



Viking Link, UK Onshore Scheme from Hagnaby Lock to Donington Zone 3

Written Scheme of Investigation for
Archaeological Mitigation

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Viking Link, UK Onshore Scheme from Hagnaby Lock to Donington Zone 3

Written Scheme of Investigation for Archaeological Mitigation

1 INTRODUCTION

1.1 Project and planning background

- 1.1.1 On behalf of National Grid Viking Link Ltd (NGVL), Wessex Archaeology has been commissioned by Balfour Beatty ('the client') to produce a written scheme of investigation (WSI) for the archaeological mitigation of Zone 3 of the Viking Link UK Onshore Scheme. Nine mitigation areas totalling 4.19 ha, are located along the route of the southern section (Zone 3) of the 67 km Viking Link onshore cable section (National Grid Viking Link Scheme; NGVLS; **Figure 1**).
- 1.1.2 Previous programmes of non-intrusive and intrusive archaeological works have identified the potential for prehistoric remains to exist buried beneath subsequent material. This potential will be addressed through a scheme of borehole investigation. Previous work has identified the potential of two areas (areas 50 and 51) located close to mapped modern/post-medieval former buildings, six areas (areas 52–55, 60 and 61) containing Romano-British remains (including evidence for a nearby pottery production centre somewhere near area 55), and four areas (areas 56–59) with less well-understood but potentially significant archaeological remains.
- 1.1.3 The Viking Link onshore cable section is part of the NGVLS proposed 1400 MW high voltage direct current (DC) electricity link between the Danish and GB national grids, which comprises approximately 762 km of onshore and offshore DC cables between the new convertor stations at each end of the route, and allows an exchange of electricity to balance demand and increase the resilience of supplies in the regions.
- 1.1.4 The UK onshore cable route is located in south-east Lincolnshire. It makes landfall near Boy Grift Bridge, south of Sandilands, from where it passes through East Lindsey, North Kesteven and South Holland Districts, as well as Boston Borough, to Bicker Fen, where it will connect to a DC to AC convertor station (**Figure 1**).
- 1.1.5 The UK Onshore Scheme comprises:
- Underground high voltage DC cables from landfall at Boygrift, East Lindsey on the Lincolnshire coast to a new converter station;
 - A new converter station at North Ing Drove, South Holland to change electricity between DC and AC or vice versa depending on the direction of the operation; and,
 - Onshore underground AC cables from the converter station to new equipment within the existing Bicker Fen 400 kV substation, which connects to the electricity transmission system.
- 1.1.6 For the ease of understanding the archaeological potential and the management of the archaeological works, the route has been divided into three main zones: Coastal Plain, the

Wolds and the Fenland (Zones 1–3). Zone 3 (the Fenland) is the subject of this WSI and starts at West Fen Catchwater Drain at Hagnaby Lock (NGR 533814, 360266) and finishes at Donington (NGR 518900, 337286; **Figure 1**)

- 1.1.7 Viking Link was included in the Union List of Projects of Common Interest (PCI) under the Regulation for the trans-European energy (TEN-E) infrastructure (EU 347/2013) on 18 November 2015 and adopted by the Commission Delegated Regulation (EU) 2016/891.
- 1.1.8 Formal notification for the Viking Link Interconnector Cable was sent to the Marine Management Organisation (MMO) from National Grid Viking Link Limited on 27 July 2016, with further information provided in October 2016. The MMO accepted the project into the planning process by letter on the 27 October 2016 and advised consultation with appropriate authorities including the Local Planning Authorities.
- 1.1.9 Planning applications were submitted by NVGL in August 2017 to the four local planning authorities (Boston Borough Council ref B/17/0340, North Kesteven District Council ref 17/1200/FUL, South Holland District Council ref H04-0823-17 and East Lindsey District Council ref N/110/01549/17). These local planning authorities granted the planning application, subject to conditions on 12 December 2018.

- 1.1.10 The following condition relates to archaeology:

8) No phase of the development (other than survey work) shall commence until a written scheme of archaeological investigation for that phase has been submitted to and approved by the Local Planning Authority. The scheme shall include:

- i) an assessment of archaeological significance and a proposed mitigation strategy;*
- ii) a methodology and timetable of site investigation and recording;*
- iii) provision for site analysis and the submission of preliminary and final reports to the Local Planning Authority, and to the Historic Environment Record Officer at Lincolnshire County Council;*
- iv) provision for publication and dissemination of the analysis and records;*
- v) provision for archive deposition;*
- vi) nomination of a competent person or organisation to undertake the work;*
- vii) a programme of works; and,*
- viii) a written procedure to notify and allow for monitoring by the Local Planning Authority.*

Thereafter, the archaeological site work shall be carried out, in full accordance with the details thus approved.

- 1.1.11 The proposed excavation is the final stage in a programme of archaeological works, which have included:
- non-intrusive archaeological work presented in a desk-based assessment (Network Archaeology 2019), which is an update and replacement for an earlier cultural heritage assessment (Arcadis Consulting 2017a) for the onshore cable route

presented as an appendix to the Viking Scheme Environmental Statement (Environmental Statement ES-4-B.08). This assessment brought in the results of a walkover survey (Arcadis Consulting 2017b), an aerial photographic and LiDAR assessment (Trent & Peak Archaeology 2017) and targeted geophysical survey of 69 areas between the cable landfall and East Kirby (Sumo 2017).

- Geophysical surveys of the onshore cable corridor completed by Headland Archaeology on behalf of Network Archaeology (Headland Archaeology 2019) and by Magnitude Surveys (Magnitude Surveys 2020).
- archaeological evaluation (trenching) conducted by Wessex Archaeology (Wessex Archaeology 2021).

1.1.12 The rationale of each mitigation area is presented in section 4.2 below.

1.2 Scope of document

1.2.1 This WSI sets out the aims of the excavation, and the methods and standards that will be employed. In format and content, it conforms to current best practice, as well as to the guidance in *Management of Research Projects in the Historic Environment* (MoRPHE, Historic England 2015a) and the Chartered Institute for Archaeologists' (CIfA) *Standard and guidance for archaeological excavation* (CIfA 2014a).

1.2.2 This document will be submitted to will be submitted to both the archaeological advisor to East Lindsey District Council (ELDC) with South Holland District Council (SHDC), and to the archaeological advisor to North Kesteven District Council (NKDC) and Boston Borough Council (BBC) for approval, prior to the start of the excavation.

1.3 Location, topography and geology

1.3.1 Zone 3 is located between Hagnaby Lock (NGR 533814 360266) and Donington (NGR 518900 337286) in Lincolnshire. It comprises low-lying fenland rising only infrequently above 3 m OD and in parts falling below sea level. The landscape was extensively drained from the early-17th century onwards and is occupied by arable land with dark friable peat soils which have been farmed over hundreds of years. Woodland cover is scarce, and hedgerows are almost entirely absent. The landscape is divided by straight drainage channels ultimately discharging into the canalised River Witham. Roads and other communications typically follow the pattern of the drains.

1.3.2 A common landscape feature are roddons (or rodhams) which are the silted remains of former channels around which the drained former peatlands have shrunk, leaving the roddons as linear prominences (Fowler 1932). These elevated areas of land became available for human activity including settlement as the sea retreated in the late Iron Age and Romano-British periods, and so are considered to have a high archaeological potential (Network Archaeology 2019, 35). The land between the roddons contains a depth of overlying estuarine/marine sediments sealing any prehistoric archaeological remains. Also overlying these old land surfaces will be peats that developed during the initial waterlogging of the landscape as the sea level rose.

1.3.3 The underlying geology is mapped as post-glacial alluvium and freshwater clays overlying solid geology of Jurassic mudstones and clays of Oxford Clay and West Walton, Amptill and Kimmeridge Clay formations (British Geological Survey online viewer).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 Introduction

- 2.1.1 A summary of the results of the archaeological and historical background assessed in the updated DBA (Network Archaeology 2019) is presented below, with relevant entry numbers from the Lincolnshire Historic Environment Record (HER) and the National Heritage List for England (NHLE) included. Additional sources of information are referenced, as appropriate.
- 2.1.2 The Network Archaeology DBA (2019) superseded the earlier DBA (Arcadis 2017a) and collated the results of all previous archaeological work on the cable route as well as new data (Wolds long barrow survey, salterns and fenland landscape review, air crash sites and UXO assessment, portable antiquities scheme review, geophysical survey and rapid walkover). It considered the route's known and potential historic environment resource, assessed the potential impact of the scheme on this resource, and formed part of the staged approach of assessment, evaluation, and mitigation for the scheme. The updated DBA identified 179 heritage assets that are wholly or partly within the planning application area (Zones 1–3) and at risk of direct impact, a further 270 assets within 250 m of this area and a further twelve assets further afield.

2.2 Archaeological and historical context

Prehistoric and Romano-British

- 2.2.1 The earliest evidence for settlement in the area of Zone 3 dates from the Bronze Age, when there was a settlement north of Stickford at Hagnaby Lock (Halls and Coles 1994). There is, however, a general potential for remains from the early prehistoric to be present within this area which, if encountered, are likely to be sealed beneath alluvial deposits and fenland peats.
- 2.2.2 Settlement evidence is likely to be found on the raised areas of land known as roddons. Cropmarks visible on aerial photographs and LiDAR data may be features dating from this period, including enclosures and ring ditches in the vicinity of Bicker, North Ing and Donington.
- 2.2.3 The fenland region has been used in most periods for making salt and Zone 3 contains a number of salting sites, including a cluster uncovered during archaeological investigations between Hogsthorpe and Burgh-le-Marsh found beneath layers of alluvial deposits.
- 2.2.4 To the north-west of Donington, cropmarks visible on aerial photographs represent enclosures and trackways forming part of a larger body of evidence for settlement and sustained occupation during the Romano-British period on the edge of the Fenland and on elevated ground either side of the River Witham. There may be further archaeological evidence for Romano-British settlement under the substantial alluvial deposits in the fenland areas around Burgh-le-Marsh. There is also evidence within Zone 3 for Romano-British drainage channels which have been absorbed into modern systems of drainage and flood defence. The most significant of these features is Car Dyke which stretches from Lincoln down to Peterborough.

Early medieval and medieval

- 2.2.5 Anglo-Saxon and Norse place names indicate that several new settlements were established in the area during the early medieval period. Beyond these settlement centres, the most substantial archaeological evidence for the people who occupied the area are several cemeteries found at East and West Keal. In addition to the cemeteries, fieldwalking

along the eventual route of the West Keal bypass recovered finds dating to the early medieval period including mainly Early Saxon pottery, with a few sherds dating to the Middle Saxon period, as well as items like a piece of burnt amber and polished bone.

- 2.2.6 By the medieval period, much of the land within Zone 3 was owned by the church who used it for grazing sheep to support the wool trade, which was critical to the local economy. When this industry collapsed, many of the settlements became deserted like those at Stickford and East Keal while drainage ditches that had allowed the land to be grazed were left to silt up.
- 2.2.7 Salt-making remained a constant on the fenland into the medieval period, and the sites in use during the medieval period are marked by distinctive mounds, unlike their Romano-British predecessors.

Post-medieval and modern

- 2.2.8 Following the dissolution of the monasteries in the mid-16th century, land owned by the church was transferred into private ownership, which was then enclosed, and new drainage ditches dug to open the land up to agriculture. Dispersed farmsteads were built on the former marshlands, responsible for working immediate holdings.
- 2.2.9 Settlements in the area expanded, evidenced by the increase in now listed buildings that trace their origins to this period, while wealthy landowners also began constructing large halls and country houses surrounded by designed landscape gardens.
- 2.2.10 Salt working continued in the area, although this was primarily focused inland by the 16th century with competition from north-east England and Scotland.
- 2.2.11 The landscape remained relatively unchanged throughout the 19th and 20th centuries, although the area was of strategic importance during the Second World War. Two planes are recorded as having crashed at RAF East Kirkby and near Northope.

2.3 Previous investigations related to the cable route

General

- 2.3.1 The Environmental Statement (ES-4-B.08) was supported by an archaeological appendix (ES Appendix 12) comprising: the superseded DBA (ES Appendix 12.1; Arcadis Consulting 2017a), an aerial photograph and LiDAR assessment (ES Appendix 12.2; Trent and Peak Archaeology 2017), and geophysical survey (ES Appendix 12.3; Sumo Survey 2017). This geophysical survey did not fully cover Zone 3.
- 2.3.2 A suite of figures were produced to illustrate where additional geophysical survey should take place and indicate indicative locations for evaluation trenches (Aecom 2019).
- 2.3.3 A geophysical survey (Magnitude Surveys 2020) successfully surveyed around 90.09 ha of a proposed 111.5 ha area to the south of the River Witham in Zone 3.
- 2.3.4 An Auger Survey (Rackham 2020) identified areas where the former (prehistoric) land surface was less than 1.5 m and 2 m below the modern ground surface.

Archaeological Evaluation (Wessex Archaeology 2021)

- 2.3.5 An archaeological evaluation of 191 trenches was completed by Wessex Archaeology during the winter of 2019/20 (Wessex Archaeology 2021). The trench-by-trench results of the evaluation are summarised in **Appendix 2**.

- 2.3.6 The geoarchaeological sequence suggested that the former prehistoric land surface may exist at relatively shallow depths (1.15 m to 1.3 m below ground level) in some localities (trenches 357, 368–369, 371, 399–401, 407 and 454).
- 2.3.7 Three foci of Romano-British activity were identified, one including evidence for a possible nearby pottery production centre (close to trenches 482 and 483) and a second focus of activity 1 km away (trenches 469–471), both at Mown Rakes. Trench 482, (where evidence for possible nearby pottery production was detected) produced the environmental assemblages with the highest potential from the evaluation. These samples suggested domestic activities including crop processing.
- 2.3.8 The third focus of Romano-British activity comprised an insecurely-dated concentration of features (trenches 545 and 546) that may form a continuation of activity recorded by excavation at the proposed converter station site as part of the wider Viking Link project and during the parallel Triton Knoll Offshore Windfarm project (unpublished).
- 2.3.9 Post-medieval/modern and undated features were scattered along the length of the Zone 3 evaluation area. Modern features comprised abandoned elements of the extant field system (as well as associated drains) and were identified by the presence of pottery, by correlation with historic maps, by their alignment with the extant field system and supported by their location on low-lying ground that would probably have been too wet to exploit prior to systematic drainage. Boundaries associated with the demolished 'Three Hundreds' farmstead were excavated as well as similar boundaries in trench 428 associated with a demolished building.

Converter Station

- 2.3.10 A separate Environmental Statement (ES-4-C.07) was produced for the site of the proposed converter station (Arcadis Consulting 2017c) and trial trench evaluation was undertaken revealing a series of ditches and discrete features dating to the 2nd to 3rd centuries AD on a roddon (Headland Archaeology pers. comm.). Some of the planned features from the converter station excavation are depicted on **Fig. 20** showing their proximity to the proposed mitigation. The Converter Station site lies outside the scope of this WSI.

Ring Holt Barrow

- 2.3.11 Ring Holt Barrow Scheduled Monument lies outside of Zone 3 and therefore also beyond the scope of this WSI. A Supplementary Environmental Information Report (SEIR) for East Lindsey District (Arcadis Consulting 2017b) was prepared with particular focus on the barrow, including updated walkover information and additional geophysical survey of around 71 ha (Headland Archaeology 2017). A Technical Paper was produced focussed on the barrow (National Grid Viking Link 2017) as was an additional review of the DBA data in East Lindsey undertaken as a Planning Appeal Core Document (Aecom 2018).

Previous investigations in the area of the cable route

- 2.3.12 Previous investigations in the area of the cable route were listed in the DBA (Network Archaeology 2019). The most relevant have been reproduced below.
- 2.3.13 Hagnaby Lock, Stickford (Halls and Coles 1994). Geophysical survey initially noted large quantities of burnt stone recorded as well as a probable Bronze Age settlement at Hagnaby Lock. Fieldwalking confirmed Mesolithic to Neolithic flint-working. This was followed by evaluation trenching: two trenches placed over two of the densest concentrations of finds identified a burnt mound and associated features.

- 2.3.14 A range of archaeological work was undertaken close to the Viking Link routes during the Environmental Impact Assessment (EIA) process for the Triton Knoll Offshore Windfarm scheme, particularly near Stickney where the two routes run roughly parallel. Within this section, the archaeological investigations uncovered a substantial Romano-British settlement lying on either side of the River Witham. The settlement was situated on slightly elevated ground formed of a number of roddons and overlooked the surrounding salt marshes. Also uncovered during the work was an Iron Age and Romano-British settlement close to Bicker Fen (<https://news.siemens.co.uk/news/hidden-history-uncovered-at-Bicker-fen>).

Negative investigations

- 2.3.15 Other archaeological investigations within the area which are relevant to the scheme include geophysical survey and evaluation trenching at Folly Lane Solar Farm and investigations at Bicker Fen and Bicker Friest Wind Farm, each with negative results.

3 AIMS AND OBJECTIVES

3.1 Aims

General

- 3.1.1 The general aims (or purpose) of the mitigation, as defined in the *ClfA Standard and guidance for archaeological excavation* (ClfA 2014a), are:

- to examine the archaeological resource within a given area or site within a framework of defined research objectives;
- to seek a better understanding of the resource;
- to compile a lasting record of the resource; and,
- to analyse and interpret the results of the excavation, and disseminate them.

Geoarchaeological

- 3.1.2 The aims of the geoarchaeological mitigation are:

- to refine understanding of the presence, nature and distribution of superficial sediments and palaeoenvironmental sequences across the site using appropriate methods and practices;
- to obtain representative samples through the deposits;
- to assess the geoarchaeological and archaeological significance of the deposits;
- to establish the potential impact of the proposed development on deposits of geoarchaeological and archaeological potential;
- to make suitable, proportionate recommendations for further work, including palaeoenvironmental analysis, where appropriate.

3.2 Objectives

General

- 3.2.1 In order to achieve the above aims, the general objectives of the mitigation are:

- to investigate and record features of archaeological origin;
- to determine (where possible) the location, depth, extent, character, date, condition and significance of any archaeological deposits or features;

- to report on the results of the mitigation and disseminate them in a manner appropriate to their significance; and,
- to produce a site archive for deposition with The Collection Museum and to provide information for accession to the museum.

Geoarchaeological

3.2.2 In order to achieve the aims of the geoarchaeological mitigation, the following objectives are proposed:

- to undertake geoarchaeological boreholes in areas where peat was identified during the evaluation, namely in the area of trenches 357, 366, 368/369, 371, 392, 399, 407, 452 and 454 as previously identified (Wessex Archaeology 2021), and in selected areas of unknown geoarchaeological potential, in order to fully characterise the geoarchaeological deposits along the cable route;
- to record the sequence of superficial deposits present in these boreholes;
- to obtain representative undisturbed core samples through the superficial deposits;
- to integrate all available stratigraphic records, including data from trenches, test pits and boreholes, to develop a deposit model for the Scheme, including where appropriate Digital Elevation Models (DEMs), thickness plots and representative transects;
- to make suitable, proportionate recommendations for further work where appropriate with a commitment to undertake these works, taking into account research objectives in the East Midlands Historic Environment Research Framework; <https://researchframeworks.org/emherf/>). Further works are likely to include paleoenvironmental assessment and radiocarbon dating of retained sequences (see below).

3.3 Research objectives

Geoarchaeological

- 3.3.1 Research objectives help to inform and identify priorities for sampling during the course of purposive geoarchaeological works and direct subsequent phases of assessment and analysis. The research objectives are relevant to themes outlined in the East Midlands Updated Research Agenda and Strategy (East Midlands Historic Environment Research Framework; <https://researchframeworks.org/emherf/>).
- 3.3.2 Sequences with geoarchaeological potential were identified during the archaeological evaluation (Wessex Archaeology 2021). Assessment of preservation quality of palaeoenvironmental remains in retained sequences will have an important bearing on the ability of retained samples to contribute towards addressing the research objectives.
- 3.3.3 The close association between wetland and dryland landscapes offers the opportunity to understand the long-term patterns of human activity and settlement and associated environmental and landscape change during prehistory.
- 3.3.4 The research objectives for the geoarchaeological investigations include the following:
- to refine understanding of the physical landscape;
 - to understand past landscape change, flora and fauna, particularly in relation to Holocene sea-level and climate change;

- to improve understanding of prehistoric landscapes, including natural/anthropogenic agencies;
- to examine evidence for the exploitation, use and/or management of the landscape; and,
- to understand resources within the wetland and adjoining dryland, taking into account period-specific research questions as outlined in the East Midlands Historic Environment Research Framework (<https://researchframeworks.org/emherf/>), including:
 - to enhance understanding of the environmental background to Mesolithic activity;
 - to investigate the transition from the Mesolithic to Neolithic;
 - to target sites with Late Mesolithic and Early Neolithic organic remains; and,
 - to investigate the development and intensification of agriculture.

3.4 Site specific research questions

Excavation

3.4.1 Following consideration of the archaeological potential of the mitigation areas and the regional research framework (East Midlands Historic Environment Research Framework; <https://researchframeworks.org/emherf/>), the following site-specific research objectives have been identified.

- Areas 50 and 51 targeting the areas of buildings known from historic maps may contribute to objectives in chapters 8 and 9 (post-medieval and modern) such as 8C 'Establish a typology of regional building traditions,' 8D 'investigate developments in estate and garden design and their landscape contexts,' 8.3 'Agricultural landscapes and economy,' 8.4 'Rural settlement patterns and building traditions,' 9G 'Assess landscape impact of industrialisation of agriculture,' 9H 'Identify and record rural historic environment features,' 9.1 'Urban and rural settlements,' 9.2 'Buildings in town and countryside,' and 9.6 'Agriculture'.
- The Romano-British remains from areas 52–55, 60 and 61 may contribute more broadly to further objectives in chapter 5, perhaps including 5H 'Investigate landscape context of rural settlements,' 5.4 'Rural settlement patterns and landscapes,' 5.5 'Agricultural economy' and/or '5.6 Artefacts: production, distribution and social identity.' The high potential of environmental remains from area 55 may be particularly suitable for this.
- There was probably a Romano-British pottery production centre somewhere near area 55. The remains of pottery production may contribute to research objective 5A 'Create regional pottery corpora and publish key production centres' and objective 5B 'Support dissemination and synthesis of information on Roman finds', particularly with reference to 5.4 'Rural settlement patterns and landscapes,' 5.6 'Artefacts: production, distribution and social identity,' and perhaps 5.1 'Chronology' or 5.5 'Agricultural economy'.
- The remains targeted by areas 56–59 are at present undated and poorly understood. Their potential is too broad to relate to specific research questions, however the results from these areas may be identified with specific research questions at a subsequent time.

Geoarchaeological

- 3.4.2 A series of site-specific research questions are outlined below, which direct the geoarchaeological sampling strategy and will feed in to any further palaeoenvironmental analysis of the deposits. These research objectives are primarily focused on determining the significance and potential of the deposits that will be impacted by the proposed scheme.
- 3.4.3 These site-specific questions should be considered alongside the research objectives and relevant themes outlined in the East Midlands Updated Research Agenda and Strategy (East Midlands Historic Environment Research Framework; <https://researchframeworks.org/emherf/>) and summarised above. The results of the geoarchaeological sampling will help to target and refine the relevant overarching research questions, in turn informing further stages of work.
- 3.4.4 Site-specific questions are listed below and linked to specific boreholes in **Table 1**:

Prehistoric landscapes

- G1: What evidence is there for topographic features (e.g. palaeochannels, roddons, topographic highs) that might be impacted by the scheme?
- G2: What is the nature and date of the deposits preserved in association with these features?
- G3: Are palaeoenvironmental remains preserved in association with these features?
- G4: Is there any evidence for buried land surfaces that might be impacted by the Scheme?

Buried soils

- G5: Are buried soils preserved on top of the till or on topographic highs, and will these sediments be impacted by the scheme?
- G6: How widespread is soil formation, and is it associated with specific landscape features (e.g. topographic highs) or stratigraphic units (e.g. the till)?
- G6: What are the dates of soil formation?
- G7: Are palaeoenvironmental remains preserved in buried soils, and what information do these remains contribute to our understanding of early Holocene landscapes?

Peat

- G8: How widespread are peat deposits across the scheme, and where are they impacted?
- G9: What is the relationship between the peat units on the scheme? Do they represent multiple periods of peat formation in localised areas, or one widespread episode of peat formation?
- G10: What are the dates of peat formation?
- G11: Are palaeoenvironmental remains preserved in the peat, and what information do these remains contribute to our understanding of Holocene landscapes, including the environmental background to Mesolithic activity, the transition from the Mesolithic to Neolithic, and the development and intensification of agriculture?

4 FIELDWORK METHODS

4.1 Introduction

4.1.1 Health and safety will override archaeological considerations in all works since, as stated in ClfA guidance, *Health and Safety regulations and requirements cannot be ignored no matter how imperative the need to record archaeological information; hence Health and Safety will take priority over archaeological matters* (ClfA 2014a, 11).

4.1.2 All works will be undertaken in accordance with the detailed methods set out within this WSI. Any significant variations to these methods will be agreed in writing with the archaeological advisor for ELDC and SHDC, the archaeological advisor for NKDC and BBC and the client prior to being implemented.

4.2 Mitigation areas

4.2.1 The mitigation comprises three categories of work which will be addressed using different techniques: boreholes, strip and map excavation and set piece excavation.

Boreholes

4.2.1 A series of purposive boreholes will be undertaken in order to investigate deposits of geoarchaeological potential identified during the archaeological evaluation of Zone 3 (**Figures 2–11**).

4.2.2 On the basis of work undertaken to date, including the results of an existing borehole survey (Rackham 2020) and the archaeological evaluation (Wessex Archaeology 2021), the sequence of sediments underlying the site is highly variable, even within relatively small areas of the site. In order to achieve the overall aims of the project and to address the site-specific research questions, a series of boreholes across the scheme are proposed. These boreholes fall within the area of impact of the scheme.

4.2.3 The boreholes are located in order to provide stratigraphic context for the deposits, and to ensure the retention of suitable sequences for any further palaeoenvironmental analysis (where appropriate). The proposal includes boreholes in areas where there is limited information on the sedimentary sequence resulting from the archaeological evaluation (Wessex Archaeology 2021).

4.2.4 The boreholes will also investigate the presence of buried land surfaces and soils (palaeosols) that may overlie the basal till (see Rackham 2020) or other topographic highs within the palaeolandscape.

4.2.5 A total of 29 purposive geoarchaeological boreholes will be undertaken to investigate the superficial deposits impacted by the scheme in the area shown in **Table 1**

4.2.6 The boreholes fall within two broad groups

Targeting peat identified in evaluation trenches

4.2.7 Boreholes BH2, BH4, BH5, BH6, BH10, BH11, BH12, BH14 and BH15 target peat identified in the previous evaluation trenches that will be impacted by the Scheme (above a level of 1.6 m bgl). These are located adjacent to trenches 357, 366, 368/369, 371, 392, 399, 407, 452 and 454 respectively.

4.2.8 These boreholes will provide additional sedimentary descriptions and samples through the peat deposits that are impacted by the scheme, particularly relevant to research questions

G8–G11. In all of these locations except BH10 (trench 392), the full sequence of alluvial deposits was also not bottomed during the evaluation, and there is therefore potential for these boreholes to identify buried land surfaces or soils impacted by the scheme that have the potential to address research questions G1–G7.

Targeting areas of unknown geoarchaeological potential

- 4.2.9 Boreholes BH1, BH3, BH7, BH8, BH9, BH13, BH14, BH16, BH17, BH18, BH19, BH20, BH21, BH22, BH23, BH24, BH25, BH26, BH27, BH28 and BH29 target areas where the sequence of alluvial deposits was not bottomed during the previous evaluation, and are currently of unknown geoarchaeological potential. These boreholes are located in the area of evaluation trenches 355, 360, 372, 383, 386, 440, 464, 469, 473, 484, 487, 494, 512, 518, 519, 520, 524, 528, 533 and 536.
- 4.2.10 Of these boreholes, four (BH7, BH8, BH9 and BH22) target areas where, on the basis of the Rackham 2020 investigation, the prehistoric land surface appears to be rising, and where there is the potential for such land surfaces and buried soils to be impacted by the scheme. These are located within the vicinity of previous boreholes A08, A09, A10 and A22.
- 4.2.11 Two of these boreholes (BH18 and BH19) have been located in order to provide a better understanding of the geoarchaeological potential in the area of Mitigation Areas 52 and 55 respectively. Depending on the nature of the sedimentary sequence in these areas, these boreholes have the potential to address research questions G1–G11.
- 4.2.12 Four of these boreholes are located in order to provide a better understanding of the geoarchaeological potential to the north and south of roddons in the area of Mitigation Areas 57 (BH24 and BH25) and 59 (BH26 and BH27). Again, depending on the nature of the sedimentary sequence in these areas, these boreholes have the potential to address research questions G1–G11.
- 4.2.13 The remainder of these boreholes are around 100–200 m from previously sunk boreholes and therefore will provide additional sedimentary descriptions of the deposits to enable an adequate assessment of the impact of the scheme, and the potential of the sediments to address research questions G1–G11.
- 4.2.14 In addition, borehole BH17 targets a possible palaeochannel feature identified during the evaluation, relevant to research questions G1–G11.

Table 1 Boreholes

Bore-hole	Equivalent evaluation trench	Max. depth of sondage during evaluation (m)	Rationale	Associated research questions	Parish	District/ Borough
BH1	355	0.35	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.35 and 1.60m bgl	G1–G11	West Fen	East Lindsey
BH2	357	1.30	Targeting peat impacted by Scheme identified in T357	G8–G11		
BH3	360	1.30	Alluvial deposits not bottomed during previous evaluation.	G1–G11		



Bore-hole	Equivalent evaluation trench	Max. depth of sondage during evaluation (m)	Rationale	Associated research questions	Parish	District/ Borough
			Scheme may impact peat or buried land surfaces between 1.30 and 1.60m bgl			
BH4	366	1.40	Targeting peat impacted by Scheme identified in T366	G8–G11		
BH5	368/369	1.50/1.30	Targeting peat impacted by Scheme identified in T368/369	G8–G11		
BH6	371	1.30	Targeting peat impacted by Scheme identified in T371	G8–G11		
BH7	372	0.38	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.38 and 1.60m bgl. Buried land surface potentially rising here on the basis of Rackham (2020) investigation	G1–G11	Sibsey	
BH8	383	1.40	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 1.40 and 1.60m bgl. Buried land surface potentially rising here on the basis of Rackham (2020) investigation	G1–G11	Carrington	
BH9	386	1.50	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Buried land surface potentially rising here on the basis of Rackham (2020) investigation	G1–G11	Frithville and Westville	
BH10	392	1.60	Targeting peat impacted by Scheme identified in T392	G8–G11		
BH11	399	1.40	Targeting peat impacted by Scheme identified in T399	G8–G11	Thornton Le Fen	
BH12	407	1.40	Targeting peat impacted by Scheme identified in T407	G8–G11		
BH13	440	1.20	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 1.20 and 1.60m bgl	G1–G11	Holland Fen with Brothertoft	Boston



Bore-hole	Equivalent evaluation trench	Max. depth of sondage during evaluation (m)	Rationale	Associated research questions	Parish	District/ Borough
BH14	452	1.00	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.00 and 1.60m bgl. Also targets peat impacted by Scheme identified in T452	G1–G11	Amber Hill	
BH15	454	1.50	Targeting peat impacted by Scheme identified in T454	G8–G11		
BH16	464	0.40	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.40 and 1.60m bgl	G1–G11		
BH17	469	1.50	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting a palaeochannel feature identified during evaluation in T469	G1–G11	Swineshead	
BH18	473	0.50	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting Mitigation Area 52	G1–G11		
BH19	484	0.50	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting Mitigation Area 57	G1–G11		
BH20	487	0.90	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.90 and 1.60m bgl	G1–G11		
BH21	494	1.20	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 1.20 and 1.60m bgl	G1–G11		



Bore-hole	Equivalent evaluation trench	Max. depth of sondage during evaluation (m)	Rationale	Associated research questions	Parish	District/ Borough
BH22	512	1.50	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl	G1-G11	Great Hale	North Kesteven
BH23	518	0.44	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.44 and 1.60m bgl	G1-G11	Little Hale	
BH24	519	0.50	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting sedimentary sequence to the north of roddon in the area of Mitigation Area 57	G1-G11		
BH25	520	0.49	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting sedimentary sequence to the south of roddon in the area of Mitigation Area 57	G1-G11		
BH26	524	0.40	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting sedimentary sequence to the north of roddon in the area of Mitigation Area 59	G1-G11		
BH27	528	0.44	Alluvial deposits not bottomed during previous evaluation; Scheme may impact peat or buried land surfaces between 1.50 and 1.60m bgl. Targeting sedimentary sequence to the south of roddon in the area of Mitigation Area 59	G1-G11		

Bore-hole	Equivalent evaluation trench	Max. depth of sondage during evaluation (m)	Rationale	Associated research questions	Parish	District/Borough
BH28	533	0.45	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.35 and 1.60m bgl. Buried land surface potentially rising here on the basis of Rackham (2020) investigation	G1–G11		
BH29	536	0.30	Alluvial deposits not bottomed during previous evaluation. Scheme may impact peat or buried land surfaces between 0.30 and 1.60m bgl	G1–G11	Bicker	Boston

Strip and map excavation

- 4.2.15 Mitigation areas 50 and 51 (**Figures 7, 8, 12 and 13**) have been selected due to their proximity to mapped modern or post-medieval remains. These areas will be excavated using a strip and map methodology. Details are given in **Table 2** below.

Set piece excavation

- 4.2.16 The remaining mitigation areas (areas 52–61; **Figures 8–11 and 15–20**) include Romano-British and undated remains with the highest potential within zone 3 and will be excavated using set piece excavation ('SPE') methods.
- 4.2.17 Details of the mitigation areas are given in **Table 2** below. The rationale is derived from the zone 3 evaluation report (Wessex Archaeology 2021), which assessed the potential for identified archaeological remains to contribute to the aims of the project as given in the evaluation WSI (Wessex Archaeology 2020). Mitigation areas are listed from north to south. The total area subject to excavation is 4.19 ha and the total number of boreholes is 29.

Table 2 Mitigation excavation

Equivalent evaluation trenches	Mitigation Area	Area m²	Method	Rationale	Parish	District/ Borough
428	50	909	Strip and map	Proximity to mapped buildings and moderate environmental potential. A former course of the River Witham is also believed to have passed through the area, although no evidence for this has been identified to date	Holland Fen with Brothertoft	Boston
465, 466	51	3590		Proximity to mapped buildings ('Three Hundreds' farm)	Amber Hill	
469–473	52	8922	Set piece excavation	Romano-British features	Swineshead	
477	53	3695		Romano-British features		



Equivalent evaluation trenches	Mitigation Area	Area m ²	Method	Rationale	Parish	District/Borough
479	54	2022		Romano-British features		
482–484 (to also include N end of 485)	55	7353		Romano-British features including nearby pottery production site and high environmental potential		
490, 491, 493	56	3261		Unusual gullies/ditches identified during trenching and from cropmarks previously described as 'sinuous watercourses'		
519, 520, 522	57	1658		Undated features that may be related to cropmarks to the east	Little Hale	North Kesteven
521	58	1183				
525–527	59	2830		Romano-British features associated with results of previous nearby excavations at the Viking Link converter station and during the Triton Knoll Offshore Windfarm project	Donington	South Holland
544, 546	60	4739				
545	61	1716				

4.3 Setting out of the excavation areas

- 4.3.1 The mitigation areas will be set out using a Global Navigation Satellite System (GNSS) in the approximate positions shown in **Figures 2–11**. Minor adjustments to the layout may be required to take account of any on-site constraints such as vegetation or located services, and to allow for machine manoeuvring. The locations of excavated areas will be tied in to the Ordnance Survey (OS) National Grid and Ordnance Datum (OD) (Newlyn), as defined by OSTN15 and OSGM15.
- 4.3.2 Where there is no Balfour Beatty post and wire demarcation fencing, post and rope fencing will be used to demarcate mitigation areas. Where mitigation excavation clashes with construction work, Heras fencing and signage ('Archaeological Excavation Area') will be used as a robust demarcation. Heras fencing used in this way will be installed at both ends of the mitigation area and also parallel with the haul road to define the 'sides' of the mitigation area.

4.4 Service location and other constraints

- 4.4.1 The client will provide information regarding the presence of any below/above-ground services, and any ecological, environmental or other constraints.
- 4.4.2 Before excavation begins, the areas will be walked over and visually inspected to identify, where possible, the location of any below/above-ground services. Each entire mitigation area will be scanned before and during excavation with a Cable Avoidance Tool (CAT) to verify the absence of any live underground services.
- 4.4.3 An *Unexploded Ordnance (UXO) Desk Study and Risk Assessment* (Zetica Ltd 2017) reviewed the UXO hazard along the scheme (including a 200 m wide buffer zone) and highlighted a low risk rating to the area containing all of the Zone 3 mitigation excavations. In accordance with the recommendations of the report, all staff will be apprised of the UXO



risk and suitable mitigation strategies via formal UXO awareness inductions prior to commencing work.

4.4.4 The client's appointed landowner liaison team will arrange all access. Wessex Archaeology will follow the client's access instructions and landowner contact protocols.

4.4.5 Soil will be stored like on like: topsoil on topsoil and subsoil on subsoil. Storage areas will be determined based on the location as supplied by the client in the form of storage maps/drawings. Soil will be handled and stored as specified in Soil Handling and Storage Protocol (VKL-BB-ENV-00-PL-EN-20471 Version 3; 11/06/202).

4.5 Geoarchaeological mitigation

4.5.1 At each borehole location a percussive window sampling rig (Terrier type) will be used to extract sleeved cores one metre in length and 100 mm in diameter until the underlying till is or the maximum depth of refusal is reached.

4.5.2 The cores will be split and described (including photographs) on-site by the geoarchaeologist as work proceeds. Where sequences are recorded that warrant further investigation, sequences will be resealed and returned to the Wessex Archaeology laboratory in Salisbury for further detailed geoarchaeological investigations.

4.5.3 Selected cores for further assessment will be sealed and marked with project number, site number, borehole number and sample depth before being returned to the Wessex Archaeology laboratory.

4.5.4 Selection of cores for further assessment will be made by a trained geoarchaeologist on the following basis:

- potential to address aims and objectives and wider research agenda; and,
- representation of common deposit types of geoarchaeological potential, with a particular focus on the retrieval of sequences preserving peat and buried soils.

4.5.5 Before drilling commences, service plans will be consulted, and all locations scanned using a CAT by a trained operative.

4.5.6 Borehole locations will be backfilled with arisings. Where selected boreholes are retained, the exploratory holes will be backfilled with bentonite pellets.

4.5.7 Boreholes described in the field or retrieved for later description will include the following information:

- depth
- texture
- composition
- colour
- inclusions
- structure (bedding, ped characteristics etc)
- contacts between deposits

- 4.5.8 Interpretations will be made regarding the likely depositional environments and formation processes of the sampled deposits. The data will be tabulated by borehole and depth.

4.6 Excavation methods

- 4.6.1 Both strip and map and set piece excavation (SPE) will follow the same methodologies laid out here.
- 4.6.2 The strip and map and SPE mitigation areas will be excavated using a 360° tracked excavator equipped with a toothless bucket. Machine excavation will be under the constant supervision and instruction of the monitoring archaeologist, and will proceed in level spits of approximately 50–200 mm until either the archaeological horizon or the natural geology is exposed. All surfaces of archaeological deposits will be cleaned by hand. Strip and Map areas will be surveyed and complete record of archaeological features will be made to include full photographic record.
- 4.6.3 Each Strip and Map and SPE mitigation area will be excavated within the easement area based upon clearance zones of up to 10 m from the last archaeological feature. If archaeological features continue beyond this 10 m clearance, the client and curator will be informed before stripping continues. The client and the curators will be informed as these areas will become contingency work. No work will be undertaken without client and curator consent.
- 4.6.4 For SPE areas a sample of the archaeological features and deposits identified will be hand-excavated, sufficient to address the aims of the excavation. The following minimum sampling levels are proposed:
- 50% of all discrete archaeological features (eg, pits, postholes);
 - 50% of all structural features (eg, ring ditches, roundhouse gullies, beam slots) including all terminals and feature intersections, except if *in situ* built remains are revealed, where they will be cleaned and recorded pending the implementation of a detailed excavation and recording strategy (to be agreed with all parties);
 - 50–100% of features and deposits associated with specific domestic and/or industrial activities (eg, hearths, ovens, kilns);
 - 100% of all inhumation and cremation burials, and other cremation-related deposits; and
 - 10–20% of all linear features (eg, ditches, gullies), including all terminals and feature intersections.
- 4.6.5 If the sampling levels outlined above are not proportionate to the significance of the archaeological remains identified, the scope of works will be reassessed in consultation with the archaeological advisor to ELDC and SHDC, and/or the archaeological advisor to NKDC and BBC (depending on the location of the mitigation area in question), with up to 100% of individual features or deposits being excavated as required. Reassessment of the methodology proportionate to the significance of the site could lead to either an increase or decrease in the proportion of sample excavation.
- 4.6.6 Spoil derived from both machine stripping and hand-excavation will be visually scanned for the purposes of finds retrieval, and where appropriate will also be metal-detected by trained archaeologists. Artefacts and other finds will be collected and bagged by context.

4.6.7 If human remains are uncovered, the specific methods outlined below (section 4.10) will be followed.

4.6.8 Consideration will be given to the use of accredited local metal detector operators, subject to written agreement regarding disclosure, surrender and ownership of finds not falling under the *Treasure Act 1996*.

4.7 Recording

4.7.1 All exposed archaeological deposits and features will be recorded using Wessex Archaeology's pro forma recording system.

4.7.2 A complete record of excavated archaeological features and deposits will be made. This will include plans and sections, drawn to appropriate scales (generally 1:20 or 1:50 for plans, 1:10 for sections) and tied to the OS National Grid.

4.7.3 A full photographic record will be made using digital cameras equipped with an image sensor of not less than 16 megapixels. This will record the detail and the general context of the principal features and the site. Digital images will be subject to managed quality control and curation processes which will embed appropriate metadata within the image and ensure long term accessibility of the image set. Photographs will also be taken of all areas, including access routes, to provide a record of conditions prior to and on completion of the excavation.

4.7.4 The record will include:

- each area (including access) prior to commencement of fieldwork;
- each area during work, showing specific stages of fieldwork;
- the layout of archaeological features within each area;
- a representative section for each area;
- individual features and their sections; and,
- groups of features where their relationship is important.

4.8 Survey

4.8.1 The real time kinematic (RTK) survey of all excavated areas and features will be carried out using a Leica GNSS connected to Leica's SmartNet service. All survey data will be recorded in OS National Grid coordinates and heights above OD (Newlyn), as defined by OSTN15 and OSGM15, with a three-dimensional accuracy of at least 50 mm.

4.9 Monitoring

4.9.1 The client will inform the archaeological advisor to ELDC and SHDC, and/or the archaeological advisor to NKDC and BBC (depending on the location of the mitigation area in question) of the start of each excavation and its progress. Reasonable access will be arranged for the appropriate archaeological advisor to make site visits to inspect and monitor the progress of the excavation. Any variations to the WSI required to better address the project aims will be agreed in advance with the client and the appropriate archaeological advisor. Variations are to be written and appended to the WSI, which is a planning document.

- 4.9.2 Regular verbal progress reports will be provided to the client and the appropriate archaeological advisor during the excavation programme and also at any stage upon request.
- 4.9.3 Brief written progress reports will be provided weekly (via e-mail) and sent to the client, appropriate archaeological advisor and NGVL during excavation. The weekly progress reports will summarize:
- status and progress of ongoing areas;
 - all archaeological findings by area; and
 - photos, as appropriate.
- 4.9.4 In addition, regular progress meetings between the appropriate archaeological advisor, Wessex Archaeology and the client will be held on site during the course of the fieldwork.

4.10 Reinstatement

- 4.10.1 Following the completion of the excavation to the satisfaction of the client and the archaeological advisor for ELDC and SHDC, and/or the archaeological advisor for NKDC and BBC (depending on the location of the mitigation area in question), the excavated areas will be backfilled, but no other reinstatement will be undertaken.

4.11 Finds

General

- 4.11.1 All archaeological finds from excavated contexts will be retained, although those from features of modern date (20th century or later) may be recorded on site and not retained. Where appropriate, soil samples may be taken and sieved to aid in finds recovery. Any finds requiring conservation or specific storage conditions will be dealt with immediately in line with *First Aid for Finds* (Watkinson and Neal 1998).
- 4.11.2 Animal bones will be hand collected from all excavated features and will be bagged and labelled according to their excavated context. Where deposits contain dense concentrations of bones or other artefact categories, judicious use of 100 litre coarse-sieved samples will be considered to maximize recovery and information potential. Articulated animal bones (complete and partial skeletons, and articulating vertebrae, limb elements, etc) will be treated in a similar fashion to human burials, i.e. should be recorded on an 'animal bone group' recording form (or similar) and bagged separately. Historic England Animal Bone guidance will be adhered to <https://historicengland.org.uk/images-books/publications/animal-bones-and-archaeology/>

Human remains

- 4.11.3 Wessex Archaeology obtained a Ministry of Justice Licence (Licence: 20-0152) and in the event of discovery of any human remains (articulated or disarticulated, cremated or unburnt), all excavation of the deposit(s) will be done under this licence (this includes cases where remains are to be left in situ).
- 4.11.4 All human remains in the agreed mitigation areas will be removed. All excavation and post-excavation will be in accordance with Wessex Archaeology protocols, and in-line with current guidance documents (eg, McKinley 2013) and the standards set out in ClfA Technical Paper 13 (McKinley and Roberts 1993). Appropriate specialist guidance/site visits will be undertaken if required.

- 4.11.5 The final deposition of human remains subsequent to the appropriate level of osteological analysis and other specialist sampling/examinations will follow the requirements set out in the Ministry of Justice licence.

Treasure

- 4.11.6 Wessex Archaeology will immediately notify the client and the archaeological advisor for ELDC and SHDC, and/or the archaeological advisor for NKDC and BBC (depending on the location of mitigation area in question) on discovery of any material covered, or potentially covered, by the *Treasure Act 1996*. All information required by the *Treasure Act* (ie, finder, location, material, date, associated items etc.) will be reported to the Coroner within 14 days.

4.12 Environmental sampling

Introduction

- 4.12.1 All sampling will be undertaken following Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (Campbell et al. 2011 and Historic England 2015b).

Area-specific sampling strategy

- 4.12.2 Depending on the size, complexity and duration of excavation, the formulation of a site-specific sampling strategy will be considered at an early stage. Initially informed by prior works or predicted conditions, the strategy will be developed and adapted as the excavation continues, with support provided by specialist site visits and/or phone advice as appropriate. The aim of the strategy will be to effectively target both archaeological and landscape features in order to address the aims and objectives of the project, if appropriate with reference to local or regional research agendas. Any change in strategy will be agreed with the archaeological advisor for ELDC and SHDC, and/or the archaeological advisor for NKDC and BBC (depending on the location of the mitigation area in question).

Sampling methods

- 4.12.3 Bulk environmental soil samples, for the recovery of plant macrofossils, wood charcoal, small animal bones and other small artefacts, will be taken as appropriate from well-sealed and dateable contexts. In general, features directly associated with particular activities (eg, pits, latrines, cesspits, hearths, ovens, kilns, and corn driers) should be prioritised for sampling over features, such as ditches or postholes, which are likely to contain reworked and residual material.
- 4.12.4 If waterlogged or mineralised deposits are encountered, an environmental sampling strategy will be devised and agreed with the archaeological advisor for ELDC and SHDC, and/or the archaeological advisor for NKDC and BBC (depending on the location of the mitigation area in question) as appropriate. Specialist guidance will be provided by a member Wessex Archaeology's geoarchaeological and environmental team, with site visits undertaken if required.
- 4.12.5 Any samples will be of an appropriate size: typically 40 litres for the recovery of environmental evidence from dry contexts, and 10 litres from waterlogged deposits.
- 4.12.6 Following specialist advice, other sampling methods such as monolith, Kubiena or contiguous small bulk (column) samples may be employed to enable investigation of deposits with regard to microfossils (eg, pollen, diatoms) and macrofossils (eg, molluscs, insects), soil micromorphological or soil chemical analyses. Wessex Archaeology guidance

booklets will be provided for all archaeologists on site. These booklets will inform in what circumstances might other sampling methods be warranted, why and how to take them.

5 POST-EXCAVATION METHODS AND REPORTING

5.1 Introduction

- 5.1.1 All costing for the post-excavation work and reporting will be agreed with NGVL and the client in advance of the post-excavation work. This will be done only when the details of the nature and quantities of archaeological features and findings are known and quantified. The cost will be presented per mitigation area.

5.2 Stratigraphic evidence

- 5.2.1 Initially, the archive will be consolidated: all written and drawn records from the excavation will be collated, checked for consistency and stratigraphic relationships. Context data will then be entered into a database, which can be updated during any future analyses. A stratigraphic assessment of the context data will be made, this will involve:

- a review of context and stratigraphic groups;
- preliminary phasing of the remains based on recorded stratigraphic relationships, pottery spot-dates and any other relevant information;
- the identification of any problems with stratigraphic interpretation (due to truncation, redeposition, residuality etc.), and problems with phasing (due to low level of finds etc.);
- the identification of area drawings to be digitised;
- the suggestion of possible contexts for radiocarbon or other scientific dating; and,
- a quantification of features.

5.3 Finds evidence

- 5.3.1 All retained finds will, as a minimum, be washed, weighed, counted and identified. They will then be recorded to a level appropriate to the aims and objectives of the excavation. The report will include a table of finds by period and/or feature group. Recording and reporting will conform to the Type 2 (Appraisal) level according to ClfA's *Toolkit for Specialist Reporting*, to include appropriate quantification, characterisation and assessment of significance and potential.
- 5.3.2 Metalwork from stratified contexts will be X-rayed and, along with other fragile and delicate materials, stored in a stable environment. The X-raying of objects and other conservation needs will be undertaken by Wessex Archaeology in-house conservation staff, or by another approved conservation centre.
- 5.3.3 Artefacts and other finds will be suitably bagged and boxed in accordance with the guidance given by the relevant museum and generally in accordance with the standards of the ClfA (2014b).

5.4 Environmental evidence

- 5.4.1 Bulk environmental soil samples will be processed by standard flotation methods. The residues will be fractionated into 5.6/4 mm and 1/0.5 mm and dried if necessary. The coarse residue fraction (>5.6/4 mm), and the fine fraction when appropriate, will be sorted and discarded, with any finds recovered given to the appropriate specialist. The flot will be

retained on a 0.25 mm mesh and scanned to assess the environmental remains present and their preservation. Unsorted fine residues will be retained until after any analyses and discarded following final reporting (in accordance with the Selection policy, below).

5.4.2 In the case of samples from cremation-related deposits the flots will be retained on a 0.25 mm mesh, with residues fractionated into 4 mm, 2 mm and 1 mm. In the case of samples from inhumation burial deposits, the sample will be wet-sieved through 9.5 mm and 1 mm mesh sizes. The coarse fractions (9.5 mm) will be sorted with any finds recovered given to the appropriate specialist together with the finer residues.

5.4.3 Any waterlogged samples will be processed by standard waterlogged flotation methods.

5.5 Laboratory-based sediment description

5.5.1 Boreholes retrieved for laboratory-based description will include the following information:

- depth
- texture
- composition
- colour
- inclusions
- structure (bedding, ped characteristics etc)
- contacts between deposits

5.5.2 A written description will be made of all geoarchaeological deposits that were encountered in each borehole. Details of all contexts will be provided in borehole tables in the appendix of the report.

5.6 Deposit modelling

5.6.1 Deposit modelling enables the subsurface topography to be mapped accurately, locating deposits of archaeological and geoarchaeological potential in two, and where appropriate, three dimensions.

5.6.2 The aim of the deposit modelling is to produce a targeted 2D lateral transect illustrating the relationship between the peat in the different areas of Zone 3.

5.6.3 This transect will incorporate the stratigraphic logs from the results of the archaeological evaluation, any available geotechnical logs for this part of the scheme and the new geoarchaeological boreholes.

5.6.4 A total of 19 geotechnical interventions (BH01(CS9)–BH03(CS9); BH01(CS1)–BH03(CS1); BH001–BH011; TP001–TP002) reported in ARUP (2017) fall within the area of Zone 3, and will provide useful stratigraphic data for the deposit model in combination with the results of the previous archaeological evaluation (Wessex Archaeology 2020) and borehole survey Rackham (2020).

5.6.5 All relevant data points will be entered into industry standard software (Rockworks™ v17.0). Each lithological description (eg, peat, clay, silt, sand etc.) will be given a colour and pattern allowing cross correlating and grouping of the different sediment and soil types. The grouping of these deposits is based on these lithological descriptions, which define distinct

depositional environments referred to as 'stratigraphical units' (eg, alluvium, peat, buried soils etc.).

- 5.6.6 Where suitable contexts are present, stratigraphical units representing certain depositional environments and/or landforms, will be reconstructed both laterally and horizontally. These can then be used to create a lateral transect illustrating the deposits.'
- 5.6.7 Because of the linear nature of the scheme, the deposit models are likely to take the form of stratigraphic profiles (transects) of sequences along the route of the scheme. However, should sufficient borehole and trench/sondage data be available to produce three dimensional models in selected areas of the site, and where necessary to achieve the overarching aims and objectives and specific research objectives, these will be created using an inverse-distance weighted (IDW) algorithm in Rockworks™ v17.0 and ArcMap™ 10.6. These models can then be displayed in the form of Digital Elevation Models (DEMs) and thickness plots where appropriate.

5.7 Palaeoenvironmental assessment techniques

- 5.7.1 The principal aim of palaeoenvironmental assessment is to date key deposits and determine the preservation and concentration of the various remains outlined below. The results of the assessment provide a framework for establishing the potential of a given deposit to contribute towards the overarching research objectives and specific research questions outlined in sections 3.3 and 3.4.
- 5.7.2 The selection of material for further palaeoenvironmental assessment will be determined by the potential of the deposits in the boreholes to contribute towards these overarching research objectives and specific research questions, to be determined following the results of the sedimentary descriptions and deposit modelling.
- 5.7.3 Palaeoenvironmental assessment involves a suite of complimentary techniques in accordance with Historic England guidelines on good practice in Environmental Archaeology (Campbell et al. 2011) and Geoarchaeology (Historic England 2015b), providing a comprehensive understanding of the deposits and environmental context.
- 5.7.4 Deposits of high geoarchaeological value include peat, buried soils and other organic rich sediment that have the potential to preserve a range of palaeoenvironmental remains, or deposits that are significance for understanding the physical evolution of the wetland and associated dry ground landscape and the site.
- 5.7.5 Targeted assessment of samples from retained cores should focused on the following key techniques to establish the date of deposits and the preservation quality of key remains.

AMS Radiocarbon dating

- 5.7.6 Targeted sections of peat or other organic-rich sediments (typically 0.2 m thick) will be extracted from retained cores for AMS (Accelerator Mass Spectrometry) radiocarbon dating (initial range-finder dates) with the aim of establishing the broad date range of peat formation. Samples will be processed, and suitable terrestrial plant remains (representing short-lived plants) selected and submitted for dating. Where thick peats are present, radiocarbon dates from the top and base of peats are recommended.

Plant macrofossils

- 5.7.7 Targeted sections of retained core extracted from peat deposits and processed through a nest of sieves to recover suitable short-lived terrestrial plant material for AMS radiocarbon

dating. Plant macrofossils also provide information on local vegetation and evidence for possible human activity.

Pollen

- 5.7.8 Pollen is one of the principal techniques used in environmental archaeology to investigate past vegetation environments and the impact of human communities on the landscape. In the case of the present site, pollen will be best preserved in the peat and other organic sediments (including buried soils) and requires small 1 cm³ samples taken at increments through the deposit. Where pollen is well-preserved it is likely to provide important evidence informing on past manipulation of the wetland, wetland edge and associated dry ground vegetation by hunter-gatherers and early agricultural communities.

Diatoms, foraminifera and ostracods

- 5.7.9 Diatoms (unicellular algae), foraminifera (marine protozoa) and ostracods (bivalve Crustacea) occur in a wide range of marine and semi-terrestrial environments (eg, saltmarsh) and provide important indicators on past coastal change. For example, they can help to distinguish freshwater from marine environments and help to understand past patterns of sea-level and coastal change. These techniques each require roughly 50 g of sediment per sample.

5.8 Reporting

General

- 5.8.1 Following completion of the fieldwork and the assessment of the stratigraphic, artefactual and ecofactual evidence, a draft post-excavation assessment report will be submitted for approval to the client and the archaeological advisors for ELDC and SHDC, and NKDC and BBC, for comment. Once approved, a final version will be submitted.
- 5.8.2 The report will include the following elements:
- Non-technical summary;
 - Project background;
 - Archaeological, geoarchaeological and historical context;
 - Aims and objectives;
 - Methods;
 - Results – stratigraphic, finds and environmental, including detailed summary of the results of the purposive borehole survey, including description, deposit modelling and interpretation of results;
 - A preliminary discussion of the likely archaeological and palaeoenvironmental potential and significance of the deposits, with reference to wider archaeological and landscape context;
 - Statement of potential – of the stratigraphic, finds and environmental data – the extent to which the archive might be able to meet the original aims and research objectives of the project;
 - Updated Project Design, including summary of recommendations for any further analyses and updated project aims, with proposals for any publication (including a task list scheduling the personnel and resources required for analyses);

- Proposals with specific details of further palaeoenvironment analysis and dating work to be undertaken (where relevant and appropriate), with a commitment to undertaking these;
- Archive preparation and deposition arrangements;
- Appendices;
- Illustrations; and,
- References.

5.8.3 A copy of the final post-excavation assessment report will be deposited with the HER, along with surveyed spatial digital data (.dxf or shapefile format) relating to the excavation.

Publication

5.8.4 Depending on the significance of the results, it is anticipated that dissemination of the results and their interpretation will be recommended by the Updated Project Design. Details of the scope and form of the publication will be outlined in the Updated Project Design.

OASIS

5.8.5 An OASIS (online access to the index of archaeological investigations) record (<http://oasis.ac.uk>) will be created, with key fields completed, and a .pdf version of the final report submitted. Subject to any contractual requirements on confidentiality, copies of the OASIS record will be integrated into the relevant local and national records and published through the Archaeology Data Service (ADS) ArchSearch catalogue.

6 ARCHIVE STORAGE AND CURATION

6.1 Museum

6.1.1 It is required that the project archive resulting from the excavation be deposited with The Collection Museum, Lincoln. Provision has been made for the cost of long-term storage in the post-fieldwork costs. The museum has been notified of the project, prior to fieldwork commencing, and an accession number has been obtained (LCNCC:2019.168 Site Code VIK19).

6.2 Transfer of title

6.2.1 On completion of the excavation, every effort will be made to persuade the legal owner of any finds recovered (ie, the landowner), with the exception of human remains and any objects covered by the *Treasure Act 1996*, to transfer their ownership to the museum in a written agreement.

6.3 Preparation of archive

Physical archive

6.3.1 The physical archive, which may include paper records, graphics, artefacts, and ecofacts, will be prepared following the standard conditions for the acceptance of excavated archaeological material by The Collection Museum, Lincoln, and in general following nationally recommended guidelines (SMA 1995; ClfA 2014c; Brown 2011). The archive will usually be deposited within one year of the completion of the project, with the agreement of the client.

Digital archive

- 6.3.2 The digital archive generated by the project will be deposited with a Trusted Digital Repository, in this instance the Archaeology Data Service (ADS), to ensure its long-term curation. Digital data will be prepared following ADS guidelines (ADS 2013 and online guidance) and accompanied by metadata. Full details of the collection, documentation, storage and selection of digital data are included in the project Document Management Plan (DMP), available on request.

6.4 Selection strategy

- 6.4.1 It is widely accepted that not all the records and materials (artefacts and ecofacts) collected or created during the course of an archaeological project require preservation in perpetuity. These records and materials will be subject to selection in order to establish what will be retained for long-term curation, with the aim of ensuring that all elements selected to be retained are appropriate to establish the significance of the project and support future research, outreach, engagement, display and learning activities, ie the retained archive should fulfil the requirements of both future researchers and the receiving Museum.
- 6.4.2 The selection strategy, which details the project-specific selection process, is underpinned by national guidelines on selection and retention (Brown 2011, section 4) and generic selection policies (SMA 1993; Wessex Archaeology's internal selection policy) and follows ClfA's *Toolkit for Selecting Archaeological Archives*. It should be agreed by all stakeholders (Wessex Archaeology's internal specialists, external specialists, local authority, museum) and fully documented in the project archive.
- 6.4.3 The project-specific selection strategy is presented here as **Appendix 3**, which at this stage includes the on-site collection strategy for finds. Further modifications are expected to be made to the selection strategy as the project progresses; specific review points will be at assessment stage, and on project completion prior to final archive preparation.

6.5 Security copy

- 6.5.1 In line with current best practice (eg, Brown 2011), on completion of the project a security copy of the written records will be prepared in the form of a digital PDF/A file. PDF/A is an ISO-standardised version of the Portable Document Format (PDF) designed for the digital preservation of electronic documents through omission of features ill-suited to long-term archiving.

7 OUTREACH AND SOCIAL MEDIA

- 7.1.1 NGVL will make a provision for an overall publication on the archaeological results of the scheme. The project will, where possible, and in consultation with all stakeholders, seek opportunities to disseminate the results of the mitigation and engage with a wide audience. This may be through social media, and/or regular press releases or via other novel and innovative methods. Statistics for social media interactions will be presented as a graph in the PXA report. Engagement with Viking Link archaeology will enhance the public's knowledge and understanding of Lincolnshire heritage. The delivery team will encourage enjoyment, provide opportunities for interaction, and facilitate engagement with the landscape, the archaeological process and project discoveries. The landscape, archaeological processes and project discoveries will be used as a stimulus for participation in the arts, enhanced wellbeing and learning about science, culture and heritage.
- 7.1.2 If possible, outreach will be done through open days (off site), public talks and presentations and when and where possible, volunteer involvement. The project will also explore other

options for the dissemination of the results and heritage interpretation (3D printing, virtual reconstructions, turning signage into interpretative public art etc). Health and safety, confidentiality and potential for vandalism will be considered in the design of all outreach and engagement activities.

- 7.1.3 Wessex Archaeology will disseminate information and images associated with the project for publicity or information purposes, with the permission of the client.

8 COPYRIGHT

8.1 Archive and report copyright

- 8.1.1 The full copyright of the written/illustrative/digital archive relating to the project will be retained by Wessex Archaeology under the *Copyright, Designs and Patents Act 1988* with all rights reserved. The client will be licenced to use each report for the purposes that it was produced in relation to the project as described in the specification. The museum, however, will be granted an exclusive licence for the use of the archive for educational purposes, including academic research, providing that such use conforms to the *Copyright and Related Rights Regulations 2003*.
- 8.1.2 Information relating to the project will be deposited with the Historic Environment Record (HER) where it can be freely copied without reference to Wessex Archaeology for the purposes of archaeological research, or development control within the planning process.

8.2 Third party data copyright

- 8.2.1 This document, the post-excavation assessment report and the project archive may contain material that is non-Wessex Archaeology copyright (eg, Ordnance Survey, British Geological Survey, Crown Copyright), or the intellectual property of third parties, which Wessex Archaeology are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Wessex Archaeology. Users remain bound by the conditions of the *Copyright, Designs and Patents Act 1988* with regard to multiple copying and electronic dissemination of such material.

9 WESSEX ARCHAEOLOGY PROCEDURES

9.1 External quality standards

- 9.1.1 Wessex Archaeology is registered as an archaeological organisation with the Chartered Institute for Archaeologists (CIfA) and fully endorses its *Code of conduct* (CIfA 2014d) and *Regulations for professional conduct* (CIfA 2014e). All staff directly employed or subcontracted by Wessex Archaeology will be of a standard approved by Wessex Archaeology, and archaeological staff will be employed in line with the CIfA codes of practice and will normally be members of the CIfA.

9.2 Personnel

- 9.2.1 The fieldwork will be directed and supervised by an experienced archaeologist from Wessex Archaeology's core staff. The overall responsibility for the conduct and management of the project will be held by one of Wessex Archaeology's project managers, who will visit the fieldwork as appropriate to monitor progress and to ensure that the scope of works is adhered to. Where required, monitoring visits may also be undertaken by Wessex Archaeology's Health and Safety manager. The appointed project manager will be involved in all phases of the investigation through to its completion.

9.2.2 The following key staff are proposed:

- Project Director: Andrew Norton
- Project Manager Milica Rajic
- Fieldwork Director Emily Eastwood
- GIS Manager: Chris Breeden

9.2.3 The analysis of any finds and environmental data will be undertaken by Wessex Archaeology core staff or external specialists, using Wessex Archaeology's standard methods, under the supervision of the departmental managers and the overall direction of the project manager. A complete list of specialists is provided in the Appendix.

9.2.4 Wessex Archaeology reserves the right, where necessary due to unforeseen circumstances, to replace nominated personnel with alternative members of staff of comparable expertise and experience.

9.3 Internal quality standards

9.3.1 Wessex Archaeology is an ISO 9001 accredited organisation (certificate number FS 606559), confirming the operation of a Quality Management System which complies with the requirements of ISO 9001:2015 – covering professional archaeological and heritage advice and services. The award of the ISO 9001 certificate, independently audited by the British Standards Institution (BSI), demonstrates Wessex Archaeology's commitment to providing quality heritage services to our clients. ISO (the International Organisation for Standardisation) is the most recognised standards body in the world, helping to drive excellence and continuous improvement within businesses.

9.3.2 Wessex Archaeology assigns responsibility to individual managers for the successful completion of all aspects of a project including reporting. This includes monitoring progress and quality; controlling the budget from inception to completion; and all aspects of health and safety for the project. At all stages, the project manager will carefully assess and monitor performance of staff and adherence to objectives, timetables and budgets, while the manager's own performance is monitored by the team leader or regional director. The technical managers in the Graphics, Research, GeoServices and IT sections provide additional assistance and advice.

9.3.3 All staff are responsible for following Wessex Archaeology's quality standards but the overall adherence to and setting of these standards is the responsibility of the senior management team who, in consultation with the team leaders/regional directors, also ensure projects are adequately programmed and resourced within Wessex Archaeology's portfolio of project commitments.

9.4 Health and safety

9.4.1 All works will be undertaken in accordance with the *Health and Safety at Work Act 1974*; the *Management of Health and Safety at Work Regulations 1999*; and all other applicable health and safety legislation.

9.4.2 Wessex Archaeology has a fully compliant health and safety management system that has year on year satisfied the criteria for SSIP certification (Safety Schemes in Procurement). SSIP itself is aligned with PAS91.



- 9.4.3 Wessex Archaeology will, for all projects, produce one or more task and site-specific risk assessments and method statements (RAMS), which will ensure our staff can work safely on the site. A copy of the RAMS and our Health and Safety Policy can be provided to the client. All staff on our sites will be made fully familiar with the RAMS before work commences. A copy of the RAMS will be held at each mitigation area to ensure that it is available to Wessex Archaeology staff and adhered to.
- 9.4.4 We aim to work collaboratively on health and safety with clients and, where separately appointed, with principal contractors. We expect clients to provide in good time all the necessary risk information about a site that may affect the archaeological work, such as locations of utilities or any known ground contamination. We will comply with the project specific Personal Protective Equipment (PPE) requirements, and any other specific additional requirements of the Principal Contractor.
- 9.4.5 All fieldwork staff are certified through the Construction Skills Certification Scheme (CSCS) and have undergone UKATA Asbestos Awareness Training. Staff who carry out specific tasks are suitably trained and competent to do so through training accredited by the Construction Industry Training Board (CITB), Institution of Occupational Safety & Health (IOSH) and the National Plant Operators Recognitions Scheme (NPORS). All site supervisors have SSSTS training.
- 9.5 Insurance**
- 9.5.1 Wessex Archaeology holds Employers Liability (£10,000,000), Public Liability (£5,000,000) and Professional Indemnity (£5,000,000) policies.

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APPENDICES

Appendix 1 Finds and environmental specialists

Name	Qualifications	Specialism
Phil Andrews	BSc; FSA; MCIfA	Slag and metal working debris
Ceridwen Boston	BSocSc; MA; MSc; DPhil	Osteoarchaeology; funerary archaeology
Pippa Bradley	BA; MPhil; Dip Post Ex; MCIfA	Prehistoric flint and worked stone, shale and jet
Elina Brook	BA; MA; PCIfA	Later prehistoric and Romano-British pottery, and small finds
Alex Brown	BA; MSc; PhD	Geoarchaeology, palynology
Kirsten Egging Dinwiddy	BA; MA; MCIfA	Human remains (inhumations)
Erica Gittins	BA; MA; PhD	Prehistoric flint
Phil Harding	PhD	Prehistoric flint, particularly Palaeolithic flint
Lorrain Higbee	BSc; MSc; MCIfA	Animal bone
Grace Jones	BA; MA; PhD; MCIfA	Prehistoric and Roman pottery, ceramic building material, fired clay, and small finds
Matt Leivers	BA; PhD; ACIfA	Prehistoric pottery and flint
Inés López-Dóriga	BA; MA; PhD	Archaeobotanical remains
Erica Macey-Bracken	BA; ACIfA	Post-medieval finds, ceramic building material and worked wood
Katie Marsden	BSc	Pottery from prehistoric to post-medieval/modern. Metalwork of all periods, including coins. Small and bulk finds including fired clay, ceramic building material, worked bone
Jacqueline McKinley	BTech; FSA	Human remains (inhumations and cremations)
Lorraine Mephram	BA; MCIfA	Pottery and other ceramic finds of all dates, concentrating on later prehistoric and post-Roman; ceramic building material; clay tobacco pipe; glass of Saxon or later date; small finds
Nicki Mulhall		Geoarchaeology and archaeobotanical remains
David Norcott	BA; MSc; MCIfA	Geoarchaeology
Richard Payne	BSc; MSc; MPhil	Geoarchaeology
Holly Rodgers	BA; MSc	Geoarchaeology
Daniel Young	BSc, MSc, PhD	Geoarchaeology
Emma Robertson	BA; MSc	Human remains (inhumations)
Rachael Seager Smith	BA; MCIfA	Pottery with particular emphasis on Roman ceramics; and metalwork, fired clay, ceramic building material, stone, worked bone, shale, glass, and wall plaster
Andrew Shaw	BA; MA; PhD	Palaeolithic lithic artefacts and Pleistocene geoarchaeology
Amy Thorp	BA; MA	Pottery with emphasis on Roman ceramics, small finds



Appendix 2 Summary of evaluation results

Evaluation trenches	Mitigation area	Boreholes	Result
350			Modern ditch and undated pit
351			Negative
352			Previously excavated by Network Archaeology
353			Negative
354–356		BH1	Rackham 2020 predicts buried peat above 1.5 m BGL
357		BH2	Peat at 1–1.2 m BGL
358–359			Not dug; directional drilling to be employed
360		BH3	Rackham 2020 predicts buried peat above 1.5 m BGL
361–363			Negative
364			Modern ditch. Environmental sample with some potential
365			Modern ditches/cultivation trenches'
366		BH4	Negative
367			Rackham 2020 predicts buried peat above 2 m BGL
368		BH5	Peat at 1–1.2 m BGL
369			Peat at 1–1.3 m BGL
370			Rackham 2020 predicts buried peat above 2 m BGL
371		BH6	Peat at 1–1.3 m BGL
372–374		BH7	Negative
375			Modern ditch
376			Modern ditches
377–381			Negative
382–383		BH8	Rackham 2020 predicts buried peat above 2 m BGL
384			Negative
385–386		BH9	Rackham 2020 predicts buried peat above 2 m BGL
387–391			Negative
392		BH10	Peat at 1.5–1.6 m BGL
393			Negative
394			Undated ditch
395			Rackham 2020 predicts buried peat above 2 m BGL
396–397			Negative
398			Rackham 2020 predicts buried peat above 1.5 m BGL. Modern gully
399		BH11	Peat at 0.95–1.25 m BGL
400			Peat at 1.1–1.25 m BGL
401			Peat at 0.9–1.15 m BGL
402–407		BH12	Rackham 2020 predicts buried peat above 1.5 m BGL
408			Negative
409			Modern drain
410			Undated ditch, gully and animal grave
411			Undated ditch
412			Negative
413			Modern ditches and gully
414			Natural feature or undated ditch



Evaluation trenches	Mitigation area	Boreholes	Result
415			Negative
416			Modern ditch
417–419			Negative
420			Undated ditches and pit
421			Negative
422			Modern ditch
423			Undated ditch
424			Modern ditch
425			'Semi-natural' drainage channels
426			Undated ditches
427			Modern ditch
428			50
429–430			Negative
431			Probable natural channel, otherwise modern ditch
432–440			BH13
441			Undated ditch and gully
442–445			Negative
446			Natural channels or undated ditches
447			Undated large discrete feature such as a pond
448–449			Negative
450			Undated ditch
451			Undated pits
452		BH14	Negative
453			Modern ditch
454		BH15	Peat at 0.8–1.2 m BGL. Modern ditch
455			Modern ditch
456–464		BH16	Negative
465–466		51	
467		Negative	
468		Probable natural channel	
469	52	BH17	Thin layer with RB pottery
470			Ditches, one with RB pottery, also geological layers
471			Modern ditch and undated ditch. RB pottery residual in land drain
472–473		BH18	Undated ditches
474			Negative
475			Undated ditch
476			Negative
477	53		Undated ditches with oyster shell
478			Negative
479	54		Ditches, one with RB pottery
480			Undated ditch. RB pottery residual in land drain
481			Negative



Evaluation trenches	Mitigation area	Boreholes	Result
482–484	55	BH19	Ditches with RB pottery. Pottery production nearby. Environmental sample with high potential
485			Undated ditch
486			Modern gully
487			Undated ditch
488–489			Negative
490–493	56		Unusual gullies/ditches identified during trenching and from cropmarks previously described as 'sinuous watercourses'
494–496		BH21	Negative
497			Undated ditch
498			Rackham 2020 predicts buried peat above 2 m BGL
499			Negative
500			Undated ditch
501–503			Negative
504			Undated ditches
505			Modern and undated ditches
506–507			Modern ditches
508–515		BH22	Negative
516			Modern gullies
517–518		BH23	Negative
519		57	BH24
520		BH25	Negative
521	58		Undated features that may be related to cropmarks to the east. Modern gully
522	57		Undated features that may be related to cropmarks to the east. Modern gully
523			Modern ditch
524		BH26	Negative
525	59		Undated features that may be related to cropmarks to the east
526			Undated features that may be related to cropmarks to the east. Modern ditches
527			Undated features that may be related to cropmarks to the east
528–533		BH27, BH28	Negative
534			Peat below 2.8 m BGL
535–540		BH29	Negative
541			Undated gully
542–543	Negative		
544	60		Probable natural channel. Proximity to RB results of Triton Knoll Offshore Windform and Viking Link converter station
545	61		Pit/ditch terminal with RB pottery and undated ditches. Proximity to RB results of Triton Knoll Offshore Windform and Viking Link converter station (see Fig. 20)
546	60		Undated stakeholes, posthole and ditch. Proximity to RB results of Triton Knoll Offshore Windform and Viking Link converter station (see Fig. 20)



Appendix 3 Selection strategy

218710-5 Viking Link version 1, 28.04.21 Selection Strategy

Project Information

Project Management

Project Manager	Milica Rajic	
Archaeological Archive Manager	Lorraine Mephram	
Organisation	Wessex Archaeology (WA)	
Stakeholders		Date Contacted
Collecting Institution(s)	The Collection (Dawn Heywood) Archaeology Data Service	04.08.20
Project Lead / Project Assurance	Lead: Emily Eastwood Assurance: Milica Rajic	N/A
Client	Balfour Beatty on behalf of National Grid Viking Link Ltd	
Other (external)	External finds & environmental specialists (see WSI) Local Planning Authority Archaeological Advisors (Jan Allen & Denise Drury)	
Other (internal)	WA Finds Manager (Rachael Seager Smith) WA North Finds & Archives Officer (Jessica Irwin) WA Environmental Officer (Inés López Dóriga) WA Geomatics & BIM Manager (Damien Campbell-Bell) WA internal finds & environmental specialists (see WSI)	N/A; briefed as part of standard project process

Resources

Resources required

WA Finds and Environmental specialists; external finds and environmental specialists; WA archives team

Context

This overarching selection strategy document is based on the ClfA Archives Selection Toolkit (2019) and relates to archaeological project work being undertaken by Wessex Archaeology as defined in the WSIs.

Relevant standards, policies and guidelines consulted include:

General

- *Selection, Retention and Dispersal of Archaeological Collections* (Society of Museum Archaeologists, 1993)
- *Archaeological archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2011, section 4)
- *Lincolnshire Archaeological Handbook: Chapter 17 Archaeological Archives Deposition Guidelines* (Jennings 2019)

Relevant research agendas

East Midlands Historic Environment Research Framework East Midlands Historic Environment Research Framework. <https://researchframeworks.org/emherf/>

Finds

- *Standard Guidance for the collection, documentation, conservation & research of archaeological materials* (ClfA, 2014b)
- *A Standard for Pottery Studies in Archaeology* (Prehistoric Ceramics Research Group, Study Group for Roman Pottery, Medieval Pottery Research Group 2016)

Environmental

- *Environmental Archaeology: A Guide to the Theory, Practice of Methods, from Sampling and Recovery to Post-excavation* (Campbell et al. 2011)
- *Geoarchaeology: Using Earth Sciences to Understand the Archaeological Record* (Historic England 2015b)
- *Guidelines for the Curation of Waterlogged Macroscopic Plant and Invertebrate Remains* (English Heritage 2008)
- *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (English Heritage 2010)
- *Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation* (Historic England 2018)

Research objectives of the project

Following consideration of the archaeological potential of the site the regional research framework the site-specific objectives of the evaluation are to:

- to examine the archaeological resource within a given area or site within a framework of defined research objectives;
- to seek a better understanding of the resource;
- to compile a lasting record of the resource;
- to analyse and interpret the results of the excavation, and disseminate them;
- to investigate and record features of archaeological origin;
- to determine (where possible) the location, depth, extent, character, date, condition and significance of any archaeological deposits or features;
- to report on the results of the mitigation and disseminate them in a manner appropriate to their significance; and,

- to produce a site archive for deposition with The Collection Museum and to provide information for accession to the museum.

REVIEW POINTS

Consultation with all Stakeholders regarding project-specific selection decisions will be undertaken at a maximum of three project review points:

- Data gathering: on site, if any unforeseen discovery necessitates an amendment to the proposed collection strategy, or if adjustments are made to any sampling strategy
- End of data gathering (assessment stage)
- Archive compilation

1 – Digital Data

Stakeholders

WA Project Manager; WA Archives Manager; WA Geomatics & BIM Manager; The Collection Museum; Local Planning Authority Archaeological Advisors; ADS

Selection

Location of Data Management Plan (DMP)

This document is designed to link to the project Data Management Plan (DMP), which can be supplied on request.

To promote long-term future reuse deposition file formats will be of archival standard, open source and accessible in nature following national guidance from ADS 2013, ClfA 2014c and the requirements of the digital repository.

Any sensitive data to be handled according to Wessex Archaeology data policy to ensure it is stored and transferred securely. The identity of individuals will be protected in line with GDPR. If required, data will be anonymised and redacted. Selection and retention of sensitive data for archival purposes will occur in consultation with the client and relevant stakeholders. Confidential data will not be selected for archiving and will be handled as per contractual obligation.

Document type	Selection Strategy	Review Points
Site records	Most records will be completed digitally on site (with the exception of registers). All will be selected for deposition.	3
Reports	To include WSIs, Interim reports, post-excavation assessment reports, publication reports. Final versions only will be selected for deposition.	2, 3
Specialist reports	Specialist reports will generally be incorporated in other documents with only minimal editing (reformatting, etc), and will be selected only if the original differs significantly from the incorporated version.	2, 3



Photographic media (site recording)	Substandard and duplicate images will be eliminated; pre-excavation images may not be selected where duplicated by post-excavation shots; working shots will be very rigorously selected to include only good quality images with potential for reuse and those integral to understanding features, their inter-relationships and location on site; site condition and reinstatement photos will not be selected.	2, 3
Photographic media (objects)	Images of individual or groups of objects, to include those of significance selected for publication and reporting. Substandard and duplicate images will be eliminated; all others will be selected.	3
Photographic media (photogrammetry)	All terrestrial photogrammetry recording will generate orthographic photos. For those features or finds which are particularly archaeological significant, 3D models will be generated and deposited but raw photos will only be selected where models have been selected and OBJs are to be deposited, where re-processing may have some archaeological value (e.g. very significant features, or where the model is less accurate than the surveyed georeference targets or of lower quality and the quality of the original photos is good enough to represent a reasonable chance of better future outcomes). Aerial photogrammetry topographic surveys will generate 3D models and orthographic photos, and the final outputs in the form of the report. These will all be selected, but not the raw photos from aerial surveys.	2, 3
Photographic media (community engagement and other activities)	General shots, promotional videos, etc. None will be selected, unless images are generated that are not duplicated in the main site record, but which have specific archaeological value.	3
Survey data	Site survey data will be used to generate CAD/GIS files for use in post-excavation activities. Shapefiles of both the original tidied survey data, and the final phased drawings will be selected.	2, 3
Databases and spreadsheets	Context, finds and environmental data in linked databases. Final versions will be selected. Any specialist data submitted separately will also be selected.	2, 3
LIDAR data	All will be selected	2, 3
Laser Scan data	All will be selected	2, 3



Geophysical data	RAW data and Interpretation Geo-tiffs	2, 3
Administrative records	Includes invoices, receipts, timesheets, financial information, email correspondence. None will be selected, with the exception of any correspondence relating directly to the archaeology.	3

De-Selected Digital Data

De-selected data will be stored on WA secured servers on offsite storage locations. The WA IT department has a backup strategy and policies that involves daily, weekly and monthly and annual backups of data as stated in the DMP. This strategy is non-migratory, and original files will be held at WA under their unique project identifier, as long as they remain useful and usable in their final version format. This data may also be used for teaching or reference collections by the museum, or by WA unless otherwise required by contractual or copyright obligations.

Amendments

Date	Amendment	Rationale	Stakeholders

2 – Documents

Stakeholders

WA Project Manager; WA Archives Manager; The Collection Museum; Local Planning Authority
Archaeological Advisors

Selection

A security copy of all paper/drawn records is a requirement of CIfA guidelines. This will be prepared on completion of the project, in the form of a digital PDF/A file. If the security copy is not required for deposition by Stakeholders, it will be retained on backed-up servers belonging to Wessex Archaeology.

Note that some information may be redacted to comply with GDPR legislation (personal data).

Document type	Selection Strategy	Review Points
Site records	Selected records only will be completed in hard copy on site (registers, some graphics). All will be selected for deposition.	3
Reports	Hard copies of all reports (SSWSIs, Interim reports, post-excavation assessment reports, publication reports). All will be selected for deposition, with the exception of earlier versions	2, 3



	of reports which have been clearly superseded.	
Specialist reports & data	Specialist reports will generally be incorporated in other documents with no significant editing. Supporting data is more likely to be included in the digital archive, but if supplied in hard copy and not incorporated elsewhere, this will be selected.	2, 3
Photographic media	X-radiographic plates: all will be selected.	3
Secondary sources	Hard copies of secondary sources will not be selected.	3
Working notes	Rough working notes, annotated plans, preliminary versions of matrices etc, will not be selected.	3
Administrative records	Invoices, receipts, timesheets, financial information, hard copy correspondence. None will be selected, with the exception of any hard copy correspondence relating directly to the archaeology.	3

De-Selected Documents

De-selected sensitive analogue data will be destroyed (shredded) subject to final checking by the WA Archives team with the remainder recycled. Possible exceptions include records retained for business purposes, including promotional material, teaching and internal WA library copies of reports.

Amendments

Date	Amendment	Rationale	Stakeholders

3 – Materials

Material type	Artefacts (bulk and registered finds)	Section 3.	3.1
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Stakeholders

WA Archives Manager; WA Finds Manager; WA internal specialists; external specialists; The Collection Museum; Local Planning Authority Archaeological Advisors; landowner

Selection

Note that human remains are not included in this selection strategy; their recovery and subsequent treatment and curation will be governed by a Ministry of Justice licence(s).

The on-site finds recovery strategy is given below; it is of necessity fairly generic. It is anticipated that this will be reviewed and updated at the project assessment stage once all collected finds have been processed and quantified. Amendments may be made prior to that on site in the event of unforeseen discoveries necessitating adjustments to recovery or sampling strategies (e.g. production sites, large concentrations of building debris, 'burnt mounds').

Throughout the following section, 'stratified' is taken to include topsoil deposits, while 'unstratified' indicates anything completely separated from context e.g. spoil heap finds, or surface finds other than those directly associated with underlying features.

Find Type	Selection Strategy	Review Points
Animal bone	All will normally be collected from stratified contexts. Selection could be recommended at next review point, dependent on stratigraphic integrity, condition and size of assemblage.	2, 3
Building materials (other, e.g., mortar, plaster, <i>opus signinum</i>)	If found <i>in situ</i> , these should be recorded on site and, if appropriate, a small sample of <i>opus signinum</i> or wall plaster (not mortar) retained for further examination. Loose fragments of mortar or <i>opus signinum</i> should not be collected, but their presence on site should be noted. All loose wall plaster will be collected from stratified contexts. Selection likely to be recommended at next review point.	2, 3
Burnt (unworked) flint	All will normally be collected from stratified contexts. Selection likely to be recommended at next review point.	1 (if large quantities encountered), 2, 3
Ceramic building material	All CBM from stratified contexts will be collected and reviewed at the processing stage. If <i>in situ</i> structures are encountered, these should be fully recorded on site, but samples of components may be collected for a closer examination of form, fabric and dimensions. Selection likely to be recommended at next review point.	1 (if large quantities encountered), 2, 3
Ceramic objects	Includes spindlewhorls, loomweights, slingshot, portable kiln furniture, etc. All will be collected, including any unstratified examples.	2, 3
Clay tobacco pipes	All will normally be collected from stratified contexts. Selection likely to be recommended at next review point.	2, 3
Coins	All will be collected, including unstratified finds.	2, 3
Fired clay	Includes structural material ('daub') as well as	2, 3



	briquettage, and undiagnostic fragments. All will be collected from stratified contexts. Selection likely to be recommended at next review point.	
Glass, vessel and window	All will normally be collected from stratified contexts. Unstratified post-medieval/modern material will not be collected, unless of intrinsic interest. If large-scale post-medieval/modern bottle dumps are encountered, items will be recorded <i>in situ</i> as far as possible, and a small sample collected. Selection likely to be recommended at next review point.	1 (if large quantities encountered), 2, 3
Glass, objects	All will be collected, including unstratified finds	2, 3
Jet, shale, amber	All will be collected, including unstratified finds.	2, 3
Leather and textile	All will be collected, including unstratified finds. Selection could be recommended at next review point, dependent on date and condition.	2, 3
Marine shell	All will normally be collected from stratified contexts. If large-scale dumps are encountered, an appropriate sampling strategy may be employed with the aim of characterising the shell assemblage (species, condition, potential sources, management of oyster beds, etc). All shell-working waste will be collected. Selection likely to be recommended at next review point.	1 (if large quantities encountered), 2, 3
Metalwork	All will be collected from stratified contexts, with the exception of obviously modern (19 th ./20 th -century) objects found in topsoil/overburden or unstratified. Selection likely to be recommended at next review point.	2, 3
Metalworking residues	All will be normally collected from stratified contexts. If large-scale dumps are encountered (eg from a metalworking site), an appropriate sampling strategy may be employed with the aim of characterising the metallurgical processes represented. Selection likely to be recommended at next review point.	1 (if large quantities encountered), 2, 3
Pottery, prehistoric	All will be collected, including unstratified finds.	2, 3
Pottery, all other periods	All will be collected from stratified contexts. From unstratified contexts, only pieces of intrinsic interest will be collected, unless this is the only datable material recovered. Selection could be recommended at next review point.	2, 3
Stone, building	<i>In situ</i> architectural fragments and other building material may be recorded on site rather than	2, 3



	collected, and samples taken for geological identification. Other building stone will be collected from stratified contexts. From unstratified contexts, only pieces of intrinsic interest (e.g., architectural fragments). Selection likely to be recommended at next review point.	
Stone, portable objects	All will be collected from stratified contexts. From unstratified contexts, only identifiable objects.	2, 3
Stone, unworked	Unworked stone will only be collected if considered to be archaeologically significant, i.e. included in features intentionally, or thought to have fulfilled a specific function.	2, 3
Worked bone and antler	Includes finished objects as well as boneworking waste. All will be collected, including unstratified finds.	2, 3
Worked flint	All will be collected.	2, 3
Worked wood	This includes all structural timbers as well as any portable objects (e.g. vessels, implements, etc). Structural timbers found <i>in situ</i> should be recorded stratigraphically but may be sampled for species identification and/or dating without full recovery. All other will be collected, with the exception of unstratified and undiagnostic pieces. Selection could be recommended at next review point.	1 (if <i>in situ</i> finds encountered), 2, 3

Uncollected Material

Finds which fall outside the categories proposed for on-site collection will not normally be recorded beyond a general comment on site recording sheets on the presence and nature of large concentrations (e.g. building materials, modern debris), but if specific sampling strategies are employed to deal with, for example, production waste, then a more accurate guide to the actual size of the parent assemblage (and thus the sample percentage) will be given.

Any uncollected material will be left *in situ* or (if collected and then de-selected), re-incorporated into the site.

De-Selected Material

Consideration will be given to the suitability for use for handling or teaching collections by the museum or Wessex Archaeology, or whether they are of particular interest to the local community. De-selected material will either be returned to the landowner or disposed of. All will be adequately recorded to the appropriate level before de-selection.

Amendments

Date	Amendment	Rationale	Stakeholders
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3 – Materials			
Material type	Palaeoenvironmental material	Section 3.	3.2
Stakeholders			
WA Archives Manager; WA Environmental Officer; WA internal specialists; external specialists; The Collection Museum; Local Planning Authority Archaeological Advisors			
Selection			
All contexts suitable for environmental sampling will be considered for sampling. All environmental sampling will be undertaken following Wessex Archaeology's in-house guidance, which adheres to the principles outlined in Historic England's guidance (English Heritage 2011 and Historic England 2015a) and as stated in relevant WSI.			
Env Material Type	Selection Strategy	Review Points	
Unprocessed samples	In the event of any samples being eliminated from processing due to lack of archaeological significance, these will not be retained.	2, 3	
Unsorted residues	Residues from samples not proposed for further analysis will be de-selected, with the possible exception of any taken for the recovery of human remains.	2, 3	
Assessed flots with no extracted materials	Assessed flots with no extracted materials are considered to be devoid of any significant environmental evidence and will be de-selected.	2, 3	
Assessed or analysed flots with extracted materials	All analysed samples will be selected; assessed flots with extracted materials with no further research potential (to be established on a sample by sample case) may be de-selected.	2, 3	
Charred & waterlogged plant remains	All extracted plant remains will be selected	3	
Mollusca	All extracted mollusca will be selected	3	
All other analysed material (e.g. insects, pollen)	All material will be selected	3	
Uncollected Material			



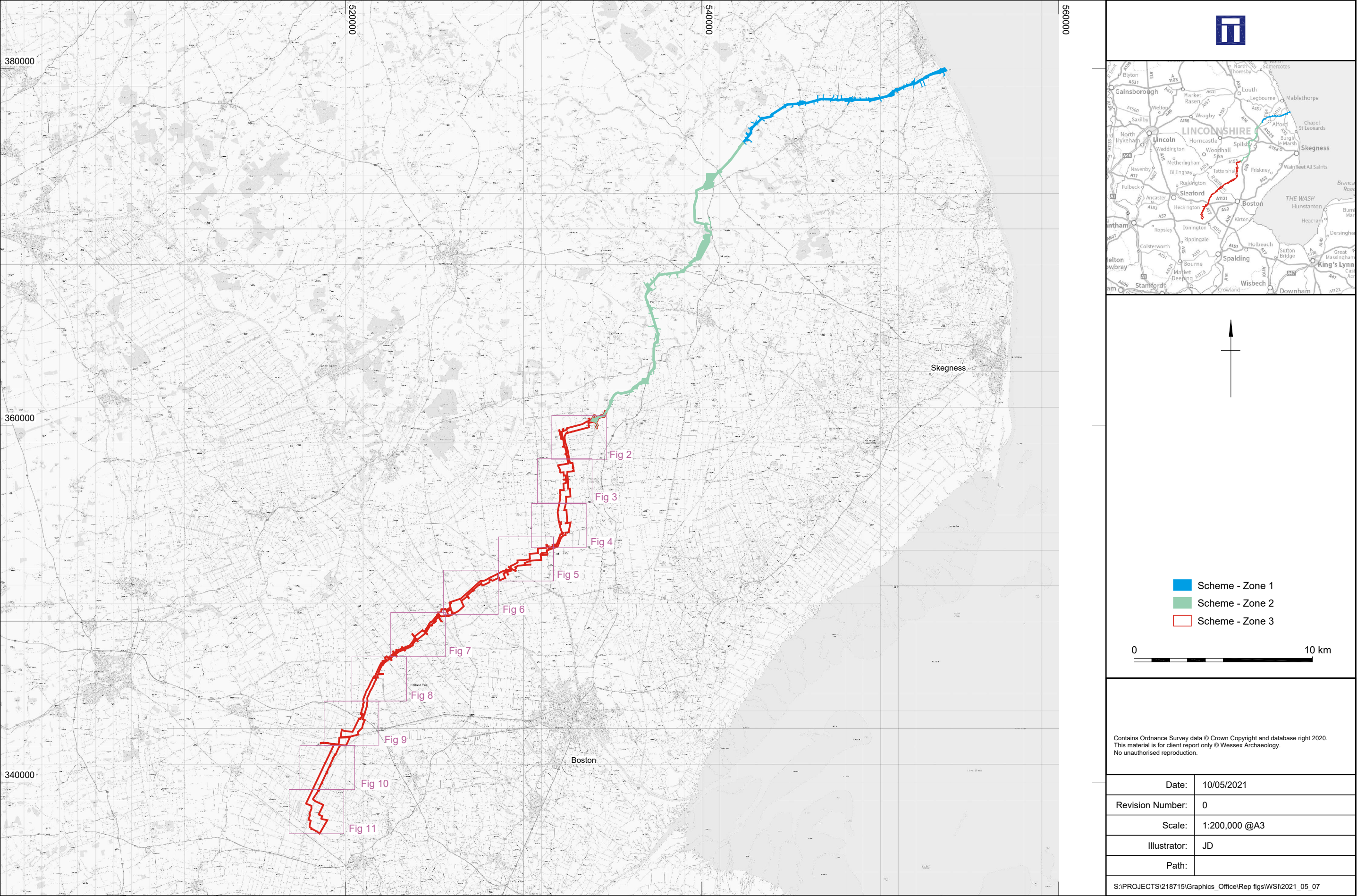
Any uncollected material will be left *in situ* or re-incorporated into the site.

De-Selected Material

De-selected material from samples will be disposed of after processing and post-excavation recording. All processed material will be adequately recorded to the appropriate level before de-selection.

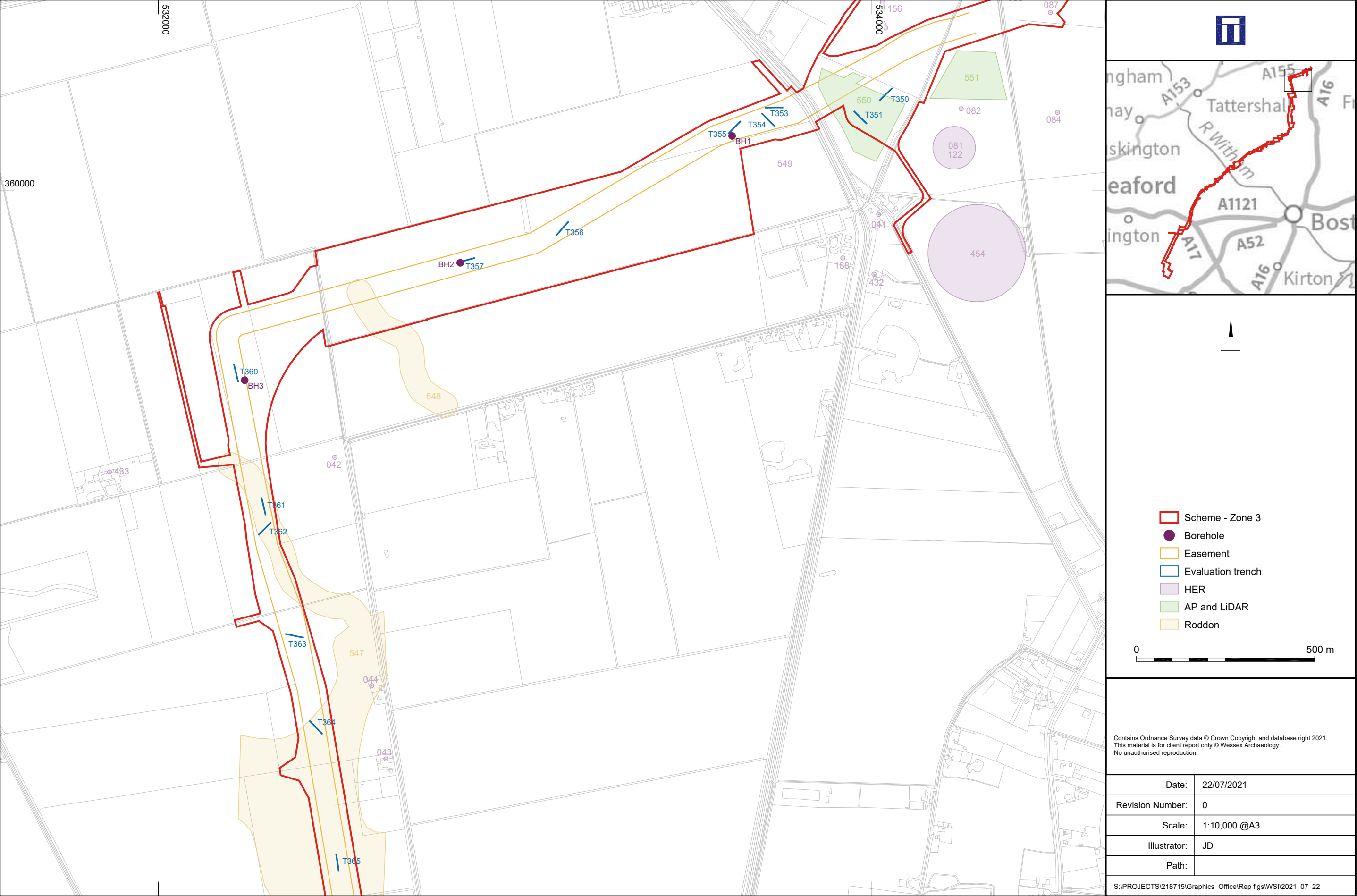
Amendments

Date	Amendment	Rationale	Stakeholders



Site location

Figure 1



0 500 m

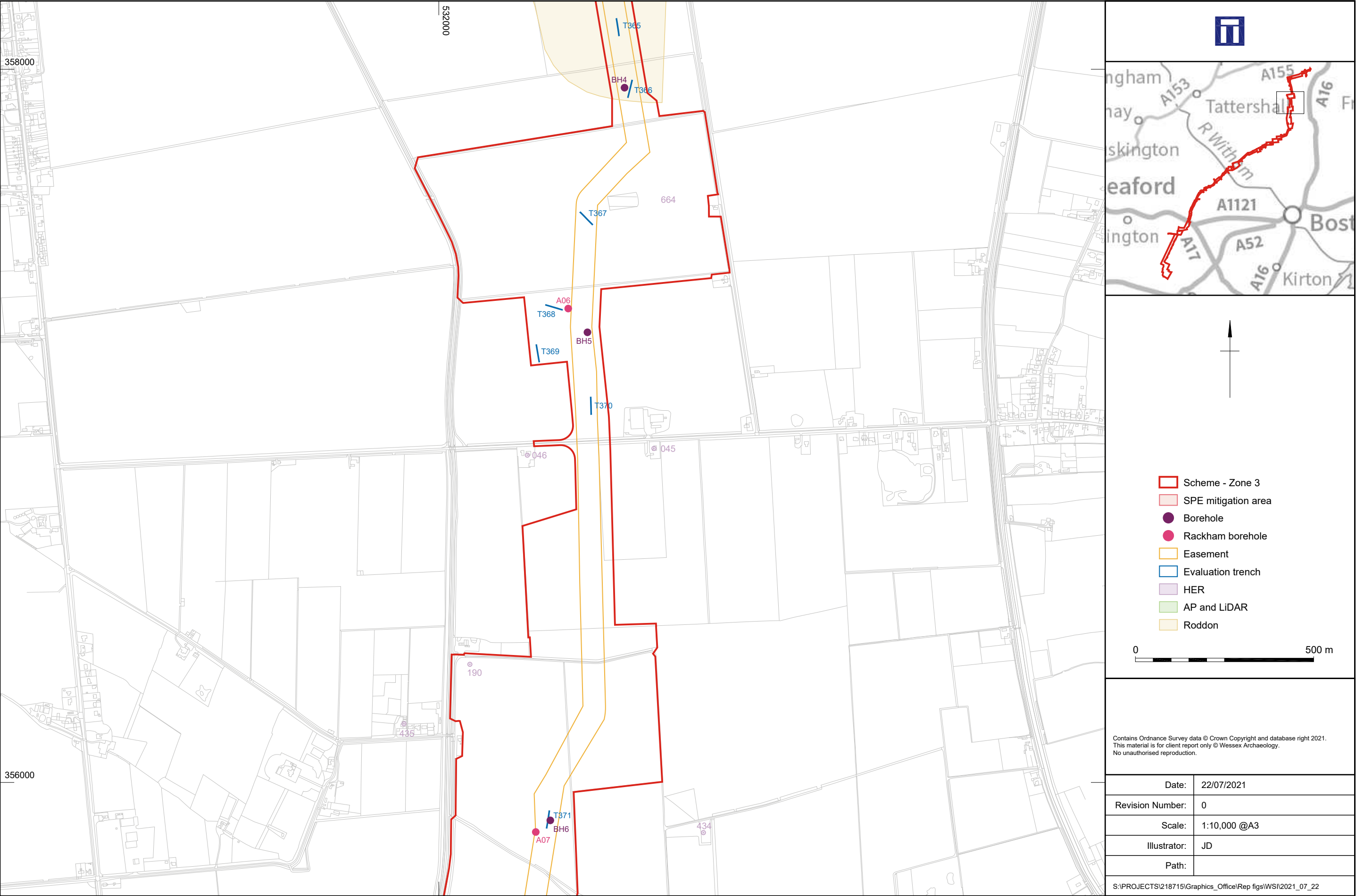
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Indicative mitigation area and borehole location

Figure 2



- Scheme - Zone 3
- SPE mitigation area
- Borehole
- Rackham borehole
- Easement
- Evaluation trench
- HER
- AP and LiDAR
- Roddon

0 500 m

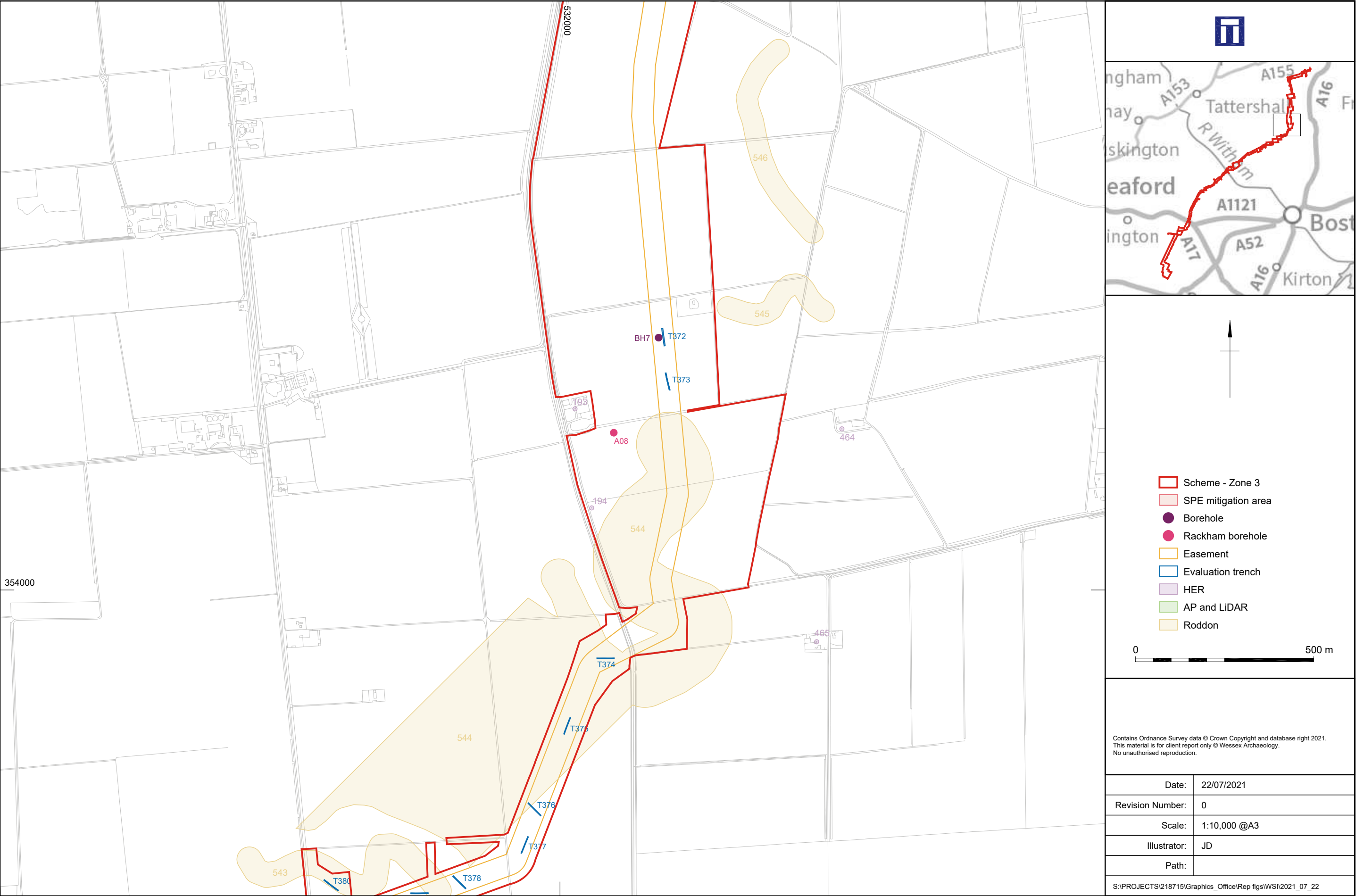
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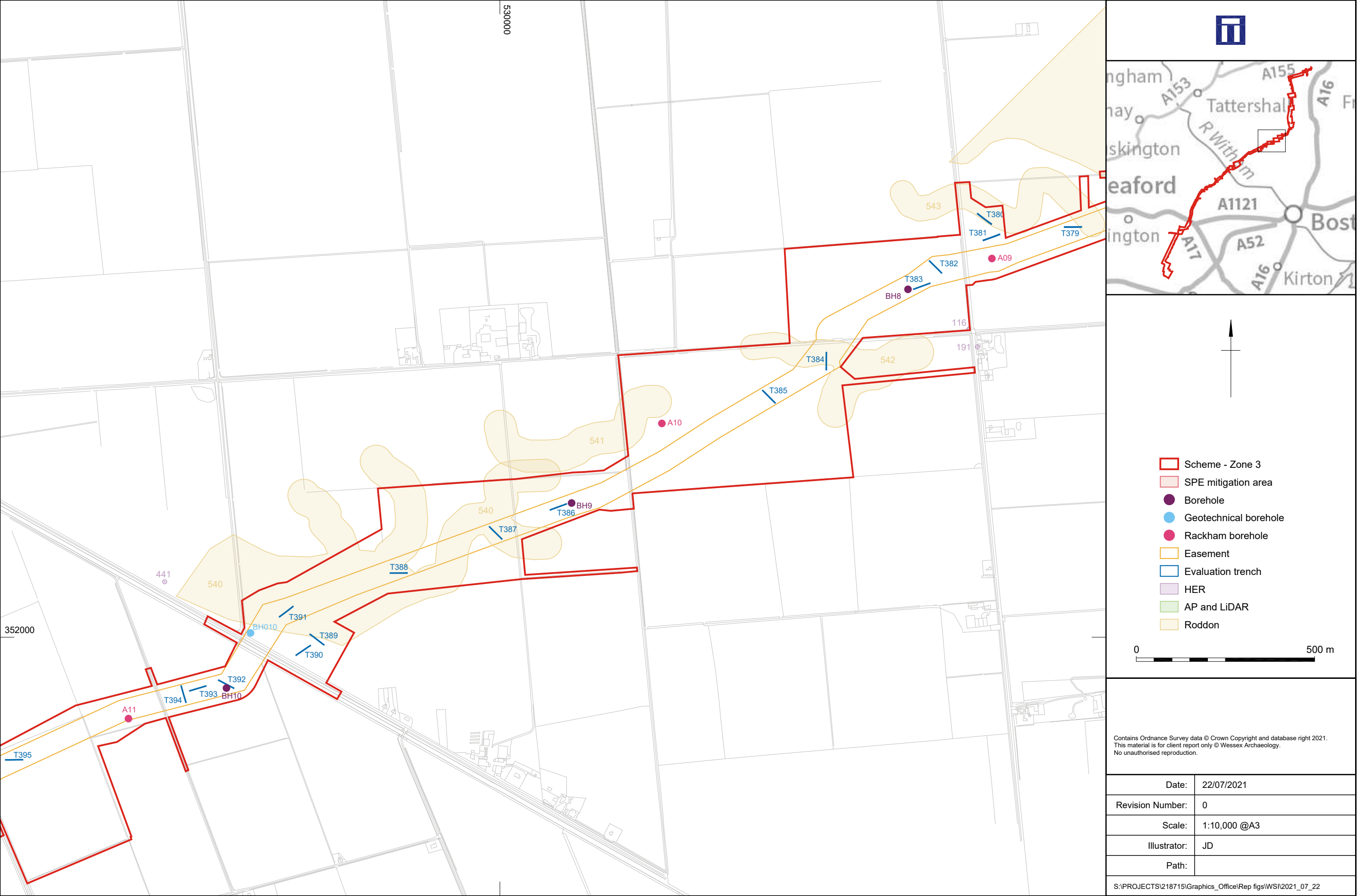
Indicative mitigation area and borehole location

Figure 3



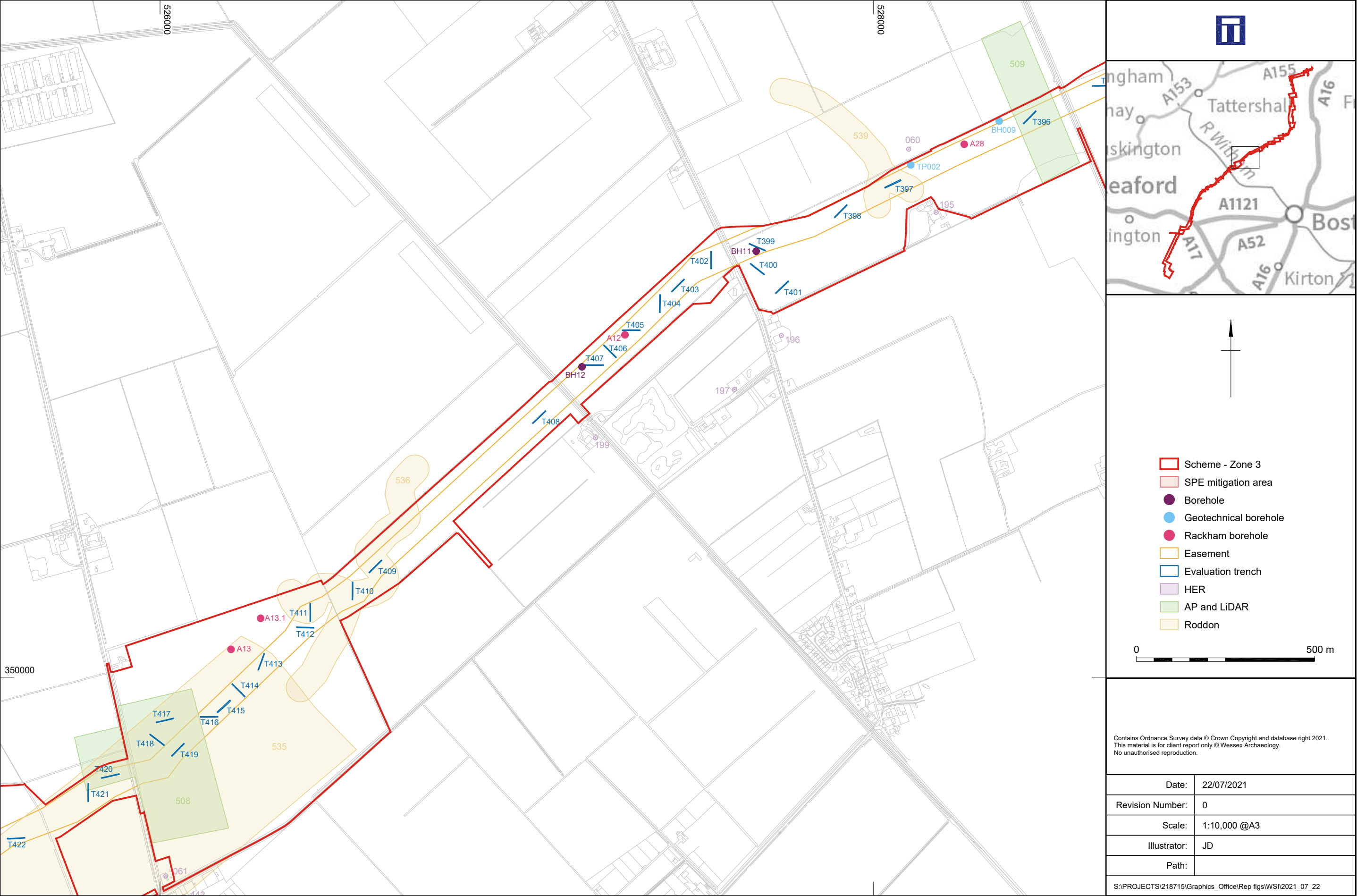
Indicative mitigation area and borehole location

Figure 4



Indicative mitigation area and borehole location

Figure 5



Indicative mitigation area and borehole location

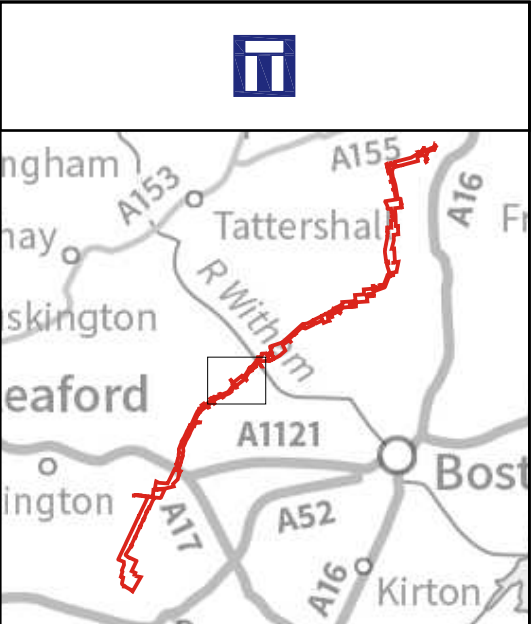
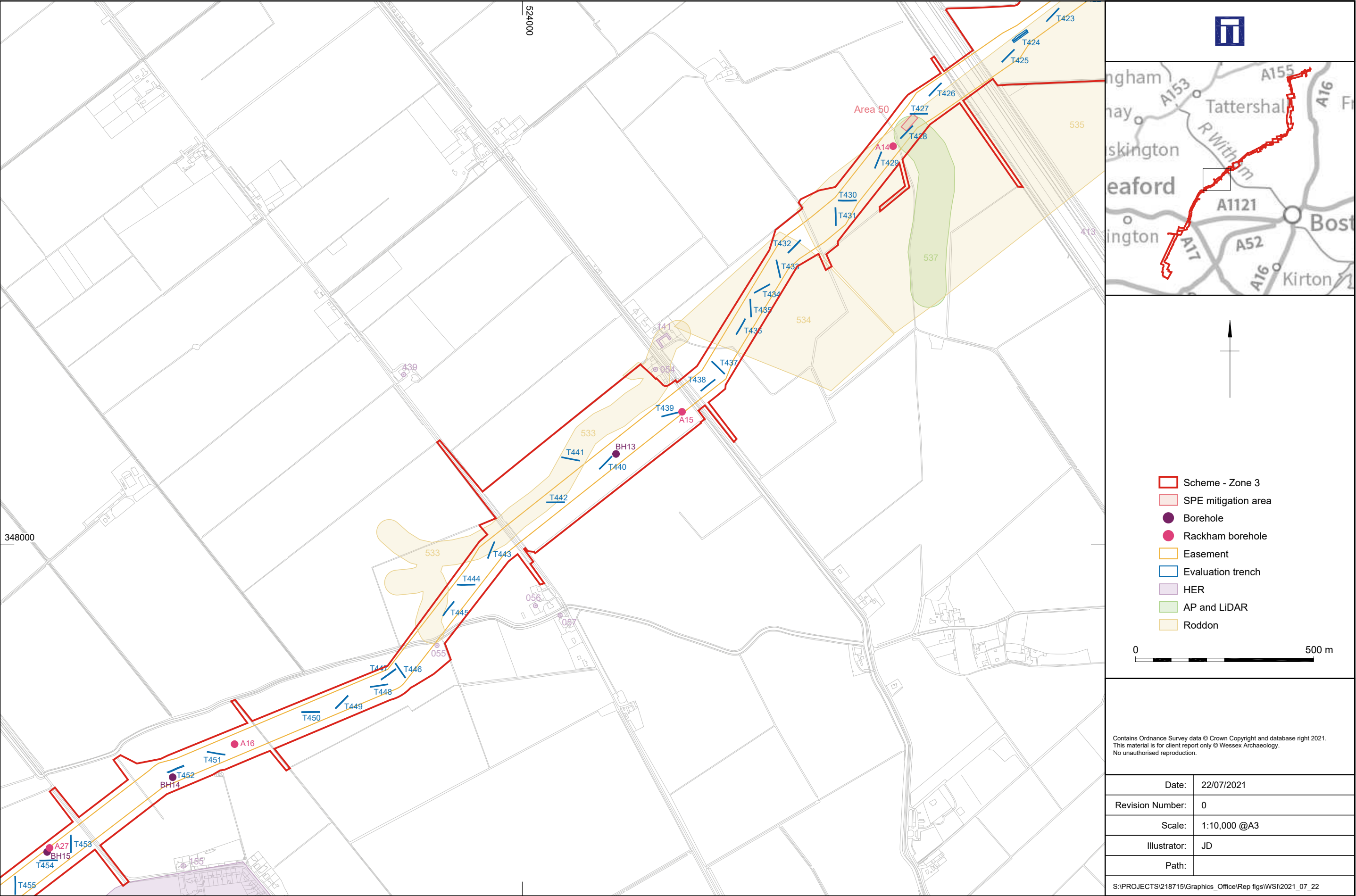
- Scheme - Zone 3
- SPE mitigation area
- Borehole
- Geotechnical borehole
- Rackham borehole
- Easement
- Evaluation trench
- HER
- AP and LiDAR
- Roddon

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Figure 6



- Scheme - Zone 3
- SPE mitigation area
- Borehole
- Rackham borehole
- Easement
- Evaluation trench
- HER
- AP and LiDAR
- Roddon

0 500 m

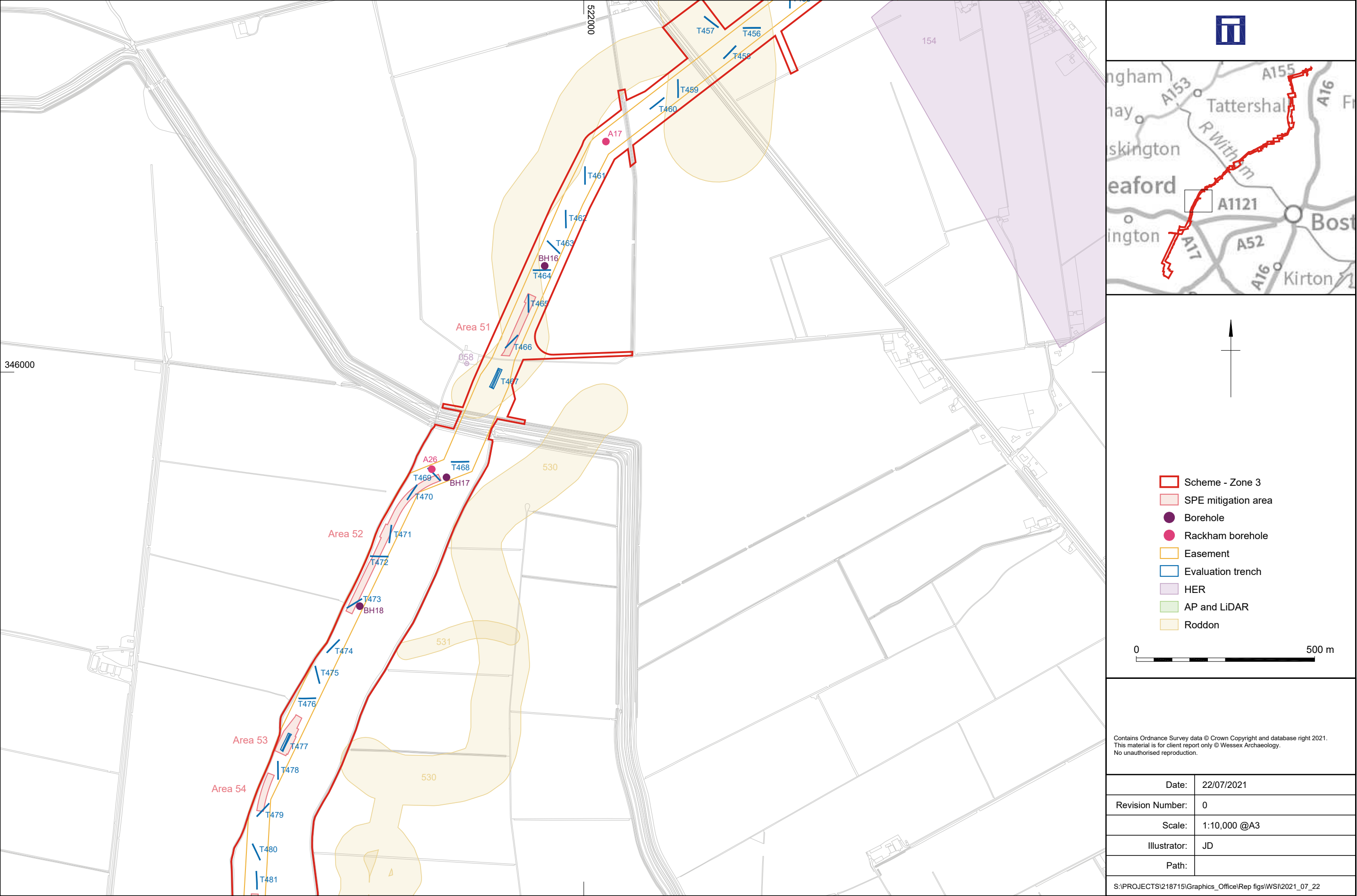
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Indicative mitigation area and borehole location

Figure 7



Indicative mitigation area and borehole location



ingham
nay
skington
eaford
ington

A153
Tattershall
R Withm
A155
A16
A1121
A52
A17
Bost
Kirton



-  Scheme - Zone 3
-  SPE mitigation area
-  Borehole
-  Rackham borehole
-  Easement
-  Evaluation trench
-  HER
-  AP and LiDAR
-  Roddon

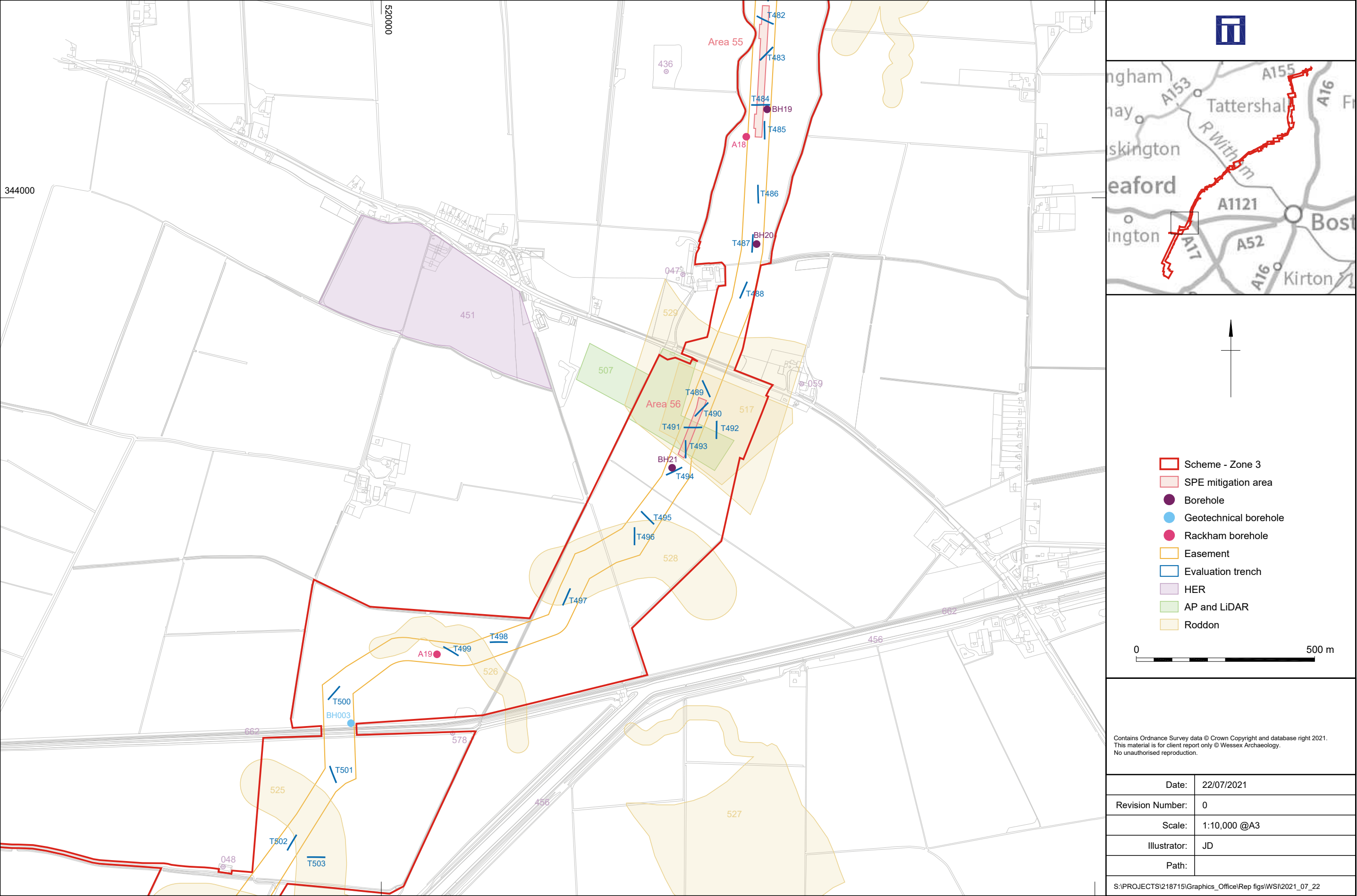
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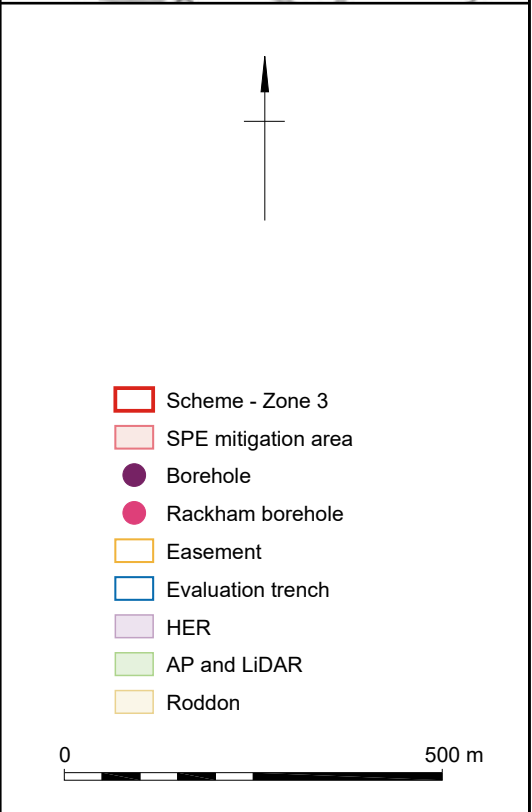
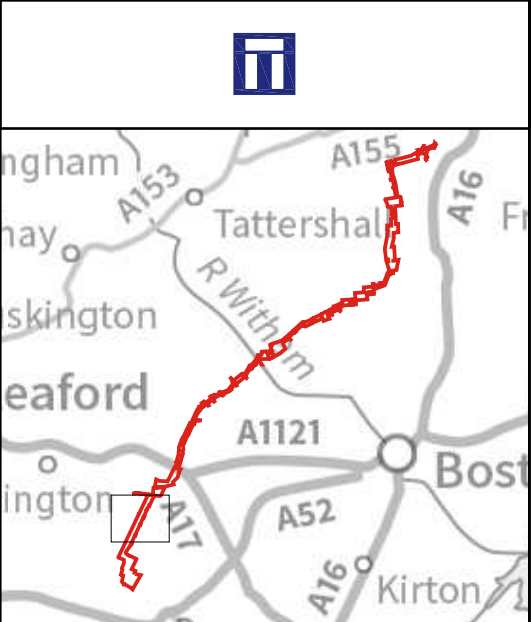
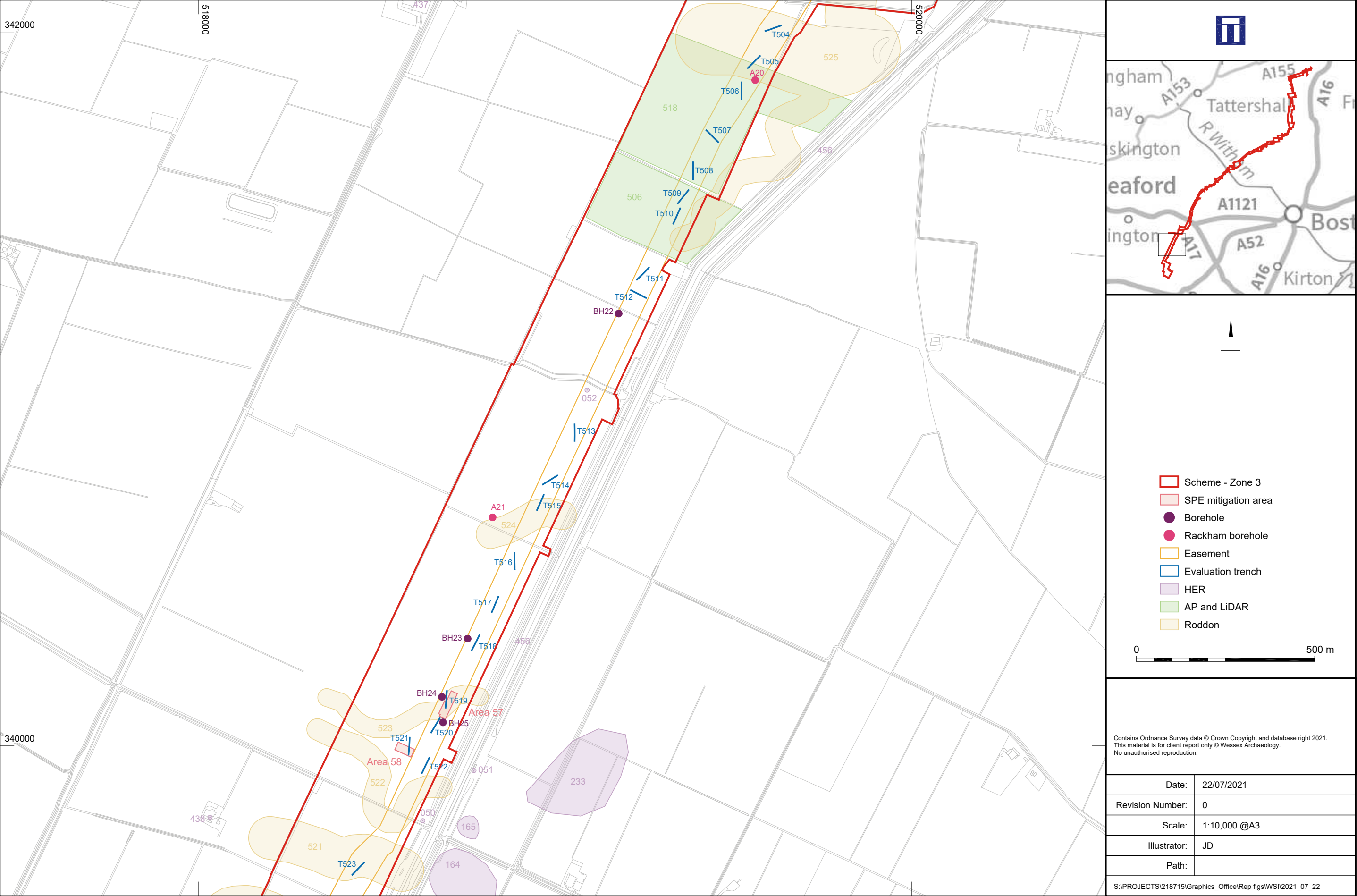
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Figure 8



Indicative mitigation area and borehole location

Figure 9



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Indicative mitigation area and borehole location

Figure 10



Indicative mitigation area and borehole location

Figure 11



Strip and map mitigation area 50

Figure 12



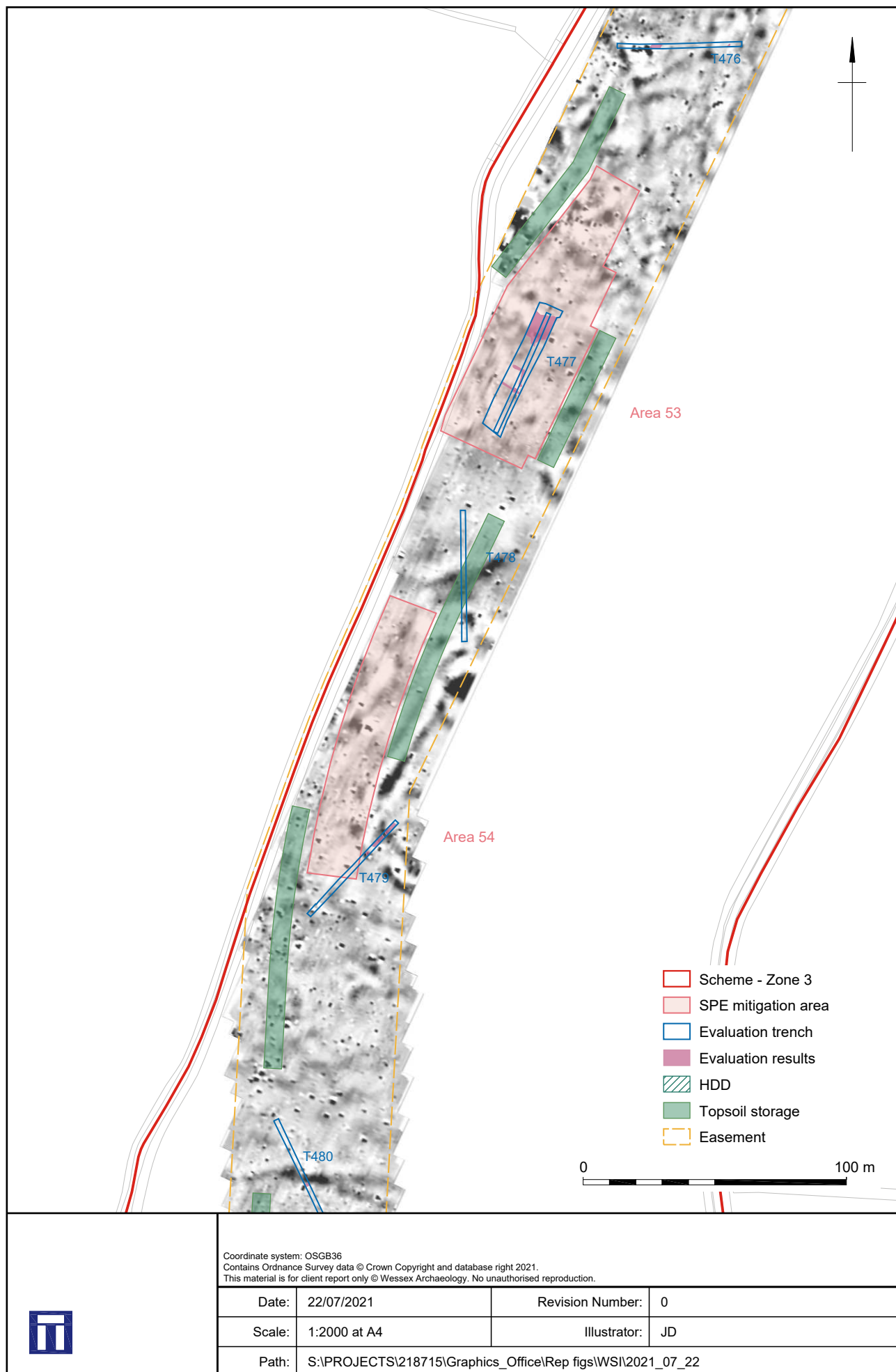
Strip and map mitigation area 51

Figure 13



SPE mitigation area 52

Figure 14



SPE mitigation areas 53 and 54

Figure 15



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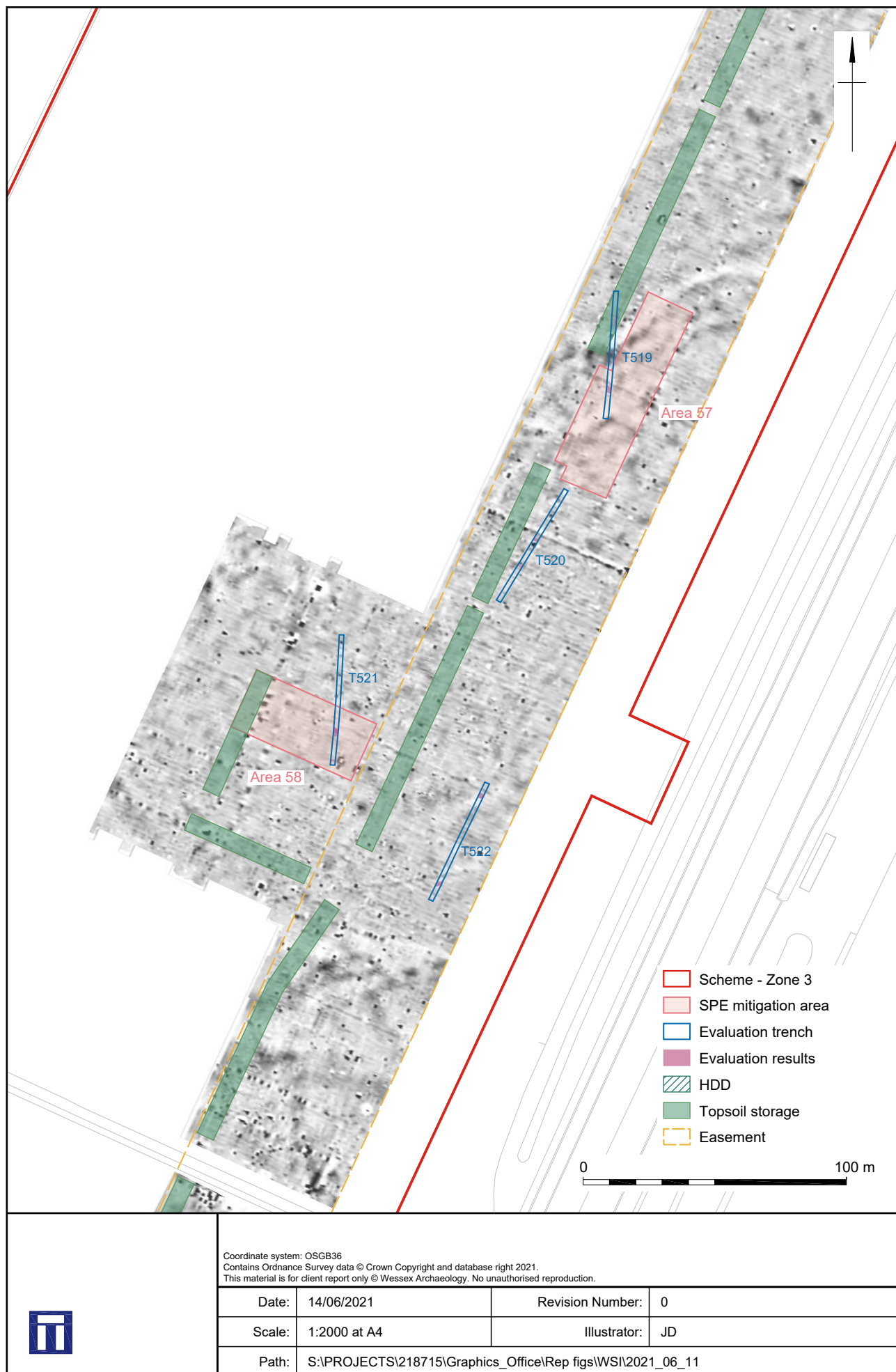
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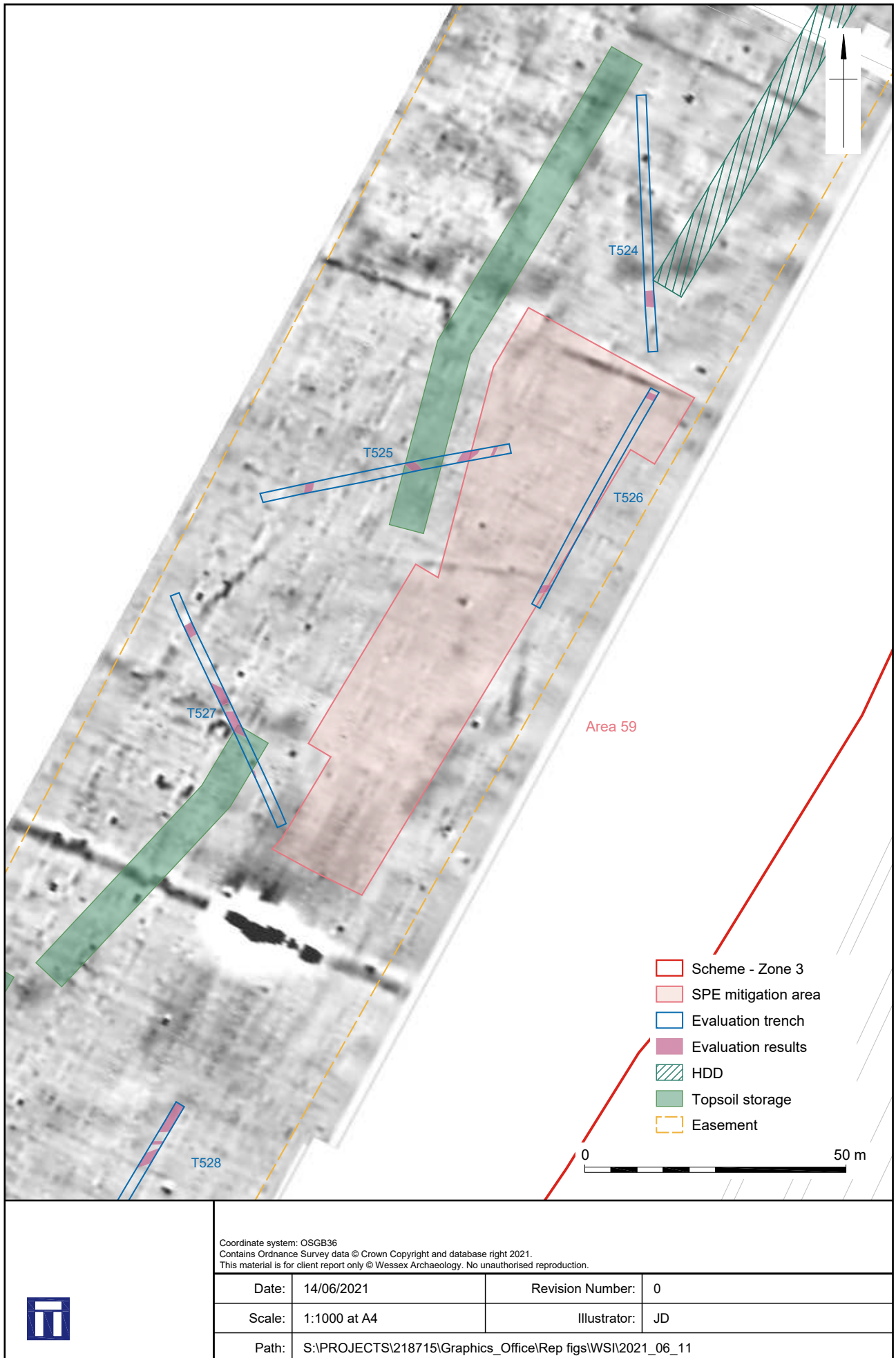
SPE mitigation area 56

Figure 17



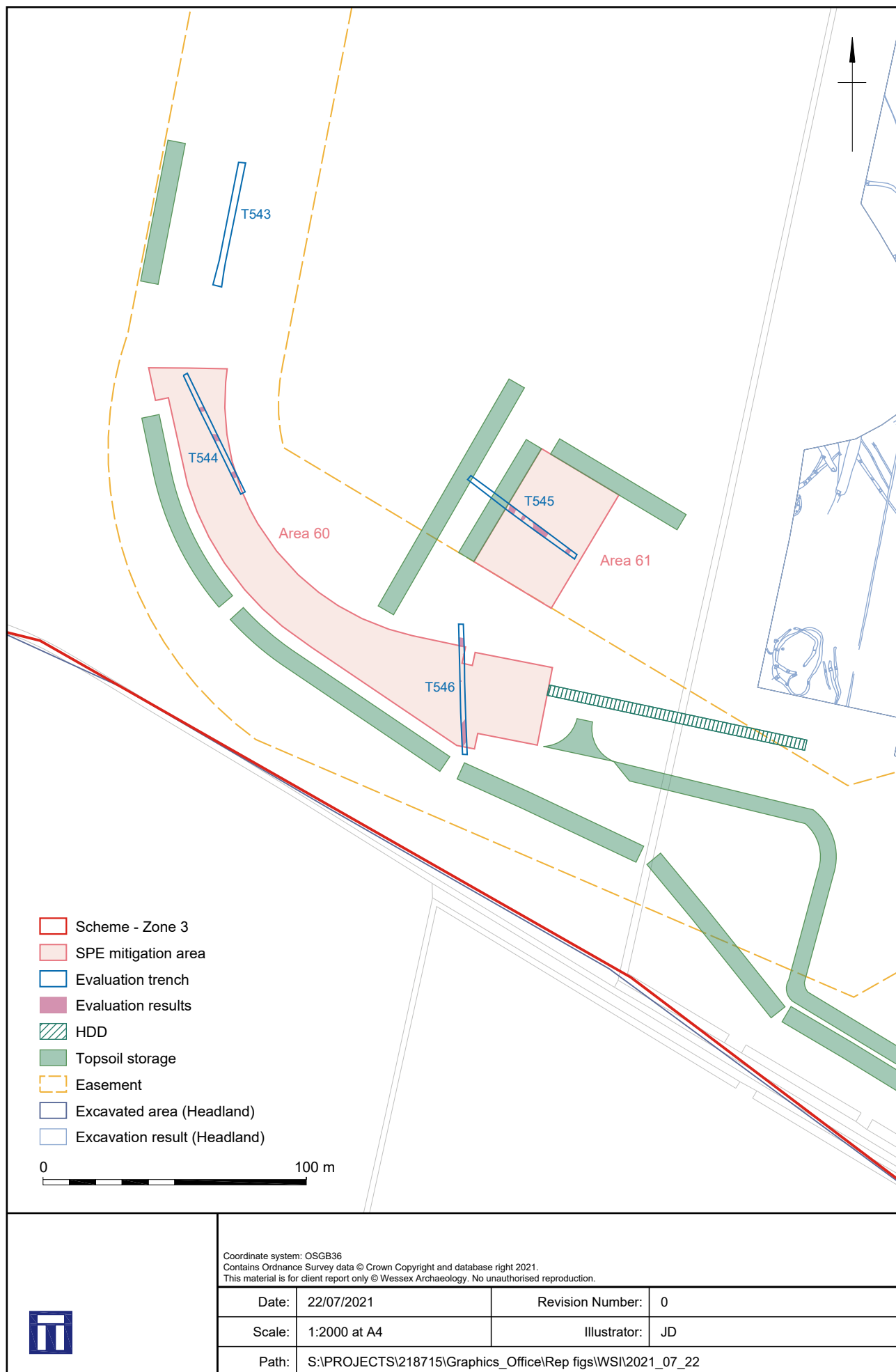
SPE mitigation areas 57 and 58

Figure 18



SPE mitigation area 59

Figure 19



SPE mitigation areas 60 and 61

Figure 20



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