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NORTH HYKEHAM RELIEF ROAD
WRITTEN SCHEME OF INVESTIGATION ARCHAEOLOGICAL WORKS

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1 INTRODUCTION

1.1 This Written Scheme of Investigation (WSI) has been instructed on behalf of Lincolnshire County Council (LCC) in association with an approved development known as the North Hykeham Relief Road (NHRR), referred to in this document as 'the Scheme' (**Appendix 1, NHRR-TEP-HER-HYKE-MP-LH-30013**).

1.2 The NHRR, previously known as the Lincoln Southern Bypass (LSB) will link the recently constructed Lincoln Eastern Bypass (LEB) with the Lincoln Western Relief Road (LWRR) and the A46 on the Strategic Road Network (SRN).

1.3 The Environment Partnership (TEP) Ltd have been appointed as heritage and archaeological consultants for the Scheme and have managed the delivery of an Environmental Statement (ES) and supporting heritage and archaeological surveys.

1.4 In November and December 2022, a programme of geophysical survey was undertaken for a broad survey area encompassing the Scheme and a sufficient surrounding area to enable characterisation of the survey results and to inform the siting of any future ancillary works such as compounds. The survey successfully characterised the survey areas and identified several areas of archaeological interest including probable building remains of the Roman period and the Site of Ermine Street, a major road to Roman Lincoln. The majority of anomalies of probable archaeological origin were located on higher ground to the east of Lincoln Ridge, a scarp which divides the east and west parts of the Scheme.

1.5 Following consultation with the Historic Places Manager at Lincolnshire County Council a programme of evaluation trenching comprising 106no. 50m long by 1.8m wide trenches was carried out to characterise and assess the significance of probable and possible archaeological remains. The survey identified an area of prehistoric activity close to the River Witham from which finds of flint tools and environmental evidence for burning activity were recovered. The remains of a stone-built structure of Roman date were confirmed to the west of Grantham Road overlooking the Lincoln Ridge. The site was interpreted as a rural site which may be part of a wider high-status estate and included finds of pottery, ceramic roof tiles and hypocaust tiles. To the east of Grantham Road shallow roadside gullies associated with Ermine Street were revealed however no road surface remained present. At the eastern end of the Scheme a boundary ditch was investigated, which appeared to delineate the extent of Roman activity. Two circular features were investigated at the eastern terminus of the Scheme from which were recovered an assemblage of 14 late Neolithic flint artefacts and a cache of hazel nutshell indicating prehistoric burning activity.

1.6 Planning permission was granted on 13th May 2024 for the construction of the North Hykeham Relief Road (NHRR) between the A46 Hykeham Roundabout and the A15 Sleaford Road Roundabout (23/1447/CCC).

1.7 Condition 5 of planning permission relates to archaeology:

- Part 1 - The Written Scheme of Investigation Archaeological Works, approved under condition 2 of this planning permission, shall be implemented in full. The applicant shall notify the County Planning Authority of the intention to commence at least fourteen days before the start of archaeological work in order to facilitate adequate monitoring arrangements. No variation shall take place without prior consent of the County Planning Authority.
- Part 2 - A report of the archaeologist's findings shall be submitted to the County Planning Authority and the Historic Environment Record Officer at Lincolnshire County Council within three months of the works hereby given consent being commenced unless otherwise approved in writing by the County Planning Authority; and the condition shall not be discharged until the archive of all archaeological work undertaken hitherto has been deposited with the County Museum Service, or another public depository willing to receive it.

- Reason: In order to ensure that satisfactory arrangements are made for the investigation, retrieval and recording of any possible archaeological remains on the site.

1.8 Condition 27 relates to the non-designated heritage asset at 46 Station Road, Waddington:

- Part 1 - Prior to the commencement of any demolition works associated with 46 Station Road, Waddington, details of a scheme of historic building recording, as referred to in the Regulation 25 Response Report Part A – Further Information, shall be submitted to and approved in writing by the County Planning Authority. The scheme shall provide a written and photographic record of the building and provide a permanent record of it in its current condition. The historic building recording works shall thereafter be implemented and carried out prior to the demolition of the building, in full accordance with the approved scheme.
- Part 2 - A report of the historic building record shall be submitted to the County Planning Authority and the Historic Environment Record Officer at Lincolnshire County Council within three months of the historic building recording works having been commenced; and the condition shall not be discharged until historic building record report has been deposited with the Historic Environment Record Officer at Lincolnshire County Council.
- Reason: In order to ensure that satisfactory arrangements are made for the recording of this non-designated heritage asset.

1.9 This WSI sets out a programme and methodology for archaeological works comprising a programme of archaeological mitigation within the proposed route of the NHRR. This WSI also provides a programme for post-excavation analysis, reporting and archiving. The proposed methodology comprises a targeted scope of works which considers the significance of archaeological remains and the extent of impact of the proposed development and has been prepared following consultation with the Historic Places Manager at Lincolnshire County Council.

1.10 This WSI has been prepared by TEP, a Registered Organisation with the Chartered Institute for Archaeologists (CIfA). It has been authored by a full member of CIfA.

1.11 The archaeological works will be undertaken by a suitably qualified archaeological subcontractor and registered organisation with CIfA under the overall management of TEP.

2 POLICY, STANDARDS AND GUIDANCE

National Planning Policy Framework (NPPF)

2.1 Section 16 of The National Planning Policy Framework (NPPF), revised September 2023, describes the provisions specifically relating to conserving and enhancing the historic environment.

2.2 Paragraph 200 advises local planning authorities to require an applicant to describe the significance of any heritage assets affected by their proposal, including any contribution made by their setting, including "where a site on which development is proposed includes, or has the potential to include heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation".

2.3 Paragraph 211 states that "local planning authorities … should require developers to record and advance understanding of the significance of any heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact, and to make this evidence (and any archive generated) publicly accessible".

Central Lincolnshire Local Plan

2.4 Policy S57: The Historic Environment describes the council's expectations for new developments with regards to the historic environment. It states that "Unless it is explicitly demonstrated that the proposal meets the tests set out in the NPPF, permission will only be granted for development affecting designated or non-designated heritage assets where the impact of the proposal(s) does not harm the significance of the asset and/or its setting."

2.5 In terms of archaeology, it states that "Development affecting archaeological remains, whether known or potential, designated or undesignated, should take every practical and reasonable step to protect and, where possible, enhance their significance."

2.6 Any mitigation strategies "should ensure the preservation of archaeological remains in-situ. Where this is either not possible or not desirable, provision must be made for preservation by record according to an agreed written scheme of investigation submitted by the developer and approved by the planning authority".

Guidance

- The guidance most relevant to this WSI is provided in:
- Chartered Institute for Archaeologists 2020, Standard and guidance for archaeological excavation;
- Chartered Institute for Archaeologists 2020, Standards and guidance for the collection, documentation, conservation and research of archaeological materials;
- Chartered Institute for Archaeologists 2020, Standards and guidance for the creation, compilation, transfer and deposition of archaeological archives;
- Historic England, 2015, Management of Research Projects in the Historic Environment (MoRPHE);
- Archaeology Handbook 2019, Lincolnshire County Council

Monitoring

2.7 The implementation of the works outlined in this WSI will be monitored by the Historic Places Manager at Lincolnshire County Council on behalf of the local authority (LPA). The LPA will be informed in advance of the commencement of any part of the mitigation works and will be kept up to date with progress during all phases of the archaeological works. The Historic Places Manager will be provided with sufficient opportunity to undertake monitoring visits during the works.

2.8 All archaeological fieldwork will be carried out by a suitably experienced and qualified archaeological contractor and registered organisation with the Chartered Institute for Archaeologists under the direction of a full member of CIfA or equivalent qualified project director.

3 BACKGROUND

Overview

3.1 The Scheme comprises approximately 8km of dual all-purpose 2 lane carriageway with a 70mph speed limit (120kph design speed) running to the south of the existing conurbations of North and South Hykeham in an east/west direction between the A46 Hykeham Roundabout (known locally as Pennell's Roundabout) and the A15 Sleaford Road Roundabout at the west end of the Lincoln Eastern Bypass. The scheme has been designed in accordance with the Design Manual for Roads and Bridges ("DMRB") Standards, along with relevant Lincolnshire County Council standards, policies and design guides.

3.2 The Scheme passes mainly through flat mixed farmland on two levels. The lower area to the west will be crossed generally at grade or on low embankment rising to cross the River Witham on a combination of embankment and a bridge. Between Brant Road and Station Road the scheme will be constructed on embankment. Station Road will be realigned and cross the Scheme on a new bridge to ensure that connectivity is maintained, whilst allowing the Scheme to pass under Station Road in cutting. Beyond Station Road, the Scheme transitions into a major cutting to reach the top of the escarpment known locally as both Lincoln Cliff and Lincoln Edge. Once the top of the escarpment is attained, the remainder of the Scheme crosses the landscape generally at grade or on low embankments to tie in with the A15 Sleaford Road and the Lincoln Eastern Bypass.

3.3 The Scheme is illustrated on the General Arrangement drawings NHRR-RAM-HGN-HYKE-DR-CH-00101 to 0011701001 to 01017 submitted as a standalone document in support of the planning application. The key features described in this report should be read in conjunction with these plans.

Topography and Geology

3.4 The western and central sections of the Scheme are located within the floodplain of the River Witham, consisting of flat level ground at an elevation of 6m-10m aOD. At the approach to Station Road the ground level gradually rises to 26m aOD then rises steeply up a ridge to a height of 70m aOD. To the east of the ridge the ground is flat. The ridge (Lincoln Edge) is a prominent natural feature providing long distance views towards the west.

3.5 The solid geology at the western and central sections of the Scheme is recorded by the British Geological Survey as Scunthorpe Mudstone Formation (interbedded mudstone and limestone of the Jurassic period) and Charmouth Mudstone Formation (mudstone of the Jurassic period). Whitby Mudstone formation is revealed within the scarp of the ridge. The eastern section of the Scheme passes through Lower Lincolnshire Limestone Member and Upper Lincolnshire Limestone Member.

3.6 The majority of the site is not underlain by superficial deposits; some superficial deposits are present within localised areas, including Quaternary alluvium adjacent to the River Witham, and Balderton Sand and Gravel Member in the area of South Hykeham.

3.7 Historic mapping and aerial photographs demonstrate that the course of River Witham has been straightened during the late 19th century and earlier channels are present within the low-lying sections of the route. A palaeochannel was identified and investigated as part of the evaluation works and measured c40m in width with a very shallow depth of 0.3m.

4 ARCHAEOLOGICAL AND HISTORIC BACKGROUND

4.1 The following background is summarised from a detailed archaeological history of the application site which is provided as a technical appendix (**NHRR-TEP-HER-HYKE-RP-LH-30003**) to the Environmental Statement.

Palaeolithic

4.2 This period extends from the earliest known use of stone tools by hominins in Britain, c. 500,000 years ago with the end of the Pleistocene, and the last glacial period 10,000 BC. It covers the biological evolutionary period from early hominid species to anatomically modern humans (homo sapiens), by the Upper Palaeolithic (40,000 – 10,000 BC). The first occurrences of knapped flint tool cultures appear during this period. During this period of human evolution, the climate warmed after the end of the last glaciation, and the environment became increasingly tree-laden, with birch and pine forests.

4.3 During this period, the study area would have been an area of natural resources with the river Witham close by. The base of springs along the Lincolnshire Wolds and Lincoln ridge, with the Ancholme valley between them, would have created an almost ideal backdrop for the settlement and movement of early prehistoric hominins. The major rivers in this area may have been the Rivers Trent, Lymn, Bain, and Witham. Hunting parties on their excursions would have had the best of both worlds hunting along these rivers because of increased resources (Williams 2016, p.26).

4.4 There is no evidence of this period within the Scheme and limited evidence of this period within the study area consisting of a find spot of two Palaeolithic hand axes from west of Thorpe on the Hill approximately 1.5km west from the Scheme. A bi-faced stone axe attributed to this period was found during the Lincoln Eastern Bypass archaeological investigations to the east of Canwick which lies outside of the study area.

Mesolithic

4.5 This period is characterised by the development of increasingly complex flint tools, including the adoption of microlith technologies, and is typically identified through finds assemblages rather than structural remains. Human activity would have likely been focused close to water bodies such as rivers and lakes for access to resources for as hunting and fishing, as well as communication. The evidence for this period in the East Midlands is notable for the broad range of environments from which Mesolithic lithic artefacts have been recovered (Myers 2006, p.51), such as moorlands, river valleys and caves.

4.6 During this period, the river Witham was much broader than now, and its floodplain contained a dendritic creek system flowing between sand bars and gravel islands during the earliest phase of the Holocene (Catney 2003). The Mesolithic people are thought to have preferred the drier, relatively open sites of the Lincoln ridge rather than the densely wooded valleys based on the higher density of finds (Collins 1999).

4.7 The area of the Scheme would have been part of a larger forested landscape with areas of wetland during this period. Evidence of this period within the Scheme comes in the form of stone tools and flint scatters. A fieldwalking exercise conducted by Birmingham University Archaeological Unit found flint scatters dating to this period, within the fields close to Canwick approximately 680m north from the Scheme, prior to works for the Lincoln Eastern Bypass. Flintwork of Mesolithic-Neolithic date including a large blade, cores, microliths and flakes was discovered in a large field approximately 925m north from the Scheme. Later investigations for the Lincoln Eastern Bypass identified 45 flint scatters to the south of the river Witham west of the village of Washingborough approximately 1km outside the study area (Network Archaeology 2020, p.8). To the north of the river, 36 flint scatters were also recorded 1km from the Scheme, which have been interpreted as working areas since most of the flint was broken with no complete tools being found. As sites of this date are rare in Lincolnshire, therefore these finds are considered particularly significant. The area could indicate sustained occupation by nomadic groups of Mesolithic hunter gatherers in the wider landscape (Network Archaeology 2020, p.8).

4.8 A lithic scatter (MLI92186) was discovered approximately 380m north from the Scheme close to the river Witham. It was restricted to an area of the field near to the old course of the river Witham on a slight rise that has a sandier subsoil. This is probably the remains of a small sandy island in the river valley that was used by local people.

4.9 Approximately 220m north of the Scheme, close to Bracebridge Heath, an assemblage of approximately 300 worked flints) were found which are likely of Mesolithic-Bronze Age and included a fragment of the cutting end of an axe, a discoidal knife as well as a barbed and tanged arrowhead, a leaf shaped arrowhead, blades, and scrapers. A flint flake of Mesolithic typology was found to the south of Bracebridge Heath, approximately 225m west of the Scheme, on or near the site of the former brickworks. These finds and assemblages suggest that the area of the Scheme was occupied at least on a seasonal basis with hunter-gatherers exploiting the resources available at the edge of river Witham. However, it is expected that these artefacts would have been dispersed from their original location through centuries of agricultural activity.

Neolithic

4.10 This period of human history is defined by the increased domestication of plants and animals, and the emergence of early agrarian communities. Forests were cleared to make way for farmland, as small farmstead settlements were established. The area of the Scheme would have been heavily forested, likely with areas of clearance used for farming and cultivation. During this period, ritual monuments were being constructed such as cursus, henges, and long barrows.

4.11 In the study area it is likely that settlement activity was located on higher and drier ground, although barrows seem to be focussed on the low-lying river valley of the Witham, most likely for visual impact (Membery 2008, p.2). The Lincoln Eastern Bypass archaeological investigations revealed significant archaeological evidence for ceremonial activities close to the river Witham.

4.12 During excavations to the west of Washingborough on the north side of the river Witham, a circular cropmark was revealed which comprised of a large circular bank with outer ditch. The feature was interpreted as a late Neolithic monument with a subsequent Bronze Age barrow at the centre. Several cremations were excavated within the barrow. It has been interpreted as a 'ceremonial enclosure' possibly dating from the later Neolithic period. A tradition of this being a sacred place persisted into the Bronze Age, when the enclosure became a focus for the construction of a barrow, in the centre of the circular interior space (Network Archaeology 2020, p.12).

4.13 Flint tools were recovered throughout the route of the Eastern Bypass, but the greatest density of finds was focussed predominantly to the south of the river Witham. The evidence was characterised by a change in types of flint tools over time including finds of leaf-shaped arrowheads and polished stone axe heads which were an important trade item.

4.14 Stone axes are the most common find of this period within the study area and their presence implies that this was an area of settled occupation with associated forest clearance. A Neolithic flint axe was found in a field to the west of Westfield Farm (formerly Branston Heath Farm) approximately 1km east from the Scheme, close to Canwick. A stone axe was discovered 370m south-east from the Scheme to the west of Bloxholm Lane, and two stone axes were found approximately 230m south from the Scheme, near Lowfields Farm. The butt of a Neolithic Group VI stone axe was found in the area of a Roman site while metal detecting and field walking. The HER also records the find of a small, polished axe of Borrowdale Ash however the accurate location of the discovery is unknown.

Bronze Age

4.15 The Bronze Age is characterised by the first adoption of metal technologies and saw increased economic and cultural communications with the rest of continental Europe, as well as a degree of population migration. The climate became wetter and forced the adaptation of settlements in lower valleys. Ore resources, such as tin and copper, both necessary for bronze smelting, would have become increasingly sought after. River valleys remained important for settlement, natural resources, and transportation links.

4.16 A major prehistoric routeway, the Jurassic Way, passes on a north to south alignment through the Witham Gap and is believed to have crossed the river valley at its narrowest point, at Stamp End, approximately 4.8km to the north of the Scheme. This was a corridor for traffic rather than a single track, and its use dates from at least from the early Bronze Age, although it may have its origins in the earlier Neolithic period.

4.17 The lower Witham valley has long been recognised as a socially significant place for this period and archaeological investigations ahead of the Lincoln Eastern Bypass identified an important Bronze Age funerary landscape approximately 1km east from the study area. Seven barrows were excavated, and evidence indicates that they had been eroded by the constant flooding of the river Witham (Network Archaeology 2020, p.11). Changes in the water levels over the centuries led to the bank of the barrows being partly buried in peat and silts. The results of the excavations are still in the post-excavation analysis stages, but other finds include over 30 cremations and 'plank burials' as well as timber fence-lines.

4.18 Evidence of this period within the study area is mostly defined by finds of stone tools. An early Bronze Age partly perforated axe hammer or mace-head was found within the Scheme to the north of Waddington. A fieldwalking exercise carried out for the Lincoln Eastern Bypass, 125m east from the Scheme, recovered Bronze Age artefacts including a single barbed and tanged arrowhead. A Beaker period thumbnail scraper was also recovered 1.4km north-east from the Scheme.

Iron Age

4.19 The adoption of iron tools, as well as an increased complexity of land use and division define this period. Settlement areas became more extensive, aimed at better exploitation of the land for agriculture. The period saw the development of hillfort sites, which are defended places, generally surrounded by one or more circuits of banks and ditches, and usually placed on hilltops, ridges, spurs, or promontories. These may indicate an increase in tension between social groups during this period, however excavated evidence now suggests that many hillforts had their origins during the earlier Bronze Age.

4.20 During this period, Lincolnshire was inhabited by the Corieltauvi tribe, who had their 'capital' at Leicester. Much of Lincolnshire was either marsh, swamp, fen, or river. Significant discoveries have been found in Lincolnshire relating to the river Witham, predominantly log boats including those found at Fiskerton, c7km to the north-east of the Scheme. A wooden causeway (like a low bridge) was also discovered at Fiskerton which provided a stable surface to cross the marsh and reach the river Witham. Evidence for the Iron Age period was relatively sparse during archaeological works for the Lincoln Eastern Bypass and was limited to the upper sides of the Witham Valley. This may reflect a sparsity of occupation or may be a result of the disturbance of remains of this period by Roman and later activity. Among the finds of this period are the possible remains of a roundhouse, field enclosures and palisaded enclosures, and two possible transitional pre-Christian burials with grave goods including a complete Roman storage jar (Network Archaeology 2020).

4.21 Some evidence for Iron Age settlement activity within the study area includes the post-medieval parish boundary of Waddington and Bracebridge Heath which appears to follow a prehistoric estate or territory boundary. This is supported by an amount of Iron Age pottery found within a ditch running along the boundary (Lindsey Archaeological Services 2000). Evidence from that work suggested that the ditch was deliberately backfilled at the end of the Iron Age and may represent an attempt by the Romans to assert dominance over the local population. Archaeological evaluation works undertaken in support of the Scheme (ASWYAS 2023) also investigated this feature which was revealed as 4m in width and 0.9m deep. Finds included Roman pottery, Ceramic Building Material (CBM) and a possible sandstone floor tile.

4.22 Trial trenching undertaken for the Lincoln Eastern Bypass revealed Iron Age activity to the east of the Scheme, including pits and a late Iron Age ditch, which had been recut in the Roman period, demonstrating the continued use of this feature 1km east from the Study Area. Further evidence of this period is represented by findspots such as a large beehive quern stone which was found north of the Fosse Way in North Hykeham approximately 700m northeast of the Scheme.

4.23 Archaeological evaluation undertaken in support of the Scheme led to the recovery of a small assemblage of Iron Age pottery including in an area close to the river Witham on its eastern side, and in an area of primarily Roman archaeological located on the Lincoln ridge at the eastern end of the Scheme (WYAS 2023).

Roman

4.24 During the Roman period Lincoln was a fortified city linked by Ermine Street and the Fosse Way to other major settlements across Britain. The Roman colonia at Lincoln originated as a legionary fortress which was built by Legio IX Hispana in the mid-1st century. The fortress was evacuated in c.70AD; however the defences were left intact perhaps to delimit land still in government ownership. The area of legionary defences was c.41 acres and lay at the southern end of the limestone ridge. The area in which the fortress was constructed was within the tribal territory of the Corieltauvi who had a tribal centre at Sleaford, several miles to the south of Lincoln, while the tribal capital was at Leicester. The foundation of a colonia at Lincoln made use of land which was already imperial property. Upon the founding of the colonia the existing timber and turf defences and ramparts were bolstered and expanded in stone.

4.25 The colonia included an 'upper' and lower' town which respectively had regular square and rectangular layouts, equally divided into quadrants by the north-south and east-west roads of which Ermine Street entered through the south gate. The internal layout of buildings and public spaces within the colonia is not well understood: the medieval cathedral partly overlies the eastern wall in the south-east quadrant and the medieval castle occupies much of the south-west quadrant and includes a partial survival of the west gate.

4.26 Lincoln is known to have possessed a sophisticated sewerage system of which traces have been uncovered to the north-west of the Cathedral. Its high capacity is indicative of a large volume of water being used by both public and private users. An aqueduct approached from the north-east and was sourced from a stream "Roaring Meg" which is located approximately 1.8km away around Nettleham Road. Archaeological investigations around Nettleham Road have revealed the remains of the former aqueduct including the remains of pier bases, sections of terracotta pipe, and metalled surfaces associated with a former track along the stream (Monument record MLI70013).

4.27 Known extramural activity suggests a thriving pottery industry with evidence for kilns being found at Cathedral Street, Swanpool, Boultham, North Hykeham, and South Carlton. Investigations ahead of the Lincoln Eastern Bypass, uncovered a complex of buildings to the south of the river Witham close to the outskirts of Washingborough on the B1190. The site had four pottery kilns and a bath house, but no mosaics, suggesting it was not primarily residential, and contained a large quantity of legionary wares, types of pottery in use by the legions in Britain especially in the mid-1st century AD, when local products were found to be inadequate (Darvill 2009) and therefore it was interpreted as a pottery production site for Lincoln (Network 2020, p 28).

4.28 The primary roads to Lincoln from the south were Ermine Street, Fosse Way, and Till Bridge Lane. Ermine Street roughly follows the crest of the Lincoln ridge. Evidence of this was uncovered in the trial trenching for the Scheme during which parallel ditches demarcating the road edges were found in field 39 south of Grange Farm, however no discernible surface material was uncovered.

4.29 The area around the Scheme would have been part of substantial rural hinterland containing small settlements (Millet 1990, p.55). Within the county are several 'small towns', some spaced at regular intervals along the main roads and serving as imperial posting houses, and others acting as markets for the surrounding countryside (Bennet 1998). The majority of these are considered likely to have had Iron Age precursors.

4.30 Much of the investigative work on Roman villas was carried out during the 18th, 19th, and early 20th centuries. The site at Winterton is a more recent investigation and showed the development of a Roman settlement and field system from the Iron Age to the fourth century (Bennet 1998). Current evidence suggests villa sites in Lincolnshire date from the later 2nd century to the 4th century. Some of the high-status sites in close proximity to Lincoln may have served as suburban dwellings for officials and local magnates working in Lincoln. One of the more important discoveries from the Lincoln Eastern Bypass investigations was the remains of a complex of Late Roman period buildings found at Washingborough on the B1190, approximately 1km outside the study area. The walls were built of stone and the large quantities of Roman tile that were recovered show that they had tiled roofs. There were also box flue tiles, which would have been part of a hypocaust system. The presence of painted wall plaster and tesserae hint that the building was of relatively high-status, possibly a small villa.

4.31 To the north of Washingborough, excavations for the Lincoln Eastern Bypass identified another possible villa that may have formed the heart of a larger estate. In addition to wall foundations, stone-lined wells and a sunken tank were uncovered. Further tiles from a 'hypocaust' and a range of domestic objects such as bone pins, have been recovered from this area during the evaluation phase of the project, suggesting that the villa complex or estate extended in the direction of Lincoln.

4.32 During archaeological investigations for the Strategic Pipeline Alliance (SPA 2022, p.94) from Elsham to Lincoln, the remains of buildings possibly representing settlement activity were uncovered on the outskirts of Bracebridge Heath close to Grange Farm and within the study area (not recorded on the HER). The location of these remains corresponds with the recorded alignment and position of Ermine Street.

4.33 Geophysical Survey (MoLA 2022) and trial trench evaluation (AYWYAS 2023) carried out for the NHRR Scheme revealed structural remains dated to the Roman period which may have formed part of a wider high-status estate. The site corresponds with a Roman site recorded by the Historic Environment Record (HER) west of Grantham Road and north of Waddington has been identified from finds which have been discovered at the location. These finds include pottery such as Samian, mortaria and an assemblage of grey ware. Roof tile and box tile have also recovered from the area. Metal finds from the site include a bronze chain and toilet set, gouge, and two coins, one of Constantine I, and the other of Constantine II. A stone wall was revealed which corresponded with the position of a building identified by the geophysical survey and is likely the remains of the wall's foundations. A heat-affected stone structure, possibly a kiln or oven was partly exposed in a trench section. Its purpose was not clear however fragments of box-tile may suggest an association with a heating system. The pottery assemblage from the site was primarily dated to the mid to late 3rd century and is indicative of a high-status rural site but with low-status inhabitants.

4.34 Evidence of a possible Roman villa site close to the Ermine Street is recorded on the HER, approximately 1.6km from the Scheme extent, east of Folly Lane. Finds from the site include a Roman inscription together with second-third century pottery, building material and tesserae, as well as a stamped amphora body sherd (dated 50-120 AD). An excavation was undertaken near the site and recovered earlier finds of Romano-British material, such as a stone foundation of irregular shape presumably for the base of a timber building. No trace of walls survived, but quantities of charred timber and nails were found around the edges of the site.

4.35 The archaeological evidence from villa complexes within and around the study area demonstrates that there was likely a number of high-status residences in the hinterland area of Lincoln, which as a provincial capital, would have a high number of government posts. There was an associated system of agricultural estates and supporting industrial activities including pottery production.

4.36 Archaeological evidence within the study area is predominantly focussed on the higher ground at the eastern end of the Scheme. Some activity is also recorded in the lower-lying areas including at North Hykeham, 600m north of the Scheme where an archaeological watching brief (Pre-Construct Archaeology 1997) identified Roman settlement features and finds, including pottery sherds, kiln furniture and complex linear features. Settlement activity is recorded approximately 785m north from the Scheme. A geophysical survey identified several anomalies on the site, requiring that a scheme of trial trenching be carried out, during which a series of pits, ditches and gullies were recorded dating to the 1st century AD through to the 4th century AD. It was interpreted as an industrial site due to the presence of iron slag. Ironstone deposits suitable for iron production are present in Lincolnshire and finds of iron slag are not uncommon on Roman sites in the wider environs of Lincoln. Both of the sites are located close to the Fosse Way, allowing for easy transportation of goods.

4.37 A ladder settlement, comprising a series of adjoining rectangular enclosures, is located to the south-east of South Hykeham approximately 500m south of the Scheme. The settlement was identified on aerial photography and no systemic excavation of the site has taken place. However, an assemblage of Roman pottery has been found over a five-year period within 100m north of the settlement, which may relate to the ladder settlement and waste disposal.

4.38 Cemeteries and burials dating to the Roman period have been found within the study area. A cemetery was uncovered during a watching brief on a pipeline installation off Grantham Road, Bracebridge Heath, 500m north of the Scheme. The cemetery included a mix of inhumations and cremations; some of the individuals were aligned north to south which suggests a pre-Christian community. All the pottery from the cemetery contexts were dated to the 2nd century.

4.39 Several Roman period inhumations were revealed during the Lincoln Eastern Bypass archaeological works. These were in an area in which two lime kilns were also discovered and an interesting discovery was that of a burial within one of the limekilns after the kiln had fallen out of use but before the roof had collapsed, suggesting that the kiln had been repurposed as a make-shift mausoleum (Network Archaeology 2020, p.28).

4.40 The remains of at least two human burials and a red clay feature were found during the construction of new offices at Cross O'Cliff Court, approximately 1.3km north of the Scheme. Limestone slabs appeared to have been used to define both graves, and sherds of Roman greyware pottery were found in association with each. The clay feature was roughly hexagonal in shape and appeared to have walls of stone. Sherds of pottery and fragments of slag were found in association with the feature and may represent the remains of a kiln.

4.41 Coins are also found in abundance within the study area. The most important of these finds is a Roman hoard of 30-40 coins dating from 69-168 AD, discovered approximately 450m north from the Scheme in Bracebridge Heath. Four of the coins are issues of Domitian (c.AD70-96), Hadrian and Marcus Aurelius (c.AD161-169) and two others were issues of Vespasian and Trajan (c.AD78-117). The study area includes a number of isolated coins issues of Vespasian, Domitian, Antonius Pius, Maximianus and Constantine II dating between 69AD-340 AD.

Early Medieval

4.42 The old Iron Age tribal region of the Corieltauvi, which survived the Roman occupation was replaced by the Post-Roman British kingdom of Lindsey (Green 2008, p1-3). The name Lindsey is possibly derived from the Roman name of Lindum Colonia. It is likely that Lindsey was independent until the 7th century, as the royal dynasty of Lindsey was included in the collection of a group of surviving royal pedigrees known as the Anglian Collection (Ten Harkel 2011, p.3). Over the next two centuries the Kingdom of Lindsey was subsumed into the larger kingdoms of Mercia to the west and Northumbria to the north.

4.43 Danes settled in the area in the late 9th century and a town was re-established within the old city walls. There was cultural continuity for the vast majority of rural communities who were left largely unaffected by the politics of the country (Rippon 2021, p.37). A continuing British presence in the region is indicated by the fact that major settlements such as Lincoln, and Lindsey itself have partially Brittonic names. In 927, the various polities were formally united into the kingdom of England by King Æthelstan.

4.44 The Roman roads of Fosse Way and Ermine Street remained important landscape features in the post-Roman period and form settlement boundaries as well as parish boundaries in some places (HLC 2010). It is clear that the post-Roman settlement pattern is strongly influenced by the existence of the Roman roads. Some early medieval and Danish settlements such as Navenby and Scunthorpe are located parallel to known Roman roads (Sleaford Rd and Ermine St), at a distance of two or three kilometres (Lord & Macintosh 2011, p.18).

4.45 The settlement of Bracebridge has its origins in the early medieval period and became part of Lincoln in the fifteenth century. It has been tentatively suggested that Canwick formed the principal part of an early medieval estate, which also included Bracebridge and Wigford (Mills 2001, p.7).

4.46 The first documented Viking attack on Lincolnshire took place in 841 and was followed by a period of increased raiding culminating in the Great Viking Army which overwintered at Torksey in 872-3 (Albone 1998). Lincolnshire became part of the Danelaw and was dominated by the five boroughs of Nottingham, Lincoln, Stamford, Derby, and Leicester. The influence of the Viking occupation is evident in many of today's place names with the suffixes "by" "thorpe" and "kirk".

4.47 Investigations for the Lincoln Eastern Bypass provide some of the most extensive evidence for early medieval life and death in Lincolnshire. A group of thirty-four burials, aligned east-to-west in the typical Christian fashion, were uncovered close to Washingborough, to the south of the railway. A much larger group of graves was uncovered further to the west. In total, 723 skeletons from the western group were uncovered. The position of skeletons on either side of Washingborough Road, most likely forming a single grouping, suggests that there was no road present in the Early Medieval period. The discovery of so many early medieval burials, implies that this was an important religious site in the first couple of centuries of English Christianity (Network Archaeology 2020, p.39-40).

4.48 Other than the discoveries made by the Lincoln Eastern Bypass investigations, outside of the study area, the most significant find from this period within the study area is a warrior burial discovered approximately 670m east from the Scheme during works associated with a water pipeline project at Bloxholm Lane, Bracebridge Heath.

4.49 Approximately 350m south-east from the Scheme, the site of an inhumation cemetery was identified adjacent to the A607 in Waddington. The full extent of the cemetery remains unknown, although it seems restricted to an area of about 12m wide. More than one phase of burial appears to be present and may have overlapped a pagan and Christian burial tradition.

4.50 A hedgerow located on land to the south of Bracebridge Heath lies on the line of the boundary between Bracebridge Heath and Waddington parishes and may date to the later part of the early medieval period. Archaeological investigations (AYWYAS 2023) suggest that a boundary at this location may have its origins in the Iron Age or Roman periods.

Medieval

4.51 This period saw a growth in the region, especially at Lincoln where the Normans began to fortify and expand Lincoln almost immediately. In 1068, King William I ordered the building of Lincoln Castle and the city walls, utilising existing Roman walls, and supplemented or added to in wood. Construction of a cathedral at Lincoln began at this time and was consecrated in 1092 as the seat of the first Norman Bishop, Remigius. Settlements around Lincoln began to grow in density but were still sparsely spaced out across the Witham Valley.

4.52 It is likely that the western and central areas of the Scheme would have been utilised as agricultural fields within the locality of scattered farmsteads. Surviving ridge and furrow earthworks around the villages suggests that the medieval farming landscape in the zone was a typical open field system, with arable land on the high ground adjacent to the settlements and grazing land on the marshy areas below. Remains of ridge and furrow cultivation can be found in the western portion of the Scheme close to South Hykeham.

4.53 There is extensive historic evidence for this period, the most significant of which is the Scheduled Monument of Hall Close: a medieval and post-medieval hall complex south of Dovecote Lane, with dovecote, gardens, fishponds, churchyard, and cultivation remains. The site is located approximately 2km south-west from the Scheme. The monument includes Hall Close, an area of over 11ha situated between Dovecote Lane and the river Witham. Hall Close is the site of Haddington Hall, an early 17th century manor house of the Nevile family. The Hall and its formal gardens incorporated the remains of two earlier manor houses, West Hall, and East Hall, which were acquired by the Neviles in 1575 and 1604 respectively. The scheduling includes the standing remains of the dovecote, the earthwork and buried remains of Haddington Hall and the manor houses which preceded it, together with associated gardens, moated fishponds and cultivation remains; it also includes underlying settlement remains of early medieval date and the site of the medieval chapel of St Nicholas, which stood at the north-eastern corner of the monument.

4.54 Investigations for the Lincoln Eastern Bypass between the river and the railway revealed the substantial stone foundations of a small, rectangular building dated to the 12th century AD, which was surrounded by a stone enclosure wall and sat atop a raised natural sandbank. The thick walls of the building and its small size indicate that it may have been a tower, possibly a beacon to warn of threats approaching by river, or perhaps a defended tower for refuge in times of unrest. This structure could correspond to the period of civil war between the forces of King Stephen and the Empress Matilda known as The Anarchy, which included the Battle of Lincoln in 1141.

4.55 Medieval settlements in the study area primarily appear to be focused upon the areas of settlements that had originally emerged during the early medieval period. The settlement of South Hykeham which is located to the north of the Scheme is first documented in the Domesday Book and the placename 'Hykeham' means 'the homestead, estate where the blue tit mouse is found', derived from Old English. Further evidence of this period within South Hykeham consists of the Grade II* Church of St Michael (LB8). The unbuttressed west tower has 13th to 14th century lower parts and decorated bell openings. Parts of the church were rebuilt in 1869.

4.56 The settlement of Waddington is first documented in the Domesday Book but may have earlier origins. The lands were held by Earl Hugh at that time (who also had soke land of Waddington in Harmston). The name Waddington comes from the Old English meaning 'the farmstead or village associated with, or called after, Wada'.

Post Medieval

4.57 The course of the river Witham once meandered through a floodplain of marshy pools and reed beds, but since the 17th century the area has been progressively drained. The river Witham now has an artificial canalised course developed during the late post medieval period, which runs straight for miles and is bounded by high banks to contain the watercourse from the lower adjacent fields (DTA 2007, p.14).

4.58 The later 16th and 17th centuries were generally a time of rural population decline with a continuing conversion of land to pasture (Field 2008, p.2). The reduction in population continued throughout the 17th century, perhaps following private enclosure of land, coupled with the migration into Lincoln and the fens (Field 2008). During the 18th and 19th centuries much of the rural landscape of the study area was subject to enclosure, either by Act of Parliament or through private agreement between landowners. Many of the isolated farms found in the modern landscape were established at this time, with no real division between the Parliamentary and private enclosure landscapes.

4.59 Much of the post-medieval archaeological evidence within the study area is artefactual and derived from manuring of arable fields. The landscape remained agricultural throughout these periods although small scale industry expanded, and transport networks and infrastructure were improved.

Modern

4.60 The modern period is marked by industrial growth with residential growth in North Hykeham, Bracebridge Heath and the outskirts of Lincoln, in part due to the establishment of companies such as Clayton and Shuttleworth and William Foster & Co Ltd. Several Lincolnshire companies were significant for contributions to the war effort including building aircraft and tanks. One such company, AV Roe & Company (Avro), was located within the study area close to Bracebridge Heath.

4.61 RAF Waddington is located directly south of the Scheme. It opened in 1916, during the First World War, operated throughout the Second World War, and is still open at present. The station was enlarged significantly during the 1930s and it re-opened as a bomber base in March 1937. Initially it stored Bristol Blenheim aircraft and then Handley Page Hampdens. When war was declared Waddington's squadrons were in action from the very first day. The Hampdens were replaced by Avro Manchesters and then in December 1941 Waddington hosted the first operational Lancaster bombers. The first concrete runways were laid in 1943.

4.62 Just outside the boundary of the Scheme close to South Hykeham on its south-east side, there is a crash site of an Avro Manchester bomber aircraft (NDHA328). The aircraft was designated L7318 based at RAF Waddington and crashed upon its return to base on a non-operational flight. There are no evidence of below ground remains associated with the crash visible on LiDAR or from the geophysical survey.

4.63 NHRR Archaeological Evaluation Works

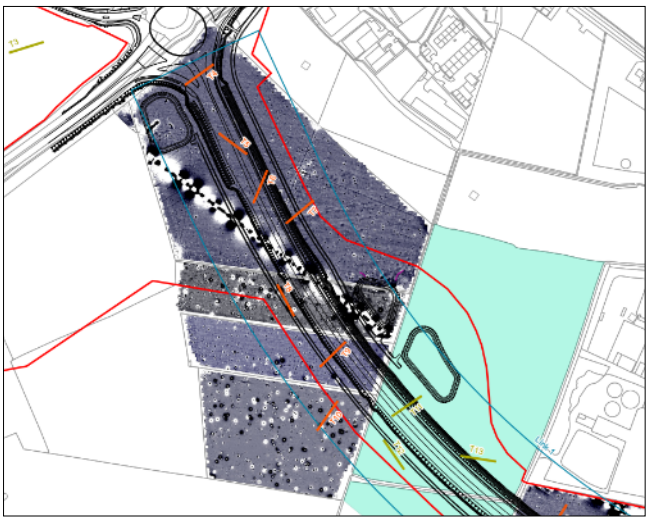
4.64 A programme of geophysical survey was undertaken between October to December 2022 by Museum of London Archaeology (MoLA 2022, **NHRR-TEP-HER-HYKE-RP-LH-30005**) consisting of a magnetometer survey of the Scheme and encompassing a broad survey area around it (survey results provided in **Appendix 2**). This survey area was intended to identify possible archaeological remains that may be impacted by development, to provide a sufficiently broad survey area to provide context to any findings, as well to inform any potential route changes and the siting of compounds and any ancillary works. The majority of survey areas were successfully completed, however due to lack of access, a small number of fields were not surveyed. The results obtained are sufficient to provide a general characterisation of the area and enabled the production of a strategy for trial trench evaluation.

4.65 Following the completion of the geophysical survey, a programme of trial trench evaluation was carried out across the Scheme between March and April 2023 (WYAS 2023, **NHRR-TEP-HER-HYKE-RP-LH-30004, Appendix 3, Appendix 4**). The works were undertaken in accordance with an approved Written Scheme of Investigation. The 106 excavated trenches were positioned to investigate and characterise anomalies identified by the geophysical survey as well as to test 'negative' areas and to evaluate areas which had not been subject to geophysical survey.

4.66 The following provides a summary of the results from the investigations and is arranged in accordance with 'Links' subdivisions of the Scheme from west to east. Field numbers and Links are identified on drawing **NHRR-TEP-HER-HYKE-MP-LH-30022 (Appendix 2 and 3)**.

Link 1

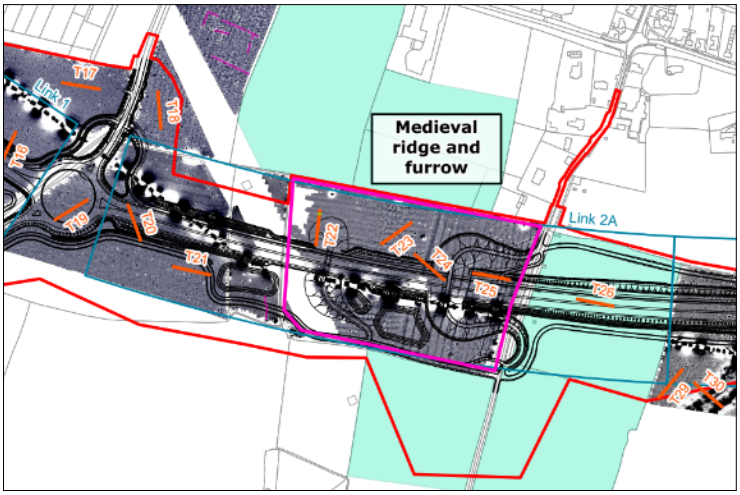
4.67 Geophysical survey within Link 1 was largely devoid of archaeological remains; a single possible anomaly has been identified in the north-west of field 1, close to the A46 and a possible pit-like anomaly has been identified in the south-east of the same field. Fields 2-4 include large numbers of ferrous anomalies which are likely to relate to debris within the topsoil and derive from soil spreading. Two former field boundaries are identified in field 1. The evaluation trenching did not identify any archaeological remains within Link 1.



Fields 1-5, Link 1

Link 2A

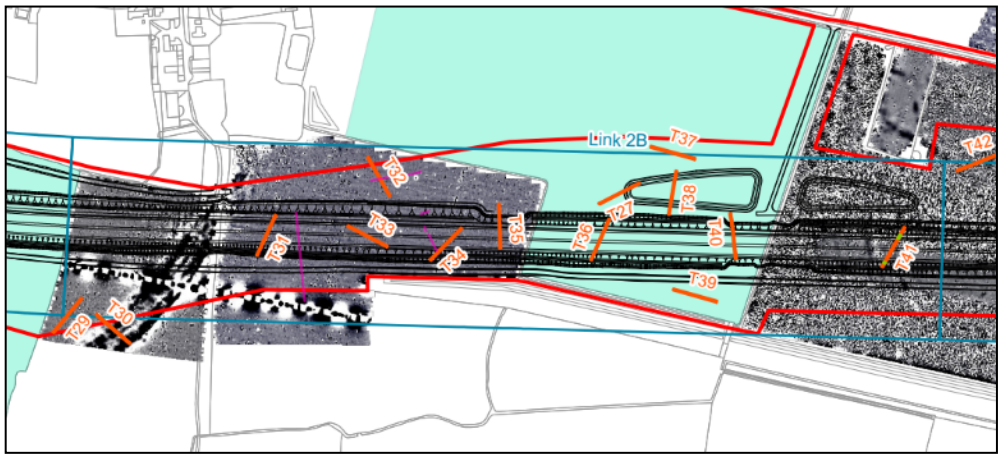
4.68 Geophysical survey has identified a possible area of archaeological remains comprising a rectangular enclosure in field 8 and a single linear anomaly of possible archaeological origin has been identified in field 11. Field 12 is recorded by the HER as including remains of medieval ridge and furrow which was confirmed by walkover survey. The ridge and furrow remains are clearly visible in the geophysical survey with a headland at the centre of the field marking a change in direction. A line of small linear anomalies in the same field may relate to buried services. The trial trench evaluation was largely devoid of archaeological remains; a single shallow ditch which may be the remains of a plough furrow or field boundary was identified in field 12. The enclosure in field 8 lies outside of the area of the Scheme and was not investigated further.



Evaluation results in Link 2A

Link 2B

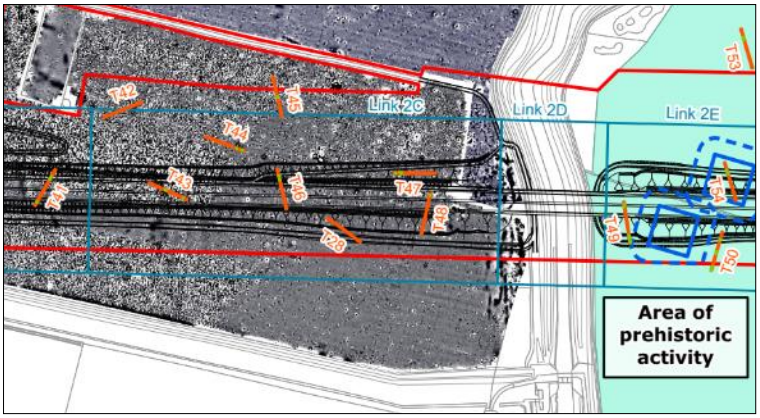
4.69 A natural anomaly interpreted as a palaeochannel has been identified in field 17 to the south of South Hykeham. The feature is c40m in width and crosses the Scheme on a north-east to south-west alignment. A series of faint linear anomalies, possibly ditches or field boundaries, have been identified in the adjacent field 18. The survey results in field 21 were limited due to the presence of green waste within the soil which causes interference with the survey and masks any underlying archaeological features. Investigation of the palaeochannel during the evaluation trenching revealed it to have a shallow a depth of 0.3m. No finds were recovered, and an environmental sample produced a small quantity of charcoal which has been interpreted as being derived from detritus washed into the deposit. Several linear features have been identified in field 19 however due to a lack of geophysical survey evidence an interpretation of the relationship of these features is uncertain. They are likely to comprise of former field boundaries or trackways. Part of a pond was investigated in trench 28 which extended to a depth of 1.35m below the topsoil.



Evaluation results in Link 2B

Link 2C

4.70 Geophysical survey in this area was also obscured by interference from green waste. The evaluation trenches in this area identified a series of linear anomalies which are likely to comprise former field boundaries. A small number of finds were recovered and have been dated to the modern and post-medieval periods. Despite the proximity to the river Witham the natural horizon within the trenches was encountered at a shallow depth of c0.3m which is relatively consistent across the scheme. No waterlogged deposits with a potential for palaeoenvironmental archaeological remains have been identified within this area.

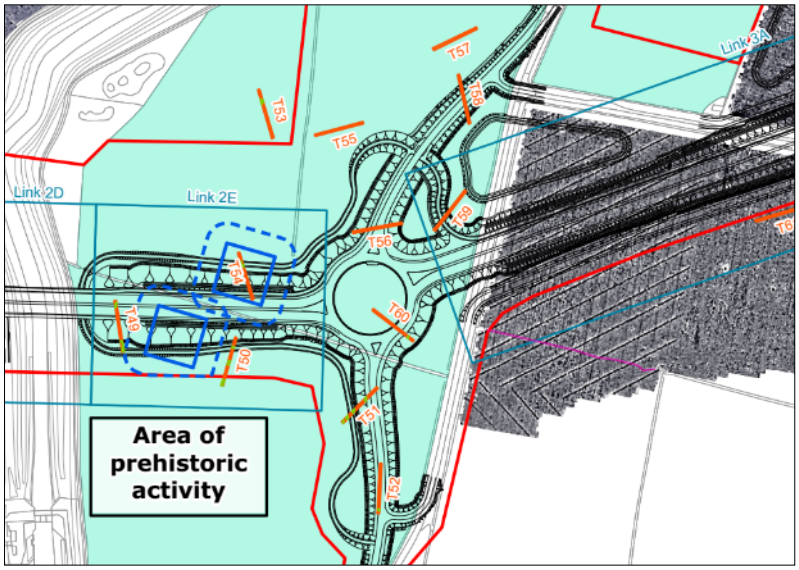


Evaluation results in Link 2C

Link 2E

4.71 No geophysical surveys were undertaken in this area. Evaluation trenching within the Link area and immediately surrounding area has identified several cut features of archaeological origin including ditches and pits. Trench 49 located in close proximity to the current course of the river identified part of a pond and two ditches from which no finds were recovered except for a flint nodule. Trench 50 included five ditches on east-west and north-south alignments from which no finds were recovered. Trench 51 included four E-W and N-S aligned ditches and two pits. Trenches 55-61 were devoid of archaeological remains.

4.72 Environmental evidence in the form of charcoal inclusions and a hazelnut shell were recovered from pit 5111 in trench 51 and have been interpreted as the remains of a prehistoric firepit which was deposited as waste into this pit. A pit in trench 54 included sherds of Iron Age pottery and two pieces of flint. Some disturbance of the feature is indicated by the recovery of post-medieval pottery from the upper fill of the pit. Pit 5406 in trench 54 contained oak charcoal and a fragment of hazel nutshell which may have been derived from a fire pit. Ditch 5403 in trench 54 also included a deposit of burn waste with trace finds of barley and cereal grain which may be indicative of burning activity or cereal processing. The lack of geophysical survey in this area makes an interpretation of the features and their relationship difficult. The stratigraphy in this area consisted of topsoil to a depth of 0.25m-0.4m overlying subsoil of 0.15m to 0.25m depth and the natural substrate of light yellowish grey medium sand.

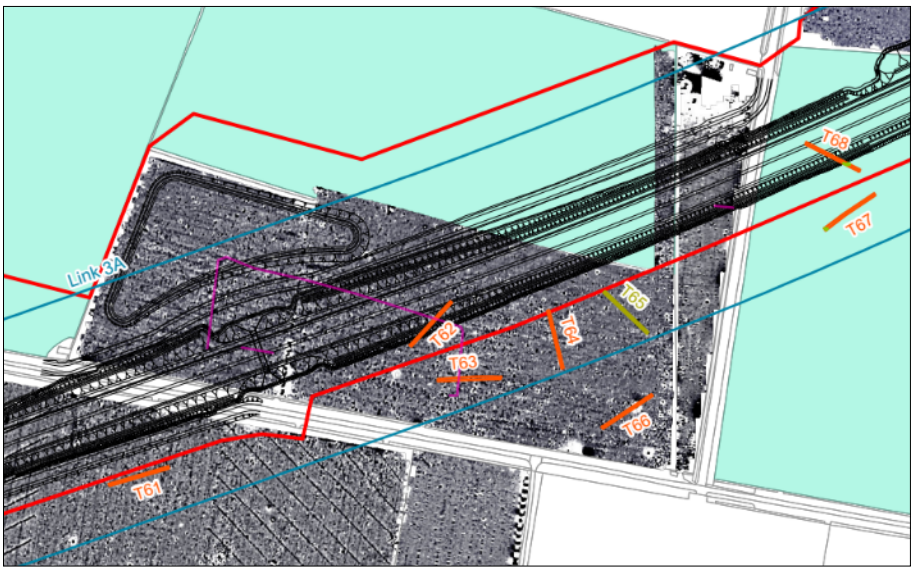


Area of prehistoric archaeology in Link 2E

Link 3A

4.73 A possible archaeological anomaly in the form of a rectangular enclosure was identified through geophysical survey in field 29. The anomaly was not present in trial trench 62 and the features which were revealed in trench 63 did not appear to correspond with the recorded location of the anomaly. Given the veracity of the geophysical survey elsewhere it is likely that the geophysical feature does not survive as a subsurface feature.

4.74 No access for geophysical survey was gained to field 31. Evaluation trenches in this field have revealed three plough furrows cut by field drains and a ditch which produced a single sherd of late Iron Age / early Roman pottery. A small lens of burnt material was also recorded in the fill. One of the plough furrows was also investigated and a sherd of Roman pottery was recovered.



Site of possible enclosure, Link 3A

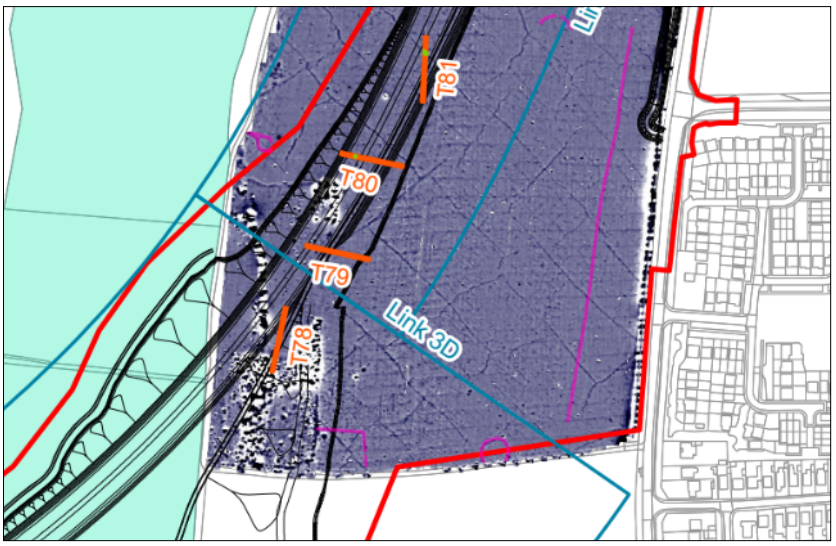
Link 3B / 3C

4.75 A set of anomalies forming a possible trackway and curvilinear ditch suggestive of an enclosure were noted in field 34 adjacent to Station Road. The geophysical survey in field 34 recorded a c70m long linear anomaly, possibly a ditch, as well as a possible ditch corresponding with the location of a pond visible on historic Ordnance Survey mapping. Evaluation trenching within field 34 did not reveal any archaeological remains.

Evaluation results in Links 3B and 3C

Link 3D

4.76 Geophysical survey in field 38 identified an isolated semi-circular anomaly adjacent to the southern field boundary. This may comprise a ring ditch of prehistoric date. The anomaly lies outside the area of predicted impact and was not subjected to trial trench evaluation. An area of possible quarrying has been identified in the south-eastern corner of the field however a trench within this area of anomaly did not identify any archaeological remains.

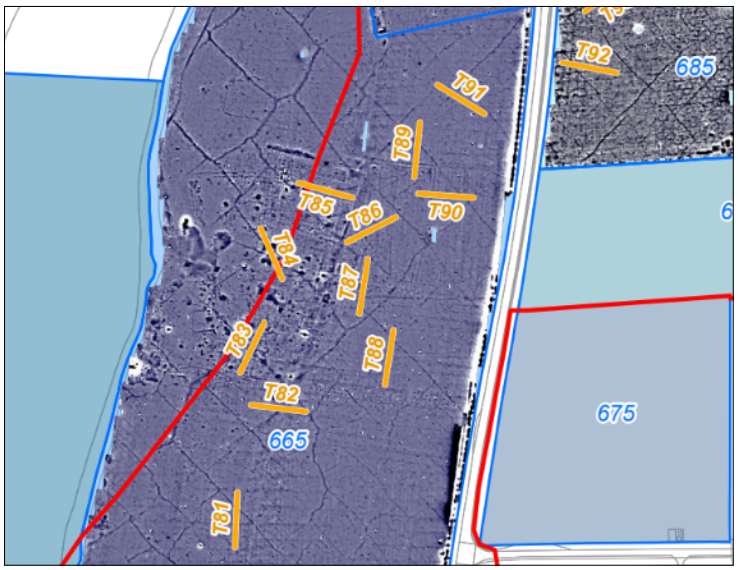


Evaluation results in Link 3D

Link 3E and 3F

4.77 Geophysical survey in field 38 identified a large concentration of archaeological anomalies which have been interpreted as building remains, pits, enclosures, and possible kilns. Five possible buildings have been identified, three of which surround a probable courtyard and included evidence for internal subdivisions. An area of magnetic response is interpreted as resulting from burning and provides contextual evidence for a possible hypocaust system. To the east of the buildings is a right-angled double ditch which appears to form an enclosure or yard immediately to the east of the buildings. Also in the vicinity of the buildings are features interpreted as possible robber trenches or quarry pits. Other discrete features indicating sub-rectangular enclosures are visible in the area around the buildings. The survey also revealed widespread occurrence of geological anomalies resembling a coaxial field system; investigation of these features confirmed a geological origin.

4.78 Evaluation trenching in this area revealed the remains of a stone-built structure in trench 85 and a heat-affected stone-structure, possibly a kiln or oven which was partly exposed in the trench section. The function of this feature was not clearly determined, however fragments of box-tile recovered from the topsoil may suggest an association with a heating system. The stone wall corresponded with the position of a structural anomaly identified on geophysics and measured 1m in width and was constructed of rough limestone blocks and likely represents foundations rather than an upstanding wall. No further walls were identified in the neighbouring trenches.



Area of archaeological remains, Link 3E and 3F

4.79 A stone surface which was cut by a narrow ditch was recorded in the adjacent trench 84 and has been interpreted as a flue. The ditch contained a heat-affected basal fill and an upper fill from which were recovered animal bone, ceramic building material (CBM) and 3rd-4th century pottery. A large pit in the same trench was investigated and included Roman pottery, animal bone and a bone pin in the upper fill. It was overlain by a stone surface which may have served as a capping layer or working surface. Three smaller pits in the same trench have provided 2nd century pottery and an amount of barley grain which is suggestive of a domestic waste pit.

4.80 The pottery assemblage from the evaluation is primarily dated to the mid to late 3rd century and was concentrated in trench 84 and associated with the Roman structure. The pottery types are indicative of a high-level rural site and the functional analysis and fineware levels imply that the inhabitants were generally low status. This pattern is noted where structures which are part of a larger estate are accommodating lower-class populations carrying out work for higher status individuals residing elsewhere.

4.81 The majority of ceramic building material (CBM) recovered in field 38 was derived from trench 84 and included brick or tile, flue tile and tegula (roof tiles). The finds have been interpreted as being material which have been re-used as wall fill and may have been derived from a structure with a hypocaust system located close to the excavation area.

4.82 Evidence for human activity extends to the south of the field, as far as trench 80 where fragments of fired clay and an iron object were recovered from a pit in trench 80 however the main concentration of activity appears to have been within Link 3F, to the north of trench 82 and south of trench 91.

4.83 Three pits or post-holes were investigated in trench 82; they were of near-identical size and shape and with similar fills and were sealed by a deposit containing 3rd century pottery, animal bone and an iron nail. They are interpreted as indicating the presence of a structure outside of the trench limits.

4.84 Evidence for Iron Age / transitional activity was provided by a large amount of late Iron Age and early Roman pottery which was recovered from a ditch terminus in trench 83, as well as animal bone fragments and cereal grain. Pottery of the same date was recovered from the topsoil during the opening of the trench.

4.85 The assemblage of animal bones recovered as part of the trial trenching were primarily recovered from features in field 38 and includes cattle, horse, pig, sheep /goats, dog, and chicken bones.

4.86 The overall pattern of evidence for Links 3E and 3F is suggestive of a low-status rural site located in the wider hinterland to Roman Lincoln and close to the one of the main Roman roads. The associated material evidence including pottery, CBM and animal bones suggests that this site was associated with a high-status villa or farm. The limited finds from the Iron Age period suggests that there may have been some pre-Roman occupation or use of this site.

4.87 The general stratigraphy within the evaluation area comprised topsoil between 0.27m - 0.44m overlying natural substrate. Subsoil was encountered in some trenches but was not present in the area of trenches 84-86.

Link 4

4.88 Geophysical survey in this area has clearly identified the position of the Roman road Ermine Street which crosses the Scheme on a north-east to south-west alignment to the west of Grange Farm. The edges of the road are defined by parallel positive anomalies interpreted as road-side ditches. To the north of Grange Farm and outside of the Scheme area are identified two well-defined enclosures of Iron Age or Roman date, and a circular anomaly which is likely a ring ditch pre-dating the square enclosure. Parallel linear anomalies extending on a roughly east-west alignment to the south of Grange Farm have been interpreted as a possible trackway. At the eastern end of field 39 is identified a collection of anomalies of probable archaeological origin which appear to form enclosures situated at right-angles to a ditch which aligns with the present parish boundary.

The route of Ermine Street visible in Link 4

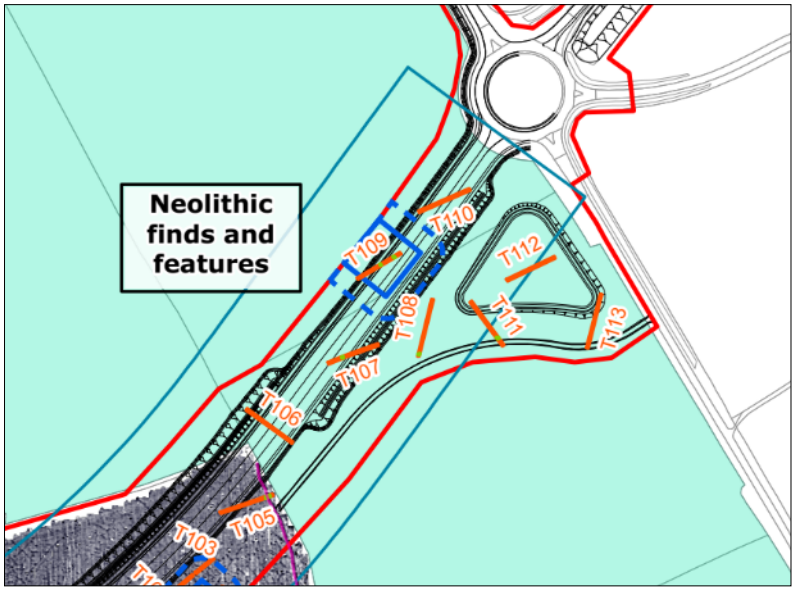
4.89 Evaluation trenching in Link 4 identified several pits and ditches in the trenches at the western side of field 39. A small quantity of Roman pottery and animal bone was recovered. Ditch 9505 in trench 95 included a discrete cache of well-preserved hazel nutshell which may be food waste from nearby burning activity. Pit 9507 in the same trench was 0.6m in depth and included a vertical cut through the centre which may be a post-pipe. Trench 97 which targeted the position of Ermine Street included two parallel shallow ditches spaced 22m apart. No road surface material was visible within the trench.

4.90 Trench 105 targeted a north-south aligned linear anomaly which is parallel with the current parish boundary. The ditch was a substantial feature measuring 4.0m in width and 0.9m deep. It included four fills two of which contained Roman pottery, CBM and a possible sandstone floor tile.

4.91 A ditch was identified in trench 104 which corresponds with part of a rectangular anomaly identified in the geophysics survey. It had a V-shaped profile and was 0.8m deep and 1.6m wide. The upper fill included fragments of animal bone, Iron Age / Roman pottery, and fragments of CBM including flue tile. Possible archaeological anomalies identified by geophysical survey in the immediate vicinity were not observed in the trench.

4.92 Two intercutting ditches of likely geological origin were recorded in trench 107 and a single ditch was recorded in trench 108 from which no finds were recovered. Two circular features were investigated in trench 109 and interpreted as waste pits. Pit 10910 had charcoal inclusions and contained a deposit of fourteen late Neolithic flint artefacts including two knives. Pit 10941 contained a small cache of hazel nutshell which is suggestive of prehistoric burning activity.

4.93 Archaeological evaluation of Link 4 shows a reduced density of archaeological remains except for the route of Ermine Street. The boundary ditch in trench 105 is likely to have been an important feature and may have demarcated the eastern limit of Roman activity which was concentrated in field 38 overlooking the Witham valley. The continued use of this alignment as a boundary until the present day suggests that there was a persistent delineation of the landscape post-dating the Roman period.



Evaluation results in the eastern extent of Link 4

Summary of the archaeological evaluation results

4.94 The earliest archaeological activity on the site dates to the late Neolithic period and comprises finds of flint tools and environmental indicators of prehistoric activity such as burnt hazel nutshells. This activity is focussed primarily in the area to the immediate east of the river Witham (Link 2E) and at the eastern end of the Scheme (Link 4).

4.95 Late Iron Age pottery was recovered from trench 54 in Link 2E which may indicate a prolonged phase of archaeological activity from the Neolithic into the Iron Age. A small amount of late Iron Age and Roman pottery was also recovered from a pit and ditch in Link 3A. A limited quantity of Iron Age pottery was recovered in trench 86 (Link 3F).

4.96 Most of the archaeological evidence has been dated to the Roman period and is concentrated on the topographic high ground to the east of the Lincoln Ridge. To the west of Grantham Road (Links 3E 3F) the remains of a stone-built structure dating to the Roman period has been identified which has been interpreted as a rural site which may be part of a wider high-status estate. The structure's rectilinear plan form and finds of ceramic roof tiles and hypocaust tiles are high-status indicators however the pottery assemblage is indicative of lower-status inhabitants and there may have been a transfer and re-use of material from another site.

4.97 To the east of Grantham Road (Link 4) the site of the Roman Ermine Street has been confirmed which includes road-side ditches. Archaeological remains in Link 4 have been dated to Roman period and are less densely concentrated than in 3E and 3F and may indicate road-side activity. The Roman archaeological remains appear to end at a boundary ditch which may have served to delineate the eastern edge of a Roman estate. The presence of a post-medieval parish boundary on the same alignment indicates that there was a continued use of established land divisions following the end of the Roman period.

4.98 Several linear features of indeterminate origins have been identified in the area to the west of the river Witham (Links 2C and 2B). The limited finds recovered from some of the features were of post-medieval or modern date and these features may comprise historic field boundaries.

5 SCOPE OF ARCHAEOLOGICAL WORKS

The Development

5.1 The development comprises an approximately 8km linear road scheme with new junctions where crossing existing roads and a bridge over the River Witham. Key activities which will affect below-ground archaeological remains include site clearance, topsoil removal and levelling through cut and fill, access roads and haulage tracks, piling works, compounds, bulk earthworks, and excavations relating to embankments ponds and landscaping.

5.2 This WSI sets out the methodology and procedures for a programme of archaeological works comprising Strip, Map and Record (SMR) and an earthworks survey of ridge and furrow. Also included is a methodology for historic building recording in relation to a residential dwelling, 46 Station Road, which will be demolished as part of the Scheme.

5.3 The scope of the archaeological works has been defined through consultation with Ian George, Historic Places Manager, Planning Services at Lincolnshire County Council

Aims and Objectives

5.4 The following programme has been designed to mitigate the impact of the Scheme on known and potential archaeological remains and is designed to be proportionate to the significance of archaeological remains and the predicted impacts of development.

5.5 The programme is designed to allow the investigation and recording of any archaeological remains in proportion to their heritage significance and is in accordance with paragraphs 189 and 199 of the National Planning Policy Framework.

5.6 The research objectives of the programme of work will be determined by what archaeological remains are present within the Scheme. The results of the archaeological evaluation works have enabled a characterisation of the archaeological potential of the Scheme and have highlighted a high potential for archaeological remains of the prehistoric and Roman periods to be present. The mitigation areas are designed to target identified areas of archaeological remains and archaeological potential. The mitigation works and subsequent assessment and analysis have the potential to contribute to research objectives outlined in the East Midlands Research Framework (RFN 2023).

5.7 These may include the following questions set in the Research Agenda:

- 3.2.1: To what extent may hunter-gatherer subsistence traditions have continued into the Neolithic?
- 4.5.1: Why did large, nucleated settlements emerge in areas such as Lincolnshire and Northamptonshire, and can we clarify further their character and functions?
- 5.4.1: How did the Conquest impact upon rural settlements and landscapes?
- 5.4.3: How did rural settlements relate to each other and to towns and military sites, and how may this have varied regionally and over time?
- 5.7.1: Can the chronology of road construction and links between road building and campaigns of conquest be clarified?

5.8 The East Midlands Research Agenda also includes overarching themes which the project could contribute to:

- Environment
  - Pleistocene and Holocene climatic change (as evidenced, for example, by palaeochannel deposits) across all periods.
- Settlement
  - Relationship between town and country from the Roman period onwards.
- Food Procurement Strategies

    - Transition from hunter-gatherer to agricultural subsistence strategies during the Mesolithic to Middle Bronze Age.
- Industry, craft and trade
    - Systems of artefact production and exchange (lithics, pottery, metals, etc) across all periods

5.9 Among the known archaeological remains which are the focus of the mitigation works are features of prehistoric date located adjacent to the river Witham, structural remains and associated features of the Roman period which may be part of a wider estate, and Ermine Street. A number of potential objectives or research questions which the mitigation works may inform include:

- Recovery and analysis of palaeoenvironmental evidence for prehistoric and Roman activity;
- Recovery of flint artefacts;
- Evidence for Iron Age to Roman transition or possible Iron Age origins for areas of Roman activity;
- Extent and character of settlement, agricultural or industrial activity in the hinterlands of Roman Lincoln;
- Define the extent of Roman building associated features, and identify phases of development;
- Land organisation during the Roman period;
- Extent and character of road-side activity and relationship between settlement and road;
- Date of origin of Ermine Street, its make-up and composition and any evidence for its development. Any evidence for date of end of use.

6 ARCHAEOLOGICAL MITIGATION WORKS

6.1 The archaeological mitigation will comprise three elements of fieldwork: a topographic survey of extant medieval ridge and furrow located to the south of South Hykeham, and five areas of archaeological strip map and record (SMR) located to the east of river Witham around Waddington and Bracebridge Heath. Historic building recording will be carried out a residential dwelling, 46 Station Road. Details of the mitigation areas are provided in the following drawings:

- **NHRR-TEP-HER-HYKE-MP-LH-30021 (Appendix 2)**
- **NHRR-TEP-HER-HYKE-MP-LH-30022 (Appendix 3)**

6.2 The topographic survey area is located to the west of Wath Lane, South Hykeham and comprises a pasture field of c6.3 hectares. The ridge and furrow survive as upstanding earthworks with a change in direction and headland roughly central to the field.

6.3 Area 1 is an archaeological SMR area located within Link 2E of the Scheme, within fields to the immediate east of the river Witham and to the west of Brant Road. Area 1 comprises two areas (1a and 1b) each measuring 50m x 50m. Geophysical survey results are not available for this area. However, evaluation trenching identified linear features and pits from which a small quantity of finds including a prehistoric flint and Iron Age pottery sherds were recovered, in addition to paleoenvironmental remains in the form of burnt hazel nutshells which is also an indicator for prehistoric activity. The anticipated depth of natural horizon is 0.5m to 0.6m.

6.4 Area 2 is located to the west of Grantham Road (Links 3E and 3F) and measures approximately 160m x 140m and is designed to target the site of an identified structure dated to the Roman period as well as associated features such as a double-ditched enclosure and possible working surfaces. In addition to the SMR area a linear trench, 50m in length (Area 2a), will be excavated to the immediate south of the SMR to investigate a possible E-W aligned trackway. The anticipated depth of natural horizon is 0.4m to 0.6m.

6.5 Area 3 is located to the east of Grantham Road (Link 4) and to the south of Grange Farm. The proposed mitigation area comprises two linear trenches (3a and 3b), each 30m in length. The trenches are designed to target the confirmed route of Ermine Street at the north and south extents of the width of the Scheme. Anticipated depth of natural horizon is 0.6m.

6.6 Area 4 is an archaeological SMR area measuring 30m x 20m and is located to the east of Area 3 (Link 4). It designed to investigate possible enclosures dated to the Iron Age or Roman period. The mitigation area is located on the proposed route of the construction haulage route. The anticipated depth of natural horizon is 0.4m to 0.5m.

6.7 Area 5 is an archaeological strip map and record area measuring 50m x 50m and is located to the west of the Sleaford Road and A15 roundabout which is the eastern terminus of the Scheme. Evaluation trenching in this area identified circular features from which an assemblage of Neolithic flint artefacts were recovered, as well as palaeoenvironmental evidence including hazel nutshells. Anticipated depth of natural horizon is 0.3m to 0.4m.

6.8 All fieldwork will be carried out by a suitably qualified archaeological contractor and RO with CIfA and under the direction of a full member of CIfA. All work will be undertaken in accordance with accepted professional standards and guidelines.

Topographic Survey Methodology

6.9 A metrically accurate survey will be carried out of the mitigation area using appropriate GPS equipment such as Trimble 5800 RTK or equivalent. The survey will record at a minimum the top and base of earthworks, breaks of slope, and any apparent variations. Profiles will be recorded across the ridge and furrow to enable definition of the form of the earthworks. The survey data should be checked on site for accuracy and processed using an up-to-date version of AutoCAD or suitable software of proprietary software such as Trimble Business Centre software. The results of the data will be outputted as a plan and cross-sections.

Historic Building Recording

6.10 Number 46 Station Road is a residential dwelling constructed between 1905 and 1932. They consist of detached houses, each set within a generous garden area and accessed from Station Road. Prior to their construction the area east of Station Road had consisted of agricultural fields and the area gradually became residential through the early and mid-20th century. The building is assessed as a non-designated heritage asset of low (local) heritage significance and will be demolished to facilitate the Scheme. The impact will be mitigated through preservation by record in the form of a programme of historic building recording prior to demolition.

6.11 The principal aim of the recording will be to produce an accurate record of the building prior to demolition. This will correspond with Historic England Level 2 guidelines as defined by the guidance document *Understanding Historic Buildings: A guide to good recording practice* (HE 2016). This will consist of a descriptive and photographic record of the exterior and interior of the building, along with an analysis of their development and use.

Recording methodology

6.12 Site recording will include the following elements:

- A photographic survey of the building to serve as a "baseline" record. This will include an overall photographic survey of the building in its present condition comprising general and detailed shots taken using a digital SLR camera of minimum 12mp resolution and including photographic scales where appropriate;
- Detailed photographic recording of architectural and decorative features and any other features of historic or architectural interest;
- A register of photographs will be maintained and the location and direction of photographs included;
- Written notes on the building's construction, present and former use and where appropriate, the building's past and present relationship to its setting in the wider landscape;
- Measured or sketched drawings such as plans, elevations or sections, or other drawings of architectural or historic features may be produced where appropriate;

Reporting and archive

6.13 An illustrated report will be produced following the guidelines described in The Management of Research Projects in the Historic Environment (HE 2015), Understanding Historic Buildings: a Guide to Good Recording Practice (HE 2016), and CIfA Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures (CIfA 2020d).

6.14 The report will include a summary of the circumstances of the work, the aims and objectives and recording methodology, and a description and analysis of the building, including where feasible an interpretation of phasing, dating, and development. The report will be supported by a range of illustrations and photographs and will include a photographic register and contact sheets.

6.15 A digital and hard copy (if required) of the report will be submitted to the Lincolnshire Historic Environment Record; a digital copy of the report will also be submitted to the Online Access to the Index of Archaeological Investigations (OASIS). Digital photographs will be archived with the Archaeology Data Service following ADS Guidelines for Depositors.

Archaeological SMR Methodology

6.16 Archaeological SMR aims to remove overburden under the direction of a suitably qualified archaeologist within the defined mitigation areas. The objective is to allow the monitoring archaeologist a clear view of previously undisturbed horizons which may reveal archaeological features, sites, artefacts or structures.

Excavation methodology

6.17 All works will be completed in accordance with an approved RAMS to be issued by the archaeological contractor, observing safe systems of work, including safe zones around plant and machinery. All works will be undertaken in accordance with the principal contractor's safe digging practices manuals including HSG47 and following the completion of any necessary C2 utilities searches or scans and CAT scans by Balfour Beatty as the principal contractor and the issue of a permit to break ground.

6.18 Archaeological excavation requires an initial removal of overburden within the defined mitigation area down to the first archaeological horizon or the natural substrata, whichever is encountered first. The defined mitigation areas will be set out using a GPS and mechanically reduced using 360 excavator equipped with toothless ditching bucket, under the direction and continuous supervision of a suitably qualified archaeologist. The machine will operate in 'spits', removing only an appropriate amount of overburden with each action. The supervising archaeologist will give the command to stop should archaeological deposits or structures become visible. At each soil horizon change, the supervising archaeologist will indicate to the machine driver that each stratum should be stored separately.

6.19 All spoil will be stored in a pre-defined area. Any required haulage tracks will be designed to avoid crossing excavation areas and will be appropriate demarcated and sign-posted to avoid presenting a hazard to staff, visitors or members of the public.

6.20 All mitigation areas will be fenced prior to commencement of excavation works and will be fitted with appropriate safety signage, describing that there is an archaeological site and that access is restricted until the archaeological mitigation work is completed. It is not anticipated that construction staff would be present during the archaeological works, however any construction staff will be made aware of the presence of the archaeological sites and the need to preserve them until completion of the programme of works. This will be communicated through the site induction and regular toolbox talks.

6.21 The site will be excavated and recorded by the appointed archaeological contractor according to accepted professional standards described in the relevant CIfA Standard and Guidance Documents and in Historic England guidance documents. Features will be recorded and excavated stratigraphically, and all relationships will be investigated. All archaeological features and deposits with potential to provide palaeoenvironmental evidence will be sampled.

6.22 The archaeological works will provide an accurate record of any archaeological or palaeoenvironmental finds, features, artefacts or ecofacts identified. Any archaeological features or surfaces that are revealed will be hand-cleaned sufficiently to enhance any features and will be hand-excavated.

6.23 Discrete features will be half-sectioned, or fully excavated if features are part of recognisable structures, contain deposits or artefacts of particular value, or likely to hold significant artefact or environmental assemblages. The anticipated depth of natural horizon across the Scheme varies between 0.3m and 0.6m. It is not anticipated that cut features will exceed 1m depth. In the event of deeper features the excavation area may be stepped and secured in accordance with a task specific methodology to be included in the approved RAMS.

6.24 Intersections will be investigated to establish strategic relationships. Representative sections of linear and curvilinear features will be sample excavated away from intersections or other features or deposits, to obtain unmixed samples of material. Sections will be drawn at a scale of 1:10 or 1:20, as appropriate. Environmental bulk samples (usually 40 litres) will be taken where the deposit is likely to contain significant environmental assemblage. Sampling strategies will be in accordance with the archaeological contractor's fieldwork manual and to the requirements of the Historic Places Manager at LCC.

6.25 All records will be undertaken using pro-forma record sheets or suitable equivalent digital pro-forma recording software. Site levels will be related to the Ordnance Survey National Grid and Datum. The general site plans will be hand drawn at a scale of 1:50 or 1:100. Detailed plans, such as plans of stone walls or surfaces will be hand-drawn to an appropriate scale and related to the National Grid.

Photography

6.26 Digital photography will form the primary photographic record. This will be undertaken using a digital SLR camera with a sensor of a minimum of 12 megapixels; each image will be supplied as both a JPEG and a TIFF versions (version 6 file of not less than 25Mbs). The Archaeological Contractor will also include metadata embedded in the TIFF file, which will include the following: the commonly used name for the site being photographed, the relevant centred OS grid coordinates for the site to at least six figures, the relevant township name, the date of photograph, the subject of the photograph, the direction of shot and the name of the organisation taking the photograph.

6.27 All photography will be undertaken in accordance with Historic England guidance, Digital Image Capture and File Storage: Guidelines for Best Practice, 2015. Photographic scales and a north arrow of appropriate sizes will be placed within all shots if possible. A photographic register will be maintained to provide an accurate record of the photographic archive.

Use of Metal Detectors on Site

6.28 The site will be scanned during machine excavation to attempt to obtain a sample of artefacts from the top and sub–soils. The exposed site and, spoil heaps will also be scanned for both ferrous and non-ferrous metal artefacts using a metal detector capable of making this discrimination, operated by an experienced metal detector user (if necessary, operating under the supervision of the contracting archaeologist). Modern artefacts are to be noted but not retained (19th-century material and earlier will be retained).

6.29 The make and model of the instrument used will be given in the methodology section of the Archaeology Contractor's report and metal detected finds identified in the relevant section.

General

Finds

6.30 All finds or environmental samples recovered during the archaeological works will be assessed and reported on by internal and external specialists of the appointed archaeological contractor. A full list of specialists will be provided prior to the commencement of the archaeological works.

6.31 Anticipated finds assemblages arising from this project include animal bones, pottery from the prehistoric and Roman periods and smaller quantities from post-Roman periods, ceramic built material (CBM), worked stone, prehistoric lithic artefacts, fragments of metal work, bone tools.

6.32 All finds will be treated in accordance with current best practice as set out in Chartered Institute for Archaeologists guidance, including CIfA Standard and Guidance for Collection, Documentation, Conservation and Research of Archaeological Materials (CIfA 2020a), and Lincolnshire County Council Archaeological Archives Deposition Guidelines (LCC 2017), dependent on the nature, quantity, and significance of the finds.

6.33 Finds work is the process of retrieving, sorting, cleaning, marking, conserving, recording, analysing, interpreting and preparing for permanent storage all materials retained as a result of archaeological fieldwork, and disseminating the results. The term 'finds' is taken to include all artefacts, building materials, industrial residues, environmental material, biological remains (including human remains) and decay products.

6.34 On completion of the fieldwork, any samples taken will be processed and any finds will be cleaned, identified, assessed/analysed, dated (if possible), marked (if appropriate) and properly packed and stored in accordance with the requirements of national guidelines and best practice. Storage will likely comprise archive standard boxes to be deposited at the Lincoln Museum

6.35 The archaeological contractor will develop an archive material selection plan based on the significance of the material excavated and its ability to answer the project's and other more general research questions and project aims. The archive selection plan will be detailed in the archaeological report. The analysis, treatment, archiving and storage of any significant finds will be determined through consultation with the local authority archaeologist and Historic England if required and will be outlined in the post-excavation report.

6.36 It is anticipated that all finds will be deposited at the Lincolnshire Museum under an agreed Museum Accession Number.

Human Remains

6.37 If human remains are encountered during the excavation, they will be left in situ and the coroner notified. If it is deemed appropriate to excavate human remains, this will be done in accordance with appropriate Historic England and Chartered Institute for Archaeologists guidance (e.g. CIfA Technical Paper 13 Excavation and Post-excavation Treatment of Cremated and Inhumed remains). Excavation, removal from site, analysis and final placing will all be subject to the requirements of the appropriate Ministry of Justice licence.

Treasure

6.38 If any artefacts are encountered that would constitute 'treasure' as defined by The Treasure Act, 1996 and the Treasure (Designation) (Amendment) Order 2023, they will be reported to the local Coroner and relevant Finds Liaison Officer. Any artefacts deemed to be Treasure should be excavated on the day they are discovered and removed to a secure site. If this is impractical then appropriate security provided until full excavation and removal can occur.

Environmental Sampling Strategy

6.39 Paleo-environmental assessment aims to identify features or areas within the excavation areas where conditions are such that deposits suitable for the study of past environments are preserved. These most commonly occur in the form of subsurface peat layers but are also taken to include all waterlogged deposits. The identification of any suitable areas will take place during the archaeological excavation.

6.40 Should any such deposits exist within the excavation areas, samples will be taken by a suitably qualified specialist sub-contractor.

6.41 The samples would be assessed for their potential by internal or external specialists of the archaeological contractor, and suitable techniques applied to sub-sample from select cores to determine the preservation and taxonomic diversity within the samples. This is likely to include assessing for one or more of the following:

- Pollen (focussing on organic units)
- Diatoms (focussing upon lithological transitions within and at the base of the Holocene sediment stack)
- Foraminifera (focussing on mineral strata and in particular on transitions)
- Plant macro-remains (focussing on organic units)

6.42 Having assessed the potential for analysis a project design will be produced that will provide a detailed proposal for analysis (including, for example, C14 dating, loss-on-ignition to measure organic carbon content, humification and mass specific magnetic susceptibility) of any present selected samples.

6.43 If necessary and appropriate the advice of the Historic England Science Advisor for the East of England will be sought.

Conservation Strategy

6.44 If necessary, a conservation strategy will be developed in collaboration with a recognised laboratory. All finds must be assessed in order to recover information that will contribute to an understanding of their deterioration and hence preservation potential, as well as identifying potential for further investigation. Furthermore, all finds must be stabilised and packaged in accordance with the requirements of the receiving museum. Artefacts of a "displayable" quality would require full conservation. Metalwork and coinage from stratified contexts are to be X-rayed if necessary.

Programme

A start date for the works has not been confirmed, the anticipated programme for completion of works within this WSI is estimated to require at least 20 weeks for completion of on-site works.

- The topographic survey of ridge and furrow is estimated to require 1 week;
- Historic building recording is estimated to require 1-2 days;
- Strip Map and Record survey of Area 1 (Link 2E) is estimated at least 10 weeks duration;
- Strip Map and Record survey of Area 2 (Link 3F) is estimated at least 20 weeks duration;
- Areas 3, 4, and 5, (Link 4), are estimated to require between 4-10 weeks duration, concurrent with Area 2.

Organisation and Key Personnel

6.45 TEP is a RO with CIfA. The heritage team is under overall management of Jason Clarke BSc MA MCIfA, Associate Director.

6.46 The archaeological works will be undertaken by an appropriately experienced archaeological contractor and will be managed by Jason Clarke.

6.47 A projected timetable for work on site, including machine hire time and staff structure and numbers, and for all post excavation work, including staff numbers and specialist sub-contractors will be provided by the appointed archaeological contractor in the form of a separate RAMS document to be submitted to and approved by Balfour Beatty as principal contractor.

7 REPORTING

7.1 In accordance with the principles of Management of Research Projects in the Historic Environment (MoRPHE) (Historic England 2015) and the Management of Archaeological Projects, 2nd Ed (MAP2) (English Heritage 1991), a programme of post-excavation assessment and reporting will be undertaken, to commence on completion of the archaeological fieldwork.

7.2 The programme will be proportionate to the findings of the fieldwork, and it is probable that a single phase of assessment, analysis and reporting will be sufficient in the event of non-complex findings. It is anticipated that the report would be completed within 6 months of completion of fieldwork and archiving completed within one year.

7.3 At this stage it is not anticipated that significant archaeological remains will be revealed, however, in the event of complex findings requiring specialist input, the 'MAP2' assessment and analysis approach would be adopted, with a post-excavation assessment report produced within six months of the completion of fieldwork, and a post excavation analysis report, a publication report, and site archive prepared within 18 months of the completion of fieldwork.

7.4 All reports will include:

- front cover to include the national grid reference (NGR), and HER reference number or accession code as relevant,
- a concise, non-technical summary of the results,
- the circumstances of the project and the dates on which the fieldwork was undertaken,
- description of the methodology, including the sources consulted,
- a summary of the historical background of the study area,
- a statement, where appropriate, of the archaeological implications of the impact,
- a copy of this project design, and indications of any agreed departure from that design,
- the report will also include a complete bibliography of sources from which data has been derived, and a list of any further sources identified but not consulted,
- a site location plan related to the national grid,
- appropriate plans showing the location and position of features or sites,
- plans and sections showing the positions of deposits and finds,
- illustrative photographs as appropriate,
- coordinates (latitude/longitude) of relevant sites if archaeological remains have been discovered.
- Oasis form providing details of the project and bibliographic and archive information

7.5 The report will be supported by a range of photographs, illustrations and GIS mapping as appropriate.

7.6 Artefact analysis will include the production of a descriptive catalogue, quantification by context and discussion/interpretation if warranted, with finds critical for dating and interpretation illustrated.

7.7 Environmental analysis will include identification of the remains, quantification by context, discussion/interpretation if warranted, and a description of the processing methodology. Radiocarbon results will be presented in full (laboratory sample number, conventional radiocarbon age, delta C13 value, calibration programme). Copies of the laboratory-issued dating certificates will be included as an appendix to the report.

7.8 Pottery reports will refer to the appropriate national type series and any appropriate regional type series where existing, including as defined in the Lincolnshire Archaeology Handbook.

7.9 In the event of archaeologically significant finds, the results of fieldwork will also be published in a relevant and appropriate journal, or other publicly disseminated publication, as appropriate.

8 ARCHIVE

8.1 At the commencement of the project an accession code will be requested from the Lincolnshire Museum.

8.2 An archive of the results of the archaeological work will be produced, in accordance with *Archaeological Archives – a guide to best practice in creation, compilation, transfer and curation* (Archaeological Archives Forum, 2011), current English Heritage guidelines (Management of Archaeological Projects, Appendix 3, 2nd edition, 1991), CIfA *Standards and Guidance for the creation, compilation, transfer and deposition of archaeological archives* (CIfA 2014), and guidelines as defined in the Lincolnshire Archaeology Handbook.

8.3 A fully indexed field archive will be compiled consisting of all primary written documents, plans, sections, and digital photographs. The archive will contain any site matrices, and summary reports of the artefact record, context records, and any other records or materials recovered.

8.4 Digital photographs will be archived with the Archaeology Data Service following ADS Guidelines for Depositors. A Data Management Plan will be produced to track the various components of the site archive and their archiving procedures. A copy of this plan will be included in the report and with any material supplied to the ADS.

8.5 An index to the field archive will be deposited with the appropriate local institution. The original archive will accompany the deposition of any finds. The County Historic Environment Record will be notified of the arrangements made.

8.6 Any finds of archaeological interest will be appropriately conserved and deposited in an appropriate institution: any finds which cannot be so deposited will be fully analysed and published. The original record archive of projects (paper, magnetic and plastic media), and a full copy of the record archive (microform or microfiche), together with the material archive (artefacts, ecofacts, and samples) will be deposited with the Lincolnshire Museum.

8.7 A digital copy of each report in PDF-a format will be submitted to the Lincolnshire HER within 6 months of the completion and approval of the report/s. Hard copies of the report will be supplied as required in accordance with regional archiving standards and guidance.

8.8 A summary account of the work will also be submitted to the editor of the Society for Lincolnshire History & Archaeology and any relevant period journals (e.g. Journal of Roman Archaeology, Proceedings of the Prehistoric Society) no later than March 31st of the year following completion of fieldwork.

8.9 An OASIS record for this site will be created upon the commencement of the fieldwork, and the final report will be entered on to OASIS within 6 months of the completion of the project. Details of the work will be entered on the OASIS database at http://ads.ahds.ac.uk/projects/oasis.

9 HEALTH AND SAFETY

9.1 All work on site would be undertaken strictly in accordance with the project health and safety plan and task specific risk assessments. All companies working on the project will adhere to the Client's required quality, health, safety and environment controls.

9.2 Access routes to working areas would be specified by the Client and access would only be permitted to those routes and the area of the fieldwork. The Client will provide the archaeologist with the details for any known constraints prior to the start of the archaeological works.

9.3 All site staff, including subcontractors and visitors will have the necessary competencies (e.g. CITB training for machine operators and CSCS cards) and any other necessary health and safety qualifications.

9.4 All site staff will familiarise themselves with the following which will be provided in a site induction:

- site emergency and evacuation procedures;
- the site's health and safety coordinator;
- the first aider; and
- the location of the nearest hospital and doctor's surgery.

9.5 The Archaeological Contractor will maintain a record of site attendance for each day that they attend site for the archaeological works.

9.6 All site staff personnel will wear PPE consisting of gloves, hardhat, steel toe-capped boots with mid-sole protection and high visibility vest or jacket at all times. All equipment must be 'fit for purpose' and be maintained in a sound working condition that complies with all relevant Health and Safety regulations and recommendations, including:

- Health & Safety at Work Act 1974;
- Management of Health & Safety at Work Regulations 1999; and
- COSHH Regulations 2005.

9.7 The Archaeological Contractor will have their own Health and Safety policies compiled using national guidelines, which conform to all relevant Health and Safety legislation and best practice.

10 GLOSSARY OF TERMS

aOD – Above Ordnance Datum
ASWYAS – Archaeological Services WYAS
CIfA – Chartered Institute for Archaeologists
ES – Environmental Statement
HER – Historic Environment Record
LCC – Lincolnshire County Council
MoLA – Museum of London Archaeology
NGR – National Grid Reference
NPPF – National Planning Policy Framework
NHRR – North Hykeham Relief Road
SMR – Strip Map and Record
TEP – The Environment Partnership (TEP) Ltd
WSI – Written Scheme of Investigation
WYAS –West Yorkshire Archaeological Services

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APPENDIX 1: SITE LOCATION PLAN – NHRR-TEP-HER-HYKE-MP-LH-30013

APPENDIX 2: MITIGATION AREAS SHOWING ARCHAEOLOGICAL EVALUATION RESULTS – NHRR-TEP-HER-HYKE-MP-LH-30021

APPENDIX 3: MITIGATION AREAS – NHRR-TEP-HYKE-NP-LH-30022

APPENDIX 4: ARCHAEOLOGICAL TRIAL TRENCHING LOCATIONS - NHRR-TEP-HER-HYKE-RP-LH-30004