YORK ARCHAEOLOGICAL TRUST

EAST HULL (BRANSHOLME)
FLOOD ALLEVIATION SCHEME

By ID Milsted

UPDATED DESK BASED ASSESMENT REPORT

Report Number 2017/31 April 2017

YORK ARCHAEOLOGICAL TRUST

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NON-TECHNICAL SUMMARY

This report presents the results of a review and update of an archaeological desk based assessment for a flood alleviation scheme to the east of Bransholme, Hull. The previous desk based assessment was undertaken in 2011 by Humber Archaeology Partnership for an earlier iteration of the scheme. The current update takes into account the amended scheme area together with a review of the Humber and East Riding of Yorkshire sites and monument record and a new walkover survey. No additional heritage assets were identified to those presented in the original desk based assessment.

KEY PROJECT INFORMATION

Project Name	East Hull (Bransholme) Flood Alleviation Scheme
YAT Project No.	5941
Document Number	2016/91 V1; 2017/31 V2
Type of Project	Desk Based Assessment
Client	CH2M
NGR	TA 1253 3434
OASIS Identifier	yorkarch1-270528

REPORT INFORMATION

Version	Produced by		Edited by		Approved by	
	Initials	Date	Initials	Date	Initials	Date
1: 2016/91	IDM	06/12/16	DA	06/12/16	DA	06/12/16
2: 2017/31	IDM	01/03/17	BR	10/03/17	IDM	08/03/17
3:2017/31	IDM	03/04/17	BR	03/04/17	IDM	03/04/17
4: 2017/31	GL/IDM	26/06/17	IDM	27/06/17	IDM	27/06/17
5: 2017/31	KW	18/07/17	IDM	18/07/17	IDM	18/07/17

1 INTRODUCTION

YAT have been commissioned to update the desk-based assessment (DBA) for an approximately 170ha piece of land at Bransholme, Hull, to inform the design of a flood alleviation scheme. An existing DBA for the area was undertaken in 2011 by Humber Archaeology (Brigham, T., HA Report 389) that encompassed all of the area concerned in the new study. Accordingly, the current DBA represents an update of that document.

2 METHODOLOGY

A new search of the Humber and East Riding of Yorkshire sites and monuments record (HER) was commissioned for the revised site boundary.

Consultation was undertaken with CH2M to ascertain the details of scheme design, which were at a formative stage at the point where this assessment was undertaken. It was understood that the Environment Agency were in contact with Historic England separately and it is expected that the results of this communication will be brought into the project design. Subsequent to the completion of the first draft of this assessment, CH2M provided a copy of the Humber Archaeology Partnership archaeological report on site investigation works undertaken in 2013. The information from this report has been added to the assessment of potential and impact, along with design information not available in December 2016.

A walkover was undertaken on 1st December 2016 to re-assess the condition of the assets listed in the HER and previously assessed in 2011, and to assess the setting of the two Scheduled Monuments located within the site.

Omission of fields originally assessed in 2011 removed two undesignated items from the original HER search results. No new assets were identified in the new search or walkover survey.

This report presents the results of the new HER search and walkover survey and provides an updated section on relevant planning policy.

3 LOCATION, GEOLOGY & TOPOGRAPHY OF STUDY AREA

The site comprises a 170ha area located immediately east of Bransholme, East Hull (Figure 1). The area lies between Bransholme and the villages of Ganstead to the east and Swine to the north.

The site is bounded to the south-west by the built-up area of Bransholme. The southern boundary is formed by the Sutton Cross Drain and the western boundary follows the course of the Swine Church Drain through arable farmland until it meets the Swine and Castle Hill Drain along the northern boundary. The north-western boundary is formed by unnamed drains that articulate with the development of Whisperwood way on the eastern edge of Bransholme.

The bedrock geology consists of chalk of the Flamborough Chalk Formation, laid down during the Cretaceous Period 71–86 million years ago. The overlying superficial geology consists of alluvium formed up to 2 million years ago, with two areas of earlier Glacial Till deposits that form the slightly higher areas of the site (BGS Geology of Britain viewer, accessed 06/12/16).

The site is generally flat, representing the alluvial deposits, with a low ridge of higher ground derived from till material aligned NNW/SSE through the centre of the site and gently rolling higher ground in the northern part of the site, as can be readily appreciated in the available LiDAR imagery (Figure 2).

The land use is a combination of cultivated and fallow land. Large areas were under winter wheat during the site walkover conducted for this update and were not traversed; other fields had recently been ploughed. The central part of the site around the Castle Hill scheduled monument and Castle Hill Farm were fallow. The site is crossed by the Holderness Drain and by the route of the former Hull-Hornsea railway, now in use as the Holderness Rail Trail cycle route. The site is accessed by Castle Hill Road, which enters the site from Noddle Hill Way in the west and was formerly the access for Castle Hill Farm.

4 DESIGNATIONS AND CONSTRAINTS

The site contains two Scheduled Monuments: SM 21181 Castle Hill, Swine and SM 21180 Castle Hill Farm Round Barrow. Any works that will affect these sites and their immediate surroundings will require Scheduled Monument Consent. Additionally, any scheme design will need to consider the setting and access to these sites.

5 NATIONAL AND REGIONAL PLANNING POLICY

5.1 National Policy

In March 2012 the Government published the National Planning Policy Framework (NPPF) in an effort to make the overall planning system less complex and more accessible. Chapter 12 of NPPF, entitled "Conserving and enhancing the historic environment", deals with archaeological and historic issues and supersedes the previous planning legislation, Planning Policy Statement 5: "Planning for the Historic Environment" (PPS5). However, in a revision note published by English Heritage in June 2012 it is stated that "the PPS5 Practice Guide remains a valid and Government endorsed document pending the results of a review of guidance supporting national planning policy". It also states that "the policies in the NPPF are very similar and the intent is the same, so the Practice Guide remains almost entirely relevant and useful in the application of the NPPF".

The relevant paragraphs of NPPF Chapter 12 are 126–141.

5.2 Regional Policy

The site straddles the boundary between two different planning authorities, the Kingston Upon Hull Unitary Authority and the East Riding of Yorkshire. Both these authorities have planning policies relating to archaeology and both are relevant to this proposal.

5.2.1 Kingston-Upon-Hull

The Hull Local Plan is currently under review. The previous Local Plan was adopted in 2000 and many of its policies remained in force after a review in 2007, including polices BE 31–34 that relate to archaeology.

BE31 - (a) The City Council will seek to preserve the remains, site and setting of important archaeological monuments (whether scheduled or not). Development will not be allowed if it adversely affects the remains, site or setting of either:

(i) A Scheduled Ancient Monument; or
(ii) (ii) remains within the area of Archaeological interest, as designated on the Proposals Map.

(b) Development affecting other important archaeological remains identified as a result of an archaeological assessment (Policy BE32) will be assessed against the importance of the remains and the degree of any adverse effect by the development of the remains or their site or setting.

BE32 - The City Council will:

(i) require a developer to provide an archaeological assessment for development affecting a known or presumed site of archaeological remains; and
(ii) use the assessment to consider the nature of the archaeological remains and the impact of development on the remains in applying Policies BE31,BE33, and BE34, if archaeological remains are found or suspected.

BE33 – The City Council will require a developer to demonstrate that development affecting important archaeological remains will:

(i) preserve archaeological remains in situ; and
(ii) minimise its impact on archaeological remains.

BE34 – If development is accepted as outweighing the loss of important archaeological remains, the City Council will require a developer to make an appropriate provision for:

(i) recording the archaeological remains; and
(ii) publishing the results of the recording.

4.2.2 East Riding of Yorkshire

The East Riding Local Plan Strategy Document was adopted in April 2016. Policies relevant to archaeology are located in chapter 8 of the document within Policy ENV3.

Policy ENV3: Valuing our heritage

A. Where possible, heritage assets should be used to reinforce local distinctiveness, create a sense of place, and assist in the delivery of the economic well-being of the area. This can be achieved by putting assets, particularly those at risk, to an appropriate, viable and sustainable use.

B. The significance, views, setting, character, appearance and context of heritage assets, both designated and non-designated, should be conserved, especially the key features that contribute to the East Riding's distinctive historic character including:

1. Those elements that contribute to the special interest of Conservation Areas, including the landscape setting, open spaces, key views and vistas, and important

unlisted buildings identified as contributing to the significance of each Conservation Area in its appraisal;
2. Listed Buildings and their settings;
3. Historic Parks and Gardens and key views in and out of these landscapes;
4. The dominance of the church towers and spires as one of the defining features of the landscape, such as those of Holderness and the Wolds;
5. Heritage assets associated with the East Yorkshire coast and the foreshore of the Humber Estuary;
6. The historic, archaeological and landscape interest of the Registered Battlefield at Stamford Bridge;
7. The historic cores of medieval settlements, and, where they survive, former medieval open field systems with ridge and furrow cultivation patterns;
8. The nationally important archaeology of the Yorkshire Wolds; and
9. Those parts of the nationally important wetlands where waterlogged archaeological deposits survive.

C. Development that is likely to cause harm to the significance of a heritage asset will only be granted permission where the public benefits of the proposal outweigh the potential harm. Proposals which would preserve or better reveal the significance of the asset should be treated favourably.

D. Where development affecting archaeological sites is acceptable in principle, the Council will seek to ensure mitigation of damage through preservation of the remains in situ as a preferred solution. When in situ preservation is not justified, the developer will be required to make adequate provision for excavation and recording before or during development.

6 UPDATE OF HERITAGE ASSET INFORMATION

6.1 Gazeteer of sites

The following gazetteer is derived from the HER search commissioned for this updated DBA and should be used in conjunction with Figure 1.

UID	HER reference	Name	Description	NGR Location	Significance
1	MHU 14253	Castlehill Road Bridge	'Castlehill Road, Bridge' printed and shown on OS 6" 1855 map	TA 1179 3400	Local
2	MHU 14285	Castlehill Bridge	Road Bridge (Post Medieval - 1540 AD to 1899 AD)	TA 1245 3430	Local
3	MHU 1515; SM 21181	Castle Hill, Swine	Scheduled as Swine Castle Hill. In existence by 1200 and may have been occupied by an Elizabethan building identified during military training excavations in WW1.	TA 1255 3435	National
4	MHU 1528; SM 21180	Castle Hill Farm Round Barrow	Scheduled monument. Round barrow 2m high and 32m in diameter in 1994. Scheduled as round barrow 300m south of	TA 1262 3451	National

			Castle Hill Farm.		
5	MHU 18965	Cropmarks E of Castle Hill	Aerial photographs show possible oval enclosure and droveway/triple dyke feature?	TA 127 340	Local
6	MHU 19951	Stone from Castle Hill Farm	Architectural fragments, originally from a Medieval ecclesiastical building were found in a 'rockery' at Castle Hill Farm in 2003.	TA 1247 3475	Local
7	MHU 14284	Castle Hill Farm	O.S 1855 6" shows ''Castle Hill'. The Farmhouse was destroyed by fire in December 2006	TA 124 347	Local
8	MHU 8819	Hull to Hornsea Railway	The Hull and Hornsea Railway opened in 1864, originally terminating at Wilmington Station in Hull before access was granted to Paragon Street in July 1864. The line closed in 1964 and the track has been lifted. It now forms a cycleway.	TA 1505 3765	Local
9	MHU 1516	Roman Coin Hoard, Sutton	Findspot of Romano-British coin hoard found west of field adjoining site of Castle Hill.	TA 125 344	Local

Table 1 HER search results

Three entries from the previous DBA, a Romano-British coin hoard (MHU 10156; Humber Archaeology number 4), Carr Farm (MHU 14281; HA number 13) and North's Bridge (MHU 14282; HA number 14), now lie outside the study area.

The new HER/SMR search did not return the Holderness Drain (MHU 15982; HA number 3) which is a heritage asset of local significance and runs though the site.

The new HER search did not include a record of double-ditches showing as soilmarks in nearby Sutton (MHU 18966; HA number 2) and the possible Romano-British settlement in Sutton (MHU 15986; HA number 15), both of which lie outside the study area but are indicative of the archaeology of this period that may be present across the land take for the scheme.

6.2 Updated description of sites

The following descriptions and condition reports are derived from the newly commissioned HER search and the results of the walkover survey.

The walkover survey was conducted on 1st December 2016 in a single day. The weather conditions were dry and bright with periodic cloud cover.

Access to the site was made on foot via Castle Hill Road and the survey was conducted on foot using footpaths.

6.2.1 Walkover results

Castle Hill road enters the site at TA 1179 3400 via the **Castlehill Road Bridge (UID 1)** (Plate 1). This is a nineteenth century brick-built bridge with a single arch and a modern concrete parapet and roadway. The bridge has been graffitied and is present on the 1855 OS Map.

720m east-north-east of UID 1 the roadway crosses the Holderness Drain at TA 1245 3430 via the **Castlehill Bridge (UID 2)** (Plate 2). This is a nineteenth century brick-built bridge with a single arch, visible on the 1855 OS map (Brigham, 7). Much of the current upper structure is of twentieth century date.

Immediately adjacent to UID 2 is the scheduled monument of **Castle Hill, Swine (UID 3)** (Plates 3 –5). This is the remains of *Branceholme Castle*, a motte and bailey fortification of probable late 12th century date (Brigham, 22). As observed in 2011 (Brigham, 17) the earthworks are well preserved although the site is heavily obscured by trees and other vegetation. The western and eastern parts of the site are best preserved, with the outer ditch and bank, inner bank and the motte all clearly discernible. The outer ditch to the east and south was traceable as tree-lined field boundaries. The Motte has been damaged in the past, either by WW1 related practice trenches (Brigham, 17) or by possible quarrying. Although the previous DBA noted that the study area was not accessible to the public, it is clear that the SM is still being routinely walked over as there are a number of well-developed, worn footpaths crossing the earthworks and there is litter present across the site.

The previous DBA noted an earthwork at TA 1267 3436 that was interpreted as a possible inlet feeding the moat from the Swine Church Drain. This earthwork is still extant.

160m north-east of the centre of the Castle, at TA 1262 3451, lies **Castle Hill Farm Round Barrow (UID 4)** (Plate 6). This is a Scheduled Monument and survives as a broad, low, grassed-over mound. Its condition is unchanged from that described in the previous DBA (Brigham, 17). It was re-surveyed at 1:2500 in 1999 by English Heritage as part of the National SAMs Survey Pilot Project (http://www.pastscape.org accessed 26/06/17).

Running immediately south of the castle from south-west to north-east is the route of the former **Hull-Hornsea Railway (UID 8)** (Plate 7), which is now a cycle route. 300m south of the Castle and bordering the former railway is an irregular field where **Cropmarks, E of Castle Hill (UID 5)** and consisting of an oval enclosure and possible dyke/droveway have been observed. This field was under crop and no evidence for archaeology was observable, although parts of the field were observed to be darker and more depressed than others, showing that there are potentially areas of the field where different activities may have taken place.

As noted in the previous DBA and above, the central part of the study area forms a north-south aligned ridge of slightly higher ground. It was noted on the recent walkover that both the Castle and Barrow sites may have used outlying elements of this ridge. A second barrow was previously indentified in this area (MHU 8896) but as noted previously (Brigham, 20) this is a misinterpretation of the topography and no other potential barrows were identified during the recent survey.

The ridge was the location of **Castle Hill Farm (UID 7)** (Plate 8) at TA 124 347, a former farm house identified on the 1855 OS and on earlier drainage plans (Brigham, 8) that was destroyed by fire in 1996. The foundation platform of the house and the yard gateposts survive and a pond was identified to the north of the farm site that may have been part of the agricultural

complex. The HER record of **Stone from Castle Hill Farm (UID 6)**, which relates to probable medieval architectural fragments discovered at the farm at TA 1247 3475, may be augmented by a single architectural fragment identified on the farm foundation platform during the walkover (Plate 9). This was approximately 0.40m across with one chamfered side and may be related to the stone identified in 2003 as likely to originate from a nearby ecclesiastical building such as Swine Nunnery or Meaux Abbey.

6.2.3 Additional heritage assets

Besides the Holderness drain, which bisects the site and was included on the previous DBA, no further heritage assets were identified during the recent walkover.

6.3 Historic Environment Characterisation by Karen Weston

Historic Environment Characterisation Records for the site show areas within the east of the site, and a small area in the north as Planned Parliamentary Enclosure by the Enclosure Acts of the mid-18th Century. They are rectangular and irregular fields and have suffered little boundary loss over subsequent years but legibility of this previous land type is fragmentary. To the north of the scheduled Motte and Bailey in the centre of the site is an area classified as an Empty Housing Plot dating from 2007. Evidence of previous land type here is fragmentary. Areas classified as Modern Fields make up the majority of the site and are situated in the north-east, south and west. They consist of rectilinear fields largely bounded by drainage and date from the 1960s. These fields show a medium to high degree of boundary loss and legibility of previous land type in these areas is partial/fragmentary.

Plate 1 UID 1 Castlehill Road Bridge looking west

Plate 2 UID 2 Castlehill Bridge looking west

Plate 3 UID 3 North-eastern end of Castle Hill motte, looking south-east

Plate 4 UID 3 North-eastern end of Castle Hill motte, looking west

Plate 5 UID 3 North-eastern end of Castle Hill motte and outer bank and ditch, looking south

Plate 6 UID 4 Barrow (pale grassed feature against hedge line) looking east

Plate 7 UID 8 Holderness rail trail bridge near Castle Hill, looking south-west

Plate 8 UID 7 Foundations of Castle Hill Farm, looking south-east

Plate 9 UID 6 Stone work from Castle Hill Farm

7 ARCHAEOLOGICAL POTENTIAL

This document is intended to update the previous study (Humber Archaeology Report 389) and as such should be regarded as supplementing the discussion and map regression presented in that report. Subsequent to the completion of our assessment, a copy of the Humber Archaeology Partnership archaeological report on site investigation work undertaken in 2013 was provided.

No new assets have been observed that would change the assessment of potential presented in the 2011 DBA report. The 2013 evaluation has contributed to this assessment. This assessment has been produced based on design information made available from February – June 2017.

7.1 Period by period

7.1.1 Palaeolithic, Mesolithic, Neolithic

As stated in the previous DBA, there are no records of this date in the area. Test pits excavated across the western side of the study area in 2013 identified potential wetland deposits of mixed marine and freshwater origin at around 2m BGL, with organic preservation present, particularly in the centre of this area (HAP, 2013). It is probable that these deposits represent the alluvium that forms most of the superficial geology of the area, which is likely to have accumulated since the end of the last glaciation until the Bronze Age as a combination of the activity of the Rivers Hull and Old Fleet, and the Humber estuary. There is therefore potential for well-preserved organic material of this date to survive in waterlogged anaerobic conditions. This material could range from structural evidence such as wooden buildings and trackways to palaeoenvironmental evidence for climate and land-use.

7.1.2 Bronze and Iron Age

As previously reported the presence of an isolated Bronze Age barrow suggests that associated features may survive exploiting the ridge of higher ground that lies in what would have been a low-lying, marshy area. Additionally, periodic flooding may have deposited alluvium in the vicinity of the barrow that conceals other archaeology of this date. It is also possible that the medieval castle site lies on top of further activity of this date taking advantage of the topography.

Possible evidence for this interpretation comes from geological data recorded in a series of test pits (HAP 2013). Samples taken from TP04 and TP05 to the south of the barrow, revealed deposits that were formed in a marsh or swamp like environment. The test pit evidence from across the site indicates that the top of organic deposits could be encountered from 1.7m BGL to 2.6m BGL and are about 0.6m in thickness. However as neither the alluvium or buried landscape are dated, it is uncertain if they relate to prehistoric or medieval/post-medieval periods.

Based on evidence from south-eastern and east England, it is likely that during the Iron Age the study area was wetter than previously, reflecting known higher sea levels (Brigham 2011)., This could be reflected by the deposition of alluvial deposits during this time. Evidence from TP03 suggested that one of the deposits was formed by marine inundation from flooding found at 2.00m BGL. However without dating information it is not possible to link this event with an Iron Age date.

Any activity of this period if present, may be found on areas of higher ground perhaps in areas where till is present at the northern end of the study area.

7.1.3 Late Iron Age/Romano-British

It is likely that the wet conditions thought to have been present in the Iron Age would have limited activity to stock management and drainage rather than settled farming (Brigham, 21) but the presence of cropmarks interpreted as being of this date both in the study area (**UID 5**) and identified prior to the construction of the nearby Bransholme development, along with two Romano-British date coin hoards, points to activity of this date in the area. Once again, the evidence this may lie beneath any alluvium deposited by periodic flooding.

As the deposits recorded during the test pits in 2013 (HAP 2013) were undated, it is not presently possible to identify phases within the alluvial deposits and the underlying buried landscape deposits. Archaeology of late Iron Age/Romano-British date may be present underneath later alluvium deposits, and at high points in the landscape may be relatively close to the surface below topsoil. However based on current data it is difficult to fully characterise these deposits.

7.1.4 Anglo-Saxon/Early Medieval

The previous DBA notes the Anglo-Saxon origins of the place names Bransholme and Sutton. The name Bransholme, meaning 'Brand's watermeadow' suggests that the study area may have lain in the outlying pastures of Anglo-Saxon settlements.

7.1.5 Medieval

The previous DBA provides a comprehensive summary of the medieval land holdings of this area and details of the Castle site. It is sufficient to state here that the Castle may have origins in the late 12th century and that it appears to have been occupied into the 16th century, when an Elizabethan building was erected on the motte. Positioned at the southern end of the ridge of higher till that projects into the alluvium of the study area, the castle occupied land that would periodically have represented an island in the surrounding marshland. There is a long history of water management and land drainage in the study area that together with the castle provides the potential to understand the exploitation, occupation and defence of this area in more detail.

7.1.6 Post Medieval

The previous DBA discusses the enclosure awards, land management and drainage operations of this period in some detail. The extant assets for this period are as discussed previously.

The identification of more probable medieval stone at the former Castle Hill Farm site supports the current interpretation that this farm house may have had 18th-century origins and that some of the stone used may have come from nearby ecclesiastical buildings such as Swine Nunnery or Meaux Abbey.

7.1.7 Modern

The previous study discusses the modern drainage works, including the Holderness Drain and Sutton Cross Drain, which required road bridges that are extant. The Hull-Holderness railway survives in the study area only as a re-purposed cycle route but the alignment of the former railway is preserved.

8 RECOMMENDATIONS FOR FURTHER WORK

8.1 Scheme proposal

The current scheme proposal is shown in Figure 2, which splits the site into three zones, A, B and C. The proposal is for a gradual embankment around the western side of the site, articulating with higher ground to the north and the Holderness Drain to the south. Material for this embankment would be won either from till in area C or desiccated crust in areas A and B.

The 2013 test pits suggest that within areas A and B alluvium has overlain potential archaeological deposits that lie approximately 1.7m-2.6m BGL. Early scheme proposals indicated excavation of borrow pits in these areas to a depth of 1.25m BGL. Based on this, intervention would not be expected to impact the deeper archaeological deposits identified in the 2013 test pits.

However it is possible that the depth of alluvium could vary as the 2013 test pits have limited coverage of the area. Also, areas of higher ground not overlain by the alluvium, particularly in area C, could contain archaeological remains at a significantly higher level. Archaeological investigation is required to inform this decision and the overall scheme design. This

investigation should take the form of geophysical survey, window sample borehole evaluation, and potentially trial trenching.

8.2 Geophysical Survey

The deposits across the site are largely alluvial, especially in areas A and B where potential deposits of interest lie approximately 2m below the surface. In area C a ridge of higher ground composed of glacial material is present in the north, with probable alluvial material to the south. Standard magnetometer geophysical survey is likely to be most effective in area C and we therefore propose initially to survey in area C as soon as access can be arranged.

The area C survey will locate any potential archaeology in the till deposits that could affect the winning of borrow material. As area C also contains alluvium, the survey will be able to test if these deposits are conducive to magnetometry. If they are, then a standard geophysical survey of areas A and B may be of benefit, but given the likely depth of material overlying earlier surfaces, this is unlikely to provide useful information. Similarly, standard resistivity survey will be unable to penetrate these deposits; specialised high-resolution resistivity survey may be able to, but this technique is costly and would be better deployed in targeted areas once the underlying deposit sequence is better understood by borehole survey.

8.3 Window sample borehole survey

The site investigation work undertaken in 2013 and discussed in the Humber Archaeology report 1343 identified a potential buried landscape of unknown date at around 2m below ground level in the areas now referred to as A and B. The HA report suggested that as environmental samples were taken during the 2013 fieldwork, there was no further need for sampling as further information, including AMS radiocarbon dates, could be obtained from existing samples.

However, the 2013 data was recovered from a very limited number of test pits and cable percussion boreholes. The 2013 samples may still be viable but the coverage of the site was very low. If material for the proposed embankment is removed from areas A and B, this would represent a significant intervention. In this event it is recommended that a programme of window sample boreholes be deployed across areas A and B to recover a greater quantity of samples and material for AMS dating, and crucially to better understand the deposit sequence and formation processes in these areas. If material is not to be won from areas A and B then window sampling programme may not be necessary, although it must be considered that access to these area for future research may be restricted by the proposed scheme and that an opportunity to contextualise and better understand information from elsewhere across the site may be lost by not surveying in areas A and B.

Based on similar surveys in the region, we propose a borehole survey of 20–25 window sample boreholes in a regular grid across Areas A and B. Standard General Biological Assessment (GBA) samples should be taken for plant macro and insect/shell assessment, alongside specialist sub-samples for pollen, diatoms, particle analysis and AMS dating. This survey would

refine and characterise the deposit sequence and inform any further investigation or mitigation, along with the evolving scheme design.

Recently published Historic England guidance on Preserving Archaeological Remains (Historic England 2016) recommends that deeply-buried organic deposits be assessed with more detailed sampling and analysis of permeability, porosity, particle size and chemical composition, alongside a programme of water monitoring, to characterise and assess impact. We would recommend undertaking this work separately, using the basic borehole data and the evolving scheme design to target specific areas for further investigation, in consultation with the Historic England Regional Science Advisor.

8.4 Trial trenching

Following the geophysical survey of area C, it may be necessary to evaluate any potential archaeological anomalies identified with trial trenches, if Area C is considered for borrow material. Similarly, it may be necessary to evaluate in areas A and B in potential borrow pit areas and along the route of the new bank if other surveys and deposit modelling highlight particular areas of impact.

Trail trenching would be dependent on the likely impact of the proposed scheme after the geophysical survey and borehole data is processed and consultation with stakeholders; if no borrow pits or other works are proposed in area, for example, then no further work would be necessary. Similarly, if the likely depth of impact from the bank is above this level than assessment by borehole will probably be sufficient.

The standard approach for trenching is to excavate trenches 2m wide and 50m long, up to a depth of 1.25m; if sensitive deposits are present deeper than this and require further evaluation, then the trenches would need to be wider in order to safely access these deposits.

8.5 Programme and constraints

It is recommended that geophysical survey of area C be carried out as soon as possible, providing that it doesn't disrupt the agricultural use of those fields. If after this survey it is still proposed to win borrow from area C than trial trench evaluation will be necessary and this would also need to be programmed around the current land-use timetable.

If the area C geophysics show that the alluvial deposits are conducive to magnetometry and contain archaeology, then geophysical survey should continue into areas A and B, particularly where the new embankment and borrow pits are proposed to be. Similarly, trial trenching would then be required. If geophysical survey is unlikely to be effective, then the borehole survey should proceed as soon as possible.

Boreholes across all areas should aim to minimise negative agricultural impacts and make best use of the optimal weather conditions of the dryer months to reduce potential risks due to wet ground conditions.

LIST OF SOURCES

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ACKNOWLEDGEMENTS

YAT wish to thank the HER staff at Humber Archaeology Partnership and CH2M for providing access to the site.

FIGURES

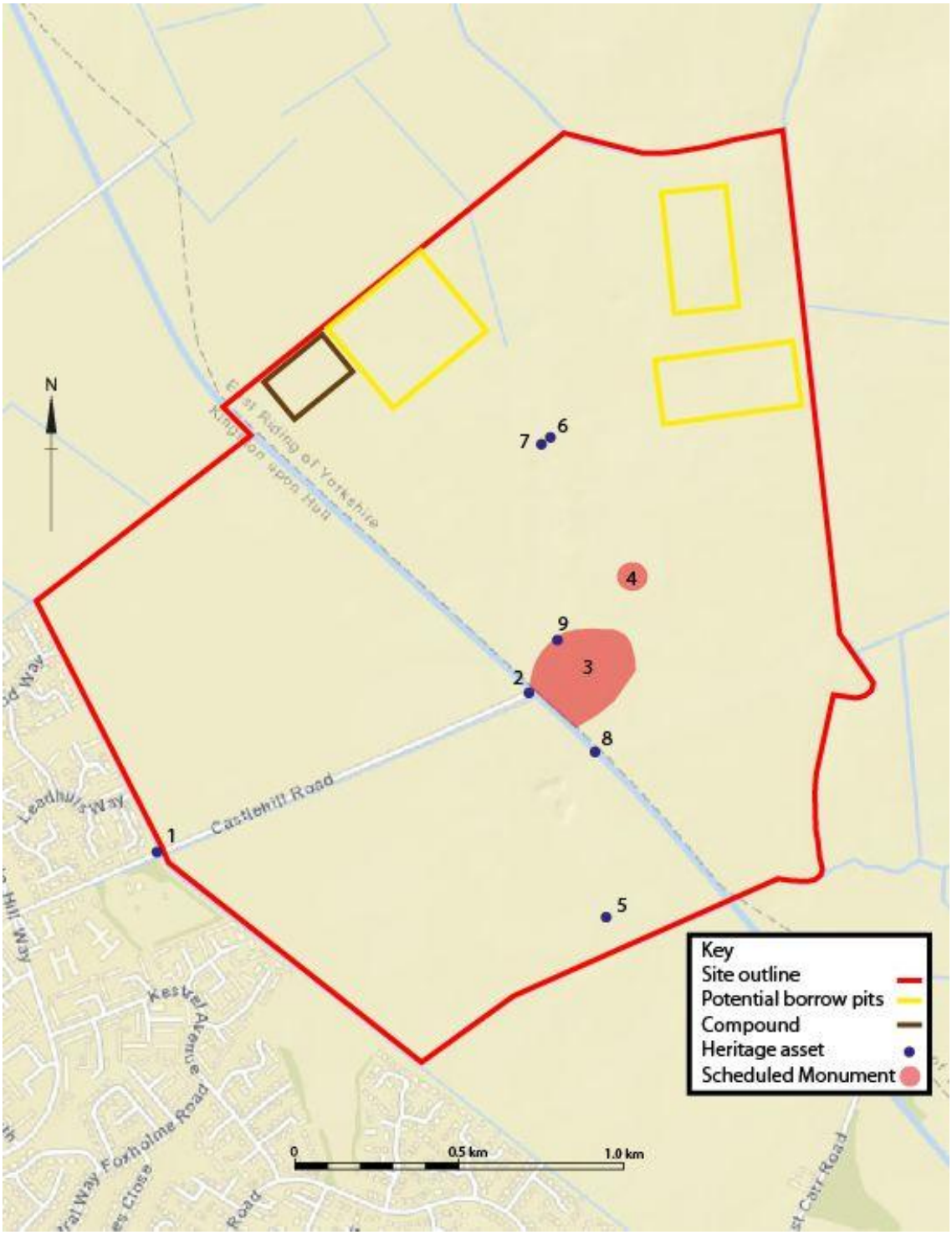

Figure 1 Location of sites

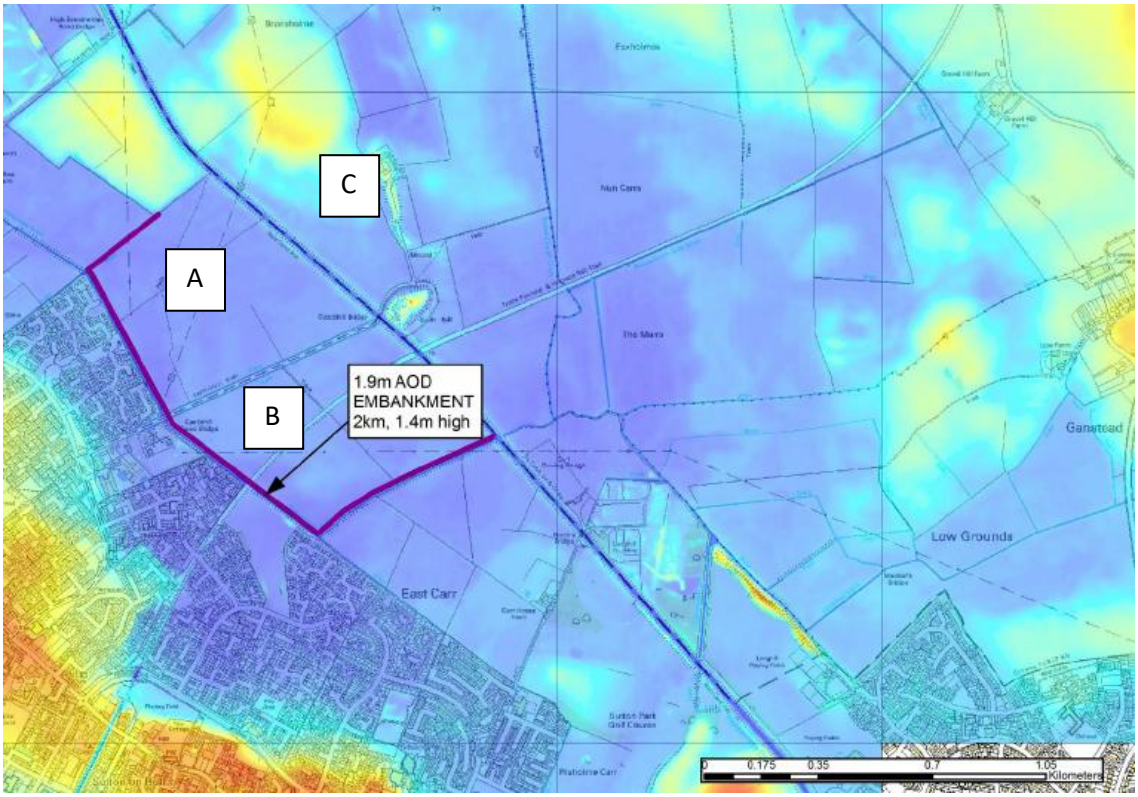

Figure 2 LIDAR survey of scheme area showing March 2017 proposals and zones A, B and C