



ARCHAEOLOGICAL ASSESSMENT

HEMLINGTON GRANGE SOUTH

MIDDLESBROUGH

prepared for
Middlesbrough Council

NAA 20/63
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Client Middlesbrough Council

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District Middlesbrough

Grid Ref NZ 50227 13690

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HEMLINGTON GRANGE SOUTH, MIDDLESBROUGH

DESK-BASED ASSESSMENT AND GEOPHYSICAL SURVEY REPORT

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Disclaimer

The results of geophysical survey may not reveal all potential archaeology and do not provide a comprehensive map of the sub-surface, but only responses relative to the environment. Geological, agricultural and modern responses may mask archaeological features. Short-lived features may not give strong responses. Only clear features have been interpreted and discussed in this report.

HEMLINGTON GRANGE SOUTH, MIDDLESBROUGH

DESK-BASED ASSESSMENT AND GEOPHYSICAL SURVEY REPORT

Summary

Northern Archaeological Associates Ltd (NAA) was commissioned by Middlesbrough Council to undertake a desk-based assessment and geophysical survey in support of a planning application for the development of land at Hemlington Grange South (NGR: NZ 50227 13690).

This archaeological assessment is sufficient to understand the potential impact of the proposals on heritage assets and it meets the requirements of NPPF Paragraphs 189 and 190 and Middlesbrough Local Development Framework Core Strategy (2008) policies CS4 and CS20 (see Table 1). In general, this document aims to assess the potential for designated and non-designated heritage assets (or their setting) to be impacted by the proposals and to recommend an appropriate programme of archaeological works in order to mitigate any identified harm or loss.

The proposed development area (PDA) comprises c.7.1ha of green land to the south of the Hemlington suburb of Middlesbrough. The assessment has confirmed that no designated heritage assets or their setting would be affected by the proposals and that there is no evidence to suggest that any nationally important non-designated archaeological remains are likely to be present. NPPF Paragraphs 193–6 and Core Strategy Policy BH9 are therefore not engaged.

The results of the assessment suggest that there is a moderate potential for remains relating to Iron Age/Roman settlement, and medieval and post-medieval agriculture, to be present within the PDA. Evidence of possible Iron Age and Roman settlement is recorded in the fields to the south of the PDA and numerous sherds of Iron Age and Roman pottery have been found, including six sherds of Roman pottery in the west of the PDA. The results of the geophysical survey identified a series of linear and rectilinear anomalies that plausibly indicate infilled features such as ditches and enclosures.

During the medieval and post-medieval periods, the PDA formed agricultural land. This is demonstrated by the ridge and furrow that is clearly visible within the geophysics and LiDAR survey data. The geophysics survey results show that the west field within the PDA contains a high level of magnetic disturbance. Although the origin of this magnetic disturbance is unknown, it corresponds with a depression visible on LiDAR survey data and might denote an infilled feature such as a pond or quarry. Hemlington Hospital was located in fields directly to the west of the PDA during the 20th century so there is potential for debris relating to hospital buildings to be present.

In order to confirm the results of the geophysical survey, it is recommended that trial trench evaluation is undertaken to characterise the nature and significance of identified geophysical anomalies (NPPF paragraph 189). This evaluation work would be undertaken in accordance with a Written Scheme of Investigation agreed with the local authority archaeologist.

If archaeological remains are identified during the trial trenching, further investigation in advance of, or during, construction may be required. If archaeological deposits are identified, NPPF paragraphs 190 and 197–9 will be engaged and mitigation works may be required to advance the understanding of the significance of any heritage assets that may be lost.

Taking into account this mitigation, it is considered that the proposals for the site are in full compliance with the NPPF and the Middlesbrough Local Development Framework Core Strategy as these relate to the historic environment.

1.0 INTRODUCTION

1.1 Northern Archaeological Associates Ltd (NAA) was commissioned by Middlesbrough Council to undertake a desk-based assessment and geophysical survey of land at Hemlington Grange South (NGR: NZ 50227 13690). The works were required to assess the archaeological potential of the site in support of a planning application for a proposed residential development.

1.2 This report describes the location of the proposed development area (PDA) and its environs, and sets out the methodology and information sources used for the study. It assesses the potential for the development to cause harm or loss to heritage assets located in the vicinity, including the possible effects of inter-site visibility on the settings of any Listed Buildings within the study area, as well as whether the proposals comply with national and local planning policy as relating to heritage.

2.0 LOCATION, TOPOGRAPHY AND GEOLOGY

Location and land use

2.1 The PDA comprises three fields, totalling c.7.1ha, that form an roughly wedge-shaped area of agricultural land in the south-east of the Hemlington suburb of Middlesbrough (NGR: NZ 50227 13690, Fig. 1).

2.2 The PDA is located among agricultural land to the west of the B1365 and the residential area of Coulby Newham. Directly to the south of the PDA are a number of buildings associated with the Larchfield Community centre. The north, east and western edges of the PDA are bounded by a woodland 'belt'. Land to the north of the PDA is being developed for housing, but prior to this it was part of the agricultural hinterland to the south of Hemlington.

Topography

2.3 The PDA comprises three relatively flat fields, generally sloping downwards from the south-west to north-east: the south-west corner of the site lies at c.64m above Ordnance Datum (aOD) and the north-east lies at c.58m aOD.

Geology and soils

2.4 The solid geology of the study area consists of mudstone of the Mercia Mudstone Group with superficial deposits of Devensian till (BGS 2020). The soils are mapped as

Dunkeswick (Soil Survey of England and Wales 1983), consisting primarily of stagnogley soils in greyish brown drift (Jarvis *et al.* 1984, 145).

3.0 PLANNING CONTEXT

Legislation and policy

3.1 The legislation, policy and guidance against which development would be considered are:

- Ancient Monuments and Archaeological Areas Act 1979;
- Planning (Listed Building and Conservation Areas) Act 1990;
- National Planning Policy Framework (NPPF) (2012); and
- Middlesbrough Local Development Framework Core Strategy (2008).

Ancient Monuments and Archaeological Areas Act 1979

3.2 Statutory protection for archaeological sites and historic structures of national importance is provided by the Ancient Monuments and Archaeological Areas Act 1979.

3.3 The Act states that any works affecting a scheduled monument require permission, in the form of Scheduled Monument Consent, from the Secretary of State.

Planning (Listed Building and Conservation Areas) Act 1990

3.4 Statutory protection for built heritage is principally provided by the Planning (Listed Building and Conservation Areas) Act 1990.

3.5 In considering whether to grant planning permission for development that affects a listed building or its setting, sections 16 and 66 of the Act require authorities to have special regard to the desirability of preserving the listed building or its setting or any features of special architectural or historic interest which it possesses.

National Planning Policy Framework (NPPF)

3.6 The NPPF sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development (para. 11). There are three dimensions to sustainable development: economic, social and environmental. The purpose of the planning system is to encourage sustainable development that makes a positive contribution to the quality of the built, natural and historic environment, and contributes to the overall quality of people's lives (para. 11 and 8). To this end, economic, social and

environmental gains should be sought jointly and simultaneously through the planning system (para. 9).

- 3.7 **Policy 12** addresses the importance of good design of new structures and features in relations to the pre-existing environment. Paragraph 127 requires that any development be ‘sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change.’
- 3.8 **Policy 16: Conserving and enhancing the historic environment** sets out the framework for local planning authorities to make informed decisions on developments that affect heritage assets. Paragraphs 184–202 set out the information requirements and policy principles in relation to heritage assets.
- 3.9 Paragraph 193 states that ‘when considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset’s conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.’ The NPPF defines setting as ‘the surroundings in which a heritage asset is experienced’. Any harm to an asset’s significance and setting requires clear and convincing justification and must be weighed against the public benefits resulting from the proposal.
- 3.10 Paragraphs 200–1 address the principles to be followed relating to development affecting a World Heritage Site. Paragraph 200 states that ‘local planning authorities should look for opportunities for new development within Conservation Areas and World Heritage Sites and within the setting of heritage assets to enhance or better reveal their significance’. It is clarified that: ‘not all elements of a Conservation Area or World Heritage Site will necessarily contribute to its significance. Loss of a building (or other element) which makes a positive contribution to the significance of the Conservation Area or World Heritage Site should be treated either as substantial harm under paragraph 195 or less than substantial harm under paragraph 196, as appropriate, taking into account the relative significance of the element affected and its contribution to the significance of the Conservation Area or World Heritage Site as a whole’ (Paragraph 201).
- 3.11 Details of other NPPF paragraphs relevant to this site are set out in Appendix A.

Table 1: 'Middlesbrough Local Development Framework Core Strategy (2008)' policies relevant to the site

Middlesbrough Core Strategy (adopted 2008)	
CS4: Sustainable Development	<p>All developments will be required to contribute to achieving sustainable development principles by, where appropriate:</p> <ul style="list-style-type: none"> a. Contributing to achieving sustainable economic development to support efficient, competitive and innovative business, commercial and industrial sectors; b. The creation of inclusive communities reducing deprivation and the disparities between the poorer and wealthier sections of the town; c. Respecting the diverse needs of communities; d. Ensuring everyone has access to the health, education, jobs, shops, leisure and other community and cultural facilities that they need in their daily lives; e. Contributing to raising the hope, aspirations and achievement of young people and adults; f. Promotion of a healthier and safer community for all; g. Being located so that services and facilities are accessible on foot, bicycle, or by public transport. Reliance on the private car must be reduced or minimised and the use of sustainable forms of transport encouraged; h. Making the most efficient use of land, with priority being given to development on previously developed land, in particular vacant and derelict sites and buildings, ensuring that there is a sufficient supply of land of a suitable quality in the right locations to meet the development needs of the people of Middlesbrough; i. Locating developments that attract large numbers of people in those locations which are accessible by sustainable forms of transport and will contribute most to achieving social inclusion; j. Ensuring that biodiversity assets, geodiversity assets, wildlife species, natural habitats, water resources, landscape character, green infrastructure, air quality and water quality; within and outside Middlesbrough are protected. Where possible such assets should be enhanced; k. Protecting and enhancing Middlesbrough's historic heritage and townscape character; l. Delivering development of a high-quality design that contributes to improvements in the quality of the townscape; m. Ensuring that inappropriate development is not carried out in the floodplain and that sustainable methods of surface drainage are used. This should include the incorporation of Sustainable Drainage Systems in new developments to mitigate against localised flooding, promote water conservation and help protect water quality; n. Minimising the generation of waste and maximising the use of recycled materials; o. Contributing to reducing the causes and impacts of climate change; and p. Incorporating within developments of 10 dwellings, or a floor space of 1,000 sq.m, or more onsite renewable energy facilities or energy saving technologies (for example combined heat and power systems, photovoltaic cells and wind turbines) that provide as a minimum 10% of energy requirements. There should be no demonstrable harm to biodiversity interests or on visual or residential amenities or by way of pollution generation. Where such harm is likely it will be necessary to demonstrate that this is outweighed by the benefits contributing to diverse and sustainable energy supplies and reducing carbon emissions; provision should be made to mitigate or compensate for any such harm. <p>Where necessary development will be phased to ensure the delivery of sustainable communities and adherence to the principles of sustainable development.</p>
CS20: Green Infrastructure	<p>The Council will work with partners to ensure the successful creation of an integrated network of green infrastructure. This will be delivered through a planned network of multifunctional green space and inter-connecting links which are designed, developed, and managed to meet the environmental, social, and economic needs of communities across Middlesbrough and the wider Tees Valley city region. It will be set within, and contribute to, a high quality natural and built environment and will be required to enhance the quality of life for present and future residents and visitors, deliver liveability for sustainable communities, and contribute to the Middlesbrough Biodiversity Action Plan.</p> <p>At a strategic level this network will include the following open spaces:</p>

	<ul style="list-style-type: none">i Green Blue Heart;ii Middlesbrough's green lung;iii beck valleys;iv green wedges;v green flag parks;vi River Tees frontage; andvii South Middlesbrough country park.
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3.12 Policy CS20, section 11.7 of the Core Strategy addresses how development will contribute to the environment. This policy is set out in Table 1 (above). The articles relevant to the study area are:

'Development will be required to contribute to the delivery and implementation of this network by, where appropriate, providing green infrastructure that:

- a) contributes to the management, conservation and improvement of the local landscape;
- b) contributes to the protection, conservation and management of historic landscape, archaeological and built heritage assets; and
- c) is managed and funded in urban areas to accommodate nature, wildlife and historic and cultural assets, and provide for sport and recreation.'

4.0 ASSESSMENT METHODOLOGY

4.1 The study area comprised a 1km buffer zone that extended from the PDA boundary (Fig. 2). The assessment included a comprehensive desk-based review of published and readily accessible documentary, cartographic, aerial photographic evidence, LiDAR evidence and online resources, with a site walk-over inspection and geophysical survey.

4.2 This assessment has been prepared in accordance with the following guidance:

- NPPF Planning Practice Guidance (2014): Conserving and Enhancing the Historic Environment;
- *Historic England Advice Note 12: Statements of Heritage Significance: Analysing Significance in Heritage Assets* (Historic England 2019);
- *Historic Environment Good Practice Advice in Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment*. Historic England (2015a);
- *Historic Environment Good Practice Advice in Planning Note 3: The Setting of Heritage Assets*. Historic England (2017);

- *Design Manual for Roads and Bridges* (DMRB 2020) LA 106 Cultural heritage assessment;
- Standard and guidance for desk-based assessment. Chartered Institute for Archaeologists (2017);
- *Shared Visions: The North-East Regional Research Framework for the Historic Environment* (Petts and Gerrard 2006); and
- Middlesbrough Local Development Framework Core Strategy (2008) (see Table 1).

Aims and objectives

4.3 The principal aim of the assessment is to meet the requirements of NPPF paragraphs 189 and 190 and provide the local planning authority (LPA) with sufficient information to enable it to make an informed decision on the effects of the development proposals on the historic environment.

4.4 The principal objectives of the assessment are to:

- identify all recorded heritage assets that could be affected by the proposals;
- assess the potential for unrecorded archaeological remains to be present within the site boundary;
- identify any areas that would require field evaluation in order for the LPA to make an informed planning decision;
- assess whether the proposals would cause harm or loss to the significance of any heritage assets; and
- recommend how any identified harm or loss could be mitigated in order that the proposals would comply with national and local planning policy as this relates to the historic environment.

Information sources

4.5 The following repositories and data sources were consulted:

- **Middlesbrough Council:** Historic Environment Record (HER), previous archaeological assessments, evaluations and excavations;
- **Historic England:** National Record of the Historic Environment (NRHE) and the National Heritage List for England (NHLE); and

- **Online sources:** historic and modern maps, landscape assessment, Google Earth, Environment Agency LiDAR coverage, historical and archaeological studies, the Middlesbrough planning policy website, and Historic England online list.

4.6 This report focuses on the PDA in particular, and discusses heritage assets in the wider vicinity only if they are directly relevant to the area under review. Section 7 lists heritage assets in the wider area that are mentioned in this report (see Table 3).

Historic maps

4.7 The following Ordnance Survey (OS) maps have been examined as part of the appraisal:

- Six-inch 1857 OS map Yorkshire 16 (includes: Hemlington; Marton; Middlesbrough.) Surveyed 1853;
- 25-inch 1894 Yorkshire XVI.14 (Hemlington; Newby; Stainton) Surveyed: 1893;
- 25-inch 1894 Yorkshire XVI.15 (Hemlington; Marton; Newby; Nunthorpe) Surveyed 1892;
- Six-inch 1895 OS map Yorkshire XVI.SE (includes: Marton; Morton; Newby; Nunthorpe; Ormesby) Surveyed 1892;
- Six-inch 1895 OS map Yorkshire XVI.SW (includes: Hemlington; Maltby; Middlesbrough; Stainton) Surveyed 1893;
- 25-inch 1915 Yorkshire XVI.15 (Hemlington; Marton; Newby; Nunthorpe) Surveyed 1912;
- 25-inch 1915 Yorkshire XVI.14 (Hemlington; Newby; Stainton) Surveyed 1913;
- Six-inch 1919 OS map Yorkshire XVI.SE (includes: Marton; Morton; Newby; Nunthorpe; Ormesby) Surveyed 1912 to 1913;
- Six-inch 1919 OS map Yorkshire XVI.SW (includes: Hemlington; Maltby; Middlesbrough; Stainton) Surveyed 1913;
- 25-inch 1928 Yorkshire XVI.15 (Hemlington; Marton; Newby; Nunthorpe) Surveyed 1927;
- 25-inch 1929 Yorkshire XVI.14 (Hemlington; Newby; Stainton) Surveyed 1927;
- Six-inch 1930 OS map Yorkshire XVI.SW (includes: Hemlington; Maltby; Middlesbrough; Stainton) Surveyed 1927;
- Six-inch 1930 OS map Yorkshire XVI.SE (includes: Marton; Morton; Newby; Nunthorpe; Ormesby) Surveyed 1927;
- 25-inch 1946 Yorkshire XVI.15 (Hemlington; Marton; Newby; Nunthorpe) Surveyed 1938;

- Six-inch 1947 OS map Yorkshire XVI.SW (includes: Hemlington; Maltby; Middlesbrough; Stainton) Surveyed 1938;
- Six-inch 1952 OS map Yorkshire XVI.SE (includes: Marton; Morton; Newby; Nunthorpe; Ormesby) Surveyed 1950;

Site walk-over

- 4.8 A site walk-over was undertaken on the 6th and 7th July 2020. The objectives of the walk-over were to:
- understand the current context, character, land use and ground conditions of the PDA;
 - understand its relationship to nearby recorded heritage assets;
 - better understand the significance of any heritage asset that may be affected by the proposals;
 - understand the setting of designated assets and historic landscape character; and
 - identify additional unrecorded heritage assets or the potential for these.

Assumptions and limitations

- 4.9 This assessment comprises a desk-based review of information derived from the Middlesbrough HER, Historic England and other published and unpublished sources. While assumed to be accurate, this information is not a complete record of the historic environment and does not preclude the potential for the presence of unrecorded heritage assets, including below-ground remains of archaeological interest, within the application boundary.
- 4.10 Due to the government-imposed lockdown during the COVID-19 crisis, which resulted in the closure of public buildings, NAA was unable to visit the local history archives.
- 4.11 There are no other apparent limitations, beyond the inherent uncertainty of the accuracy of archaeological records from antiquarian periods.

5.0 ADDITIONAL SOURCES

Archaeological investigations

- 5.1 The location of archaeological investigations are shown on Figure 2 and detailed in Table 2.

Table 2: Archaeological investigations within the 1km study area

HER event record/ NAA identifier	Event type	Grid reference			Description	Year of works
145	Earthwork survey	NZ	50510	13770	Earthwork survey carried out to record a paddock of ridge and furrow (see SMR 1546). The survey was followed by trial trenching (Event 146).	2003
146	Trial trench	NZ	50510	13760	Following earthwork survey (Event No.145), three linear trenches were opened across the ridge and furrow (SMR 1546).	2003
358	Desktop survey	NZ	51342	13479	Desk-based assessment of Newham Hall was produced but could not be finished due to foot and mouth disease preventing access to the site. An archive file has been set up.	2001
476	Trial trench	NZ	50153	14259	Two trial trenches excavated to the rear of Evergreens, to establish the presence or absence of archaeological deposits prior to development. All features were found to be modern and a single sherd of late medieval green glazed pottery was recovered.	2007
644	Trial trench	NZ	51150	13600	Excavation of seven trenches in a field immediately to the west of Lingfield Farm. The only archaeological features were a series of ditches indicating the presence of a small enclosure.	1991
645	Trial trench	NZ	50401	14580	Ten trial trenches targeting scant geomagnetic anomalies (Event 646). No significant archaeological features or deposits were identified and the geomagnetic anomalies were identified as periglacial features.	2002
646	Geophysics survey	NZ	50400	14580	Geophysics survey of a sports playing fields attached to Coulby Newham Secondary School. The survey area covered c.4ha and, other than ridge and furrow, did not identify archaeological features.	2002
647	Trial trench	NZ	50600	13680	Six trenches excavated on land immediately to the south of The Coulby Hotel (formerly Coulby Farm). This area was found to be heavily disturbed.	1991
648	Trial trench	NZ	51000	13750	Ten trenches were excavated to the north-west of Lingfield Farm and identified former stream channels.	1991
656	Trial trench	NZ	51130	14230	Trial trench evaluation that produced signs of former stream channels.	1991
657	Trial trench	NZ	49695	13384	Five trenches that revealed no features of archaeological interest and sherds of medieval pottery.	1990
802	Watching brief	NZ	49609	13530	Two negative trenches.	1997
893	Heritage statement	NZ	51324	13248	Heritage statement of land surrounding Newham Hall that found a negligible potential for prehistoric, Roman or early medieval activity to be present within the site.	2013
NAA1	Heritage statement	NZ	49863	13919	Heritage statement for a proposed development of 56.65ha of land directly to the west of the current site. The results suggested that activity dated to the prehistoric period was limited to enclosures recorded as cropmarks on aerial photographs to the north of Stainton Way. The report identified a 4th-century Romano-British farmstead to the south-west of Larchfield Farm (c.240m to the	2013

					south-west of the current PDA) during trial trenching in 1984. During the medieval and post-medieval periods the area formed agricultural land. By the end of the post-medieval period, the environs were transformed from open countryside into a mixed use urbanscape. The most rapid period of development occurred in the mid-20th century, with the erection of buildings that evolved Hemlington village into a sizeable township (URS 2013).	
NAA2	Geophysical survey	NZ	49863	13919	Geophysical survey of several fields within the area assessed by URS (Event NAA1). Anomalies identified were considered unlikely to be of an archaeological origin.	2016
NAA3	Trial trench	NZ	49863	13919	Five trenches identified ridge-and-furrow cultivation.	2016

LiDAR

- 5.2 Available Environment Agency LiDAR coverage was examined at 1m and 2m resolution.
- 5.3 The LiDAR survey data showed evidence of ridge and furrow running on a north–south alignment in the two eastern fields (Fields B and C) in the PDA. Evidence of ridge and furrow appeared fainter in the western field (Field A), in which there appeared to be a depression in the centre of the field of an unknown origin.

Site inspection

- 5.4 The objectives of the site inspection were to:
- understand the current context, character, land use and ground conditions of the PDA;
 - understand its relationship to nearby previously recorded heritage assets;
 - understand the significance of any heritage asset that may be affected by the proposals;
 - understand the setting of designated heritage assets and historic landscape character; and
 - identify additional unrecorded heritage assets or the potential for these.

Geophysical survey

- 5.5 The geophysical survey was carried out on 6th and 7th July 2020 and covered an area of approximately 5.4ha.
- 5.6 The aim of the geophysical survey was to map and record potential buried features located within the PDA. Through analysis of the results of the geophysical survey, NAA

aimed to provide a detailed interpretation of the archaeological potential of the site that will inform subsequent archaeological mitigation strategies.

5.7 The objectives of the survey were to:

- undertake a geophysical survey across areas deemed suitable for data collection within the PDA;
- attempt to identify, record and where possible characterise any subsurface remains within the survey boundary;
- assess the archaeological potential of identified anomalies; and
- identify possible concentrations of past activity in order to inform the requirement for any further archaeological investigation at the site.

5.8 All survey work was completed to appropriate standards contained in current guidelines (ClfA 2014b; Schmidt *et al.* 2015). The gradiometer survey used a Bartington Grad601-2 dual magnetic gradiometer system with data logger. Readings were recorded at a resolution of 0.01nT and data was collected with a traverse interval of 1m and a sample interval of 0.25m. The survey data was collected with reference to a site survey grid comprised of individual 30m x 30m squares. The grid was established using Real Time Kinematic (RTK) differential GPS equipment and marked out using non-metallic survey markers. All grid nodes were set out with a positional accuracy of at least 0.1m and could be relocated on the ground by a third party. The base lines used to create the survey grids are shown on Figure 5 and further details are available in Appendix C.

5.9 The processing was undertaken using Geoplot 3.0 software and consisted of standard processing procedures. Details of processing steps applied to collected data are provided in Appendix D.

5.10 On the greyscale plots, positive readings are shown as increasingly darker areas and negative readings are shown as increasingly lighter areas (Fig. 6 and Fig. 7).

5.11 Interpretation of identified anomalies is generally achieved through analysis of anomaly patterning and increases in magnetic response and is often aided by examining supporting information. The interpreted data uses colour coding to highlight specific readings in the survey area (Fig. 8). Appendix E details the terminology and characterisation of anomalies used for interpreting data.

6.0 DESIGNATED HERITAGE ASSETS

World Heritage Sites

6.1 There are no World Heritage Sites within the PDA or 1km study area.

Scheduled monuments

6.2 There are no scheduled monuments within the PDA or the 1km study area.

Listed buildings

6.3 There are no listed buildings within the PDA.

6.4 The nearest listed building to the PDA is Grade II Listed Stainton Grange and Garden Walls (Historic England List entry number: 1329531), which is located c.0.95km to the west of the PDA.

Conservation Areas

6.5 There are no Conservation Areas within the PDA or 1km study area.

6.6 There are eight Conservation Areas within Middlesbrough. The nearest is the Stainton and Thoresby Conservation Area, which is located c.1.93km to the west of the PDA.

Historic Parks and Gardens and Registered Battlefields

6.7 There are no Historic Parks or Gardens or Registered Battlefields within the PDA or 1km study area.

7.0 BASELINE HISTORIC ENVIRONMENT DATA

7.1 Specific heritage assets recorded within the study area and described in this report are catalogued in Table 3 and their locations are shown on Figure 2.

Table 3: Heritage assets within the 1km study area of the PDA

HER site record/NAA identifier	Grid reference			Description	Period/ date
HER no: 1508 NHLE no: 1329531	NZ	49040	13736	Stainton Grange and Garden Walls Grade II* Listed Building. Early/mid-18th-century farmhouse with late 19th-century rear extensions.	Post-medieval
452	NZ	450600	513800	Coulby Farm	Medieval

				Possible site of deserted medieval village identified through post-war RAF aerial photographs.	
842	NZ	451200	513500	Larchfield Farm – enclosure Cropmark of an enclosure identified to the west of Lingfield Farm on an aerial photograph. The enclosure is suggested to relate to agricultural activity associated with the farm.	Post-medieval
882	NZ	450020	513350	Larchfield – Romano-British farmstead Excavation in 1984 identified several ditches, 4th-century pot sherds, and a beehive quern which have been interpreted as belonging to a Romano-British farmstead.	Romano-British
928	NZ	450200	514310	Hemlington Village Hemlington is first recorded in the Domesday Book of 1086 as ‘Himeligetun’ or ‘Himelintun’. Etymology of the place name is ‘Hemela’s Farm’. The village is described by Reverend Graves in 1808 as ‘a small township...contains only about 50 inhabitants occupied solely in husbandry’ (Ref. 3). The settlement is first shown on the Tithe Map of 1849 and detailed on the First Edition OS map of 1856 (Ref. 5) as several buildings clustered around the crossroads of Hemlington Village Road and Stokesley Road. Amongst these buildings are the ‘Blue Bell Public House’ and ‘Haggers Gate. The village remained in this form until the late 1960s/early 1970s saw the area be heavily urbanised with housing estates to the north-west and north-east. Hemlington Village Road was by-passed with ‘Stainton Way’.	Medieval
1360	NZ	450050	513400	Hemlington Hospital – enclosure Aerial photographs in fields excavated in 1984 (HER 882) identified a series of cropmarks relating to possible Iron Age enclosures and modern drainage.	Iron Age
1420	NZ	450120	513300	Larchfield Farm – enclosure Possible circular enclosure identified from aerial photographs.	Iron Age
1518	NZ	450800	513200	Brass Castle Lane – field system Field containing ridge and furrow and a pond.	Medieval
1544	NZ	449760	513440	Hemlington Hospital Four fields containing ridge and furrow.	Medieval
1545	NZ	450380	513540	Ridge and furrow cultivation, field immediately NW of Larchfield Farm One field of ridge and furrow cultivation running SSE to NNW identified immediately north of Larchfield Farm from aerial photographs.	Medieval
1546	NZ	450520	513770	Coulby Farm – field system Field containing ridge and furrow to the west of Coulby Farm. Subjected to an earthwork survey (Event 145) and excavation (Event 146).	Medieval
1793	NZ	450120	513660	Hemlington Grange Farm – pottery scatter Six sherds of pottery found during field walking.	Romano-British
1794	NZ	450390	513340	Larchfield – pottery 1 sherd of pottery found during field walking.	Romano-British
1795	NZ	450530	513400	Larchfield – pottery 1 sherd of pottery found during field walking	Romano-British
1796	NZ	450450	513210	Larchfield – pottery 1 sherd of Iron Age and 4 sherds of Romano-British pottery found during field walking.	Romano-British
1797	NZ	450280	513330	Larchfield – pottery 1 sherd of pottery found during field walking.	Romano-British
1798	NZ	450510	513580	Larchfield – pottery	Romano-British

				1 sherd of pottery found during field walking.	
1799	NZ	450060	513340	Larchfield – pottery 1 sherd of pottery found during field walking.	Romano-British
1800	NZ	450120	513320	Larchfield – pottery 30 sherds of pottery found during field walking.	Romano-British
2854	NZ	450800	514500	Coulby Newham – stone axehead Greenstone axehead recorded in 1990 CBA research report No.87: Prehistoric and Roman Archaeology of North East Yorkshire.	Neolithic
3266	NZ	449930	514010	Belle Vue Farm – field system Two fields of ridge and furrow identified on aerial photographs.	Medieval
7936	NZ	450192	514291	Haggersgate Farm Haggersgate Farm was situated in the centre of the medieval village of Hemlington on the crossroads of the B1365 and Stainton Way. It is first noted as an unnamed spread of small farm buildings forming one large farmstead on the 1849 Tithe map of Hemlington and is recorded on the 1857 First Edition OS map as ‘Haggers Gate’. Today, only the northern-most building survives in part, as the site has been converted into one of several nursing homes called ‘The Evergreens’.	19th century
7937	NZ	449677	513467	Hemlington Grange Farm Hemlington Grange Farm lay within fields approximately 1km south south-west of Hemlington Village. Medieval field systems to the east suggest the farm has medieval origins. It is first recorded as a large unnamed farmstead on the 1849 Tithe map and labelled ‘Hemlington Grange’ on the 1857 first edition OS map. Hemlington Grange was left to ruin by c.1990, and has since been demolished and replaced by a large modern farmstead.	19th century
7939	NZ	450321	513461	Larchfield Farmstead First documented on the 1849 Tithe map as a large farmstead, and recorded on the 1857 First Edition OS map as a L-shaped farmstead labelled Larchfield. The main farmhouse was the only surviving 9th-century building in the second half of the 20th ^c century. In 1970 the south half of the building was demolished and the farm was later restored to become ‘Cherry Hill Nurseries’ in the 1980s.	19th century
7940	NZ	450045	514647	Sunny Side Farm, Hemlington Sunny Side Farm was situated 0.4km north of Hemlington just off the east side of Stokesley Road (B1365). It is first noted on the 1849 Tithe map of Hemlington as a large U-shaped farmstead. By the 1857 First Edition OS map it is called ‘Sunny Side’, and comprises a large quadrangle with outbuildings to north, south and west, with a larger farmhouse to the east. Smaller, separate outbuildings appear on subsequent OS maps. The farmstead was demolished in the 1980s to make room for housing development. The actual site of the farm has since been left as part scrubland, part recreational grassland.	19th century
7958	NZ	451425	513817	Wind? House, Marton 18th-century farmstead.	18th century
6967	NZ	449845	513177	Stainton Beck – animal bone	Unknown

				Collection of a variety of different animal bone from a stream bed of Stainton Beck in 2007.	
7932	NZ	449910	514180	Belle Vue Farm, Hemlington Belle Vue Farm lay within the fields to the south of modern-day Stainton Way just to the west of the medieval village of Hemlington. Several medieval field systems are extant immediately south of the farmstead and demonstrate the long-term agricultural use of the land. Belle Vue Farm first appears as a large U-shaped farmstead on the 1849 Tithe map of Hemlington. A large building has been recently demolished, which may have been the original farmhouse. The site is now open land.	19th century
7933	NZ	449392	514191	Cass House/Finkle Nook Farm Cass House/Finkle Nook farm is situated in the fields immediately north of Stainton Way, and to the south-east of Hemlington Hall. A small unnamed smallholding is first documented on 1849 Hemlington Tithe map and labelled as Cass House on the 1857 First Edition OS map. For a brief time in the late 19th and early 20th century the farmstead was expanded and named Finkle Nook Farm. The farmstead was demolished to make way for housing in the 1970s.	19th century
7934	NZ	450588	513773	Coulby Farm Coulby Farm is situated in the fields to the east of the B1365, 0.6km south from Hemlington. It overlies the deserted medieval village of Coulby (SMR 452). It is first noted as a small unnamed farmstead on the 1849 Tithe map of Hemlington and appears on the 1857 First Edition OS map as 'Coulby'. The farmhouse has recently been converted into a pub/restaurant retaining the name 'The Coulby Farm'.	19th century
7988	NZ	449342	513587	Glebe Farm/Holme Farm Farmstead comprising a farmhouse, small outbuilding and pond that is first noted on the 1857 First Edition OS map as Glebe Farm. The name of the farm changed to Holme Farm at the beginning of the 20th century and was expanded with the addition of an outbuilding and extension to the farmhouse. The level of survival of historic building elements is unknown.	19th century
4777	NZ	451280	513590	Lingfield Farm – farmstead Late 18th-century 2-storey farmstead with an adjacent barn (HER no 4778).	18th century
4778	NZ	451260	513570	Lingfield Farm – barn 19th-century 2-storey barn located next to Lingfield Farmhouse.	19th century
NAA 5	NZ	449704	514340	Possible enclosure Possible prehistoric enclosure recorded as a cropmark on aerial photographs from 1972 (URS 2013).	Prehistoric
NAA 6	NZ	449958	514518	Possible enclosure Possible prehistoric enclosure recorded as a cropmark on aerial photographs from 1972 (URS 2013).	Prehistoric
NAA 7	NZ	449936	513822	Possible enclosure Possible prehistoric or Roman enclosure recorded as a cropmark on aerial photographs from 1972 (URS 2013).	Unknown (possibly prehistoric or Roman)

- 7.2 There are no designated heritage assets within the PDA or 1km study area. Thirty-one sites are recorded in Middlesbrough HER in the 1km study area and a further three sites have been identified that are not recorded on any national or local heritage lists.
- 7.3 One site is recorded within the PDA and comprises a scatter of six sherds of Roman pottery. This, coupled with other sites that have been found to the south of Larchfield Farm, is suggestive of the presence of an Iron Age/Roman settlement directly to the south of the site. Since the medieval period, the site is likely to have formed agricultural land initially to the south of Hemlington Village and later in the hinterland of the post-medieval farmsteads of Hemlington Grange and Larchfield Farms. Historic maps confirm the continued agricultural nature of the PDA, showing it within an agricultural landscape to the south of Hemlington during the 19th and 20th centuries.
- 7.4 The Middlesbrough HER classifies the site as lying in an area of institutional land associated with the Larchfield Community for adults with learning difficulties (modern 1986–2005).

Archaeological remains (non-designated heritage assets)

- 7.5 The following section sets out details of the archaeological sites that are recorded within the study area. It then discusses the potential for additional unrecorded archaeological remains to be present within the PDA, based on the evidence from the wider study area. The dates of the various periods referred to in the following text are defined in Table 4.

Table 4: Period definitions

Prehistory	Palaeolithic	800,000BC to 12,000BC
	Mesolithic	12,000BC to 4,000BC
	Neolithic to Early Bronze Age	4,000BC to 1,500BC
	Middle Bronze Age to Iron Age	1,500BC to AD78
Roman		AD78 to AD410
Early Medieval		AD410 to AD1066
Later Medieval		AD1066 to AD1536
Post-Medieval		AD1536 to AD1900
Modern		AD1900 to present

Prehistoric (Palaeolithic to Iron Age)

- 7.6 There are no previously recorded heritage assets dated to the prehistoric period within the PDA.
- 7.7 Three possible cropmarks of unknown prehistoric date have been recorded from aerial photographs taken in 1972 [Fig. 2: NAA5, NAA6 and NAA7]. Two of these possible enclosures [Fig. 2: NAA 5 and NAA6] were destroyed by mid-20th-century residential development and so detailed analysis of their significance is not possible. The third possible enclosure [Fig. 2: NAA7] lies c.0.17km to the north-west of the PDA. Although not identified in the interpretation, it is plausible that anomalies within the geophysical survey of 2016 relate to the cropmarks.
- 7.8 A single object of prehistoric date has been recorded within the 1km study area: a Neolithic greenstone axehead that was found c.0.87km to the north-east of the PDA in Coulby Newham.

Iron Age and Roman

- 7.9 A scatter of six sherds of Roman pottery was identified in the PDA [Fig. 2: 1793].
- 7.10 Several sites are recorded in the HER that are plausibly indicative of Iron Age/Roman settlement directly to the south of Larchfield Farm. Two possible Iron Age enclosures have been identified on aerial photographs c.0.24km [Fig. 2: 1360] and 0.31km [Fig. 2: 1420] to the south of the PDA. Excavation in 1984 identified several ditches, 4th-century pottery sherds and a beehive quern c.0.33km to the south-west of the PDA that were postulated as belonging to a Romano-British Farmstead [Fig. 2: 882].
- 7.11 Further evidence of Iron Age/Roman settlement comprises numerous sherds of Iron Age and Roman pottery that have been found across various fields surrounding Larchfield Farm [Fig. 2: 1794, 1795, 1796, 1797, 1798, 1799 and 1800], including a scatter of six sherds of Roman pottery in the west of the PDA [Fig. 2: 1793].

Early medieval/Anglo-Saxon

- 7.12 No finds or features have been discovered within the PDA or the 1km surrounding study area that date to the early medieval/Anglo-Saxon period.

- 7.13 The etymology of Hemlington suggests that the place name is of Anglo-Saxon origin and describes an enclosed settlement ('*-ton*') that was connected with Hemela ('*Hemling-*') (University of Nottingham 2018).

Medieval

- 7.14 During the medieval period, land to the south of the River Tees comprised a rural landscape ordered by a series of nucleated villages. Two medieval villages are recorded within the 1km study area: Hemlington and a deserted medieval village (DMV) at Coulby Farm. Hemlington – located c.0.54km to the north of the PDA – is first recorded in the Domesday Book (AD1086) as a small village in the North Riding of Yorkshire that contained 1.6 households, 22 ploughlands (totalling three carucates) and a church under the administration of Earl Hugh's manor of Acklam (Powell-Smith 2018) [Fig. 2: 928]. A second possible medieval village was identified through post-war RAF aerial photographs at Coulby Farm c.0.13km to the east of the PDA [Fig. 2: 452]. The DMV at Coulby Farm now lies under residential development and so little is known about the form, extent or significance of this medieval settlement.
- 7.15 It is likely that the PDA formed agricultural land in the hinterland of these villages. This is demonstrated by the ridge and furrow that is evident in LiDAR survey data within the site and the various medieval field systems that have been recorded on aerial photographs [Fig. 2: 1544, 1545, 1546, 1518, 3266].

Post-medieval

- 7.16 During the post-medieval period, the landscape was reordered from being centred on nucleated villages to dispersed farmsteads. This is evidenced in the study area by the numerous farmsteads of post-medieval date: Grade II* Listed Stainton Grange [Fig. 2: 1508], Lingfield Farm [Fig. 2: 4777], associated barn [Fig. 2: 4778] and cropmarks of a post-medieval enclosure [Fig. 2: 842], Haggergate Farm [Fig. 2: 7936], Hemlington Grange Farm [Fig. 2: 7937], Larchfield Farmstead [Fig. 2: 7939], Sunny Side Farm [Fig. 2: 7940], Belle Vue Farm [Fig. 2: 7932], Cass House/Finkle Nook Farm [Fig. 2: 7933], Coulby Farm [Fig. 2: 7934], Glebe Farm/Holm Farm [Fig. 2: 7988] and Wind House [Fig. 2: 7958].
- 7.17 The PDA is likely to have continued to form agricultural land during the post-medieval period. Maps from the 19th century show only minor change to the composition of the

PDA: a field boundary present in the eastern field – Field C – is present on the 1857 First Edition six-inch OS map (Fig. 3) but was removed by the end of the 19th century.

Modern

- 7.18 Historic maps demonstrate that much of the study area retained its rural character until mid-20th-century urbanisation saw land to the east of B1365 and north of Stainton Way developed as residential estates.
- 7.19 At the beginning of the 20th century, Hemlington Hospital for infectious diseases was erected directly to the west of the PDA and sewage beds were installed c.0.17km to the north-west of the PDA. The evolution of these sites is documented on 20th- and 21st-century OS maps – both first appearing on the 25-inch 1915 OS map (Fig. 4). Hemlington Hospital was built in 1901 as an isolation hospital to treat smallpox and tuberculosis. The hospital quickly expanded at the beginning of the 20th century so that by the 1915 25-inch OS map the hospital comprised three double wards linked by a central annex as well as several administration/accommodation outbuildings. The hospital was expanded at the end of the 1920s and in the 1940s so that by the mid-20th century it formed a sizable unit offering a range of difference services (URS 2013). By the end of the 20th century, the hospital fell out of use and was demolished; the land it was on has remained undeveloped.

Site walk-over

- 7.20 A site walk-over was undertaken on 6th and 7th July 2020 (Plates 1–3). The aim was to establish the condition of the land, topographical features and the potential for heritage constraints within and surrounding the site.
- 7.21 The site inspection did not identify any previously unrecorded heritage assets within or close to the site.
- 7.22 The PDA was composed of three fields, bounded by woodland to the west, east and north. Field boundaries comprised trees and hedgerow. At the time of the site inspection, the field contained overgrown grass (see Plates 1–3).

8.0 GEOPHYSICAL SURVEY RESULTS

Figure 8

Field A

- 8.1 There is a high level of magnetic disturbance in Area A that corresponds with the location of a possible depression identified on LiDAR survey data. The magnetic disturbance is likely to be caused by material with a high magnetic susceptibility of an unknown origin. Although very tentative, it is possible that the disturbance is indicative of infilled features such as a pond or quarry. It should be noted, however, that this field is located directly to the east of the former Hemlington Hospital so there is potential for building debris to be present.

Fields B and C

- 8.2 A linear anomaly oriented from the north–west to south–east in Field B [**B1**] runs perpendicular to a linear anomaly running north–east to south–west in Field C [**C1**]. It is plausible that these anomalies relate to the same infilled feature and are indicative of an enclosure.
- 8.3 Other linear and rectilinear linear anomalies have also been identified [**B2**, **B3**, **B4**, **B5**, **C2**, **C3**, and **C4**] but are composed of weak increases in magnetic value and so have a more tentative interpretation. It is unclear if they are of the same origin as **B1** and **C1**, denote an alternative archaeological feature, or are caused by pedological or geological changes in the substrata.
- 8.4 The linear anomaly [**C5**] running on a north–south alignment through Field C corresponds with the location of a former field boundary depicted on the 1857 First Edition OS map. A second linear anomaly [**C6**] composed of weaker increases in magnetic value appears to run perpendicular to **C5** on an east–west orientation. Although tentative, it is plausible that **C6** is also indicative of a former field boundary.
- 8.5 There are numerous regularly spaced linear anomalies that are considered likely to relate to agricultural activity. Broadly spaced anomalies running on a north–south alignment in Fields B and C correspond with features identified on LiDAR survey data and are indicative of earlier agricultural features, such as ridge and furrow. A second

area of broadly spaced linear anomalies running east–west occurs in the east of Field C and is also considered to denote ridge and furrow.

- 8.6 The strong bipolar linear anomaly that runs on a north–south orientation along the eastern edge of Field C is caused by a buried utility. It should be noted that the strength and size of the anomaly associated with the buried utility reflect the highly magnetic responses of the ferrous material of the pipe rather than actual feature dimensions.

General anomalies across the whole site (Fig. 8)

- 8.7 There are numerous weak isolated anomalies with an amorphous form across the survey area. Those with a coherent patterning or broader form have been identified within the interpretation; however, given the lack of anomalies conclusively identified as being of an archaeological nature, a very tentative interpretation applies, and their origin is unknown.
- 8.8 There are several weak and diffuse linear trends. These fail to produce the necessary patterning or increases in magnetic response in order to be interpreted fully, and as a consequence their origin is unknown.
- 8.9 Several regularly spaced linear anomalies with weak increases in magnetic value have been identified. It is likely these are also of an agricultural nature, but it is not known if they relate to modern agricultural processes or earlier cultivation activity.
- 8.10 Dipolar anomalies are often likely to relate to ferrous or modern objects buried in the topsoil. Consequently, these anomalies are largely considered to be of a modern nature and therefore have not been depicted on interpretation plots.
- 8.11 Several isolated bipolar responses have been identified. These are considered to be modern and caused by highly magnetic material, such as ferrous objects.
- 8.12 Areas of increased magnetic response have been used to highlight concentrations of dipolar anomalies. These are likely to be caused by modern magnetic debris in the topsoil or near the surface of the site.
- 8.13 Strong responses caused by above-ground features external to the survey area, such as metal fencing and gates, have been characterised as external interference.

9.0 ASSESSMENT OF SIGNIFICANCE AND IMPACT

Development description

- 9.1 The current archaeological assessment was requested by Middlesbrough Council for a new housing development.
- 9.2 Although the exact development proposals were not available at the time of writing this report, a presumption has been made that development works are not likely to exceed 10m in height from finished floor levels. With this in mind, and given the built-up nature of the immediately surrounding area, the development is considered unlikely to affect any long-distance views of its local environ. If development or associated works do exceed 10m from finished floor levels, then mitigation will be required to reduce the impact on designated assets within the study area.

Heritage assets

Designated sites

- 9.3 There are no designated heritage assets within the PDA and no evidence to suggest that any designated heritage assets or their setting would be affected by the proposed development within the site.
- 9.4 The proposal will have no impact on either designated sites or non-designated heritage assets of national importance and therefore NPPF Paragraphs 193–6 and Core Strategy Policy BH9 (1) are not engaged.

Non-designated sites

- 9.5 There is a moderate potential for archaeological remains of an Iron Age or Roman date to be present within the PDA. Two possible Iron Age enclosures have been identified to the south of Larchfield Farm. Numerous sherds of pottery of Iron Age and Roman date have been recorded in the fields surrounding Larchfield Farm – including six sherds of Roman pottery in the west of the PDA – and a possible Romano-British farmstead was identified 0.34km to the south of the PDA by excavations in 1984. Geophysical survey has identified a series of linear anomalies in the centre and east of the PDA (Fields B and C) that may be indicative of infilled features such as ditches or enclosures of an unknown date. The alignment of these anomalies is different from those suggested to relate to medieval and post-medieval cultivation techniques. Therefore, although very speculative, it could be suggested that if the geophysical anomalies do relate to an

enclosure, it pre-dates the medieval period and is plausibly contemporary with the Iron Age/Roman settlement activity to the south of Larchfield Farm.

- 9.6 During the medieval and post-medieval periods, the PDA formed agricultural land. This is evidenced by the ridge and furrow that is clearly present in geophysical and LiDAR survey data within the PDA. Therefore, there is a high potential for buried remains relating to medieval and post-medieval agricultural activity.
- 9.7 Geophysical survey has revealed that the west of the PDA (Field A) contains a high level of magnetic disturbance that corresponds with the location of a possible depression on LiDAR survey data. Although the origin of the magnetic disturbance is unknown, it can be speculated to be of either post-medieval or modern date and either related to an infilled feature such as a pond, or building debris related to the former Hemlington Hospital that was located directly to the west of the PDA.
- 9.8 If present, and depending on their nature, there is the potential for buried remains to have a regional importance, of up to a medium value in terms of their archaeological and historic interest (Appendix B, Tables B1 and B2).
- 9.9 NPPF Paragraph 189 and Core Strategy Policy BH9 (2.i) states that where a site on which development is proposed 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. Paragraph 197 requires that the effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application.
- 9.10 This report meets the requirements of the NPPF in terms of the desk-based assessment and non-intrusive field evaluation. The assessment has identified that there is a potential for buried remains to be present within the PDA. Further evaluation is required to test the results of the geophysical survey and characterise the nature and significance of identified geophysical anomalies. It is considered that the mitigation proposals set out in Section 10 below are sufficient to protect any archaeological interest in the site.

Regional Research Framework

- 9.11 The proposed development has potential to contribute towards two objectives set out in the *North-East Regional Research Framework for the Historic Environment* (Petts and

Gerrard 2006). The following research themes were considered the most pertinent to the baseline information accrued within the PDA and its immediate local environ:

- Iron Age/Roman native and civilian life; and
- medieval and post-medieval agriculture.

10.0 MITIGATION

10.1 The results of this assessment have identified that there is a potential for buried remains to be located within the PDA; the geophysical survey has identified several anomalies that are potentially of an archaeological nature.

10.2 It is recommended that trial trench evaluation is undertaken across the site to test the results of the geophysical survey. This evaluation should target anomalies suggested to have an archaeological potential, as well as 'blank' areas where the geophysical survey has not suggested the presence of buried features.

10.3 If archaeological deposits are identified during trial trenching, NPPF paragraphs 190 and 197–9 will be engaged. If that is the case, an appropriate level of mitigation in the form of further investigation in advance of, or during, ground works will be required to record and advance the understanding of significance of any heritage assets prior to their loss.

10.4 Any intrusive archaeological investigations would be undertaken in accordance with a Written Scheme of Investigation agreed with the local authority archaeologist. If archaeological remains are identified, the results of all investigations would be subject to a programme of post-excavation assessment, analysis, reporting and publication. The site archive (including finds) would be deposited with the appropriate museum.

10.5 Taking into account this mitigation, if unrecorded archaeology is found to be present on the PDA, then the impact of the proposals on the significance of such remains is considered to be minor/moderate adverse in terms of their physical loss. They would be considered to be minor/moderate beneficial in terms of providing an opportunity to enhance understanding of the archaeological resource and potentially contribute to the regional and local research agendas (Appendix B, Table B4).

10.6 This mitigation would be in accordance with NPPF Paragraph 199 and Core Strategy Policies CS4 and CS20.

11.0 CONCLUSIONS

- 11.1 This archaeological assessment is sufficient to understand the potential impact of the proposals on heritage assets and meets the requirements of NPPF Paragraphs 189 and 190.
- 11.2 It confirms that no designated heritage assets or their setting would be affected by the proposals. The Ancient Monuments and Archaeological Areas Act 1979 and the Listed Buildings and Conservation Areas Act 1990 are not applicable in the case of this development, as it does not affect any Scheduled Monuments and there are no listed buildings within the development area.
- 11.3 The assessment has identified that there is a potential for buried remains to be present within the PDA. If present, unrecorded remains may relate to possible Iron Age/Roman settlement and medieval and post-medieval agricultural activity. Depending on the nature of extant buried remains, they have the potential to be of regional interest of a medium value in terms of their archaeological and historical interest.
- 11.4 It is recommended that trial trench evaluation is undertaken to confirm the presence or absence of anomalies identified through the geophysical survey and to characterise the nature and significance of any buried features that are present. If archaeological deposits are identified, further archaeological mitigation may be required in advance of, or during, ground works. All intrusive archaeological work would be undertaken in accordance with a Written Scheme of Investigation agreed in writing with the local authority archaeologist.
- 11.5 If previously unrecorded archaeology is found to be present on the site, then the effects of the impact of the proposals on the significance of such remains is considered minor/moderate adverse in terms of their physical loss and minor/moderate beneficial in terms of providing an opportunity to enhance understanding of the archaeological resource and potentially contribute to the regional and local research agendas (Appendix B, Table B4).
- 11.6 This mitigation would be in accordance with NPPF Paragraph 199 and Middlesbrough Local Development Framework Core Strategy (2008) and it is considered that the proposals are in full compliance with the NPPF and the local development plan policies as these relate to the historic environment.

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APPENDIX A: RELEVANT NPPF POLICIES

National Planning Policy Framework (NPPF) (MHCLG 2019)	
Paragraph 189	In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. 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.
Paragraph 190	Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.
Paragraph 191	Where there is evidence of deliberate neglect of, or damage to, a heritage asset, the deteriorated state of the heritage asset should not be taken into account in any decision.
Paragraph 192	In determining planning applications local authorities should take account of: <ul style="list-style-type: none"> • the desirability of sustaining and enhancing heritage assets and putting them to a viable use consistent with their conservation; • the positive contribution that preservation of heritage assets can make to sustainable communities including their economic vitality; and • the desirability of new development to making a positive contribution to local character and distinctiveness.
Paragraph 193	When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.
Paragraph 194	Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of: <ol style="list-style-type: none"> a) grade II listed buildings, or grade II registered parks or gardens, should be exceptional; b) assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.
Paragraph 195	Where a proposed development will lead to substantial harm to or total loss of significance of a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply: <ul style="list-style-type: none"> • the nature of the heritage asset prevents all reasonable uses of the site; • no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; • conservation by grant funding or some form of charitable or public ownership is demonstrably not possible; and • the harm or loss is outweighed by the benefit of bringing the site back into use.

Paragraph 196	Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use.
Paragraph 197	The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset.
Paragraph 198	Local planning authorities should not permit the loss of the whole or part of a heritage asset without taking all reasonable steps to ensure the new development will proceed after the loss has occurred.
Paragraph 199	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. However, the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted.
Paragraph 200	Local planning authorities should look for opportunities for new development within Conservation Areas and World Heritage Sites, and within the setting of heritage assets, to enhance or better reveal their significance. Proposals that preserve those elements of the setting that make a positive contribution to the asset (or which better reveal its significance) should be treated favourably.
Paragraph 201	Not all elements of a Conservation Area or World Heritage Site will necessarily contribute to its significance. Loss of a building (or other element) which makes a positive contribution to the significance of the Conservation Area or World Heritage Site should be treated either as substantial harm under paragraph 195 or less than substantial harm under paragraph 196, as appropriate, taking into account the relative significance of the element affected and its contribution to the significance of the Conservation Area or World Heritage Site as a whole.
Paragraph 202	Local planning authorities should assess whether the benefits of a proposal for enabling development, which would otherwise conflict with planning policies but which would secure the future conservation of a heritage asset, outweigh the disbenefits of departing from those policies.

NPPF GLOSSARY:

This glossary sets out the definitions for heritage and archaeological issues which should be treated as a material consideration in the planning process. Definitions of relevance to the current application are:

Historic environment:

- All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity whether visible, buried or submerged, as well as landscaped areas and planted or managed flora.

Heritage assets:

- A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing).

Archaeological interest:

- There will be archaeological interest in a heritage asset if it holds, or potentially may hold, evidence of past human activity worthy of expert investigation at some point.

Setting of a heritage asset:

- The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

Significance (for heritage policy):

- The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance.

Historic environment record:

- Information services that seek to provide access to comprehensive and dynamic resources relating to the historic environment of a defined geographic area for public benefit and use.

APPENDIX B: ASSESSMENT CRITERIA

This appendix sets out the criteria used in this assessment for determining:

- The importance value of archaeological remains
- The heritage interest
- The magnitude of impact
- The significance of effects of impact

Importance value

Table B1 provides a guide for establishing the importance value of archaeological remains and is based on criteria set out in the Design Manual for Roads and Bridges (DMRB 2020) (LA 104 Table 3.2N) *Environmental Value (sensitivity and descriptions)* adapted with definitions of archaeological sites.

Table B1: Importance value of archaeological remains

Importance value	Definition
Very high	<ul style="list-style-type: none"> • World Heritage Sites (including nominated sites) • Assets of acknowledged international importance • Assets that can contribute significantly to acknowledged international research objectives
High	<ul style="list-style-type: none"> • Scheduled monuments (including proposed sites) • Non-designated assets of schedulable quality and national importance • Assets that can contribute significantly to acknowledged national research objectives.
Medium	<ul style="list-style-type: none"> • Non-designated assets that contribute to regional research objectives
Low	<ul style="list-style-type: none"> • Non-designated assets of local importance • Assets compromised by poor preservation and/or poor survival of contextual associations • Assets of limited value, but with potential to contribute to local research objectives
Negligible	<ul style="list-style-type: none"> • Assets with very little or no surviving archaeological interest
Unknown	<ul style="list-style-type: none"> • The importance of the resource has not been ascertained

Assessment of heritage significance

Significance is one of the guiding principles running through the historic environment section of the NPPF. The NPPF defines significance as ‘the value of a heritage asset to this and future generations because of its heritage interest’. Historic England Advice Note 12 (p.16) states that interest may be archaeological, historical, architectural and artistic and may derive ‘not only from a heritage asset’s physical presence, but also from its setting’. Table B2 defines these different interests using the criteria set out in Advice Note 12.

Table B2: Definitions of heritage interest

Archaeological Interest	There will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point. Group value, as well as rarity, preservation and date are all considered.
Historic Interest	An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation’s history but can also provide meaning for communities

	derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.
Architectural and Artistic Interest	These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. Architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skills, like sculpture.
Magnitude of impact	'Impact' refers to a predicted change to the baseline environment arising from either the construction or operation of the scheme. Impacts can be adverse or beneficial, reversible or irreversible. Table B3 sets out the criteria adopted for this assessment and is based on the criteria set out in the DMRB 2020) (LA 104 Table 3.4N Magnitude of impact and typical descriptions).

Table B3: Criteria for assessing magnitude of impact

Magnitude of Impact (Change)		Definition
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, feature or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No Change		No loss or alteration of characteristics, features or elements; no observable adverse or beneficial impact.

Significance of effects criteria

The significance of an effect is reported after an assessment of the effectiveness of the design and mitigation measures (the residual effect). It is determined by the interaction of receptor value/sensitivity and impact magnitude. Effects can be beneficial (i.e. enhance the heritage asset) or adverse (i.e. detrimental to the resource). Table B4 sets out the method for assessing the significance of effects using the following criteria definitions:

- **Substantial:** considerable effects (by extent, duration or magnitude) or of more than local significance or breaching identified standards of policy
- **Moderate:** limited effects which may be considered significant
- **Minor:** slight, very short or highly localised effects
- **Neutral/Negligible:** no effects or those that are beneath levels of perception or within normal bounds of variation

Table B4: Significance of effects matrix

VALUE SENSITIVITY	Very High	Neutral	Minor	Moderate/ Substantial	Substantial	Substantial
	High	Neutral	Minor	Moderate/ Minor	Moderate/ Substantial	Substantial
	Medium	Neutral	Negligible	Minor	Moderate	Moderate/ Substantial
	Low	Neutral	Negligible	Negligible	Minor	Minor/ Moderate
	Negligible	Neutral	Neutral	Negligible	Negligible	Minor
		No Change	Negligible	Minor	Moderate	Major
		MAGNITUDE OF IMPACT				

APPENDIX C: TECHNICAL INFORMATION

GRADIOMETER SURVEY

Magnetic surveys measure distortions in the earth's magnetic field caused by small magnetic fields associated with buried features (Gaffney and Gater 2003, 36) that have either remanent or induced magnetic properties (Aspinal *et al.* 2008, 21–26). Human activity and inhabitation often alters the magnetic properties of materials (Aspinal *et al.* 2008, 21) resulting in the ability for numerous archaeological features to be detected through magnetic surveys. Intensive burning or heating can result in materials attaining a thermoremanent magnetisation; examples of which include kilns, ovens, heaths and brick structures (Gaffney and Gater 2003, 37; Aspinal *et al.* 2008, 27). When topsoil rich with iron oxides, fills a man-made depression in the subsoil, it creates an infilled feature, such as a pit or ditch, with a higher magnetic susceptibility compared to the surrounding soil (Gaffney and Gater 2003, 22–26; Aspinal *et al.* 2008, 37–41). Magnetic surveys can also detect features with a lower magnetic susceptibility than the surrounding soil, an example of which is a stone wall.

LIMITATIONS

Poor results can be due to several factors including short lived archaeological occupation/use or sites with minimal cut or built features. Results can also be limited in areas with soils naturally deficient in iron compounds or in areas with soils overlying naturally magnetic geology, which will produce strong responses masking archaeological features.

Overlying layers, such as demolition rubble or layers of made ground, can hide any earlier archaeological features. The presence of above ground structures and underground services containing ferrous material can distort or mask nearby features.

Particularly uneven or steep ground can increase the processing required, or distort results beyond the capabilities of processing. It is also possible in areas containing dramatic topographical changes that natural weathering, such as hillwash, often in combination with intensive modern ploughing, will reduce the topsoil on slopes and towards the peaks of hills and possibly destroy or truncate potential archaeological features. Conversely features at the bottom of slopes may be covered by a greater layer of topsoil and so if buried features are present they appear faint within the results, if at all.

Over processing of data can also obscure or remove features, especially if there are on the same orientation as the direction of data collection. Consequently, where possible, attempts are made to ensure data is not collected on the same orientation as known potential features and that data quality is sufficient to minimise the required data processing.

INSTRUMENTATION

The data was collected using handheld Bartington Grad 601-2 fluxgate gradiometers. The Bartington 601-2 is a single axis, vertical component fluxgate gradiometer comprising a data logger battery cassette and two sensors. The sensors are Grad-01-1000L cylindrical gradiometer sensors mounted on a rigid carrying frame; each sensor contains two fluxgate magnetometers with 1m vertical separation.

The difference in the magnetic field between the two fluxgates in each sensor is measured in nanoTesla (nT). NAA gradiometer data is recorded with a range of ± 100 nT, which equates to a resolution of 0.01nT. It should be noted that the actual resolution is limited to 0.03nT as a consequence of internal instrumental noise (Bartington Instruments Ltd n.d., 23).

The gradiometer records two lines of data on each traverse, the grids are walked in a zig-zag pattern amounting to 15 traverses. The gradiometers are calibrated at the start of every day and recalibrated whenever necessary.

SURVEY DETAILS

Table C1: Survey summary

	Survey
Grid size	30m x 30m
Traverse interval	1m
Reading interval	0.25m
Direction of 1st traverse	N
Number of Grids	94
Area covered	5.4ha

Table C2: Baseline co-ordinates (baseline is shown on Fig. 2)

Grid point (gp) A	Grid point (gp) B
NGR: 450360.7 513675.6	NGR: 450390.3 513675.6

Table C3: Site information and conditions

Item	Detail
Geology	Mudstone of the Mercia Mudstone Group
Superficial deposits	Diamicton of Devensian till
Soils	Dunkeswick
Topography	58 to 64m aOD
Land use	Grassland
Weather/conditions prior to and during survey	Sunny

APPENDIX D:

DATA PROCESSING INFORMATION

Gradiometer survey data is downloaded using the Bartington Grad 601 software and the processing was undertaken using Geoplot 3.0 software.

Table D1: Commonly applied techniques

Process	Effect
Zero mean traverse	Removes stripping which can occur as a consequence of using multi sensor arrays or a zig-zag data collection method by setting the mean reading for each traverse to zero.
Destagger	Removes stagger in the data introduced through inconsistency data collection pace and often exacerbated through the zig-zag methodology.
Clip	Clips data above or below a set value to potentially enhance potential weaker anomalies.
Despike	Removes random spikes or high readings to reduce the appearance of dominant readings, often created by modern ferrous objects that can distort the results.
Low pass filter	Removes low frequency waves or broad anomalies such as those caused by strong or large gradual variations in the soil's magnetic susceptibility often caused by geological or natural changes in the substrata.
Interpolation	Used to smooth or reduce the blocky appearance of data by improving the spatial density and balance the quantity of data points in the X and Y directions.

Table D2: Processing steps

Minimal processing	Increased processing
<ul style="list-style-type: none"> • Zero mean traverse +5/-5 • Destagger: 	<ul style="list-style-type: none"> • Low Pass Filter • Interpolate Y, Expand – Linear, x2

**APPENDIX E:
DATA VISUALISATION INFORMATION**

FIGURES

The data from the surveys were used to produce a series of images to represent the results. The terminology is detailed below:

- Greyscale/Colourscale Plot: this visualised the results as a shaded drawing with highest readings showing as black, running through to lowest shade showing as white.
- XY-trace Plot: this creates a line drawing showing the peaks and troughs of the readings as vertical offset from a centreline.
- Interpreted Plot: through detailed analysis, anomalies have been interpreted and possible features identified. Interpretation drawings are used to show potential features and, in particular, to reinforce and clarify the written interpretation of the data. Anomalies have been characterised using the terminology detailed in the following section, and have been assigned colour coding outlined in keys found on the relevant figures associated with this report.

MAGNETIC ANOMALIES AND TERMINOLOGY

Table E1: Lexicon of terminology

Terminology	Detail
Anomaly	Any outstanding high or low readings forming a particular shape or covering a specific area with the survey results.
Feature	A man-made or naturally created object or material that has been detected through investigation works and has sufficient characteristics or supporting evidence for positive identification.
Magnetic susceptibility	The ability of a buried feature to be magnetically induced when a magnetic field is applied.
Magnetic response	The strength of the changes in magnetic values caused by a buried feature with either a greater or lesser ability to be magnetised compared with the soil around it. Anomalies are considered to either have strong/weak or positive/negative responses. The strength of magnetic response (along with patterning) can be essential in determining the nature of an anomaly, but it should be noted that the size or strength of the magnetic response does not correlate with the size of the buried feature.
Patterning of an anomaly	The shape or form of an individual anomaly.
Thermoremanence	The affect caused when a material has been magnetically altered through a process of heating. Thermoremanent magnetisation occurs when an object or material is heated passed the Curie Point and acquires a permanent magnetisation that is associated with the magnetic field that they cooled within (Gaffney and Gater 2003, 37).

Different anomalies can represent different features created by human, agricultural or modern activity, or natural pedological or geological changes in the substrata.

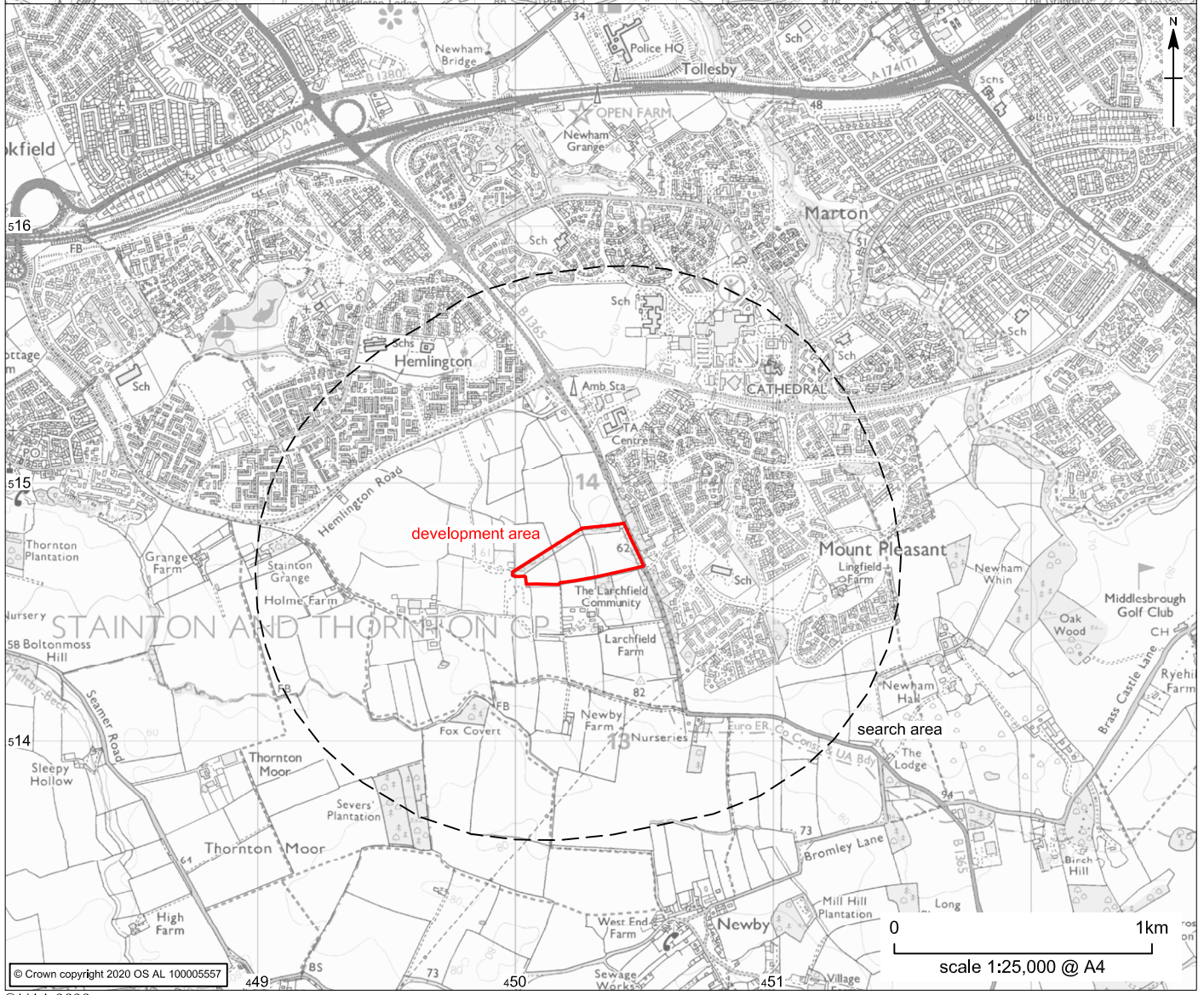
Anomalies interpreted with a 'greater' categorisation are considered more likely to be of the interpreted characterisation; whereas a more tentative interpretation is applied to those with a 'lesser' categorisation as a consequence of weaker increases in magnetic response or the anomalies incomplete patterning or irregular form.

The strength and size of anomalies can vary depending on the magnetic properties of the feature, the magnetic susceptibility of the soil, the depth to which the feature is buried, and the state of preservation.

Table E2: Characterisation of anomalies

Characterisation	Detail
Archaeology	
Linear anomaly (archaeology)	<p>Linear anomalies with a positive or negative magnetic responses, and composed of a patterning or shape that is suggestive of a buried archaeological feature. These are often indicative of structural remains or infilled features such as ditches.</p> <p>The strength of anomaly signal can be suggestive of the properties of the feature. Negative linear anomalies represent upstanding or infilled features that are less magnetically susceptible than background readings, for example structures or ditches composed of a non-igneous stone material. Bipolar linear anomalies considered to be of an archaeological nature are indicative of material with a high magnetic susceptibility, such as a brick wall.</p>
Isolated anomaly	<p>Isolated anomalies, or anomalies with a more amorphous form, possibly represent infilled features or thermomagnetic features such as areas of heating/burning of an archaeological origin.</p> <p>Unless associated with conclusively identified archaeological remains, such as linear anomalies, absolute identification of positive responses can be problematic as it is often not possible to decipher if they are of an archaeological, modern or agricultural origin. Consequently, isolated positive responses are not shown within the interpretation unless composed of a broad form or belonging to a series of isolated positive responses.</p> <p>Bipolar responses considered likely to be of an archaeological are also interpreted as isolated anomaly (archaeology). These are considered to relate to material with a very strong magnetic susceptibility or thermoremanent magnetisation.</p>
Trends	<p>Weak and diffuse anomalies with an uncertain origin are denoted by trends. It is possible that these belong to archaeological features, but given their weak signatures or incomplete patterning it is equally plausible that they relate to agricultural features or natural soil formations.</p>
Agriculture	
Field boundary	<p>Isolated linear anomalies that are likely to be indicative of former land divisions. A more conclusive interpretation is given to linear anomalies that</p>

Characterisation	Detail
	correspond with the location of field boundaries recorded on historic maps, Aerial photos or LiDAR coverage of the site.
Ridge and furrow	Broadly spaced linear anomalies that are likely to be indicative of earlier forms of agriculture, such as ridge and furrow. These often correspond with the location of earthworks visible on the ground or identified on aerial photos or LiDAR survey coverage.
Agriculture?	Weak, irregularly spaced or isolated linear anomalies that possibly relate to agricultural activity. Given the tentative interpretation, the agricultural process they are caused by is also likely to unknown.
Modern	
Bipolar response (modern)	<p>Positive anomalies with associated negative 'halo' (bipolar) denote features with a strong magnetic response are likely to be of a modern origin.</p> <p>Isolated bipolar responses of a modern nature are likely to relate to buried ferrous material or objects, such as metallic agricultural debris. If a trend is noted in the alignment or spacing of isolated bipolar responses, it is possible that they are indicative of ferrous fittings or connectors used on buried non-magnetic buried utilities.</p> <p>Linear bipolar anomalies are likely to be indicative of modern services.</p>
Dipolar response	<p>Dipolar anomalies relate to individual spike within the data and tend to be caused by ferrous objects. These responses have only been shown when located near to archaeological features.</p> <p>When the site is located in a mining landscape it is possible that identified dipolar anomalies relate to mining activity and are indicative of further pits or mine shafts.</p>
Area of increased magnetic response	Areas of increased magnetic response denote areas of disturbance containing a high concentration of dipolar and/or bipolar responses. These are generally considered to be caused by modern debris in the topsoil, although it is possible that the disturbance is in part also caused by isolated archaeological material or geological or pedological changes in the substrata.
External interference	Areas of magnetic disturbance, often along the edges of survey areas are caused by standing metal structures such as fencing and buildings.

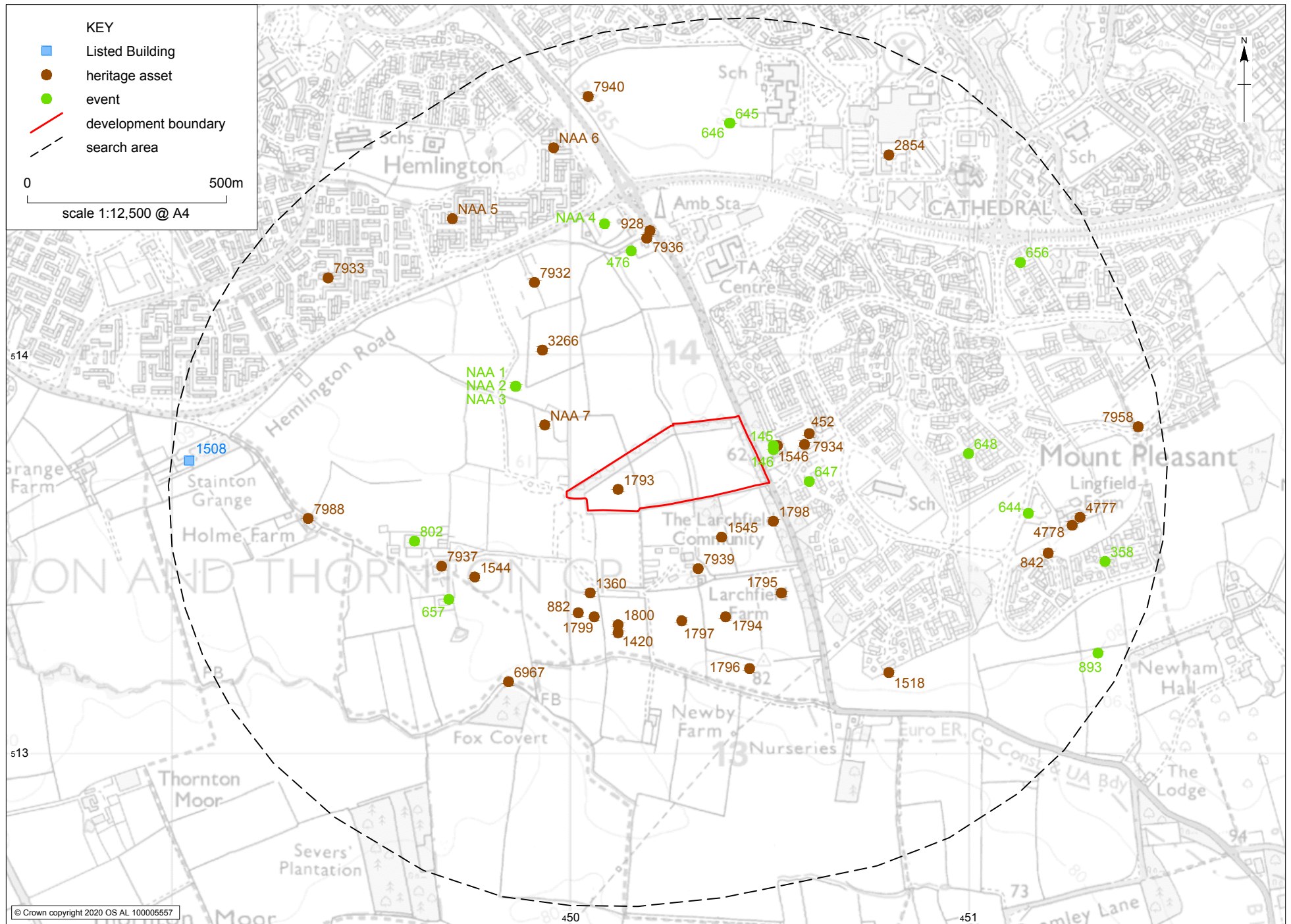


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Hemlington Grange South, Middlesbrough: site location

Figure 1

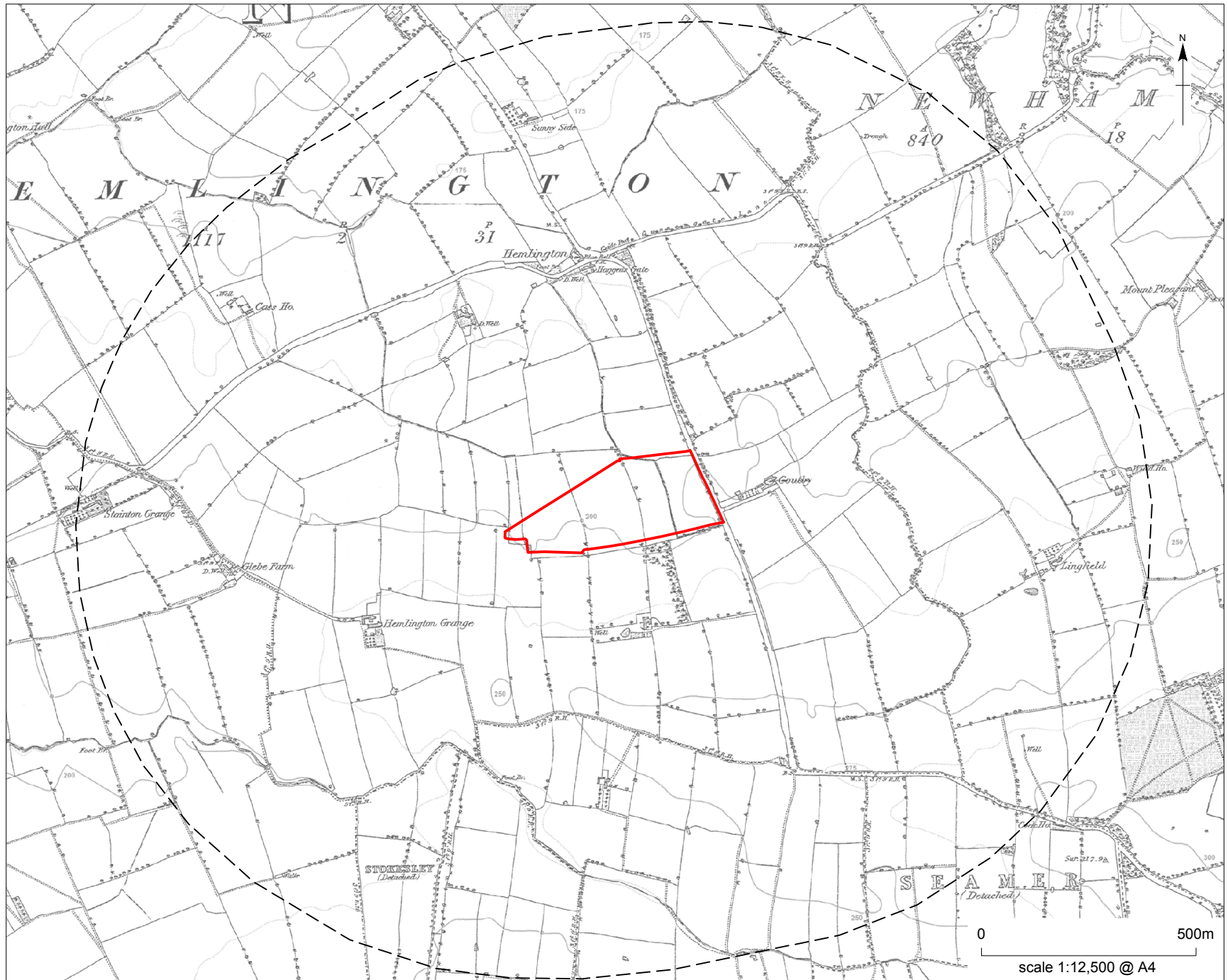


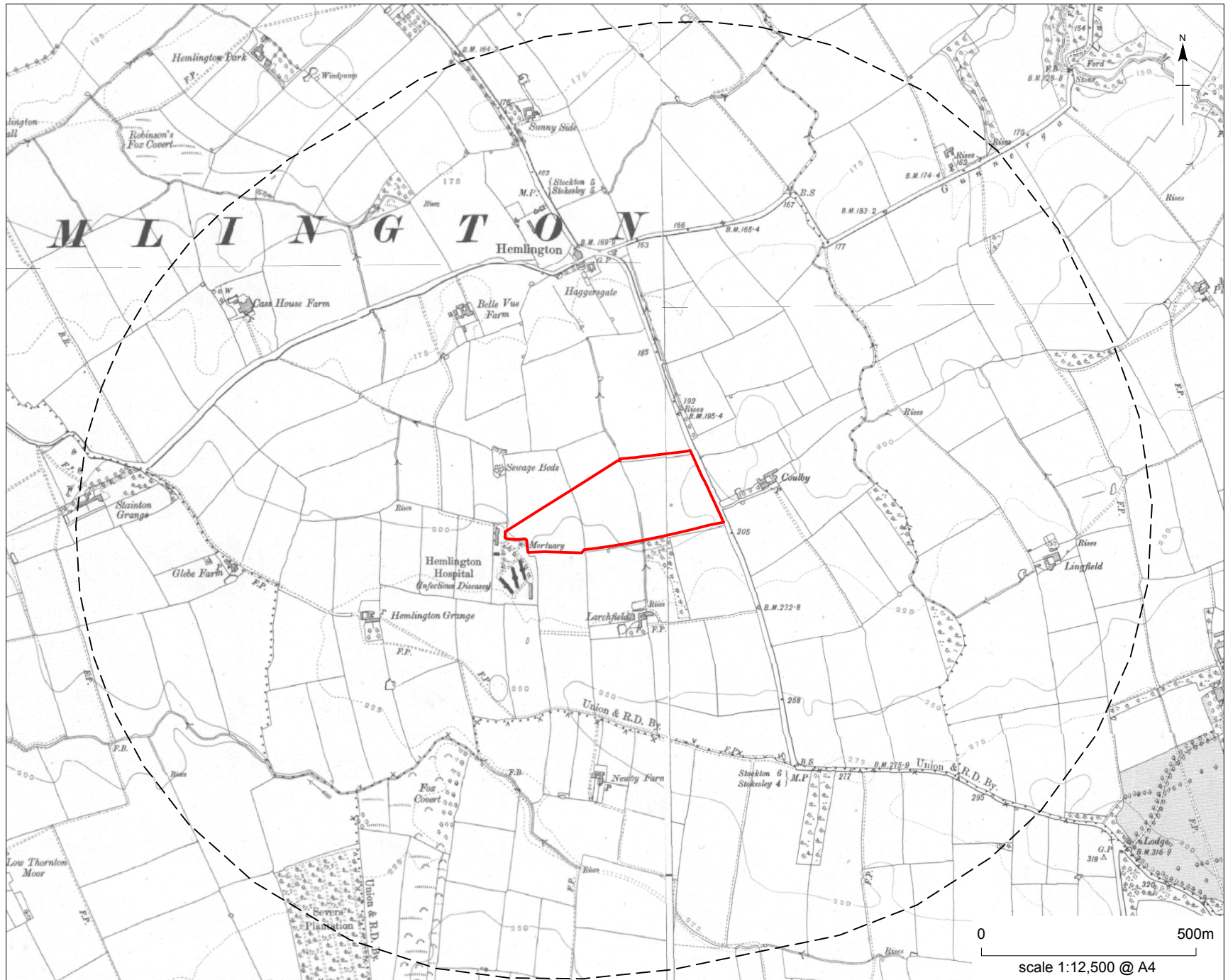
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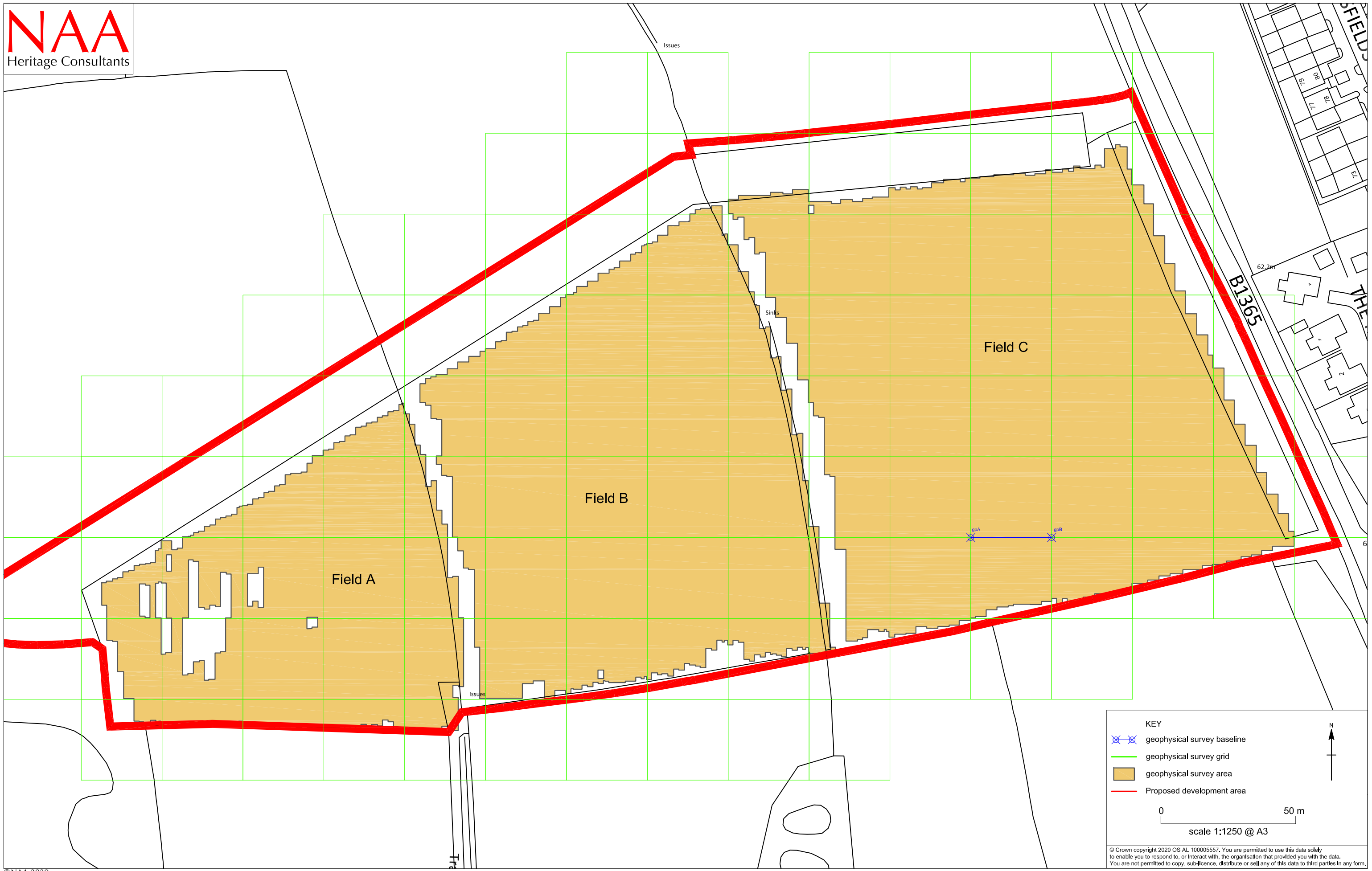
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Hemlington Grange South, Middlesbrough: heritage assets

Figure 2

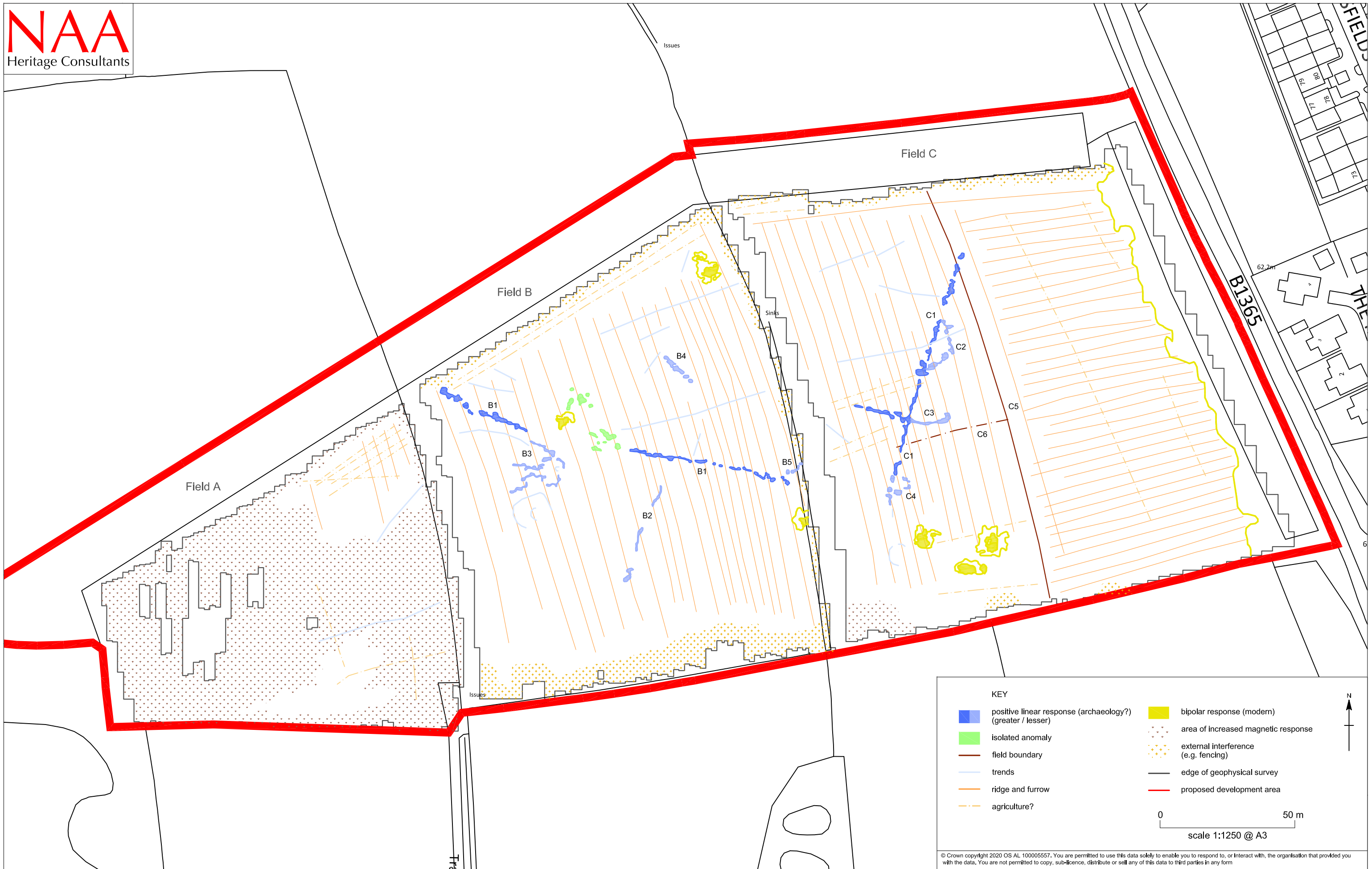












KEY

positive linear response (archaeology?) (greater / lesser)	bipolar response (modern)
isolated anomaly	area of increased magnetic response
field boundary	external interference (e.g. fencing)
trends	edge of geophysical survey
ridge and furrow	proposed development area
agriculture?	

0 50 m
scale 1:1250 @ A3

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*Hemlington Grange South, Middlesbrough: Field A,
looking north-west*

Plate 1



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*Hemlington Grange South, Middlesbrough: Field B,
looking north*

Plate 2



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*Hemlington Grange South, Middlesbrough: Field C,
looking north*

Plate 3