will need to be undertaken in the western extent of the temporary construction compound. Should the buried soils continue into the area for the temporary construction compound, the mitigation would be upgraded and the area of currently undefined buried soils included in an expansion of the geoarchaeological mitigation area, to the east. Further clarification of this will be available following the completion of the evaluation trenches in this location.

3.4.4 All areas of archaeological watching brief are marked on Figure 1. Some receptors may also be studied as part of wider areas of Strip Map and Sample due to their proximity to other receptors.

3.4.5 Where archaeological remains are discovered through archaeological watching brief, a quick characterisation of the features should be made to try and ascertain their significance and any association to potential nearby features within a stripped area of the Scheme. Only if these remains are deemed to be of significance, consultation with the Archaeological Advisor to LCC may be required to determine an approach in line with the Strip Map and Sample (see below 3.5).

3.4.6 If it becomes apparent that specific areas of archaeological watching brief hold a limited potential for archaeological remains to be present, then areas can be removed from the requirement to be archaeologically monitored. This is subject to consultation with the Archaeological Advisor to LCC and the area is to be clearly demarcated.

3.5 Strip Map and Sample

- 3.5.1 Two areas of Strip Map and Sample (Figure 1) have been identified within the Scheme, to mitigate impacts to archaeological features. These areas are located within the proposed bypass, where construction activity would result in the removal of a significant amount of material.
- 3.5.2 The western area of Strip Map and Sample covers an area stretching from the edge of the projected buried soils, as defined in the evaluation (OAN, Appendix A), and across to the draft order limit. The eastern edge of this area will be defined by the current field ditch. This area is located adjacent to an area of known cultural activity, as identified in the buried soils. Undated ditches, not recorded on historic mapping, were also identified in trench 55 within this area. Known field boundaries (62) are also located in within this area of proposed archaeological intervention.
- 3.5.3 A programme of Strip Map and Sample in this area (as drawn Figure 1) of approximately 10,474 square meters will implement a mitigation strategy of preservation by record for these assets. It would look to map and date the known ditches from trench 55 as well as identifying any associated continuation of human activity from the south. Archaeological remains associated with the known field boundaries would also be studied in further detail.
- 3.5.4 The second area of Strip Map and Sample would encompass the proposed route alignment. Going from Lodge Lane in the east where the proposed bypass would be in its deepest cutting, the area would stretch to the west, until it met the area of geoarchaeological interest, as further defined in the evaluation. As drawn (Figure 1), this area of Strip Map and Sample would cover an area of 31,976 square metres. This area of investigation would mitigate any archaeological remains present within the area of greatest impact due to the nature of the deep cutting proposed as part of construction.
- 3.5.5 A series of undated ditches, identified within trenches 36 and 37 of the evaluation (OAN, Appendix A) would be mapped through this area of Strip Map and Sample. This area will preserve by record these features and associated archaeological remains. Stripping the area will allow the ditches to be seen in a wider context, as well as provide additional opportunities to date them and obtain potential evidence of their function. Any continuation of the flint scatter in this field (159) and or its association with the undated ditches identified through evaluation would also be studied in this area of Strip Map and Sample.
- 3.5.6 If colluvial deposits are revealed within a trench and it is believed there is potential for paleoenvironmental remains to be present the archaeological contractor will excavate a sondage within the colluvium to test for any such remains. Following the excavation of the sondage the colluvium may be removed by machine unless specifically requested otherwise by the monitoring archaeologists.

3.6 Geoarchaeological Mitigation

- 3.6.1 The evaluation has identified an area of geoarchaeological potential along wetland edges within the Scheme. These areas are of archaeological interest having yielded evidence of early Neolithic activity on the margins of Valley 2 and 3, as defined by the geoarchaeological assessment (document reference TR010035/APP/6.7.3). There is the potential for these deposits to yield further evidence of early Prehistoric activity which, dependent on the information gained, would be of at least regional importance if not nationally.
- 3.6.2 As a result, a programme of detailed archaeological investigations would be required to appropriately mitigate the impacts to these archaeologically sensitive deposits of organically rich peat and buried soils. This programme would require an appropriate sampling strategy, to be devised in consultation with Historic England's north west scientific advisor and overseen by an onsite paleoenvironmental specialist.
- 3.6.3 Two areas of geoarchaeological interest have been identified, either side of the A586 Garstang Road East. Due to the differing proposed construction activity in both areas, the mitigation strategy would differ to be proportionate to the impacts.
- 3.6.4 The area to the south of the A586 Garstang Road East measures an area of 29,261 square metres (as drawn Figure 1). The proposed Scheme would result in the total removal of the archaeological resource within the footprint of the proposed Scheme. The removal of up to 3m of peat, in this area is proposed due to the instability of the soil for construction.
- 3.6.5 Consequently, detailed, strategic excavation of the peat and buried deposits would be required, with an appropriate sampling strategy, to extract all available information of potential early human activity. This could potentially include the sieving of an extensive volume of material for environmental sampling and artefactual retrieval. Dependent on what, if any structural remains the peat or buried soils are masking, a lot of this work may potentially be conducted in post-excavation. A paleochannel has the potential to be masked by the peat in this area and would therefore also be studied as part of the strategic archaeological stripping of the area.
- 3.6.6 The post-excavation process, as part of the mitigation for the peat should look to use a range of scientific dating methods to develop a high-resolution chronological framework for peat development and detailed analysis of proxy environmental indicators. This could include, but not limited to, dating through Accelerator Mass spectrometry or tephrochronology, as well as pollen, insect and macroscopic plant remains analysis.
- 3.6.7 A large area of peat stretches further south and west of this area of investigation. The Scheme assigns this area as a proposed temporary construction compound. It is anticipated that this area would experience a limited amount of impact, primarily through vehicle movement or compression of a temporary surface. The use of bog mats should be considered to mitigate the potential impact from the compaction of sediments by vehicles. Due to the depth of the peat in this area (3m), it is anticipated that with mitigation this impact from the temporary construction compound would have a negligible effect (OAN, Appendix A). Therefore, invasive mitigation measures are focused to the area of greatest impact from the proposed bypass.

- 3.6.8 Proposed impacts to the peat to the north of the A586 Garstang Road East would be different. Here, the proposed bypass would be constructed on an embankment with limited topsoil stripping and potential drilling or compaction of the geoarchaeological deposits to secure the structural integrity of the embankment. However, this work could have an impact on the geoarchaeological deposits through a change in hydrology of the area as result of the proposed construction activity. The wet organic nature of the deposits within the Valley 2 location, means that they are vulnerable to this potential change in hydrology, which could lead to the desiccation of the deposits and therefore destruction of the sensitive organic materials of archaeological interest (OAN, Appendix A).
- 3.6.9 Detailed design information would be required to fully understand the impact of construction on the hydrology of the site in this area. The mains work contractor should provide this information to the archaeological contractor for the proposed mitigation as soon as possible. Once this is known, appropriate mitigation can be devised based on the engineering design and the results of the geoarchaeological assessment as part of the evaluation.
- 3.6.10 The exposure of these peat areas within the valley locations of the Scheme would require a range of samples for the recovery of different types of evidence (Historic England, 2011). The above aims and objectives of the mitigation strategy would inform the sampling strategy. As noted in Appendix A, peat cores and bulk samples were taken during the evaluation to enable the assessment of artefacts, insects, pollen and waterlogged and charred plant remains (OAN, Appendix A). It is anticipated that a sampling strategy, requiring the collection of a large number of bulk samples, would be led on the results of this current assessment which will further the potential and methodology for extracting the evidence of human activity within these deposits. These samples will have the potential for providing additional dating evidence as well as palaeoenvironmental data. Whilst the samples taken in the evaluation may provide dating evidence, a co-ordinated sampling for different environmental materials from the same deposits is often desirable and will provide a more enhanced interpretation than relying on a single line of evidence (Historic England, 2011).
- 3.6.11 It is anticipated that the methodology would collate further samples which would be finely wet sieved to at least 2mm which would provide a good indication of any fish and small mammal species present in a context (Historic England, 2011). Additional on-site coarse sieving may be deemed appropriate. The full methodology will depend on the impact of any proposed detailed construction on these deposits and the nature of the deposits when analysed in the laboratory. The final methodology will be agreed in consultation with Historic England's North West scientific advisor and detailed in a detailed WSI.
- 3.6.12 As part of the August/September 2019 evaluation, additional geoarchaeological sampling was proposed (Arcadis, 2019; OAN, 2019) to complete the deposit model of the Scheme. At the point of writing this mitigation strategy (September 2019), this has not been completed due to timescales and incomplete information. It is proposed, that as part of the overall mitigation and contextual understanding of the local and regional significance of the geoarchaeological deposits, this deposit model should be completed as an overarching mitigatory measure.

3.7 Undetermined Archaeological Receptors

- 3.7.1 Due to the various constraints experienced by the 2019 evaluation of the Scheme, not all trenches as part of the advanced archaeological project design (Arcadis, 2019) and accompanying WSI (OAN, 2019) have been completed. Consequently, the presence, nature and significance of several heritage receptors within the Scheme, remains undetermined.
- 3.7.2 Detailed mitigation through Strip Map and Sample should not be considered the default option of mitigation for these receptors, as a means of establishing the presence or absence of archaeological remains. As shown in the evaluation, targeted receptors have not provided evidence of cultural activity but rather geological changes. There is no further evidence to suggest a specific change to this pattern in other areas of the Scheme.
- 3.7.3 Therefore, the following receptors and further measures of evaluation will be required as part of a continued phased approach to the mitigation of the Scheme.
- 3.7.4 Skippool Mill (**12**), east of Skippool Bridge, would be impacted by road widening to create a junction between the existing A585 Mains Lane and the new road. This represents a revised location for the receptor, captured in the revised desk-study (document reference TR010035/APP/6.7.1 – Rev 1). Therefore, evaluation to establish the presence of any associated archaeological remains is key to understanding the exact location of this receptor. The proposed evaluation (Arcadis, 2019; OAN, 2019) was constrained due to vegetation.
- 3.7.5 It is proposed that mitigation would still require a phase of evaluation. Extensive vegetation should be cleared to create an appropriate working space and would aid the later construction activity. Three 25m x 2m trenches are proposed (Figure 1); too assess the presence of any associated remains to the receptor. This should follow the process of the evaluation WSI (OAN, 2019). Based on the results of this evaluation, discussions can be held with the Archaeological Advisor to LCC and appropriate mitigation captured in a future revision of the detailed WSI or a receptor specific WSI.
- 3.7.6 A range of receptors of potential archaeological interest have been identified within the area of Singleton Park (**168, 179, 181, 184**). These receptors are of an unknown nature and significance. It is proposed that the phased approach, as detailed in ES Chapter 7: Cultural Heritage (document reference TR010035/APP/6.7 - Rev 1) should still stand. Based on other receptors successfully evaluated, these receptors in Singleton Park may be of geological origin. The evaluation should take the form of the advanced archaeological project design (Arcadis, 2019; OAN, 2019). Should remains of archaeological interest and significance be identified, discussions can be held with the archaeological advisor to LCC and appropriate mitigation captured in a future revision of this document or the detailed WSI.
- 3.7.7 The potential for archaeological remains to be present within the bird mitigation area, located behind properties off the A585 Mains Lane and south of the River Wyre, remains unassessed. Since the advanced archaeological project design (Arcadis, 2019) was prepared, the location of the bird mitigation scrapes have changed. A zone for the location of the scrapes has been agreed (Figure 1). Two trial trenches will be excavated in this area to assess the archaeological potential. This is consistent with the advanced archaeological project design (Arcadis, 2019); just the locations of the trenches have slightly changed.

3.7.8 Additional work may be required to mitigate impact from the scrapes, dependent on trenching results, and the overall size of each scrape. It is anticipated this will be an archaeological watching brief, if required.

3.8 Mitigation Summary

3.8.1 Table 2 provides a summary of mitigation proposed for receptors as part of the Scheme.

Table 2: Summary of archaeological mitigation proposed for the Scheme.

Project ID	Name	Proposed Mitigation
LB8	Grade II Icehouse at Singleton Hall	Design
12	Skippool Mill	Staged Evaluation
38, 104, 132, 135	Cluster of built heritage assets in Singleton Park	Design
40	Main Dyke	Archaeological Watching Brief
62	Field boundaries south of Garstang Road	Archaeological Watching Brief
65, 66, 67, 68, 69, 70, 71	Clay Pits	Archaeological Watching Brief
139	Potential remains associated with the Ribchester to Poulton-le-Fylde Roman Road	Archaeological Watching Brief
151	Singleton Park	Design
159	Flint Scatter potentially associated with peat activity (196)	Strip Map and Sample
160	Derelict structure identified during walkover survey	Level 2 Building Recording followed by Archaeological Watching Brief
166	Former quarry pit south west of Shard Road	Archaeological Watching Brief
167	Covered Viaduct	Archaeological Watching Brief
169	Former clay pits identified through walkover survey	Archaeological Watching Brief
168, 179, 181, 184	Earthwork Platform and range of receptors identified through LiDAR analysis, located within Singleton Park	Staged Evaluation
186	Quarry scoop located south of Mains Lane	Archaeological Watching Brief
191	A former pond in Singleton Park	Archaeological Watching Brief
196	Peat deposits and buried surfaces with associated Prehistoric activity- identified through Geoarchaeological Assessment and Evaluation	Detailed Investigation to include appropriate environmental sampling and artefactual retrieving

Project ID	Name	Proposed Mitigation
198	Milestone identified On 1911 OS map	Design and record with relocation
N/A	Potential impact from scrapes in bird mitigation area	Staged Evaluation
N/A	Potential impact from Temporary Construction Compound north of the A586	Archaeological Watching Brief

- 3.8.2 It is acknowledged that draft mitigation strategy has been compiled based on the current understanding of the archaeological resource. This includes the compilation of the evidence presented in a range of documents (listed in 1.1.5 of this document) and including the interim report in Appendix A. The interim results of the evaluation (Appendix A) represent the current best understanding through intrusive archaeological evaluation. However, there is the potential for this understanding to change as detailed assessment of the evaluation material is studied. Any changes in this understanding shall be reported to the Archaeological Advisor to LCC. Should alterations to the mitigation strategy be required, this will be consulted with the archaeological advisor to LCC and written in a detailed WSI.

4 PRELIMINARY WRITTEN SCHEME OF INVESTIGATION

4.1.1 The following provides a preliminary understanding of how the archaeological mitigation will be carried out, to discharge the Requirement 9 within the DCO. A detailed methodology for each phase of archaeological mitigation will be written by the Scheme's appointed archaeological contractor.

4.1.2 This will take the form of a WSI and will be consulted with the Archaeological Advisor to LCC prior to the commencement of works. The WSI shall respond to the areas of archaeological mitigation set out in this document.

4.2 Programme

4.2.1 The archaeological mitigation works would be conducted by an archaeological contractor, under the instruction of the Scheme's main works contractor. Consequently, the programme of works will be influenced by the overall schedule and resourcing, put in place by the Scheme's contractor. Other programme variations may be felt due to ecological constraints; particularly any works in the bird mitigation area.

4.2.2 Prior to the commencement of work within the Scheme, the archaeological contractor will provide Highways England and the Archaeological Advisor to LCC, a programme of site works. This will detail the proposed start date on site and the proposed duration of time the archaeological contractor intends to be on site.

4.2.3 Any programme, as set out by the Scheme's contractor and or the archaeological contractor, will allow sufficient time for the archaeological excavations, as mitigation, to take place prior to the commencement of construction activity; including any enabling works that are planned.

4.3 Monitoring

4.3.1 All archaeological works will be monitored by an archaeologist appointed by Highways England and the archaeological advisor to LCC. Historic England's North West scientific advisor may also wish to monitor aspects of the archaeological mitigation works due to the sensitive geoarchaeological remains located within the Scheme. Advance notice of the commencement of any excavations will be given to all aforementioned parties.

4.3.2 The monitoring archaeologists will have free access to the site, and all records to ensure that the work being carried out is in accordance with later versions of this WSI and all relevant standards.

4.3.3 The frequency of monitoring visits thereafter will depend upon how much archaeology is being found and the specific requirements of the monitoring archaeologists.

4.4 Open Area Excavation

4.4.1 The process of open area archaeological excavation has the following aims and objectives:

- To establish the character and complexity and significance of any remains by sample excavation
- To attempt to establish the date of the deposits encountered through recovery of artefacts and where appropriate through absolute dating techniques
- To establish the environmental significance of deposits with evidence of potential by targeted environmental sampling, processing and assessment

- To place any archaeological discoveries into the local and, where appropriate, regional/national context and to assess the implications of any such discoveries for our current understanding of the Scheme

- 4.4.2 The open area excavation areas will be laid out based on the layout given in this mitigation strategy (Figure 1), and any variations will be recorded by GPS and transferred to a digital plan of the site. A shapefile of the trench layout, as displayed on Figure 1, will be provided to the Archaeological Contractor.
- 4.4.3 Each area will be excavated by machine using a toothless bucket under close archaeological supervision, down to the top of the first archaeological horizon, or failing that, to the surface of the underlying geology. Spits will be no more than 100mm thick. The spoil and the exposed surface will be scanned for finds by eye and, if deemed appropriate, using a metal detector. When excavating the topsoil will be excavated first and stored in designated topsoil storage areas. Subsoil will be stored separately, also within a designated spoil storage area. When backfilling (if required) the subsoil will be returned to the area first followed by the topsoil.
- 4.4.4 Careful stripping of areas by machine under archaeological supervision should leave a surface that can be planned and photographed without the need for further hand-cleaning. Any areas left obscured or unclear after machine-stripping will be hand cleaned before being photographed and planned.
- 4.4.5 The revealed surface will be inspected for archaeological features, and where necessary cleaned by hand before being photographed and planned. A period of time shall be left, prior to excavation of any features, to allow for weathering and potential identification of additional archaeological features this may bring.
- 4.4.6 Discrete deposits will generally be excavated by hand, unless otherwise agreed with the Archaeological Advisor to LCC and the monitoring archaeologists working on behalf of Highways England. Should thick, sterile or well-dated recent deposits be encountered, these may be sampled by hand-excavation but further excavated by machine under archaeological supervision.
- 4.4.7 The final sampling strategy will be agreed following a monitoring visit from the Archaeological Advisor to LCC. The following percentages are provided as a guide and will be applied unless there is clear evidence that a change in sampling strategy is required to characterise the archaeological resource. All structural features or those relating to a specialised activity will be subject to 100% sample. All post and stake holes that relate to specialised activities will be subject to a 100% sample. Others will be subject to a 50% sample. A 50% sample of all pits will be undertaken. Up to 10% or 10 metres, whichever is greater, of all linear features will be sampled.
- 4.4.8 Appropriate samples will be taken for scientific dating. Radiocarbon dating will be considered in the first instance. Alternative techniques will be discussed where appropriate. Dateable features will be sampled for environmental analysis.
- 4.4.9 All excavation and recording of archaeological features will be undertaken in accordance with the general principles, outlined in guidance (CIFAa).

4.5 **Strip Map and Sample**

- 4.5.1 The process of Strip Map and Sample has the following aims and objectives:
- To determine the existence or absence of archaeological remains, and where these exist

- To establish the character and complexity and significance of any remains by sample excavation
- To attempt to establish the date of the deposits encountered through recovery of artefacts and where appropriate through absolute dating techniques
- To establish the environmental significance of deposits with evidence of potential by targeted environmental sampling, processing and assessment
- To place any archaeological discoveries into the local and, where appropriate, regional/national context, and to assess the implications of any such discoveries for our current understanding of the development of the area

4.5.2 The excavation of the Strip Map and Sample areas will be set out based upon the layout given in this mitigation strategy (Figure 1), and any variations will be recorded by GPS and transferred to a digital plan of the site. A shapefile of the trench layout will be provided to the Archaeological Contractor.

4.5.3 Trenches will be excavated by machine using a toothless bucket under close archaeological supervision, down to the top of the first archaeological horizon, or if absent, to the surface of the underlying geology. Spits will be no more than 100mm thick. The spoil and the exposed surface will be scanned for finds by eye and, if deemed appropriate, using a metal detector. When excavating the trenches, the topsoil will be excavated first and stored within the designated topsoil storage area. Subsoil will be stored separately, also within a designated spoil storage area. When backfilling the trenches (if required) the subsoil will be returned to the trench first, followed by the topsoil.

4.5.4 Careful stripping of areas by machine under archaeological supervision should leave a surface that can be planned and photographed without the need for further hand-cleaning. Any areas left obscured or unclear after machine-stripping will be hand-cleaned before photographing and planning.

4.5.5 The revealed surface will be inspected for archaeological features, and where necessary cleaned by hand before being photographed and planned. A period of time shall be left, prior to excavation of any features, to allow for weathering and potential identification of additional archaeological features this may bring.

4.5.6 Discrete deposits will generally be excavated by hand and the monitoring archaeologists, working on behalf of Highways England. Should thick sterile or well-dated recent deposits be encountered, these may be sampled by hand-excavation but further excavated by machine under archaeological supervision. Discrete features will be excavated according to the following strategy; 100% of all stake-holes; 50% of every post-holes, unless part of a building when they will be 100% sampled; 50% sample of each pit with a diameter up to 1.5m (this should include a complete section across the pit to recover its full profile). A minimum of 10% of linear features will be hand-excavated, or a minimum of 1m length if this is larger. In this case of enclosure ditches and field boundary ditches up to 5m in length the sample will be increased to 20%. All junctions or 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. All funerary contexts, all buildings, and all industrial features will be subject to 100% excavation.

4.5.7 If colluvial deposits are revealed within a trench and it is believed there is potential for

paleoenvironmental remains to be present the archaeological contractor will excavate a sondage within the colluvium to test for any such remains. Following the excavation of the sondage the colluvium may be removed by machine unless specifically requested otherwise by the monitoring archaeologists.

- 4.5.8 All excavations and recording of archaeological features will be undertaken in accordance with the general principles outlined in guidance (CIFA, 2014a).
- 4.5.9 Appropriate samples will be taken for carbon scientific dating. Radiocarbon dating will be considered in the first instance. Alternative techniques will be discussed where appropriate. Multiple samples may require absolute dating to inform interpretation of sequences of deposits. Dateable features will be sampled for environmental analysis.
- 4.5.10 Following completion of the site work a post-excavation assessment report will be produced in line with the general principles outlined in section 4.6 of this document.

4.6 **Archaeological Watching Brief**

- 4.6.1 The archaeological supervision of the stripping of top and subsoils as part of the Scheme's construction has the following aims and objectives:

- To determine the existence or absence of archaeological remains, and where these exist
- To establish the character and complexity and significance of any remains by sample excavation
- To attempt to establish the date of the deposits encountered through recovery of artefacts and through absolute dating techniques
- To establish the environmental significance of deposits with evidence of potential by targeted environmental sampling, processing and assessment
- To place any archaeological discoveries into the local and, where appropriate, regional/national context, and to assess the implications of any such discoveries for our current understanding of the development of the area

- 4.6.2 All areas subject to archaeological watching brief will be stripped of topsoil under appropriate archaeological supervision. The spoil and the exposed surface will be scanned for finds by eye, if deemed appropriate, using metal detector.
- 4.6.3 The revealed surface will be inspected for archaeological features, and where necessary cleaned by hand before being photographed and planned. Where possible, archaeological features will be excavated and recorded upon identification and construction activity allowed to continue.
- 4.6.4 If significant concentrations of archaeological features are identified, then it may be necessary to halt construction activity and demarcate an area for archaeological investigation. In these cases, the excavation of the features should proceed promptly, and the area handed back for construction activity as soon as possible.
- 4.6.5 Discrete deposits will generally be excavated by hand and the monitoring archaeologists, on behalf of Highways England. Should thick sterile or well-dated recent deposits be encountered, these may be sampled by hand-excavation but further excavated by machine under archaeological supervision. Discrete features will be half-excavated by hand, unless particularly large, when an alternative strategy may be agreed with the Archaeological Advisor to LCC. A minimum of 10% of any linear

features will be hand-excavated, or a minimum of 1m length if this is larger.

- 4.6.6 All excavation and recording of archaeological features will be undertaken in accordance with the general principles outlined in guidance (CIFA, 2014b).

4.7 **Building Recording**

- 4.7.1 A detailed methodology for the recording of historic buildings will be written by a specialist buildings archaeologist, ahead of any recording survey.
- 4.7.2 The aims and objectives of the building recording is to preserve by record a built heritage asset prior to its demolition or alteration as part of construction works.
- 4.7.3 The building recording will provide a methodology which meets the Level 2 descriptive record survey level, as defined by Historic England guidance (2016).
- 4.7.4 The Level 2 survey will consist three elements of a drawn record, written record and photography. These records will be of both the interior and exterior and produce an analysis of its development and use.

4.8 **Reporting, Publication and Archiving**

- 4.8.1 Upon completion of the archaeological mitigation for the Scheme, an archive will be assembled in line with guidance published by CIFA (2014c) and all other relevant guidance; which should include the emerging CIFA archives selection tool kit.
- 4.8.2 In addition to the site records, artefacts, ecofacts and other samples residues, the archive shall contain all the data collected during the excavations, including records, finds and environmental samples. It will be quantified, ordered, indexed and internally consistent. Adequate resources will be provided during fieldwork to ensure that all records are checked and internally consistent.
- 4.8.3 A process of archive consolidation will be undertaken immediately following the conclusion of the fieldwork and in preparation of recording. This will include the checking and cross-referencing of site records as well as all finds and samples being washed, conserved, packaged and catalogued as relevant.
- 4.8.4 The integrity of the primary field record will be preserved. Security copies will be maintained where appropriate.
- 4.8.5 Provision will be made for the deposition of the archive, artefacts and environmental material, an index and copies for all reports, subject to the permission of the relevant landowner (and if no further archaeological work is to be initiated), in the appropriate recipient museum. The museum will be advised by the archaeological contractor of the timetable of the proposed investigation prior to excavation commencing and a site code applied for before site works commence. Provisions will be made for the stable storage of paper records and their long-term storage.
- 4.8.6 Prior to the commencement of any works associated with the archaeological mitigation of the Scheme. the appointed archaeological contractor shall make contract with an appropriate Museum and Galleries Commission registered organisation to discuss a proposed approach to the archiving of material which may be potentially be recovered from the mitigation works.
- 4.8.7 A report will be prepared within an agreed timescale following the completion of on-site archaeological investigations.
- 4.8.8 The report will be supported by an overall plan of the site, accurately identifying the

location of all areas of excavation, as excavated and detailed plans of areas of excavation containing features.

- 4.8.9 The report will outline the archaeological significance of the deposits identified and provide an interpretation of the relates in relation to other sites in the vicinity.
- 4.8.10 A draft copy of the report will be supplied (paper and/or digital as preferred) to the recipients to the Archaeological Advisor to LCC and Highways England to enable suggestions and/or comments to be made. This draft will be submitted within 12 months of the completion of fieldwork, unless specialist reports are awaited. In the latter case, a revised date should be agreed.
- 4.8.11 Following the submission of a draft version of the report, and the receipt of any comments from the above parties, a final report will be produced.
- 4.8.12 It is possible that the excavation findings will warrant wider dissemination through formal publication in an appropriate archaeological journal.
- 4.8.13 A period of 6 weeks after the return of this draft report will be provided to allow any changes to be made before a final report is produced. The results of the archaeological mitigation works will also be entered on to the Online Access to Index of Archaeological Investigations (OASIS) project. The overall aim of the OASIS project is to provide an online index to the mass of archaeological grey literature that has been produced as a result of the advent of large-scale developer funded fieldwork. The archaeological contractor will therefore initiate an OASIS form immediately before fieldwork commences and complete this once the project is finished. It will include a .pdf version of the final report. A copy of the OASIS form will be included in the final report.
- 4.8.14 The final report of the Scheme's archaeological mitigation work will also be deposited with Lancashire Historic Environment Record Office.

4.9 **Health and Safety**

- 4.9.1 All fieldwork associated with the programme of archaeological mitigation of the Scheme will be subject to a site-specific Risk Assessment Method Statement (RAMS) in accordance with the contractor's own health and safety procedures and risk assessments. This will be produced by the archaeological contractor to the commencement of work.
- 4.9.2 As a minimum, the RAMS will:
- Detail the work activities, tasks and steps that will be undertaken during the archaeological mitigation works
 - Identify all hazards and foreseeable causes of harm that may be associated with the archaeological mitigation works
 - Identify who or what might be harmed and how
 - Assess the risks associated with the hazards
 - Detail how risks will be controlled/mitigated
 - Detail how Health and Safety will be managed and monitored throughout this element of the Scheme
- 4.9.3 The RAMS will also detail the archaeological contractor's scope of work, programme,

staff responsibilities, welfare provision, PPE, equipment and tools, safe method of working, environmental protection measures, work-specific emergency procedures and hazard and near miss reporting procedures.

- 4.9.4 All staff working on site will undertake a safety induction and will read and sign RAMS prior to starting work on site.
- 4.9.5 Prior to commencement of fieldwork the archaeological contractor will liaise with Highways England or their agents to determine if nearby services need to be considered and for the routes of any such services or pipelines to be pegged out on the ground.
- 4.9.6 Prior to the excavation of any areas for archaeological mitigation, the archaeological contractor will use a CAT scanner across the proposed area of excavation to check for any live cables that may be present below the ground. If any such cables are identified, measures will be put in place to ensure the archaeological mitigation works do not interfere with the cables and all site personal maintain a safe distance from the live cable.

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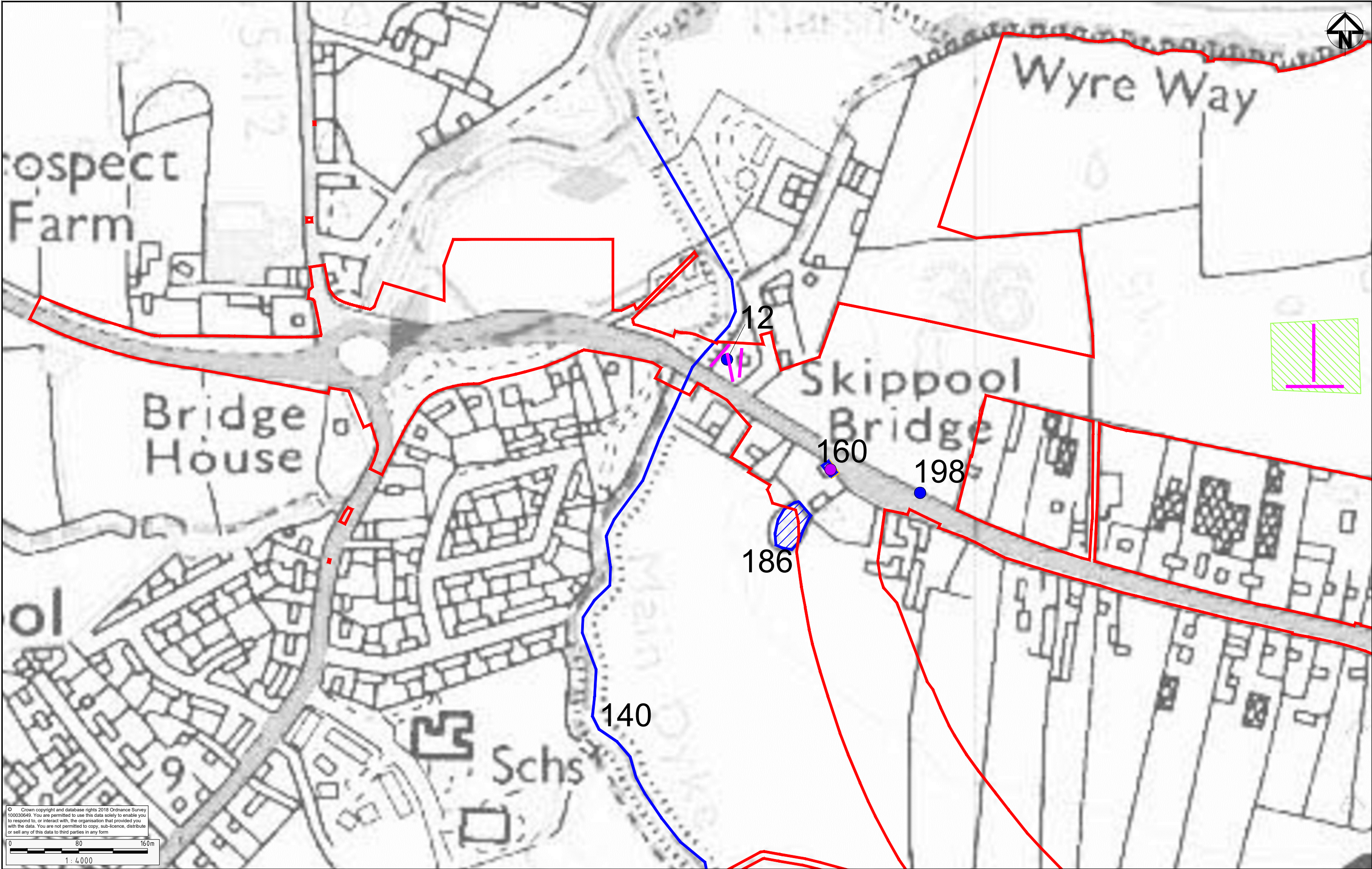
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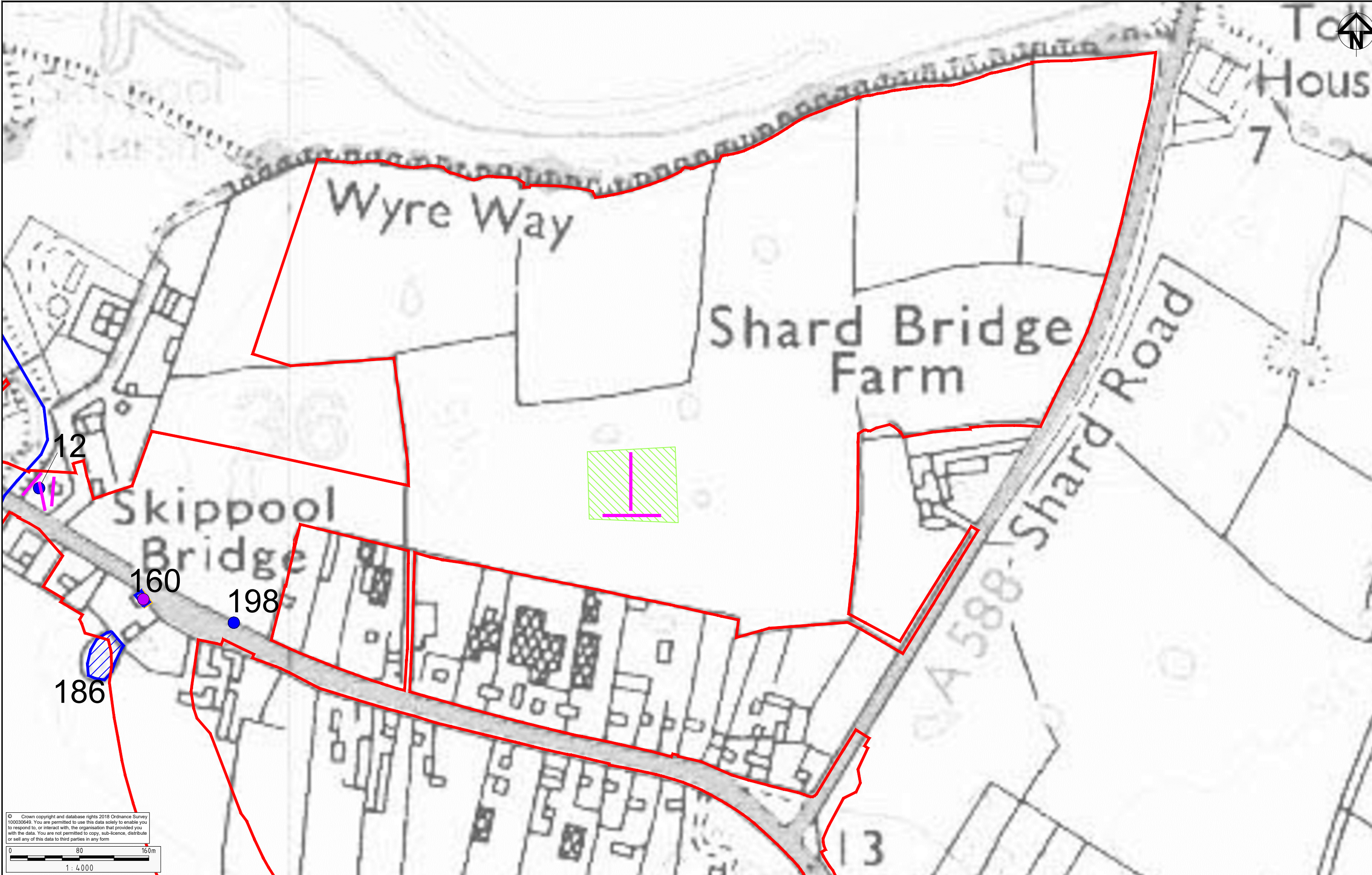
Figure 1: Proposed areas of archaeological mitigation and receptor locations



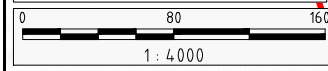
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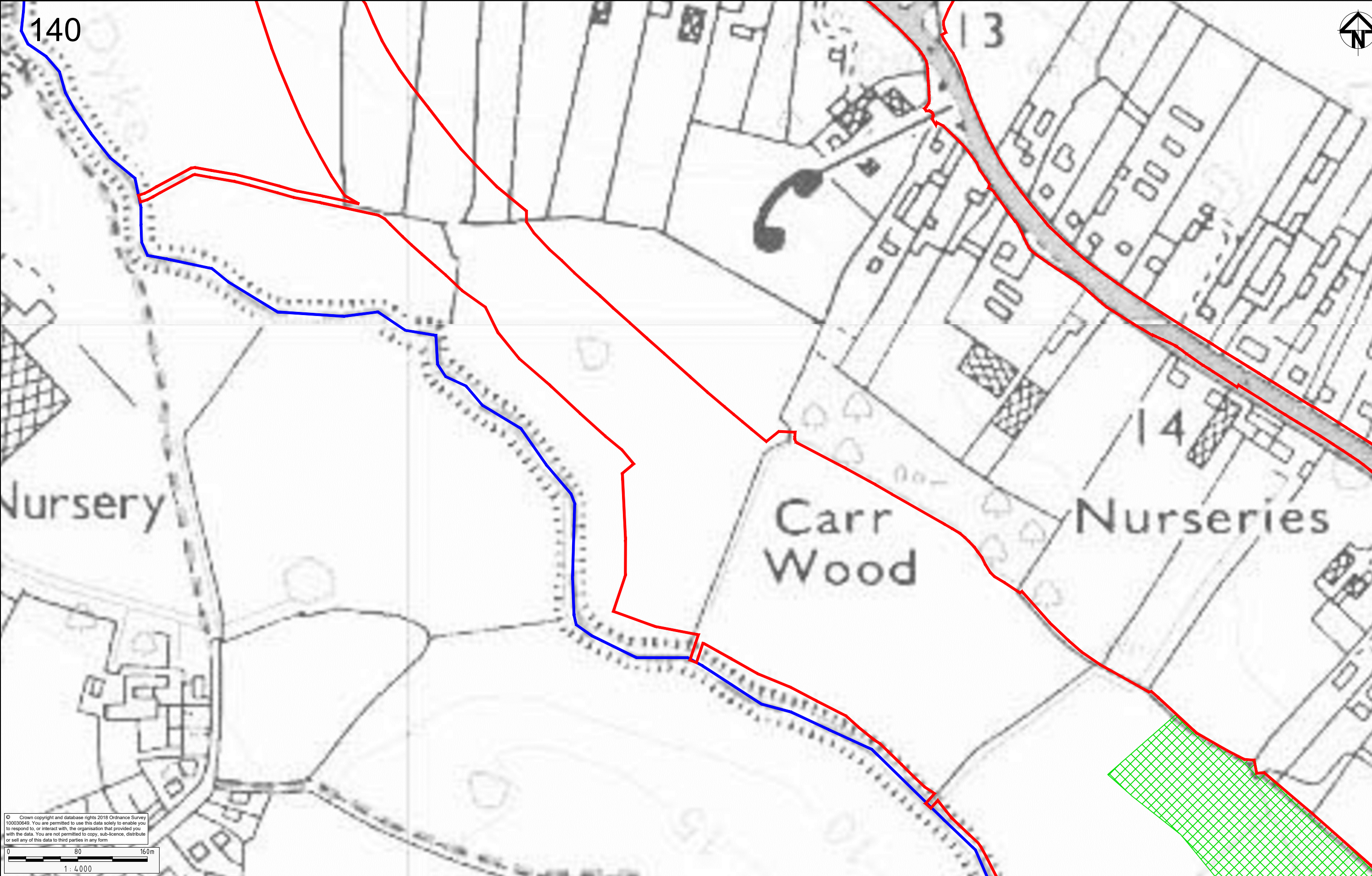
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Legend

- Draft Order Limits
- Additional Evaluation Trenches
- Listed Building
- Level 2 Building Recording
- Archaeological Watching Brief
- Bird Mitigation Scrapes Zone

- Geoarchaeological Mitigation Areas
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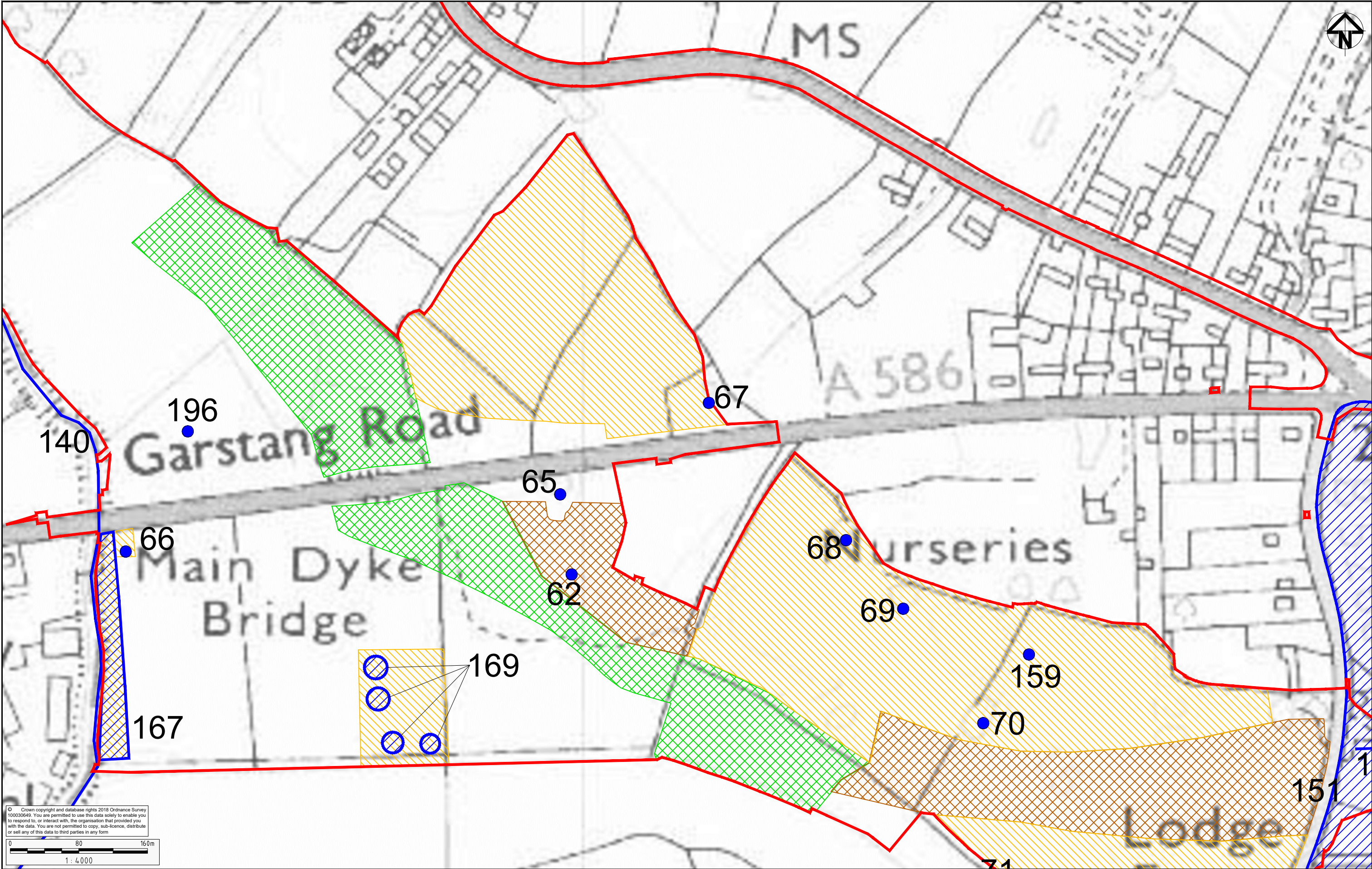
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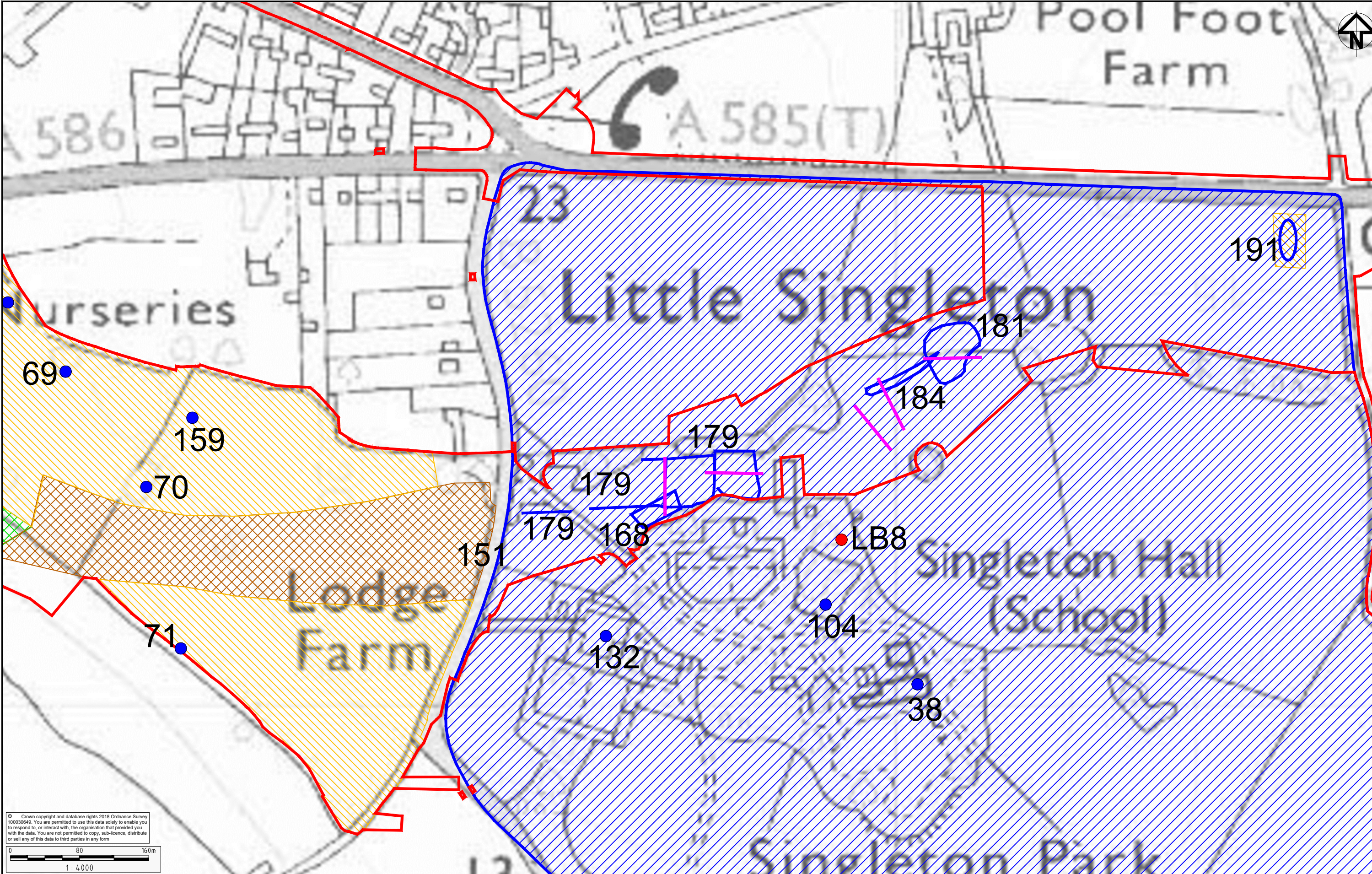
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							 Bird Mitigation Scrapes Zone						PINS No.			TR010035			FIGURE 1											
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Appendix A: Preliminary Evaluation Report

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Interim Report 1: A585 Windy Harbour to Skippool Improvement Scheme Archaeological Evaluation

September 2019

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Interim Report 1: A585 Windy Harbour to Skippool Improvement Scheme Archaeological Evaluation

Written by Fraser Brown

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Summary

This document is the first interim report on the results of an archaeological evaluation undertaken by Oxford Archaeology North (OA North) along the route of the A585 Windy Harbour to Skippool Improvement Scheme. The Scheme is located on the western edge of the town of Skippool, approximately 4.20 kilometres inland from the west Lancashire coastline at Bispham, Blackpool. The evaluation comprises various phases of work, as set out in the Written Scheme of Investigation (WSI; OA North April 2019). This report focuses on work undertaken in the central part of the Scheme, in July and August. This comprised a geophysical survey, undertaken to characterize the subsurface geological sediments, to a depth of 6m, and a programme of trenching, trial pitting and borehole drilling, to confirm the results of the survey and to determine the archaeological potential for this part of the Scheme.

The work is still ongoing at the time of writing, so all interpretations are preliminary and will require confirmation by assessment/analysis. There have, however, been some significant prehistoric discoveries in parts of the evaluated area, which have the potential to be of regional significance (at least). The remains include *in-situ* materials and artefacts, some of which are diagnostic of an early Neolithic date (*c* 3800-3600 cal BC), although earlier Mesolithic and later Neolithic activity could also be present. The archaeological remains are associated with waterlogged organic deposits that appear rich in palaeoenvironmental materials and which have the potential to preserve organic cultural structures and artefacts. Detailed design information was not available, but construction work associated with the Scheme could potentially impact both directly and indirectly on the archaeology. In other trenches, outside of the central area, several archaeological features of probable later date have also been identified.

1 INTRODUCTION

1.1 Scope of work

- 1.1.1 An archaeological evaluation is being undertaken by Oxford Archaeology North (OA North) along the route of the A585 Windy Harbour to Skippool Improvement Scheme. The Scheme is located on the western edge of the town of Skippool, approximately 4.20 kilometres inland from the west Lancashire coastline at Bispham, Blackpool (Fig 1). The evaluation comprises various phases of work, as set out in the Written Scheme of Investigation (WSI; OA North April 2019). This report focuses on work undertaken in the central part of the Scheme, in July and August. This comprised a geophysical survey, undertaken to characterize the subsurface geological sediments, to a depth of 6m, and a programme of trenching, trial pitting and borehole drilling, to confirm the results of the survey and to determine the archaeological potential for this part of the Scheme.

1.2 Preliminary Results

- 1.2.1 **Geophysical Survey:** a geophysical survey (Electro-magnetic (EM) Ground Conductivity Survey) was undertaken over the central part of the site, by the Bartlett Clark Consultancy (subcontracted to OA North; Fig 2). This area had been identified as being potentially geoarchaeologically significant (OA North 2018) and the survey was successful in helping to confirm this, defining several zones of potential archaeological significance, including a probable palaeochannel, flowing south-east/north-west, towards the north-eastern edge of the route corridor, and a possible island within this, in the north-west of the surveyed area.
- 1.2.2 The survey provided a means of identifying the margins between what would have formerly been wetlands and drier ground. These kinds of environments tend to attract prehistoric activity and are, as such, of potential archaeological significance. On this basis, and in consultation with Lancaster County Council's Archaeological Advisor (LCCAA) and Historic England (HE), several of the proposed evaluation trenches, those that were not already targeted on 'heritage receptors' (OA North April 2019), were relocated to sample the wetland margins and to profile potential palaeochannels.

1.3 Trial Trenching and Test Pitting

- 1.3.1 **Geological Stratigraphy:** generally, the stratigraphic sequence of sediments across the site conformed to what had been predicted by the geoarchaeological desk-based assessment (OA North 2018; Fig 3). Within Valley 2 (*ibid*), the sequence over much of the draft order limits (everywhere west of the north-eastern channel) comprised topsoil over shallow deposits of peat, which sealed alluvium and tidal-flat deposits (Fig 4; Plates 1 and 2). The peat in this sequence may not be of any great antiquity.
- 1.3.2 The north-eastern channel (*Section 1.2.1*) was filled with peat that, where sampled (over a 900m stretch), was shown to extend in a north-west/south-east a ribbon, approximately 80m wide. This graded upslope, to the north-east, into, first, a complex

sequence of sands and silty sediments (buried soils), and then glacial tills under topsoil.

1.3.3 In the southern part of the draft order limits in this part of the Scheme (south of Garstang Road), the situation was different. Within Valley 3 (*ibid*; Fig 3) the topsoil overlay a shallow deposit of silty yellow-brown alluvium, which sealed deep deposits of peat (up to 3m). These then appeared to seal tidal-flat deposits (Fig 4; Plates 3 and 4).

1.3.4 **Trench Additions and Relocations:** in accordance with the WSI (OA North April 2019), trenches were excavated at predetermined positions across the central area, and others were moved to target geological features identified by the geophysical survey (Fig 2). The relocated trenches comprised:

- Trench 24: this was moved to the north-east and reoriented on the same axis as the adjacent channel, to run along the suspected transition between wetland and drier land;
- Trench 23: this was reoriented to extend laterally across the north-eastern channel;
- Trench 17: this was reoriented to extend laterally across another suspected channel at the south-western edge of the site.

1.3.5 Various additional trenches were also sited, following consultation with LLCAA and HE, to help determine the extent of any archaeological activity and those geological deposits that had the greatest archaeological potential (Figs 2-6):

- Trench 51: this like Trench 24, but further to the north-west, was positioned adjacent to the north-eastern channel, to run along the suspected transition between wetland and drier land;
- Trench 52: this was placed laterally across the north-eastern channel, north-west of Trench 23;
- Trench 53: this was positioned to extend, at a perpendicular, north-eastwards from Trench 24, to characterize the upslope transition from waterlogged peats to a buried soil and then glacial till;
- Trench 54: this was placed across an area of lower ground on the wetland margins, adjacent to a modern-day spring;
- Trench 55: this was placed across an indistinct ridge to the north of Trench 58;
- Trench 56: this aimed to detect any southwards extension of the archaeological activity in Trench 24;
- Trench 57: this was located to characterize the north-eastern channel in the southern part of the site and to determine the western extent of the deep peats sampled in Trench 33;

- Trench 58: this T-shaped trench was positioned on a notable salient, perched above the deepest peats in Trench 33, which had the appearance of having been levelled to form a platform;
- Trenches 59 and 60: these were placed across a geophysical anomaly thought to indicate a sandier island within the north-eastern channel.

1.3.6 An array of 25 test pits (some mechanically excavated, others excavated mechanically and then by hand) was also placed around the trenches to help further define and sample the potentially significant deposits and the archaeological activity (Figs 5 and 6). The majority of these were sited to the north-east of Trenches 24 and 51, to try to determine the extent of the archaeological activity and the transition from wetter, peaty deposits to drier deposits of silt, sand and glacial till. Other test pits, such as 10, 11 and 12, were placed to determine the westwards extent of the peat associated with the north-eastern channel. Test pits 23 and 21 were positioned to trace the extent of the peats between Trenches 32, 58 and 33.

1.4 Archaeological Evidence

- 1.4.1 The excavations along the wetland/dryland margins, north of Garstang Road, identified deposits of a rich organic waterlogged peat, in places over 1m deep, that were associated with palaeochannels or which had formed over deeper former channels (Fig 5). The peat extended over for an 80m-wide band, before transitioning, upslope to the north-east, to sands and silts (buried soils) that had not been permanently waterlogged (these extending for another 20m from the peats; Fig 4). In the west, the peat became shallower eventually dwindling out. This probably indicated that it had been truncated by tidal or fluvial action across the more active floodplain.
- 1.4.2 The peats on the dryland/wetland margins contain large pieces of preserved wood (Plate 5), and other organic materials, such as hazelnuts and smaller twigs with bark. The deposits have not been sieved and assessed yet, but it is anticipated that they will contain rich assemblages of waterlogged plant remains and probably insects too. A cursory on-site visual examination of these materials suggests that they include tree species, such as hazel and oak, indicative of the woodland edge.
- 1.4.3 Charcoal was relatively ubiquitous in the deposits excavated within a c230m-long area between Trenches 24 and 51, and which could potentially extend further to both the north and the south. At times this charcoal occurred in relatively dense concentrations within the silts and sands (buried soils) and also within the peats. This included large chunks of wood charcoal. The overall impression is of a general zone of human activity where fires were set along the wetland margins. This could relate to environmental management practices, such as reed burning, but the denser concentrations of charcoal, and the fact that wood charcoal was present, might instead (or additionally) suggest denser concentrations of more intensive activity – possibly camps, settlements *etc.*
- 1.4.4 In addition to the charcoal, various archaeological finds were recovered from many of the trenches and test pits distributed all along this zone. The artefacts occurred in the buried soils but were also observed at depths of 0.60m in the peats. This could indicate

a contemporary land surface extending down from the higher, drier land into the boggy wetland margins.

- 1.4.5 The finds largely comprised worked lithic materials (flint, chert and coarser stones), but also included a piece of worked rock crystal, several sherds of pottery and, possibly, a piece of unburnt bone (Plates 6 and 8). These occurred in low concentrations, retrieved as individual finds from the excavated test pits and trenches. It is notoriously difficult to identify and retrieve such finds at evaluation (Historic England 2019), and they can be difficult to discern amongst the peats. As such, those retrieved are likely to be just the tip of the iceberg in terms of what is actually there; sieving of the artefact samples might help elucidate this. The flaked cherts and flints included blades, but no definite tools. Many of the coarser stones evidenced very crude and *ad hoc* working and would not necessarily have been identified as tools except for their association with more definitely worked materials and because they seemed out of place in the deposits in which they occurred.
- 1.4.6 There was a particular concentration of finds in Trench 24 and also in Test Pits 5, 6 and 13, which probably denote activity foci (Fig 5). The finds from Trench 24 included two flakes of Langdale tuff (probably Group VI; Plate 6), occurring 0.60m down in the peat, only 100mm apart from each other (Plate 7). One of these showed clear signs of polish and they were both probably struck from a polished stone axe, perhaps when this was reshaped or used as a core for the manufacture of other tools. Approximately 1m from the axe flakes, at a similar level in the peat, was a large flat stone, probably also a kind of tuff. This had been split along a natural bedding plane in the rock. The underside was unworn, but the upper surface bore longitudinal striations and generally had the appearance of having been worn by rubbing/grinding. It is possible that this is a *polissoir* for polishing axes. No other such stones occurred more generally in this deposit and, being of large size, it seemed very out of place in the peats.
- 1.4.7 A similar large stone, also split along a bedding plane, was retrieved from the buried soil in Test Pit 5 (Plates 9 and 10). The underside of the stone was unworn in contrast to the upper surface, which was concave, and it might also have been used as a *polissoir* or a quern or suchlike. In the adjacent Test Pit 6, approximately 5m further downslope towards the peats, other finds were retrieved from the charcoal-rich buried soils (Plate 11). These included several flaked flints (narrow blades amongst these; Plate 6) and stones, three sherds of pottery, a possible 500mm fragment of bone, and burnt hazelnuts. In Test Pit 13, 14m further to the north, the charcoal mottles were particularly dense in the sands below the buried soils, and sherds of pottery occurred at the same level (Plate 12). These included one sherd of coarse material and another rim sherd of a much finer material. The latter was in a similar sandy fabric with fine white burnt flint as the sherds from Test Pit 6, but the everted rim had been burnished on the exterior (Plate 8). Based on the diagnostic characteristics of the pottery, and its association with flint blades, this is tentatively identified as Carinated Bowl (Sheridan 2007).
- 1.4.8 On the south side of Garstang Road, another concentration of worked chert and flint occurred in Trench 58 (Fig 6). This T-Shaped trench sampled a raised area, perched above Valley 3 (OA North 2018). It had a flattened top, suggestive of truncation by

ploughing or otherwise. Under the topsoil, the trench revealed a layer of redeposited material c0.8m thick, sealing a grey silty buried soil that spread down the flanks of the slope, grading into peats at its southern foot (Plate 13). Four worked pieces of a similar, grey chert were retrieved from the peats at the southern end of the 'T'. More worked flints were associated with a wide, shallow bowl-shaped feature caught in the westernmost arm of the 'T', which also contained a layer of charcoal (Plate 13).

- 1.4.9 Trench 33, to the south of Trench 58, contained deposits of peat 3m thick, sealed by a yellow-brown alluvium (c0.20m thick), below topsoil (Plates 3 and 4). At a depth of 1m in the peat, there was a layer of dense wood. There was no evidence of human activity, in terms of charcoal or artefacts, although the peat still has the potential to contained archaeology, especially in light of the nearby activity in Trench 58. The peat was also detected in Trenches 32 and 34, where a similar potential exists. In Trench 31, there were deposits of peat up to 2.5m in depth, but these were separated by a layer of alluvium/tidal-flat deposits approximately 1m thick (Plate 15). These peats in Valley 3 have the potential to represent a different, freshwater, ecotone to the tidal environment of Valley 2. This, however, will need to be confirmed via offsite analysis.
- 1.4.10 Elsewhere on the scheme, archaeological features have been detected in the form of undated ditches in Trench 55 and also in Trenches 35-7. These do not feature on the historic mapping and might instead relate to enclosures and agricultural activity concentrated on the south-west-facing slopes of the valley sides in later prehistory or, indeed, later periods. In the area of Trenches 1-3, the trenches encountered deep deposits of made ground and dumped post-medieval refuse.

1.5 Environmental Sampling and Geoarchaeological Coring

- 1.5.1 A peat core has been retrieved from Trench 33 using a Russian auger, which sampled the peats and the transition into the tidal-flat deposits below them (Plate 4). Monoliths sampled the full peat sequence in Trench 24 (Plate 7). These samples should all be suitable for pollen and sediment analysis. Various other monolith and bulk samples were taken from significant positions across the site, including Trench 58 and Test Pit 6, where cultural evidence for human activity was detected. When processed offsite, these will potentially enable the assessment of the artefact, insect, pollen and waterlogged and charred plant remains assemblages contained within them.
- 1.5.2 An array of approximately 40 boreholes has been set out across the central part of the site (Fig 4). These cores are currently being collected and the drillers are presently attaining depths of approximately 6m, which should be sufficient to characterize the full depth of the Holocene sedimentary sequence. The borehole transects extend across Valley 2 in a variety of locations north of Garstang road, and across Valley 2 and into Valley 3, south of Garstang Road. Closely spaced transects have been targeted on the deposits in the immediate vicinity of Trench 24 and also the sand island sampled by Trenches 59 and 60.
- 1.5.3 Both the palaeoenvironmental samples and the geoarchaeological samples should have the potential to provide organic material for C14 dating purposes. The geoarchaeological samples should also retrieve sediments suitable for OSL dating.

1.6 Discussion and Significance

- 1.6.1 The evaluation is still on going, so the results of the fieldwork must be considered as being preliminary, it will only be possible to provide more concrete and in-depth conclusions once assessment/analysis of the stratigraphy and assemblages retrieved by the evaluation has taken place. It is also the case, for certain areas of the Scheme, that the extent of the geological deposits has had to be extrapolated from a few data points – this is especially so for the buried soils south of Garstang Road – so some caution should be employed in using these extrapolations. Even so, it is clear that the landscape covered by the central part of the scheme has significant potential for prehistoric archaeology. This confirms the initial recommendations of the geoarchaeological DBA (OA North 2018) and the *Advanced Archaeological Works Project Design* (Highways England March 2019). The geoarchaeological geophysical survey has provided a baseline characterization of the subsurface deposits that has been confirmed and enhanced by the trenching and test pitting. Further confirmation of the nature of the deeper stratigraphy should be provided by the borehole survey.
- 1.6.2 North of Garstang Road, the areas of greatest archaeological potential are those where peats (c1m maximum depth) and buried soils (sands and silts) have been found preserved, surviving in a ribbon along the north-eastern edge of the Valley 2 floodplain, on the wetland/dryland margins (Fig 5). The peats probably blanket a palaeochannel there, being preserved because the valley margins have been subjected to less tidal/fluviat erosion. Other peat deposits (c 3m maximum depth) and buried soils, both of high archaeological potential, survive in Valley 3, south of Garstang Road.
- 1.6.3 Significantly, widespread evidence for burning and distributions of artefacts (flaked lithics and pottery) indicate that extensive prehistoric activity appears to have been focused on these wetland/dryland margins. Within this, there are denser concentrations of finds and charcoal. The presence of pottery and the fact that axe polishing and reduction seem to have taken place, could indicate intensive use of the landscape – potentially settlement. Apart from a possible pit, surviving in section in Trench 58, no cut features were confidently identified, but this is probably explained by the extremely limited extent of the excavations made through the deposits sealing the buried land surfaces, and open area excavation could very well reveal well-preserved features at this lower level.
- 1.6.4 The waterlogged nature of the deposits and the good organic preservation means that there is also potential for finding preserved organic cultural materials and wooden structures (*cf* Kate's Pad (late Neolithic trackway) Middleton *et al* 1995, 60-5). It also means that rich palaeoenvironmental assemblages survive in direct association with the archaeology, which have the potential to inform on the local and wider environment. The possibility (raised by the probable bone fragment) that faunal remains might also survive is highly significant, as prehistoric bone assemblages are particularly rare in the North West. The presence of Carinated Bowl pottery and the bladeliike nature of the lithic assemblages, suggests a late Mesolithic to early Neolithic date for the activity (the transition between these two periods in the North West being around 3800-3600 cal BC; Griffiths 2011). Transitional sites are extremely rare in the North West, and nationally (Brennand 2007), which enhances the significance and

research potential of the archaeological remains. Furthermore, the well preserved and stratified nature of the archaeology, and the fact that it is associated with waterlogged organic materials provides ideal conditions for developing an accurate radiocarbon chronology for the site (*ibid*).

1.7 Recommendations

1.7.1 As the evaluation is still in progress and no assessment of the assemblages has yet taken place, all recommendations must remain tentative and provisional at this stage. There is also presently only limited information available regarding the Scheme design and proposed development impacts, so it is also difficult to be specific. The following observations are proffered, however:

- The fieldwork has been successful in retrieving palaeoenvironmental and cultural materials that, if assessed/analyzed in their stratigraphic context (as specified in the WSI; OA North 2019), should yield valuable information that will inform an archaeological mitigation strategy for the Scheme and has research potential in its own right.
- With the proviso that the boreholes may yet return information on the deeper stratigraphy that might alter this interpretation, it is possible to define zones of higher- and lower-potential archaeological significance within the central part of the Scheme. Broadly speaking, the peats and the buried soils on the slopes of Valleys 2 and 3 (Fig 4) have the greatest archaeological potential. Unless archaeologically sensitive deposits survive at greater depth than the evaluation trenches, the area of alluvium and tidal-flat deposits in Valley 2 have lesser overall potential (although they can still provide valuable baseline information).
- The depths at which the sensitive geological archaeological deposits occur at are also relevant. Depending on the design specifics, low-level interventions in the areas of any deeply buried archaeology may have no, or only minimal, impact. For example, the deep peats in parts of Valley 3 have the potential to seal or contain archaeology, but minimal impacts there may have negligible effects. Conversely, in the areas where the peats and buried soils occur at shallow depths, such as the north-eastern edges of Valley 2 (*eg* Trenches 24 to 51 and test pits 1-20 and 22, 24 and 25) and the upslope parts of Valley 3 (*eg* Trench 58), any archaeology of a similar nature to that detected would be much more vulnerable to even minor impacts.
- It is not only direct impacts that could have an adverse effect on the integrity, and future survival, of the archaeological remains. Given the nature of the waterlogged deposits and the excellent levels of organic preservation in the prevailing anaerobic conditions, the indirect impacts of construction also need to be considered. For example, the compaction of the sediments by building up or by engineering practices such as surcharging could destroy any archaeology they contain. Likewise, surcharging and subsurface interventions such as piling *etc* or balancing ponds, could affect the hydrology of the site,

leading to desiccation of the deposits and the destruction of sensitive organic materials (archaeological and palaeoenvironmental).

- Depending upon the design specifics, it might be possible to mitigate the adverse impacts of the Scheme by a well-considered programme of appropriate archaeological excavation and research.

1.8 References

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1.9 Images



Plate 1: Topsoil over a thin layer of peat, sealing alluvium and tidal-flat deposits



Plate 2: Topsoil over a thin layer of peat, sealing laminated alluvial and tidal-flat deposits (2m scale)



Plate 3: Trench 33: topsoil over a thin layer of alluvium, sealing peat deposits (200mm scale)

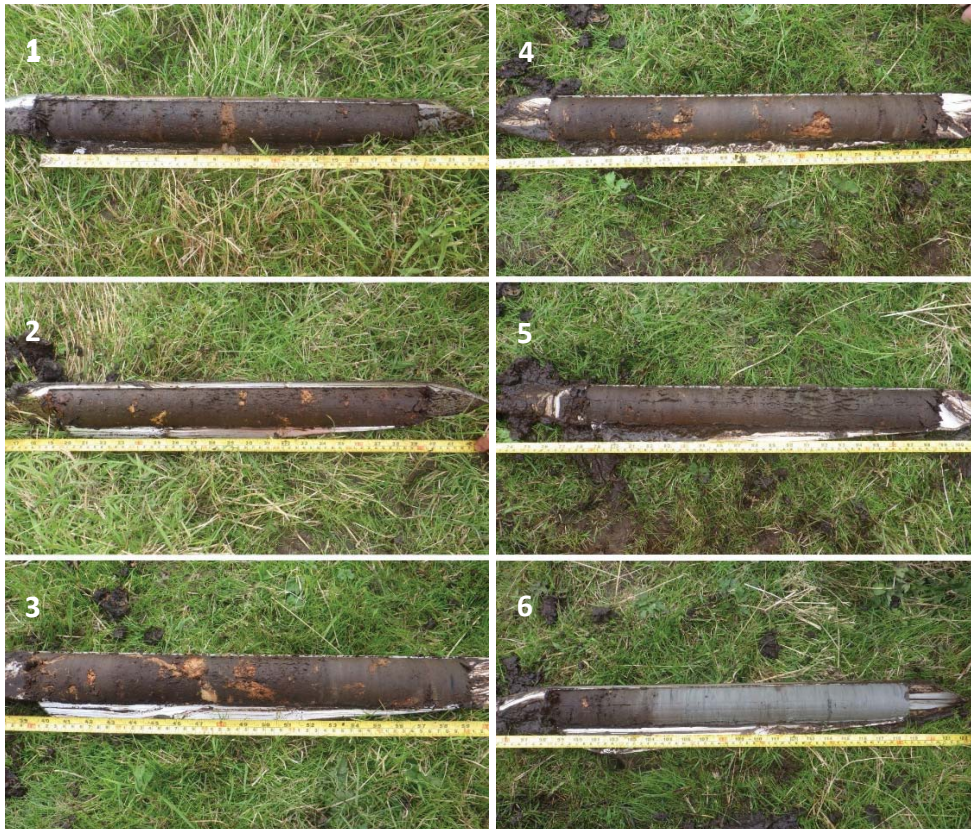


Plate 4: Trench 33: 200mm cores of peat (1-6) sealing tidal-flat deposits (6)



Plate 5: Examples of the larger pieces of wood retrieved from the peats (1m scale)



Plate 6: Flaked lithics: three flint blades (Test Pit 5; top left) and a chert flake (Trench 24; top centre); two Langdale tuff axe reduction flakes (Trench 24; right); rock crystal (Trench 24; bottom left)



Plate 7: Peat in Trench 24 (scale 0.5m); the axe reduction flakes were from 0.6m below ground, 0.5m to the right of the monoliths



Plate 8: Carinated Bowl rim sherd from Test Pit 6



Plate 9: Test Pit 5: sands sealing silts – both buried soils (possible *polissoir* has been removed, from just below point of 2m scale)



Plate 10: Possible *polissoir* retrieved from the silty buried soils in Test Pit 5



Plate 11: Monolith samples (0.5m) placed through the sand and charcoal-rich silts (both buried soils) in Test Pit 5



Plate 12: Test Pit 13: charcoal-rich buried soils revealed in test pit (left, 1m scale); pottery *in-situ* within charcoal rich layer (right, 100mm scale)



Plate 13: Trench 58: test pit excavated in the peats at the foot of the raised area, grey silty buried soils visible under redeposited material, with orange glacial till at top of slope (looking north; 1m scale)



Plate 14: Trench 58 (western arm): shallow, concave feature with charcoal rich fills (1m scale)



Plate 15: Trench 31: peat layers separated by a layer of alluvial/tidal-flat deposits

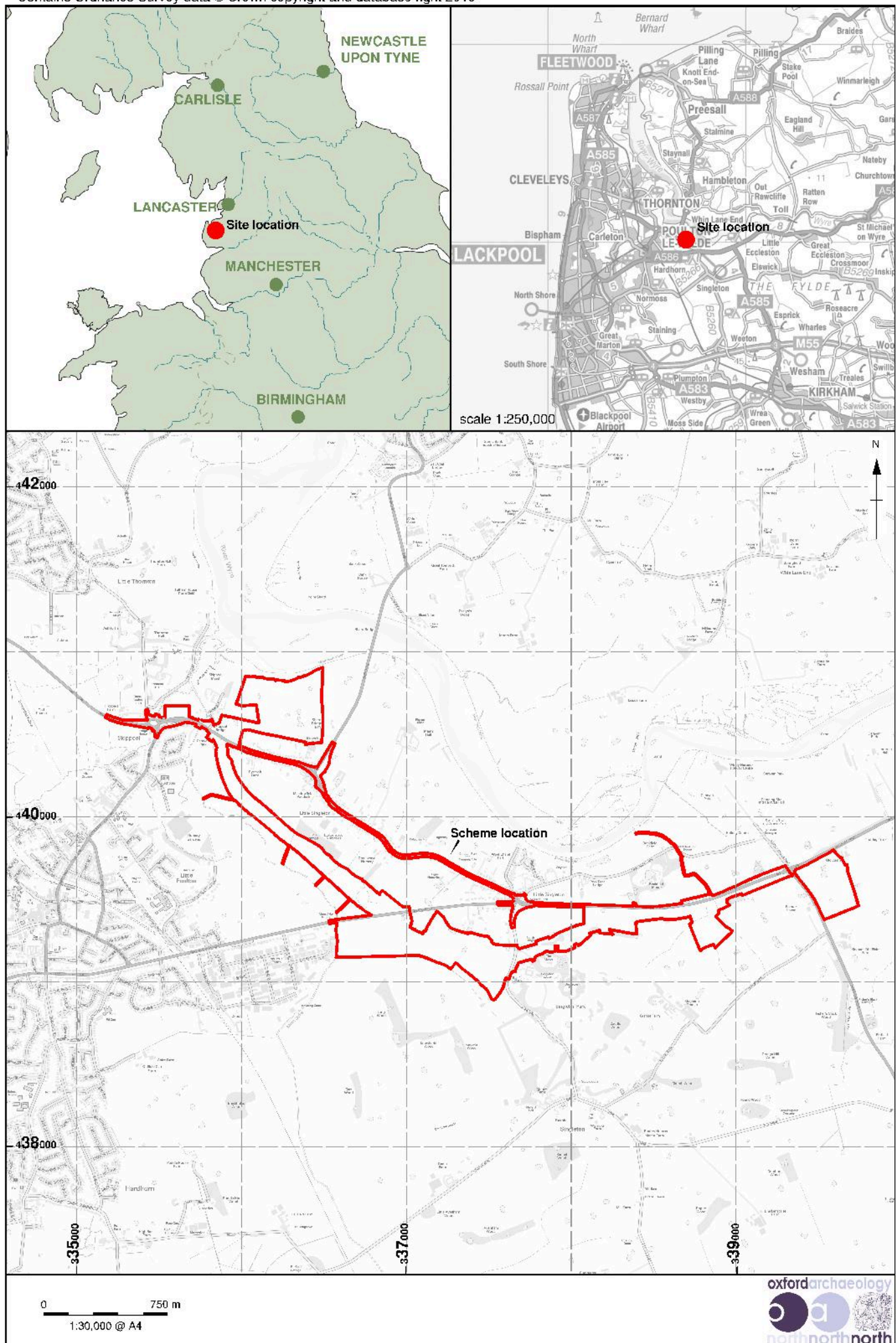


Figure 1: Site location

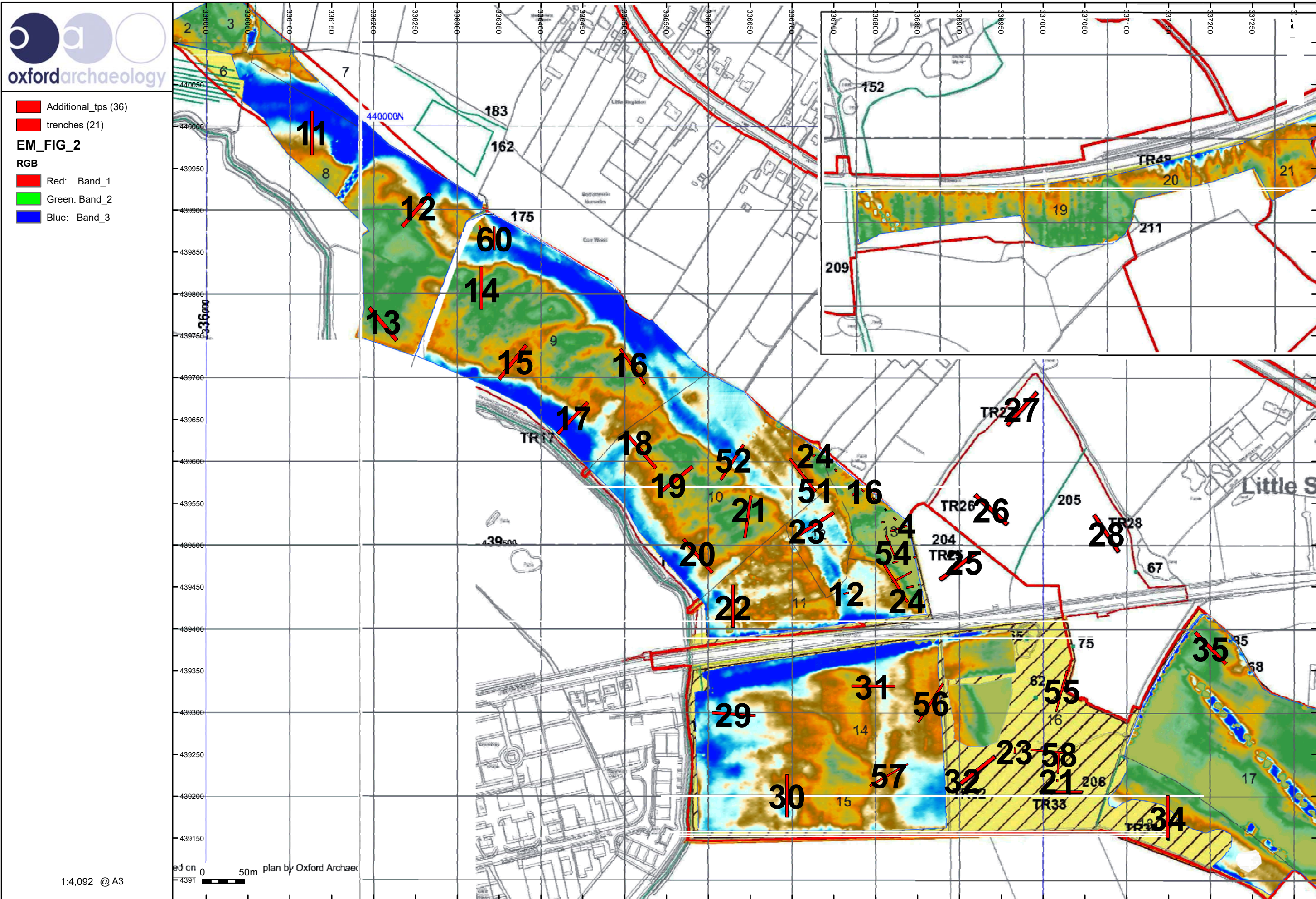


Figure 2: Geophysical survey (EM), trenches and test pits in the central part of the Scheme

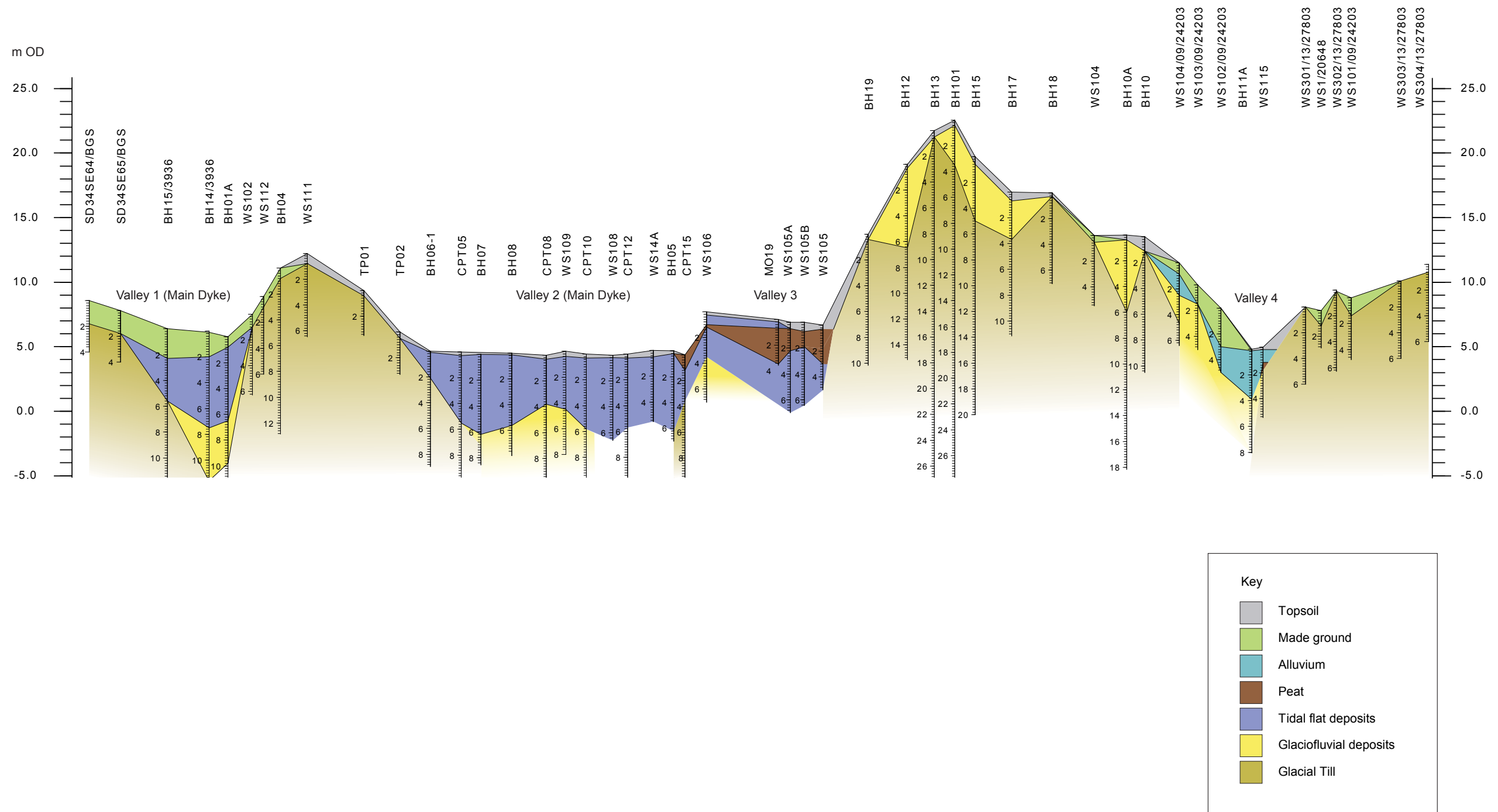
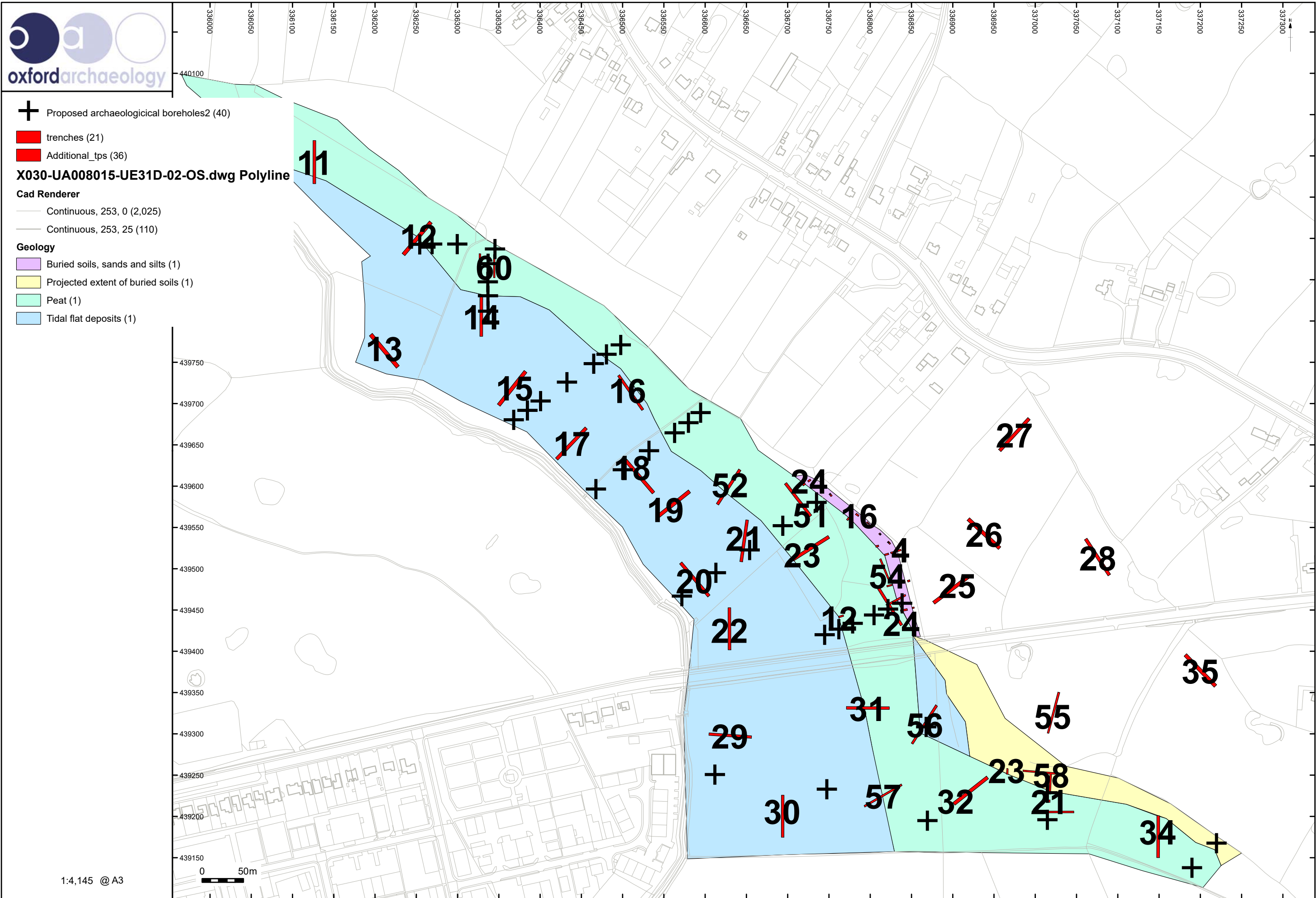
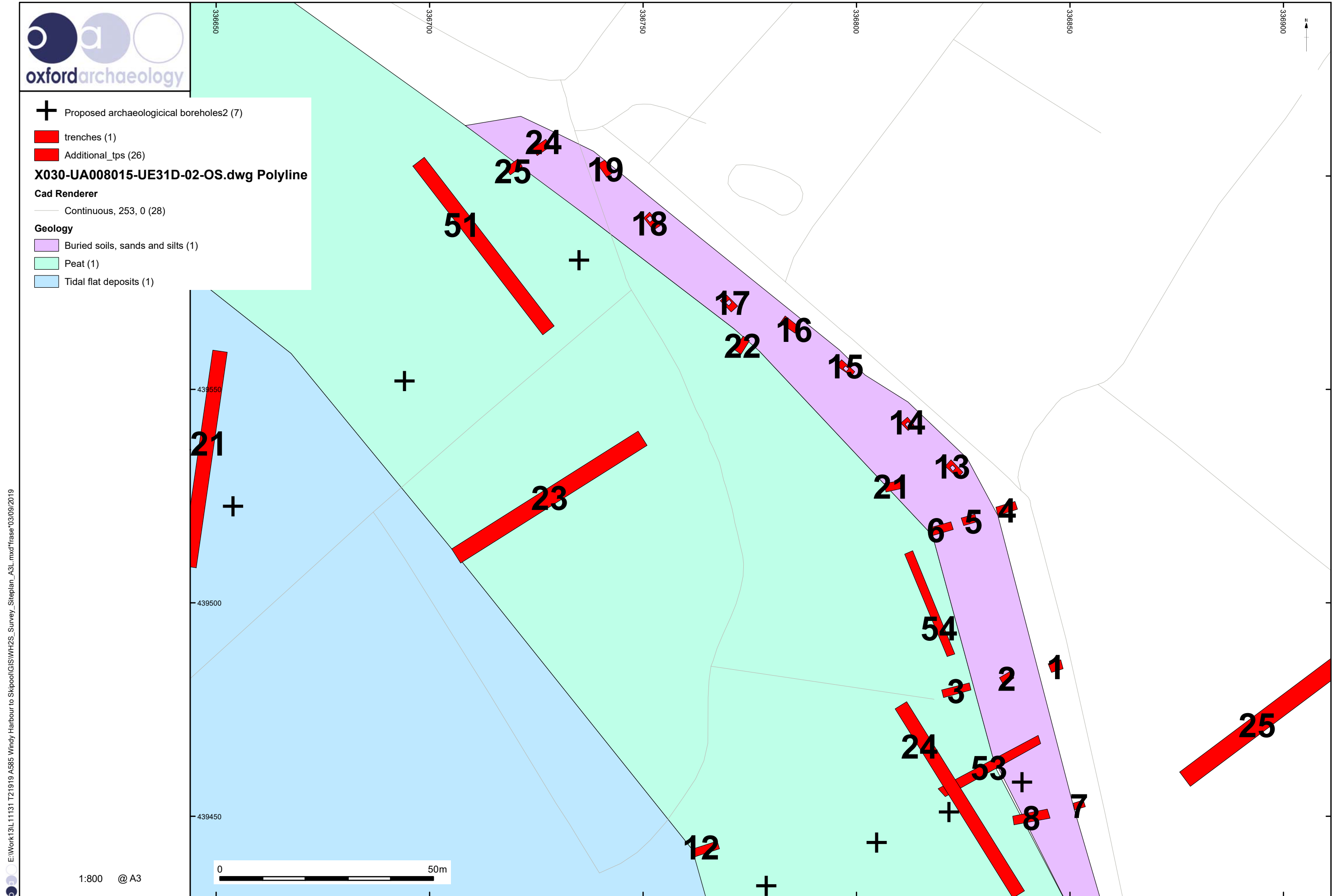
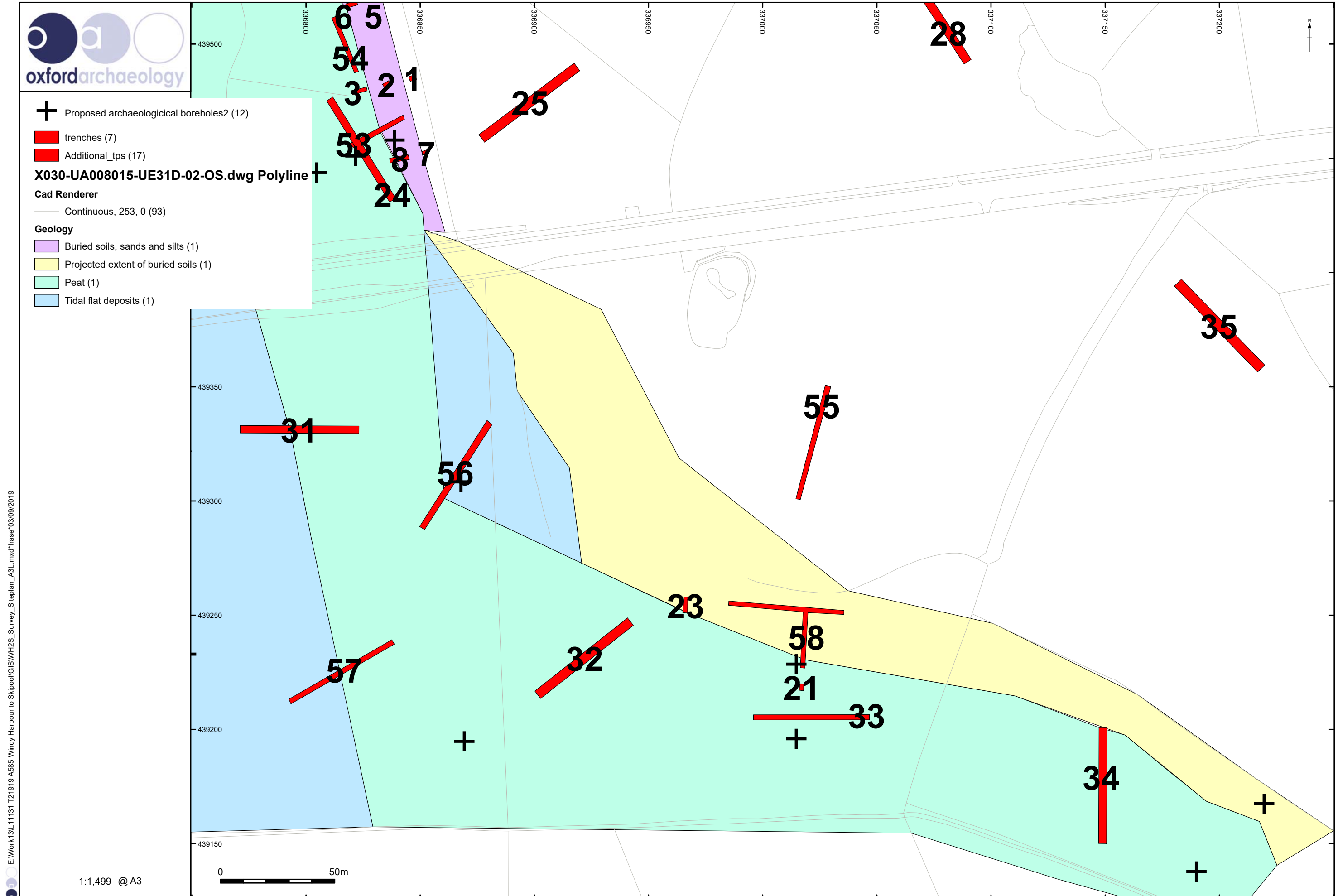


Figure 3: Stratigraphic transect







E:\Work\13\11131 T21919 A585 Windy Harbour to Skipool\GIS\WH2S_Survey_Siteplan_A3L.mxd*frase*03/09/2019



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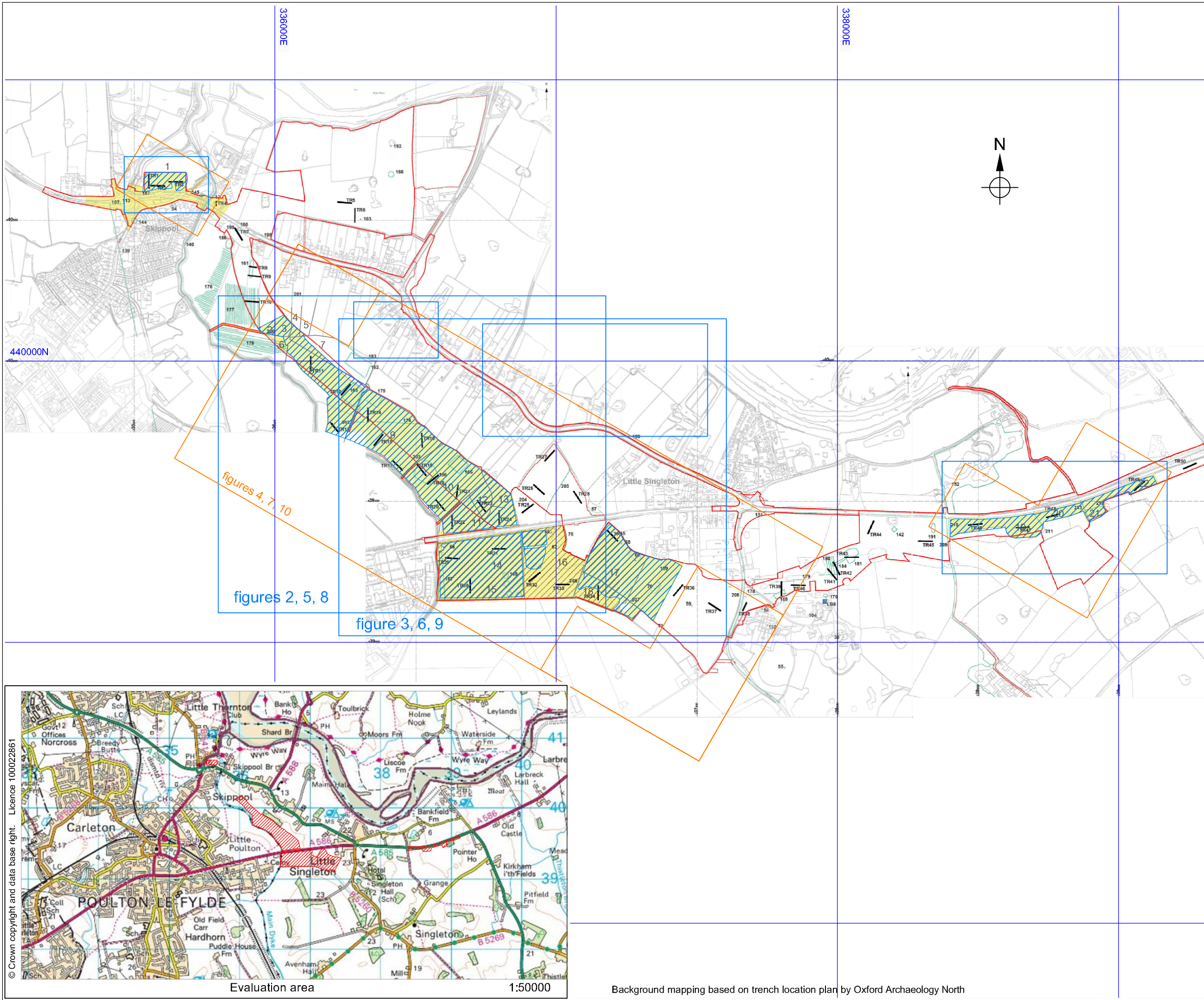
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Appendix B: Geoarchaeological Geophysical Results

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Legend

survey coverage

location of 1:4000 scale data plots (figures 2-3, 5-6, 8-9)

location of 1:6250 data plots (figures 4, 7, 10)

archaeological evaluation area shaded in yellow

1 - 22 field numbers

0 500m
Scale 1:12500 @ A3

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Windy Harbour to Skippool, Lancashire

Electromagnetic Conductivity Survey 2019

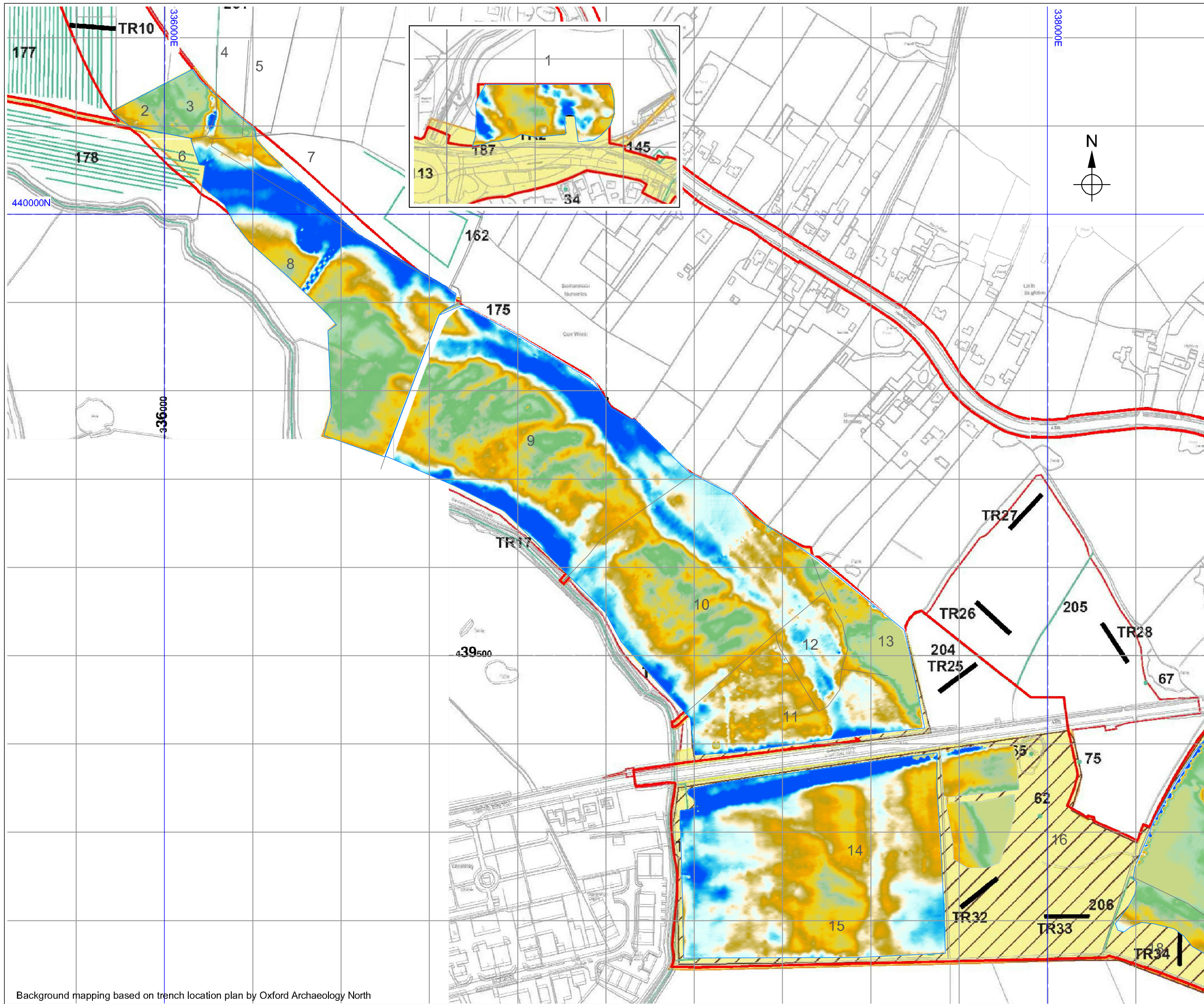
Drawing title

Figure 1

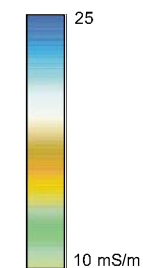
Location of evaluation area and survey

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Background mapping based on trench location plan by Oxford Archaeology North



Legend



EM display range:

mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations

(c. 10 to 80 mS/m for field 1
c.10 to 25 mS/m for fields 2+)

archaeological evaluation area
shaded in yellow

1 - 22 field numbers

0 200m
Scale 1:4000 @ A3

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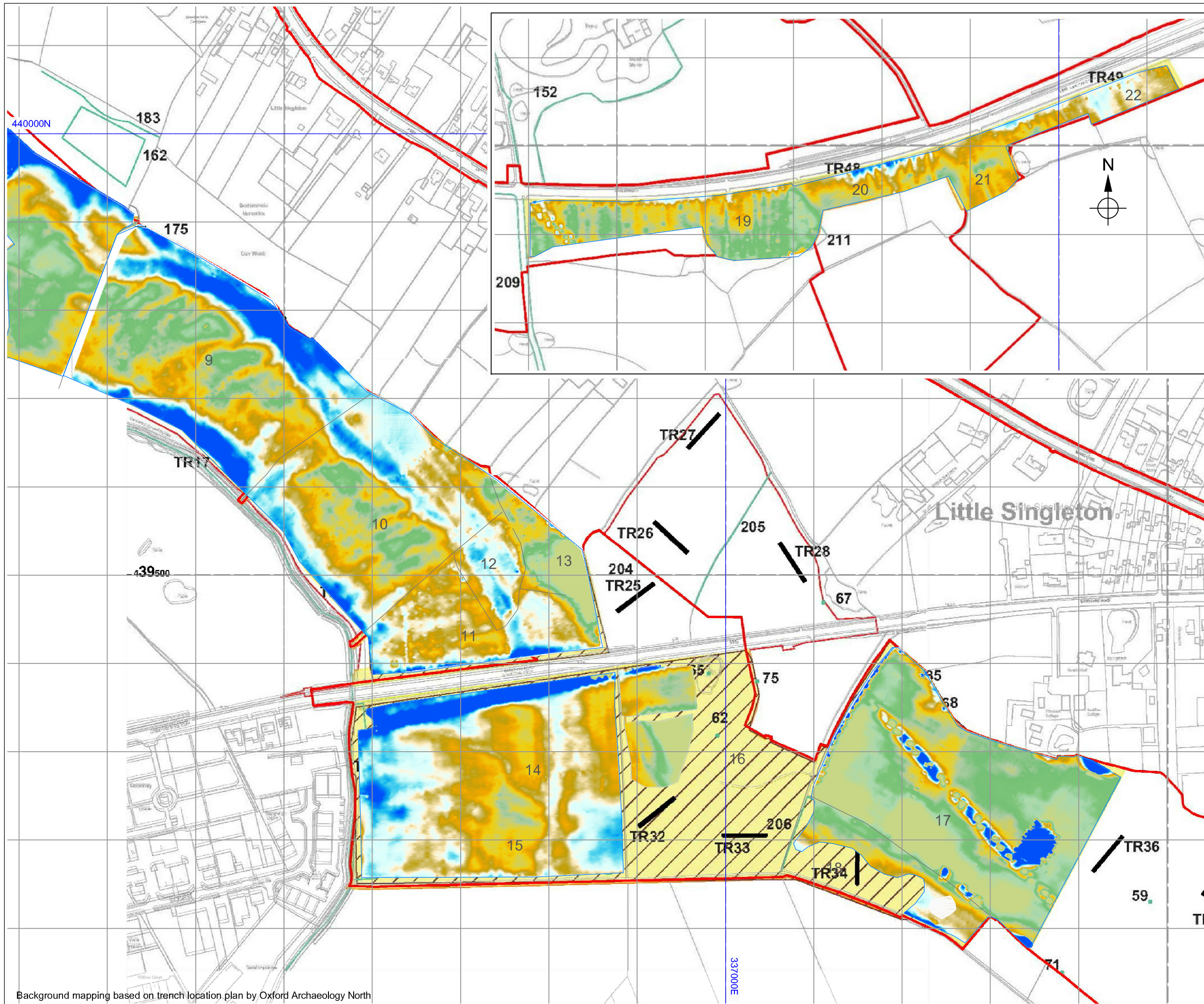
Electromagnetic Conductivity
Survey 2019

Drawing title

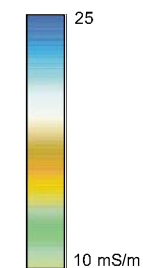
Figure 2

Apparent conductivity
(dipole 2: c. 4m depth)

1/2



Legend



EM display range:

mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations

(c. 10 to 80 mS/m for field 1
c.10 to 25 mS/m for fields 2+)

archaeological evaluation area
shaded in yellow

1 - 22 field numbers

0 200m
Scale 1:4000 @ A3

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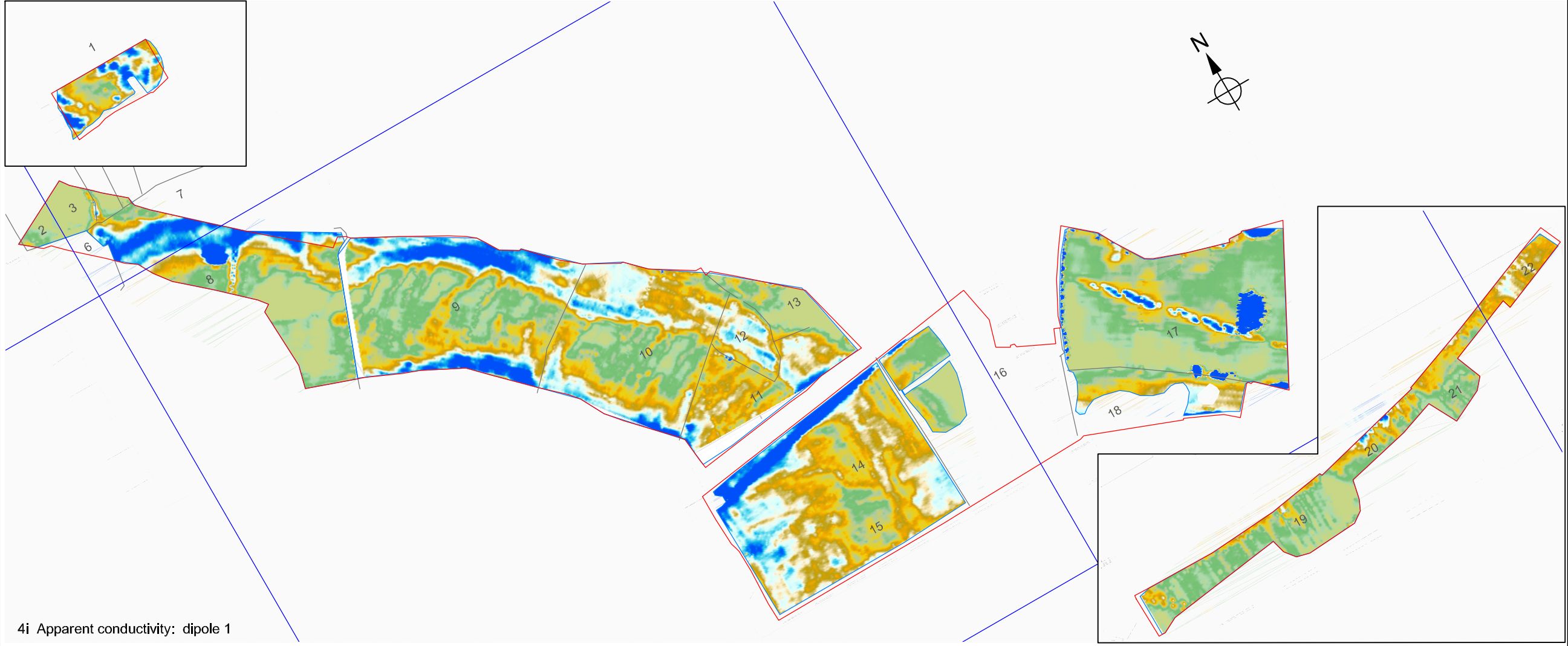
Electromagnetic Conductivity
Survey 2019

Drawing title

Figure 3

Apparent conductivity
(dipole 2: c. 4m depth)

2/2



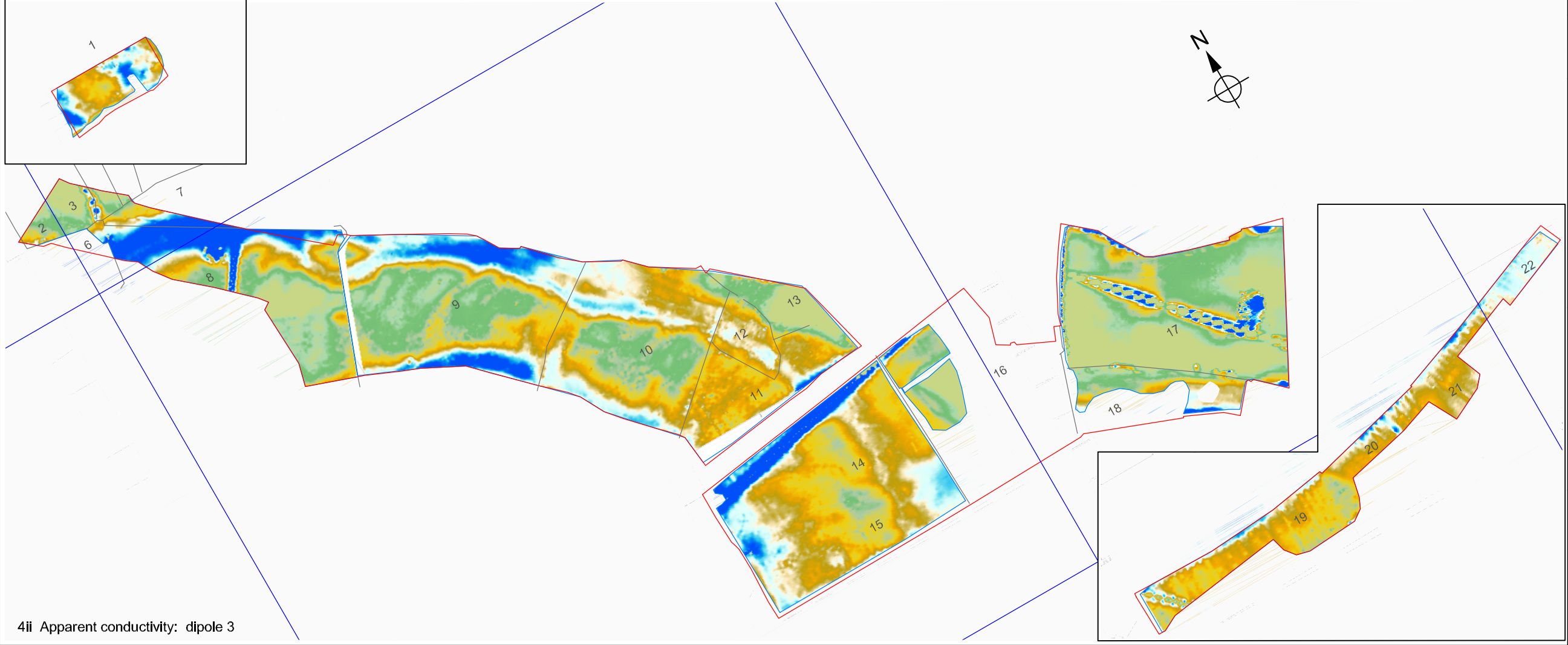
Legend

18 or 40
8 or 15
mS/m

EM display range:
mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations
(c.8 to 18 mS/m for dipole 1
c. 15 to 40 mS/m for dipole 3)

archaeological evaluation area
shaded in yellow

1 - 22 field numbers



0 250m
1:6250 @ A3

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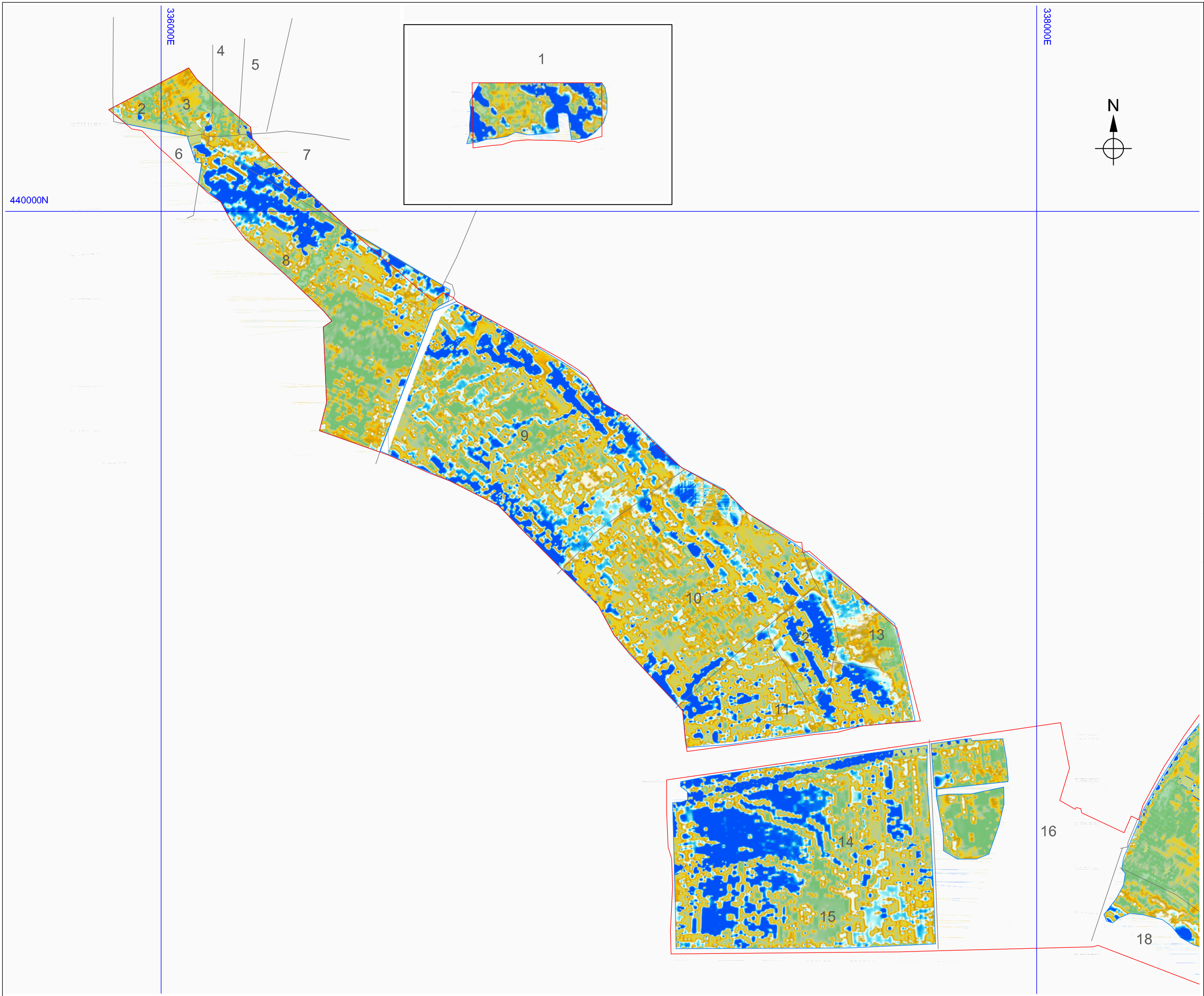
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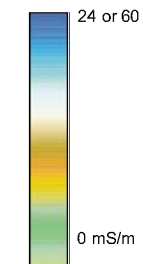
**Electromagnetic Conductivity
Survey 2019**

Drawing title
Figure 4

Apparent conductivity
(dipole 1: c. 2 m depth
and dipole 3: c. 6m depth)



Legend

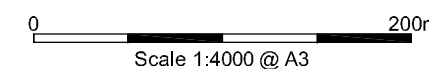


EM display range:

mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations

(c. 0 to 60 mS/m for field 1
c.0 to 24 mS/m for fields 2+)

1 - 22 field numbers



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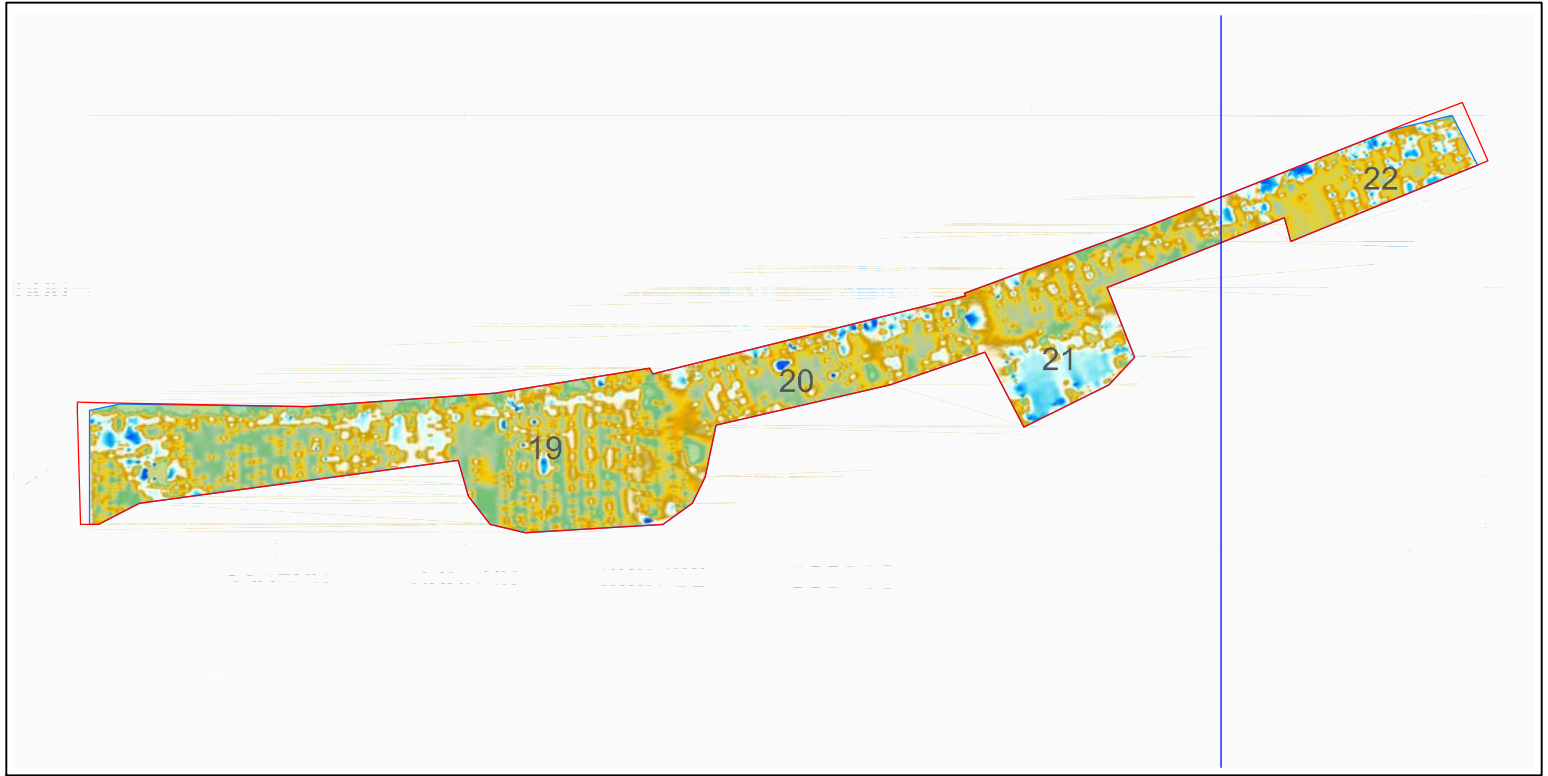
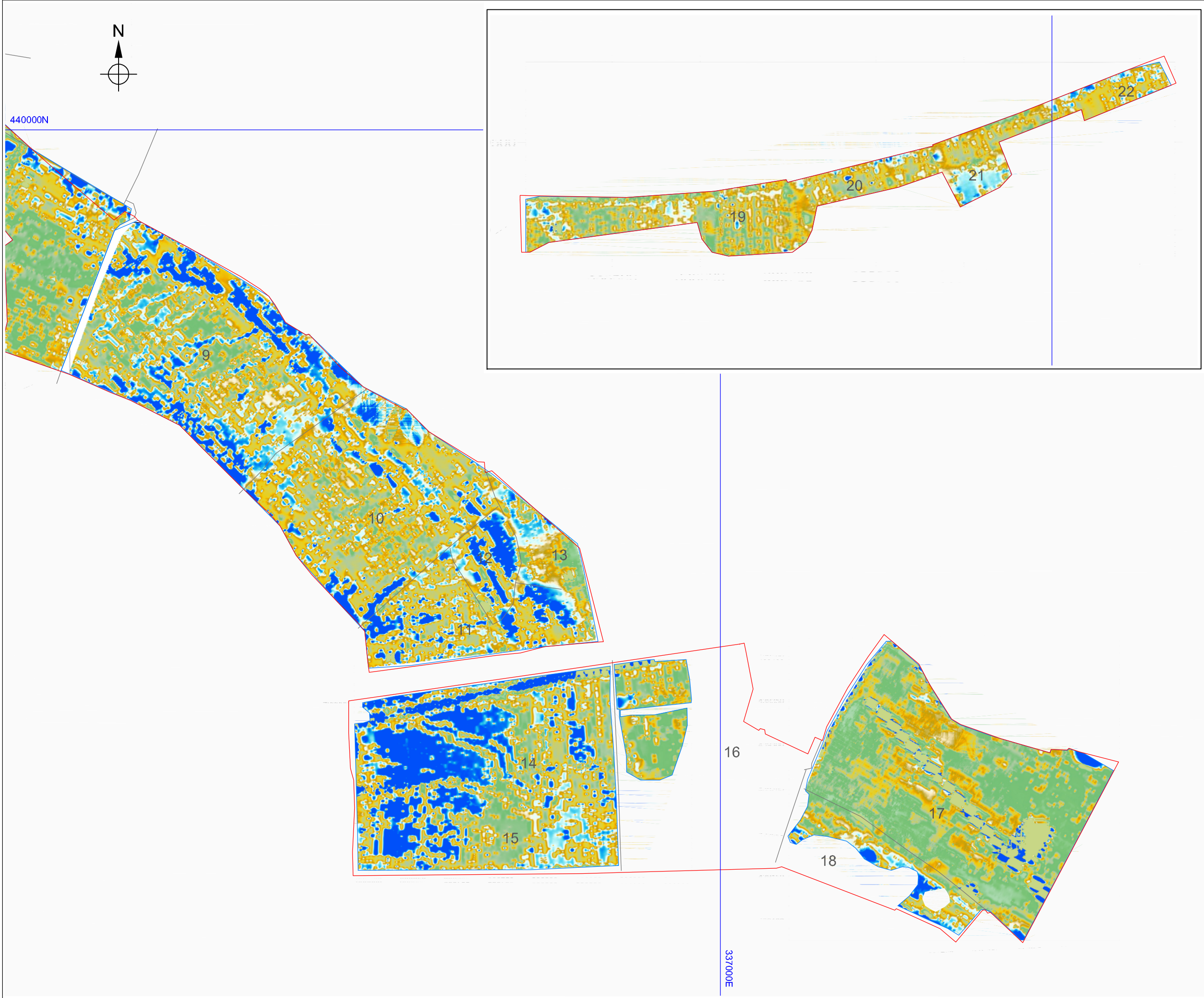
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Survey 2019

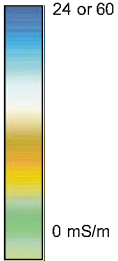
Drawing title

Figure 5

True conductivity
(by numeric inversion:
c. 2 - 4m depth)
1/2



Legend

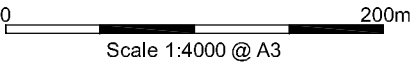


EM display range:

mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations

(c. 0 to 60 mS/m for field 1
c.0 to 24 mS/m for fields 2+)

1 - 22 field numbers



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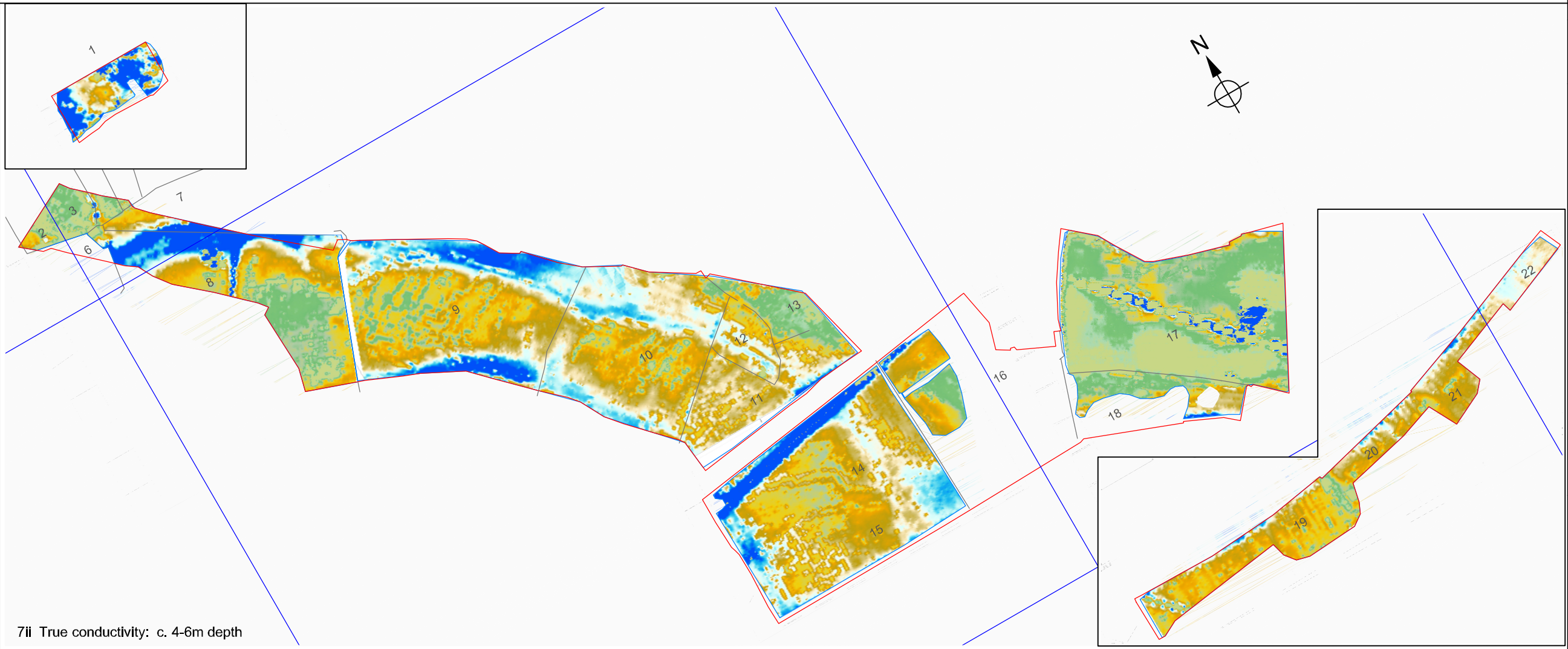
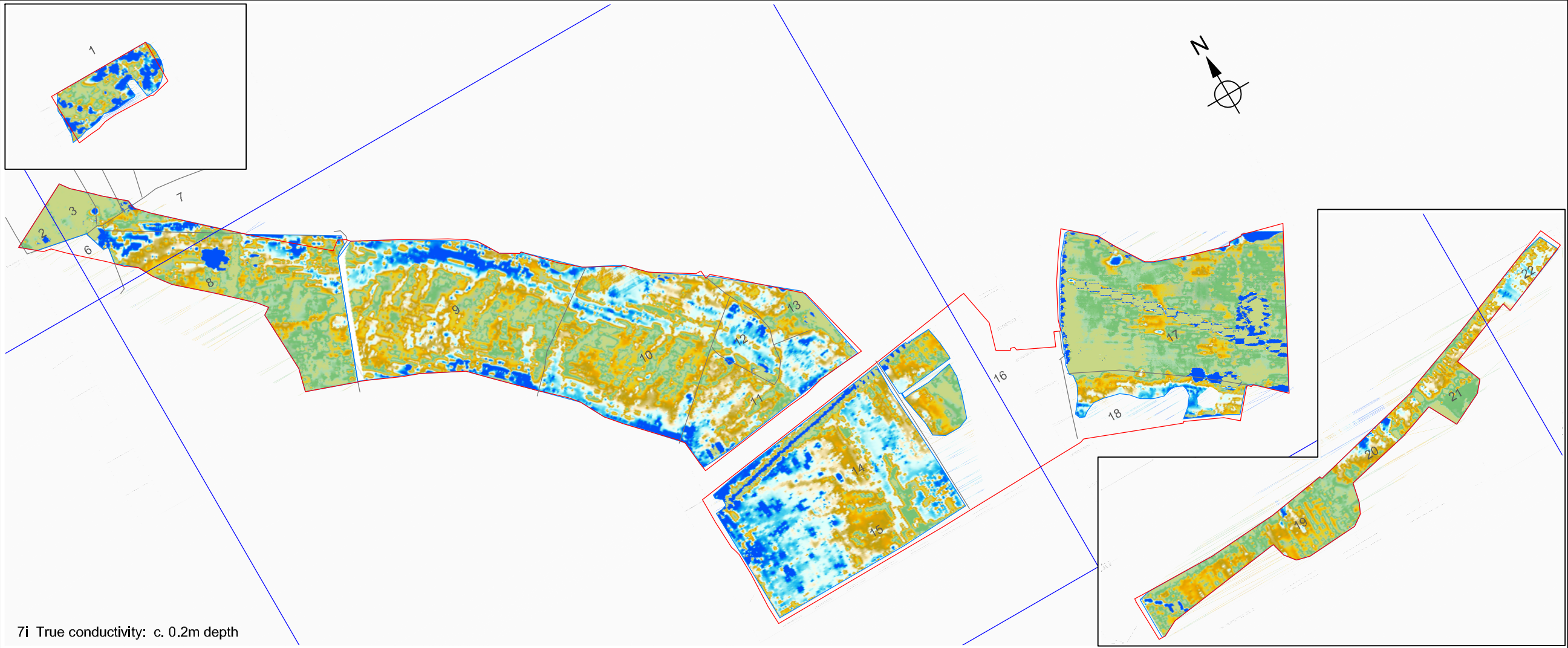
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Electromagnetic Conductivity
Survey 2019

Drawing title

Figure 6

True conductivity
(by numeric inversion:
c. 2 - 4m depth)
2/2



Legend

9 or 75
3 or 15
mS/m

EM display range:
mean of data -1.5 standard deviations
to
mean of data + 1.5 standard deviations
(c. 3 to 9 mS/m for 0-2m depth
c. 15 to 75 mS/m for 4-6m depth)

archaeological evaluation area
shaded in yellow

1 - 22 field numbers

0 250m
1:6250 @ A3

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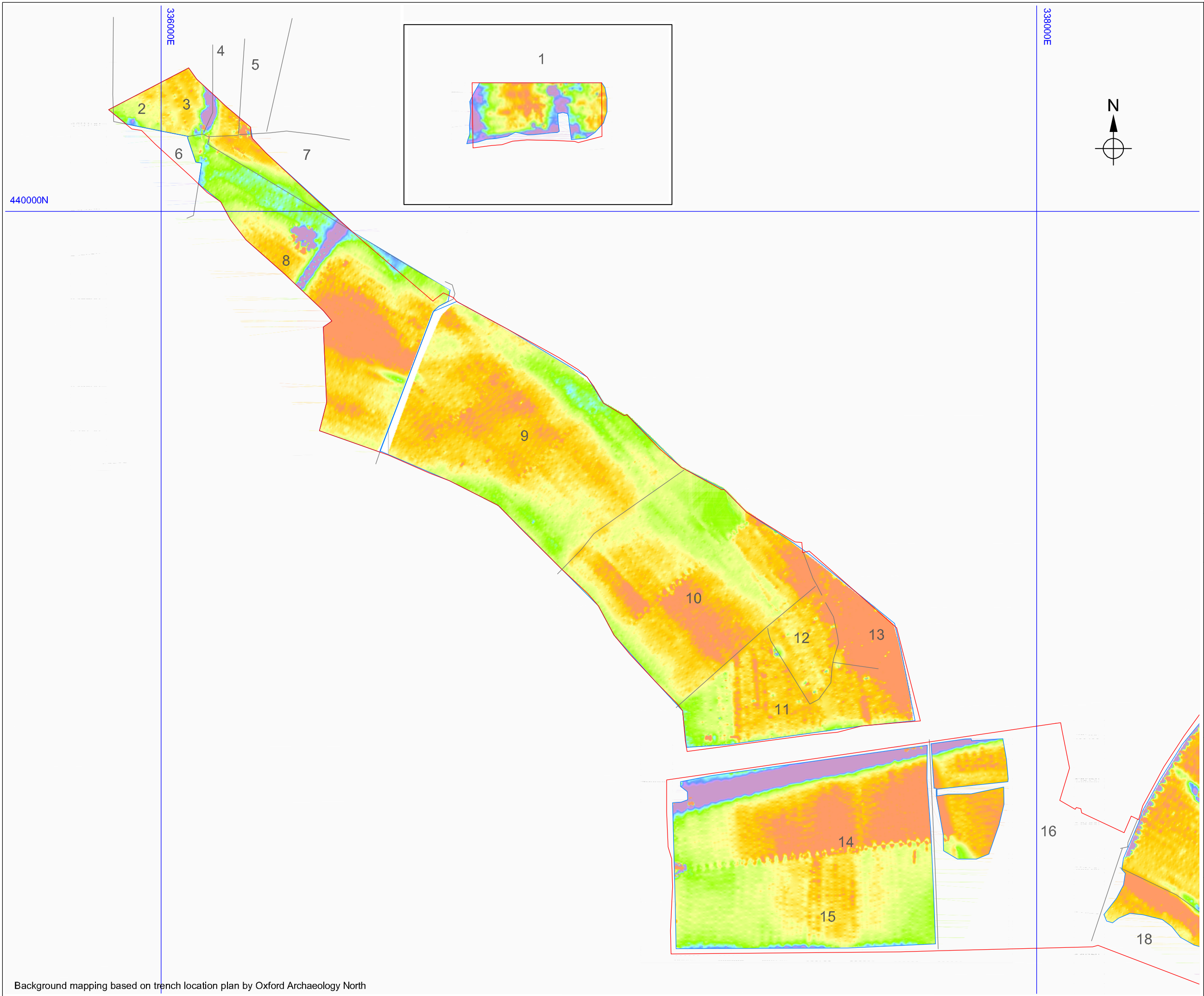
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Electromagnetic Conductivity
Survey 2019

Drawing title

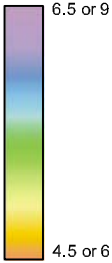
Figure 7

True conductivity
(by numeric inversion:
c. 0-2m and 4-6m depth)
2/2



Background mapping based on trench location plan by Oxford Archaeology North

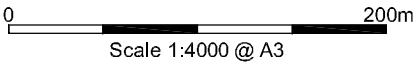
Legend



In-phase display range :

(c. 4.5 to 6.5 ppt for field 1
c. 6 to 9 for fields 2+)

1 - 22 field numbers



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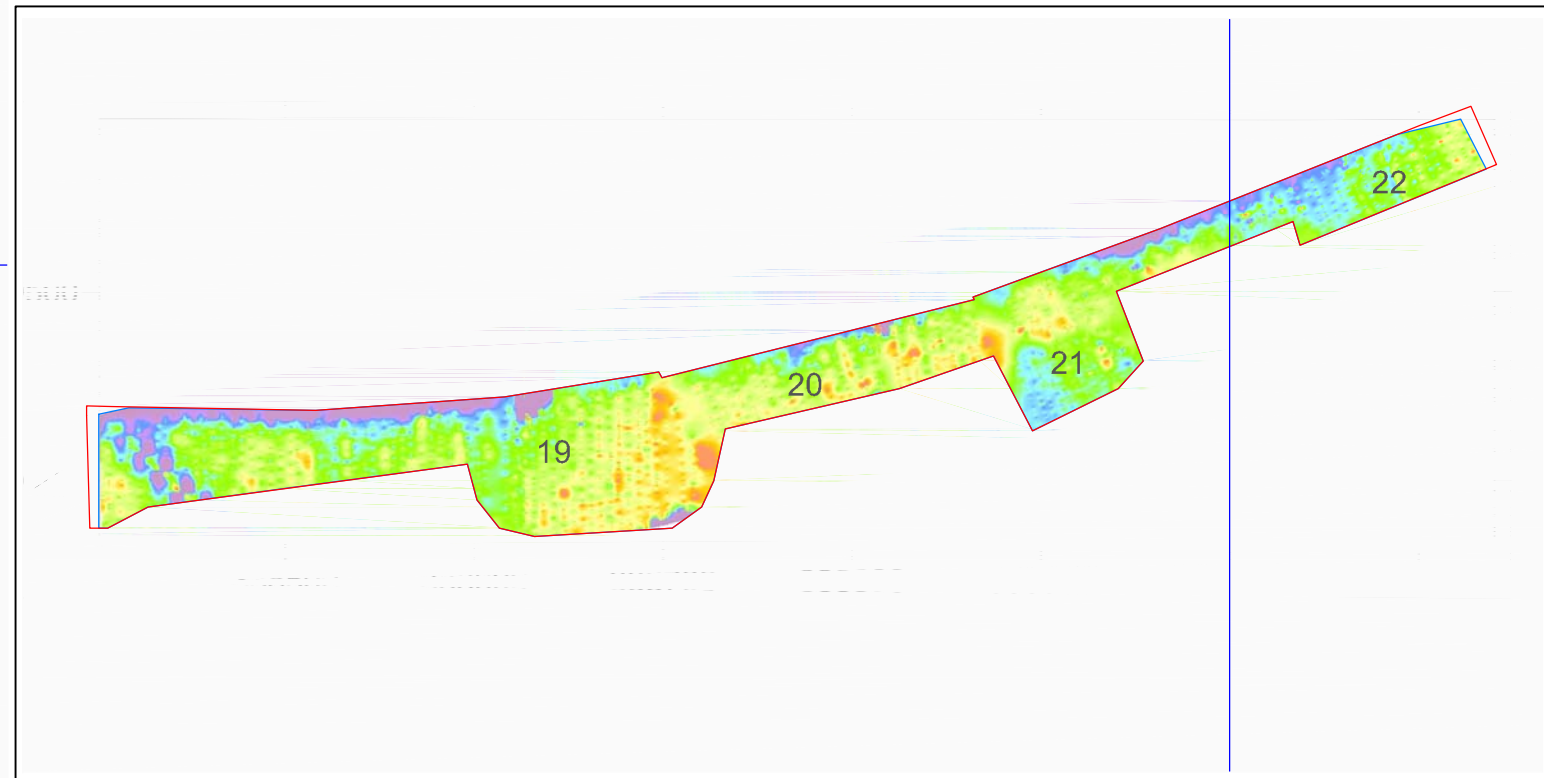
Drawing title

Figure 8

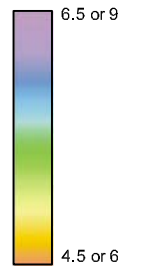
In-phase (susceptibility) data
(dipole 2: c. 4m depth)



440000N



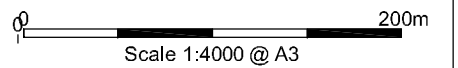
Legend



In-phase display range :

(c. 4.5 to 6.5 ppt for field 1
c. 6 to 9 for fields 2+)

1 - 22 field numbers



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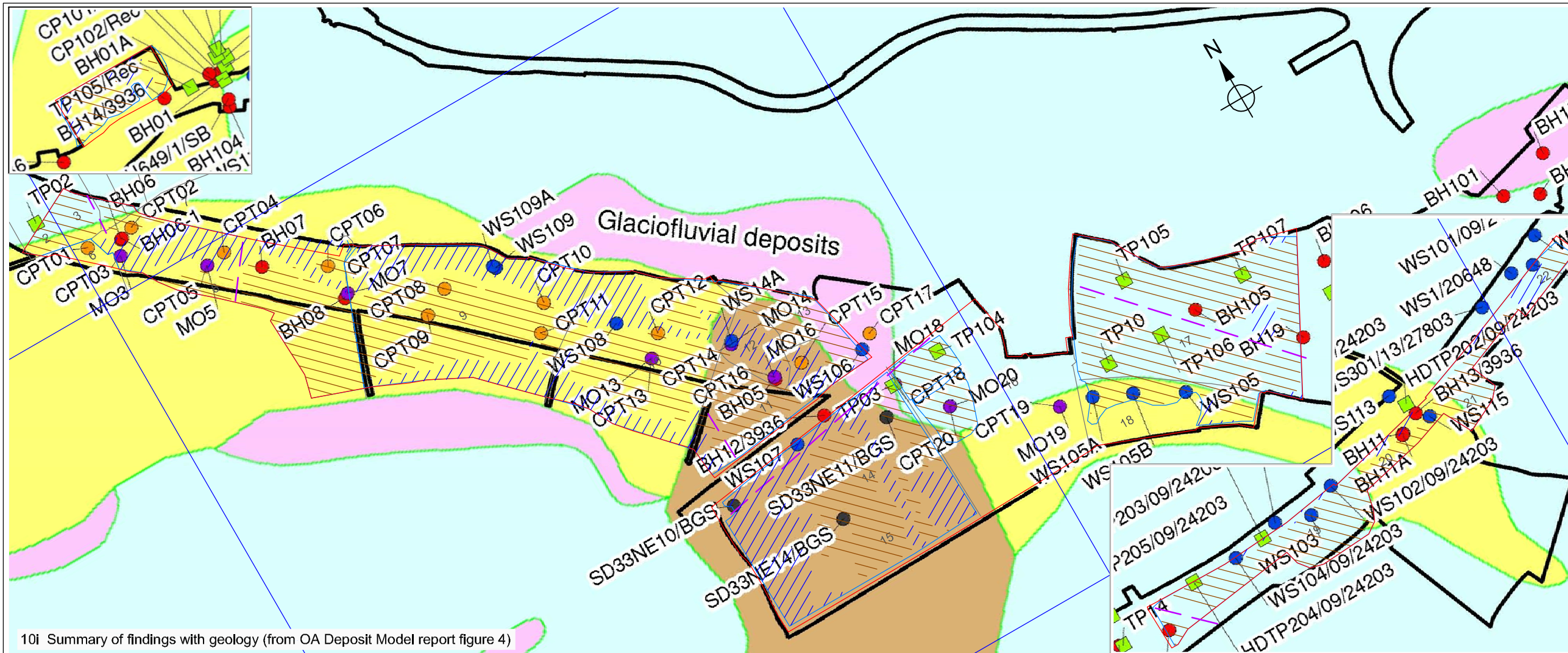
Drawing title

Figure 9

In-phase (susceptibility) data
(dipole 2: c. 4m depth)

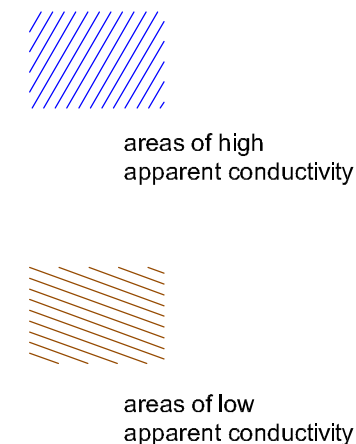
2/2

337000E

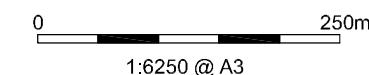


10i Summary of findings with geology (from OA Deposit Model report figure 4)

Legend



1 - 22 field numbers



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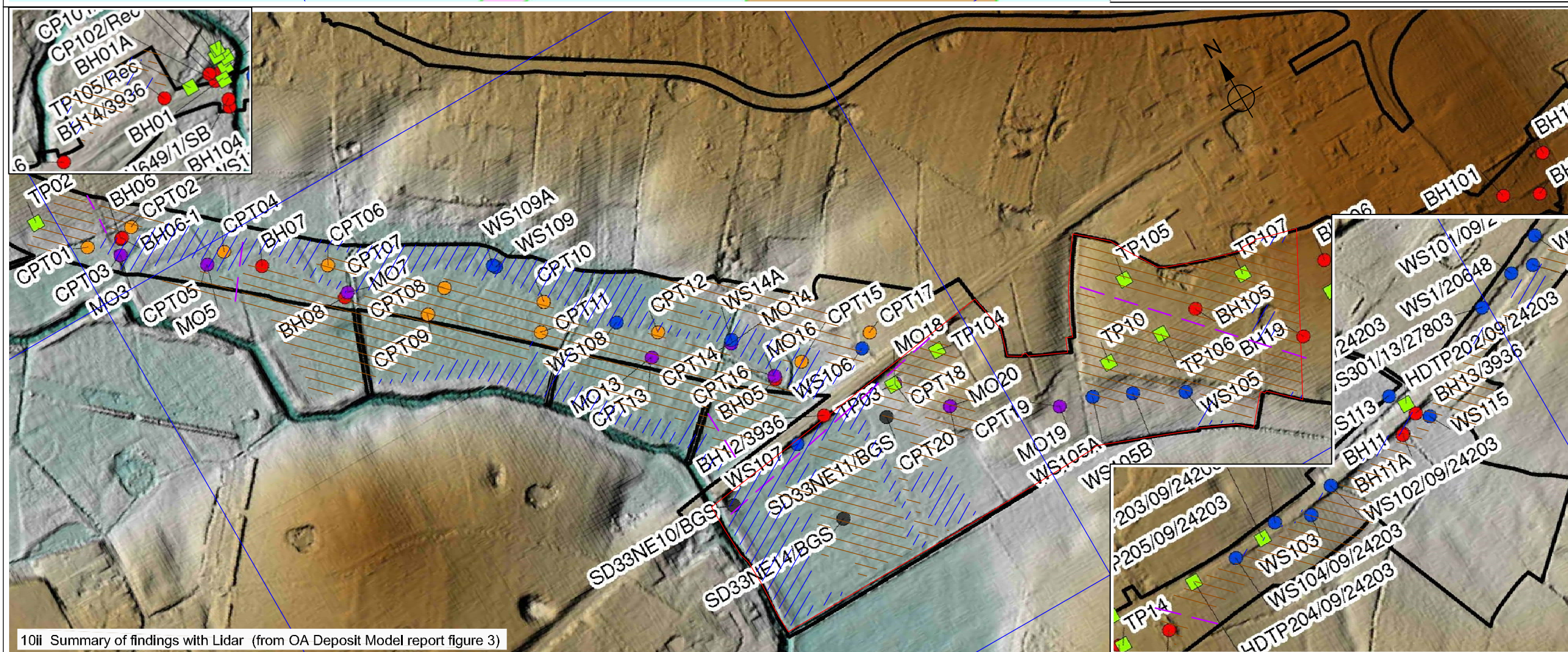
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Drawing title

Figure 10

Schematic summary:
comparative plans



10ii Summary of findings with Lidar (from OA Deposit Model report figure 3)