Gate Burton
ENERGY PARK

Gate Burton Energy Park Environmental Statement

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Gate Burton Energy Park Limited

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LIDAR AND AIR PHOTO

MAPPING, INTERPRETATION AND ANALYSIS

FOR ARCHAEOLOGICAL APPLICATIONS

[redacted]

Air photo and LiDAR mapping and interpretation: Gate Burton Energy Park Nottinghamshire and Lincolnshire

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Undertaken by Alison Deegan BSc MCIfA

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AECOM

[redacted]

Summary

This report concerns the results of interpretation and mapping of archaeological features from air photos and LiDAR imagery for the Gate Burton Energy Park.

This survey has identified the levelled and buried remains of prehistoric and Roman date enclosures, field and trackways and remnants of medieval or post medieval farming landscapes.

Contents

1 Introduction

1.1 Client details

1.1.1 This survey of levelled and upstanding archaeological and historical remains using existing air photos and LiDAR data was commissioned by AECOM on behalf of Gate Burton Energy Park.

1.2 The survey area (see Figure 1)

1.2.1 This survey concerns the Energy Park Site and the Grid Connection Options for the Gate Burton Energy Park. The Energy Park Site comprises approximately 682 hectares of land east of the River Trent in the county of Lincolnshire. The four Grid Connection Options link the Energy Park Site to a substation near Cottam Power Station, on the west side of the River Trent, in the county of Nottingham. Together the connection corridor options cover approximately 987 hectares.

1.2.2 Overall this survey area is rural in character with small scattered settlements, Littleborough, Coates and Cottam to the west of the river, Knaith, Gate Burton and Marton to the east and minor roads. Cottam Power Station is a significant industrial component in this landscape but it's footprint is largely excluded from this survey.

1.2.3 Along this stretch of the Trent valley the bedrock geology comprises a narrow band of Penarth Group Mudstone that runs north-north-west to south-south-west between Knaith and Brampton. To the west is Mercia mudstone (Mercia Mudstone Group) and to the east interbedded mudstone and limestone (Scunthorpe Mudstone Formation) (Geology of Britain Viewer).

1.2.4 To the west of the Knaith to Brampton Line the bedrock is covered with sand and gravel (Holme Pierrepont Sand And Gravel Member) and, along the floodplain and in palaeochannels, with alluvium.

1.2.5 To the east of the river the superficial deposits are less extensive and characterised by small patches of sand and gravel (Glaciofluvial Deposits), particularly around Knaith.

1.2.6 A brief overview of the uses of air photos and LiDAR for archaeological remote sensing is provided in Appendices 1 & 2.

2 Methodology

2.1 Data sources

2.1.1 The following data sources were examined

- Environment Agency LiDAR data, 1m resolution Digital Terrain Model and Digital Surface Model,
- Google Earth imagery, data captured between 2003 and 2021,
- Bing imagery, undated imagery,
- Historic England Archive, 185 vertical air photos from 21 different sorties flown 1946 to 1992 and 390 obliques air photos taken between 1954 and 2006 (see Appendix 4 for full list),
- Low resolution screen captures from the Cambridge University Collection of Air Photos online catalogue ([redacted](see Appendix 4 for full list),
- Historic Environment Monument and Event Records from Nottinghamshire and Lincolnshire, spatial data and record documents, and
- Historical Ordnance Survey and earlier maps were examined via the National Library of Scotland website [redacted]

2.1.2 The AP and LiDAR survey area is covered by the Royal Commission on the Historical Monuments of England's National Mapping Programme (NMP): specifically the Nottinghamshire NMP Project and the Lincolnshire NMP project. Both were completed in the late 1990s and they produced hand-drawn maps. Although these maps are now out-of-date in terms of the methodology and the sources available, they were consulted alongside the resources listed above as they inform many of the Historic Environment Records. Digitised versions of these maps are available through Historic England's Aerial Archaeology Mapping Explorer [redacted]

2.2 Processing and mapping

2.2.1 LiDAR data at 1m resolution was obtained from the Environment Agency in geotiff format. Using the Relief Visualisation Toolbox 2.2.1 16-direction hill-shaded visualisations were generated for the Digital Surface Model (DSM) and Digital Terrain Model (DTM) and Simple Local Relief Model models were generated for the DTM. A colour relief and hill-shaded model of the DTM was generated in MapInfo Professional 17 to provide and overview of the topography (see Figure 2).

2.2.2 The digital aerial images delivered online by Google Earth were examined on screen. Relevant portions were captured for georeferencing and digitisation of archaeological features.

2.2.3 The digital air photos held by the Historic England Archive were examined online via the Aerial Photograph Explorer [redacted] a small number were selected and digital copies were obtained to facilitate rectification

and digitisation of archaeological features.

2.2.4 The vertical and obliques air photographic prints held by the Historic England Archive were examined systematically, using x2 magnification where necessary and stereoscopically where possible. Selected prints were then photographed with a hand-held digital camera to enable rectification and digitisation of archaeological features.

2.2.5 The various captures and the digital copies were rectified to the ground control points derived from the Ordnance Survey Mastermap and the LiDAR visualisations using Aerial5.36. AERIAL5.36 gives error readings for each control point, where 5 or more control points are used. In all cases errors of within ±3m were achieved for the control points. However this may not reflect the on-the-ground positional accuracy of the features mapped since these tend to lie between rather than at the control points.

2.2.6 All LiDAR visualisations and rectified image captures were examined methodically and in detail in the GIS (MAPInfo Professional 17) and with reference back the original prints, where possible. Archaeological features were mapped to a scale of 1:2500 in detail and accuracy and data pertaining to each feature was recorded in the MapInfo table. The structure and content of the digital map dataset is described in Appendix 5.

3 Results

3.1.1 The results of this survey are presented on Figures 2 to 6 and a brief overview by period is provided below. Features have been catalogued and described according to pre-allocated land parcels (see Appendix 3).

3.1.2 Details including type, period and sources for individual archaeological features can be accessed in the digital version of the mapping (see Appendix 5). All attributions of date and type are open to re-interpretation.

3.2 Distribution of the evidence

3.2.1 The air photos range widely in date and include digital and print, colour and black and white, vertical and oblique formats. They have revealed archaeological features as earthworks, cropmarks and, less frequently, as soilmarks. The historical air photos indicate that in the late 1940s and early 1950s fairly extensive earthworks, mostly medieval or post medieval ridge and furrow survived in the east of the survey area, but earthworks only survived in a few pockets of land on the west side of the river.

3.2.2 Conversely the more extensive cropmarked landscapes are concentrated on the sand and gravel capped upper river terrace in the west. There are some fragmentary and poorly defined cropmarked features of possible pre-medieval date around Knaith and to the east and west of Marton that suggest more extensive pre-medieval landscapes may survive largely unseen in this area.

3.3 Neolithic and Bronze Age

3.3.1 No cropmarked, soilmark or earthwork features of known or possible Neolithic or Bronze Age date were identified by this survey. Pollen evidence from cores augured in the vicinity of **parcels 122** and **224** indicated possible small scale agricultural activity in the Neolithic (see **MNT27156**) and a possible Late Neolithic or Early Bronze Age burial was recovered at Rampton in **parcel 226** (**M18354-MNT26008**) (Knight 2000,12). Relatively little material from these periods has been recovered across the survey area, either incidentally or from archaeological field walking.

3.3.2 A triple ditched boundary runs east to west across **parcels 126, 128** and **155**, and a possible second example lies just 160m to the north in **parcels 127** and **130**. Long boundary features such as these have been resistant to dating and are often complex and long lived, but an example at Ketton, Rutland produced late Bronze Age to Middle Iron Age pottery (Mackie 1993,7).

3.4 Iron Age and Roman

3.4.1 There is evidence for Iron Age and Roman settlement at several locations within and immediately adjacent to the AP and LiDAR survey area. There has been a thorough archaeological excavation at one of these sites: Moor Pool, Rampton and small scale excavations at the Roman town of Segelocum, just outside of the survey area. Other sites are known only from remote sensing activities.

3.4.2 Moor Pool, Rampton (**parcel 226** in this survey) was the site of several archaeological investigations in the 1960s and 1990s (eg ENT457 and ENT3739). These revealed an extensive settlement considered to be of 'village' status. Excavation revealed an early to middle Iron Age settlement that developed into a series of large sub-divided enclosures and field from the late Iron Age through to the 4th century AD (Knight, 2000 20-21). Some elements of this settlement were visible as cropmarks on air photos taken in 1991 but the site has now been destroyed by gravel extraction.

3.4.3 A swathe of cropmarks runs along the west edge of the AP and LiDAR survey area. Although the map shows these to be extensive and cohesive the evidence is pieced together from many different air photos. Some of these cropmarks represent features that were demonstrably in use in the post medieval period (see below) others are likely to be of Iron Age or Roman date. They comprise enclosures, trackways and fields systems. The groups of enclosures in **parcels 219**, **136** and **141** may represent farmsteads.

3.4.4 In **parcels 137** and **138** the system of fields and trackways follows a regular grid-like layout, but in the **parcels 130**, **131**, **218** and **219** the trackways follow the topography and influence the shape and alignment of the neighbouring fields.

3.4.5 Moving eastward the cropmarks peter out across the lower terrace before the flood plain. Parcels such as **125**, **126**, **155**, **214** and **235** do produce some small and well-defined cropmarks, but not the extensive and cohesive features that are observed a few fields further west. A similar difference in the distribution of known archaeological sites was observed between the higher and lower terraces at the Trent-Soar confluence by Howard et al (2008, 1044-1046). This was attributed, in part, to alluviation on the lower terrace continuing into the late historic period (Howard 2008, Figure 7). In this survey area subtle variations in topography revealed by the LiDAR imagery suggest alluvial deposits may have washed southward across the lower terrace from the lower ground of the old meander at Littleborough rather than eastward where the edge of the terrace is well defined (see Figure 2). There is potential, as realised at Moor Pool, Rampton, for prehistoric and Roman date features to be concealed beneath alluvium deposits on this lower terrace.

3.4.6 Cropmarked features are almost entirely absent from the flood plain. Between Cottam and

Coates the western edge of the flood plain is topographically well defined and further north spreads westward across a large relict meander.

3.4.7 East of the river the cropmark evidence is very patchy and sporadic, a factor of the bedrock and superficial geology and more persistent medieval and post medieval cultivation remains. **Parcels 102**, **207**, **F1** and **F30** contain fragmentary enclosures and traces of field system that may be of Iron Age or Roman date, but there is no supporting evidence at present.

3.4.8 As mentioned above, the Roman town of Segelocum lies just outside of the Survey Area at Littleborough. The main area of the town has repeatedly produced clear and complex cropmarks but there is no evidence on the air photos that the settlement continued westward into **parcel 104**. Segelocum appears to have been constrained to the small island rising slightly above the flood plain and separated from the river terrace to the west by a palaeochannel, now cut by the Mother Drain (see Figure 2). The only feature extending into **parcel 104** is a short stretch of possible Roman road. This appears to be the same feature that was investigated on east side of the Mother Drain in 1954 (Riley et al 1995 262).

3.4.9 In **parcel 206**, however, approximately 370m to the south-west of Segelocum, cropmarks and geophysical anomalies indicate the presence of a roadside settlement of likely Roman date (Johnson 2016, Fig 8). The road lies on the course of the Roman road that ran from Lincoln to Doncaster. This section runs north-west to south- east and aligns with a section of road observed as a cropmark within the town (MNT6182) and the possible Roman-date ford that crossed the Trent near Littleborough (MLI52485). Ditches running perpendicular to the road indicate a series of narrow and organised plots of land. Pits are heavily distributed across the plots, but appear to avoid the road.

3.4.10 This settlement is mirrored on the east side of the River Trent in **parcels 212** and **211** near Marton. Here the cropmark evidence is more sporadic and fragmentary but there is a series of short cropmark ditches and geophysical anomalies running perpendicular to the Lincoln to Doncaster Roman road (MLI50575), here still in use and known as Littleborough Lane. It is the finds recovered from the field walking on either side of the road that indicate the likely Roman origin and status of this settlement (Worrell 1997, 177-178).

3.4.11 Also in **parcel 212** is a small Roman fort. It sits on the edge of the low cliff overlooking what likely to have been an important crossing point even before the ford was constructed (see Figure 2).

3.5 Medieval and post medieval cultivation remains

3.5.1 The evidence of cultivation remains such as ridge and furrow and plough headlands is fairly widespread east of the River Trent but far less so to the west. This probably reflects the differences in bedrock and superficial geology and their influences on land use.

3.5.2 West of the Trent traces of medieval or post medieval ridge and furrow are visible as cropmarks in **parcels 151**, **127**, **218**, **235** and **206**. The ridge and furrow in **parcel 206** is significant because it runs across the Roman road and settlement. Ridge and furrow in **parcels 147** and **149** survived as earthworks in the late 1940s but most other examples had already been levelled by that time. Only in **parcel 225,** on at the north end of Cottam and on the edge of the flood plain, does ridge and furrow still survive as earthworks on the west side of the river.

3.5.3 The floodplain was probably grazed rather than cultivated in these periods and this land is labelled as 'Common Meadows' on Chapman's map of 1794. However on the higher ground further west the fragmentary evidence for ridge and furrow probably reflects the ease with which subsequent intensive ploughing truncated the earlier plough ridges.

3.5.4 East of the Trent many fields still contained ridge and furrow earthworks in the late 1940s but most has now been levelled. The AP and LiDAR survey area avoids the areas of well-preserved ridge and furrow and other earthworks around Knaith, Gate Burton and Marton but there are fragments of earthwork plough ridges in **parcels 105**, **116**, **F17** and **F18**.

3.5.5 The LiDAR imagery reveals that very low and spread remnants of medieval plough headlands and later field boundaries extend across many of the fields east of the river.

3.5.6 The relationship between the ridge and furrow and the plough headlands is complex. In **parcels F16**, **F64** and **F65**, for example, the plough ridges appear to run over the plough headlands suggesting a change in the layout of fields between the development of the latter and the former. In contrast some post medieval field boundaries, for example in **parcels F12**, **F63** and **104** appear to follow former plough headlands suggesting that these persisted as boundary markers through the medieval and post medieval period.

3.5.7 Ridge and furrow in the **parcels F16**, **F62**, **F65** and **116** has some of the characteristics of medieval ploughing: broad S-shaped ridges and interlocking furlongs, but overall it is difficult to distinguish the plough ridges that are medieval from those with post medieval origins.

3.6 Other post medieval features

3.6.1 Amongst the cropmarks of likely Iron Age and Roman field systems and settlements on the western edge of the survey area there are linear features that correspond with roads or lanes and field boundaries that are depicted on historical maps. These features are summarised in the table below.

Parcel	Feature	Corresponds with	Historical map source
218	Lane and field boundaries to the north extant in 1940s, cropmarks on recent air photos	Section of Southbank Lane and adjacent fields	OS 6inch 1885,
219	Lane extant in 1940s, cropmarks on recent air photos	Section of Craikbank Lane	OS 6inch 1885
220	Long boundary running along northern side of Broad Lane	Section of Broad Lane	Chapman 1794
141 & 135	Boundary consisting of broad ditch and narrow ridge running perpendicular to Outgang Road	Northern boundary of previously wider Outgang Road	Chapman 1794
232, 142 & 134	Scarp slope south of Outgang Road	Southern boundary of previously wider Outgang Road	Chapman 1794
151 & 229	Scarp and double-ditched linear feature	Earlier route of Torksey Ferry Road	Chapman 1794

3.6.2 There is an arrangement of flood defences to the south-west of Marton. A sinuous and degraded embankment meanders through **parcels 233**, **110**, **111**, **109 and 113**. This feature is depicted on the OS map of 1885. A more substantial embankment runs south-west to Trent Port. It is not clear if this is a flood defence or infrastructure associated with Trent Port.

3.7 Features of uncertain date and origin

3.7.1 Within the survey area there are some cropmarked, soilmark or earthwork features of uncertain origin and unknown date.

3.7.2 Part of the long sinuous feature that runs through **parcels 125** and **126** has previously been interpreted as a possible Iron Age or Roman enclosure (see MNT15983). More recent air photos highlight the very diffuse and ephemeral nature of these cropmarks and cast doubt on their being caused by buried archaeological features. These are more likely to be cropmarks formed in response to localised variations in the soils and superficial geology, perhaps ribbons of alluvium running through sand and gravel.

3.7.3 A similarly ambiguous feature is visible on some air photos in **parcel 136**. It is defined by broad dark soilmarks on some air photos and on others by diffuse cropmarks that suggest a large near-square enclosure. Some air photos show areas of parching within the 'ditch' and fine linears that resemble rubble and robber trenches suggesting levelled buildings or structures. On balance it is more likely that these cropmarks and soilmarks are natural or geological origin.

3.7.4 There are two small but well-defined cropmarks in **parcel F40** and **F41**. One is oval plan and 33m long, the other a very crisp and regular rectangle and 26m long. Both are visible on air photos taken nearly 34 years apart, so they are unlikely to be cropmarks produced by some superficial agent such as overseeding or spraying. The oval example is visible as slight hollow on the LiDAR imagery. The archaeological significance of these features is not known.

4 Concluding remarks

4.1.1 The survey area is a transect across different soils and topography and this is reflected in the variations in the nature of the evidence collected from the air photo and LiDAR data by this survey.

4.1.2 The absence of evidence for archaeological features, particularly in those areas with a complex history of alluviation, and on the heavier soils to the east, should not be taken as an absence of presence.

Appendix 1 Archaeology from black and white and colour air photographs

Air photographs and aerial imagery taken in appropriate conditions can record crop marks, soilmarks and earthworks of archaeological origin.

Crop marks result from variations in leaf and stalk colour and plant height and vigour. Crop marks occur where there are anomalies below the ground: in-filled hollows, palaeochannels, frost cracks, archaeological pits, ditches, surfaces and banks or modern disturbances such as land drains. Crop marks can also be created by variations in the treatment of the topsoil and ground cover, for example the uneven application of fertilizers, pesticides and herbicides or damage.

Crop marks that delineate buried and levelled archaeological features are the effect of differential growth and ripening between the vegetation on the archaeological deposits and that on surrounding undisturbed ground. Variations in growth and ripening are most visible when there is a significant difference in the water and nutrient availability between the archaeological and natural deposits. Crop marks can form at any stage from germination to ripening but the optimal conditions are during periods when precipitation is exceeded by transpiration. This results in potential soil moisture deficit (SMD) and water-stressed plants (Jones and Evans 1975). Prolonged periods of SMD halt plant growth and then cause wilting of the plant leaves, stem and finally root. Water-stress is exacerbated by free-draining sub-surface deposits such as archaeological walls or road surfaces but mitigated by rich and humic ditch and pit deposits. Even after ripening, differences in crop height and bulk can indicate the presence of buried features where there are no tonal differences. Crop marks can be seen most clearly in large areas of homogenous, fast-growing plants such as cereal crops and, less frequently, in root crops and grass. Crop marks produced in arable and grass at times of significant moisture stress, usually over buried structures or other highly permeable archaeological deposits, are often referred to as parchmarks.

Soilmarks are the colour and tonal differences between archaeological deposits and the plough or subsoil. The action of ploughing, which can penetrate the ground to a depth of 45cm, brings to the surface previously buried material. The rotation of the plough exposes the cut surface uppermost. Where the plough cuts buried and infilled archaeological features such as banks and ditches it brings to the surface slices of these deposits. If these slices are sufficiently differentiated from the natural plough or subsoil they can be visible from the air.

Archaeological earthworks that are visible on the ground can also be seen from the air. Detection and recording of earthworks from the air is determined by their survival and visibility. The survival of earthworks depends on past and present land use; natural erosion processes, deliberate destruction and ploughing can all reduce upstanding features to ground level. Earthworks can be revealed by the pattern of sunlight and shadow, differential frost or snow cover or the distribution of standing and flood water. Large and subtle variations in ground relief are further accentuated when viewed stereoscopically. Most stereo images are vertical photographs taken in long, regular sorties but stereo-overlapping can also be achieved from correctly set-up oblique views.

Appendix 2 Archaeology from LiDAR survey data

Airborne Light Detection and Ranging (LiDAR) is a data collection technique that uses a laser to measure certain variables. For archaeological purposes it is the distance between the aircraft and the ground that provides particular interest. During LiDAR flights up to 100,000 measurements per second are made of the ground, allowing highly detailed models of the ground surface, including the details of surviving archaeological earthworks, to be generated at spatial resolutions of between 25cm and 2 metres.

The resulting dataset is a grid of height points called a Digital Elevation Surface Model, these points can be filter to remove those measurements that were read from trees, buildings and other supra-surface features, the result is a Digital Terrain Model, sometimes called a 'Bare Earth' model. The latter is particular useful for the identification of archaeological earthworks where they are obscured on conventional air photos by tree and shrub cover. The DSM and DTM need to be transformed into a visualisations for analysis and interpretation. For this survey two different visualisations were employed for the identification of archaeological earthworks: multi-direction hill-shaded model and simple local relief model.

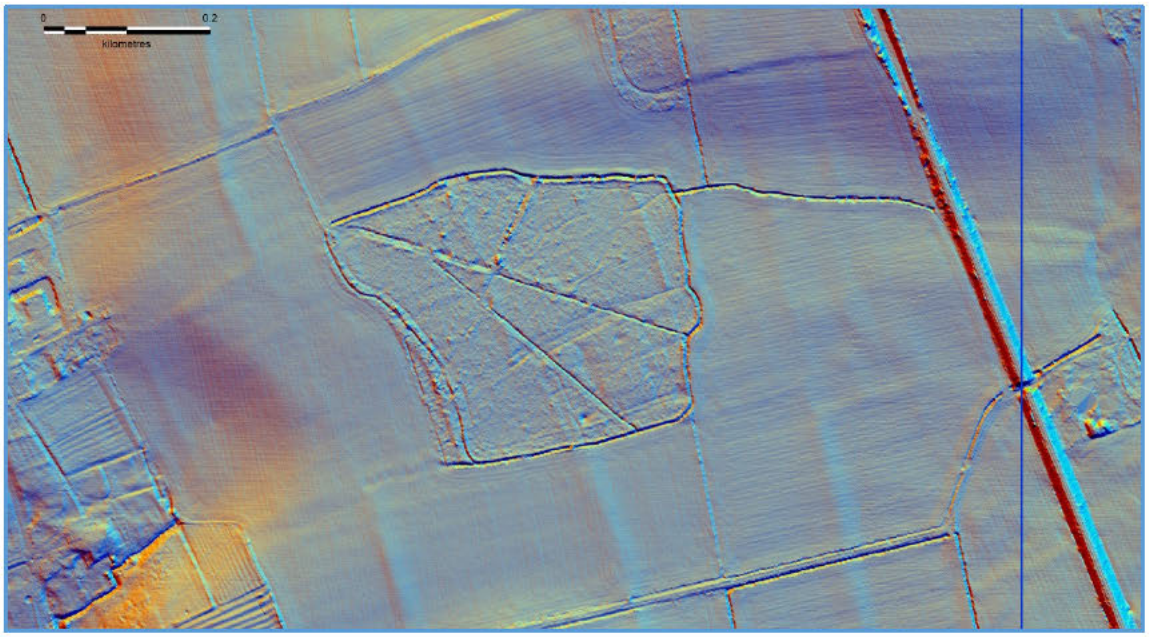

Figure A. A 16-Direction Hill-shaded model of DTM. Hill-shading casts and artificial light source across a landscape to reveal surface irregularities. Hill-shading from a single direction of light will not reveal those features that are in alignment with the light source. This visualisation combines the light and shade of 16 difference directions of light. The visualisation can be further enhance by exaggerating the vertical elevation and lowering the angle of the light source.

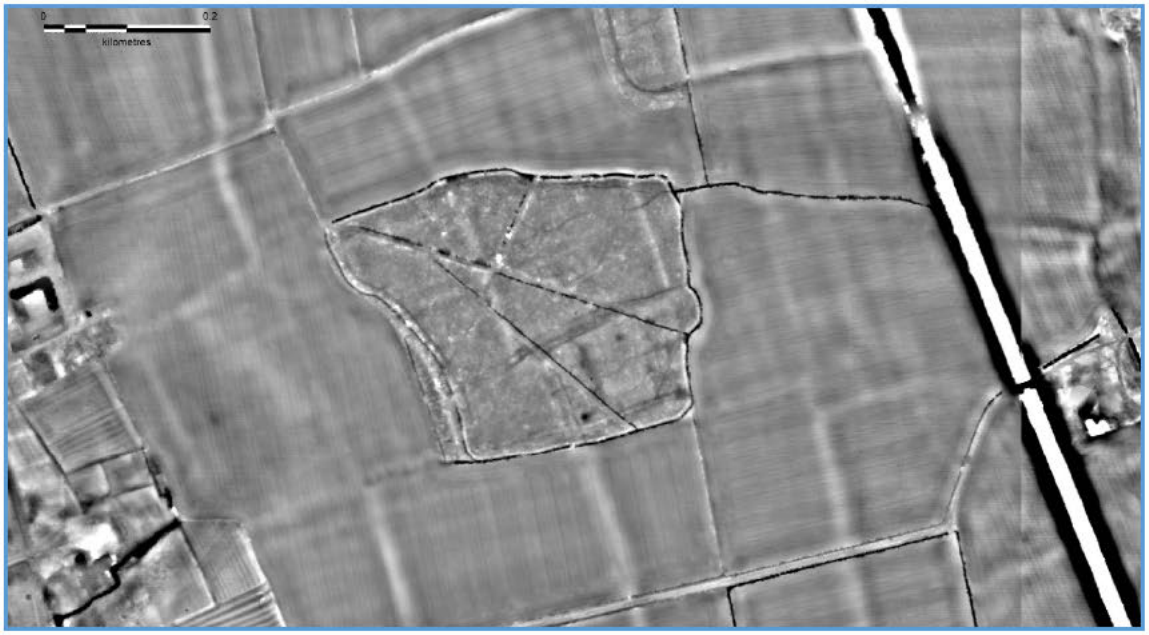

Figure B. Simple Local Relief Model (of DTM). General relief models convey landscape scale topography at the expense of smaller scale features including archaeological earthworks. This visualisation removes the general trend, eg hills and valleys to accentuate the appearance of the smaller scale features. In this visualisation the lighter tones represent banks and mounds, the darker, ditches and pits. This visualisation is particularly effective at revealing very low earthworks.

Further information and guidance on the use of LiDAR for archaeological prospection and the creation of visualisation from LiDAR data can be found in Crutchley and Crow (2009) and Kokalj and Hesse (2017).

Appendix 3 Catalogue of features

Parcel	Description	HER
F1	Faint cropmarks of possible Iron Age or Roman rectilinear enclosures and the low remains of a post medieval field boundary are visible on air photos and on lidar imagery respectively. The cropmarks indicate an arrangement of short perpendicular ditches to the immediate east of Fox Covert, but more features are likely to survive beneath the ground surface.	MLI54018
F2	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F3	Medieval or post medieval ridge and furrow is visible as earthworks on historical air photos and on lidar imagery.	
F4	The low remains of a post medieval field boundary extends into this field from F1.	
F5	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F6	The low remains of a post medieval field boundary are visible on lidar imagery respectively. This field boundary is depicted on the OS map of 1885.	
F7	Fragments of likely post medieval ridge and furrow and a pair of banks are visible as earthworks on lidar imagery. The former are located amongst the trees along the western edge of the parcel, the latter along the northern edge of this parcel and within Long Nursery.	
F8	Ridge and furrow and a possible plough headland are visible as earthworks on historical air photos and on lidar imagery. The plough headland survives as a low spread earthwork, it runs near north to south and is likely to be of medieval origin. The plough furrows appear to run across the headland so may be of later medieval or post medieval date.	
F9	Ridge and furrow and a possible plough headland are visible as earthworks on historical air photos and on lidar imagery. The plough headland runs near north to south and is likely to be of medieval origin. The ridge and furrow continues from F8 an may be of later medieval or post medieval date.	
F10	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F11	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F12	Ridge and furrow, plough headlands and a possible trackway or avenue are visible as earthworks on historical air photos and on lidar imagery. The plough headlands most run north to south and are likely to be of medieval origin but they were marked by field boundaries until the late 20th century. The ridge and furrow is of medieval or post medieval date. A pair of narrow banks run near east to west from Burton Wood towards Gate Burton Hall, these may be a trackway or avenue associated with the landscaping around the hall. The ridge and furrow and the banks have now been levelled.	
F13	Part of a medieval plough headland is visible as a low earthwork on lidar imagery. It continues southward into Burton Wood.	
F14	Medieval or post medieval ridge and furrow and a post medieval field boundary are visible as earthworks on historical air photos and on lidar imagery respectively. The ridge and furrow has now been levelled. The field boundary was extant in the 1940s.	
F15	A medieval plough headland and post medieval field boundaries are visible as low earthworks on lidar imagery. The field boundaries were extant in the 1940s.	
F16	Ridge and furrow and plough headlands of likely medieval origin are visible as earthworks on historical air photos and on lidar imagery. The plough headlands survive as low earthworks but the plough ridges have been levelled.	
F17	A medieval plough headland continues into this parcel from F15. A fragment of likely post medieval ridge and furrow is visible in Golddale Plantation. Both features are visible as earthworks on lidar imagery.	
F18	A fragment of likely post medieval ridge and furrow is visible as earthworks on lidar imagery in Golddale Plantation.	

Parcel	Description	HER
F19	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F20	A broad ditch and fragments of ridge and furrow and plough headland are visible as earthworks on historical air photos and on lidar imagery. The ditch runs north-west to south east across this parcel and continues along the eastern side of Siding Farm (see F21) and into the field to the south(see F23). These features may be of medieval or post medieval origin.	
F21	A broad ditch is visible as an earthwork on lidar imagery and two narrow ditches are indicated by cropmarks on Google Earth imagery. The broad ditch continued into F20 to the north and F23 to the south and its relationship to ridge and furrow is those two parcels suggests it may be of medieval or post medieval origin. The date of the two cropmarked ditches is not known.	
F22	A likely drainage ditch of post medieval origin is visible cropmarks and soilmarks on historical air photos.	
F23	The possible medieval or post medieval broad ditch observed in F20 and F21 continues into this field. It appears to be cut by medieval or post medieval ridge and furrow that is visible as earthworks on historical air photos. The lidar imagery indicates that the ditch survives as a shallow earthwork but the ridge and furrow has been levelled.	
F24	Medieval and post medieval ridge and furrow and post medieval field boundaries are visible as earthworks and cropmarks on historical air photos and lidar imagery. Most of the field boundaries, which are marked by ditches and banks, were still extant in the 1940s. These survive as low earthworks but the ridge and furrow has been levelled.	
F25	A fragment of medieval or post medieval ridge and furrow is visible as cropmarks on historical air photos.	
F26	Medieval or post medieval ridge and furrow and post medieval field boundaries are visible as earthworks on historical air photos. The ridge and furrow has now been levelled. The field boundaries, which were extant in the 1940s survive as low and spread earthworks.	
F27	Fragments of medieval or post medieval ridge and furrow are visible as soilmarks on historical air photos.	
F28	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F29	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F30	A possible Iron Age or Roman rectilinear enclosure, a post medieval field boundary and ditches of uncertain date are visible as cropmarks on air photos. The enclosure and possible internal features is located to the north-west of Central Park Farm and measure 58m by at least 87m. The field boundary is depicted on the OS map of 1885.	MLI54017
F31	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F32	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F33	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F34	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F35	Two ditches of likely post medieval date are visible as cropmarks on historical air photos.	
F36	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F37	Cropmarks of a post medieval field boundary, fragments of medieval or post medieval ridge and furrow and ditches of unknown date are visible on air photos.	
F38	Two narrow ditches in a perpendicular arrangement are visible as cropmarks on air photos. The date of these features is not known.	

Parcel	Description	HER
F39	Three narrow ditches are visible as cropmarks on air photos. One of the ditches is likely to be a continuation of a similar feature observed in F38. The date of these ditches is not known.	
F40	Numerous ditches are visible as cropmarks on historical air photos, and a small earthwork mound is visible on air photos and on lidar imagery between Park Wood and the railway line. The mound measures approximately 42x18m is rectangular in plan and well-defined. It is depicted on the OS map of 1885 and lies to the immediate west of the railway line. The same map also depicts earthworks on the east side of the line (outside of the area of this survey). This mound is likely to be of post medieval date but is purpose is not known. The origins of the various ditches is also unknown but it is noted that one appears to continue as an earthwork running south-westward through Park Plantation.	MLI54019
F41	Two small cropmarks, one oval, the other rectangular, are visible on air photos taken in 1971 and again in 2005. This suggests they are caused by subsurface features or disturbance rather than a superficial influence such as overseeding or spraying. The oval feature is also visible as a very shallow hollow on the lidar imagery. The archaeological signficance of these features is not known.	MLI90939
F42	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F43	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F44	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F45	Medieval or post medieval ridge and furrow is visible as cropmarks on historical air photos.	
F46	A possible post medieval field boundary is visible as a cropmark on recent air photos.	
F47	Medieval or post medieval ridge and furrow are visible as cropmarks on historical air photos.	
F48	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F49	A fragment of medieval or post medieval ridge and furrow is visible as earthworks on historical air photos. The lidar imagery indicates that it has now been levelled.	
F50	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F51	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F52	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F53	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F54	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F55	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
F56	Medieval or post medieval ridge and furrow is visible as earthworks on historical air photos. The lidar imagery indicates that it has now been levelled.	
F57	A possible medieval plough headland is visible as a very low earthwork on lidar imagery.	
F58	Medieval or post medieval ridge and furrow is visible as earthworks on historical air photos. The lidar imagery indicates that it has now been levelled.	
F59	Fragments of medieval or post medieval ridge and furrow are visible as earthworks on historical air photos. The lidar imagery indicates that these earthworks have now been levelled.	
F60	Fragments of medieval or post medieval ridge and furrow are visible as earthworks on historical air photos. The lidar imagery indicates that these earthworks have now been levelled.	

Parcel	Description	HER
F61	Ridge and furrow, a section of plough headland, both of possible medieval date and a post medieval dew pond are visible as earthworks on historical air photos. The lidar imagery indicates that the plough headland survives as a very low earthwork but the plough ridges have been levelled.	
F62	Ridge and furrow and a section of plough headland, both of possible medieval date are visible as earthworks on historical air photos. The lidar imagery indicates that the plough headland survives as a very low earthwork but the plough ridges have been levelled.	
F63	Possible medieval plough headlands are visible as low earthworks on lidar imagery. Portions of these headlands are marked by fields boundaries on the OS map of 1885.	
F64	Ridge and furrow and a plough headland, both of possible medieval date are visible as earthworks on historical air photos. The lidar imagery indicates that the plough headland survives as a low earthwork but the plough ridges have been levelled.	
F65	Medieval ridge and furrow and plough headlands and a post medieval field boundary are visible as earthworks on historical air photos. The lidar imagery indicates that the plough headland and field boundary survive as low earthworks but the plough ridges have been levelled.	
F66	Medieval or post medieval ridge and furrow and post medieval field boundaries are visible as earthworks on historical air photos and lidar imagery respectively. The lidar imagery indicates that the plough ridges have been levelled but the field boundaries, which were extant in the 1940s, survive as low earthworks.	
F67	Medieval or post medieval ridge and furrow is visible as earthworks on historical air photos. The lidar imagery indicates that the plough ridges have been levelled.	
F68	A post medieval field boundary, which was extant in the 1940s, is visible as a low earthwork on lidar imagery.	
100	Medieval ridge and furrow and plough headlands are visible as earthworks on historical air photos. The lidar imagery indicates that the plough headlands survive as low earthworks but the plough ridges have been levelled.	
101	A post medieval field boundary, which was extant in the 1940s, is visible as a low earthwork on lidar imagery.	
102	Possible field boundaries and small rectilinear enclosures are visible as faint and indistinct cropmarks on recent air photos. These features may be of Iron Age or Roman date.	
103	A medieval plough headland, medieval or post medieval ridge and furrow and a post medieval field boundary are visible on historical air photos. The lidar imagery indicates that the headland survives as a low earthwork but the other features have been levelled.	
104	A medieval plough headland and medieval or post medieval ridge and furrow are visible as earthworks on historical air photos, the plough headland was marked by a later field boundary at that time. The lidar imagery indicates that the headland survives as a low earthwork but the plough ridges have been levelled.	
105	Medieval or post medieval ridge and furrow and post medieval field boundaries are visible on historical air photos. The lidar imagery indicates that the eastern half of the ridge and furrow has been levelled but the western half is well preserved and the other features survive as low earthworks.	
106	Medieval or post medieval ridge and furrow, a possible plough headland and post medieval narrow ridge and furrow are visible as earthworks on historical air photos. Most of these features have now been levelled but the plough headland is detectable as a very low earthwork on the lidar imagery.	
107	A section of a likely medieval plough headland and a fragment of medieval or post medieval ridge and furrow are visible as a low earthwork on lidar imagery and as soilmarks on historical air photo respectively. This survey did not observe the cropmarked features recorded by the NMP Project (MLI52489) on any of the air photos examined.	
108	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
109	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	

Parcel	Description	HER
110	A section of a post medieval flood defense bank is visible as an earthwork on historical air photos and on lidar imagery. This feature is depicted on the OS map of 1885 and it continues into parcels 111 and 233.	MLI52488
111	A short section of a likely post medieval flood defense bank is visible as an earthwork on historical air photos and on lidar imagery. This feature is depicted on the OS map of 1885 and it continues into parcels 110 and 233.	MLI52488
112	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
113	Ditches and banks are visible as earthwork and cropmarks on air photos and on lidar imagery. A narrow bank, flanked by small ponds runs along the eastern edge of this parcel. These features are depicted on the OS map of 1885 and the bank is likely to be the remains of a post medieval flood defence. These features stood as earthworks in the 1940s but have now been levelled. The L-shaped cropmarked ditch to the west is the remains of post medieval field boundary which was extant in the 1940s. Between the two there are short cropmarked ditches of uncertain origin.	MLI52488
114	A substantial embankment, possibly a post medieval flood defence, is visible as an earthwork on the lidar imagery.	
115	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
116	Fragments of medieval or post medieval ridge and furrow are visible as earthworks on historical air photos and on lidar imagery.	
117	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
118	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
119	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
120	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
121	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
122	A ditch of uncertain date is visible as a cropmark on air photos.	
123	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
124	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
125	A linear feature and several small discrete features are visible as cropmarks on air photos. The linear feature runs north to south through this parcel and continues northward beyond the survey area and southward into 126. In this parcel it is definded by a rather indistinct and irregular swathe of slower ripening crop with an area of parching along it centre. These cropmarks are likely to reflect variations in the superficial geology which comprises sand and gravel overlain by ribbons of alluvium in this area. However in the absence of other evidence an archaeological origin cannot be discounted and they may indicate a trackway of later prehistoric or Roman date. West of this feature there are two small circular features and a swathe of small round pits. Again these may have archaeological significance but are more likely to be of natural origin. On the eastern margins of the linear feature there is rectilinear enclosure measuring 22x11m and second similar but incomplete enclosure to the south. Elsewhere to the east there is a large hollow and adjacent arrangment of pits, discrete pits and a possible rectilinear enclosure. The enclosures and pits may be of later prehistoric or Roman date.	MNT15983

Parcel	Description	HER
126	A multiple ditch boundary, a long sinuous linear feature, small circular features, other ditches and fragments of ridge and furrow are visible as cropmarks. The boundary comprises three ditches and runs east to west through this parcel and continues westward into 128 and eastward into 155. The more northerly of the three ditch appears to coincide with a field boundary that was still extant in 1946 but it is possible that this boundary has its origins in the later prehistoric period. The sinuous linear feature continues into 125. In this field it comprises two converging and sinous arms defined by short irregular cropmarks that suggest pits, slots and short ditches. This feature has been described as a 'curvilinear enclosure' (MNT15983) but as suggested in 125 is perhaps more likely reflect variations in the superficial geology. If this feature is of archaeological origin it may be the remains of later prehistoric trackways. There are small square and circular features on the margins of this feature, again probably but not certainly of natural in origin.	MNT15983
127	Two sides of a possible rectilinear enclosure, a circular pond or hollow, faint traces of a multiple ditch boundary, other short ditches and ridge and furrow are visible as cropmarks on air photos. The putative enclosure is defined by a broad ditch and may be of Iron Age or Roman date. The circular feature lies within the enclosure ditches but may not be related. The multiple ditch boundary comprises three faint ditches running south-east to north-west through this field but it continues north-westward through 130 and 131, mostly as a single broad ditch. This boundary may be of later prehistoric date.	
128	A multiple ditch boundary and perpendicular and parallel field boundaries and other ditches are visible as cropmarks. The boundary continues westward from 126 and may be of later prehistoric origin. The field boundaries running perpendicular and parallel to the boundary may be of similar or later date.The origins of the other ditches in this parcel are uncertain.	
129	A trackway, field boundaries and small hollow are visible as cropmarks on air photos. The double ditched trackway appears to merge with the triple ditched boundary in 128 and it continues into 131. It may be of later prehistoric or Roman date. The hollow is rectilinear in plan and may be the remains of a small post medieval quarry pit.	MNT4983
130	A section of a multiple ditch boundary of likely later prehistoric origin and a short section of a likely medieval or post medieval field boundary are visible as cropmark. The boundary is represented by two or three narrow ditches and a broader ditch in this section and continues eastward into 127 and westward into 131. The field boundary continues westward into 131.	MNT4983
131	From north to south this parcel intersects a medieval or post medieval field boundary, a section of later prehistoric boundary, tripled ditched in the neighbouring field but a single ditch here, a possible Iron Age or Roman field boundary, and trackways flanked by fields and enclosures on either side of a palaeochannel, also of likely Iron Age or Roman date.	MNT4983
132	A trackway flanked by enclosures runs north to south-west along the eastern edge of this parcel. To the west and angular corner defined by up to three ditches may indicate the north-west corner of a rectilinear enclosure that has been truncated by the railway line. These features may be of Iron Age or Roman date. The ditch oriented east to west is likely to be a post medieval field boundary and the lidar imagery shows a low bank aligned north-west to south-east, which may be a heavily truncated plough headland.	MNT4983
133	A section of possible field boundary or trackway and a rectilinear enclosure are visible as cropmarks. These features may be of Iron Age or Roman date.	MNT4983
134	Two ditches are visible as faint cropmarks on air photos. The short more southerly ditch appears to coincide with a field boundary that is depicted on the OS map of 1885. The other may be associated with the Iron Age or Roman field system observed in 136 to the west.	
135	Medieval or post medieval ditches that may have marked the northern edge of an earlier and wider Outgang Road are visible as cropmarks on air photos. This is a continuation of the feature observed in 141.	

Parcel	Description	HER
136	Complex cropmarks are visible in this parcel. Most suggest a coaxial field system with trackways and associated rectilinear enclosures. These features are likely to be of Iron Age or Roman date. In the south-west quadrant of the field some photos show more ephemeral soilmarks and cropmarks. These marks suggest a broad ditched enclosure with patches of parching within the 'ditch' and robber trenches at it is north-east corner suggestive of levelled structural remain, however it is perhaps more likely that these features are natural or geological origin.	MNT4983
137	Complex perpendicular arrangements of ditches are visible as cropmarks on air photos. Most of these are likely to be trackways and boundaries in a coaxial field system of Iron Age or Roman dates. The field system continued northward beyond the survey area, southward into 138 and eastward into 136. Also present in this parcel are long post medieval field boundaries that cut obliquely across the earlier field system and rund parallel or perpendicular to the extant field boundaries.	MNT4983
138	Trackways and field boundaries in a coaxial field system are visible as cropmarks on air photos. These features are likely to be of Iron Age or Roman date and they continue into 137 and 136.	MNT4983
139	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
140	Two possible Iron Age or Roman field boundaries are visible as cropmarks on air photos. They continue eastward into the field system observed in 141.	
141	Complex cropmarks are visible in this parcel. Most suggest rectilinear enclosures within a coaxial field system. These features are likely to be of Iron Age or Roman date. A broad linear ditch runs parallel to and approximately 25m north of the Outgang Road. Chapman's 1794 map indicates that the road widened in this area and this ditch may have marked it's northern boundary. It is flanked by a large rectanglar area of slower ripening crop, which may indicate a shallow quarry.	MNT4983
142	A scarp slope runs east to west and parallel to Outgang Road through this parcel and into 143 to the east and 232 to the west. This section is depicted as a field boundary on the OS map of 1885, but Chapman's map of 1794 indicates that Outgang Road was wider at that time. This scarp may indicate the southern edge of the Outgang Road and be a counter part to a feature described in 135 and 141.	MNT4983
143	A short section of a scarp slope runs east to west and parallel to Outgang Road through this parcel and into 142 and 232 to the west. This section is depicted as a field boundary on the OS map of 1885, but Chapman's map of 1794 indicates that Outgang Road was wider at that time. This scarp may indicate the southern edge of the Outgang Road and be a counter part to a feature described in 135 and 141.	
144	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
145	Ditches of uncertain date are visible as cropmarks on air photos.	
146	Two small groups of fragmentary cropmarks are visible on air photos. The more southerly cropmarks suggest a rectilinear enclosure and hut circle, which may be of Iron Age or Roman date. The more northerly comprises short ditches of unknown date.	
147	Medieval or post medieval ridge and furrow is visible as earthworks and two ditches and a irregular curvilinear disturbance are visible as cropmarks on air photos. The ridge and furrow had been levelled on more recent images. The ditches are near parallel to similar features observed in 149 and may be the remains of Iron Age or Roman field boundaries. The curvilinear feature may be the remains of an enclosure but is perhaps more likely to be of natural or superficial origin.	
148	Medieval or post medieval ridge and furrow is visible as earthworks on historical air photos but has now been levelled.	
149	Possible Iron Age or Roman field boundaries, medieval or post medieval ridge and furrow, a post medieval field boundary and several possible post medieval quarry pits are visible as cropmarks on air photos. The ridge and furrow survive as earthworks in the 1940s but has since been levelled.	

Parcel	Description	HER
150	A short section of possible Iron Age or Roman field boundary and a possible enclosure are visible as cropmarks on historical air photos. The field boundary continues into 149. These features have now been destroyed.	
151	Two trackways, ridge and furrow, field boundaries and a pond and a possible earlier trackway are visible as cropmarks and earthworks on air photos. These features are in a field to the south of Torksey Ferry Road. Chapman's 1794 map indicates that the road took a more sinuous route between Rampton and Torksey at that time and the more northerly trackway maybe the remains on this route. This trackway continues westward towards Rampton in 229 and there may be traces of it 153. In this parcel this trackway is abutted to the south by ridge and furrow and field boundaries. These features and the pond may be of medieval or post medieval origin. The field boundaries, plough furrows and pond appear to cut across the second trackway, which runs near perpendicular to and 80m south of the first. This trackway may have earlier origins.	MNT6166
152	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
153	The remains of either a plough headland or a former course of the Torksey Ferry Road is visible as a very low earthwork on lidar imagery. There is further evidence of this route in 151 and 229.	
154	No features of archaeological origin were identified on the air photos and lidar imagery examined for this survey.	
155	A later prehistoric multiple ditch boundary, field boundaries, a curvilinear enclosure, ditches and pits, are visible as cropmarks on air photos. The multiple ditch boundary continues into 126.	MNT15983
200	Medieval or post medieval ridge and furrow is visible as earthworks on air photos taken in 1980. Lidar imagery indicates that these earthworks have now been levelled.	MLI54010
201	Fragmentary ditches of unknown origin and purpose are visible as cropmarks on air photos.	
202	Fragmentary ditches of unknown origin and purpose are visible as cropmarks on air photos.	
203	The remains of infilled water channel of likely post medieval date is visible as a shallow earthwork on the lidar imagery. This ditch was extant in the 1940s.	
204	This parcel lies to the west and north west of the Roman settlement at Littleborough. It contains some cropmarks and low earthworks (now levelled) but most of these appear to be the remains of medieval or post medieval ridge and furrow and post medieval ridge field boundaries, drainage ditches, a possible quarry pit. Several of the field boundaries are depicted on the OS map of 1885 and some were still extant in the 1940s. The historical air photos also show a short section of low spread bank seemingly cut by the Mother Drain. Riley et al report that Clark excavated a cobbled road surface east of the drain in 1954 (1995 262). It is possible that the bank, now levelled, is a continuation of that road.	
205	Possible post medieval drainage ditches are visible as earthworks on historical air photos. The lidar imagery suggest that they have now been levelled.	
206	A Roman roadside settlement overlain by medieval or post medieval ridge and furrow and, further south, a possible waterchannel of unknown date are all visible as cropmarks on air photos. The road runs north-west to south-east as is abutted by north and south by a series of ditches to form a regular arrangement of plots or enclosures. There are a large number of pits distributed across these enclosures. The putative water channel runs between the settlement and an extant channel. The ridge and furrow runs perpendicular to the road and on almost the same orientation as the Roman ditches so the latter may be recut or obscure by the plough furrows.	MNT6183

Parcel	Description	HER
207	Indistinct cropmarks of a possible Iron Age or Roman field system and medieval or post medieval ridge and furrow and plough headlands are visible as cropmarks and earthworks respectively on air photos. The ridge and furrow and plough headlands stood as earthworks on air photos taken in the 1940s and the lidar imagery suggest that only the plough headlands surive and these are very low. The putative Iron Age and Roman features are revealed by cropmarks on recent Google Earth imagery.	MLI116360 , MLI52472
208	Medieval or post medieval plough headlands and ridge and furrow are visible as earthworks on historical air photos and on lidar imagery. The lidar imagery indicates that plough ridges have been levelled but the headlands survive as low earthworks.	
209	The remains of a post medieval field boundary that may have originated as a medieval plough headland is visible as a very low earthwork on lidar imagery. The field boundary was depicted on the OS map of 1885.	
210	The remains of a post medieval field boundary that may have originated as a medieval plough headland is visible as a very low earthwork on lidar imagery. The field boundary was depicted on the OS map of 1885.	
211	Multi period cropmarks and earthworks are visible on air photos and lidar imagery. The cropmarks in the western side of this parcel are fragmentary and indistinct. They appear to indicate an arrangement of ditches and a possible enclosure, possibly of Iron Age or Roman date. The lidar imagery shows the low remains of two medieval or post medieval plough headlands running south-west to north-east and the older air photos shows these were abutted or cut by ridge and furrow. Long ditches running north to south through the middle of this parcel and their adjacent dew ponds are likely to be of post medieval date.	MLI51369, MLI54011
212	A Roman fort, a possible roadside settlement and traces of ridge and furrow are visible as cropmarks on air photos and low earthwork banks are visible on the lidar imagery. The fort, which is scheduled (List Entry no. 1004935), lies on the edge of the low cliff that runs along the western edge of this parcel and overlooks the flood plain. It comprises two ditches on three sides, with the fourth side open to the cliff edge. A slight narrowing of the ditches along the eastern side may indicate the location of an entrance. Several short ditches run perpendicular to the Littleborough Road. This area has been interpreted as the location of Roman settlement, based on the combined evidence of the cropmarks, geophysical survey, field walking and metal detecting (Worrell 1997 177-178). Linear cropmarks suggestive of medieval or post medieval ridge and furrow run east to west across the parcel. Two of the low earthwork banks run east to west across the parcel and may be the remains of post medieval field boundaries, the third clips the north-east corner and may be a medieval or post medieval plough headland.	MLI51369, MLI54200
213	Fragments of medieval or post medieval ridge and furrow and a post medieval field boundary are visible as earthworks on historical air photos and on lidar imagery respectively. The field boundary may have also marked the southern edge of a previously wider Littleborough Road on its approach to the river bank.	
214	Two short undated ditches are visible as cropmarks on air photos.	
215	A fragment of medieval ridge and furrow and post medieval narrow ridge and furrow are visible as earthworks and cropmarks on historical air photos.	
216	Several linear features, possible trackways and groups of pits are visible as cropmarks. Two broad and slightly irregular ditches curve north to south just to the west of this parcel. The ditch to the west coincides with a field boundary depicted on the OS map of 1885 which is slightly anomalous to the very straight and regular field ditches that characterise this area. The other seems to follow the curve of the waterchannel that lies 350m to the east. The short sections of double ditched trackway may be of Iron Age or Roman date. The date and function of other features is not known.	
217	A post medieval field boundary is visible as a cropmark on recent air photos and is depicted on the OS map of 1885.	

Parcel	Description	HER
218	Cropmarks indicating the route of Southbank Lane run along the southern edge of this parcel. The lane was still extant on air photos taken in the 1940s. The lidar imagery suggests a low bank runs along the southern edge of the lane, perhaps indicating a medieval plough headland. Other ditches in this field are mostly the remains of field boundaries that were also still extant in the 1940s, but some may be part of a broad trackway that is more clearly defined where it continues in 219.	MNT4981
219	Iron Age or Roman settlement, trackways and field boundaries are visible as cropmarks on air photos. This includes a number of conjoined rectilnear enclosure with small internal and corner enclosures. The cropmarked double ditch trackway running along the northern edge of this parcel is the remains of a now redundant section of Craikbank Lane, which was extant on air photos taken in the 1940s. This trackway is of medieval or post medieval origin.	MNT4981
220	Post medieval and undated ditches and a possible quarry pits are visible as cropmarks on air photos. The north to south aligned ditch bisecting this parcel is a post medieval field boundary that was still extant in the 1940s. The long ditch running along the north side of Broad Lane probably marked the edge of that road when it was a wider route than it is now, as shown on Chapman's map of 1794.	
221	Ditches of uncertain date and a post medieval field boundary are visible as cropmarks on air photos.	MNT4982
222	Ditches and a small curvilinear enclosure of uncertain date and a post medieval field boundary are visible as cropmarks on air photos.	MNT4983
223	Three low banks are visible on lidar imagery, these are the remains of post medieval field boundaries.	
224	Post medieval narrow ridge and furrow is visible as earthworks on historical air photos. The lidar imagery indicates that these earthworks have now been levelled.	
225	A fragment of medieval or post medieval ridge and furrow is visible as earthworks on lidar imagery.	
226	Cropmarks pertaining to the Iron Age and Roman settlement excavated at Moor Pool Close, Rampton in 1999-2000 are visible on air photos taken in 1991 (Knight 200 Fig 4). These features have now been destroyed by quarrying.	MNT15344
227	Short ditches and circular hollows are visible as cropmarks on air photos. The date and purpose of these features is now known.	
228	Post medieval field boundaries are visible as cropmarks and low earthworks on air photos and on lidar imagery.	
229	A scarp slope and ditch may indicate the former position of Torkey Ferry Road.	
230	Post medieval ridge and furrow is visible as earthworks on lidar imagery in Long Nursery woods.	
231	Two medieval or post medieval plough headlands, possible field boundaries and pits are visible as earthworks on lidar imagery in Burton Wood.	
232	A scarp slope runs east to west and parallel to Outgang Road through this parcel and into 142 and 143 to the east. It is depicted as an earthwork on the OS map of 1885, but Chapman's map of 1794 suggests that Outgang Road was wider at that time. This scarp may mark the southern edge of the Outgang Road. There are traces of medieval or post medieval ridge and furrow to the south of this scarp slope.	
233	A short section of a likely post medieval flood defense bank and possible ponds are visible as earthworks on historical air photos and on lidar imagery. This bank is depicted on the OS map of 1885 and it continues into parcels 111 and 110.	MLI52488
234	Post medieval flood defences and a possible pond are visible as earthworks on historical air photos. Lidar imagery suggest that the embankments are still upstanding but the pond has been filled in.	MLI52488

Appendix 4 Historic England Archive and CUCAP list of air photos examined

Historic England Archive

The Engine House, Fire Fly Avenue, Swindon SN2 2EH. Enquiry reference no. AP 132472. The Specialist Collection (mostly oblique) and Vertical Collection air photos listed below were consulted at the Archives 22nd to 24th and 29th March 2022. The 'Digital colour' images were examined on screen via APEX WEBSITE LINK and digital copies were obtained of those marked *. All other photographs were available to view as prints at the Archive.

Photo reference	Film and frame number		Date	Film type	
SK 8078 / 5	NMR 28469	/ 11	01 AUG 2013	Digital colour	35 mm
SK 8078 / 6	NMR 28469	/ 12	01 AUG 2013	Digital colour	35 mm
SK 8078 / 7	NMR 28469	/ 13	01 AUG 2013	Digital colour	35 mm
SK 8079 / 1	INV 19406	/ 13A	25 AUG 1996	Colour neg	35 mm
SK 8079 / 5	NMR 17596	/ 01	20 JUL 2001	Colour slide	35 mm
SK 8079 / 6	NMR 17596	/ 02	20 JUL 2001	Colour slide	35 mm
SK 8079 / 7	NMR 17606	/ 01	20 JUL 2001	Black & white	70mm,120,220
SK 8079 / 8	NMR 17606	/ 02	20 JUL 2001	Black & white	70mm,120,220
SK 8079 / 9	NMR 17606	/ 03	20 JUL 2001	Black & white	70mm,120,220
SK 8079 / 10	NMR 17606	/ 04	20 JUL 2001	Black & white	70mm,120,220
SK 8079 / 11	NMR 17606	/ 05	20 JUL 2001	Black & white	70mm,120,220
SK 8079 / 12	NMR 28469	/ 09	01 AUG 2013	Digital colour	35 mm
SK 8079 / 13	NMR 28469	/ 10	01 AUG 2013	Digital colour	35 mm
SK 8079 / 14	NMR 28469	/ 14	01 AUG 2013	Digital colour	35 mm
SK 8079 / 15	NMR 28469	/ 15	01 AUG 2013	Digital colour	35 mm
SK 8080 / 1	DNR 427	/ 3	21 JUN 1970	Black & white	35 mm
SK 8080 / 2	DNR 427	/ 4	21 JUN 1970	Black & white	35 mm
SK 8080 / 3	DNR 427	/ 5	21 JUN 1970	Black & white	35 mm
SK 8080 / 5	DNR 870	/ 9	02 JUL 1976	Black & white	35 mm
SK 8080 / 6	DNR 870	/ 12	02 JUL 1976	Black & white	35 mm
SK 8080 / 7	DNR 866	/ 63	29 JUN 1976	Black & white	70mm,120,220
SK 8080 / 8	DNR 866	/ 64	29 JUN 1976	Black & white	70mm,120,220
SK 8080 / 9	DNR 866	/ 65	29 JUN 1976	Black & white	70mm,120,220
SK 8080 / 10	DNR 866	/ 66	29 JUN 1976	Black & white	70mm,120,220
SK 8080 / 11	DNR 866	/ 67	29 JUN 1976	Black & white	70mm,120,220
SK 8080 / 12	DNR 865	/ 1	29 JUN 1976	Black & white	35 mm
SK 8080 / 13	DNR 865	/ 2	29 JUN 1976	Black & white	35 mm
SK 8080 / 14	DNR 865	/ 3	29 JUN 1976	Black & white	35 mm
SK 8080 / 15	DNR 865	/ 4	29 JUN 1976	Black & white	35 mm
SK 8080 / 19	DNR 1557	/ 27	27 JUL 1979	Black & white	35 mm
SK 8080 / 28	JAP 19333	/ V111	09 JUL 1996	Colour slide	35 mm
SK 8080 / 29	JAP 19333	/ V112	09 JUL 1996	Colour slide	35 mm
SK 8080 / 30	JAP 19333	/ V113	09 JUL 1996	Colour slide	35 mm
SK 8081 / 2	DNR 427	/ 11	21 JUN 1970	Black & white	35 mm
SK 8081 / 3	DNR 870	/ 4	02 JUL 1976	Black & white	35 mm
SK 8081 / 4	DNR 870	/ 5	02 JUL 1976	Black & white	35 mm
SK 8081 / 5	DNR 870	/ 6	02 JUL 1976	Black & white	35 mm
SK 8081 / 6	DNR 870	/ 7	02 JUL 1976	Black & white	35 mm
SK 8081 / 8	DNR 865	/ 6	29 JUN 1976	Black & white	35 mm
SK 8081 / 11	DNR 865	/ 10	29 JUN 1976	Black & white	35 mm
SK 8081 / 12	DNR 865	/ 12	29 JUN 1976	Black & white	35 mm
SK 8081 / 13	DNR 865	/ 13	29 JUN 1976	Black & white	35 mm
SK 8082 / 4	NMR 20269	/ 09	28 JUN 2005	Colour neg	35 mm
SK 8082 / 5	NMR 20269	/ 10	28 JUN 2005	Colour neg	35 mm
SK 8082 / 6	NMR 20269	/ 11	28 JUN 2005	Colour neg	35 mm
SK 8082 / 7	NMR 20321	/ 15	28 JUN 2005	Digital colour	35 mm
SK 8082 / 8	NMR 20297	/ 05	28 JUN 2005	Colour neg	70mm,120,220
SK 8082 / 9	NMR 20297	/ 06	28 JUN 2005	Colour neg	70mm,120,220
SK 8178 / 1	NMR 1830	/ 073	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 2	NMR 1830	/ 075	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 3	NMR 1830	/ 080	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 4	DNR 2423	/ 06	18 JUL 1990	Black & white	35 mm
SK 8178 / 5	DNR 2423	/ 07	18 JUL 1990	Black & white	35 mm

SK 8178 / 6	DNR 2423	/ 08	18 JUL 1990	Black & white	35 mm
SK 8178 / 7	DNR 2423	/ 09	18 JUL 1990	Black & white	35 mm
SK 8178 / 8	DNR 2423	/ 10	18 JUL 1990	Black & white	35 mm
SK 8178 / 9	DNR 2423	/ 11	18 JUL 1990	Black & white	35 mm
SK 8178 / 10	DNR 2423	/ 12	18 JUL 1990	Black & white	35 mm
SK 8178 / 11	NMR 1830	/ 074	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 12	NMR 1830	/ 076	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 13	NMR 1830	/ 077	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 14	NMR 1830	/ 081	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 15	NMR 1830	/ 082	24 JUL 1980	Black & white	70mm,120,220
SK 8178 / 28	HEA 29953	/ 011	26 AUG 2016	Digital colour	35 mm
SK 8178 / 29	HEA 29953	/ 012	26 AUG 2016	Digital colour	35 mm
SK 8179 / 2	JAP 1187	/ 28	02 SEP 1972	Black & white	35 mm
SK 8179 / 3	NMR 1830	/ 078	24 JUL 1980	Black & white	70mm,120,220
SK 8179 / 4	DNR 866	/ 57	29 JUN 1976	Black & white	70mm,120,220
SK 8179 / 5	NMR 1830	/ 079	24 JUL 1980	Black & white	70mm,120,220
SK 8179 / 6	NMR 17284	/ 29	29 JUN 1999	Colour slide	35 mm
SK 8179 / 7	INV 19549	/ 01A	30 AUG 1998	Colour neg	35 mm
SK 8179 / 8	INV 19549	/ 02A	30 AUG 1998	Colour neg	35 mm
SK 8179 / 9	INV 19549	/ 03A	30 AUG 1998	Colour neg	35 mm
SK 8179 / 10	INV 19549	/ 04A	30 AUG 1998	Colour neg	35 mm
SK 8179 / 11	INV 19549	/ 05A	30 AUG 1998	Colour neg	35 mm
SK 8179 / 12	INV 19552	/ 23	14 MAR 1999	Colour neg	35 mm
SK 8179 / 13	INV 19552	/ 24	14 MAR 1999	Colour neg	35 mm
SK 8179 / 22	NMR 27943	/ 17	04 MAR 2014	Digital colour	35 mm
SK 8179 / 23	NMR 27943	/ 18	04 MAR 2014	Digital colour	35 mm
SK 8179 / 24	NMR 27943	/ 19	04 MAR 2014	Digital colour	35 mm
SK 8179 / 25	NMR 27943	/ 20	04 MAR 2014	Digital colour	35 mm
SK 8179 / 26	HEA 29953	/ 001	26 AUG 2016	Digital colour	35 mm
SK 8179 / 27	HEA 29953	/ 002	26 AUG 2016	Digital colour	35 mm
SK 8179 / 28	HEA 29953	/ 003	26 AUG 2016	Digital colour	35 mm
SK 8179 / 29	HEA 29953	/ 004	26 AUG 2016	Digital colour	35 mm
SK 8179 / 30	HEA 29953	/ 005	26 AUG 2016	Digital colour	35 mm
SK 8179 / 31	HEA 29953	/ 006	26 AUG 2016	Digital colour	35 mm
SK 8179 / 32	HEA 29953	/ 007	26 AUG 2016	Digital colour	35 mm
SK 8179 / 33	HEA 29953	/ 008	26 AUG 2016	Digital colour	35 mm
SK 8179 / 34	HEA 29953	/ 009	26 AUG 2016	Digital colour	35 mm
SK 8179 / 35	HEA 29953	/ 010	26 AUG 2016	Digital colour	35 mm
SK 8179 / 36	HEA 29953	/ 013	26 AUG 2016	Digital colour	35 mm
SK 8179 / 37	HEA 29953	/ 014	26 AUG 2016	Digital colour	35 mm
SK 8179 / 38	HEA 29953	/ 015	26 AUG 2016	Digital colour	35 mm
SK 8179 / 39	HEA 29953	/ 016	26 AUG 2016	Digital colour	35 mm
SK 8179 / 40	HEA 29953	/ 017	26 AUG 2016	Digital colour	35 mm
SK 8179 / 41	HEA 29953	/ 018	26 AUG 2016	Digital colour	35 mm
SK 8179 / 42	HEA 29953	/ 019	26 AUG 2016	Digital colour	35 mm
SK 8179 / 43	HEA 29953	/ 020	26 AUG 2016	Digital colour	35 mm
SK 8179 / 44	HEA 29953	/ 021	26 AUG 2016	Digital colour	35 mm
SK 8179 / 45	HEA 29953	/ 022	26 AUG 2016	Digital colour	35 mm
SK 8179 / 46	HEA 29953	/ 023	26 AUG 2016	Digital colour	35 mm
SK 8180 / 1	JAP 1187	/ 11	02 SEP 1972	Black & white	35 mm
SK 8180 / 2	DNR 870	/ 10	02 JUL 1976	Black & white	35 mm
SK 8180 / 3	DNR 870	/ 11	02 JUL 1976	Black & white	35 mm
SK 8180 / 4	DNR 870	/ 13	02 JUL 1976	Black & white	35 mm
SK 8180 / 5	DNR 866	/ 62	29 JUN 1976	Black & white	70mm,120,220
SK 8180 / 6	DNR 2401	/ 6	26 JUL 1986	Black & white	35 mm
SK 8180 / 7	DNR 2401	/ 7	26 JUL 1986	Black & white	35 mm
SK 8180 / 10	NMR 20269	/ 14	28 JUN 2005	Colour neg	35 mm
SK 8180 / 11	NMR 20269	/ 15	28 JUN 2005	Colour neg	35 mm
SK 8180 / 12	NMR 20269	/ 16	28 JUN 2005	Colour neg	35 mm
SK 8180 / 13	NMR 20269	/ 17	28 JUN 2005	Colour neg	35 mm
SK 8180 / 14	NMR 20321	/ 19	28 JUN 2005	Digital colour	35 mm
SK 8180 / 15	NMR 20321	/ 20	28 JUN 2005	Digital colour	35 mm
SK 8180 / 16	NMR 20321	/ 21	28 JUN 2005	Digital colour	35 mm
SK 8180 / 17	NMR 20297	/ 11	28 JUN 2005	Colour neg	70mm,120,220
SK 8180 / 18	NMR 20297	/ 12	28 JUN 2005	Colour neg	70mm,120,220
SK 8180 / 19	NMR 20297	/ 13	28 JUN 2005	Colour neg	70mm,120,220
SK 8180 / 20	NMR 20551	/ 43	11 JUL 2006	Digital colour	35 mm
SK 8180 / 21	NMR 20551	/ 44	11 JUL 2006	Digital colour	35 mm
SK 8180 / 22	NMR 20551	/ 45	11 JUL 2006	Digital colour	35 mm

SK 8180 / 23	NMR 20551	/ 46	11 JUL 2006	Digital colour	35 mm
SK 8180 / 24	NMR 20551	/ 47	11 JUL 2006	Digital colour	35 mm
SK 8181 / 1	JAP 1187	/ 5	02 SEP 1972	Black & white	35 mm
SK 8181 / 2	JAP 1187	/ 6	02 SEP 1972	Black & white	35 mm
SK 8181 / 3	JAP 1187	/ 7	02 SEP 1972	Black & white	35 mm
SK 8181 / 4	JAP 1187	/ 8	02 SEP 1972	Black & white	35 mm
SK 8181 / 5	DNR 865	/ 9	29 JUN 1976	Black & white	35 mm
SK 8181 / 6	DNR 865	/ 11	29 JUN 1976	Black & white	35 mm
SK 8181 / 7	DNR 2401	/ 2	26 JUL 1986	Black & white	35 mm
SK 8181 / 8	DNR 2401	/ 3	26 JUL 1986	Black & white	35 mm
SK 8181 / 9	DNR 2401	/ 4	26 JUL 1986	Black & white	35 mm
SK 8181 / 10	DNR 2401	/ 5	26 JUL 1986	Black & white	35 mm
SK 8181 / 11	DNR 1170	/ 60	09 JUL 1977	Black & white	70mm,120,220
SK 8181 / 12	DNR 1170	/ 61	09 JUL 1977	Black & white	70mm,120,220
SK 8181 / 13	DNR 1170	/ 62	09 JUL 1977	Black & white	70mm,120,220
SK 8181 / 14	DNR 1170	/ 63	09 JUL 1977	Black & white	70mm,120,220
SK 8181 / 15	DNR 1170	/ 64	09 JUL 1977	Black & white	70mm,120,220
SK 8181 / 16	DNR 2365	/ 0	17 JUL 1984	Black & white	35 mm
SK 8181 / 17	DNR 2365	/ 1	17 JUL 1984	Black & white	35 mm
SK 8181 / 18	DNR 2365	/ 2	17 JUL 1984	Black & white	35 mm
SK 8181 / 19	DNR 2365	/ 3	17 JUL 1984	Black & white	35 mm
SK 8181 / 20	DNR 1557	/ 28	27 JUL 1979	Black & white	35 mm
SK 8181 / 23	NMR 20269	/ 12	28 JUN 2005	Colour neg	35 mm
SK 8181 / 24	NMR 20269	/ 13	28 JUN 2005	Colour neg	35 mm
SK 8181 / 25	NMR 20321	/ 17	28 JUN 2005	Digital colour	35 mm
SK 8181 / 26	NMR 20321	/ 18	28 JUN 2005	Digital colour	35 mm
SK 8181 / 27	NMR 20297	/ 07	28 JUN 2005	Colour neg	70mm,120,220
SK 8181 / 28	NMR 20297	/ 08	28 JUN 2005	Colour neg	70mm,120,220
SK 8181 / 29	NMR 20297	/ 09	28 JUN 2005	Colour neg	70mm,120,220
SK 8181 / 30	NMR 20297	/ 10	28 JUN 2005	Colour neg	70mm,120,220
SK 8182 / 1	NMR 1830	/ 083	24 JUL 1980	Black & white	70mm,120,220
SK 8182 / 2	NMR 1830	/ 084	24 JUL 1980	Black & white	70mm,120,220
SK 8182 / 3	NMR 1830	/ 085	24 JUL 1980	Black & white	70mm,120,220
SK 8182 / 4	NMR 1830	/ 086	24 JUL 1980	Black & white	70mm,120,220
SK 8182 / 5	NMR 12086	/ 23	22 JUL 1991	Colour slide	35 mm
SK 8182 / 6	JAP 19333	/ V109	09 JUL 1996	Colour slide	35 mm
SK 8182 / 8	NMR 17584	/ 41	05 JUL 2001	Black & white	70mm,120,220
SK 8182 / 9	NMR 17584	/ 42	05 JUL 2001	Black & white	70mm,120,220
SK 8182 / 10	NMR 17584	/ 43	05 JUL 2001	Black & white	70mm,120,220
SK 8182 / 11	NMR 17584	/ 44	05 JUL 2001	Black & white	70mm,120,220
SK 8182 / 12	NMR 17571	/ 37	05 JUL 2001	Colour slide	35 mm
SK 8182 / 13	NMR 17573	/ 02	05 JUL 2001	Colour slide	35 mm
SK 8182 / 14	NMR 17573	/ 03	05 JUL 2001	Colour slide	35 mm
SK 8182 / 15	NMR 17573	/ 04	05 JUL 2001	Colour slide	35 mm
SK 8182 / 16	NMR 17573	/ 05	05 JUL 2001	Colour slide	35 mm
SK 8182 / 17	NMR 17573	/ 06	05 JUL 2001	Colour slide	35 mm
SK 8182 / 18	NMR 20321	/ 16	28 JUN 2005	Digital colour	35 mm
SK 8182 / 19	NMR 20297	/ 02	28 JUN 2005	Colour neg	70mm,120,220
SK 8182 / 20	NMR 20297	/ 03	28 JUN 2005	Colour neg	70mm,120,220
SK 8182 / 21	NMR 20297	/ 04	28 JUN 2005	Colour neg	70mm,120,220
SK 8183 / 1	DNR 2364	/ 14	17 JUL 1984	Black & white	35 mm
SK 8183 / 2	DNR 2364	/ 15	17 JUL 1984	Black & white	35 mm
SK 8279 / 3	HEA 28714	/ 049	15 JUN 2015	Digital colour	35 mm
SK 8282 / 1	DNR 427	/ 6	21 JUN 1970	Black & white	35 mm
SK 8282 / 2	NMR 886	/ 209-212	01 AUG 1975	Black & white	70mm,120,220
SK 8282 / 3	NMR 886	/ 213-216	01 AUG 1975	Black & white	70mm,120,220
SK 8282 / 4	JAP 940	/ 32	16 JUN 1974	B&W copy clr	35 mm
SK 8282 / 5	JAP 940	/ 33	16 JUN 1974	B&W copy clr	35 mm
SK 8282 / 6	JAP 941	/ 3	16 JUN 1974	B&W copy clr	35 mm
SK 8282 / 7	JAP 941	/ 5	16 JUN 1974	B&W copy clr	35 mm
SK 8282 / 8	DNR 518	/ 3	15 JUN 1974	Black & white	35 mm
SK 8282 / 9	DNR 518	/ 4	15 JUN 1974	Black & white	35 mm
SK 8282 / 10	DNR 518	/ 5	15 JUN 1974	Black & white	35 mm
SK 8282 / 11	CAP 8245	/ 47	19 JUL 1954	Black & white	Unknown
SK 8282 / 12	CAP 8245	/ 48	19 JUL 1954	Black & white	Unknown
SK 8282 / 13	DNR 866	/ 58	29 JUN 1976	Black & white	70mm,120,220
SK 8282 / 14	DNR 866	/ 59	29 JUN 1976	Black & white	70mm,120,220

SK 8282 / 15	DNR 866	/ 60	29 JUN 1976	Black & white	70mm,120,220
SK 8282 / 16	DNR 866	/ 61	29 JUN 1976	Black & white	70mm,120,220
SK 8282 / 17	DNR 863	/ 31	29 JUN 1976	Black & white	35 mm
SK 8282 / 18	DNR 863	/ 32	29 JUN 1976	Black & white	35 mm
SK 8282 / 19	DNR 863	/ 33	29 JUN 1976	Black & white	35 mm
SK 8282 / 20	DNR 863	/ 34	29 JUN 1976	Black & white	35 mm
SK 8282 / 21	DNR 863	/ 35	29 JUN 1976	Black & white	35 mm
SK 8282 / 22	DNR 863	/ 36	29 JUN 1976	Black & white	35 mm
SK 8282 / 23	DNR 2401	/ 8	26 JUL 1986	Black & white	35 mm
SK 8282 / 24	DNR 2401	/ 9	26 JUL 1986	Black & white	35 mm
SK 8282 / 25	NMR 4358	/ 19	23 JUN 1989	Black & white	35 mm
SK 8282 / 26	NMR 4358	/ 21	23 JUN 1989	Black & white	35 mm
SK 8282 / 27	NMR 4358	/ 22	23 JUN 1989	Black & white	35 mm
SK 8282 / 28	NMR 4358	/ 23	23 JUN 1989	Black & white	35 mm
SK 8282 / 29	NMR 4518	/ 12	29 JUN 1989	Colour slide	35 mm
SK 8282 / 30	NMR 4518	/ 13	29 JUN 1989	Colour slide	35 mm
SK 8282 / 31	NMR 4518	/ 14	29 JUN 1989	Colour slide	35 mm
SK 8282 / 32	NMR 4518	/ 15	29 JUN 1989	Colour slide	35 mm
SK 8282 / 33	DNR 1557	/ 30	27 JUL 1979	Black & white	35 mm
SK 8282 / 34	DNR 1557	/ 31	27 JUL 1979	Black & white	35 mm
SK 8282 / 35	NMR 12114	/ 57	22 JUL 1991	Black & white	70mm,120,220
SK 8282 / 36	NMR 12114	/ 58	22 JUL 1991	Black & white	70mm,120,220
SK 8282 / 37	NMR 12114	/ 59	22 JUL 1991	Black & white	70mm,120,220
SK 8282 / 38	NMR 12114	/ 60	22 JUL 1991	Black & white	70mm,120,220
SK 8282 / 39	NMR 12114	/ 61	22 JUL 1991	Black & white	70mm,120,220
SK 8282 / 40	NMR 12086	/ 22	22 JUL 1991	Colour slide	35 mm
SK 8282 / 41	NMR 12086	/ 24	22 JUL 1991	Colour slide	35 mm
SK 8282 / 42	NMR 12086	/ 25	22 JUL 1991	Colour slide	35 mm
SK 8282 / 43	JAP 19333	/ V107	09 JUL 1996	Colour slide	35 mm
SK 8282 / 44	JAP 19333	/ V108	09 JUL 1996	Colour slide	35 mm
SK 8282 / 45	JAP 19333	/ V110	09 JUL 1996	Colour slide	35 mm
SK 8282 / 46	INV 19404	/ 01A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 47	INV 19404	/ 02A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 48	INV 19404	/ 03A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 49	INV 19404	/ 04A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 50	INV 19404	/ 05A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 51	INV 19404	/ 06A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 52	INV 19404	/ 07A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 53	INV 19404	/ 08A	10 AUG 1996	Colour neg	35 mm
SK 8282 / 54	INV 19405	/ 02	11 AUG 1996	Colour neg	35 mm
SK 8282 / 55	INV 19405	/ 03	11 AUG 1996	Colour neg	35 mm
SK 8282 / 56	INV 19405	/ 04	11 AUG 1996	Colour neg	35 mm
SK 8282 / 57	INV 19405	/ 05	11 AUG 1996	Colour neg	35 mm
SK 8282 / 58	INV 19405	/ 06	11 AUG 1996	Colour neg	35 mm
SK 8282 / 59	INV 19405	/ 07	11 AUG 1996	Colour neg	35 mm
SK 8282 / 60	INV 19406	/ 09A	25 AUG 1996	Colour neg	35 mm
SK 8282 / 61	INV 19406	/ 10A	25 AUG 1996	Colour neg	35 mm
SK 8282 / 62	INV 19406	/ 11A	25 AUG 1996	Colour neg	35 mm
SK 8282 / 63	INV 19410	/ 29	30 MAR 1997	Colour neg	35 mm
SK 8282 / 67	NMR 17578	/ 00	20 JUL 2001	Colour neg	35 mm
SK 8282 / 68	NMR 17578	/ 01	20 JUL 2001	Colour neg	35 mm
SK 8282 / 69	NMR 17821	/ 07	20 JUN 2003	Colour neg	35 mm
SK 8282 / 70	NMR 17821	/ 08	20 JUN 2003	Colour neg	35 mm
SK 8282 / 71	NMR 17821	/ 09	20 JUN 2003	Colour neg	35 mm
SK 8282 / 72	NMR 20321	/ 11	28 JUN 2005	Digital colour	35 mm
SK 8282 / 73	NMR 20321	/ 12	28 JUN 2005	Digital colour	35 mm
SK 8282 / 74	NMR 20321	/ 13	28 JUN 2005	Digital colour	35 mm
SK 8282 / 75	NMR 20297	/ 01	28 JUN 2005	Colour neg	70mm,120,220
SK 8282 / 76	NMR 28038	/ 23	22 JUN 2010	Digital colour	35 mm
SK 8282 / 77	NMR 28038	/ 24	22 JUN 2010	Digital colour	35 mm
SK 8282 / 78	NMR 28469	/ 01	01 AUG 2013	Digital colour	35 mm
SK 8282 / 79	NMR 28469	/ 02	01 AUG 2013	Digital colour	35 mm
SK 8282 / 80	NMR 28469	/ 03	01 AUG 2013	Digital colour	35 mm
SK 8282 / 81	NMR 28469	/ 04	01 AUG 2013	Digital colour	35 mm
SK 8380 / 1	NMR 1961	/ 083	08 JUL 1981	Black & white	70mm,120,220
SK 8380 / 2	NMR 1961	/ 084	08 JUL 1981	Black & white	70mm,120,220
SK 8380 / 4	HEA 28714	/ 053	15 JUN 2015	Digital colour	35 mm
SK 8381 / 1	DNR 2401	/ 10	26 JUL 1986	Black & white	35 mm
SK 8381 / 3	NMR 17815	/ 00	20 JUN 2003	Colour neg	35 mm

SK 8381 / 8	NMR 28313	/ 06	23 JUL 2012	Digital colour	35 mm
SK 8381 / 9	NMR 28313	/ 07	23 JUL 2012	Digital colour	35 mm
SK 8381 / 10	NMR 28313	/ 08	23 JUL 2012	Digital colour	35 mm
SK 8382 / 1	DNR 427	/ 7	21 JUN 1970	Black & white	35 mm
SK 8382 / 2	CAP 8245	/ 73	24 JUL 1954	Black & white	Unknown
SK 8382 / 3	CAP 8245	/ 74	24 JUL 1954	Black & white	Unknown
SK 8382 / 4	CAP 8245	/ 75	24 JUL 1954	Black & white	Unknown
SK 8382 / 5	CAP 8245	/ 76	24 JUL 1954	Black & white	Unknown
SK 8382 / 6	CAP 8245	/ 77	24 JUL 1954	Black & white	Unknown
SK 8382 / 7	CAP 8245	/ 79	24 JUL 1954	Black & white	Unknown
SK 8382 / 8	CAP 8245	/ 80	24 JUL 1954	Black & white	Unknown
SK 8382 / 11	DNR 2364	/ 9	16 JUL 1984	Black & white	35 mm
SK 8382 / 12	DNR 2364	/ 10	16 JUL 1984	Black & white	35 mm
SK 8382 / 13	NMR 12114	/ 62	22 JUL 1991	Black & white	70mm,120,220
SK 8382 / 14	NMR 12114	/ 63	22 JUL 1991	Black & white	70mm,120,220
SK 8382 / 15	NMR 12114	/ 64	22 JUL 1991	Black & white	70mm,120,220
SK 8382 / 16	NMR 12086	/ 26	22 JUL 1991	Colour slide	35 mm
SK 8382 / 17	NMR 12086	/ 27	22 JUL 1991	Colour slide	35 mm
SK 8382 / 18	INV 19405	/ 12	11 AUG 1996	Colour neg	35 mm
SK 8382 / 19	INV 19413	/ 10	20 APR 1997	Colour neg	35 mm
SK 8382 / 20	INV 19413	/ 11	20 APR 1997	Colour neg	35 mm
SK 8382 / 21	INV 19413	/ 12	20 APR 1997	Colour neg	35 mm
SK 8382 / 22	INV 19413	/ 13	20 APR 1997	Colour neg	35 mm
SK 8382 / 23	INV 19413	/ 14	20 APR 1997	Colour neg	35 mm
SK 8382 / 24	INV 19416	/ 28A	08 JUN 1997	Colour neg	35 mm
SK 8382 / 27	NMR 17911	/ 09	22 JUL 2003	Black & white	70mm,120,220
SK 8382 / 28	NMR 17911	/ 10	22 JUL 2003	Black & white	70mm,120,220
SK 8382 / 29	NMR 17895	/ 06	22 JUL 2003	Colour neg	35 mm
SK 8382 / 30	NMR 17895	/ 07	22 JUL 2003	Colour neg	35 mm
SK 8382 / 31	NMR 17895	/ 08	22 JUL 2003	Colour neg	35 mm
SK 8382 / 32	NMR 17895	/ 09	22 JUL 2003	Colour neg	35 mm
SK 8382 / 33	NMR 20321	/ 14	28 JUN 2005	Digital colour	35 mm
SK 8382 / 40	NMR 28313	/ 09	23 JUL 2012	Digital colour	35 mm
SK 8382 / 41	HEA 28921	/ 025	12 AUG 2016	Digital colour	35 mm
SK 8382 / 42	HEA 28921	/ 026	12 AUG 2016	Digital colour	35 mm
SK 8382 / 43	HEA 28921	/ 027	12 AUG 2016	Digital colour	35 mm
SK 8382 / 44	HEA 28921	/ 028	12 AUG 2016	Digital colour	35 mm
SK 8382 / 45	HEA 28921	/ 029	12 AUG 2016	Digital colour	35 mm
SK 8382 / 46	HEA 28921	/ 030	12 AUG 2016	Digital colour	35 mm
SK 8382 / 47	HEA 28921	/ 031	12 AUG 2016	Digital colour	35 mm
SK 8382 / 48	HEA 28921	/ 050	12 AUG 2016	Digital colour	35 mm
SK 8383 / 1	CAP 8245	/ 78	24 JUL 1954	Black & white	Unknown
SK 8383 / 2	NMR 1863	/ 445	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 3	PLE 2969	/ 29	04 AUG 1979	Black & white	35 mm
SK 8383 / 4	PLE 2969	/ 30	04 AUG 1979	Black & white	35 mm
SK 8383 / 5	PLE 2969	/ 31	04 AUG 1979	Black & white	35 mm
SK 8383 / 6	PLE 2969	/ 32	04 AUG 1979	Black & white	35 mm
SK 8383 / 7	PLE 2969	/ 33	04 AUG 1979	Black & white	35 mm
SK 8383 / 8	NMR 1863	/ 446	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 9	NMR 1863	/ 447	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 10	NMR 1863	/ 448	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 11	NMR 1863	/ 449	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 12	NMR 1863	/ 450	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 13	NMR 1863	/ 451	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 14	NMR 1863	/ 452	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 15	NMR 1863	/ 453	31 OCT 1980	Black & white	70mm,120,220
SK 8383 / 24	HEA 28921	/ 020	12 AUG 2016	Digital colour	35 mm
SK 8383 / 25	HEA 28921	/ 021	12 AUG 2016	Digital colour	35 mm
SK 8383 / 26	HEA 28921	/ 022	12 AUG 2016	Digital colour	35 mm
SK 8383 / 27	HEA 28921	/ 023	12 AUG 2016	Digital colour	35 mm
SK 8383 / 28	HEA 28921	/ 024	12 AUG 2016	Digital colour	35 mm
SK 8383 / 29	HEA 28921	/ 032	12 AUG 2016	Digital colour	35 mm
SK 8383 / 30	HEA 28921	/ 033	12 AUG 2016	Digital colour	35 mm
SK 8383 / 31	HEA 28921	/ 034	12 AUG 2016	Digital colour	35 mm
SK 8383 / 32	HEA 28921	/ 035	12 AUG 2016	Digital colour	35 mm
SK 8383 / 33	HEA 28921	/ 036	12 AUG 2016	Digital colour	35 mm
SK 8383 / 34	HEA 28921	/ 037	12 AUG 2016	Digital colour	35 mm
SK 8383 / 35	HEA 28921	/ 038	12 AUG 2016	Digital colour	35 mm
SK 8383 / 36	HEA 28921	/ 039	12 AUG 2016	Digital colour	35 mm

SK 8383 / 37	HEA 28921	/ 040	12 AUG 2016	Digital colour	35 mm
SK 8383 / 38	HEA 28921	/ 041	12 AUG 2016	Digital colour	35 mm
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SK 8581 / 5	NMR 28335	/ 33	06 SEP 2012	Digital colour	35 mm
SK 8581 / 6	NMR 28335	/ 34	06 SEP 2012	Digital colour	35 mm

Sortie number	Library number	Camera position	Frame number	Date	Scale 1:
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OS/91158	13851	V	87	14 AUG 1991	7500
OS/91158	13851	V	88	14 AUG 1991	7500
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MAL/61478	21271	V	91902	30 JUN 1961	11000
MAL/61478	21271	V	91903	30 JUN 1961	11000

Cambridge University Collection of Air Photos.

[redacted] The following air photos were available as low resolution thumbnails and were examined on screen between 24 January and 8 April 2022.

Photo reference	Date taken
AHU25	22-Jul-63
AHU26	22-Jul-63
BQI66	11-Jul-74
BQI67	11-Jul-74
BQI68	11-Jul-74
BQU69	11-Jul-74
BQI70	11-Jul-74
BQI71	11-Jul-74
BQI72	11-Jul-74
BQI73	11-Jul-74
BQM17	20-Jul-74
BQM18	20-Jul-74
BQM19	20-Jul-74
BQM20	20-Jul-74
BQM21	20-Jul-74
BQM22	20-Jul-74
BQM24	20-Jul-74
BQQ82	23-Jul-74
BQQ83	23-Jul-74
BQQ84	23-Jul-74
BSB80	30-Jan-75
K17AH002	06-Aug-74
K17AH003	06-Aug-74

Appendix 5 Structure and content of digital map dataset

All features in the MapInfo table and ESRI shape files 'A27 ARUNDEL AP_LIDAR MAPPING' are associated with the following information, where applicable.

PARCEL	AECOM allocated land parcel reference number
LAYER	Indicates nature of feature depicted eg bank, ditch, ridge and furrow, modern etc
TYPE	Historic England Monument Type Thesaurus term
PERIOD	Period
SOURCES1	Photo reference number + date
SOURCE1EVIDENCE	Evidence (earthwork, structure, soilmark, parchmark, cropmark) as features appears on SOURCE1
SOURCES2	Photo reference number + date
SOURCE2EVIDENCE	Evidence (earthwork, structure, soilmark, parchmark, cropmark) as features appears on SOURCE2
SOURCES3	Photo reference number + date
SOURCE3EVIDENCE	Evidence (earthwork, structure, soilmark, parchmark, cropmark) as features appears on SOURCE3
HER	Historic Enviroment Record monument number (where applicable)

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Worrell, Sally Ann 1997. 'Marton, north Lincolnshire: a Romano-British settlement in its context', Durham Theses, Durham University. Available at Durham E-Theses Online: [redacted]

Digital sources (all accessed between February and 14 April 2022)

Geology of Britain Viewer. Viewed online at [redacted]

Ordnance Survey 25 inch and 6 inch scale maps. Various dates via [redacted]

[redacted]

[redacted]

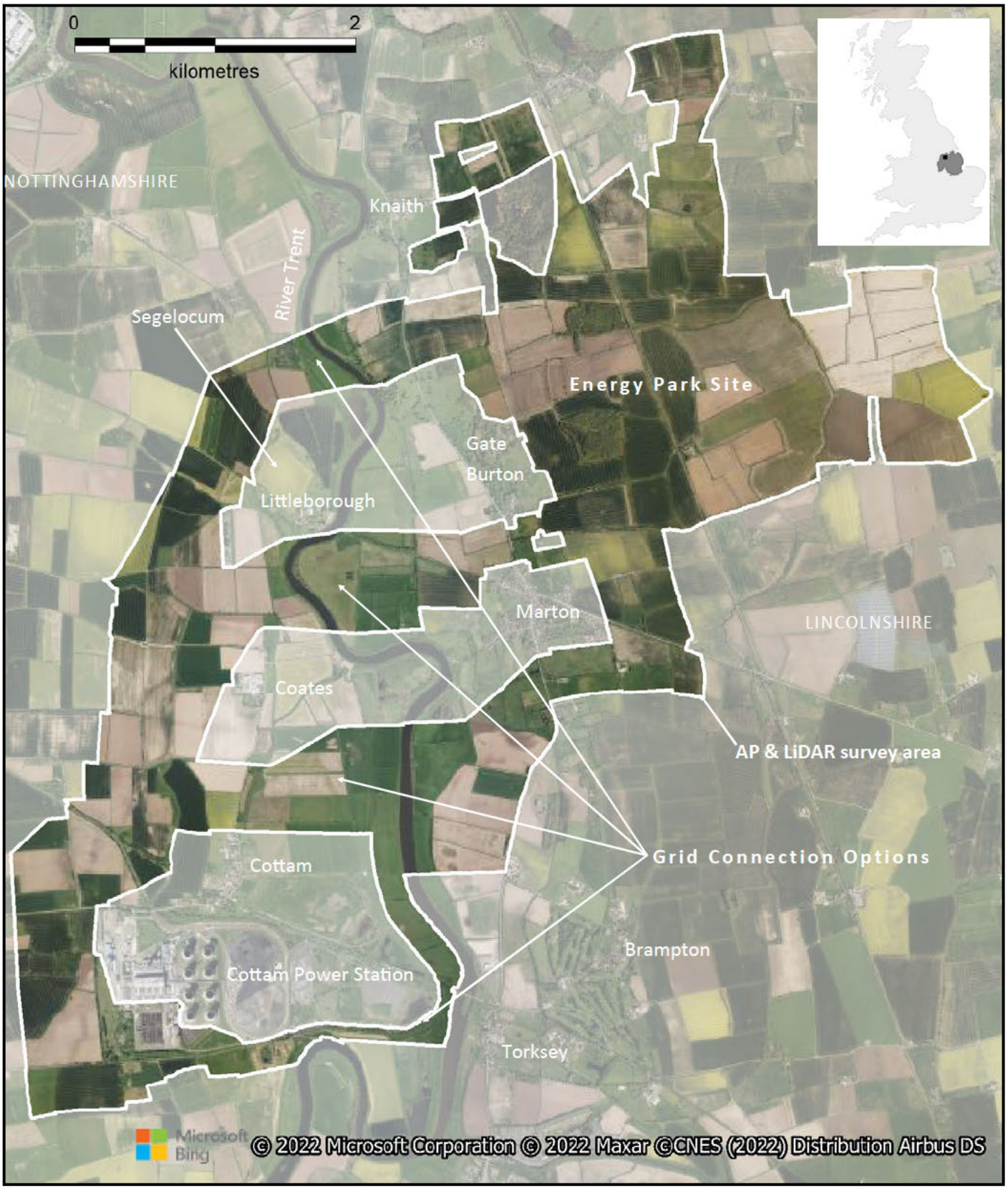

Figure 1. Location plan of the air photo & LiDAR survey area for the Gate Burton Energy Park, Nottinghamshire and Lincolnshire

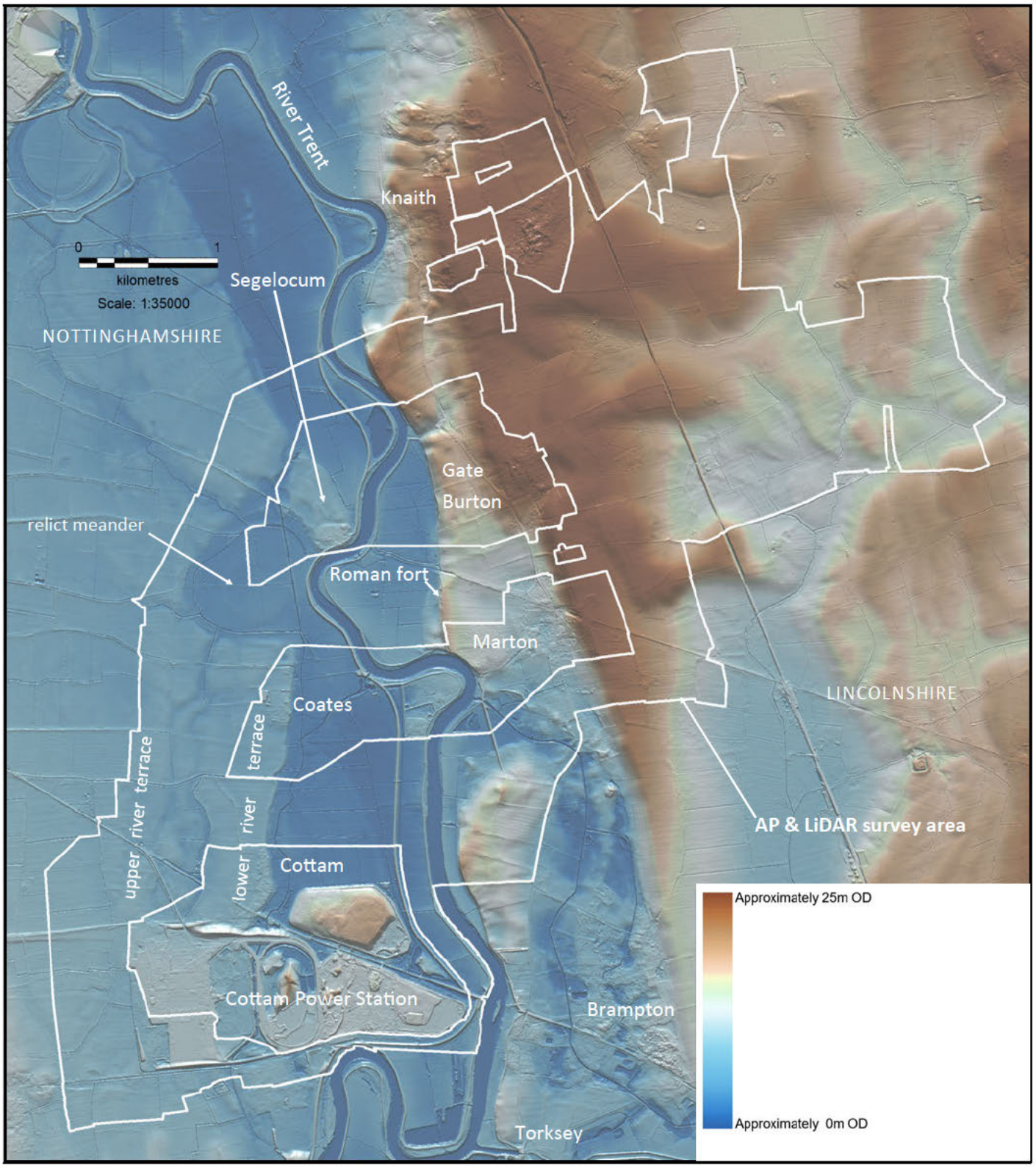

Figure 2. Hill-shade and colour relief model generated from the Environment Agency LiDAR DTM for the Gate Burton Energy Park, Nottinghamshire and Lincolnshire.

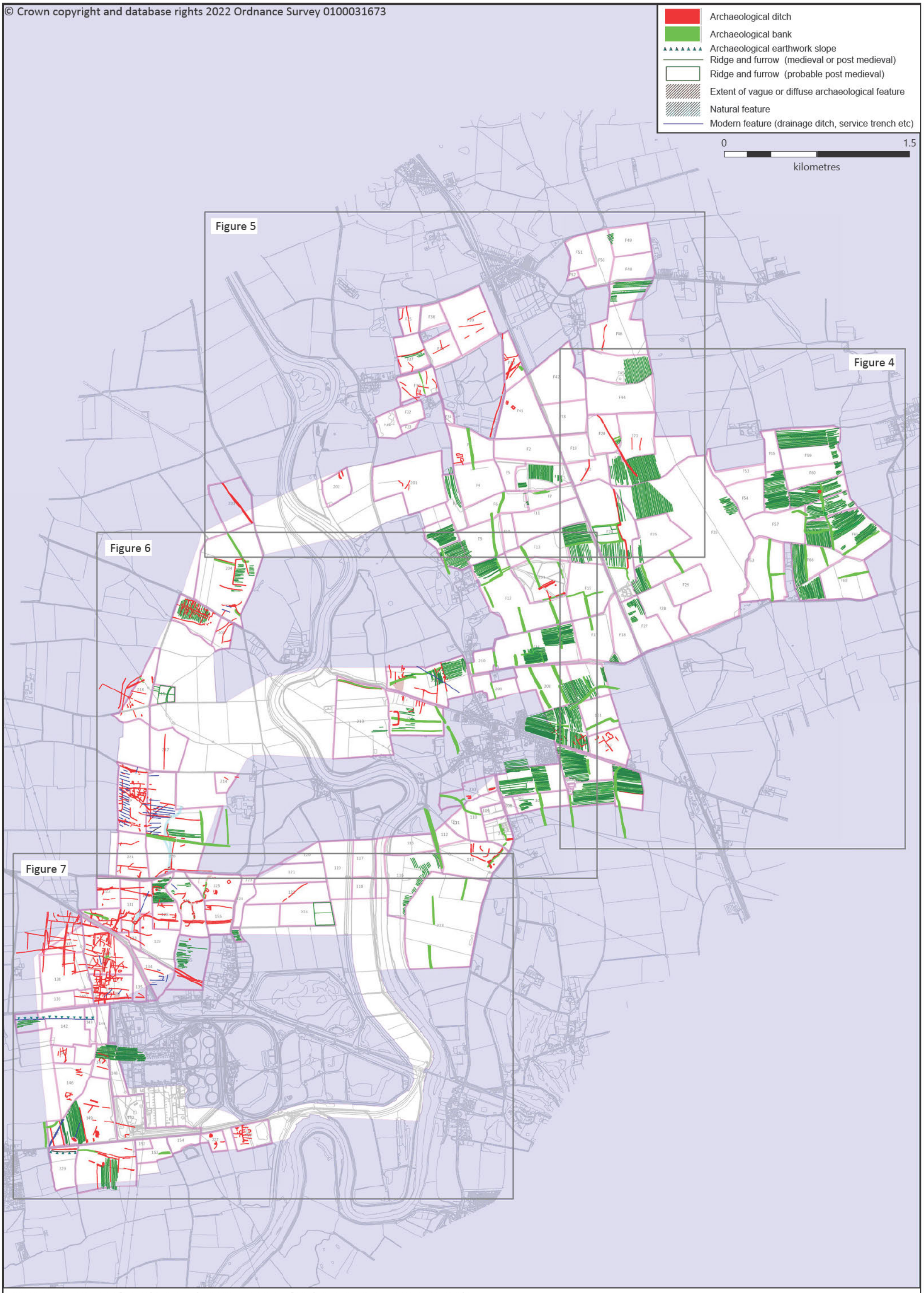

Figure 3. Overview of air photo and LiDAR mapping for the Gate Burton Energy Park.

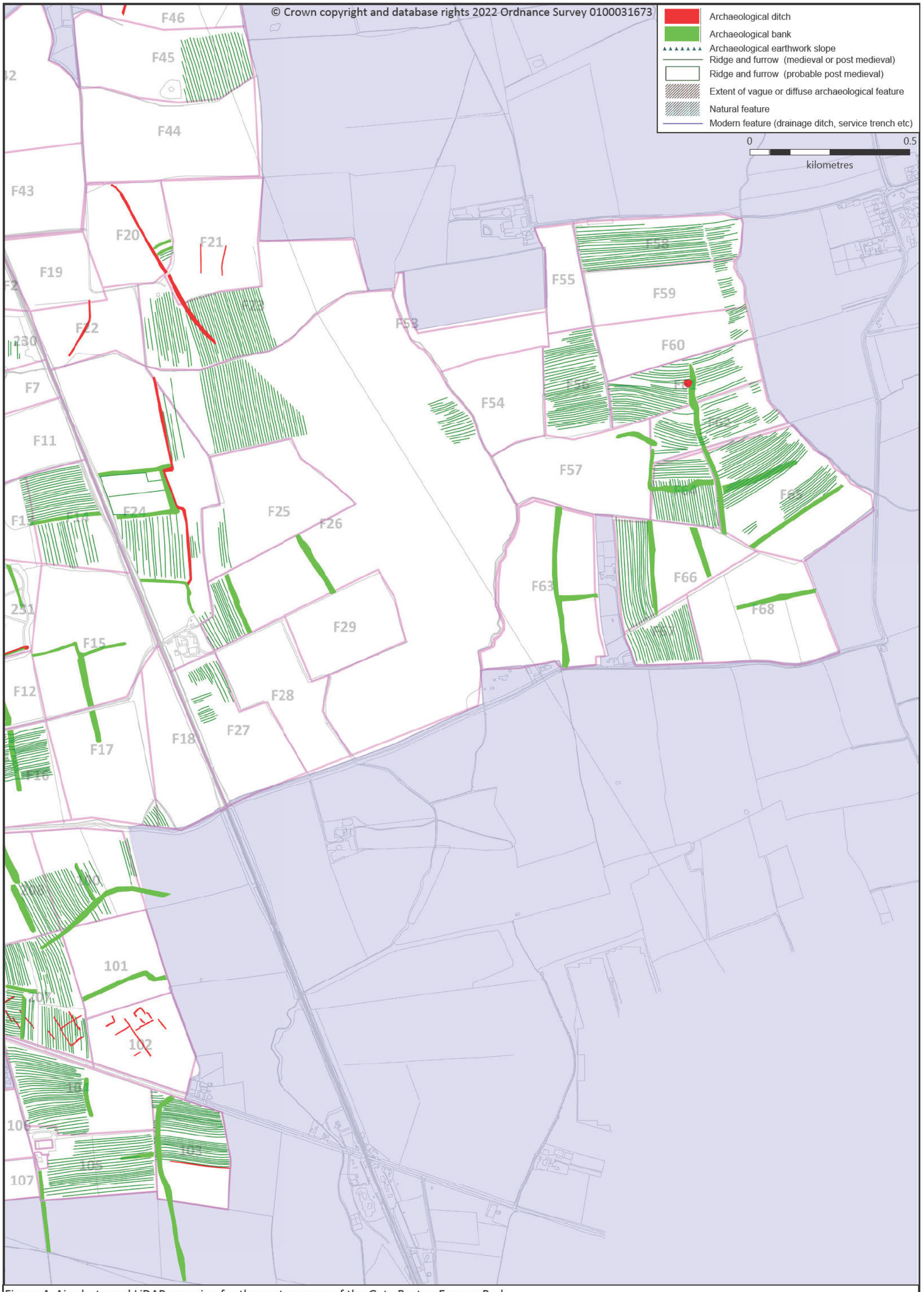

Figure 4. Air photo and LiDAR mapping for the eastern area of the Gate Burton Energy Park.

Figure 5. Air photo and LiDAR mapping for the northern area of the Gate Burton Energy Park.

Archaeological ditch
Archaeological bank
Archaeological earthwork slope
Ridge and furrow (medieval or post medieval)
Ridge and furrow (probable post medieval)
Extent of vague or diffuse archaeological feature
Natural feature
Modern feature (drainage ditch, service trench etc)

0 0.5
kilometres

F49 F51 F50 F48 F52 F47 F46 F45 F42 F44 F41 F43 F35 F36 F39 F37 F38 F40 F34 F32 F31 F33 F20 F21 F1 F2 F19 F22 F5 F4 F7 F3 F6 F11 F10 F9 F13 F24 F25 F26 202 201 203 204 231

Archaeological ditch
Archaeological bank
Archaeological earthwork slope
Ridge and furrow (medieval or post medieval)
Ridge and furrow (probable post medieval)
Extent of vague or diffuse archaeological feature
Natural feature
Modern feature (drainage ditch, service trench etc)

0 0.5
kilometres

Figure 6. Air photo and LiDAR mapping for the central area of the Gate Burton Energy Park.

Figure 7. Air photo and LiDAR mapping for the southern area of the Gate Burton Energy Park.