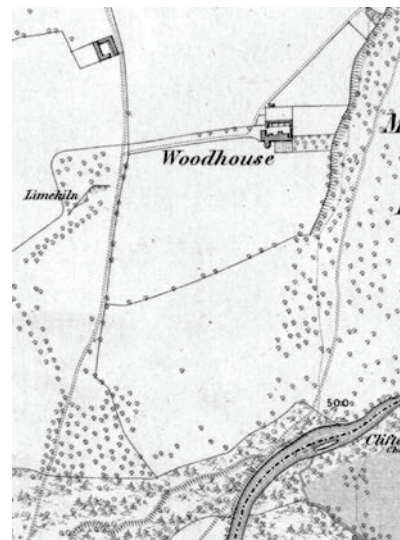


# EXTENSION TO LOWTHER HOLIDAY PARK, LOWTHER, CUMBRIA

## Heritage Impact Assessment



Client: Lowther Estates

NGR 352292 526117

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October 2020



<b>The Site</b>	
Site Name	Extension to Lowther Holiday Park, Lowther
County	Cumbria
NGR	352292 526117

<b>Client</b>	
Client Name	Lowther Holiday Park

<b>Planning</b>	
Pre-planning?	Yes
Planning Application No.	N/A
Condition number	N/A
Local Planning Authority	Eden District Council
Planning Archaeologist	Jeremy Parsons, Historic Environment Officer, Cumbria County Council

<b>Desk-based Assessment</b>	
Relevant Record Office(s)/Archive Centre(s)	Cumbria (Carlisle and Kendal)
Relevant HERs	Cumbria and Lake District National Park

<b>Archiving</b>	
Relevant Record Office(s)/Archive Centre(s)	Kendal
Relevant HER	Cumbria

<b>Staffing</b>	
Desk-based assessment	Dan Elsworth
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Illustrations	Tom Mace
Date site visit carried out	04/03/2020
Date geophysical survey carried out	08/09/2020 – 10/09/2020

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## Summary

As part of pre-planning work associated with the creation of a proposed extension to the existing Lowther Holiday Park, Lowther, Cumbria, Greenlane Archaeology was appointed to carry out a heritage impact assessment. The site is located immediately north of the extensive park associated with Lowther Castle but on the north side of the River Lowther, south of Yanwath and Eamont Bridge and just to the north of the boundary of the Lake District National Park.

The surrounding area is filled with archaeological remains from the prehistoric period onwards, including some substantial monuments of Neolithic and Bronze Age date a short distance to the north, but with a number of settlements of medieval and earlier origin nearby and the important Lowther Castle and church to the south. More significant is a Romano-British settlement and associated earthworks immediately to the west of the proposed development area and a neighbouring barrow, both of which are Scheduled Monuments. The site is also just to the north of the registered park associated with Lowther Castle and the World Heritage Site of the Lake District National Park.

The desk-based assessment revealed a number of designated and non-designated sites of archaeological interest within a study area around the site, including the Listed Yanwath Woodhouse Farm immediately to the north, but also other sites such as industrial remains. A consultation of the available maps shows that the site has been open fields since at least the 18<sup>th</sup> century, with some variation to the field pattern occurring since that time. Aerial photographs have also revealed a range of cropmarks within the main part of the site, some of which perhaps relate to the Scheduled Romano-British settlement to the west.

A site visit was carried out in order to examine the proposed development area, better understand the nature of any disturbance to the archaeological remains, and provide a consideration of the likely impact of the proposals on the setting of both the designated and non-designated heritage assets. A consideration of the information gathered during the site visit and the desk-based assessment found that the visual impact on the adjacent Listed Building and outlying elements of one of the two Scheduled Monuments could be relatively severe due to the proximity to the proposals, although the impact on the World Heritage Site, Registered Park and Garden and the second Scheduled Monument, would be fairly minimal due to the intervening topography and woodland. It was also apparent that the main field comprising the site has been extensively ploughed and improved and so any remains relating to the cropmarks shown here will have already been impacted upon but elements could still survive.

Following the completion of this initial phase of work, an archaeological geophysical survey was also carried out in order to better examine the features already revealed to the east of the Scheduled settlement site in aerial photographs. This found a range of features, some of which clearly corresponded to those already known, while others were previously unknown. The results of this survey were also subsequently incorporated into this report.

It is apparent that the proposed development has the potential to impact on both below-ground archaeological remains and on the setting of both designated and non-designated heritage assets. The conclusions of the report therefore provide recommendations for further mitigation work, including archaeological evaluation in the area of the cropmarks and geophysical anomalies, but that the current design of the proposed holiday camp, which creates substantial 'exclusion zones' between it and the designated heritage assets, reduces the degree of harm to a minor level. In addition, the opportunity to carry out further archaeological investigations in this area would complement that carried out in 1979, and the possibility of improved interpretation of the local heritage assets would also be important factors in mitigating the development proposals.

## Acknowledgements

Greenlane Archaeology would like to thank Lowther Estates for commissioning and supporting the project, and their agent Andrew Murphy at Stansgate Planning for his assistance with the project and information about the site. Further thanks are due to the staff of the Cumbria Archive Centres in Kendal and Carlisle for help with accessing the information they hold, and Jeremy Parsons, Historic

Environment Officer at Cumbria County Council, and Louise Martin, Strategy and Partnership Advisor (Archaeology) at the Lake District National Park, for enabling access to their respective Historic Environment Records. The geophysical survey was carried out by Phase Site Investigations on behalf of Greenlane Archaeology.

# 1. Introduction

## 1.1 Circumstances of the Project

1.1.1 The circumstances of the project are set out in the tables on the inside cover of this report.

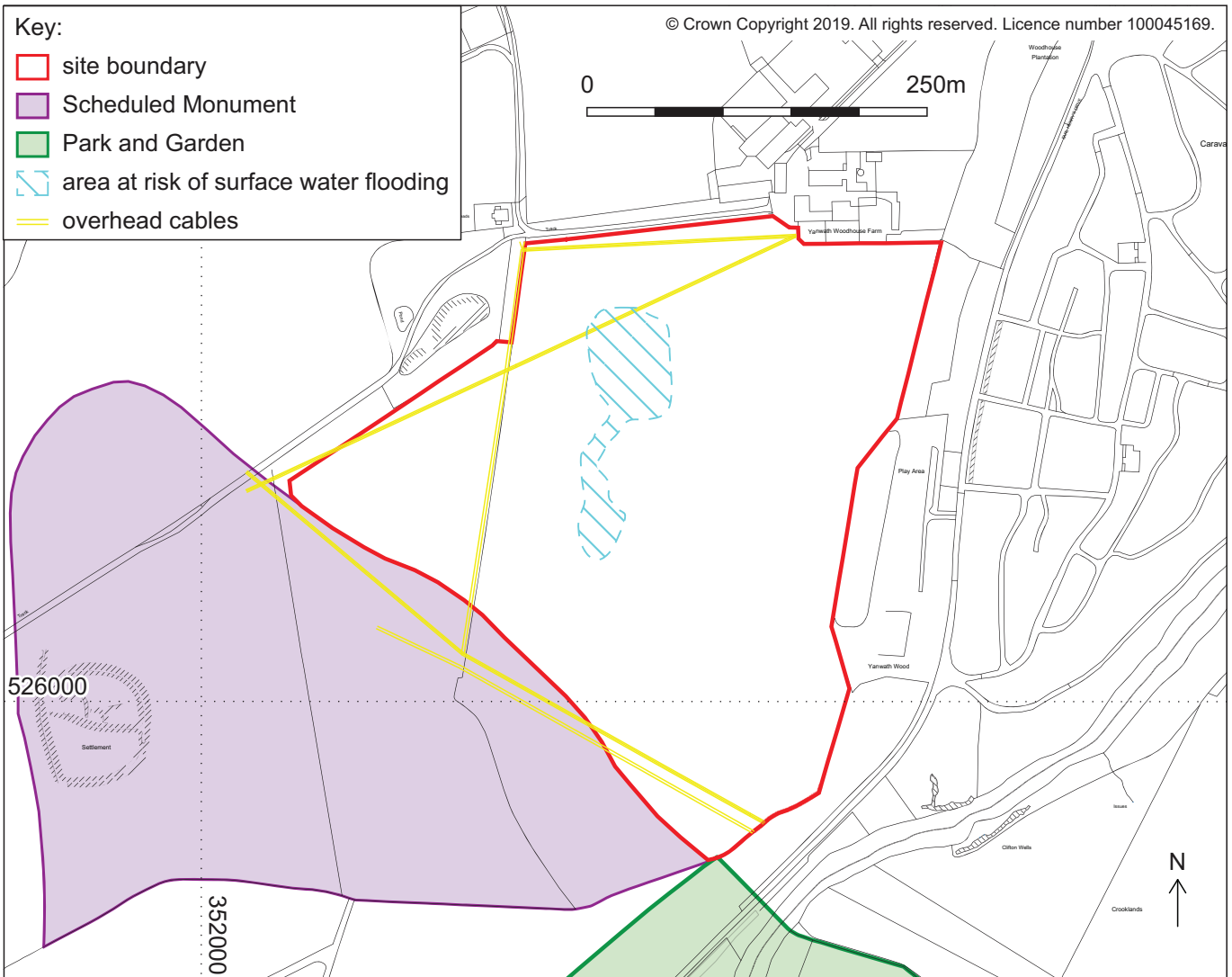
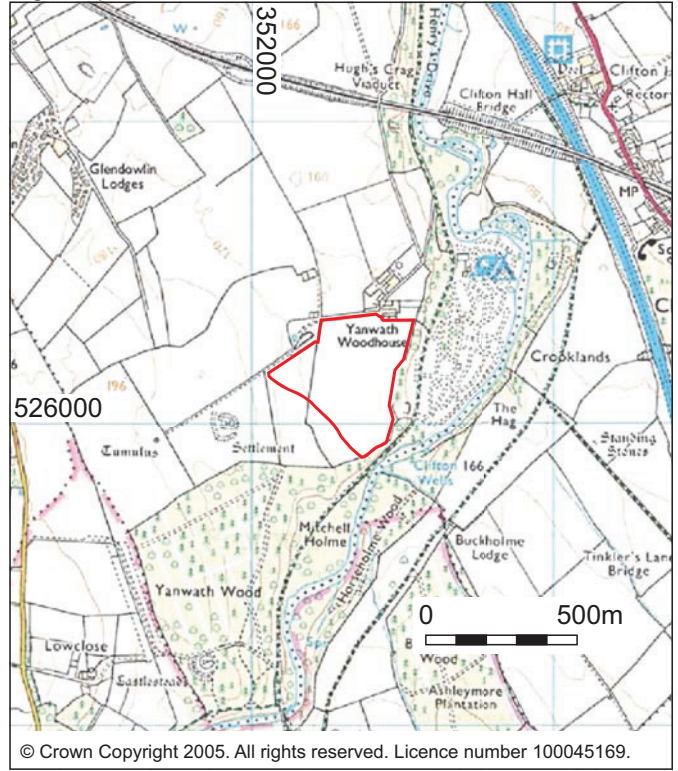
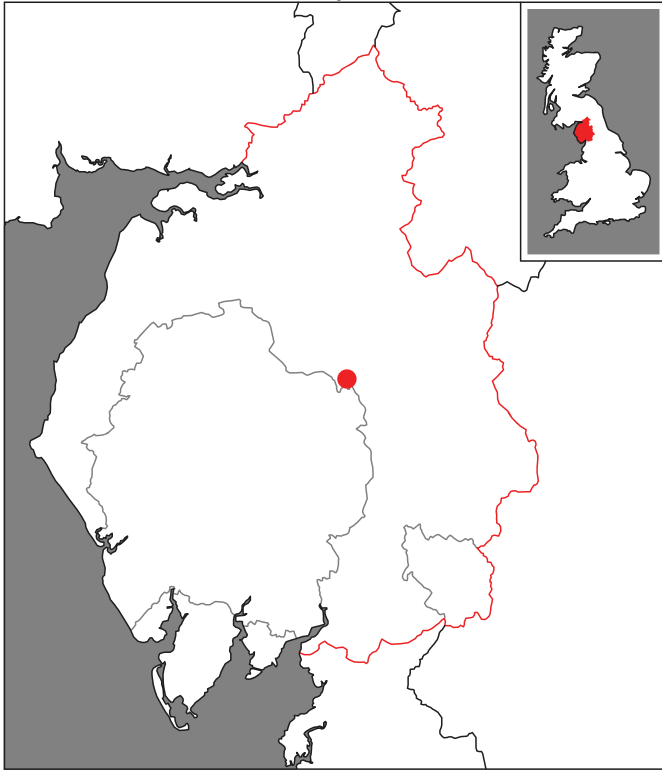
## 1.2 Location, Geology, and Topography

1.2.1 The site comprises c12.5ha of open fields to the west of the Lowther Holiday Park site and is located c4km south of Penrith city centre and c2.8km north-west of Lowther village approximately 160m above sea level (Ordnance Survey 2018; see Figure 1). The site is adjacent to the Registered Park and Garden at Lowther Castle and c200m outside the Lake District National Park World Heritage Site (Figure 2). The River Lowther meanders round the north end of the existing holiday park, c300m to the north, and sweeps round to the east and south side of the site between 40m and 250m from the proposed extension.

1.2.2 The underlying geology of the area comprises Dinantian Carboniferous limestone covered by glacial till (Moseley 1978, plate 1).

1.2.3 The landscape is characterised by large expanses of moorland and rolling upland farmland with limestone outcrops (Countryside Commission 1998, 56).





Client: Lowther Holiday Park

Figure 1: Site location

## 2. Methodology

### 2.1 Relevant Policies

2.1.1 The compilation of this heritage impact assessment and recommendations for any further work arising from the findings, accords with National, Regional and Local Planning Policies which relate to the Historic Environment. National planning policies relevant to heritage asset management are contained within the *National Planning Policy Framework* (Ministry of Housing, Communities & Local Government 2019). This document highlights the essential need for applicants to assess the significance of heritage assets, use appropriate expertise, access historic environment records and recommend strategies for the recording and furthering of understanding of heritage assets as part of any proposal that might result in the loss or impact upon a heritage asset.

2.1.2 **National Planning Policy Framework (NPPF)**: chapter 16 of the NPPF relates to conserving and enhancing the historic environment. Paragraph 189 provides that: *'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'*. In paragraph 190 it goes on to state: *'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 assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal'*.

2.1.3 **Designated Assets**: with regards designated heritage assets, paragraph 193 of the NPPF 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'*. This theme is developed further in 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:*

- 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'*.

2.1.4 **Undesignated assets**: with regards non-designated heritage assets, paragraph 197 states that: *'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'*.

### 2.2 Desk-Based Assessment

2.2.1 A desk-based assessment was carried out in accordance with the guidelines of the Chartered Institute for Archaeologists (CIfA 2014a). This principally comprised an examination of early maps of the site and published secondary sources. A number of sources of information were used during the compilation of the desk-based assessment:

- **HER**: this is the primary source of information recording previously known archaeological discoveries. For each site a grid reference, description, and related sources were obtained for inclusion in the gazetteer (see *Appendix 3*). In addition, details of previous archaeological work carried out within the study area was also obtained from the HER;

- **Record Office/Archive Centre:** the majority of original and secondary sources relating to the site are deposited in the relevant Record Office(s) or Archive Centre(s), as specified in the cover sheet of this report. Of principal importance are early maps of the site. These were examined in order to establish the development of the site, date of any structures present within it, and details of land use, in order to set the site in its historical, archaeological, and regional context. In addition, any details of the site's owners and occupiers were acquired where available;
- **Online Resources:** where available, mapping such as Ordnance Survey maps and tithe maps were consulted online;
- **Greenlane Archaeology:** Greenlane Archaeology's office library includes maps, local histories, and unpublished primary and secondary sources. These were consulted where relevant, in order to provide information about the history and archaeology of the site and the general area.

## 2.3 Site Visit

2.3.1 A brief site visit, equivalent to a Level 1 survey (Historic England 2017), was carried out covering the proposed development area and other areas that might be affected. Particular attention was paid to the identification of features of historical or archaeological interest, but other relevant features were recorded such as later aspects of the site that may have impacted on the earlier remains or could constrain further investigation. Colour digital photographs showing the general arrangement of the site and any features of interest were taken and a selection of these was used to illustrate the report.

## 2.4 Heritage Impact Assessment

2.4.1 The proposed extension to the holiday park was added to the gazetteer site map, and designated and non-designated heritage assets likely to be affected were assessed based on this. The visual impacts on the views to and from designated heritage assets were assessed during the site visit.

## 2.5 Consultation

2.5.1 Pre-application with the Conservation Officer for Eden District Council and Historic England, regarding the designated heritage assets most directly impacted on by the proposed development, was carried out by Andrew Murphy at Stangate Planning. Their responses are reproduced in *Appendix 1*.

## 2.6 Archaeological Geophysical Survey

2.6.1 The report also includes the results of a geophysical survey, carried out following the completion of the initial phases of work listed above, which was intended to identify the extent of below-ground features of archaeological interest already known to be present as well as any that were previously unknown (*Appendix 6*). The methodology used during this is included within the report.

## 2.7 Archive

2.7.1 The archive of the project will be deposited with the relevant Record Office or Archive Centre, as detailed on the cover sheet of this report, together with a copy of the report. The archive has been compiled according to the standards and guidelines of the ClfA guidelines (ClfA 2014b). In addition, details will be submitted to the Online AccesS to the Index of archaeological investigationS (OASIS) scheme. This is an internet-based project intended to improve the flow of information between contractors, local authority heritage managers and the general public. A copy of the report will be provided to the client and a digital copy of the report will be provided for the relevant Historic Environment Record, as detailed on the cover sheet of this report.

### 3. Results

#### 3.1 Introduction

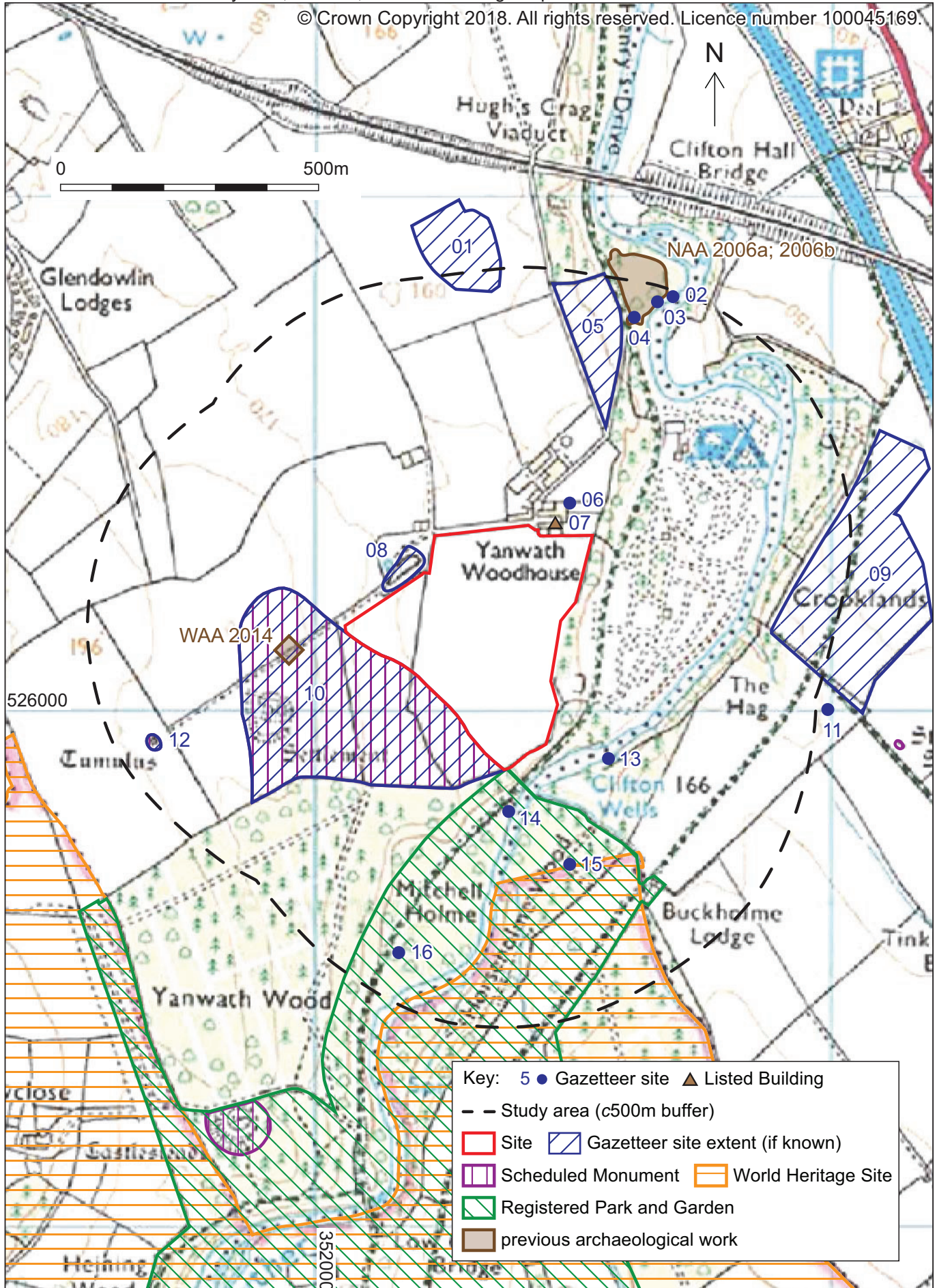
3.1.1 A total of 16 sites of archaeological interest were identified within the study area during the desk-based assessment and site visit (Figure 2; summarised in Table 1 below) ranging from Neolithic/Bronze Age to post-medieval in date. Sites included in the gazetteer that relate to periods of the study area's history are individually mentioned in the site history (see *Section 4* below).

Site No.	Type	Period	Site No.	Type	Period
01	Cropmarks (unclassified)	Uncertain	09	Earthwork (ridge and furrow)	Medieval – post-medieval
02	Quarry	Post-medieval	10	Settlement	Romano-British
03	Structure	Post-medieval	11	Find spot (altar)	Roman
04	Quarry	Post-medieval	12	Bowl barrow	Neolithic/Bronze Age
05	Earthwork (ridge and furrow)	Medieval – post-medieval	13	Clifton Wells	Post-medieval
06	Deserted medieval village	Medieval	14	Earthwork (hollow)	Post-medieval
07	Farmhouse (Listed Building: Grade II)	Post-medieval	15	Earthwork (lynchet)	Uncertain
08	Limekiln and quarry	Post-medieval	16	Cropmark (enclosure)	Uncertain

**Table 1: Summary of the gazetteer sites identified within the study area**

3.1.2 **Designated Heritage Assets:** the 16 gazetteer sites include one Listed Building, Yanwath Farmhouse (Historic England 2020g; **Site 07**). Its location is shown on Figure 2 and its details are shown in *Appendix 4*. It is also identified in Table 1, with the Listing Grade given in brackets. Other designated heritage assets comprise a Registered Park and Garden at Lowther Castle (Historic England 2020c), and two Scheduled Monuments (Historic England 2020d; 2020a; **Site 10** and **Site 12**); and The English Lake District is also a World Heritage Site (Historic England 2020e).

3.1.3 **Non-designated Heritage Assets:** there are 13 non-designated heritage assets within the study area.



Client: Lowther Holiday Park

Figure 2: Gazetteer site plan

## 3.2 Desk-Based Assessment

3.2.1 The results of the heritage assessment have been used to produce two main elements. Firstly, all available maps of the area were compiled into a map regression, demonstrating how the site physically developed (*Section 3.3*). The second purpose of the desk-based assessment is to produce a background history of the site. This is intended to cover all periods, in part to provide information that can be used to assess the potential of the site, but more importantly to present the documented details of any sites that are known (see *Section 4*).

3.2.2 Once this information has been compiled the significance of those sites of archaeological interest within the study area, their potential, and the degree to which they are likely to be affected is considered (*Section 5*) and based on this possible mitigation work is then suggested.

## 3.3 Map and Image Regression

3.3.1 **Introduction:** while there are a number of county-wide plans of the area of reasonable detail from the late 18<sup>th</sup> century none of these provide enough detail to be useful in terms of understanding the site. There is a tithe map for the township of Yanwath and Eamont Bridge (CAC(K) DRC/8/28 1843) but this does not include the site. Therefore, the majority of the useful maps are of late 19<sup>th</sup> century and early 20<sup>th</sup> century date, although there is an earlier estate plan of mid-18<sup>th</sup> century date (CAC(C) D/LONS/L/5/3/2/Low 6 mid-18<sup>th</sup> century). In addition, there are two figures detailing the archaeological earthworks and cropmarks recorded during survey work carried out by Nick Higham (1980; 1983), which are in part based on aerial photographs (see *Section 3.3.6*).

3.3.2 **Lowther Estate Plan, mid-18<sup>th</sup> century:** while there are various plans of the park and wider estate associated with Lowther Castle, the majority do not extend as far as the proposed development site. However, one does (CAC(C) D/LONS/L/5/3/2/Low 6 mid-18<sup>th</sup> century). This clearly depicts the large field making up the majority of the site as comprising two fields at this time, the northern of which is labelled 'Hudson's Croft' while the farm house to the north (**Site 07**) is not named but is shown as a simple linear block. The woodland to the south is clearly shown while the field to the west containing the settlement site and associated earthworks (**Site 10**) is name 'Birks Hill'.



Plate 1: Extract from the mid-18<sup>th</sup> century estate plan

3.3.3 **Ordnance Survey, 1863:** the site occupies parts of three large open fields with what is now a single large field sub-divided as per the earlier map (Plate 2). The farm (**Site 07**) is shown and named 'Woodhouse'. There is a north/south track close to the west side of the field boundary to the west side of the area and a slope down to Mitchelholm Bottom to the east side of the field immediately to the south of Woodhouse.

3.3.4 **Ordnance Survey, 1898:** the south-west/north-east boundary between the two large fields to the east side of the area has changed as have the boundaries to the east of the area (Plate 3). A smaller area is enclosed to the north end of the site and the south end of the east side of the area was previously unenclosed.

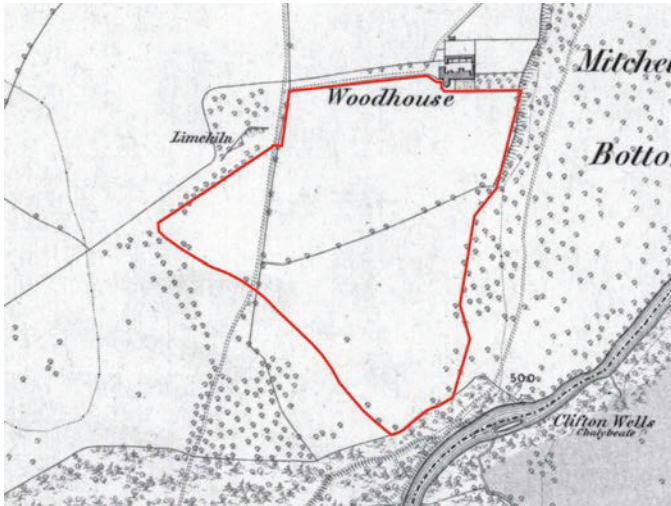


Plate 2 (left): Extract from the Ordnance Survey map of 1863

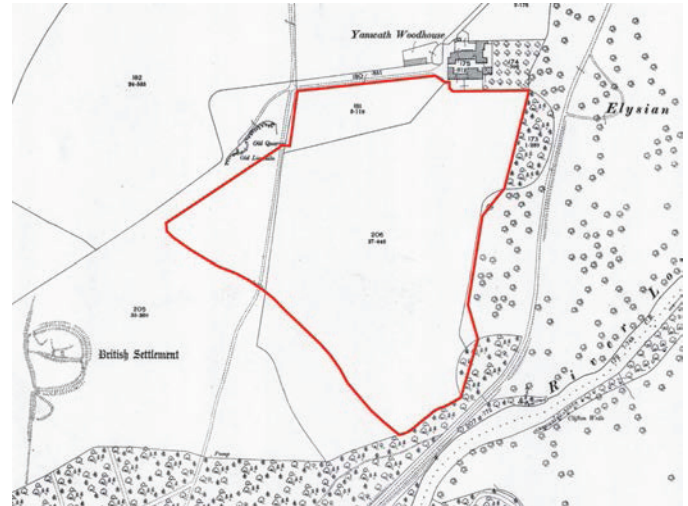


Plate 3 (right): Extract from the Ordnance Survey map of 1898

3.3.5 **Ordnance Survey, 1915:** field boundaries to the east have again changed and a small area is enclosed to the far south of the area (Plate 4). The field boundary to the east side of the area has moved to the west and there is now a north/south track from 'Yanwath Woodhouse' to the east side of it.

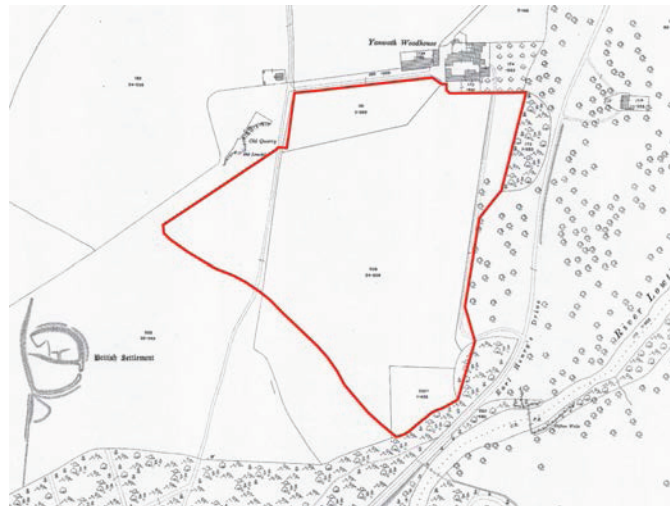


Plate 4: Extract from the Ordnance Survey map of 1915

3.3.6 **Plan of Yanwath Wood settlement and field system, 1980 and 1983:** the settlement site (**Site 10**) immediately to the south-west of the area has been surveyed in detail (see *Appendix 3*), most recently by Nick Higham (1980; 1983). This has resulted in two plans showing both the extant earthworks running eastward from the main settlement and a number of features identified as cropmarks (see *Section 3.3.6* below) (Plate 5 and Plate 6: note these plans have been reoriented so that north is up the page, the original is reproduced in *Appendix 3*). It is evident that in the earlier of these two plans a

range of additional details are shown in an earlier version of the survey (Higham 1980; Plate 5) that are not reproduced later (Higham 1983, figure 5.3; Plate 6). The field system is fairly extensive: the south-west boundary of the site coincides with one of the field boundaries and features relating to the relict field system and post-Roman features extend inside the proposed development site area (Plate 5), although it is apparent that the feature labelled 'post roman' is actually a former field boundary shown on the earliest maps of the site (see Section 3.3.2 and 3.3.3).

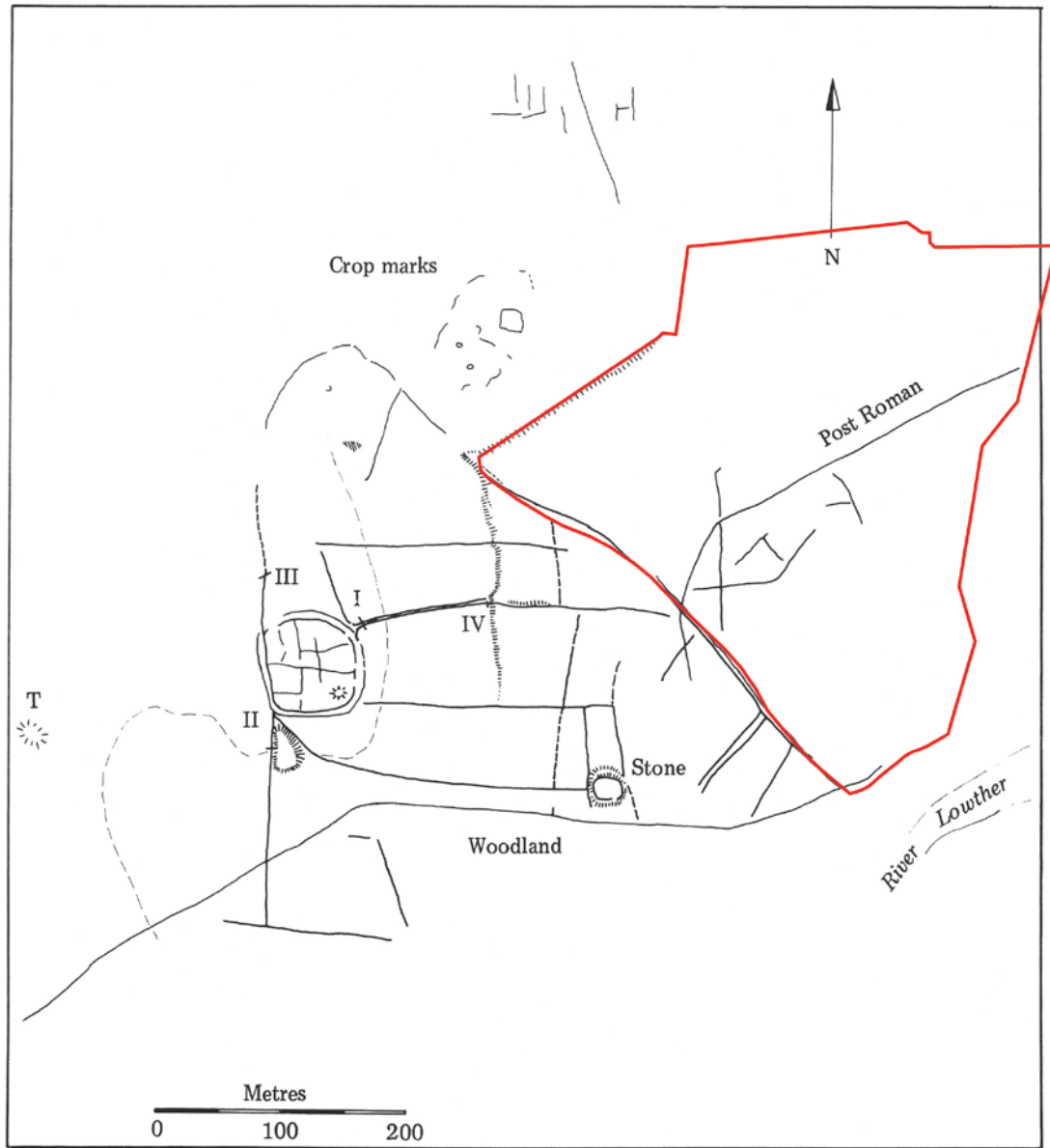


Plate 5: The farmstead and field system at Yanwath Wood (Site 10) (after Higham 1980, figure 5.3), showing the site location



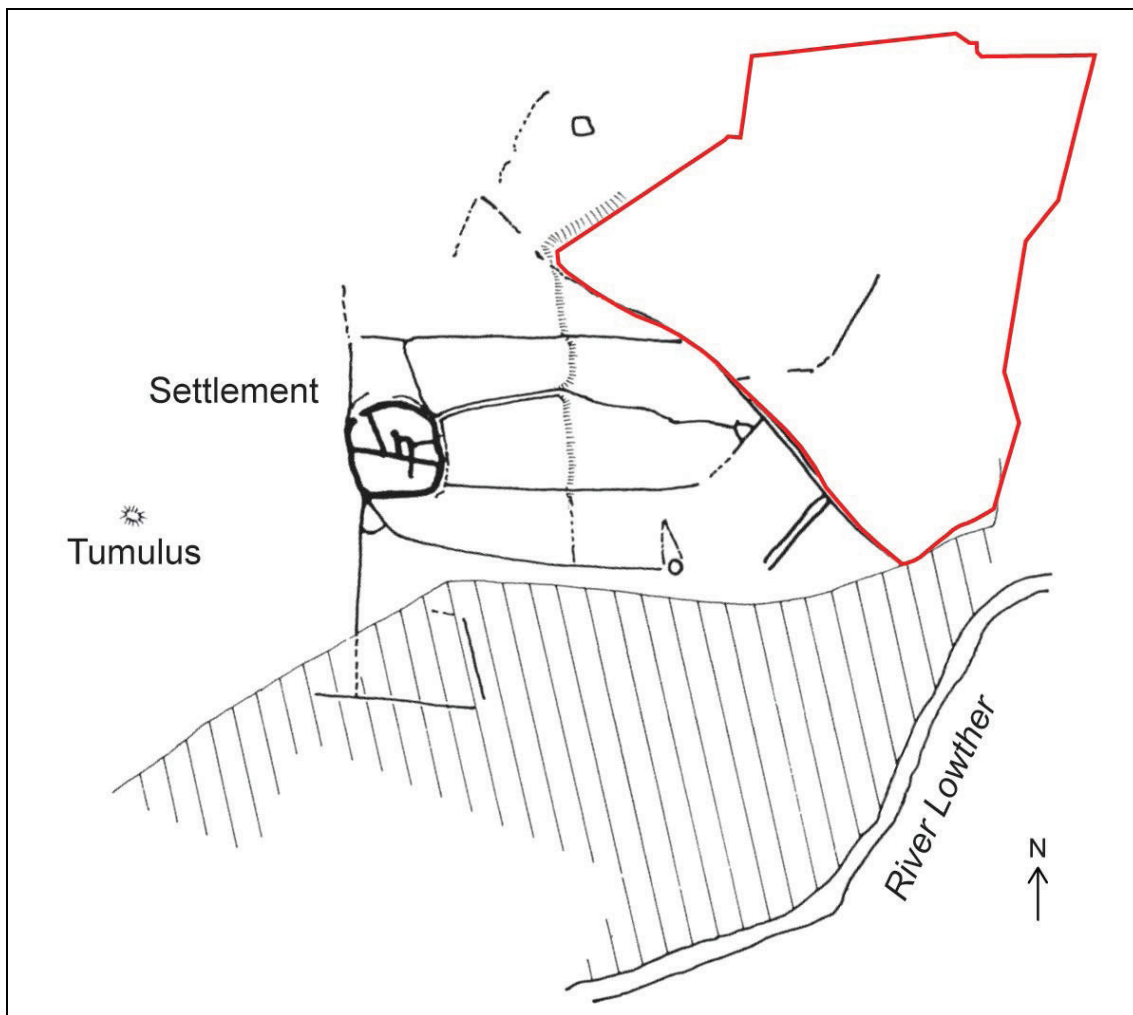
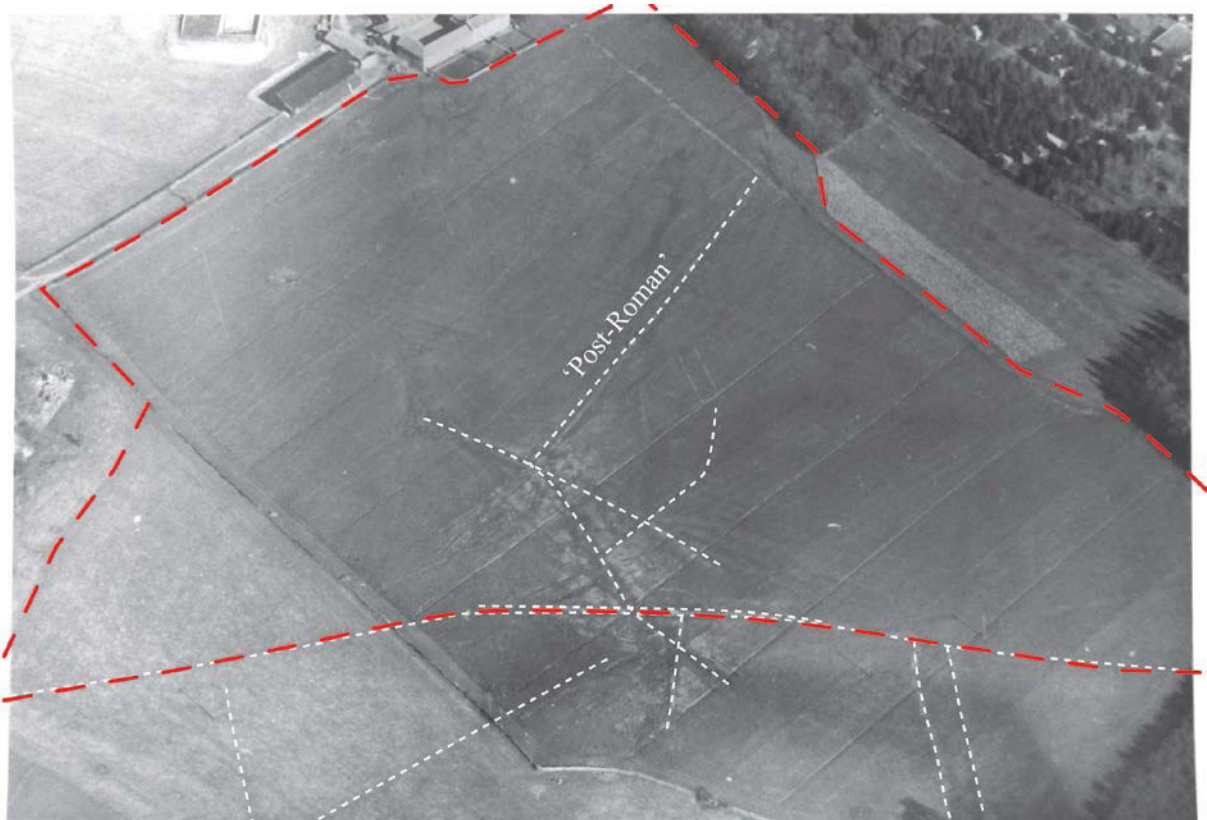


Plate 6: Yanwath Wood settlement and field system (Site 10) (after Higham 1983, fig. 2)

3.3.7 **Aerial photographs:** there are numerous aerial photographs of the local area, the majority focussing on the settlement site and associated field system extending to the east (**Site 10**). However, there are also several showing various cropmarks, probably related to infilled ditches, buried walls and trackways, extending into the proposed development site (Manchester University 1975, **NY5226/A** and **NY5226/C-E**; Plate 7 and Plate 8). These are clearly the source of the features plotted by Nick Higham and depicted in the preceding plates although it is not possible to match them perfectly from the original un-rectified photographs.



**Plate 7: Aerial photograph (Manchester University 1975, NY5226/A)**



**Plate 8: Aerial photograph (Manchester University 1975, NY5226/A), showing the approximate location of the site boundary and features identified by Higham (1983, figure 5.3)**

### 3.4 Site Visit

**3.4.1 Introduction:** the site visit took place in early March 2020 at which time the vegetation was low. The main part of the area had evidently been ploughed some time prior to the site visit and had a fresh growth of grass, but due to the heavy rainfall in the preceding weeks the ground was very wet and muddy (Plate 9). The western corner of the site runs up slope towards a low summit and so was drier and had not been ploughed. At least some of the earthworks recorded in earlier surveys (Higham 1980; 1983) were visible in this area and extending to the west and south, outside of the area of the proposed park extension, but they were not all apparent (Plate 10). At the same time other, more recent, elements of the topography that were not recorded in the previous survey were observed, such as a trackway running north-east/south-west (which is depicted on the early Ordnance Survey maps), a substantial hedge-bank running across the line of the earthworks (Plate 10), and a very thick ruined wall now replaced by a post and wire fence (Plate 11). There are a pair of high-voltage overhead wires running north-west/south-east across the main field and another running north-east/south-west across both fields (Plate 12).



**Plate 9 (left):** General view of the main field, from the south-east

**Plate 10 (right):** General view of the western field and earthworks extending up the hill, from the north-east



**Plate 11 (left):** The ruined wall at the boundary between the two fields, viewed from the north

**Plate 12 (right):** High voltage overhead cables, viewed from the south-east

**3.4.2 Main area:** the main area comprises a single large irregular field bounded by a mixture of hedges and post and wire fences, although with a drystone wall forming the south-west corner. On the north-east side it is directly overlooked by the Grade II Listed Yanwath Woodhouse Farm (**Site 07**). The field is

currently only really visible from an access track to the farm running approximately north-east/south-west along the northern boundary of the site, which has a walled and fenced garden running directly to the boundary with a gate leading into the field (Plate 13 and Plate 14). It is otherwise only publicly visible from the existing holiday park to the east.



**Plate 13 (left): The view from the main field towards Yanwath Woodhouse Farm (Site 07), from the south**

**Plate 14 (right): The view from Yanwath Woodhouse Farm (Site 07) into the site, from the north**

3.4.3 *Western area*: the western corner of the site forms a small part of another irregular field between the main area to the east and a field to the west at the top of the slope and is bounded primarily by hedges and post and wire fences, with a prominent hedge bank forming the western boundary (Plate 15), although the southern boundary is formed by a tall drystone wall containing at least 11 smoot holes (holes used for catching rabbits (Winchester 2016, 71); Plate 16). This field and that to the west contain the settlement and associated earthworks running down the slope, which form part of the Scheduled Monument (**Site 08**). The second Scheduled Monument (**Site 10**) is located approximately 200m to the west. The earthworks forming part of **Site 08** are visible from the proposed development area and the Scheduled Monument boundary is also very close to it. Whilst the actual settlement site is entirely hidden from view from the site by the hedge bank and the slope (Plate 17), it is possible to see part of the main field from it (Plate 18). The second Scheduled Monument (**Site 10**) is not visible at all from the proposed development site – it is in yet another field further to the west (Plate 19), and nor is there any visibility to the site from it.



**Plate 15 (left): Hedge bank forming the western boundary of the western field**

**Plate 16 (right): Example of a smoot hole in the southern boundary of the western field**



**Plate 17 (left):** The view from the site towards the settlement forming part of Site 10, from the north-east

**Plate 18 (right):** The view from the settlement forming part of Site 10 towards the site, from the west



**Plate 19:** Site 12, viewed from the east

### 3.5 Archaeological Geophysical Survey

3.5.1 The geophysical survey revealed a large number of anomalies of potential or likely archaeological interest; the full report is presented in *Appendix 6* and the following is a summary. Of particular interest are a range of long linear features, labelled A, I, J, and O, which seem to continue the lines of the field system associated with the settlement to the west. In addition, shorted linear features, labelled T and possibly also L, appear to correspond with features previously identified in aerial photographs (see *Sections 3.3.6-3.3.7* above). However, a long linear feature crossing the whole of the main field identified in the aerial photographs was not picked up in the geophysical survey, although it is apparent from the map evidence that this is a field boundary that was present until the late 19<sup>th</sup> century (see *Sections 3.3.2-3.3.3* above). Potentially more significant in the geophysical survey results is a large

collection of irregular features, labelled D-H, which include at least two very obvious circular structures. These features are likely to represent either another area of settlement, with the circular structures representing huts, or perhaps burial monuments. Other features of potential interest include a large anomaly, labelled U, that is perhaps a hollow way or palaeochannel, as well as a range of more amorphous features across several other parts of the survey area.

## 4. Site History

### 4.1 Background History

4.1.1 The background history to the site helps our understanding of the development and use of the site, where known, making use of the map evidence presented above (see *Section 3*) where relevant. The background to the site is intended to place the results of the project in its local context and in order to do so a brief discussion of the earlier history of its wider environs is also necessary.

### 4.2 Prehistoric Period (c11,000 BC – 1<sup>st</sup> century AD)

4.2.1 While there is some limited evidence for activity in the county in the period immediately following the last Ice Age, this is typically found in the southernmost part on the north side of Morecambe Bay. Excavations of a small number of cave sites have found the remains of animal species common at the time but now extinct in this country and artefacts of Late Upper Palaeolithic type (Young 2002). Again, the county was also clearly inhabited during the following period, the Mesolithic (c8,000 – 4,000 BC), as large numbers of artefacts of this date have been discovered during field-walking and eroding from sand dunes along the coast, but these are typically concentrated in the west coast area and on the uplands around the Eden Valley (Cherry and Cherry 2002). These discoveries demonstrate that further remains of similar date are likely to exist in the local area, and conform to the notion that river valleys, lakesides, and coastal areas are a common place for such remains to be discovered (Middleton *et al* 1995, 202; Hodgkinson *et al* 2000, 151-152).

4.2.2 In the following period, the Neolithic (c4,000 – 2,500 BC), large scale monuments such as burial mounds and stone circles begin to appear in the region and one of the most recognisable tool types of this period, the polished stone axe, is found in large numbers across the county, having been manufactured at Langdale to the south-west of the site (Hodgson and Brennand 2006, 45). Neolithic remains in the wider area include Moor Divock stone avenue, which is located on Askham Fell c4km to the south-west and associated with a range of other prehistoric monuments, and the Shap Avenue c9km to the south-east (OA North 2005, 10-11), but closer to the site are the spectacular remains of King Arthur's Round Table and Mayburgh Henge a little over 3km to the north (Barrowclough 2010, 119-125). A 274m long mound which is thought to date from this period was also recorded at Lowther (Higham 1986, 67). During the Bronze Age (c2,500 – 600 BC), monuments, particularly those thought to be ceremonial in nature, become more common still, and it is likely that many settlement sites thought to have been extant in the Iron Age or even Romano-British period have their origins in the Bronze Age. A comparatively dense scatter of enclosed settlement sites normally assigned to the later prehistoric period has been identified close to the junction of the River Lowther with Eamont, including the occupation site and *tumulus* of Yanwath Wood (Historic England 2020a; **Site 12**) and the settlement site at Castlesteads (Historic England 2020b; Scheduled Monument 1008236), which forms part of a wider group of settlements making use of the various resources of the river and woodland in addition to the available agricultural and grazing land within the Lowther valley (Higham 1983, 49-50). The Castlesteads monument, located on a slight knoll 370m outside the area to the south-west in Yanwath Wood, includes a multivallate prehistoric defended enclosure (Historic England 2020b). It is roughly 53m in diameter and partially defended by three ramparts and two ditches. The enclosure itself is divided into two by an east/west cross wall and there are faint traces of other walls and shallow circular depressions thought to have been hut circles in the northern half.

4.2.3 Stray finds of Bronze Age date are found throughout the county and activity from this period is suggested by a burnt mound and a pair of round cairns to the south of Lowther Castle and a pair of standing stones and round cairn at Crooklands (OA North 2005, 11). The two standing stones and adjacent round cairn are located 170m outside the area to the east on flat land south of Crooklands (Historic England 2020f; Scheduled Monument 1012826). The cairn was built from small stones laid in circles around a central area of larger stones with a kerb of unshaped boulders and the central area contained a large amount of burnt human bone (Fairclough 1979). Sites that can be specifically dated to the Iron Age (c600 BC – 1<sup>st</sup> century AD) in the region are very rare (Hodgson and Brennand 2006, 51); there are large enclosures around the county that might represent hillforts, a typical site of this period,

but none have been dated in any detail and most are small and unspectacular (see Higham 1986, 130-131). Closer to the site is the settlement site and associated earthworks (**Site 10**), which was likely to have been occupied in the Iron Age but may have earlier origins and continued in use into the Roman period and perhaps beyond, although such sites tend to only produce finds of Roman date (Higham 1983). A second such settlement is also located nearby at Castlesteads while another is potentially recorded in an aerial photograph (**Site 16**), although this is not well described. At Levens, in the south of the county, the only burials radiocarbon dated to the Iron Age in Cumbria were discovered (OA North 2004), but these remain a rarity both regionally and nationally. As noted, however, there was probably a considerable overlap between the end of the Iron Age and the beginning of the Romano-British period; it is evident that in this part of the country, initially at least, the Roman invasion had a minimal impact on the native population in rural areas (Philpott 2006, 73-74).

### 4.3 Romano-British to Early Medieval Period (1<sup>st</sup> century AD – 11<sup>th</sup> century AD)

4.3.1 The Roman military presence in the North West is apparent from the existence of forts, which in many cases led to the formation of nearby towns or *vici* and the supply network of roads and coastal trade, as well as the incidence of Roman artefacts such as coins (Philpott 2006, 71). The Lune and Eden valley provided a route of access to Carlisle for the Roman advance (*ibid*, 63) and the route northwards is still apparent along the modern A6 between Carlisle and Penrith (Shotter 2004, 31). A large proportion of the identified Romano-British settlement sites in Cumbria are located to the south and east of Penrith (Philpott 2006, 75) and it is likely that many of the rural settlements in the Eamont and Lowther river valleys that appear to have prehistoric origins continued to be used into and throughout the Roman period. The Romano-British settlement and field system north of Yanwath Wood (**Site 10**) saw limited excavation in the 1970s and sherds of Samian pottery were found (Historic England 2020d; Higham 1980; 1983). A Roman altar was also found in 1848 at Clifton (**Site 11**), during the construction of the Lancaster-Carlisle Railway, although its present whereabouts and exact findspot are unknown. The nearest substantial Roman site is the fort at Brougham, where the main north/south road from Carlisle intersected with the road along the Eden Valley, approximately 6km to the north-east of Lowther. The evidence here suggests an early *Flavian* occupation (69 to 96 AD), but burials at the notable formal Roman cemetery there date mainly to the second and third centuries AD (Shotter 2004, 62; see also Philpott 2006, 79, 80-81). A Roman coin (an *as*) of Vespasian, the founder of the Flavian dynasty, dated 71 AD, was found at Askham, although the exact find-spot is unknown (Shotter 1992, 278).

4.3.2 Following the cessation of Roman administration in the early fifth century the region fragmented into smaller kingdoms but by the mid-seventh century the area was securely under Northumbrian rule (Kirkby 1962, 80-81). Firmly dated archaeological evidence for the immediate post-Roman period in the county is sparse due in part to poor site visibility, which often consists of exiguous traces of rural settlements which have been heavily truncated (see discussion in Philpott 2006, 59). Furthermore, there is inevitably a great deal of uncertainty with dating settlement sites on stylistic grounds alone given the persistence of traditional styles from the Roman to the early medieval period. However, a rectangular building with earth-fast timber posts excavated at Shap, 5km to the south of Askham, has tentatively been attributed to the seventh to eighth century on the basis of loom weight fragments found nearby (Heawood and Howard-Davis 2002, 157-8). In the wider context of possible Anglo-Saxon settlement at Fremington and Brougham (although again the evidence for this classification is slight), a settled rural hinterland around the foci at Dacre and Penrith is suggested for the early medieval period (*ibid*, 168).

4.3.3 The arrival of Norse settlers between perhaps the late ninth and early 10<sup>th</sup> century had a considerable effect on the area, in particular on the local place-names (Edwards 1998, 7-8). The name Lowther, for example, originates with the river and comes from the Norse meaning lather or foam (Smith 1967a, 9) and the names of nearby settlements such as Askham and Hackthorpe also indicate that they are Norse in origin (Smith 1967b, 182 and 200). In terms of archaeological evidence several complete and fragmentary 'Viking Age' (late ninth and early 10<sup>th</sup> century) silver brooches have been found in the Penrith area, most notably on Flusco Pike, three miles to the west of Penrith (Edwards 1998, 33-36; Richardson 1996). Furthermore, a furnished Viking burial is known at Hesketh-in-the-Forest, north of Penrith (Edwards 1998, 10-12). Closer to the site a group of sculptured stones comprising fragments of cross-shaft and several hogback tombstones dating from the 8<sup>th</sup> to 10<sup>th</sup> centuries have been discovered



in the churchyard at Lowther (Bailey and Cramp 1988, 127-133). These indicate that this site was extremely significant in the early medieval period, and it has been suggested that there may have been an early monastery at the site of the church (Clarkson 2014, 105). In addition, it has been suggested that it is Lowther that is referred to in the account of the pilgrimage of St Cathroe in the mid-10<sup>th</sup> century, who is said to have been met at the border between British Strathclyde and Norse-controlled lands at a place known as *Loida* (*ibid*).

#### 4.4 Medieval Period (11<sup>th</sup> century AD – 16<sup>th</sup> century AD)

4.4.1 While the presence of early medieval sculpture at the church at Lowther has been taken to suggest that there was an early monastic site, it is likely that the original village at Lowther has similar origins, but there is relatively little documentary evidence for it. Lowther is first recorded only in the late 12<sup>th</sup> century (Smith 1967b, 182), and the Lowther family, which took its name from the site, is recorded from a similar date (Whellan 1860, 795-796), so it is likely that a settlement of some form existed at this time and there may have been continuation from earlier periods. The earliest castle at Lowther was probably of 12<sup>th</sup> century date. The present Lowther Castle has its origins in the late 14<sup>th</sup> century, when the east tower was constructed (Perriam and Robinson 1998, 290). The west tower was added in the 16<sup>th</sup> century but during the 17<sup>th</sup> and later centuries the whole site underwent several phases of alteration (*ibid*). A park was created by Sir Hugh Lowther in 1283 (Port 1981, 123) and 200 acres were also emparked in 1337 (Owen 1990).

4.4.2 The site actually falls within the township of Yanwath and Eamont Bridge, part of the parish of Barton. All of the settlements within this area have at least medieval origins, although their names typically indicate earlier beginnings (Smith 1967, 204-210).

#### 4.5 Post-Medieval Period (16<sup>th</sup> century AD – present)

4.5.1 The site is situated at the north end of the Lowther estate, the most prominent landscape feature of the post-medieval period, and although evidently not part of the core area of the park it was closely associated with it. Towards the end of the 16<sup>th</sup> and early 17<sup>th</sup> century, and benefitting from the peaceful conditions near the border at this time, the house was enlarged and beautified. The outer court was created between 1640 and 1664 when Sir John Lowther (d. 1675) (first baronet of Lowther, 1639) built the coach house and stables at a cost of £80 (Port 1981, 123-124). Sir John Lowther, the second baronet, succeeded his grandfather in 1675 and was created Viscount Lonsdale in 1696 (Port 1981, 124). At first he set about improving the old house but began demolishing and rebuilding much of it on a palatial scale, befitting of the leading resident landed dynasty in Cumberland and Westmorland (The Landscape Agency 2002, 10), with the architect William Talman, the work being undertaken by contract c1690s (Port 1981, 124-125). He found the location of the old house disagreeable, however, '*in the Middle of the Village*', so he displaced the old village, shifted the high road, and levelled the landscape such that '*when executed the Place would be as pleasant as so Northern a climate was capable off [sic]*' (Port 1981, 124). The Hall and inner west or chapel wing was gutted by fire in 1718 and although further rebuilding was planned by the third viscount (d. 1751) with designs from Gibbs and Campbell, it was never undertaken (Port 1981, 127).

4.5.2 The estates were inherited by his cousin, Sir James Lowther (d. 1802), who would later become the first Earl of Lonsdale (The Landscape Agency 2002, 10). Further grandiose schemes for reviving Lowther Castle were planned during the 1760s and 70s but never implemented, including designs from Brettingham, Capability Brown, and Robert and James Adam (Port 1981, 127). Sir James was succeeded by his distant cousin William (d. 1844), the founder of the modern Lowther family, who was recreated Earl of Lonsdale (of the second creation) in 1807 (The Landscape Agency 2002, 11). Further additions and improvements were made to the house c1800s under the supervision of Francis Webster, a mason of Kendal who developed into an architect, and further paper schemes were drawn up by Harrison of Chester, the foremost neo-classical architect in Northern England at the time (Port 1981, 127-8). Ultimately Sir William Lowther commissioned Robert Smirke, the protégé of George Dance (1741-1825), surveyor to the City of London, to design him a Gothic house and he was directed to start work on the new Lowther Castle in April 1806 (Port 1981, 128-9), the ruins of which form the main

section of the current Castle. Work started on the new stables in June, being executed by Webster in partnership with one B. Proctor – some of the plasterwork was done by Simpson of Kendal with the greater part completed by the ornamental plasterer, Bernasconi of London, and similarly some of the painting was undertaken by Colvin of Penrith, with the majority performed by Cornelius Dixon of London (Port 1981, 129). With reportedly little of the work left unfinished, Smirke submitted his account in June 1814 for a total expenditure of £77,000 since 1806 (Port 1981, 131).

4.5.3 The estates were inherited by Hugh Lowther (d. 1944), the fifth Earl, known to posterity as ‘the Yellow Earl’, in 1882 (The Landscape Agency 2002, 11). However, his free-spending largely wrecked the estate and, struggling financially, the fifth Earl closed the castle in 1935, the remaining contents being sold off by his successor at auction in 1947 in the largest English country house sale of the 20<sup>th</sup> century, which lasted 22 days (The Landscape Agency 2002, 11; Port 1981, 131). The estate was occupied by a department of the army and used for night-time tank training during the Second World War and the Castle was largely dismantled by the seventh Earl in 1957 (The Landscape Agency 2002, 11, 18) at which time the roofs were removed, *‘the house gutted, and its bare walls left a magnificent ruin’* (Port 1981, 131). It has remained an unoccupied ruin ever since, but recently the castle and gardens have been subject to a substantial programme of restoration, including consolidation of the castle ruins, and have reopened as a visitor attraction.

4.5.4 There are a number of sites of post-medieval date within the study area. Yanwath Woodhouse Farm to the north of the area (**Site 07**) is an early 18<sup>th</sup> century farmhouse with late 18<sup>th</sup> or early 19<sup>th</sup> century alterations (RCHME 1936, 252, plate 31). The quarry and limekiln (**Site 08**), c300m to the west-south-west of Yanwath Woodhouse, are also post-medieval, as are the quarries (**Site 02** and **Site 04**) and structure (**Site 03**) to the north of the area. The artificially cut hollow at **Site 14** is thought to be relatively modern and could be the remains of a disused pool (LUAU 1997), while Clifton Wells (**Site 13**) was certainly in use in the post-medieval period but could have earlier origins.

## 4.6 Previous Archaeological Work

4.6.1 The following section summarises archaeological investigative work undertaken within the study area:

- **LUAU 1997**: a level 1 survey of Lowther Park was carried out between 8<sup>th</sup> July and 6<sup>th</sup> December 1996 (LUAU 1997). The survey identified 127 monuments ranging in date from the prehistoric period to the 19<sup>th</sup> century. There was a large concentration of medieval and post medieval monuments, especially relating to farming;
- **NAA 2006**: a desk-based assessment and survey were carried out on a previous area into which the holiday park was expanded (NAA 2006a; NAA 2006b). This revealed a number of features, the majority of which comprised small areas of quarrying and probably related activity;
- **WAA 2014**: a watching brief was carried out during the replacement of a pole for an overhead electricity cable within the Scheduled Monument area of **Site 10**. No finds or features of archaeological interest were identified.

## 5. Discussion

### 5.1 Introduction

5.1.1 The discussion of the results of the desk-based assessment can be divided into two parts: firstly, a consideration of specifically archaeological remains, determining the significance of those that are already known and likely to be impacted upon, but also identifying the potential and for any further, as yet unidentified, remains being present and the extent to which these might be impacted. In addition, suitable mitigation work for dealing with such remains is also identified.

5.1.2 Secondly, a consideration of the known designated sites (in this case Scheduled Monuments and Listed Buildings) likely to be impacted upon by the proposed development is presented. This identifies the specific significance of these structures, an assessment of the impact of the proposed development, and proposed mitigation work.

5.1.3 In both cases the sites are described in *Appendix 4*. There is also some inevitable overlap in some areas, specifically in the case of **Site 10**, which has apparently associated remains recorded as crop marks that are not within the designated (Scheduled) area.

### 5.2 Significance of Known Archaeological Remains

5.2.2 While there are no specific previously identified sites of archaeological interest within the proposed development area it is apparent that parts of an extensive area of cropmarks extend from **Site 10** into the proposed development area, the complexity of which has been further enhanced by the geophysical survey (see *Appendix 6*). All of these are of uncertain origin, but it is likely that some or all relate to **Site 10** and so are late prehistoric to Romano-British date, although at least one corresponds with a field boundary shown in the mapping until 1863. The significance of these remains is considered to be high; the system used to judge this is based on the criteria used to define Scheduled Monuments (DCMS 2013, annex 4; *Appendix 2*).

Site	<i>Cropmarks/geophysical anomalies associated with Site 10</i>
<i>Period</i>	M
<i>Rarity</i>	H
<i>Documentation</i>	M
<i>Group value</i>	H
<i>Survival/condition</i>	M
<i>Fragility/Vulnerability</i>	H
<i>Diversity</i>	H
<i>Potential</i>	H
<b>Significance</b>	<b>H</b>

**Table 2: Significance by site**

### 5.3 Potential for Unknown Archaeological Remains

5.3.1 Details of the archaeological remains present within the study area are presented in the results of the desk-based assessment (*Section 4*; *Figure 2*; *Appendix 3*). However, the potential for as yet unidentified archaeological remains to be present is based on the known occurrence of such remains in the study area and local environs (see *Section 4*). Where there are no remains known within the study area the potential is based on the known occurrence within the wider local area. The degree of potential archaeological interest and significance is examined by period and the results are presented in *Table 3*; in each case the level of potential is expressed as low, medium, or high.

Period	Present in study area?	Potential
Late Upper Palaeolithic	N	L
Mesolithic	N	M
Neolithic	Y?	L
Bronze Age	Y	M
Iron Age	Y?	M
Roman	Y	M
Early Medieval	N	M
Medieval	Y	M
Post-medieval	Y	H

**Table 3: Potential for unknown archaeological remains by period**

5.3.2 In consideration of Table 3 it should be noted that there is considerable uncertainty regarding the dating of the barrow (**Site 12**) and the settlement site (**Site 10**), with the former probably Neolithic or Bronze Age and the latter described as 'Romano-British' and so potentially having its origins in the Iron Age, or earlier and perhaps continuing in use into the post-Roman period. Regardless of this, and the presence of substantial monuments of Neolithic date in the wider area, the likelihood of previously unknown Neolithic sites being present is low. In addition, although no remains of Mesolithic date are recorded from within the study area artefacts of this period have been found in the wider area during fieldwalking and the location of the site, next to a major river, increases the potential for such material to be present (see *Section 4.2.1*). It should also be noted that remains of medieval date within the study area are perhaps less extensive than the gazetteer suggests because the deserted medieval village (**Site 06**) is almost certainly recorded in entirely the wrong location in the HER. The grid reference is incorrect, and the site is actually at Whale, c4km to the south of the site.

## 5.4 Impact on Archaeological Remains

5.4.1 The majority of the non-designated heritage assets are at some distance from the proposed development site with only **Sites 06, 08, 13, 14** and **15** in close proximity with only the visual impact a likely issue. Of these **Site 06** is clearly marked in the wrong place and so can be dismissed and **Site 15** is also extremely vague and potentially in the wrong location too. **Sites 13** and **14** are well hidden amongst the woods and so unlikely to be substantially impacted upon. **Site 08** is the most likely to be directly affected as it faces directly onto the proposed development site, but the proposed exclusion zone along the eastern side of the Scheduled Monument (**Site 10**) extends to include this, again reducing the impact (see *Section 5.7.1* below and *Appendix 5*).

5.4.2 The only known archaeological remains present within the proposed development area, which would therefore be directly impacted upon, are the crop marks recorded in aerial photographs and anomalies recorded in the geophysical survey that are potentially associated with **Site 10**. It was apparent during the site visit that the large field making up the main part of the site in which these cropmarks are located has been extensively ploughed and improved, and this will have had a considerable impact on any buried archaeological deposits, although it is unlikely to have totally destroyed them. Indeed, the geophysical survey confirms that these features do survive, although in what condition is not known. In addition, the presence of overhead high voltage wires means that there will have been some disturbance from the installation of the upright posts that support these.

5.4.3 The proposed development would involve only minor groundworks, for example for the creation of concrete bases for static homes and associated services (water, electricity and gas, if the latter is piped rather than from bottles), although these would be no deeper than 600mm below the surface. These would most likely have a minor impact on the features present in the main part of the site that are potentially associated with **Site 10**, although the extent to which these survive is at present unknown. It would also have the potential to impact on any as yet unknown remains of archaeological interest that might be present (see *Section 5.3.1* above), although these too would already have been affected by previous improvements to the main part of the site. The two ponds that are proposed in the centre of the site are in an area of relatively low potential interest, certainly in terms of what was revealed during the

geophysical survey (compare *Appendix 5* and *Appendix 6*), and are also areas in which groundwater already collects.

## 5.5 Mitigation for Archaeological Remains

5.5.1 As outlined in *Section 5.3.1* there is the potential for archaeological remains to be present in the form of the features recorded in the main area most likely associated with **Site 10**. For this reason, further archaeological investigation would be beneficial in order to better understand the extent to which the features recorded as cropmarks and in the geophysical survey survive, their form, extent, and dating. Suitable mitigation might include archaeological evaluation prior to any groundworks, or an archaeological watching brief during groundworks deemed likely to affect any remains of archaeological interest.

5.5.2 In addition, any further archaeological investigation of the proposed development area actually has the potential to enhance the settlement site and associated earthworks/cropmarks (**Site 10**) by improving the understanding of it and building on the archaeological work carried out by Nick Higham in 1979. It is also possible that access to the settlement site making up the core of **Site 10** might be improved with enhanced interpretation, either in the form of signage or through information made available in the holiday park itself, and the potential for the creation of a permissive footpath to it. Both of these elements would potentially increase the public benefit of the proposed development.

## 5.6. Significance of Designated Sites

5.6.1 Of the 16 sites of archaeological interest identified within the study area there are two Scheduled Monuments (**Sites 10** and **12**) and a single Listed Building (**Site 07**). However, a small section of Lowther Park, which is a Registered Park and Garden (Historic England 2020c), is also within the study area as is the Lake District National Park, which is a World Heritage Site (Historic England 2020e). All these sites are statutorily protected and of local to national significance, while the World Heritage Site is of international significance. Full descriptions of these sites are presented in *Appendix 3* with relevant historical mapping in *Section 5.3*. Only **Sites 07** and **10** are in close proximity to the proposed development and so likely to be impacted upon by it.

5.6.1 As detailed in *Appendix 3* and *4* **Site 07** is a Grade II Listed farmhouse of probable 18<sup>th</sup> century origins with 19<sup>th</sup> century alterations. As such it is statutorily protected and considered to be of special interest (Historic England 2019). While the rear (north) elevation is somewhat obscured by the presence of other farm buildings and impacted on by modern sheds, and the east and south wings are less architecturally interesting, the front (south) elevation, which faces towards the proposed development area, is arguably the most architecturally interesting as it comprises a 'polite' symmetrical façade (Plate 20). This was clearly intended to be viewed from some distance and is specifically aligned on a small planned garden contained by a boundary wall topped with iron railings, which incorporates a gate into the adjoining field (Plate 20). There is no suggestion from the early mapping that this field formed part of the gardens, so this gate was presumably intended simply to allow direct access from the farm to this part of the associated land.



**Plate 20: Detailed view of the front (south) elevation of Site 07, viewed from the proposed development area**

5.6.2 Again, a detailed description of the Scheduled Monument (**Site 10**) is presented in *Appendix 3* and 3. The structure primarily comprises a roughly circular settlement enclosure of typical 'Romano-British' form, although such structures potentially have their origins in the Bronze Age and may have continued in use into and beyond the Roman period. Unusually for a monument of this type some excavation has taken place, which demonstrated activity in the 2<sup>nd</sup> century AD, at which point the site may have been essentially abandoned. It is also associated with a range of earthworks forming an extensive field system extending down slope to the east and perhaps also recorded within the proposed development area in the form of cropmarks (see *Section 5.4.2* above). As a Scheduled Monument the site is considered to be of National Significance, although its core is located on the hilltop some distance to the east of the proposed development area. The closest elements of **Site 10** to the proposed development sites are very slight earthworks, which were surveyed in 1979 as part of Nick Higham's work and are now difficult to distinguish on the ground (see Plate 17). The site forms a good example of such an enclosure, which are widespread across the county but have typically been studied in relatively limited detail and there is a need for more investigation in order to make them better understood (Philpott and Brennand 2007, 64-67), making this something of an exception.

## 5.7 Impact on Designated Sites

5.7.1 None of the three designated sites within the study area (**Sites 07, 10, and 12**), nor the Registered Park and Garden, nor World Heritage Site will be directly physically affected by the proposals. However, in all of these cases there will be some impact on their setting. In the case of **Site 12**, the Registered Park and Garden, and the World Heritage Site this will be very minimal. All three are obscured from the proposed development area by trees or the local topography.

5.7.2 Nevertheless, there is some impact on the setting on the two closest designated sites to the proposed development area: the Scheduled settlement (**Site 10**) and the Listed farmhouse (**Site 07**). As already noted in *Section 2.5* consultation was carried out with the Conservation Officer for Eden District Council and Historic England regarding these sites (see *Appendix 1* for their responses) and the proposed lay out of the development was modified and mitigation put into place to take these into account (see *Section 5.7* below). In both cases the impact is on the visual setting of the assets; in the

case of **Site 10** this is relatively minimal because, as already noted, the core and most significant part of the site is some distance from the eastern edge of the Scheduled area and obscured by a substantial hedge bank (see Plate 15 and Plate 18). However, the proposed development area does immediately adjoin the eastern boundary of the Scheduled Monument area. By comparison, the development area directly impinges on the front elevation of the Listed farmhouse (**Site 07**), and so would have a considerable impact on its visual setting since it was clearly designed to be viewed from a distance.

## 5.7 Mitigation for Designated Sites

5.7.1 Taking into account the impact on the setting of the two most affected designated heritage assets (**Sites 07** and **10**) the current proposal (*Appendix 5*) has been specifically designed to keep all of the intended new structures away from these areas as much as possible. Specifically, this has been achieved by creating 'exclusion zones' comprising areas of open space along its western edge alongside the eastern edge of **Site 10** (also extending in front of **Site 08** and providing an additional exclusion zone for this non-designated asset) and in front of **Site 07** (see *Appendix 5*). In the case of **Site 10** this is specifically intended to provide a wide physical barrier with the Scheduled Monument area in order to minimise the risk of damaging archaeological remains and with suitable planting it would also form an area of screening to minimise the impact on its setting. In addition, the existing hedge bank, which already forms an effective screen for **Site 10**, would be maintained and the existing gap replanted, while still allowing for a permissive footpath to path through if this were created (see *Appendix 5*). In the case of **Site 07** the proposed exclusion zone is intended to act not only as a visual buffer between the proposed development and the view from the farmhouse, but also as a space in which the front elevation of this Listed Building can still be viewed and appreciated as intended. The exclusion zone in this area could, with appropriate design, essentially become an extension to the small formal garden and therefore retain a physical link to the gate in the boundary wall. The size of the exclusion zone in this area is therefore intended to provide enough space to provide uninterrupted views of the farmhouse's façade as well as physically separating it from the proposed development by retaining a substantial part of the existing field immediately to its south. In addition, the creation of further screening in the form of tree planting within these exclusion zones and around the more exposed southern and western edges of the site, would also be of benefit in terms of protecting the setting of the Registered Park and Garden and World Heritage Site to the south.

## 5.7 Conclusion

5.7.2 On the basis of the current design proposals for the holiday park (see *Appendix 5*), the impact on the closest of the two Scheduled Monuments (**Site 10**) and the Listed Building (**Site 07**) is considered to be minor. The completion of further archaeological investigations into the cropmarks perhaps forming an extension to **Site 10**, associated improvements to understanding, access, and improved interpretation of the Scheduled Monument potentially also provide a positive benefit to the heritage resulting from the proposed development.

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## **Appendix 1: Consultation Responses**

From: Paula Sada [mailto:Paula.Sada@eden.gov.uk]

Sent: 24 April 2020 15:13

To: Andy Murphy <andy@stansgate.co.uk>

Subject: RE: Pre-application heritage advice - proposed extension to Lowther Holiday Village

Dear Andrew

Thanks for your email.

The HIA produced by Greenlane Archaeology appears to contain considerable information relating to the archaeology of the site and correctly identifies the important designated heritage assets within the surrounding area i.e. SMs, LBs, WHS and Parks & Gardens. However for me I would like to see further detail on the assessment of the impact to the listed farmhouse – the report identifies there will be an impact on the setting of the listed building and recommends an exclusion zone with little explanation as to how that assessment/ recommendation has been reached.

An assessment of the historical and architectural significance of the listed building and its setting in accordance with the attached guidance document should be included along with:

- An assessment of how the proposed design of the development (location and design of caravans, landscaping, access etc.) will impact on the setting of the LB
- an explanation of why the exclusion zone has been proposed:- why it has been included in that particular location/ why the proposed size and extent is deemed appropriate etc.

Thanks

Kind Regards

Paula

Paula Sada\_BA (Hons), MSc

Conservation Officer

Planning and Economic Development

Eden District Council

Mansion House

Penrith

CA11 7YG

01768 817817

From: Andy Murphy [mailto:andy@stansgate.co.uk]

Sent: 17 April 2020 15:50

To: Paula Sada <Paula.Sada@eden.gov.uk>

Subject: Pre-application heritage advice - proposed extension to Lowther Holiday Village

FAO Conservation Officer at Eden District Council (Paula Smith).

Dear Ms Smith,

I represent the Lowther Estate Trust and Lowther Holiday Park Ltd.

I am preparing a planning application for proposed "Extension to existing holiday caravan site by virtue of change of use of land from agriculture to the stationing of up to 125 static caravans for holiday accommodation and associated works" at land adjacent to Lowther Holiday Park, Lowther CA10 2JB on behalf of Lowther Holiday Park Ltd.

Before submitting the planning application, the applicant intends to carry out a geophysical survey and a programme of targeted trial trenching. Even so, at this relatively early stage I would appreciate any ideas, comments or advice regarding the proposed site plan in terms of its impact on heritage assets. To help your assessment, I attach a draft Heritage Impact Assessment.

I am also carrying out pre-application consultation with Historic England and Jeremy Parsons, the county council Historic Environment Officer.

Kind regards,

Andrew Murphy BA(Hons) MSc MRTPI

Director

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Historic England

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Direct Dial: 0161 242 1441

Our ref: PA01117566

26 August 2020

Dear Mr Murphy

### **Pre-application Advice**

#### **LOWTHER HOLIDAY PARK, LOWTHER CA10 2JB**

Thank you for contacting us on 17 April 2020 regarding your proposals for the above site. We apologise for the delay in providing you with pre-application advice but note that this was due to COVID-19 restrictions preventing us from undertaking a site visit until 3 August 2020.

### **Summary**

The scheduled monument comprises a Romano-British settlement and its associated regular aggregate field system. It is located on the west side of the River Lowther; the settlement occupies the eastern end of a plateau overlooking the river floodplain. Its associated field system extends to the east down the hill slope towards the river. The monument is significant due to its notable levels of survival and as it is a rare example of a site of this type in a lowland situation, retaining upstanding earthworks.

The development proposal is for the extension to an existing holiday caravan site by virtue of the change of use of land from agriculture to the stationing of up to 125 static caravans for holiday accommodation, and associated works. The proposed development location is on a site of high archaeological sensitivity due to its position immediately adjacent to the above-noted scheduled monument. For this reason, the proposals need scrutiny of their potential for impacts on the nationally important designated heritage asset.

As the site is designated as a scheduled monument under the Ancient Monuments and



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Archaeological Areas Act 1979, it is afforded specific protections. This means that prior written permission is required for most works and other activities that physically affect a scheduled monument. This permission is obtained through the Secretary of State for Digital, Culture, Media and Sport, which is administered by Historic England and is known as Scheduled Monument Consent (SMC). It is important to note that SMC is separate and without prejudice to other consents that might be required for works and other activities, such as planning permission.

Providing our detailed advice is fully considered, our assessment of the potential impact of the proposal is that it would be sufficiently unlikely to negatively affect nationally important archaeological remains or their settings.

## Advice

### *Significance*

The scheduled monument comprises a Romano-British settlement and its associated regular aggregate field system. It is located on the west side of the River Lowther; the settlement occupies the eastern end of a plateau overlooking the river floodplain. Its associated field system extends to the east down the hill slope towards the river. The settlement includes upstanding earthworks whereas the field system has been identified from cropmarks visible on aerial photographs which clearly show in-filled ditches, buried walls and trackways. The settlement includes a stone and earth enclosure bank up to 7m wide and 1m high which encloses a roughly oval area measuring approximately 75m by 73m. The enclosure is subdivided into at least eight sub-rectangular enclosures or stock pens and also includes a low mound approximately 4m in diameter interpreted as a possible hut platform. There are four entrances into the enclosure; one on the north-west side and three at the east side. The associated field system visible in aerial photographs includes three large sub-rectangular fields to the east of the settlement enclosure; a small rectangular field, itself containing a sub-rectangular enclosure with a south-facing entrance, is located at the eastern end of the southernmost of the large fields. Three lengths of trackways and numerous other linear features lying to the north, south and east of the settlement enclosure have also been identified on the aerial photographs and have been interpreted as field boundaries.

The monument is significant due to its notable levels of survival and as it is a rare example of a site of this type in a lowland situation, retaining upstanding earthworks. The remains preserve considerable detail of the layout of the site and will facilitate further study of Romano-British settlement patterns in the area. Additionally, an



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associated field system is visible on aerial photographs and has been confirmed by limited excavation. Such field systems provide important evidence of a carefully planned reorganisation of landscape and definition of landholding. Their articulation with other contemporary archaeological features, such as land boundaries, settlements, farmsteads and enclosures, makes them worthy of protection.

### *Impact*

The development proposal is for the extension to an existing holiday caravan site by virtue of the change of use of land from agriculture to the stationing of up to 125 static caravans for holiday accommodation, and associated works. The proposed development location is on a site of high archaeological sensitivity due to its position immediately adjacent to the above-noted scheduled monument. For this reason, the proposals need scrutiny of their potential for impacts on the nationally important designated heritage asset.

At this stage of pre-application, we confirm that we are broadly content with the general principle of the proposed development. We note that the development proposal has been submitted along with an appropriate Heritage Impact Assessment, which takes account of all designated and non-designated heritage assets in the vicinity of the development site, and which considers the potential for impacts on these.

Having considered the details of the proposal, the Heritage Impact Assessment, and the information gathered from our site visit, we have the following comments to offer on potential impacts on the above-noted scheduled monument only. For comments on any non-designated archaeology, you should seek the advice of the local authority archaeology and conservation service.

In terms of potential physical impacts, the proposed caravan site extension would be outside of the scheduled area and there would be an exclusion buffer zone between the application site and scheduled monument boundaries, which we are content with. However, the proposals indicate that access to the scheduled monument could be improved. It is noted that this could be achieved via a private footpath to be created from the holiday park to the monument and that this may be combined with enhanced interpretation either in the form of signage or through information made available in the holiday park itself. While we are content with the general principle of this aspect of the proposal, as it would increase the public benefit of the development proposal, we would have to be consulted on the specific details of any groundwork required for paths, gates, and signage, and any interpretation, inside the scheduled monument. We would



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be keen to see a footpath creation methodology that would have limited to zero physical impact on the monument. Furthermore, if access was to be improved to the scheduled monument, we note that it is currently suffering from vegetation overgrowth and we would be keen to see the management of this issue considered in any proposal to open up access. It is likely that all these works inside the scheduled area, should they be appropriate, would also require scheduled monument consent (SMC).

In terms of potential setting impacts, the addition of an extension to the existing nearby holiday caravan site has the potential to further impact on the setting of the scheduled monument. However, having considered the scale, location, and elevation of the proposed extension in relation to the height of the core settlement component of the scheduled monument, we believe that any setting impact would be minor and that this could be further reduced by the implementation of appropriately designed screening in the identified exclusion buffer zone. Additionally, we note that at the point at which the proposed private footpath would pass through a large gap in a hedgerow running north-south across the scheduled monument there is a large gap. Although a small gap would need to be maintained here should footpath access be created, we believe that the majority of this gap could be replanted, which would help to close off the proposed development site in views looking east down the hill from the core settlement component of the monument. These views east appear to be the key views from the monument, which should be maintained. Lastly, the current views looking west to the monument from the proposed development site are generally obscured by the above-noted hedgerow running north-south, which should be maintained. Should closing the gap in this hedgerow be proposed as part of screening mitigation measures, and any other screening measures be proposed, we would have to be consulted on the specific details of any of these groundworks inside the scheduled area, and we note that this would also likely require SMC. As noted above, we would remind you of the need to consult the local authority archaeology and conservation service with regards to the potential impacts that the planting of screening between the proposed development site and the scheduled monument may have on non-designated heritage assets.

### *Policy*

As the site is designated as a scheduled monument under the Ancient Monuments and Archaeological Areas Act 1979, it is afforded specific protections. This means that prior written permission is required for most works and other activities that physically affect a scheduled monument. This permission is obtained through the Secretary of State for Digital, Culture, Media and Sport, which is administered by Historic England and is known as Scheduled Monument Consent (SMC). It is important to note that SMC is



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separate and without prejudice to other consents that might be required for works and other activities, such as planning permission.

### *Position*

Providing our detailed advice is fully considered, our assessment of the potential impact of the proposal is that it would be sufficiently unlikely to negatively affect nationally important archaeological remains or their settings.

### **Next Steps**

Thank you for involving us at the pre-application stage. We are broadly content with your proposals, subject to you addressing the issues as outlined above before any statutory approval is sought.

You can find information about applying for scheduled monument consent here:  
<https://historicengland.org.uk/advice/planning/consents/smc>

Yours sincerely

Dr Jamie Barnes

Inspector of Ancient Monuments

E-mail: [Jamie.Barnes@HistoricEngland.org.uk](mailto:Jamie.Barnes@HistoricEngland.org.uk)

## **LOWTHER HOLIDAY PARK, LOWTHER CA10 2JB**

### **Pre-application Advice**

#### **List of information on which the above advice is based**

- Heritage Impact Assessment
- Proposed Site Plan
- Location Plan



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## Appendix 2: Significance Criteria

After DCMS 2013, Annex 1: '*Principals of Selection for Scheduled Monuments*'

- i) *Period*: all types of monuments that characterise a category or period should be considered for preservation;
- ii) *Rarity*: there are some monument categories which in certain periods are so scarce that all surviving examples which retain some archaeological potential should be preserved. In general, however, a selection must be made which portrays the typical and commonplace as well as the rare. This process should take account of all aspects of the distribution of a particular class of monument, both in a national and regional context;
- iii) *Documentation*: the significance of a monument may be enhanced by the existence of record of previous investigation or, in the case of more recent monuments, by the supporting evidence of contemporary written records;
- iv) *Group Value*: the value of a single monument (such as a field system) may be greatly enhanced by its association with related contemporary monuments (such as a settlement and cemetery) or with monuments of different periods. In some cases, it is preferable to protect the complete group of monuments, including associated and adjacent land, rather than to protect isolated monuments within the group;
- v) *Survival/Condition*: the survival of a monument's archaeological potential both above and below ground is a particularly important consideration and should be assessed in relation to its present condition and surviving features;
- vi) *Fragility/Vulnerability*: highly important archaeological evidence from some field monuments can be destroyed by a single ploughing or unsympathetic treatment; vulnerable monuments of this nature would particularly benefit from the statutory protection which scheduling confers. There are also existing standing structures of particular form or complexity whose value can again be severely reduced by neglect or careless treatment and which are similarly well suited by scheduled monument protection, even if these structures are already listed historic buildings;
- vii) *Diversity*: some monuments may be selected for scheduling because they possess a combination of high-quality features, others because of a single important attribute;
- viii) *Potential*: on occasion, the nature of the evidence cannot be specified precisely but it may still be possible to document reasons anticipating its existence and importance and so to demonstrate the justification for scheduling. This is usually confined to sites rather than upstanding monuments.

## Appendix 3: Site Gazetteer

**Site Number: 01****Cumbria HER No:** 13582**National Park HER:** –**Site name:** Yanwath and Eamont Bridge, unclassified cropmarks**NGR:** NY 52200 26900**Sources:** HER**Designation:** none**Monument type:** cropmarks (unclassified)**Description:** unclassified cropmarks; no features were visible above the ground other than faint traces of a former field boundary which shows up clearly on the aerial photograph. This also shows obscure dark patches towards the middle of the field: impossible to interpret.**Period:** uncertain

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**Site Number: 02****Cumbria HER No:** 41685**National Park HER:** –**Site name:** Lowther Estate quarry**NGR:** NY 52700 26800**Sources:** HER; NAA 2006a, site D**Designation:** none**Monument type:** quarry**Description:** an oval measuring approximately 12m by 8m, possibly forming part of a more extensive area of disused quarrying.**Period:** post-medieval

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**Site Number: 03****Cumbria HER No:** 41686**National Park HER:** –**Site name:** Lowther Estate Structure**NGR:** NY 52670 26790**Sources:** HER; NAA 2006a, site E**Designation:** none**Monument type:** structure**Description:** a possible small square structure sited in woodland. Shown on the first edition Ordnance Survey map of 1860 but not shown on the second edition map of 1899.**Period:** post-medieval

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**Site Number: 04****Cumbria HER No:** 15407**National Park HER:** –**Site name:** Yanwath Woodhouse Quarry**NGR:** NY 52625 26760**Sources:** HER; NAA 2006a, site 27**Designation:** none**Monument type:** quarry**Description:** Yanwath Woodhouse quarry lies beside the River Lowther west of Clifton. The quarry is not shown on the first edition Ordnance Survey map of 1860 and is marked 'old quarry' on the second edition map of 1899 (NAA 2006a, site 27).

**Period:** post-medieval

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**Site Number: 05**

**Cumbria HER No:** 41692

**National Park HER:** –

**Site name:** Lowther Estate Ridge and Furrow

**NGR:** NY 52500 26700

**Sources:** HER; NAA 2006a; 2006b, 4

**Designation:** none

**Monument type:** earthwork (ridge and furrow)

**Description:** area of ridge and furrow in Lowther Park (NAA 2006b, 4).

**Period:** medieval – post-medieval

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**Site Number: 06**

**Cumbria HER No:** 5404

**National Park HER:** –

**Site name:** Lowther Whale deserted village

**NGR:** NY 52500 26400

**Sources:** HER

**Designation:** none

**Monument type:** deserted village

**Description:** Lowther deserted village; very good earthworks (nothing visible on RAF aerial photographs 1948). This may be same site as SMR 2875 (NY 525 216) with the wrong grid reference given. Evaluated as part of the Monument Protection Plan, but not Scheduled as no traces of the site could be found at this grid reference.

**Period:** medieval

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**Site Number: 07**

**Cumbria HER No:** –

**National Park HER No:** –

**Site name:** Yanwath Woodhouse Farm, Eamont Bridge

**NGR:** NY 52473 26355

**Sources:** Historic England 2020g; RCHME 1936, 252, plate 31

**Designation:** Listed Building (Grade II)

**Monument type:** farmhouse

**Description:** early 18<sup>th</sup> century farmhouse with late 18<sup>th</sup> century or early 19<sup>th</sup> century alterations. Roughcast walls with V-jointed quoins, under graduated greenslate roof with banded stone chimney stacks. Two storeys, three bays. Central top-glazed panelled door, up steps, in stone architrave under panel of quartered Lowther arms. Sash windows in stone architraves (RCHME 1936, 252, plate 31). Adjoining barns are not of interest.

**Period:** post-medieval

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**Site Number: 08**

**Cumbria HER No:** 16805

**National Park HER No:** –

**Site name:** site of a quarry and limekiln near Yanwath Woodhouse; Yanwath Woodhouse Quarry

**NGR:** NY 52140 26249 (point)

**Sources:** HER; Ordnance Survey 1863; 1898; 1915

**Designation:** none

**Monument type:** limekiln and quarry

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**Description:** Yanwath Woodhouse quarry lies west of the farm of that name. For the associated limekiln see SMR 15375 [this entry does not exist]. A limekiln is shown on the first edition 6" Ordnance Survey map of 1863. The site is marked as an old limekiln and old quarry on later editions (Ordnance Survey 1898; 1915). The quarry is marked as an earthwork on the 1989 Ordnance Survey map.

**Period:** post-medieval

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**Site Number:** 09

**Cumbria HER No:** 13583

**National Park HER:** –

**Site name:** Lowther Ridge and Furrow

**NGR:** NY 53000 26100

**Sources:** HER

**Designation:** none

**Monument type:** earthwork (ridge and furrow)

**Description:** ridge and furrow and other earthworks shown on aerial photographs. The field has been re-seeded and levelled. Faint features are still visible (including a possible sub-rectangular enclosure?).

**Period:** medieval – post-medieval

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**Site Number:** 10

**Cumbria HER No:** 2899

**National Park HER No:** –

**Site name:** Romano-British settlement and regular aggregate field system north of Yanwath Wood

**NGR:** NY 52114 25984 [Historic England (2020d) gives the NGR as NY 52114 25984; Cumbria HER gives the NGR as NY 51690 25930]

**Sources:** Dymond 1893; Ordnance Survey 1898; 1915; RCHME 1936; Higham 1979; 1980; 1983; Manchester University 1975 **NY/5226/A**; 1976 **NY/5226/C-E**; Historic England 2020d

**Designation:** Scheduled Monument

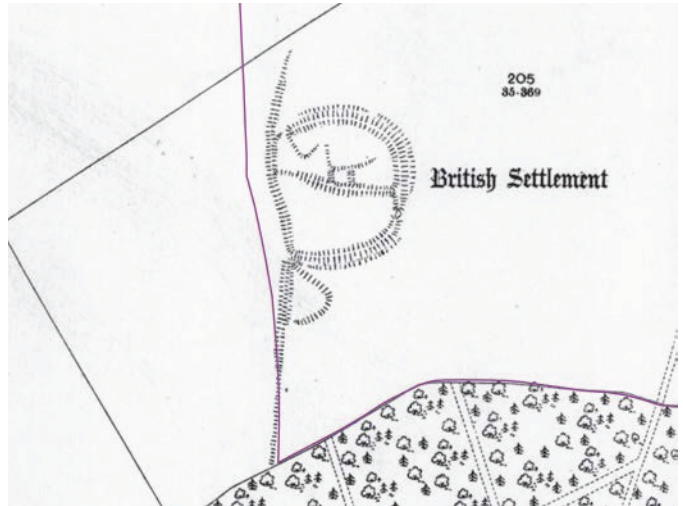
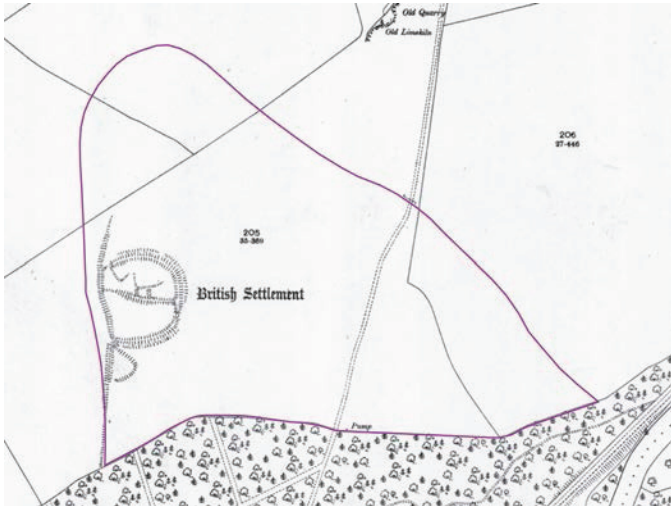
**Monument type:** settlement

**Description:** the Romano-British settlement north of Yanwath Wood survives well and is a rare example of a site in a lowland situation which retains upstanding earthworks. The remains preserve considerable detail of the layout of the site and will facilitate further study of Romano-British settlement patterns in the area. Additionally, an associated field system is clearly visible on aerial photographs and has been confirmed by limited excavation. Such field systems provide important evidence of a carefully planned reorganisation of landscape and definition of landholding. Their articulation with other contemporary archaeological features, such as land boundaries, settlements, farmsteads and enclosures, makes them worthy of protection.

The monument includes a Romano-British settlement and its associated regular aggregate field system. It is located on the west side of the River Lowther; the settlement occupies the eastern end of a plateau overlooking the river floodplain. Its associated field system extends to the east down the hillslope towards the river. The settlement includes upstanding earthworks whereas the field system has been identified from cropmarks visible on aerial photographs which clearly show infilled ditches, buried walls and trackways. The settlement includes a stone and earth enclosure bank up to 7m wide and 1m high which encloses a roughly oval area measuring approximately 75m by 73m. The enclosure is subdivided into at least eight sub-rectangular enclosures or stock pens and also includes a low mound approximately 4m in diameter interpreted as a possible hut platform. There are four entrances into the enclosure; one on the north-west side and three at the east side. The associated field system visible in aerial photographs includes three large sub-rectangular fields to the east of the settlement enclosure; a small rectangular field, itself containing a sub-rectangular enclosure with a south-facing entrance, is located at the eastern end of the southernmost of the large fields. Three lengths of trackway and numerous other linear features lying to the north, south and east of the settlement enclosure have also been identified on the aerial photographs and have been interpreted as field boundaries. In the late 1970's limited excavation of some of the features identified from aerial photographs confirmed the

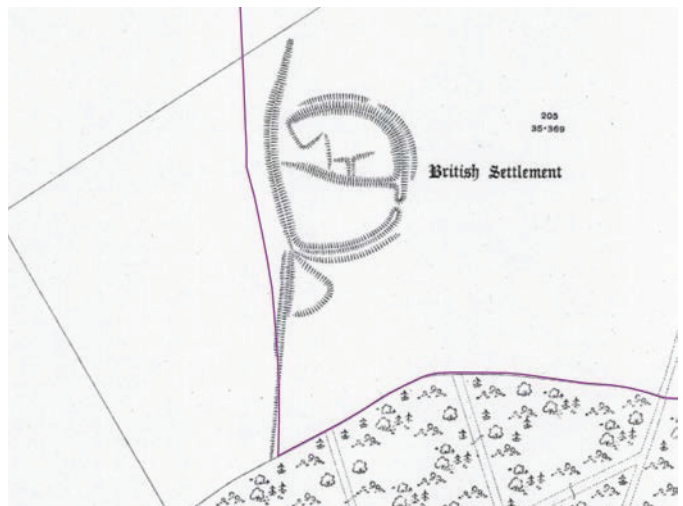
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existence of a trackway to the east of the settlement and running between the central and northern of the large sub-rectangular fields. On the southern side of the enclosure excavation through a bank noted by survey in 1936, but since levelled by agricultural operations, found the base of a stone wall and ditch interpreted as the south-western boundary of the field system. Within the ditch sherds of Samian pottery were found and suggest that it became silted up at the end of the second century AD. To the north of the enclosure excavation through another bank noted by the survey found traces of a more substantial wall interpreted as forming the north-western boundary of the field system. All modern field boundaries, telegraph poles, gateposts, a small brick and concrete reservoir, a water trough, and the surface of a farm track are all excluded from the scheduling, although the ground beneath all these features, is included.



**Plate 21 (left):** Extract from the Ordnance Survey map of 1898, showing the Scheduled Monument area around Site 10

**Plate 22 (right):** Extract from the Ordnance Survey map of 1898, showing the Romano-British settlement at Site 10 in detail



**Plate 23 (left):** Extract from the Ordnance Survey map of 1915, showing the Scheduled Monument area around Site 10

**Plate 24 (right):** Extract from the Ordnance Survey map of 1915, showing the Romano-British settlement at Site 10 in detail

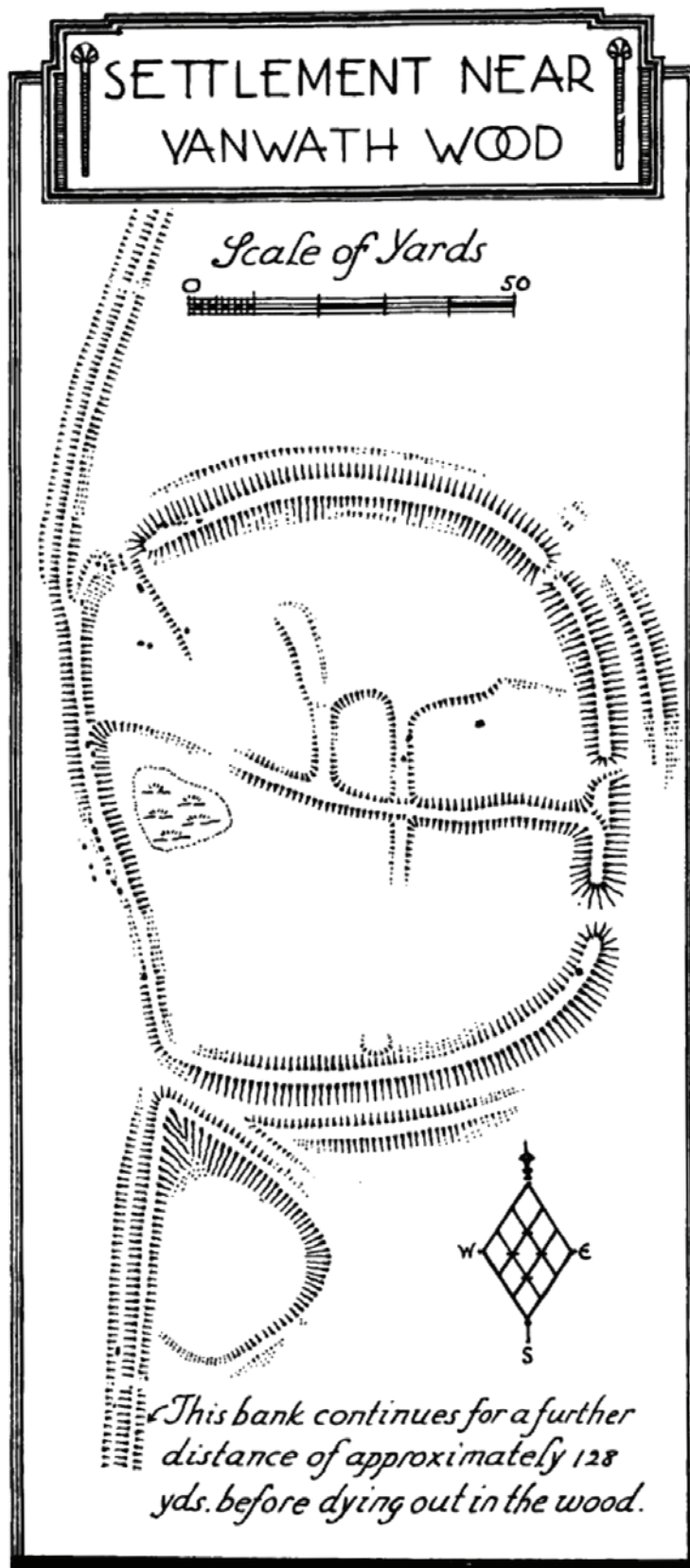


Plate 25: Settlement near Yanwath Wood (RCHME 1936)



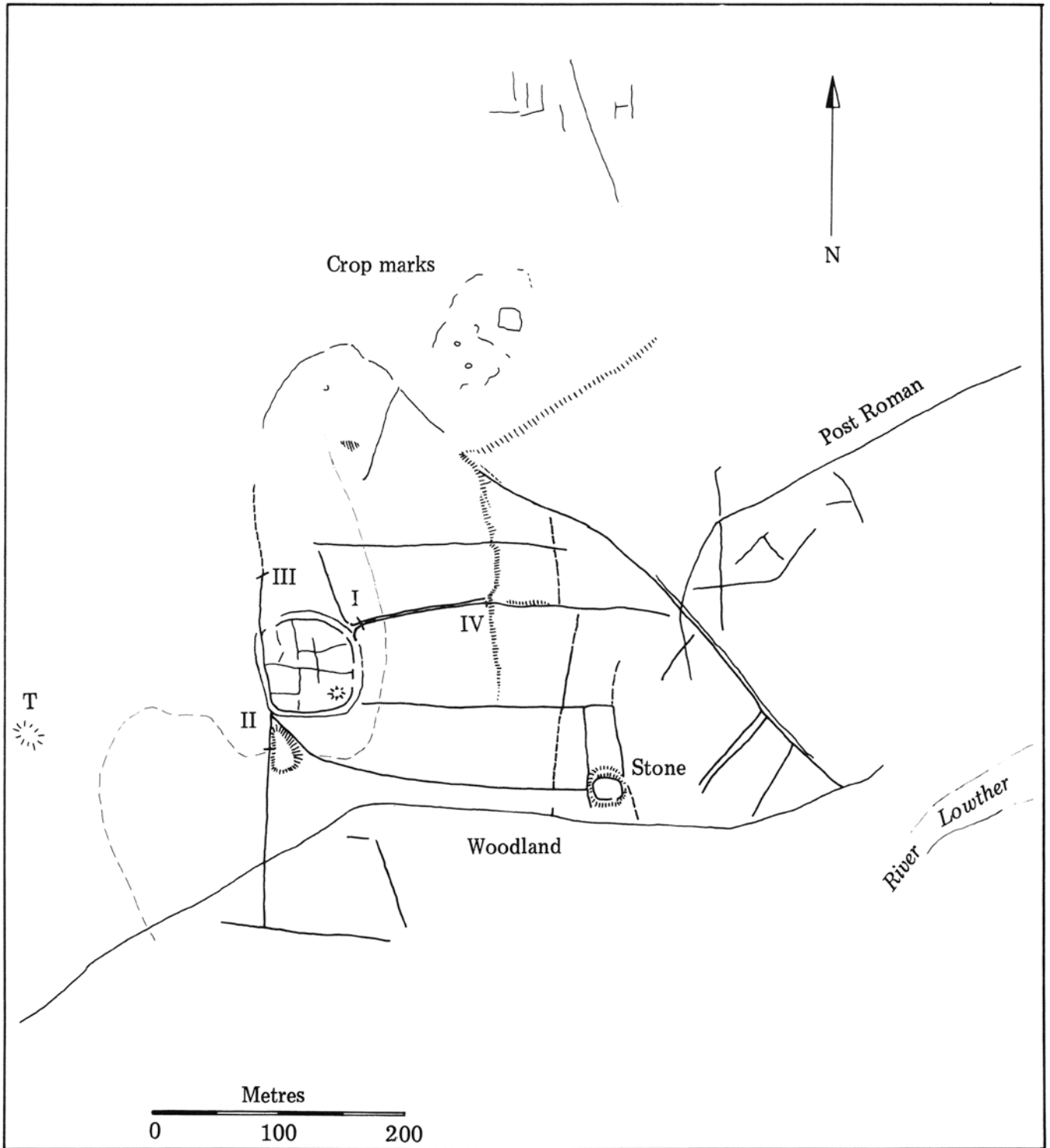


Plate 26: The farmstead and field system at Yanwath Wood (Site 10) (after Higham 1980, figure 5.3)

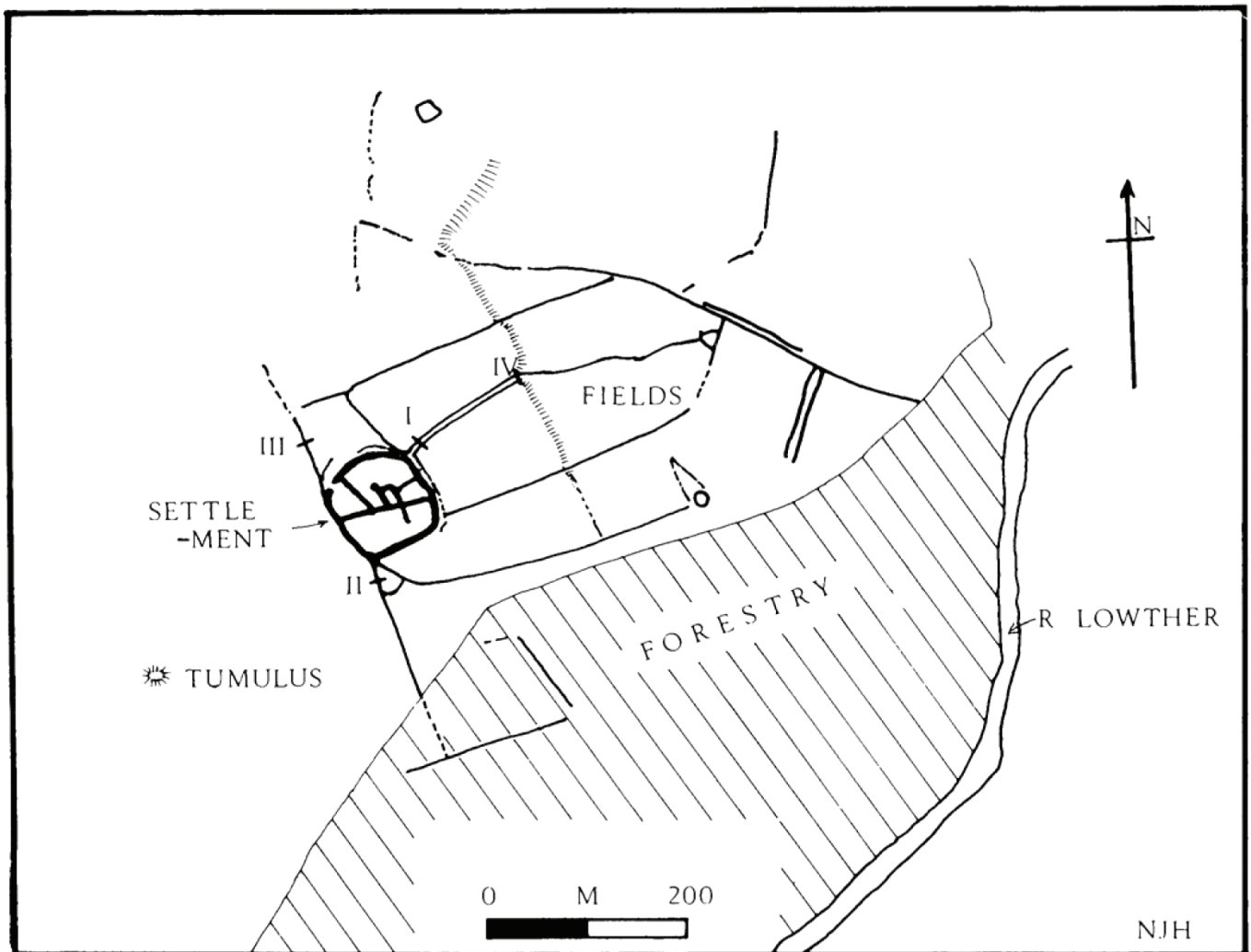


Plate 27: Yanwath Wood settlement and field system (Site 10), showing the location of trial excavation trenches I-IV (Higham 1983, fig. 2)

Period: Roman

**Site Number:** 11

**Cumbria HER No:** 2893

**National Park HER:** –

**Site name:** altar find, Clifton

**NGR:** NY 53000 26000

**Sources:** HER; Collingwood and Wright 1965, 266, no 792; News article Carlisle Patriot 7<sup>th</sup> May 1847; 8<sup>th</sup> May 1847

**Designation:** none

**Monument type:** find spot (altar)

**Description:** a Roman altar found 1848 at Clifton when making the Lancaster-Carlisle Railway. Until May 1951 the stone was within the grounds of Dykes Field (NY 3079 5921) and was published on the Ordnance Survey 25" map at that position. In 1960 it was in the possession of JH Brett, 137 Fishpool Street, St Alban's, Hertfordshire. Present whereabouts unknown.

**Period:** Roman

**Site Number:** 12

**Cumbria HER No:** 2876

Client: Lowther Holiday Park

© Greenlane Archaeology Ltd, October 2020

**National Park HER No:** –

**Site name:** Bowl barrow 850m WSW of Yanwath Woodhouse Farm

**NGR:** NY 51693 25937 [Cumbria HER gives the NGR as NY 51930 25980]

**Sources:** HER; Dymond 1893; Ordnance Survey 1898; 1915; RCHME 1936, 255; Historic England 2020a

**Designation:** Scheduled Monument

**Monument type:** bowl barrow

**Description:** the monument includes a bowl barrow located on gently sloping ground 850m west-south-west of Yanwath Woodhouse Farm. It includes a flat-topped oval mound of earth and stones up to 2m high with maximum dimensions of 25.5m by 21.5m. Despite minor surface disturbance to the monument's summit, the monument survives well. It will contain undisturbed archaeological deposits within the mound and upon the old land surface beneath.

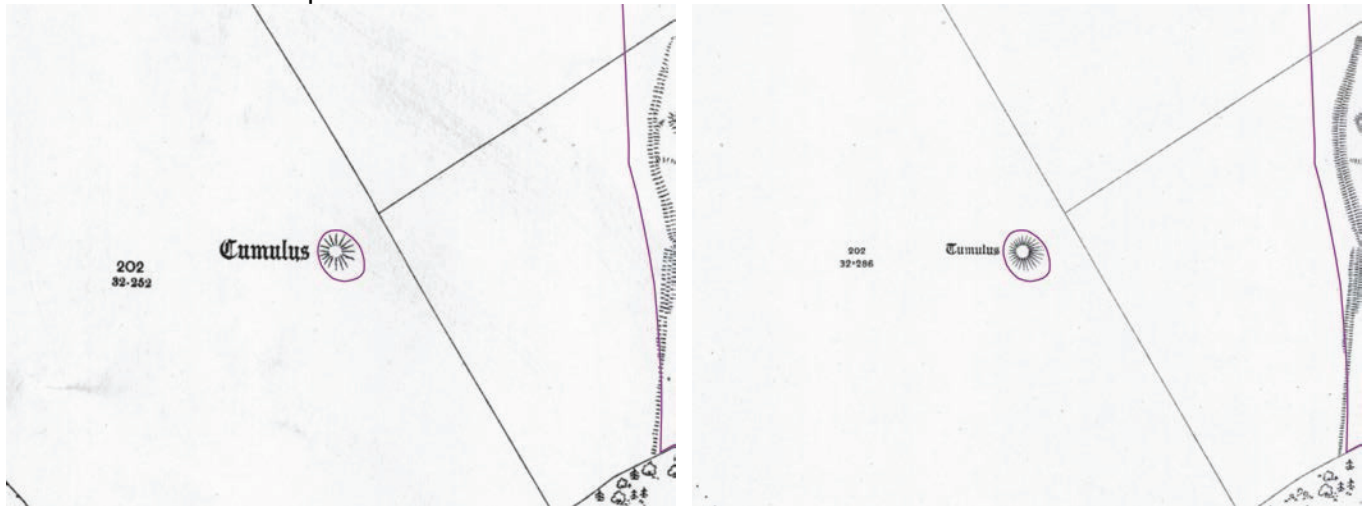


Plate 28 (left): Extract from the Ordnance Survey map of 1898, showing the Scheduled Monument area around Site 12

Plate 29 (right): Extract from the Ordnance Survey map of 1915, showing the Scheduled Monument area around Site 12

**Period:** Neolithic/Bronze Age

**Site Number:** 13

**Cumbria HER No:** 2882

**National Park HER No:** –

**Site name:** Clifton Wells

**NGR:** NY 52575 25905 [Cumbria HER gives the NGR as NY 52500 25900]

**Sources:** Ordnance Survey 1863; Walker 1858, 108-109; MacIntire 1944, 13; Heelis 1914, 341

**Designation:** none

**Monument type:** wells

**Description:** Clifton Wells (Chalybeate) is marked on the first edition 6" Ordnance Survey map of 1863; a fountain credited with medicinal properties. Various authors recount the tradition of 'well Sundays' when the people of the parish held a fair on four successive Sundays in May at local wells, with that at Clifton Wells held on the second Sunday. Although a footbridge is shown here on the Ordnance Survey map there is no longer public access to the site. Clifton Wells is still marked on up to date Ordnance Survey maps.

**Period:** post-medieval

**Site Number:** 14

**Cumbria HER No:** –

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**National Park HER No:** 32420

**Site name:** Hollow, Mitchell Holme

**NGR:** NY 52367 25812

**Sources:** HER; LUAU 1997

**Designation:** none

**Monument type:** earthwork (hollow)

**Description:** a relatively modern 6m by 4m artificially cut hollow with curved corners and two piles of stone at each of the short ends. The site could be the remains of a disused pool. This site was located during field survey conducted by LUAU in 1996 (LUAU 1997).

**Period:** post-medieval

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**Site Number:** 15

**Cumbria HER No:** 1171

**National Park HER:** –

**Site name:** Yanwath and Eamont Bridge Lynchets

**NGR:** NY 52500 25700

**Sources:** HER

**Designation:** none

**Monument type:** earthwork (lynchets)

**Description:** the site is permanent pasture but used for camping. This area is not presently used for camping but is permanent pasture. The lynchets are most pronounced at NY 526 258. Here, to the east side of the track. There are other extensive earthworks, too indistinct to categorise, when visited in August 1997.

**Period:** uncertain

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**Site Number:** 16

**Cumbria HER No:** –

**National Park HER No:** 2583

**Site name:** Yanwath Enclosure, Yanwath and Eamont Bridge

**NGR:** NY 52163 25530

**Sources:** HER; LUAU 1997

**Designation:** none

**Monument type:** cropmark (enclosure)

**Description:** cropmark of enclosure. No surface traces 1979.

**Period:** uncertain

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## Appendix 4: Summary of Registered Park and Garden, Listed Building, Scheduled Monument, and World Heritage Site Information

### REGISTERED PARK AND GARDEN

**Site:** LOWTHER CASTLE  
**Category:** Park and Garden (Grade II)  
**List Entry Number:** 1000668  
**Sources:** Historic England 2020c  
**National Grid Reference:** NY 52246 23583  
**Details:** Parkland of the 17<sup>th</sup>, 18<sup>th</sup> and early 19<sup>th</sup> century with medieval origins and a late 17<sup>th</sup> century/early 18<sup>th</sup> century avenue, a terrace with early 18<sup>th</sup> century or earlier origins, and an early 19<sup>th</sup> century terrace and forecourt by Robert Smirke.

### HISTORIC DEVELOPMENT

Lowther was the seat of the Lowther family from the 12<sup>th</sup> century until the mid-20<sup>th</sup> century. Hugh Lowther was granted a licence to enclose 200 acres of land as a park in 1337. In 1682 Lowther village, which was situated between the main house and Lowther church, was purchased by Sir John Lowther and pulled down. The parkland was successively augmented and it reached its greatest size, when it covered more than 3000 acres, under the fifth Earl of Lonsdale (1857-1944). The Castle and much of the park were used for training by the army in the Second World War and the Castle is currently (1997) maintained as a controlled ruin.

### DESCRIPTION

**LOCATION, AREA, BOUNDARIES, LANDFORM, SETTING** Lowther Castle is situated c5km south of Penrith in an area which is rural and agricultural. The c600ha site is on land which slopes down to the River Lowther on the north and west sides. The northern and eastern boundaries of the registered site are generally formed by woodland: on the north-west side by Heining Bank, immediately north of Askham, an avenue on the west edge of Yanwath Wood and the southern and eastern part of Yanwath Wood. The boundary then follows the outer edge of Horseholme Wood to the north, and part of Buckholme Wood and Buckholme Slip to the north-east. To the south-east the boundary is defined first by the road between Newtown and Lowther village and then, turning south, the outer edge of Boonby Plantation. The southern boundary is formed by a track running along the edge of Decoy Hag and Rowlandfield to the hamlet of Whale. From this point the western boundary is formed by the east bank of the River Lowther as far as Askham. A public road runs through the park between Askham and Newtown.

**ENTRANCES AND APPROACHES** The principal entrance to the site is from Askham, where the public road leads into the site over Askham Bridge on the east side of the village and runs north and then east, past Lowther church, to Newtown. This road crosses Buckholme Drive, which leads south to the Castle from Clifton and enters the registered area at Buckholme Lodge, at the north-east tip of the site. West of this a drive called Earl Henry's Drive leads south from Lowther Bridge and enters the registered site at the northern end of Yanwath Wood, crossing the River Lowther via a 20<sup>th</sup> century bridge built to bypass a narrow stone bridge called Low Gardens Bridge. It then joins Buckholme Drive and continues south to the Castle. This configuration of drives is shown on Greenwood's county map of 1824 but not on that by Jeffreys of 1770. Emperor's Drive, built in honour of Kaiser Wilhelm's 1895 visit, runs west-north-west from a gateway at the south-east tip of the site before dividing, one route leading north to Newtown and the other north-west to the Castle. The latter is not shown on the 1<sup>st</sup> edition OS map surveyed

1859, but it does appear on that published in 1898. There are a number of other private drives through the estate.

**PRINCIPAL BUILDING** Lowther Castle (Listed grade II\*) was designed by Robert Smirke (1780-1867) and built 1807-14 at a cost of £77,000. The building was closed in 1935 and was stripped of its roofs and gutted in 1956-7 when the walls were capped. Attached on the east side is a stable block (Listed grade II\*), also by Smirke. The present building replaced a medieval pele tower which, following successive 17<sup>th</sup> century improvements, was largely destroyed by fire in 1718. It was not rebuilt until William, first Earl of Lonsdale (second creation) engaged Smirke. Successive schemes for the rebuilding of the seat at Lowther were commissioned by the owners from the late 17<sup>th</sup> century to the early 19<sup>th</sup> century and the collection of architectural drawings from Lowther Castle is one of the largest and most important of its kind. The collection is deposited on loan to Cumbria County Council Archive Department in Carlisle.

**GARDENS AND PLEASURE GROUNDS** The north front of Lowther Castle overlooks a terrace and forecourt by Robert Smirke. A lodge with square battlemented turrets flanking a central arched opening (Listed grade II\*) is situated c70m to the north and is aligned with the front of the Castle. On each side canted battlemented stone walls (Listed grade II\*) form an enclosure around the north side of the Castle and stables, and there are rectangular turrets at the angles. Central stone steps flanked by ramps lead up to a terrace (all Listed grade II\*) in front of the Castle. There are views from the terrace over parkland to the north and of an avenue aligned with the lodge and centre of the Castle which continues into the far distance. The terrace and forecourt are on the site of a forecourt with radial paths and formal gardens shown on an engraving of c1700 by Knyff and Kip and on a survey plan of the Castle made after the 1718 fire. This map also shows other areas illustrated by Knyff and Kip, including an enclosed garden with a fountain marked 'Fountain Yard' and, on the west side, an area marked 'The Old Garden'.

Pleasure grounds and gardens were situated to the south of the Castle in an area enclosed on the west side by a wall attached to the canted forecourt wall which turns and runs southwards, continuing as the retaining wall of a terrace for a distance of c1km. The area is planted with conifers, replacing lawns and formal gardens laid out during the late 19<sup>th</sup> century and early 20<sup>th</sup> century which were destroyed during army occupation in the mid-20<sup>th</sup> century. Some of the forestry tracks appear to follow garden paths as shown on the 1898 Ordnance Survey map. The gardens were the subject of a series of photographs in 1911 which correspond with areas shown on a plan in a pre-war guide book. The remains of a summerhouse shown on the 1898 Ordnance Survey map are situated c300m south-west of the Castle, overlooking the terraced walk which extends southwards from the north end of the garden for a distance of c1km. The terrace is on the line of a natural scarp called Burtree Scar which continues through parkland for a distance of c500m. The terrace is suggested on Jeffreys' county map of 1770 and is on the line of a walk shown on the engraving of c1700 by Knyff and Kip. This engraving shows elaborate formal gardens south and south-west of the Castle, and estate papers record Sir John Lowther spending £1500 on planting by 1697.

**PARK** The Castle is situated north of the centre of an elongated, sub-rectangular area of parkland. An avenue extends from the Castle's north forecourt up rising land on the western edge of Yanwath Wood for a distance of c1.8km. It is shown in a painting of c1725 by Matthias Read (Harris 1979). There are three other avenues in the northern part of the park; one follows the line of Buckholme Drive and was planted during the 20<sup>th</sup> century and another of similar date runs along the public road between Newtown and Askham. The third avenue, which is shown on the 1859 Ordnance Survey map, ran parallel to and c300m to the east of Buckholme Drive, extending c600m north of the public road. An avenue shown on an estate map of 1732 and the 1770 county map ran parallel to and south of the public road.

The River Lowther runs along the western side of the northern part of the park and then curves east at a point c800m north-west of the Castle in an area called Low Gardens, where a natural amphitheatre is formed by the fall of the land to the riverbank. Some 200m north of this there is an Iron Age earthwork called Castlesteads (Scheduled Monument 1008236) in Yanwath Wood. The river turns north-eastwards through woodland called Mitchell Holme and Horseholme Wood. Thomas Wilkinson (1751-1836) laid out paths along the riverbanks in Yanwath Woods in 1804 and subsequent years. The area to the north of the Castle was not imparked until the late 18<sup>th</sup> century or early 19<sup>th</sup> century; the main avenue is shown on the estate map of 1732 running through enclosed land. Greenwood's county map of 1824 shows parkland extending north as far as the river and the 1859 Ordnance Survey map shows it extending north to Buckholme Lodge and along each side of the river.

The southern part of the park is a mixture of open land with scattered trees and areas of woodland and plantations. A pond called Decoy Pond, c1.5km south-east of the Castle, is overlooked from its eastern bank by a hunting lodge called Decoy House, which is possibly of 18<sup>th</sup> century or earlier origin. This is immediately west of an area of woodland called Decoy Hag, and the pond and Decoy Hag are within a roughly oval area shown on an estate map of 1685 as a park. Earthworks and ditches within woodland in this area probably relate to the boundaries of the earlier medieval park. The 1685 park boundary survives in various places in the form of wall footings. At the southern tip of the park there is an area called Rowlandfield Plantation which is walled on the south and north-east side. This is shown on the 1685 map and is mentioned by the second Sir John Lowther in a memoir of 1640 (quoted in Capsticks 1995) in which he states that his father walled Rowlandfield as well as repairing the walls around areas described as the Old and New Parks. Lancelot Brown (1716-83) visited Lowther on two occasions, in 1763 and 1771 and produced plans similar to those for Croome Court in Worcestershire (qv), which were not executed. In 1807 John Webb (c1754-1828) also prepared a design which may have been partially executed, but it is not possible to relate the features of the park and the pattern of planting as shown on the 1859 Ordnance Survey map to his design with any confidence. It seems likely that landscaping was undertaken when the parkland was extended to the north which happened between 1770 and 1824. A painting by JMW Turner of 1809 (Harris 1979) does not show the principal avenue, perhaps as a result of artistic licence, but if it was removed as proposed by both Webb and Brown, it had been replanted on the same line by the time Jan De Wint painted the scene c1835 (*ibid*).

**KITCHEN GARDEN** The kitchen garden is situated c800m south-east of the Castle and is reached from a drive running south from the public road to Lowther village. This leads into a walled enclosure with glasshouses along the north wall and a single-storey cottage at the west end. There is an arched opening in the north wall west of the glasshouses. The south wall has a range of bothies and other ancillary buildings now (1997) used as a cafe and as exhibition space. An arched opening leads into a second walled enclosure with a glasshouse along the western part of the north wall. There are opposed arched entrances at the northern ends of the east and west walls. The southern wall has been demolished, and the garden is divided by an east/west brick wall with a central opening which has been reduced in height on both sides and is topped by ball finials. The east and west walls continue beyond this but the area has been fenced along the line of the dividing wall and the area to the south is in use as pasture land. The 1859 Ordnance Survey map shows that the garden extended to the west as an orchard. The garden is currently (1997) in use as the Lakeland Bird of Prey Centre and it contains cages and demonstration areas.

**OTHER LAND** Lowther church (Listed grade II\*) is situated c700m north-west of the Castle. The building is of Norman origin, rebuilt and remodelled on a number of occasions. The rectangular churchyard is entered at its south end where there are 17<sup>th</sup> century gate piers (Listed grade II). Some 60m south of the church there is a mausoleum

(Listed grade II), dated 1857, for William, second Earl of Lonsdale. The western side of the churchyard is formed by a retaining wall along the edge of a scarp which drops steeply down to the River Lowther.

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## LISTED BUILDING

**Site:** YANWATH WOODHOUSE FARM, EAMONT BRIDGE, CA10 2JB (**Site 07**)  
**Category:** Listed Building (Grade II)  
**List Entry Number:** 1145306  
**National Grid Reference:** NY 52473 26355  
**Sources:** Historic England 2020g  
**Details:** Farmhouse. Early 18<sup>th</sup> century with late 18<sup>th</sup> century or early 19<sup>th</sup> century alterations. Roughcast walls with V-jointed quoins, under graduated greenslate roof with banded stone chimney stacks. Two storeys, three bays. Central top-glazed panelled door, up steps, in stone architrave under panel of quartered Lowther arms. Sash windows in stone architraves (RCHME 1936, 252, plate 31). Adjoining barns are not of interest.

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## SCHEDULED MONUMENT

**Site:** ROMANO-BRITISH SETTLEMENT AND REGULAR AGGREGATE FIELD SYSTEM NORTH OF YANWATH WOOD (**SITE 10**)  
**Category:** Scheduled Monument  
**List Entry Number:** 1008238  
**National Grid Reference:** NY 52114 25984  
**Sources:** RCHME 1936; Higham 1979; 1980; 1983; Manchester University 1975 **NY5226/A** and 1976 **NY226/C-E**; Historic England 2020d  
**Details:** The Romano-British settlement north of Yanwath Wood survives well and is a rare example of a site in a lowland situation which retains upstanding earthworks. The remains preserve considerable detail of the layout of the site and will facilitate further study of Romano-British settlement patterns in the area. Additionally, an associated field system is clearly visible on aerial photographs and has been confirmed by limited excavation. Such field systems provide important evidence of a carefully planned reorganisation of landscape and definition of landholding. Their articulation with other contemporary archaeological features, such as land boundaries, settlements, farmsteads and enclosures, makes them worthy of protection.

The monument includes a Romano-British settlement and its associated regular aggregate field system. It is located on the west side of the River Lowther; the settlement occupies the eastern end of a plateau overlooking the river floodplain. Its associated field system extends to the east down the hillslope towards the river. The settlement includes upstanding earthworks whereas the field system has been identified from cropmarks visible on aerial photographs which clearly show infilled ditches, buried walls and trackways. The settlement includes a stone and earth enclosure bank up to 7m wide and 1m high which encloses a roughly oval area measuring approximately 75m by 73m. The enclosure is subdivided into at least eight sub-rectangular enclosures or stock pens and also includes a low mound approximately 4m in diameter interpreted as a possible hut platform. There are four entrances into the enclosure: one on the north-west side and three at the east side. The associated field system visible in aerial photographs includes three large sub-rectangular fields to the east of the settlement enclosure; a small rectangular field, itself containing a sub-rectangular enclosure with a south-facing entrance, is located at the eastern end of the southernmost of the large fields. Three lengths of trackway and numerous other linear features lying to the north, south and east of the settlement enclosure have also been identified on the aerial photographs and have



been interpreted as field boundaries. In the late 1970's limited excavation of some of the features identified from aerial photographs confirmed the existence of a trackway to the east of the settlement and running between the central and northern of the large sub-rectangular fields. On the southern side of the enclosure excavation through a bank noted by survey in 1936, but since levelled by agricultural operations, found the base of a stone wall and ditch interpreted as the south-western boundary of the field system. Within the ditch sherds of Samian pottery were found and suggest that it became silted up at the end of the second century AD. To the north of the enclosure excavation through another bank noted by the survey found traces of a more substantial wall interpreted as forming the north-western boundary of the field system. All modern field boundaries, telegraph poles, gateposts, a small brick and concrete reservoir, a water trough, and the surface of a farm track are all excluded from the scheduling, although the ground beneath all these features, is included.

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## SCHEDULED MONUMENT

**Site:** Bowl barrow 850m WSW of Yanwath Woodhouse Farm (**Site 12**)

**Category:** Scheduled Monument

**List Entry Number:** 1008235

**National Grid Reference:** NY 51693 25937

**Sources:** Historic England 2020a

**Details:** Despite minor surface disturbance to the monument's summit, the bowl barrow 850m WSW of Yanwath Woodhouse Farm survives well. It will contain undisturbed archaeological deposits within the mound and upon the old land surface beneath. The monument includes a bowl barrow located on gently sloping ground 850m WSW of Yanwath Woodhouse Farm. It includes a flat-topped oval mound of earth and stones up to 2m high with maximum dimensions of 25.5m by 21.5m.

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## WORLD HERITAGE SITE

**Site:** The English Lake District

**Category:** World Heritage Site

**List Entry Number:** 1452615

**National Grid Reference:** NY 29958 09568

**Sources:** Historic England 2020e

**Details:** *Summary* Located in northwest England, the English Lake District is a mountainous area, whose valleys have been modelled by glaciers in the Ice Age and subsequently shaped by an agro-pastoral land-use system characterized by fields enclosed by walls. The combined work of nature and human activity has produced a harmonious landscape in which the mountains are mirrored in the lakes. Grand houses, gardens and parks have been purposely created to enhance the landscape's beauty. This landscape was greatly appreciated from the 18<sup>th</sup> century onwards by the Picturesque and later Romantic movements, which celebrated it in paintings, drawings and words. It also inspired an awareness of the importance of beautiful landscapes and triggered early efforts to preserve them.

*Significance* The English Lake District is a self-contained mountainous area in North West England of some 2,292 square kilometres. Its narrow, glaciated valleys radiating from the central massif with their steep hillsides and slender lakes exhibit an extraordinary beauty and harmony. This is the result of the Lake District's continuing distinctive agro-pastoral traditions based on local breeds of sheep including the Herdwick, on common fell-grazing and relatively independent farmers. These traditions have evolved under the influence of the physical constraints of its mountain setting. The stone-walled fields and

rugged farm buildings in their spectacular natural backdrop, form an harmonious beauty that has attracted visitors from the 18<sup>th</sup> century onwards. Picturesque and Romantic interest stimulated globally-significant social and cultural forces to appreciate and protect scenic landscapes. Distinguished villas, gardens and formal landscapes were added to augment its picturesque beauty. The Romantic engagement with the English Lake District generated new ideas about the relationship between humanity and its environment, including the recognition of harmonious landscape beauty and the validity of emotional response by people to their landscapes. A third key development was the idea that landscape has a value, and that everyone has a right to appreciate and enjoy it. These ideas underpin the global movement of protected areas and the development of recreational experience within them. The development in the English Lake District of the idea of the universal value of scenic landscape, both in itself and in its capacity to nurture and uplift imagination, creativity and spirit, along with threats to the area, led directly to the development of a conservation movement and the establishment of the National Trust movement, which spread to many countries, and contributed to the formation of the modern concept of legally-protected landscapes.

*Integrity* The English Lake District World Heritage property is a single, discrete, mountainous area. All the radiating valleys of the English Lake District are contained within it. The property is of sufficient size to contain all the attributes of Outstanding Universal Value needed to demonstrate the processes that make this a unique and globally-significant property. The boundary of the property is the Lake District National Park boundary as designated in 1951 and is established on the basis of both topographic features and local government boundaries. The attributes of Outstanding Universal Value are in generally good condition. Risks affecting the site include the impact of long-term climate change, economic pressures on the system of traditional agro-pastoral farming, changing schemes for subsidies, and development pressures from tourism.

*Authenticity* As an evolving cultural landscape, the English Lake District conveys its Outstanding Universal Value not only through individual attributes but also in the pattern of their distribution amongst the 13 constituent valleys and their combination to produce an over-arching pattern and system of land use. The key attributes relate to a unique natural landscape which has been shaped by a distinctive and persistent system of agro-pastoral agriculture and local industries, with the later overlay of distinguished villas, gardens and formal landscapes influenced by the Picturesque Movement; the resulting harmonious beauty of the landscape; the stimulus of the Lake District for artistic creativity and globally influential ideas about landscape; the early origins and ongoing influence of the tourism industry and outdoor movement; and the physical legacy of the conservation movement that developed to protect the Lake District.

## **Appendix 5: Current Design for Proposed Extension to Holiday Park**



general notes:  
do not scale the drawing.  
all dimensions to be checked on site prior to commencement of work and any discrepancy shall be immediately reported and resolved prior to work commencing.  
this drawing is to be read in conjunction with all relevant drawings and specifications relating to the job whether or not indicated on the drawing.  
copyright reserved to mck associates ltd. and this drawing may not be used or reproduced without prior written consent.

**KEY:**

- Planning Application Site Boundary
- Extent of Lowther Holiday Park as existing and subject to:

1/ Westmorland County Council  
Planning Permission dated 20/9/1967,  
ref. NW 5732/WCC.C/7329  
2/ Certificate of Lawful Use or  
Development reference 18/0914 for  
"the continued use of land for the  
stationing of caravans or tents for  
all year-round occupation"  
3/ Site Licence for 628 pitches

- Scheduled Monument
- Historic Parks and Gardens
- ★ Listed Building (Farmhouse: Grade II)
- ▨ Flood Risk Zone (2 & 3)
- ▨ Caravan Exclusion Zones 1 and 2 including Structural Landscaping
- ✳ Potential future permissive footpath link between Lowther Holiday Park and the Scheduled Monument

This potential route passes through a gap in the hedgerow (total length between points A to B at Point C. Associated long-term hedgerow maintenance and re-planting the gap

**APPLICATION SITE AREA :**

**TOTAL : 31.04 acres (12.56 hectares of which 8.41 hectares comprises the stationing of caravans)**

**NUMBER OF PROPOSED CARAVANS WITHIN APPLICATION SITE BOUNDARY :**

**TOTAL : 125**

Rev. Date By Description  
Client:  
**PURE LEISURE GROUP**

**mck associates limited**  
architecture | building surveying | urban design  
burnaby villa ■ 48 waiting street road ■ fulwood ■ preston ■ pr2 8bp  
tel: 01772 774510 fax: 01772 774511 email mck@mckassociates.co.uk

Project:  
Proposed extension to holiday caravan site,  
Lowther Holiday Park,  
Penrith, CA10 2JB  
Drawing Title:  
Proposed Site Plan

Drawn: RE	Checked: PS	Scale: 1:2500 @ A1	Date: 01.04.2020
Job No: 19-032	Drawing No: 1004	Rev: A	

A1 PLANNING

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## **Appendix 6: Archaeological Geophysical Survey Report**



**PHASE**  
SITE INVESTIGATIONS

**Extension to Lowther Holiday Park  
Lowther, Cumbria**

**Archaeological geophysical survey**

**Project No. ARC/2861/1067**

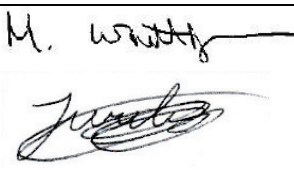

**October 2020**



# **Extension to Lowther Holiday Park Lowther, Cumbria**

## **Archaeological geophysical survey**

**Project No. ARC/2861/1067**

<b>Report prepared by</b>		<b>Report checked by</b>	
Name	Mark Whittingham BSc MA MCIfA Jelmer Wubs BA MA	Name	Nicola Fairs BSc MSc DIC CGeol FGS
Signature		Signature	
Date	02/10/20	Date	07/10/20

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## 1. SUMMARY

Phase Site Investigations Ltd was commissioned by Greenlane Archaeology Ltd to carry out a magnetic gradient survey at the site of a proposed extension to Lowther Holiday Park, Lowther, Cumbria. The aim of the survey was to help establish the presence / absence, extent, character, relationships and date (as far as circumstances and the inherent limitations of the technique permits) of archaeological features within the survey area.

The survey was undertaken using a Phase Site Investigations Ltd multi-sensor array cart system (MACS). The MACS comprised 8 Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The MACS data was collected on profiles spaced 0.5 m apart with readings taken at between 0.1 and 0.15 m intervals.

The survey has provided evidence for archaeological activity, in the form of two sub-circular anomalies, suggestive of prehistoric features such as barrows or round-houses, and several linear / curvi-linear responses indicative of infilled archaeological ditches. There are also a number of additional anomalies that could be related to archaeological features / activity.

The majority of the responses associated with probable and possible archaeological features are fragmented, weak or discontinuous. This suggests that some features may have been truncated but also that the magnetic susceptibility of the soils could vary across the site and be relatively low in places; possibly to the extent that some features may only produce weak or intermittent responses or may not produce measureable magnetic responses. It is likely that the full extent of the archaeological activity across the site has not been determined by the magnetic survey.

The survey has also identified anomalies that relate to modern material / objects (including a number of pipes, drains or cables), agricultural activity (including ridge and furrow) and geological / pedological variations.

There are a large number of weak responses that are of uncertain origin. Generally the weakness of the responses and their fragmented / discontinuous nature precludes a reliable interpretation. Some of them could be related to archaeological features / activity but others could be a product of natural features / variations, agricultural or other relatively modern activity.

## 2. INTRODUCTION

### 2.1 Overview

Phase Site Investigations Ltd was commissioned by Greenlane Archaeology Ltd to carry out an archaeological geophysical survey at the site of a proposed extension to Lowther Holiday Park, Lowther, Cumbria utilising magnetic gradiometers.

The aim of the survey was to help establish the presence / absence, extent, character, relationships and date (as far as circumstances and the inherent limitations of the technique permits) of archaeological features within the survey area.

The location of the site is shown in drawing ARC\_2861\_1067\_01.

### 2.2 Site description

The site is situated on land to the west of Lowther Holiday Park (centred at NGR NY 522 261), approximately 8.1 km to the south of Penrith and covered an area of approximately 12.6 ha.

The site covered two areas located in parts of two adjacent fields. Each area has been given a number as shown in drawing ARC\_2861\_1067\_02.

Area 1 covered the northern part of a pasture field and had a downwards slope from west to east. The geology in the north of this area consists of limestone of the Three Yard Limestone Member with mudstone, siltstone and sandstone of the Alston Formation in the south of the area with the east of the area overlain by glacial till (British Geological Survey, 2020).

Area 2 covered the majority of a field that was under grass or an immature crop and was relatively level, except for a depression in the south-east of the area. The geology in the north-east and south-west of this area consists of mudstone, siltstone and sandstone of the Alston Formation with limestone of the Three Yard Limestone Member present in the central, north-western and southern parts of the area. The entire area is overlain by glacial till (British Geological Survey, 2020).

The site was bounded by a mixture of hedges, post and wire fences and drystone walls to the north, west and east with no fixed boundary along the southern edge of the site. A dilapidated wall and area of soft / uneven ground separated Areas 1 and 2 and a metal cattle feeder was present in this area. Farm machinery was present in the north of the area

### 2.3 Archaeological background

A heritage impact assessment undertaken by Greenlane Archaeology Ltd (2020) highlighted that the area surrounding the site,

*‘is filled with archaeological remains from the prehistoric period onwards, including some substantial monuments of Neolithic and Bronze Age date a short distance to the north, but with a number of settlements of medieval and earlier origin nearby and the important Lowther Castle and church to the south. More significant is a Romano-British settlement and associated earthworks immediately to the west of the proposed development area and a neighbouring barrow, both of which are Scheduled Monuments’.*

The assessment also notes that,

*‘A consultation of the available maps shows that the site has been open fields since at least the 18<sup>th</sup> century, with some variation of the field pattern occurring since that time.*



*Aerial photographs have also revealed a range of cropmarks within the main part of the site [Area 2], some of which perhaps relate to the Scheduled Romano-British settlement to the west. [...] the main field comprising the site has been extensively ploughed and improved and so any remains relating to the cropmarks [...] will have already been impacted upon but elements could still survive.'*

The heritage impact assessment indicates that there are numerous air photographs of the local area with some,

*'showing various cropmarks, probably related to infilled ditches, buried walls and trackways, extending into the proposed development site'*

An Ordnance Survey map from 1863, shown within the heritage impact assessment, shows a field boundary within Area 2 on a rough south-west to north-east alignment. The assessment also indicated the presence of a post-medieval limekiln and quarry to the immediate north-west of the site.

## **2.4 Scope of work**

The survey area was specified by the client.

The scheduled area surrounding the Roman-British settlement to the west extends up to the boundary of the site. This boundary was set out on site and the survey area was offset by several metres to the east to ensure that the scheduled area was not encroached upon. Areas adjacent to the field boundaries and metal surface obstructions were left unsurveyed which meant that the area accessible / suitable for survey was reduced to approximately 11.4 ha, the extents of which are shown in drawing ARC\_2861\_1067\_02.

No other problems were encountered during the survey which was carried out between 8 and 10 September 2020.



### **3. SURVEY METHODOLOGY**

#### **3.1 Magnetic survey**

The survey was undertaken using a Phase Site Investigations Ltd multi-sensor array cart system (MACS).

The MACS comprised 8 Foerster 4.032 Ferex CON 650 gradiometers with a control unit and data logger. The Foerster gradiometers do not require balancing as each sensor is automatically 'zeroed' using the control unit software.

The MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The sensors have a separation of 0.5 m which means that data was collected on profiles spaced at 0.5 m apart. Readings were taken at between 0.1 m and 0.15 m intervals.

Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features by several metres to reduce the detrimental effect that these surface magnetic features have on the data. The location of the MACS data is converted direct to Ordnance Survey co-ordinates using the UK OSTN 02 projection. As the survey is referenced direct to Ordnance Survey National Grid co-ordinates temporary survey stations are not established.

#### **3.2 Data processing and presentation**

The MACS data was stored direct to a laptop using in-house software which automatically corrects for instrument drift and calculates a mean value for each profile. A positional value is assigned to each data point based on the sensor number and recorded GNSS co-ordinates. The data is gridded using in-house software and parameters are set based on the sensor spacing and mean values. No additional processing is required. The gridded data is then displayed in Surfer 9 (Golden Software) and image files of the data are created.

The data was exported as greyscale raster images (PNG files). Data for the entire site is presented at a scale of 1:3000 and plots for individual fields / areas (or parts of fields / areas) with accompanying interpretations are shown at a scale of 1:1500. All greyscale plots were clipped at -2 nT to 3 nT. Greyscale plots have been 'smoothed' using a visual interpolation but the data itself has not been interpolated.

The data has been displayed relative to a digital Ordnance Survey base plan provided by the client as drawing '*1004 – Site Plan – Rev A.dwg*'. The base plan was in the Ordnance Survey National Grid co-ordinate system and as the survey grids / data were referenced directly to National Grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar and bipolar responses that will probably be associated with surface / near-surface iron objects. However, X-Y trace plots have not been presented here as they do not show any additional anomalies that are not visible in the greyscale data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot is provided in the digital archive.



All isolated responses have been assessed using a combination of greyscale and X-Y trace plots. There are a large number of 'iron spike', isolated dipolar anomalies present in the data. These responses are highly likely to be caused by modern material but the potential for these to be associated with archaeological features is increased slightly by their proximity to other anomalies / features. As such the isolated responses have been shown on the interpretation.

Anomalies associated with agricultural and drainage regimes are present in the data but each individual anomaly has not been shown on the interpretation. Instead the general orientation of the regime is indicated.

The data was examined over several different ranges during the interpretation to ensure that the maximum information possible was obtained from the data.

The anomalies have been categorised based on the type of response that they exhibit and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided.

A general discussion of the anomalies is provided for the entire site and then the results are discussed on an area by area basis. A discussion of the general categories of anomaly which have been identified by the survey is provided in Appendix 1.5.

***The geophysical interpretation drawing must be used in conjunction with the relevant results section and appendices of this report.***



## 4. RESULTS

### 4.1 General

The data quality across the majority of the survey area is very good allowing the data to be viewed at a narrow range of readings to better identify weak anomalies. There are several areas that have a more disturbed magnetic background and a number of strong responses but these are due to the presence of magnetic material / features in the topsoil or sub-surface, rather than low data quality.

Anomalies relating to archaeological features are present in the data but in places these are weak and / or fragmented and 'fade out'. It is also worth noting that a former field boundary, which is shown on historic maps to cross the survey area, is not visible in the data and responses relating to agricultural activity have varying responses across the site. These suggest that the magnetic susceptibility of the soils could vary across the site and be relatively low in places; possibly to the extent that some features may only produce weak or intermittent responses or may not produce measureable magnetic responses.

There are a large number of isolated responses across the site. The majority of these will relate to modern material or natural features / variations and some could be associated with natural features / variations. It is possible that a small number could be related to archaeological features / material but it is not possible to determine, which, if any, these may be other than possibly by proximity to archaeological features / activity. A selection of the stronger / larger isolated responses has been shown on the interpretation. The archaeological potential of these may be increased where they are located in proximity to archaeological or possible archaeological features / activity but it should be recognised that the majority of these responses will be caused by modern or natural material.

### 4.2 Area 1

**Basic topography:** Relatively steep downwards slope from the west to the east. Some undulations present.

**Area description:** Pasture field. The area was relatively soft underfoot, particularly along the eastern edge. The area was bounded by a mixture of hedges and post and wire fencing to the north-,north-west and east with no fixed boundary to the south or south-west. An unmetalled trackway ran along and adjacent to the southern edge of the survey area. A cattle feeder and remnants of a dilapidated wall were present in the east of the area and overhead cables were present within the north of the area.

**Summary of anomalies:** Numerous isolated dipolar and small bipolar responses are present, a large majority, if not all, of which will be associated with relatively modern material. Selected responses have been shown on the interpretation.

A linear bipolar anomaly associated with sub-surface utility apparatus (pipe or cable).

Very strong responses associated with strongly magnetic relatively modern features / material. These responses can extend for some distance beyond the feature and in some cases



the feature causing the strong response may be located beyond the survey area.

Positive linear responses associated with a probable regime of ridge and furrow.

Several trends of uncertain origin. Some trends may indicate continuations of archaeological features.

A number of isolated positive responses, the majority of which are probably related to modern deeper buried ferrous / fired material or geological / pedological variations but could also be caused by an infilled isolated feature.

Positive linear / curvi-linear responses and trends related to a trackway.

A positive linear response associated with an infilled archaeological feature.

**Further discussion / additional information:**

A relatively strong positive linear response (**Anomaly A**) runs through the area from west to east. The anomaly is slightly staggered / fragmented which could indicate that it has been truncated by a regime of ridge and furrow that cuts across it. The anomaly is indicative of an infilled ditch and has a similar alignment to features associated with the scheduled settlement to the west.

**Anomalies B** are made up of fragmented positive linear responses and weaker trends. It corresponds with the location of a trackway and is probably associated with this modern feature.

There are several weak trends adjacent to the eastern edge of the survey area (**Anomalies C**). The cause of these is not certain but they are not suggestive of archaeological features and are probably related to relatively modern agricultural activity.

**4.3 Area 2**

**Basic topography:** Relatively level. An area of lower ground is present towards the south of the field but the ground rises again in the south-east.

**Area description:** The field was under grass or an immature arable crop and was relatively firm underfoot. The area was bounded by a mixture of hedges, post and wire fencing a drystone wall with no fixed boundary to the south or south-west of the area. Farm machinery was present in the north of the field. Overhead cables were present within the north-east and south of the area.

**Summary of anomalies:** Numerous isolated dipolar and small bipolar responses are present, a large majority, if not all, of which will be associated with relatively modern material. Selected responses have been shown on the interpretation.

Areas of magnetic disturbance probably associated with relatively modern features / material although some responses could be related to natural features / variations.



A number of linear bipolar anomalies associated with sub-surface utility apparatus (pipes or cables).

Very strong responses associated with strongly magnetic relatively modern features / material. These responses can extend for some distance beyond the feature and in some cases the feature causing the strong response may be located beyond the survey area.

Relatively weak positive linear responses are present associated with modern ploughing regime(s).

Positive linear responses associated with probable field drains.

Broad areas of positive responses probably associated with natural features or variations

Two negative linear responses of uncertain origin.

Numerous trends of some of which will indicate continuations of archaeological features others are of uncertain origin.

Numerous isolated positive responses, the majority of which are probably related to modern deeper buried ferrous / fired material or geological / pedological variations but some could be caused by an isolated features.

Positive linear / curvi-linear responses of uncertain origin. Some responses may be related to infilled linear / curvi-linear archaeological features but others may be caused by agricultural or drainage activity.

Positive linear / curvi-linear responses associated with several archaeological infilled features.

**Further discussion / additional information:**

A number of bipolar linear anomalies are present in this area that will be related to pipes, drains or possibly cables.

There is evidence for archaeological features / activity in the south-east and south of field and a number of other possible archaeological features across the area.

There are two sub-circular anomalies in the south-east of the area. **Anomaly D** is indicative of a feature such as a barrow or round-house and is relatively strong, although it is weaker in its south-eastern edge. There are several isolated responses in this part of the anomaly and it is not certain if these are masking the response from the underlying feature or if there is a break in it. **Anomaly E** is weaker but the response appears to be unbroken. It is not certain if the variations in strength suggest a different function or composition for the two features, greater truncation or increasing depth of soil cover for Anomaly E or if it just reflects natural changes in the soils infilling the sub-circular ditches.

There are numerous other curving responses in the south of the area (**Anomalies F**), many of which are relatively weak and / or fragmented and have been shown as trends. Given that Anomaly E is relatively weak but is related to an archaeological feature it is possible that some of these other weak responses could also be related to the remnants of archaeological features. However, it is also possible that some of these anomalies could be related to natural





features / variations or are a product of agricultural activity. There are several general groupings of these weak curving responses but whether these reflect areas of archaeological activity or natural variations is not certain. One area may be defined by more linear responses (**Anomalies G**) which could suggest that it is an area of archaeological activity but it is also possible that some of Anomalies G are caused by natural features and / or agricultural activity. There are anomalies that are indicative of archaeological ditches (**Anomalies H**) which indicates that there is archaeological activity, other than the circular features, in the south of the area but these responses are fragmented and / or discontinuous and so the full extent of the archaeological features / activity cannot be determined.

Slightly further north there are other anomalies suggestive of an infilled archaeological ditch (**Anomalies I**) but again these are fragmented and discontinuous across the area. They are on the same alignment as **Anomalies J** in the west of the area, which in turn is probably caused by a continuation of the ditch in Area 1 which produced Anomaly A. It is not certain if the underlying feature continues across the full width of Area 2, but contains fill material that is less magnetic in the centre of the area or is more deeply buried or whether the underlying feature has been truncated to a greater extent where there are no visible anomalies.

In the south-west of the area there are several responses (**Anomalies K**) that could be related to the same, relatively modern feature that has produced Anomalies B in Area 1 but it is also possible that these are caused by an unrelated feature and so could be related to an archaeological feature / activity. Also in the south-west of the area there are weak linear responses on the same alignment (**Anomalies L**). The responses are fragmented and relatively straight and could be related to a modern feature, such as a field drain, but they could also be associated with an infilled feature and as such could possibly be archaeological in origin. There are several other weak trends in this part of the area that are suggestive of anthropogenic features / activity (**Anomalies M**) but these are too weak and fragmented to reliably interpret. They could possibly be related to infilled ditches, and as such may be archaeological in origin, but they could also be caused by drainage or other relatively modern features / activity.

**Anomalies N** are suggestive of an infilled feature and so could be related to an archaeological ditch but there are similar anomalies further north, some of which are more suggestive of natural features and so it cannot be determined with certainty if Anomalies N are related to archaeological or natural features. **Anomalies O** are indicative of an infilled feature and are suggestive of an archaeological ditch but could be related to a more modern feature. There are a number of other responses in this part of the area but some are relatively diffuse and others are weak so again a reliable interpretation is not possible. **Anomalies P** may be more suggestive of anthropogenic features and **Anomalies Q** natural features / variations but the exact cause of these is not certain.

There are numerous additional trends across the area but in many cases it is not possible to reliably determine if these are related to drainage or other modern features / activity, archaeological features or are a product of natural variations. **Anomalies R** stand out slightly as these are linear, slightly stronger or more coherent and are suggestive of being caused by anthropogenic features / activity but whether this is archaeological or more modern activity is not certain. If some of these anomalies are related to archaeological features then it is clear that the full extent of this activity cannot be determined from the magnetic data. The trends in the far south of the area (**Anomalies S**) are probably related to agricultural or other modern features but it is possible that some of them could have a different origin.



There are two negative linear anomalies in the south of the area (**Anomalies T**). The exact cause of these is uncertain but on this geology it is unlikely that these are related to infilled features and they are probably caused by non-metallic pipes or drains.

There are two broad, diffuse areas of positive and / or negative responses, one of which forms a curving shape (**Anomaly U**). These are indicative of natural features / variations with Anomaly U possibly being related to a palaeochannel (or other infilled natural feature).

There are several areas of magnetic disturbance. Anomalies of this type are usually caused by concentrations of modern material and that could be the case here as the anomalies could be related to areas of infill material. However, the responses could be also caused by concentrations of naturally magnetic material, such as gravel deposits. There is evidence for industrial activity to the north of the site and it is possible that some of the areas of magnetic disturbance or larger isolated responses could be related to similar activity but there is no direct evidence to suggest that this is the cause of any responses within this site.



## 5. DISCUSSION AND CONCLUSIONS

The survey has provided evidence for archaeological activity, in the form of two sub-circular anomalies, suggestive of prehistoric features such as barrows or round-houses, and several linear / curvi-linear responses indicative of infilled archaeological ditches. There are also a number of additional anomalies that could be related to archaeological features / activity.

The majority of the responses associated with probable and possible archaeological features are fragmented, weak or discontinuous. This suggests that some features may have been truncated but also that the magnetic susceptibility of the soils could vary across the site and be relatively low in places; possibly to the extent that some features may only produce weak or intermittent responses or may not produce measureable magnetic responses. It is likely that the full extent of the archaeological activity across the site has not been determined by the magnetic survey.

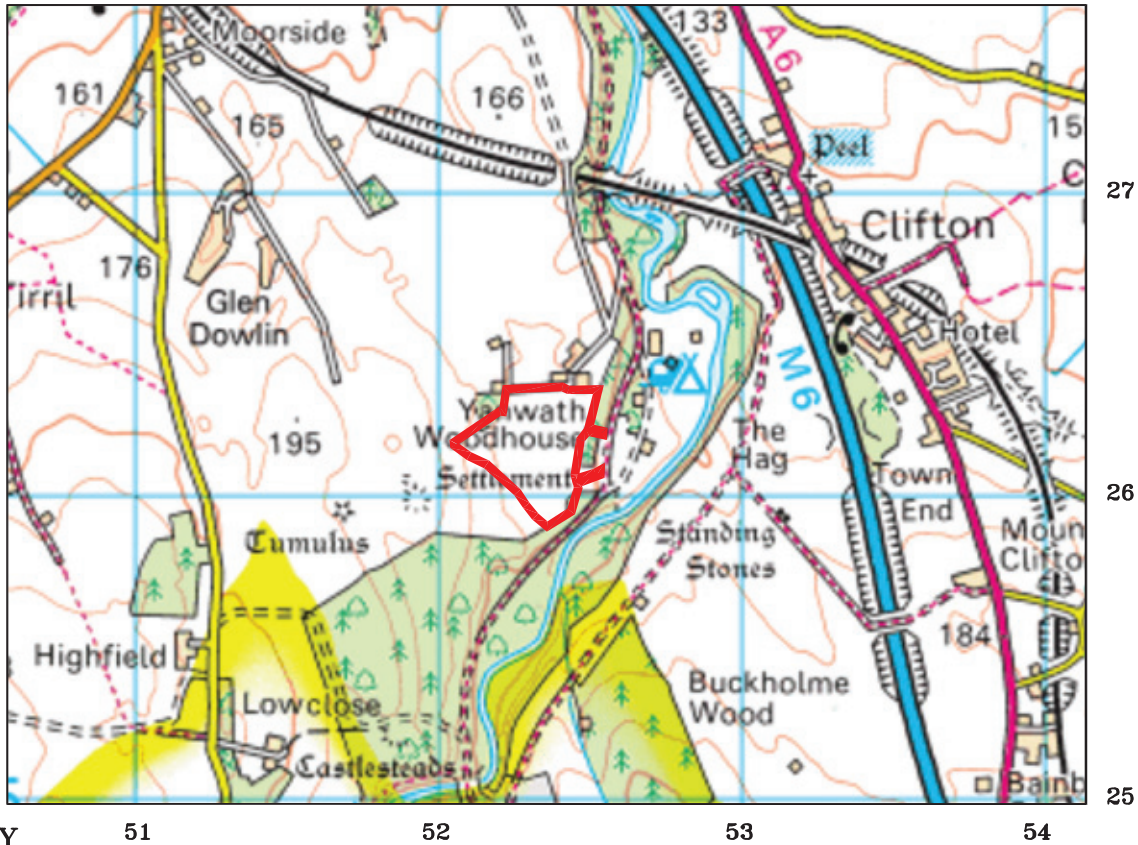
The survey has also identified anomalies that relate to modern material / objects (including a number of pipes, drains or cables), agricultural activity (including ridge and furrow) and geological / pedological variations.

There are a large number of weak responses that are of uncertain origin. Generally the weakness of the responses and their fragmented / discontinuous nature precludes a reliable interpretation. Some of them could be related to archaeological features / activity but others could be a product of natural features / variations, agricultural or other relatively modern activity.

***It should be noted that a geophysical survey does not directly locate sub-surface features - it identifies variations or anomalies in the background response caused by features. The interpretation of geophysical anomalies is often subjective and it is rarely possible to identify the cause of all such anomalies. Not all features will produce a measurable anomaly and the effectiveness of a geophysical survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a geophysical survey will identify all sub-surface features. Confirmation on the identification of anomalies and the presence or absence of sub-surface features can only be achieved by intrusive investigation.***



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SITE LOCATION

SCALE



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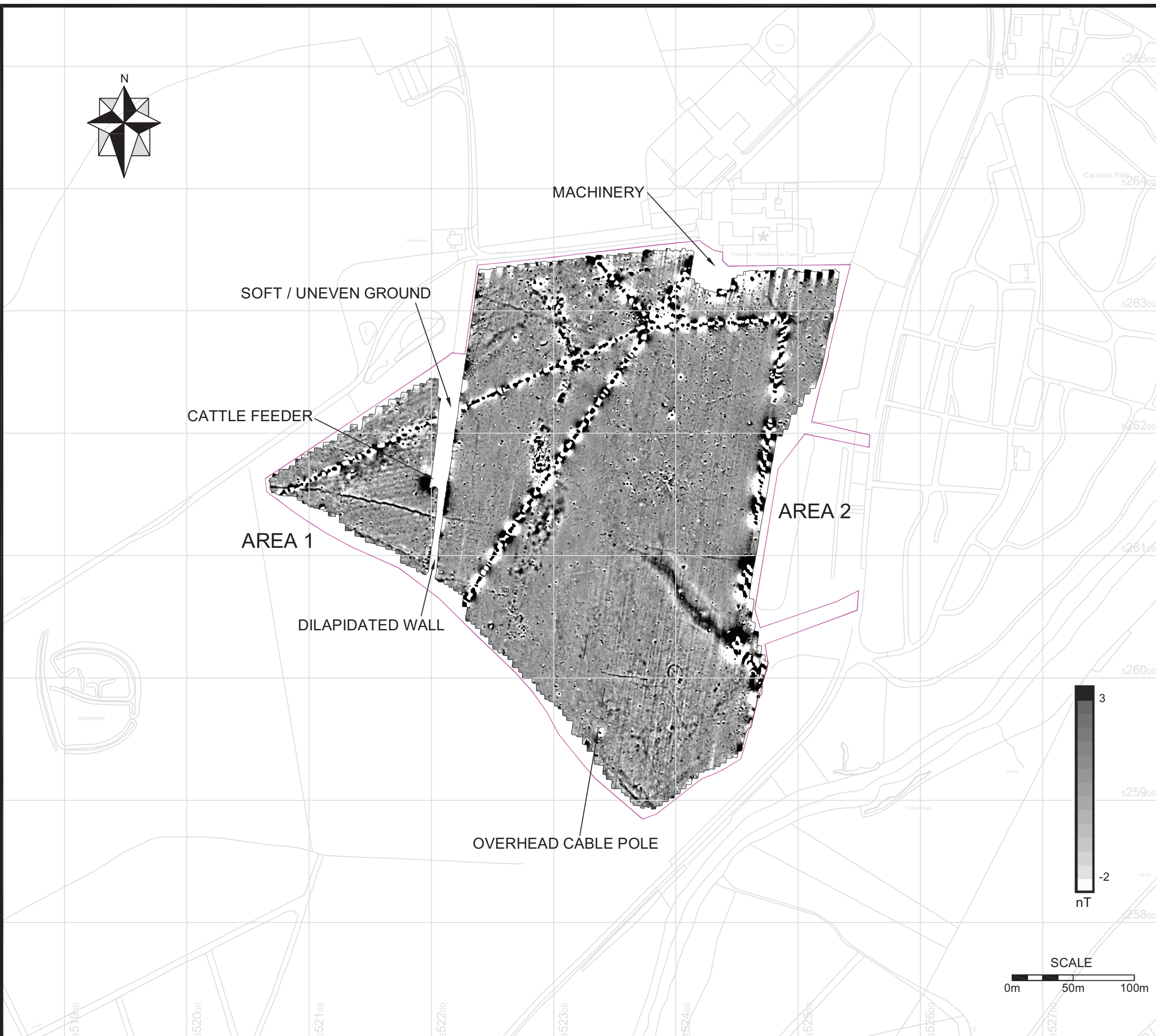


**PHASE**  
SITE INVESTIGATIONS

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Scale [A4 Sheet]	Drawing	Status
AS SHOWN	ARC_2861_1067_01	FINAL
Client		
GREENLANE ARCHAEOLOGY LTD ULVERSTON		
Site		
EXTENSION TO LOWTHER HOLIDAY PARK LOWTHER, CUMBRIA		
Title		
SITE LOCATION MAP		
Job No		
ARC_2861_1067		
Chk.	Drawn	Date
NF	CW	11/09/2020



**NOTES**

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**KEY**

— SITE BOUNDARY



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Scale	[A3 Sheet]	Drawing	Status
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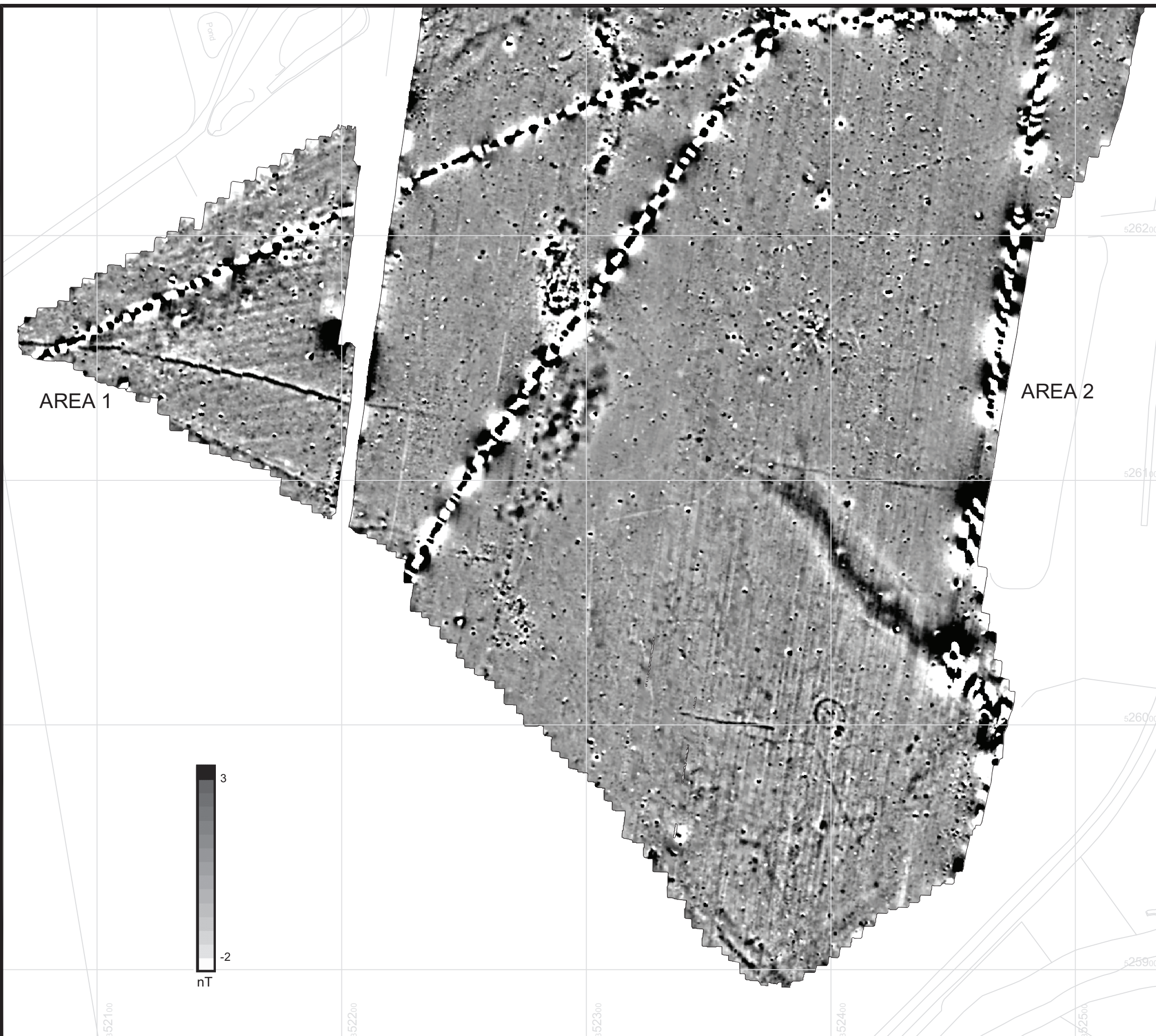
Client	GREENLANE ARCHAEOLOGY LTD ULVERSTON
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Site	EXTENSION TO LOWTHER HOLIDAY PARK LOWTHER, CUMBRIA
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Title	LOCATION OF SITE SHOWING MAGNETIC GRADIENT DATA
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Job No	ARC_2861_1067
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Surveyed	JW, PW	Drawn	JW, MW
Chk.	NF	Date	10/09/2020



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Scale	[A3 Sheet]	Drawing	Status
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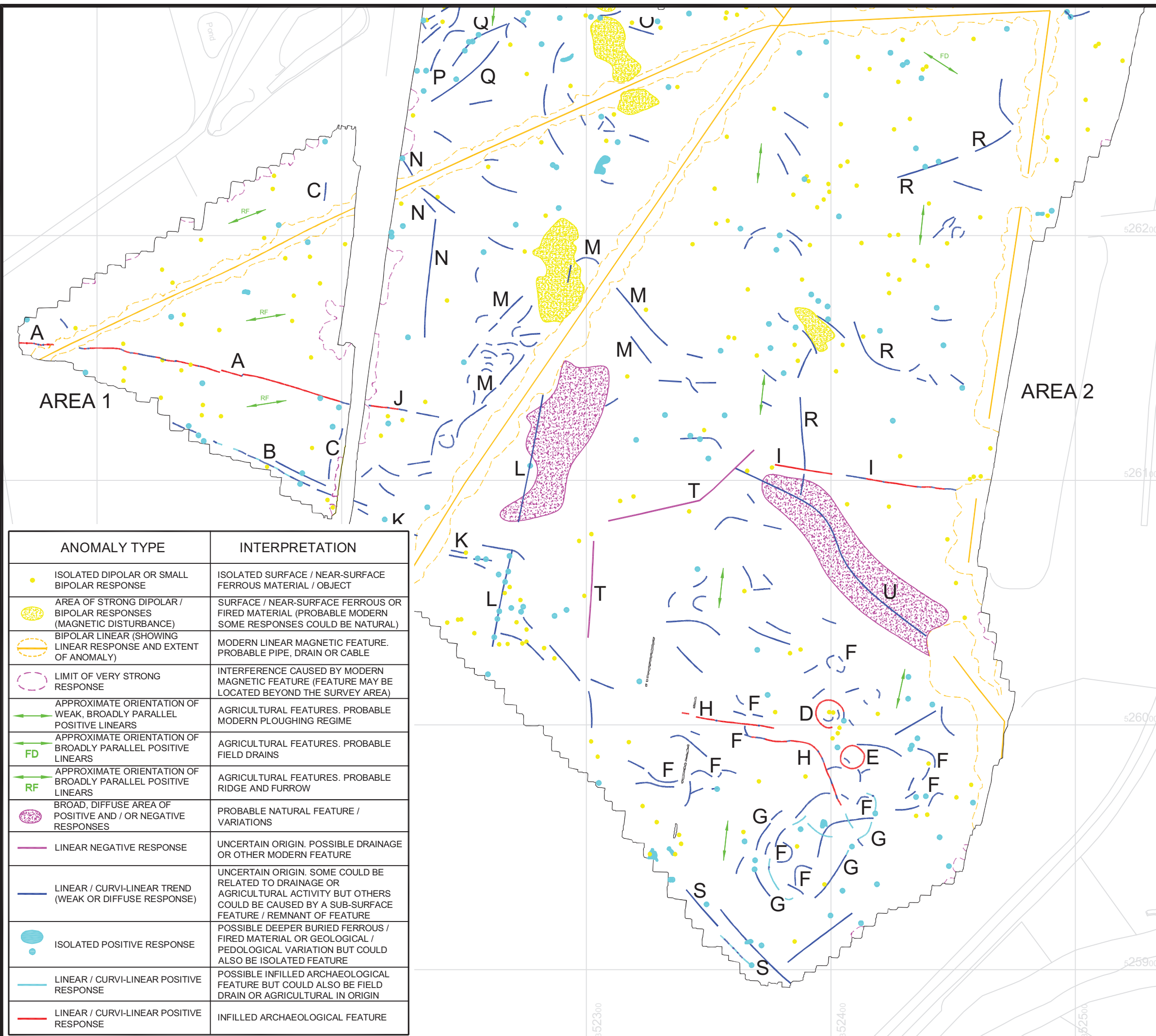
Client  
**GREENLANE ARCHAEOLOGY LTD  
 ULVERSTON**

Site  
**EXTENSION TO LOWTHER HOLIDAY PARK  
 LOWTHER, CUMBRIA**

Title  
**GREYSCALE PLOTS OF MAGNETIC  
 GRADIENT DATA: AREA 1 AND CENTRE  
 AND SOUTH OF AREA 2**

Job No  
**ARC\_2861\_1067**

Surveyed	JW, PW	Drawn	MW
Chk.	NF	Date	10/09/2020



**NOTES**

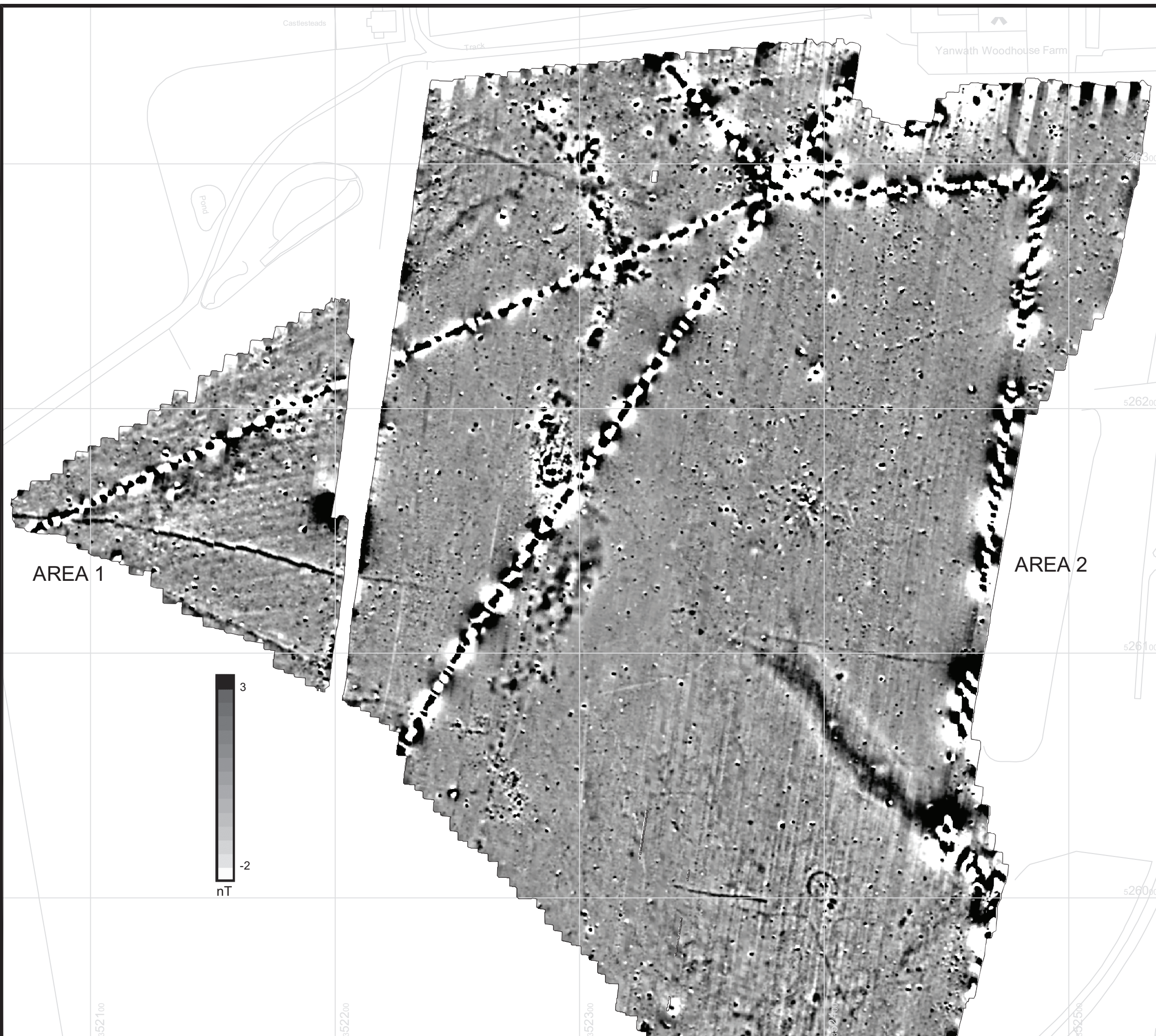
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ANOMALY TYPE	INTERPRETATION
	ISOLATED DIPOLAR OR SMALL BIPOLAR RESPONSE ISOLATED SURFACE / NEAR-SURFACE FERROUS MATERIAL / OBJECT
	AREA OF STRONG DIPOLAR / BIPOLAR RESPONSES (MAGNETIC DISTURBANCE) SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL (PROBABLE MODERN SOME RESPONSES COULD BE NATURAL)
	BIPOLAR LINEAR (SHOWING LINEAR RESPONSE AND EXTENT OF ANOMALY) MODERN LINEAR MAGNETIC FEATURE. PROBABLE PIPE, DRAIN OR CABLE
	LIMIT OF VERY STRONG RESPONSE INTERFERENCE CAUSED BY MODERN MAGNETIC FEATURE (FEATURE MAY BE LOCATED BEYOND THE SURVEY AREA)
	APPROXIMATE ORIENTATION OF WEAK, BROADLY PARALLEL POSITIVE LINEARS AGRICULTURAL FEATURES. PROBABLE MODERN PLOUGHING REGIME
	APPROXIMATE ORIENTATION OF BROADLY PARALLEL POSITIVE LINEARS AGRICULTURAL FEATURES. PROBABLE FIELD DRAINS
	APPROXIMATE ORIENTATION OF BROADLY PARALLEL POSITIVE LINEARS AGRICULTURAL FEATURES. PROBABLE RIDGE AND FURROW
	BROAD, DIFFUSE AREA OF POSITIVE AND / OR NEGATIVE RESPONSES PROBABLE NATURAL FEATURE / VARIATIONS
	LINEAR NEGATIVE RESPONSE UNCERTAIN ORIGIN. POSSIBLE DRAINAGE OR OTHER MODERN FEATURE
	LINEAR / CURVI-LINEAR TREND (WEAK OR DIFFUSE RESPONSE) UNCERTAIN ORIGIN. SOME COULD BE RELATED TO DRAINAGE OR AGRICULTURAL ACTIVITY BUT OTHERS COULD BE CAUSED BY A SUB-SURFACE FEATURE / REMNANT OF FEATURE
	ISOLATED POSITIVE RESPONSE POSSIBLE DEEPER BURIED FERROUS / FIRED MATERIAL OR GEOLOGICAL / PEDOLOGICAL VARIATION BUT COULD ALSO BE ISOLATED FEATURE
	LINEAR / CURVI-LINEAR POSITIVE RESPONSE POSSIBLE INFILLED ARCHAEOLOGICAL FEATURE BUT COULD ALSO BE FIELD DRAIN OR AGRICULTURAL IN ORIGIN
	LINEAR / CURVI-LINEAR POSITIVE RESPONSE INFILLED ARCHAEOLOGICAL FEATURE

Scale	[A3 Sheet] 1:1500	Drawing	ARC_2861_1067_04	Status	FINAL
Client	GREENLANE ARCHAEOLOGY LTD ULVERSTON				
Site	EXTENSION TO LOWTHER HOLIDAY PARK LOWTHER, CUMBRIA				
Title	INTERPRETATION OF MAGNETIC GRADIENT DATA: AREA 1 AND CENTRE AND SOUTH OF AREA 2				
Job No	ARC_2861_1067				
Surveyed	JW, PW	Drawn	JW, MW		
Chk.	NF	Date	10/09/2020		



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Scale	[A3 Sheet]	Drawing	Status
1:1500		ARC_2861_1067_05	FINAL

Client	GREENLANE ARCHAEOLOGY LTD ULVERSTON
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Site	EXTENSION TO LOWTHER HOLIDAY PARK LOWTHER, CUMBRIA
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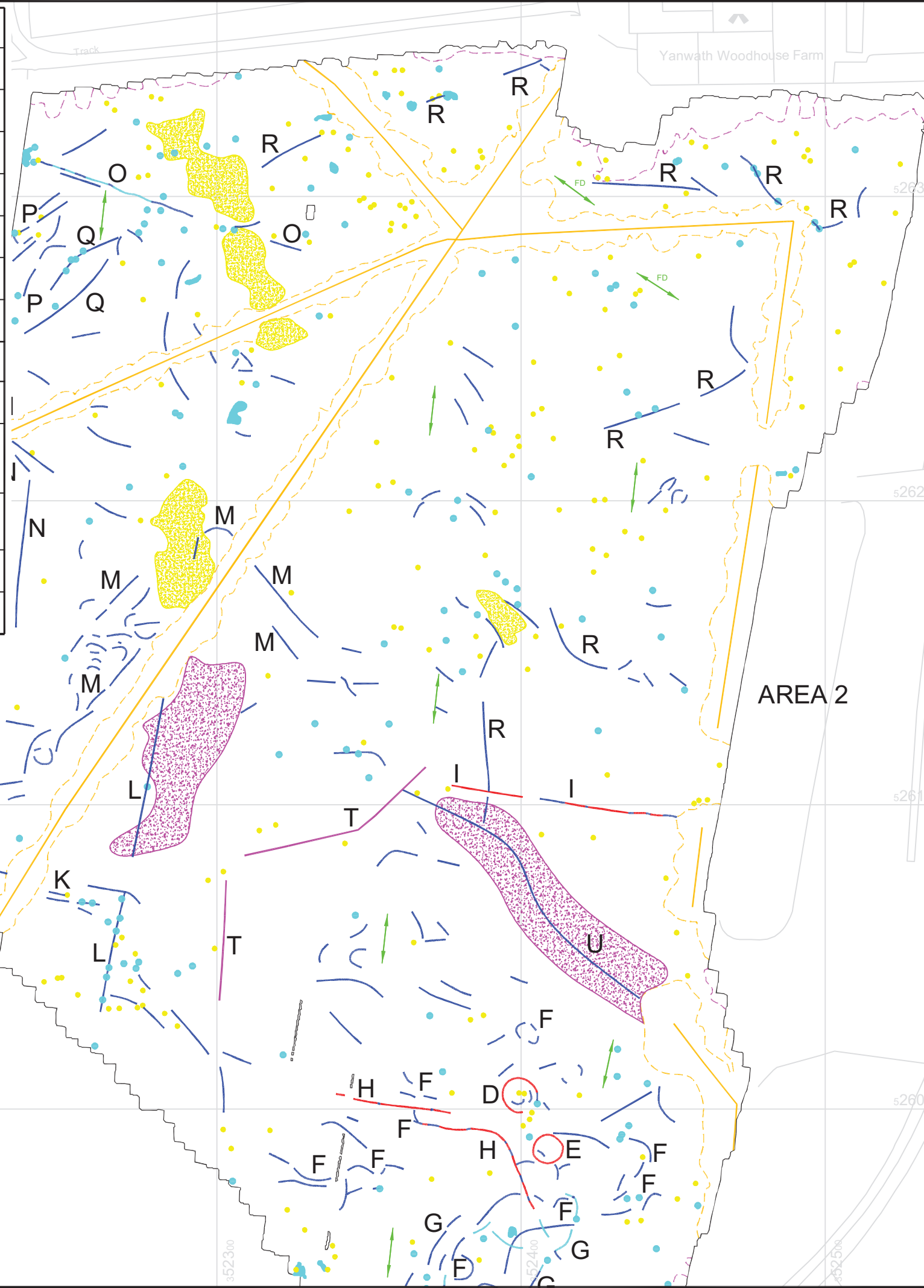
Title	GREYSCALE PLOTS OF MAGNETIC GRADIENT DATA: NORTH AND CENTRE OF AREA 2 AND AREA 1
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Job No	ARC_2861_1067
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Surveyed	JW, PW	Drawn	MW
Chk.	NF	Date	10/09/2020



ANOMALY TYPE	INTERPRETATION
ISOLATED DIPOLAR OR SMALL BIPOLAR RESPONSE	ISOLATED SURFACE / NEAR-SURFACE FERROUS MATERIAL / OBJECT
AREA OF STRONG DIPOLAR / BIPOLAR RESPONSES (MAGNETIC DISTURBANCE)	SURFACE / NEAR-SURFACE FERROUS OR FIRED MATERIAL (PROBABLE MODERN SOME RESPONSES COULD BE NATURAL)
BIPOLAR LINEAR (SHOWING LINEAR RESPONSE AND EXTENT OF ANOMALY)	MODERN LINEAR MAGNETIC FEATURE. PROBABLE PIPE, DRAIN OR CABLE
LIMIT OF VERY STRONG RESPONSE	INTERFERENCE CAUSED BY MODERN MAGNETIC FEATURE (FEATURE MAY BE LOCATED BEYOND THE SURVEY AREA)
APPROXIMATE ORIENTATION OF WEAK, BROADLY PARALLEL POSITIVE LINEARS	AGRICULTURAL FEATURES. PROBABLE MODERN PLOUGHING REGIME
APPROXIMATE ORIENTATION OF BROADLY PARALLEL POSITIVE LINEARS	AGRICULTURAL FEATURES. PROBABLE FIELD DRAINS
APPROXIMATE ORIENTATION OF BROADLY PARALLEL POSITIVE LINEARS	AGRICULTURAL FEATURES. PROBABLE RIDGE AND FURROW
BROAD, DIFFUSE AREA OF POSITIVE AND / OR NEGATIVE RESPONSES	PROBABLE NATURAL FEATURE / VARIATIONS
LINEAR NEGATIVE RESPONSE	UNCERTAIN ORIGIN. POSSIBLE DRAINAGE OR OTHER MODERN FEATURE
LINEAR / CURVI-LINEAR TREND (WEAK OR DIFFUSE RESPONSE)	UNCERTAIN ORIGIN. SOME COULD BE RELATED TO DRAINAGE OR AGRICULTURAL ACTIVITY BUT OTHERS COULD BE CAUSED BY A SUB-SURFACE FEATURE / REMNANT OF FEATURE
ISOLATED POSITIVE RESPONSE	POSSIBLE DEEPER BURIED FERROUS / FIRED MATERIAL OR GEOLOGICAL / PEDOLOGICAL VARIATION BUT COULD ALSO BE ISOLATED FEATURE
LINEAR / CURVI-LINEAR POSITIVE RESPONSE	POSSIBLE INFILLED ARCHAEOLOGICAL FEATURE BUT COULD ALSO BE FIELD DRAIN OR AGRICULTURAL IN ORIGIN
LINEAR / CURVI-LINEAR POSITIVE RESPONSE	INFILLED ARCHAEOLOGICAL FEATURE



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Scale	[A3 Sheet]	Drawing	Status
1:1500		ARC_2861_1067_06	FINAL

Client  
**GREENLANE ARCHAEOLOGY LTD  
 ULVERSTON**

Site  
**EXTENSION TO LOWTHER HOLIDAY PARK  
 LOWTHER, CUMBRIA**

Title  
**INTERPRETATION OF MAGNETIC  
 GRADIENT DATA: NORTH AND CENTRE  
 OF AREA 2 AND SOUTH OF AREA 1**

Job No  
**ARC\_2861\_1067**

Surveyed	JW, PW	Drawn	JW, MW
Chk.	NF	Date	10/09/2020



## **BIBLIOGRAPHY AND REFERENCES**

Greenlane Archaeology Ltd, 2020, Extension to Lowther Holiday Park, Lowther, Cumbria:  
Heritage Impact Assessment

British Geological Survey, 2020, online resource - [www.bgs.ac.uk](http://www.bgs.ac.uk)

## APPENDIX 1

### Magnetic survey: technical information

#### 1.1 Theoretical background

- 1.1.1 Magnetic instruments measure the value of the Earth's magnetic field; the units of which are nanoTeslas (nT). The presence of surface and sub-surface features can cause variations or anomalies in this magnetic field. The strength of the anomaly is dependent on the magnetic properties of a feature and the material that surrounds it. The two magnetic properties that are of most interest are magnetic susceptibility and thermoremanent magnetism.
- 1.1.2 Magnetic susceptibility indicates the amount of ferrous (iron) minerals that are present. These can be redistributed or changed (enhanced) by human activity. If enhanced material subsequently fills in features such as pits or ditches then these can produce localised increases in magnetic responses (anomalies) which can be detected by a magnetic gradiometer even when the features are buried under additional soil cover.
- 1.1.3 In general, it is the contrast between the magnetic susceptibility of deposits filling cut features, such as ditches or pits, and the magnetic susceptibility of topsoils, subsoils and rocks into which these features have been cut which causes the most recognisable responses. This is primarily because there is a tendency for magnetic ferrous compounds to become concentrated in the topsoil, thereby making it more magnetic than the subsoil or the bedrock. Linear features cut into the subsoil or geology, such as ditches, that have been silted up or have been backfilled with topsoil will therefore usually produce a positive magnetic response relative to the background soil levels. Discrete feature, such as pits, can also be detected. Less magnetic material such as masonry or plastic service pipes which intrude into the topsoil may give a negative magnetic response relative to the background level. The strength of magnetic responses that a feature will produce will depend on the background magnetic susceptibility, how rapidly the feature has been infilled, the level and type of human activity in the area and the size and depth of a feature. Not all infilled features can be detected and natural variations can also produce localised positive and negative anomalies.
- 1.1.4 Thermoremanent magnetism indicates the amount of magnetism inherent in an object as a result of heating. Material that has been heated to a high temperature (fired), such as brick, can acquire strong magnetic properties and so although they may not appear to have a high iron content they can produce strong magnetic anomalies
- 1.1.5 The magnetic survey method is highly sensitive to interference from surface and near-surface magnetic 'contaminants'. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult, or even impossible, in the vicinity of surface magnetic features. The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.
- 1.1.6 The interpretation of magnetic anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. The main factors that may limit whether a feature can be detected are the



composition of a feature, its depth and size and the surrounding material. It is not possible to guarantee that a magnetic survey will identify all sub-surface features.

- 1.1.7 Most high resolution, near surface magnetic surveys utilise a magnetic gradiometer. A gradiometer is a hand-held instrument that consists of two magnetic sensors, one positioned directly above the other, which allows measurement of the magnetic gradient component of the magnetic field. A gradiometer configuration eliminates the need for applying corrections due to natural variations in the overall field strength that occur during the course of a day but it only measures relative variations in the local magnetic field and so comparison of absolute values between sites is not possible.
- 1.1.8 Features that are commonly located using magnetic surveys include archaeological ditches and pits, buried structures or foundations, mineshafts, unexploded ordnance, metallic pipes and cables, buried piles and pile caps. The technique can also be used for geological mapping; particularly the location of igneous intrusions.

## **1.2 Instrumentation**

- 1.2.1 A multi-sensor array cart system (MACS) utilising 8 Foerster 4.032 Ferex CON 650 gradiometers, spaced at 0.5 m intervals, with a control unit and data logger was used for the magnetic survey.

## **1.3 Survey methodology**

- 1.3.1 The MACS utilises an RTK GNSS system which means that survey grids do not have to be established. Instead an area is surveyed over a series of continuous profiles and the position of each data point is recorded using an RTK GNSS system. The sensors have a separation of 0.5 m which means that data was collected on profiles spaced at 0.5 m apart. Readings were taken at between 0.1 m and 0.15 m intervals.
- 1.3.2 Data is collected on zig-zag profiles along the full length or width of a field, although fields can be sub-divided if they are particularly large. Marker canes are set-out along field boundaries at set intervals and these are used to align the profiles. The survey profiles are usually offset from field boundaries, buildings and other metallic features by several metres to reduce the detrimental effect that these surface magnetic features have on the data. The location of the MACS data is converted direct to Ordnance Survey co-ordinates using the UK OSTN 02 projection. As the data is related direct to Ordnance Survey National Grid co-ordinates temporary survey stations are not established.
- 1.3.3 The Foerster gradiometers have a resolution of 0.2 nT but the stability of the cart system significantly reduces noise caused by instrument tilt and movement when compared with a traditional hand-held gradiometer system and the increased data intervals provide a higher resolution data set. The sensors have a range of  $\pm 10,000$ nT and readings are taken at 0.1 nT resolution.

## **1.4 Data processing and presentation**

- 1.4.1 The MACS data is stored direct to a laptop using in-house software which automatically corrects for instrument drift and calculates a mean value for each profile. A positional value is assigned to each data point based on the sensor number and recorded GNSS co-ordinates. The data is gridded using in-house software and parameters are set based on the sensor spacing and mean values. No additional processing is required. The gridded data is then displayed in Surfer 9 (Golden Software) and image files of the data are created.



- 1.4.2 The data was exported as greyscale raster images (PNG files). Data for the entire site is presented at a scale of 1:3000 and plots for individual fields / areas (or parts of fields / areas) with accompanying interpretations are shown at a scale of 1:1500. All greyscale plots were clipped at -2 nT to 3 nT. Greyscale plots have been 'smoothed' using a visual interpolation but the data itself has not been interpolated.
- 1.4.3 The data has been displayed relative to a digital Ordnance Survey base plan provided by the client as drawing '1004 - Site Plan - Rev A.dwg'. The base plan was in the Ordnance Survey National Grid co-ordinate system and as the survey grids were set-out directly to National Grid co-ordinates the data could be simply superimposed onto the base plan in the correct position.

## 1.5 Interpretation

- 1.5.1 The anomalies have been categorised based on the type of response that they have and an interpretation as to the cause(s) or possible cause(s) of each anomaly type is also provided. The following anomaly types may be present within the data:

### **Dipolar, bipolar and strong responses**

Dipolar and bipolar responses are those that have a sharp variation between strongly positive and negative components.

In the majority of cases these responses are usually caused by modern ferrous features / objects, although fired material (such as brick), some ferrous or industrial archaeological features and strongly magnetic gravel could also produce dipolar and bipolar responses.

**Isolated dipolar responses** are those that have a single positive and negative element. They are usually caused by isolated, ferrous or fired material on or near to the surface. The objects that cause dipolar responses are usually relatively small, such as spent shotgun cartridges, iron nails and horseshoes (hence they are often referred to as 'iron spikes') or pieces of modern brick or pot. Some types of archaeological artefacts can also produce this type of response but unless there is strong supporting evidence to the contrary they are assumed not to be of archaeological significance.

Bipolar anomalies have strong positive and negative components but are not technically magnetic dipoles. The majority of **isolated bipolar responses** are caused by ferrous or fired material on or near to the surface. These responses tend to be produced from larger objects, compared to dipolar anomalies, or a concentration of smaller objects. Some archaeological features/ activity, including areas of burning or industrial activity can also produce this type of response but unless there is strong supporting evidence to the contrary they are assumed not to be of archaeological significance.

A large majority, if not all, of the dipolar and bipolar responses at this site will be non-archaeological in origin but there may be greater potential for them to be related to archaeological features / activity where they are located in proximity to probable or possible archaeological features.

**Bipolar linear** anomalies are usually produced by buried pipes / cables that are usually metallic, although in some instances ceramic pipes can also produce popular anomalies. In some instances the anomaly can extend for a significant distance beyond the feature that produces the anomaly. Bipolar anomalies are often very strong and can potentially mask responses from other sub-surface features in the vicinity of the pipe or cable.



Areas containing numerous **strong dipolar / bipolar responses (magnetic disturbance)** are usually caused by greater concentrations of ferrous or fired material and are often found adjacent to field boundaries where such material tends to accumulate. Above ground metallic or strongly magnetic features, such as fences, gates, pylons and buildings can also produce very strong bipolar responses. If an area of magnetic disturbance is located away from existing field boundaries then it could indicate a former field boundary, several large isolated objects in close proximity, an area where modern material has been tipped or an infilled cut feature, such as a quarry pit. Areas of dipolar / bipolar response can occasionally be caused by features / material associated with archaeological industrial activity or natural deposits that have varying magnetic properties but they are usually caused by modern activity. Responses in areas of magnetic disturbance can sometimes be so strong that archaeological features located beneath them may not be detected.

Very strong responses, notably bipolar anomalies, from modern features can dominate the data for a significant distance beyond the feature. The extent of these areas is usually shown either as part of the bipolar anomaly or as a **limit of very strong response**. It should be noted that this effect extends beyond the feature and so the limit of the response does not correspond to the actual size or location of the feature within it. In many cases where these strong responses are present at the edge of survey area the feature causing the anomaly be actually be located beyond the survey area. It should be recognised that other sub-surface features located within these areas may not be detected.

#### **Negative linear anomalies**

**Negative linear anomalies** occur when a feature has lower magnetic readings than the surrounding material and can often be associated with ploughing regimes or plastic / concrete pipes or natural features.

They can also indicate the presence of a feature that cuts into magnetic soils or bedrock and which is infilled with less magnetic material and in certain geologies can be associated with archaeological features.

#### **Linear / curvi-linear anomalies (probable agricultural)**

In many geological / pedological conditions agricultural features / regimes can produce magnetic anomalies due to the accumulation / alignment of magnetic topsoil. In most cases these are exhibited as a series of **broadly parallel positive linear** anomalies. The majority of these responses are associated with modern ploughing regimes but in some instances, where the responses are broader and more widely spaced, they can indicate the presence of the remnants of ridge and furrow.

Field drain systems can also produce linear anomalies, usually where the drains are made from fired ceramic or infilled with magnetic gravels.

Where a series of parallel anomalies are present then the approximate orientation of the anomalies are shown on the interpretation drawing to indicate the direction of the agricultural regime but for the sake of clarity individual anomalies have not been shown.

Individual anomalies may be shown if the response is not part of a regime.

#### **Broad area of positive / negative responses**

**Broad areas of positive / negative responses** can have a variety of causes. If the areas are generally quite large and irregular in shape then they are usually suggestive of natural features, such as lenses of sand and gravel deposits, palaeochannels or other natural



features / variations where the natural material differs from the surrounding sub-surface. In some instances anomalies of this type can be associated with anthropogenic (usually modern) activity.



### Linear / curvi-linear trends

An anomaly is categorised as a **trend** if it is not certain that the response is associated with an extant sub-surface feature. Trends are usually weak, irregular, diffuse or discontinuous and it is usually not certain what their cause is, if they represent significant sub-surface features or even if they are associated with definite features.

It is possible that some of the trends are associated with geological / pedological variations. Others may be produced by artificial constructs within the data, either caused by processing or in some instances by intersecting anomalies (usually different agricultural regimes) that give the appearance of curving or regular shapes. Many trends are a product of weak, naturally occurring responses that happen to form a regular pattern but which are not associated with a sub-surface feature.

In some instances former features that have been severely truncated can still produce broad, diffuse or weak responses even if the underlying feature has been removed. This is due to the presence of magnetic soils associated with the former feature still being present along its route. In other instances the magnetic properties of the soils filling a feature may vary and so the magnetic signature of the feature can change, even if the sub-surface feature itself remains uniform. If a response from a feature becomes significantly weak or diffuse then part of the anomaly may be shown as a trend as it is uncertain if the feature is still present or has been severely truncated or removed.

### Isolated positive responses

**Isolated positive responses** can occur if the magnetism of a feature, area or material has been enhanced or if a feature is naturally more magnetic than the surrounding material. It is often difficult to determine which of these factors causes any given responses and so the origin of this type of anomaly can be difficult to determine. They can have a variety of causes including geological variations, infilled archaeological features, areas of burning (including hearths), industrial archaeological features, such as kilns, or deeper buried ferrous material and modern fired material.

Larger or stronger areas of positive response have been shown on the interpretation as have those isolated responses located in close proximity to possible or probable archaeological features. These anomalies could also be associated with geological / pedological variations but their size or proximity to other anomalies increases their archaeological potential.

### Positive linear / curvi-linear anomalies

Positive magnetic anomalies indicate an increase in magnetism and if the resulting anomaly is linear or curvi-linear then this can indicate the presence of a man-made feature.

**Positive or enhanced linear / curvi-linear** anomalies can be associated with agricultural activity, drainage features but they can also be caused by ditches that are infilled with magnetically enhanced material and as such can indicate the presence of archaeological features. Some natural infilled features can also produce positive anomalies.

- 1.5.2 Several different ranges of data were used in the interpretation to ensure that the maximum information possible is obtained from the data.
- 1.5.3 X-Y trace plots were examined for all of the data and overlain onto the greyscale plot to assist in the interpretation, primarily to help identify dipolar / bipolar responses that will probably be associated with surface / near-surface iron objects. X-Y trace plots have not been used in the report as they do not show any additional anomalies that are not visible in the greyscale





data. A digital drawing showing the X-Y trace plot overlain on the greyscale plot has been provided in the digital archive.

- 1.5.4 All isolated responses have been assessed using a combination of greyscale and X-Y trace plots.
- 1.5.5 Anomalies associated with agricultural regimes are present in the data. The general orientation of these regimes has been shown on the interpretation but, for the sake of clarity, each individual anomaly has not been shown.
- 1.5.6 The greyscale plots and the accompanying interpretations of the anomalies identified in the magnetic data are presented as 2D AutoCAD drawings. The interpretation is made based on the type, size, strength and morphology of the anomalies, coupled with the available information on the site conditions. Each type of anomaly is displayed in separate, easily identifiable layers annotated as appropriate.

## **1.6 Limitations of magnetic surveys**

- 1.6.1 The magnetic survey method requires the operator to walk over the site at a constant walking pace whilst holding the instrument. The presence of an uneven ground surface, dense, high or mature vegetation or surface obstructions may mean that some areas cannot be surveyed.
- 1.6.2 The depth at which features can be detected will vary depending on their composition, size, the surrounding material and the type of magnetometer used for the survey. In good conditions large, magnetic targets, such as buried drums or tanks can be located at depths of more than 4 m. Smaller targets, such as buried foundations or archaeological features can be located at depths of between 1 m and 2 m.
- 1.6.3 A magnetic survey is highly sensitive to interference from surface and near-surface magnetic ‘contaminants’. Surface features such as metallic fencing, reinforced concrete, buildings or walls all have very strong magnetic signatures that can dominate readings collected adjacent to them. Identification of anomalies caused by sub-surface features is therefore more difficult or even not possible in the vicinity of surface and near-surface magnetic features.
- 1.6.4 The presence of made ground also has a detrimental effect on the magnetic data quality as this usually contains magnetic material in the form of metallic scrap and brick. Identification of features beneath made ground is still possible if the target feature is reasonably large and has a strong magnetic response but smaller features or magnetically weak features are unlikely to be identified.
- 1.6.5 It should be noted that anomalies that are interpreted as modern in origin may be caused by features that are present in the topsoil or upper layers of the subsoil. Removal of soil to an archaeological or natural layer can therefore remove the feature causing the anomaly.
- 1.6.6 A magnetic survey does not directly locate sub-surface features - it identifies variations or anomalies in the local magnetic field caused by features. It can be possible to interpret the cause of anomalies based on the size, shape and strength of response but it should be recognised that a magnetic survey produces a plan of magnetic variations and not a plan of all sub-surface features. Interpretation of the anomalies is often subjective and it is rarely possible to identify the cause of all magnetic anomalies. Geological or pedological (soil) variations or features can produce responses similar to those caused by man-made (anthropogenic) features.
- 1.6.7 Anomalies identified by a magnetic survey are located in plan. It is not usually possible to obtain reliable depth information on the features that cause the anomalies.



1.6.8 Not all features will produce a measurable magnetic response and the effectiveness of a magnetic survey is also dependant on the site-specific conditions. It is not possible to guarantee that a magnetic survey will identify all sub-surface features. A magnetic survey is often most-effective at identifying sub-surface features when used in conjunction with other complementary geophysical techniques.