E126

High Speed Two Phase 2a (West Midlands - Crewe)

Background Information and Data

CA3: Stone and Swynnerton

Cultural heritage survey reports (BID-CH-004-003)

July 2017

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Department for Transport

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Contents

List of Figures

1 Introduction

1.1.1 This document presents the results of the cultural heritage surveys carried out in the Stone and Swynnerton community area (CA3) relevant to High Speed Rail (West Midlands - Crewe). Geophysical surveys and remote sensing studies have been undertaken.

1.1.2 The cultural heritage assessment is detailed in the High Speed Rail (West Midlands - Crewe) Environmental Statement (ES)[1]. Volumes 2, 3 and 4 discuss cultural heritage effects and Volume 5, Appendices sets out the following:

- a cultural heritage baseline report for each community area;
- a gazetteer of heritage assets for each community area;
- a cultural heritage impact assessment table for each community area;
- a route-wide historic landscape character report; and
- a route-wide geoarchaeology desk study report.

[1] HS2 Ltd (2017), High Speed Rail (West Midlands-Crewe) Environmental Statement. Available online at: www.gov.uk/hs2

2 Geophysical survey report

2.1 Introduction

2.1.1 This document presents the results of the geophysical survey carried out within the Stone and Swynnerton area. The surveyed areas are shown in Figure 1.

2.1.2 The works undertaken conform with current best practice and guidance for geophysical surveys as outlined in the Chartered Institute for Archaeologists' Standards and Guidance for archaeological geophysical survey[2] and Historic England's (HE; formerly English Heritage) Guidelines Geophysical Survey in Archaeological Field Evaluation[3]. For more information see the Technical Note on geophysical survey in the Environmental Impact Assessment Scope and Methodology Report (SMR) Addendum (ES Volume 5: Appendix CT-001-002).

2.1.3 Geophysical surveys of multiple areas between Lichfield and Crewe were undertaken in association with environmental assessments being completed for the Scheme. This report provides the results of non-intrusive geophysical surveys on the Stone and Swynnerton area of the route of the Proposed Scheme between August 2016 and January 2017. The Stone and Swynnerton area is approximately 13.5km from the south-east of Aston-by-Stone.

2.1.4 The geophysical surveys undertaken here were preceded by desk-based research and a remote sensing survey (described in Section 3 of this report) comprising light detection and ranging (LiDAR) survey and analysis. Geophysical survey areas have been identified based on the archaeological potential and conclusions identified in these reports with the current survey areas selected with regards to priority and accessibility.

2.1.5 Archaeological background presents a brief summary of the known archaeological assets within and surrounding the individual survey areas.

2.2 Survey objectives

Aims of the fieldwork

2.2.1 The aim of this survey is to establish the presence/absence, extent and character of detectable archaeological remains within the survey area, including both the testing of previously recorded sites and the identification of additional locations of archaeological potential not previously recorded.

Objectives of the fieldwork

2.2.2 The results of the surveys will be combined with data from other archaeological assessments carried out as part of the project, such as desk-top studies and LiDAR

[2] Chartered Institute for Archaeologists (2014), *Standard and Guidance for archaeological geophysical survey*
[3] English Heritage (2008), *Geophysical Survey in Archaeological Field Evaluation*, Research and Professional Service Guideline No. 1, 2nd Edition

data, in order to analyse the archaeological potential of the survey locations with a view to contributing to the preparation of the ES for the Proposed Scheme; and the development of a programme of archaeological investigation.

2.2.3 This report presents a brief description of the methodology followed, the detailed survey results and the archaeological interpretation of the geophysical data.

2.3 Methods

Introduction

2.3.1 All surveys covered within this report adhere to the same methodology, as set out below, and conform to HE guidelines and recommendations[4] and the HS2 Technical note.

Grid location

2.3.2 The individual survey grid nodes were established at 30m by 30m intervals using a Leica Viva Real Time Kinetic (RTK) Global Navigation Satellite System (GNSS) instrument, which is precise to approximately 0.02m and therefore exceeds HE recommendations[5].

2.3.3 A representative sample of survey grid nodes (around 10%) were re-surveyed in the mornings in the event they were left out in the field overnight which may result in misalignment. This was undertaken along with a visual inspection of entire lines of grid nodes to ensure the survey grid remained accurate for the entire survey.

Instruments used and survey method

2.3.4 The magnetic survey was conducted using Bartington Grad-01-1000L fluxgate gradiometers, which has a vertical separation of 1m between sensors. These are positioned with horizontal separations of 1m on either a hand-held Bartington Grad-601-2 instrument carrying two gradiometers, or a Bartington cart system carrying four gradiometers. Data were collected at 0.25 m intervals along transects spaced 1m apart with an effective sensitivity of 0.03 nT[6], in accordance with HE guidelines[7].

2.3.5 For the hand-held system, data were collected in the zigzag method with grids orientated north to south (Grid North). The first direction walked for each grid was on a northward heading. The cart system also collected data in a zigzag method north to south, but the position of readings is recorded by GPS rather than a grid system.

2.3.6 Further details of the geophysical and survey equipment and methods are provided in Annex A.

[4] English Heritage (2008)
[5] English Heritage (2008)
[6] nT = unit of magnetic flux density
[7] English Heritage (2008)

Data processing

2.3.7 Data from the survey were subject to minimal data correction processes. For hand-held data, these comprise a zero mean traverse (ZMT) function (±5 nT thresholds) applied to correct for any variation between the two Bartington sensors used, and a de-step function to account for variations in traverse position due to varying ground cover and topography. For the cart system, a smooth is applied to the data achieving a similar effect as the ZMT in the hand-held data.

2.3.8 Further details of the geophysical data processing are provided in Annex A.

Data presentation

2.3.9 The processed gradiometer data were output as .png image files and georeferenced in CAD (AutoCAD Map 3D 2011); these images were exported as georeferenced .png image files (accompanied by .pgw files). The interpretation layers were digitised in CAD and the resulting interpretation layers were exported as ESRI shapefiles. The data images and interpretation shapefiles were then used to produce the final figures in a Geographic Information system (GIS (ESRI ArcMap 10)).

2.3.10 The gradiometer data are displayed at -2 nT (white) to +3 nT (black) for the greyscale image and ±25 nT at 25 nT per cm for the XY trace plots for all hand-held collected data. Due to technical limitations XY trace plots cannot be produced for data collected by the cart systems.

Assumptions and limitations

2.3.11 Gradiometer survey will detect numerous ferrous anomalies. These are presumed to be modern in provenance and are not referred to, unless considered relevant to the archaeological interpretation. In areas with a large amount of ferrous responses, such as those covered by 'green waste', it is possible that archaeological anomalies will be masked. As such, accurate interpretation in affected areas is likely to be limited or impossible.

2.3.12 It should be noted that, in all areas, small, weakly magnetised features may produce responses that are below the detection threshold of magnetometers. It may therefore be the case that more archaeological features may be present than have been identified through geophysical survey.

2.3.13 Best efforts are made to provide accurate analysis of the geophysical data. This includes using all available resources to inform interpretations and drawing on experience from previous surveys. However, the true date and character of anomalies can only be accurately defined by a programme of ground truthing (such as trenching or trial pitting). Further details of the interpretation of geophysical survey results are provided in Annex B.

Sources

2.3.14 Reference numbers used within the archaeological background sections below are from the relevant county Historic Environment Records (HER) or other stated source.

2.3.15 Records are prefixed as follows:

- national heritage list for England = NHLE (designated assets);
- SHER = Staffordshire HER;
- CHER = Cheshire HER;
- AP= Aerial Photograph; and
- LiDAR = Light Detection and Ranging.

2.4 CA3-1997 Pirehill Cottage Farm, Aston-By-Stone

Site details

2.4.1 A geophysical survey was carried out over area CA3-1997 Pirehill Cottage Farm, Aston-By-Stone, Staffordshire (centred on National Grid Reference (NGR) 390118, 330619 (Figure 2)).

2.4.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval to post-medieval activity identified from LiDAR data and aerial photography.

2.4.3 This survey area comprises three pasture fields to the west of Pirehill Lane, approximately 1.3km south-west of Aston-By-Stone and 3.8km to the south of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries for the majority of the survey area, with open boundaries to the east. The gradiometer survey covered 5.6ha of the 7.9ha survey area, with the remaining area to be surveyed at a later date.

2.4.4 This survey area lies on a north-west facing slope. The south-eastern boundary of the survey area lies at approximately 125m above Ordnance Datum (AOD) and drops to 105m AOD at the north-western extent.

2.4.5 There are no overhead cables present over the survey area. There is a small water course and pond recorded running along the north-western boundary but outside of the survey area. Internal field boundaries are formed of hedgerows.

2.4.6 The solid geology is recorded as mudstone and halite-stone of the Mercia Mudstone Group across the survey area with no recorded superficial deposits[8]. The soils underlying the north of this survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association. Whereas soils underlying the south of the survey area are likely to comprise the typical argillic pelosol soils of the

[8] British Geological Survey (2015), http://www.bgs.ac.uk

Worcester (431) association[9]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.4.7 Evidence for medieval to post-medieval agriculture has been identified within the survey area from analysis of aerial photographs. To the north of the area, an area of ridge and furrow earthworks has been identified from features visible on LiDAR data (LiDAR2044), while a faint linear feature to the south-west likely represents a former field boundary (LiDAR2206).

2.4.8 A bank identified to the south-east of the survey area from LiDAR data may represent a possible enclosure (LiDAR2172).

Results

2.4.9 The gradiometer survey carried out on the 16 August 2016 using hand-held systems has identified anomalies of likely archaeological origin, as well as agricultural and geological features, and numerous ferrous responses and trends.

2.4.10 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures 3 - 5**)**. The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 5).

Interpretation: archaeology

2.4.11 An area of weak (+/-1 nT) dipolar responses (3-1997-001) can be seen to the south-east of the area. This relates to an 'old marl pit' on the 1924 edition Ordnance Survey map of the area, providing evidence of post-medieval extraction.

2.4.12 Regularly spaced (4.5m) parallel linear anomalies (3-1997-002) have been identified running north-west to south-east across the west of the dataset. These responses are likely related to medieval to post-medieval ridge and furrow cultivation, also identified from aerial photography of the survey area.

Interpretation: agricultural

2.4.13 Weak (+/-2 nT) dipolar linear responses (3-1997-003) running north-east to south-west are seen at regular intervals (10m) across the south-east of the dataset. This response and pattern is indicative of a land drainage system. Further linear anomalies along the boundaries of the south-eastern field are likely modern plough scars, but could also be part of the drainage system.

[9] Soil Survey of England and Wales (1983), *Sheet 3, Soils of Midland and Western England*, Ordnance Survey: Southampton

2.4.14 An area of magnetically strong dipolar responses (3-1997-004) has been identified on the south-eastern boundary of the western field. This is caused by the backfilling of a pond present on Ordnance Survey maps until the 1925 edition.

Interpretation: geological or natural

2.4.15 Weak areas of magnetic variation (3-1997-005) have been identified in the western field. Given that these anomalies do not have any discernible shape or pattern it is likely that they relate to natural geological or pedological variation.

Conclusions

2.4.16 The detailed gradiometer survey has detected a small number of anomalies of likely archaeological origin, along with plough trends, a drainage system, and natural features. The archaeological anomalies relate to a marl pit in the south-east of the dataset and ridge and furrow across the west. These provide evidence that the area was mostly used for agricultural purposes and material extraction during the medieval to post-medieval period. The agricultural land use continues to modern day with a drainage system, former pond and plough scars also present in the data.

2.5 CA3-2005 Peasley Bank, Aston By Stone

Site details

2.5.1 A geophysical survey was carried out over area CA3-2005, north-east of Elmhurst, Yarley (centred on NGR 390133, 330315 (Figure 6)).

2.5.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to evidence of ridge and furrow have been identified within and immediately adjacent to the survey area.

2.5.3 This survey area comprises an irregular shaped parcel of land covering areas within several fields to the east of Pirehill Lane, at Peasley Bank, Aston by Stone, approximately 7.7km north north-west of the centre of Stafford. The limits of the survey area are defined by hedgerow field boundaries. The gradiometer survey covered 9.0ha of the 17.8ha survey area, with the remaining area to be surveyed at a later date. This survey area lies on a north-west facing slope, the south-east peaks at approximately 142m AOD and falls to approximately 120m AOD in the north-west. There are no overhead cables or water courses recorded at the survey area. Internal field boundaries consist of hedgerows and fences.

2.5.4 The underlying geology is recorded as Mercia Mudstone Group with no superficial deposits recorded within the area[10]. The soils across the area likely consist of typical argillic pelosols of the Worcester (431) formation[11]. Soils derived from these parent geological materials are considered suitable for magnetometry.

[10] British Geological Survey (2015)
[11] Soil Survey of England and Wales (1983)

Archaeological background

2.5.5 Ridge and furrow earthworks have been identified from aerial photographs across much of the survey area (AP129), indicative of medieval or post-medieval cultivation. The 1st edition Ordnance Survey map shows the main survey area as comprising sections of four separate fields with a trackway depicted crossing the northern part of the area.

2.5.6 To the south-west of the survey area a number of pits and hollows are shown marked as 'old clay pit' indicating earlier quarrying. To the south-east of the survey area a possible enclosure has been identified in the LiDAR data (LiDAR2172). Earthworks and a small pond are depicted in this area on the 1st and 2nd edition Ordnance Survey maps suggesting that it may also be related to quarrying.

Results

2.5.7 The gradiometer survey carried out between 14 – 15 December 2016 using hand-held systems has identified some anomalies indicative of archaeological features, as well as numerous other magnetic trends of agricultural origin have been detected. Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of 1:2000 (Figures 7 - 12).

2.5.8 The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figures 9 and 12).

Interpretation: archaeology

2.5.9 To the far south of the survey area, broadly spaced low magnitude linear anomalies have been identified (2-2005-001). These are aligned broadly east to west. These anomalies are likely to relate to ridge and furrow cultivation.

Interpretation: agricultural

2.5.10 Several dipolar linear anomalies have been identified generally aligned south-west to north-east. 2-2005-002 and 2-2005-004 correspond to former field boundaries visible on 1st edition 1881 Ordnance Survey mapping. 2-2005-003 has also been interpreted as a former field boundary as it is consistent with historic patterns of land divisions and presents as a similar magnitude, dipolar linear anomaly.

2.5.11 In the far north-west of the dataset, there is a notable area presenting an increased magnetic background (2-2005-005). This area has been identified as an area of spreading, possibly of green waste as a method of cultivation.

2.5.12 Surrounding 2-2005-002, closely spaced parallel linear trend anomalies have been identified (2-2005-006) aligned north-west to south-east. This area has been interpreted as evidence of ploughing. Similar anomalies have been identified across the survey area located at 2-2005-007, 2-2005-008 and 2-2005-009.

2.5.13 Two low magnitude, linear anomalies aligned north-west to south-east (2-2005-010 and 2-2005-011) have been identified. These anomalies have been interpreted as unidentified trends but are likely to be agricultural in origin and could be evidence of ploughing activity or may represent former field boundaries not identified on historic mapping.

2.5.14 A broader dipolar linear anomaly has been identified in the southern portion of the surveyed area (2-2005-012). This anomaly has been identified as a modern trackway that is also visible on historic mapping (1st edition Ordnance Survey mapping, 1881) leading to a former clay pit.

Conclusions

2.5.15 The survey has detected ridge and furrow as the only archaeological feature across the area within the dataset. There is no visible evidence for any further medieval or post-medieval activity. It is possible that ferrous responses related to green waste in the north-west of the area are masking weaker archaeological anomalies. However, these responses are relatively weak and sparsely spread, suggesting that archaeological anomalies would still be detected. Several other trends consistent with historic and modern agricultural activity have been identified by the survey.

2.6 CA3-2008 east and west of Pirehill Lane, Aston-by-Stone, Staffordshire

Site details

2.6.1 A geophysical survey was carried out over areas CA3-2008, east and west of Pirehill Lane, Aston-by-Stone, Staffordshire (centred on NGR 389788, 330938 (Figure 13)).

2.6.2 The area was selected for geophysical survey as Pire Hill is the potential location of a beacon site and the location of a meeting place of one of the Staffordshire hundreds. The exact position of these activates is unknown but may fall within the survey area. Quarrying, medieval and post-medieval agricultural activity has been identified from the LiDAR data and aerial photography assessment within the survey area and in the wider area.

2.6.3 The survey area comprises areas across a number of arable fields to the east and west of Pirehill Lane, 178km west of Aston-by-Stone and approximately 3.7km to the south-west of Stone. The limits of the survey area are defined by hedgerow field boundaries and predefined survey extents. The gradiometer survey covered 18.3ha of the 29.7ha survey area, with the remaining area to be surveyed at a later date. This survey area lies on an east facing slope. The eastern boundary of the survey area lies at approximately 130m AOD and drops to 110m AOD at the north-western extent. There are no overhead cables or watercourses present over the survey area. Internal field boundaries are formed of hedgerows.

2.6.4 The underlying geology is mapped as the Wildmoor Sandstone Formation with superficial deposits of alluvium recorded at the very western edge of the area[12]. The soils underlying the survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association[13]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.6.5 The place name Pire Hill is thought to drive from 'look-out hill' or suggests the possible association of the area as the site of a beacon (SHERMST3623). The location was also the meeting place of one of the Staffordshire hundreds.

2.6.6 Areas of ridge and furrow indicative of medieval or post-medieval cultivation have been identified at the northern, south-western, south-eastern and eastern edges of the survey area (SHERMST4254, LiDAR2044). Adjacent to the northern edge of the survey area lies North Pirehill Farm, which is thought to date to the 18th century (SHERMST17287).

2.6.7 Within and adjacent to the survey area several ponds and hollows have been identified (LiDAR2185, 2186, 2276, 2277, 2278, 2279), some of which are labelled as former quarry pits on the 1st edition Ordnance Survey map.

Results

2.6.8 The gradiometer survey carried out between 25 – 28 August 2016 using a cart based system has identified anomalies of archaeological origin. Evidence of modern agriculture and numerous ferrous responses are also present.

2.6.9 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –14 - 17). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figures 15 and 17).

Interpretation: agricultural

2.6.10 Regularly spaced linear anomalies aligned north-west to south-east have been identified in the south-east of the dataset at 3-2008-001. Given their regular spacing of 7m and consistency of direction and length these have been interpreted as modern ploughing.

2.6.11 Several areas of increased magnetic response have been identified along the west and north of the dataset. The origin for these is unclear however, given their proximities to the field edge; it is likely that these are modern dumps of burnt or fired materials.

[12] Soil Survey of England and Wales (1983)
[13] Soil Survey of England and Wales (1983)

Conclusions

2.6.12 The detailed gradiometer survey has not detected anomalies of archaeological origin. There is no evidence for medieval or post-medieval activity, which is seen in the surrounding area. Ploughing trends and areas of increased magnetic responses have however been identified. These features are likely to relate to the agricultural use of the land and are largely thought to be modern.

2.7 CA3-2089 Walton Heath Farm, Walton

Site details

2.7.1 A geophysical survey was carried out over area CA3-2089 Walton Heath Farm, Walton, Staffordshire (centred on NGR 388919, 332116 (Figure 18)).

2.7.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to evidence for medieval to post-medieval activity recorded in the HER and visible in LiDAR data.

2.7.3 The survey area comprises eight pasture fields to the south of B5026 Eccleshall Road, approximately 1km south-west of Walton and 2.4km to the south-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries to the north and south, a wooded boundary along the M6 to the west, and mostly open boundaries to the east. The gradiometer survey covered 5.2ha of the 26ha survey area, with the remaining area to be surveyed at a later date.

2.7.4 This survey area lies on a gentle north facing slope. The southern boundary of the survey area lies at approximately 120m AOD and drops to 115m AOD in the north-west and 110m AOD in the north-east.

2.7.5 There are no overhead cables present over the survey area. There are a number of small ponds located in and on the south survey boundary. Internal field boundaries are formed of hedgerows and fence lines.

2.7.6 The solid geology is recorded as mudstone and halite-stone of the Mercia Mudstone Group across the survey area with a small area of superficial deposits of till on the eastern boundary of this survey area[14]. The soils underlying the survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple (572f) association[15]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.7.7 The farmstead of Walton Heath, which was originally known as 'Clement House', appears to have been established in the early 19th century (SHERMST17285). The

[14] British Geological Survey (2015)
[15] Soil Survey of England and Wales (1983)

contemporary Walton House Farm (SHERMST17286) lies to the south-east of the survey area.

2.7.8 The fieldname 'Black Pits' is recorded on the 1844 tithe map in the northern part of the survey area, possibly indicating an earlier peat extraction site (SHERMST4255). Several linear features noted in the LiDAR data within the survey area can be seen to correspond to field boundaries marked on late 19th century maps (LiDAR2207, 2280, 2281, 2292). However, traces of ridge and furrow seen on aerial photographs within the southern part of the area suggest earlier medieval and post-medieval activity (SHERMST4254, AP133, 150).

2.7.9 An 'Old Clay Pit' is marked within the survey area on late 19th century Ordnance Survey maps. Several other small water-filled hollows within the area are also likely to be the result of earlier quarrying.

Results

2.7.10 The gradiometer survey carried out between 17-19 August 2016 using hand-held systems has identified anomalies of likely archaeological origin, along with agricultural and geological features, and numerous trends and ferrous responses.

2.7.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –19 - 21). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 21).

Interpretation: archaeology

2.7.12 Three areas of dipolar responses (3-2089-001-3-2089-003) are seen at the centre of the dataset. 3-2089-001 relates to an 'Old Clay Pit' marked on the 1880 edition Ordnance survey map of the area. Whilst the other two anomalies are not present on available mapping they give similar responses, suggesting that they too relate to clay extraction.

2.7.13 A small number of unidentified trends have also been highlighted in the north-east of the surveyed area. These responses present clear variations from the background magnetic response however are too weak to provide an accurate interpretation. Most are likely related to modern agricultural activity.

Interpretation: agricultural

2.7.14 Areas of regularly spaced parallel linear anomalies are seen across much of the dataset. These are indicative of modern agricultural activity, such as ploughing. It is possible that some of these areas, particularly in the south-east, could relate to medieval or post-medieval ridge and furrow due to the wider spacing between the anomalies. However, responses in these areas are weak, making confident interpretation difficult.

2.7.15 Two linear areas of enhanced magnetic responses (3-2089-004, 3-2089-005) have been identified in the west of the surveyed fields. These relate to features present on Ordnance Survey maps between 1880 and 1965. 3-2089-004 is a former field boundary, whilst 3-2089-005 is a former footpath.

2.7.16 Weak dipolar linear anomalies (3-2089-006) have been identified in the east of the surveyed area. These weak dipolar responses and the pattern formed by the anomalies are indicative of a land drainage system. It is not clear whether the fragmented nature of the anomalies is due to damage to the drains or if the full extent of the anomalies is not being detected.

Interpretation: geological or natural

2.7.17 Areas of weak positive responses (3-2089-007 and 3-2089-008) have been identified across the dataset. The lack of pattern or any archaeological responses with which they may be associated suggests that these are most likely natural anomalies. The larger responses (3-2089-007) are likely to be due to variation soils or superficial deposits, whilst the smaller (3-2089-008) are likely pitting in the bedrock.

Interpretation: modern

2.7.18 An area of dipolar responses has been identified in the south of the area at 3-2089-009. Whilst these have some similarity to the backfilled extraction pits to the north, the more diffuse nature suggests this is an area of modern debris.

Conclusions

2.7.19 The detailed gradiometer survey has detected anomalies of likely archaeological origin, along with evidence of modern agriculture, and natural features. The archaeological anomalies relate to extraction recorded on 19th century mapping. The majority of the other anomalies identified relate to agricultural practises in the survey area. A former field boundary and footpath can be seen, as well as a land drainage system, and areas of ploughing. The date of the ploughing is not clear; whilst the majority appears to be modern, areas in the south where the responses become weak cannot be interpreted confidently.

2.7.20 The remaining anomalies are thought to be areas of natural response. These include large areas of probable pedological variation as well as small anomalies likely related to pitting in the bedrock.

2.8 CA3-2152 west of Whitemoor Farm, Stone

Site details

2.8.1 A geophysical survey was carried out over area CA3-2152 west of Whitemoor Farm, Stone, Staffordshire (centred on NGR 387545, 333310 (Figure 22)).

2.8.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to evidence for medieval to post-medieval activity recorded in the local area.

2.8.3 The survey area comprises three fields to the west of the M6 motorway, approximately 1km north-east of Yarnfield and 2.5km to the south-west of the centre of Stone. The limits of the survey area are defined by hedgerow field boundaries to the north and south, a wooded boundary along the M6 to the east, and an open boundary to the west. The gradiometer survey covered 2.3ha of the 2.4ha survey area, with the remaining area the result of overgrown hedgerows. As such the survey is considered complete. This survey area lies on flat ground resting at approximately 107m AOD across the survey area. Overhead cables traverse north to south across the south-west of the survey area. No water courses are recorded within the survey area and internal boundaries are formed of hedgerows.

2.8.4 The solid geology is recorded as mudstone and halite-stone of the Mercia Mudstone Group across the survey area with no superficial deposits recorded[16]. The soils underlying the survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association[17]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.8.5 A field located approximately 200m to the north of the survey area is named 'Five Stones' by the 1848 Tithe map and apportionment. Although the origin of the field name is uncertain, the corresponding HER entry suggests that this could indicate that a series of standing stones, or boundary stones may have been located in the area (SHERMST4259).

2.8.6 Cropmark features, interpreted as traces of an extensive medieval to post-medieval agricultural landscape, have been recorded to the east of the survey area. The location of the cropmarks coincides with a large area of possible relict water meadows recorded by the HER (SHERMST 14479).

2.8.7 The now infilled 'Darlaston Pool', which is depicted by late 19th and early 20th century Ordnance Survey maps and identifiable on LiDAR imagery, lies approximately 300m to the east of the survey area (LiDAR2214).

Results

2.8.8 The gradiometer survey carried out on the 5 January 2017 using hand-held systems has not identified anomalies of archaeological origin; however agricultural features as well as numerous trends and ferrous responses have been detected.

[16] British Geological Survey (2015)
[17] Soil Survey of England and Wales (1983)

2.8.9 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –23 - 25). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 25).

Interpretation: agricultural

2.8.10 The northern portion of the survey area shows a highly variable, increased magnetic background (3-2152-001). This could be the result of spreading green waste over the land as a means of cultivation, or the resulting impact of the construction of the M6 motorway to the north-east. The high magnitude responses have the potential to mask weaker archaeological anomalies.

2.8.11 Areas of closely spaced, parallel linear anomalies have been identified in the southern portion of the survey. These are aligned north-west to south-east (3-2152-002) and south-west to north-east (3-2152-003), and are indicative of modern ploughing activity.

2.8.12 A small area of fragmented, dipolar linear anomalies has been detected in the centre of the south-eastern boundary of the survey area (3-2152-004). This is likely evidence of a land drainage system.

Conclusions

2.8.13 The detailed gradiometer survey has not detected any anomalies of archaeological origin. There are no visible medieval or post-medieval agricultural features, which are recorded as cropmarks in the surrounding area. The anomalies identified mostly relate to modern agricultural activity, including ploughing and land drains. There is also an area of magnetic disturbance across the north, which may relate to the spreading of green waste or construction of the adjacent M6 motorway. The spread of strong magnetic responses is likely to mask any archaeological responses that may be present in this area.

2.9 CA3-2155 south of Fox Covert

Site details

2.9.1 A geophysical survey was carried out over area CA3-2155 South of Fox Covert, Staffordshire (centred on NGR 387446, 333620 (Figure 26)).

2.9.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to evidence for medieval to post-medieval activity recorded in the local area.

2.9.3 This survey area comprises two arable fields to the west of the M6 motorway, approximately 1.2km north-east of Yarnfield and 2.5km to the west-south-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerows and wooded land to the north, west and south, and by the M6 to the east. The gradiometer survey covered 2.1ha of the 2.2ha survey area, with the remaining area

the result of overgrown hedgerows. As such the survey is considered complete. This survey area lies on level ground lying at approximately 108m AOD across the survey area. No overhead cables or water courses traverse the survey area. Internal boundaries are formed of hedgerows.

2.9.4 The solid geology is recorded as mudstone and halite-stone of the Mercia Mudstone Group across the survey area overlain by alluvium[18]. The soils underlying the survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association[19]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.9.5 No features of potential archaeological interest have been identified within the survey area to date. However, widespread traces of the medieval to post-medieval agricultural landscape have been identified in the surrounding area via the assessment of aerial photographs. This includes areas of ridge and furrow to the north and south of the survey area, and a large expanse of relict field systems and water meadows to the south-east (MST14479).

2.9.6 Other features identified in the surrounding area include a linear feature of unknown date, which has been recorded from aerial photography to the west of the survey area (SHER MST4260). It is possible that this feature corresponds with a field boundary depicted on the first edition Ordnance Survey map.

2.9.7 Former quarries or extraction pits have also been identified, in association with a possible hollow way or track, to the east of the survey area (MST4261, LiDAR 2221 and 2222).

Results

2.9.8 The gradiometer survey carried out on the 6 January 2017 using hand-held systems has identified an area of ridge and furrow cultivation, as well as more modern agricultural activity, numerous trends, and ferrous responses.

2.9.9 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –27 - 29). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 29).

[18] British Geological Survey (2015)
[19] Soil Survey of England and Wales (1983)

Interpretation: archaeology

2.9.10 Broadly spaced, parallel linear anomalies have been identified aligned south-west to north-east across the southern portion of the survey (3-2155-001). This type of anomaly is indicative of ridge and furrow that could date to the medieval period.

Interpretation: agricultural

2.9.11 Closely spaced, parallel linear anomalies have also been identified aligned north-west to south-east across the southern portion of the survey area (3-2155-002). These anomalies have been interpreted as evidence of modern agricultural activity, such as ploughing.

2.9.12 In the north of the survey, higher magnitude, dipolar linear anomalies have been identified aligned north-west to south-east (3-2155-003). These anomalies are indicative of burnt or fired materials, such as ceramic. This, combined with their parallel arrangement, suggests they are likely related to land drains.

Conclusions

2.9.13 The detailed gradiometer survey has detected an area of ridge and furrow cultivation as the only archaeological anomalies within the survey area. There is also evidence of more modern agricultural activity in the form of ploughing and land drains. This suggests that the area has been used for agricultural purposes since the medieval period.

2.10 CA3-2175 Blakelow

Site details

2.10.1 A geophysical survey was carried out over area CA3-2175 Blakelow, Staffordshire (centred on NGR 386934, 335561 (Figure 30)).

2.10.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to evidence for medieval to post-medieval, as well as prehistoric funerary activity recorded in the local area.

2.10.3 This survey area comprises seven arable fields to the east of the M6 motorway, approximately 1.4km east of Swynnerton and 3.2km to the north-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerows along the M6 to the west, with the majority of the other sides being open boundaries. The gradiometer survey covered 16.2ha of the 18.2ha survey area, with the remaining area the result of overgrown hedgerows. As such the survey is considered complete. This survey area lies on a south-west facing slope resting at approximately 140m AOD in the north-east and 126m AOD in the south-west of the survey area. Overhead cables traverse north-east to south-west across the south of the survey area. Internal boundaries are formed of hedgerows.

2.10.4 The solid geology across the north of the area is recorded as Wildmoor Sandstone formation with Mercia Mudstone Group across the south. There are no recorded superficial deposits[20]. The soils underlying the north of the survey area are likely to comprise the typical humo-ferric podzols of the Delamere (631b) association, with the typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association across the south[21]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.10.5 To the north-east of the survey area lies the location of a burial cairn. Upon excavation this was found to contain the remains of a possible cist or pyre arrangement, and fragments of human skull (SHERMST589). At the western edge of the area the fieldname 'Blakelow' may also indicate the location of a burial mound (SHERMST4285).

2.10.6 Ridge and furrow landforms, which are likely to derive from medieval cultivation, are recorded within the southern part of the area (SHERMST4284, LiDAR2264). Additional areas of ridge and furrow are also noted to the north-west, west and south-east of the survey (SHERMST5656). A series of sinuous linear features to the south-west of, and extending into the survey area may be the remnants of a track or hollow-way (LiDAR2259, 2260, 2262).

2.10.7 Blakelow Farm is thought to date from at least the 18th century (SHERMST17314). An outfarm, shown on 19th century maps, formerly lay to the south-east of this (SHERMST17315) but was probably demolished during the construction of the M6 motorway in the 1960s.

2.10.8 Land to the north-west of the survey area forms part of Swynnerton Hall Park, which was re-designed by Lancelot 'Capability' Brown in the mid 18th century (SHERMST5993).

Results

2.10.9 The gradiometer survey carried out between 9 – 12 January 2017 using a cart based system has identified areas of possible archaeology, as well as modern agricultural activity, geological features, underground services, numerous trends, and ferrous responses.

2.10.10 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures 31 - 34). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figures 32 and 34).

[20] British Geological Survey (2015)
[21] Soil Survey of England and Wales (1983)

Interpretation: archaeology

2.10.11 An area of weak (0-1 nT) positive linear anomalies (3-2175-001) has been identified in the west of the survey area. These cover an area 100m^2, with the majority aligned north-east to south-west. Several linear features run perpendicular to form broken rectilinear features, possibly related to enclosures or field boundaries. The anomalies become more fragmented in the north of the area, making their interpretation difficult. This is most likely evidence of a former field system; however, its date is not clear. It is also possible that some of the anomalies, particularly the weaker and more fragmented areas in the north, are related to geological features.

2.10.12 Three small discrete positive anomalies (3-2175-002) can be seen in in the centre of the survey area. These may be evidence of undated pit features, however their isolation from any other archaeological anomalies suggests that they are more likely related to natural geological pitting or tree throw holes.

Interpretation: agricultural

2.10.13 Closely spaced, parallel linear anomalies have been identified aligned north-east to south-west (3-2175-003) and north-west to south-east (3-2175-004) across the west of the area. These anomalies have been interpreted as evidence of modern agricultural activity, such as ploughing.

2.10.14 Dipolar linear anomalies have been identified across the south-east of the area (3-2175-005 – 3-2175-009). These anomalies are indicative of burnt or fired materials, such as ceramic. This, combined with their herringbone alignment, suggests that they are likely related to land drains.

2.10.15 Large, dense areas of strong dipolar responses can be seen across two fields in the south-east of the area. This is indicative of the use of green waste across the area as a fertiliser. Whilst this has the potential to mask weaker archaeological anomalies, the effect does not appear to have a dense enough coverage to completely obscure larger or stronger features. Further evidence of this practise, or other modern deposits, may be present in the north of the survey area where a large number of ferrous responses have been detected.

Interpretation: geological or natural

2.10.16 A small area of weak positive (0 – 1 nT) amorphous anomalies (3-2175-010) has been identified in the south of the area. Whilst these are indicative of pit-like features, their low amplitude and isolation suggests that they are most likely related to natural pitting in the bedrock or variation in superficial deposits.

2.10.17 A broad (4.5 – 12 m) band of weak (+/- 1 nT) negative and positive responses (3-2175-011) have been identified in the east of the survey area. This is likely related to a variation in superficial deposits or soils in the area. However, the possibility that it is a former field boundary cannot be discounted.

Interpretation: modern services

2.10.18 Several magnetically strong (+/-100 nT) linear anomalies have been identified across the west of the survey area. These are indicative of modern utilities. The anomaly at 3-2175-012, in the north of the area, runs north-north-east to south-south-west and likely continues across field boundaries, also being seen at 3-2175-013 and 3-2175-014. This gives a total length of approximately 530m across the survey area. Three shorter utilities have been detected in the south-west at 3-2175-015 – 3-2175-018, aligned north-west to south-east, east to west, and north-north-west to south-south-east respectively. The anomaly at 3-2175-018 is longer (approximately 185m) and runs north-west to south-east. It is possible that this continues at 3-2175-019; however the large un-surveyed area between the anomalies makes this unclear. 3-2175-019 runs approximately 130m on a north-west to south-east alignment.

Conclusions

2.10.19 The detailed gradiometer survey has detected an area of linear anomalies likely related to a former field system of unknown date, and a small area of possible pitting. There are no anomalies that can confidently be attributed an archaeological origin, with no evidence of prehistoric funerary activity which is seen in the surrounding area. However, it is possible that areas of ferrous responses related to the spreading of green waste evident in the south-east of the dataset could be masking weaker archaeological anomalies. Areas of modern ploughing activity are seen as well as several land drainage systems. A number of modern utilities are also apparent across the west of the area.

2.11 CA3-2178 Swynnerton Grange, Swynnerton

Site details

2.11.1 A geophysical survey was carried out over area CA3-2178 Swynnerton Grange, Swynnerton Staffordshire (centred on NGR 386888, 334763 (Figure 35)).

2.11.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due a series of mounds identified within the area, which could be the remains of a prehistoric barrow cemetery. There is also evidence for quarrying activity as well as post-medieval and potentially medieval cultivation in the wider study area.

2.11.3 This survey area comprises an irregular parcel of land across four arable fields to the west of the M6 motorway, approximately 1.7km west of Meaford and 10.7km to the south-west of the centre of Stoke-on-Trent. The limits of the geophysical survey area are defined by hedgerow field boundaries as well as open boundaries. The gradiometer survey covered 1.9ha of the 20.8ha survey area, with the remaining area to be surveyed at a later date.

2.11.4 This survey area lies on a gentle south facing slope. The southern boundary of the survey area lies at approximately 115m AOD and rises to 126m AOD in the north.

2.11.5 There are no overhead cables present over the survey area. The M6 motorway runs adjacent to the eastern boundary of the survey. Internal field boundaries are formed of hedgerows and fence lines.

2.11.6 The solid geology is recorded as mudstone of the Mercia Mudstone Group across the whole survey area with a small area of superficial glaciofluvial deposits in the centre and south, and a band of alluvium recorded across the north-east[22]. The soils underlying the survey area are likely to comprise the typical stagnogleyic argillic brown earths of the Whimple (572f) association[23]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.11.7 A series of mounds were visible within the LiDAR data immediately to the west of the survey area (LiDAR2247, 2248, 2249, 2250, 2251 and 2252). Without further investigation the exact nature and date of these features is unclear but they may potentially be burial mounds representing a small prehistoric barrow cemetery or could equally be a series of spoil heaps potentially related to quarrying. Two depressions within this area are considered to most probably be the remains of former ponds or extraction pits (LiDAR2253, 2254), but could also be funerary features.

2.11.8 Within the north part of the survey area ridge and furrow earthworks have been identified from aerial photography suggesting potential medieval cultivation in this area (AP138, SHERMST5656). Further areas have also been identified immediately to the east (LiDAR2264, 2265, SHERMST4284) and north-west of the area (LiDAR2243).

2.11.9 A north-west – south-east aligned track lies to west of the area, this route is marked on 19th century maps and appears to have connected Swynnerton Grange to Yarnfield Lane (SHERMST14477). Swynnerton Grange Farm is marked as 'The New House' on early 19th century mapping, suggesting a late post medieval or 19th century date (SHERMST17313).

2.11.10 Two linear features identified from the LiDAR data within the survey area are considered the remains of former field boundaries or drains (LiDAR2255, 2246) and are likely to be of post medieval or 19th century date. Immediately to the north of the area a north – south linear feature could be the remains of a former track or hollow-way (LiDAR2259) and may extend into the survey area.

Results

2.11.11 The gradiometer survey carried out between 24 – 25 November 2016 using hand-held systems has identified anomalies of likely archaeological origin. Evidence of

[22] British Geological Survey (2015)
[23] Soil Survey of England and Wales (1983)

agricultural, geological features, numerous trends and ferrous responses can also be seen.

2.11.12 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –36 - 38). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 38).

Interpretation: agricultural

2.11.13 Low magnitude, parallel, linear trends have been identified aligned north-east to south-west in the west of the area and north-west to south-east in the east (3-2178-001 and 3-2178-002). These are indicative of modern ploughing activity.

Interpretation: geological or natural

2.11.14 In the south-east of the surveyed area, two low magnitude areas present several small anomalies (3-2178-003 and 3-2178-004). These have been interpreted as localised variations in the underlying geology or soils, with a slightly variable magnetic susceptibility comparative to the surrounding magnetic background. These have been interpreted as natural or geological in origin.

Conclusions

2.11.15 The survey has not identified any anomalies of archaeological origin. There is no evidence of medieval or post-medieval agricultural or quarrying activity within the dataset. Several anomalies indicative of modern agricultural activity in the area have been identified. Anomalies indicative of underlying natural deposits have also been identified by the survey.

2.12 CA3-2192 Swynnerton Grange, Swynnerton

Site details

2.12.1 A geophysical survey was carried out over area CA3-2192 Swynnerton Grange, Swynnerton, Staffordshire (centred on NGR 386360, 334783 (Figure 39)).

2.12.2 The area was selected for geophysical survey as it is considered to be in an area with elevated archaeological potential due to the presence of medieval and post-medieval activity visible in the LiDAR data and on aerial photography.

2.12.3 This survey area comprises three pasture fields and one arable field to the south and east of Swynnerton Grange, approximately 1km south-east of Swynnerton centre and 4km to the west of the centre of Stone. The limits of the survey area are defined by hedgerow field boundaries and fenced field boundaries to all sides, a small area to the north and south are an open boundary. The gradiometer survey covered 7.3ha of the 16.8ha the remaining area to be surveyed at a later date.

2.12.4 This survey area lies across a gentle slope. The northern and central boundary of the survey area lies at approximately 130m AOD and drops to 120m AOD at the eastern extent and 125m AOD in the south.

2.12.5 A set of overhead cables are present traversing from the north-east to the south-west of the survey area. A number of water filled dykes are also recorded within the survey area forming field boundaries. Further internal boundaries consist of dry dykes, hedgerows and fence lines.

2.12.6 The solid geology is recorded as mudstone and halite-stone of the Mercia Mudstone Group across the survey area with a small area of superficial deposits of glaciofluvial sheet deposits of sand and gravel on the southern boundary of this survey area[24]. The soils underlying the north of the survey area are likely to comprise typical stagnogleyic argillic brown earths of the Whimple 3 (572f) association, whilst the south is likely covered by typical cambic gley soils of the Wigton Moor (831c) formation[25]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.12.7 There is currently a lack of evidence for prehistoric, Romano-British, and Saxon activity on this survey area or within the surrounding area, with no recorded sites, findspots, or assets. Archaeological records for this area predominantly cover the medieval and post-medieval periods, with a small number of assets unknown date.

2.12.8 The HER records the location of the 19th century Swynnerton Grange Farm (SHERMST 17313) within the survey area. Aerial photography and LiDAR data indicate the presence of medieval to post-medieval ridge and furrow, field boundaries and ditches surrounding the farm (AP138, LiDAR 2233, 2244, and 2243). LiDAR data has also identified the presence of a medieval to post-medieval enclosure within the survey area, defined by an infilled ditch within an internal and external ditch, with a small sub-rectangular enclosure or building located within its south western edge (LiDAR 2245)

2.12.9 Further areas of ridge and furrow earthworks are recorded outside the survey area (SHERMST 5656); although aerial photography suggests this may be a continuation of the field system within the survey area. Swynnerton Hall Park (SHERMST 5993), a landscaped park designed by Lancelot 'Capability' Brown is located nearby.

Results

2.12.10 The gradiometer survey carried out between 31 August – 2 September 2016 using a cart based system has identified anomalies of possible archaeological interest,

[24] British Geological Survey (2015)
[25] Soil Survey of England and Wales (1983)

agricultural features and modern services, as well as numerous trends and ferrous responses.

2.12.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –40 - 41). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 41).

Interpretation: archaeology

2.12.12 A fragmented, low magnitude linear anomaly has been identified on a north-east to south-west alignment in the central portion of the survey area (3-2192-001). The magnitude of the anomaly makes a definitive interpretation difficult. This may be indicative of a natural deposit in the underlying geology; however, an archaeological interpretation cannot be ruled out.

2.12.13 Broadly spaced, low magnitude (+/- 1 -2 nT), parallel linear trend anomalies have been identified by the survey (3-2192-002 to 3-2192-005). These are aligned north-west to south-east in the south-west of the survey and a south-west to north-east across the remaining area. The wide spacing and an alignment not respecting modern field boundaries suggests these anomalies may be evidence of ridge and furrow cultivation.

Interpretation: agricultural

2.12.14 A weak and fragmented dipolar linear anomaly has been identified aligned north-east to south-west at 3-2192-006.This anomaly corresponds to a former field boundary visible on historic mapping (1st edition Ordnance Survey map 1880). To the east of this anomaly, at 3-2192-007, a similar magnitude anomaly on the same alignment appears to respect the historic pattern of land division. As such this anomaly has been interpreted as a former field boundary, possibly predating the earliest available mapping.

2.12.15 Weak dipolar linear anomalies have been identified in the west of the surveyed area (3-2192-008) and in the north-east (3-2192-009). This response and the pattern formed by the anomalies are indicative of a land drainage system. It is not clear whether the fragmented nature of the anomalies is due to damage to the drains or if the full extent of the anomalies is not being detected.

2.12.16 There are areas of high magnetic linear response in the central portion of the survey area (3-2192-010, 3-2192-011 and 3-2192-012). These anomalies correspond to modern trackways, visible on mapping and aerial photography.

2.12.17 Several low magnitude anomalies with an undetermined origin have been identified. It is likely many of these anomalies relate to agricultural activity such as ploughing or temporary land divisions.

2.12.18 A number of areas of increased magnetic background have been identified across the survey area at 3-2192-013 to 3-2192-016). These anomalies are unclear as to their

origin, but are likely to be related to agricultural activity, such as the spreading of green waste.

Interpretation: modern services

2.12.19 Two large areas of high (+/-100 nT) magnetic disturbance have been identified (3-2192-017 and 3-2192-018). These correspond to electricity pylons.

2.12.20 Several strong dipolar linear anomalies run through the dataset, two of which run parallel to each other (3-2192-019) on a north-north-west to south-south-east alignment and are crossed by another on a south-west to north-east alignment (3-2192-020). The remaining two anomalies align west-south-west to east-north-east (3-2192-021) and south-west to north-east (3-2192-022). These anomalies are indicative of modern utilities.

Conclusions

2.12.21 The detailed gradiometer survey has detected anomalies of possible archaeological origin within the survey area, along with evidence of modern agriculture and utilities. The possible archaeological anomalies may relate to a medieval boundary ditch related to Swynnerton Grange Farm, and areas of ridge and furrow. Evidence of modern agricultural practices is also present in the dataset. A land drainage system and several modern services have been identified.

2.13 CA3-2204 Swynnerton

Site details

2.13.1 A geophysical survey was carried out over area CA3-2204 at Swynnerton, Staffordshire (centred on NGR 386017, 335026 (Figure 42)).

2.13.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval and post-medieval activity seen in the LiDAR data and on aerial photography.

2.13.3 This survey area comprises two pasture fields to the south and east of Swynnerton, approximately 1km south-east of Swynnerton centre and 4.7km to the north-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries and fenced field boundaries to all sides; a small area to the south has an open boundary. The gradiometer survey covered all 8ha of the survey area.

2.13.4 This survey area lies across a gentle south facing slope. The northern and central boundary of the survey area lies at approximately 150m AOD and drops to 140m AOD at the southern extent.

2.13.5 Overhead cables traverse the north of the survey area on an east to west alignment. No water courses traverse the survey area. Internal boundaries consist of hedgerows and fence lines.

2.13.6 The underlying geology of the majority of the survey area is mapped as the Tarporley Siltstone Formation of siltstone, mudstone and sandstone with an area of the Mercia Mudstone Group of mudstone and halite stone along the southern edge of the larger part of the survey area. A thin band of the Bromsgrove Sandstone Formation also runs through this area. Superficial glaciofluvial deposits are recorded within the smaller part of the survey area[26]. The soils underlying the survey area are likely to comprise of the Whimple 3 (572f) classification, consisting of stagnogleyic argillic brown earths[27]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.13.7 To the south-east of the survey area lies Swynnerton Grange Farm (SHERMST17313), which appears to have been extant by the early 19th century. LiDAR data has identified an extensive area of clearly defined ridge and furrow earthworks (LiDAR2243), which extends across the survey area and around Swynnerton Grange Farm.

2.13.8 An extensive field system, defined by levelled ridge furrow, drains and field boundaries (AP138), has been identified from aerial photograph analysis immediately adjacent to the eastern boundary of the survey area. LiDAR data has identified an enclosure (LiDAR2245) to the south of the area, within which a small sub-rectangular enclosure or building platform is also visible. The enclosure may be related to medieval occupation.

2.13.9 Adjacent to the western boundary of the survey area, the SHER records the location of Swynnerton Hall Park (SHERMST5993), a landscaped park designed by Capability Brown. Large areas of ridge and furrow are recorded within the boundaries of the park by both the SHER (SHERMST600) and have been identified on aerial photographs.

Results

2.13.10 The gradiometer survey carried out between 9 – 10 January 2017 using hand-held systems has identified anomalies of likely archaeological origin, agricultural features, modern services, numerous trends, and ferrous responses.

2.13.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –43 - 45). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 45).

Interpretation: Archaeology

2.13.12 Low magnitude, broadly spaced, parallel linear trend anomalies have been identified across the survey area. To the south-west these are aligned north-west to south-east (3-2204-001), whilst to the east they are aligned south-west to north-east (3-2204-002

[26] British Geological Survey (2015)
[27] Soil Survey of England and Wales (1983)

and 3-2204-003). These anomalies are indicative of ridge and furrow cultivation, a method of cultivation that is known to date back to the early medieval period.

Interpretation: agricultural

2.13.13 A number of fragmented linear anomalies (3-2204-004 – 3-2204-006) have been identified running through the centre of the dataset on a south-west to north-east alignment. In the east, 3-2204-006 corresponds to a former field boundary visible on historic mapping (1st edition Ordnance Survey map, 1880). The anomalies at 3-2204-004 and 3-2204-005 are not present on available mapping but follow the same alignment as the visible historic land divisions.

2.13.14 Closely spaced, low magnitude; parallel linear anomalies have been identified throughout the dataset. These anomalies are indicative of modern agricultural activity, such as ploughing.

2.13.15 Several dipolar linear anomalies have been identified throughout the survey (3-2204-007 – 3-2204-009). These anomalies are indicative of ceramic land drains.

Interpretation: geological or natural

2.13.16 Broad areas with an increased magnetic response have been detected across the survey area (3-2204-010 and 3-2204-011). These anomalies are interpreted as natural in origin and are believed to be caused by variation in the underlying superficial geology.

Interpretation: modern services

2.13.17 Two high magnitude (+/-100 nT) linear anomalies have been identified running broadly parallel aligned north to south across the central portion of the survey area (3-2204-012). A similar anomaly is seen at 3-2204-013 on a north-west to south-east alignment. These are indicative of modern utilities.

Conclusions

2.13.18 The detailed gradiometer survey has detected anomalies of likely archaeological origin within the surveyed area, along with evidence of modern agriculture. The archaeological anomalies relate to ridge and furrow cultivation that could date to the medieval period. The remaining anomalies relate to modern agricultural practices, natural variation, and modern utilities.

2.14 CA3-2205 Swynnerton Grange, Swynnerton

Site details

2.14.1 A geophysical survey was carried out over area CA3-2205, Swynnerton Grange, Swynnerton, Staffordshire (centred on NGR 385850,335947 (Figure 46)).

2.14.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval and post-medieval activity seen in the LiDAR data and on aerial photography.

2.14.3 This survey area comprises four fields to the north of Swynnerton, approximately 0.8km north-east of Swynnerton centre and 4.7km to the north-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries and fenced field boundaries as well as a section of open boundary to the north-east and south-west of the survey area. The gradiometer survey covered 16.7ha of the 27ha survey area, with any remaining area to be surveyed at a later date.

2.14.4 This survey area lies across a gentle north-east facing slope. The north-east extremity of the survey area lies at approximately 145m AOD and rises to approximately 170m AOD along the south-western boundary.

2.14.5 Overhead cables traverse the south-western portion of the survey area. No watercourses are noted within the survey area.

2.14.6 The underlying geology of the survey area is mapped as the Mercia Mudstone Group of mudstone and halite stone overlain by a small area of superficial deposits of glaciofluvial sheet deposits of sands and gravels covering the southern section of the survey area. The underlying soils are likely to be typical brown earths of the Wick 1 (541r) association across the majority of the area, with areas of typical brown sands of the Bridgnorth (551a) association in the south. Soils derived from these parent geological materials are considered suitable for magnetometer survey.

Archaeological background

2.14.7 Within and adjacent to the survey area is Swynnerton Hall Park (SHERMST5993), a landscaped park designed by Lancelot 'Capability' Brown. Evidence for medieval to post-medieval agriculture has also been identified within the survey area from analysis of aerial photographs where extensive traces of ridge and furrow earthworks have been observed (AP145). Further areas of ridge and furrow are noted within the area of the park to the south-west of the survey area (LiDAR2237).

2.14.8 Three depressions within Lodge Covert, which is excluded from, but situated adjacent to the survey area, may be the remains of former extraction pits or ponds (LiDAR2234, 2235, 2236).

Results

2.14.9 The gradiometer survey carried out between 29 November – 1 December 2016 using hand-held systems has identified areas of ridge and furrow cultivation, as well as anomalies relating to modern agricultural features, modern utilities, and variation in the underlying geology.

2.14.10 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –47 - 55). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figures 49, 52 and 55).

Interpretation: archaeology

2.14.11 Broadly spaced, parallel linear anomalies have been identified throughout the survey area. These are aligned north-east to south-west and can be found in the west (3-2205-001 and 3-2205-002), centre (3-2205-003), south-east (3-2205-004 and 3-2205-005) and north-east (3-2205-006). These anomalies are indicative of ridge and furrow cultivation. Given the relatively straight and uniform nature of the anomalies it is likely that these are post-medieval in date.

Interpretation: agricultural

2.14.12 Dipolar, low magnitude linear trends have been identified across a large portion of the west of the survey (3-2205-011 – 3-2205-015). These anomalies have been identified as a network of land drains due to their herringbone alignment.

Interpretation: geological or natural

2.14.13 Four large dipolar (+/- 100 nT) linear anomalies have been identified aligned north-west to south-east across the south-west of the survey area (3-2205-016 and 3-2205-017). This has been interpreted as a natural variation in the underlying bedrock geology. Of particular interest in the area is the Butterton – Swynnerton Dykes (microgabbro) which comprises igneous bedrock formed from magma in high temperatures. This in turn is likely to result in a highly varied magnetic background response. However, this type of high magnitude response is generally indicative of a modern utility and therefore, this alternative interpretation should be considered.

2.14.14 Several smaller low magnitude anomalies have been identified traversing the centre of the south of the surveyed area (3-2205-018 – 3-2205-020) as well as the south-east (3-2205-021). These anomalies have been interpreted as natural in origin and are considered to be the result of variation in the underlying superficial geology and soils.

Interpretation: modern services

2.14.15 Several large, dipolar, high magnitude (+/- 100 nT) linear anomalies have been identified by the survey. 3-2205-022 is aligned south-west to north-east in the south-west of the survey. 3-2205-023 presents as several linear anomalies converging on an area to the south of the central survey area. Further north, a single, high magnitude, linear response (3-2205-024) has been identified. These anomalies are indicative of modern utilities.

Interpretation: modern

2.14.16 Several areas of variable magnetic response have been identified by the survey (3-2205-007 – 3-2205-010). These anomalies are like associated with localised spreading of modern debris.

Conclusions

2.14.17 Areas of post-medieval ridge and furrow cultivation have been identified across the survey area, as well as anomalies consistent with modern agricultural activity. Land

drains and ferrous surface spreads appear to have been widely utilised on this portion of land. Variations in the underlying geology, including a significant area of bedrock variation have been identified, although this interpretation should be considered with caution as similar anomalies can be caused by modern utilities.

2.15 CA3-2223 south of Closepit Plantation, Swynnerton

Site details

2.15.1 A geophysical survey was carried out over area CA3-2223, south of Closepit Plantation Swynnerton, Staffordshire (centred on NGR 385402, 336222 (Figure 56)).

2.15.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval and post-medieval activity seen in the LiDAR data and on aerial photography.

2.15.3 This survey area comprises four fields to the north of Swynnerton, approximately 0.7km north-east of Swynnerton centre and 5.5km to the north-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries and fenced field boundaries as well as a section of open boundary to the north-east. The gradiometer survey covered 3.1ha of the 18.3ha survey area, with any remaining area to be surveyed at a later date.

2.15.4 This survey area lies across a gentle east-south-east facing slope. The south-east extremity of the survey area lies at approximately 159m AOD and rises to approximately 183m AOD along the south-western boundary and to 170m AOD along the northern boundary. No overhead cables are noted within the survey area. A narrow stream runs into the area from the eastern boundary.

2.15.5 The solid geology is recorded across the southern part of the survey area as Tarporley Siltstone Formation with Bromsgrove Sandstone Formation across the northern part of the survey area. Superficial deposits of till are recorded across the majority of the survey area[28]. The underlying soils are likely to be typical brown earths of the Wick 1 (541r) association[29]. Although the presence of overlying deposits of till may reduce the effectiveness of magnetometer survey, potentially providing random false positive readings in the geophysical survey, soils derived from these parent geological materials are considered suitable for magnetometry.

Archaeological background

2.15.6 To the south-east of survey areas lies Swynnerton Hall Park (SHERMST5993), a landscaped park designed by Lancelot 'Capability' Brown in the mid 18th century. Two ponds to the south of the area are likely to be ornamental fish ponds (LiDAR2240 and 2241). Also within the park and adjacent area ridge and furrow earthworks have been

[28] British Geological Survey (2015)
[29] Soil Survey of England and Wales (1983)

identified from aerial photographs, indicative of medieval and post medieval cultivation.

2.15.7 A former drain or watercourse can be seen within the southern part of the survey area leading eastwards to a series of still extant ponds visible on the 1st edition Ordnance Survey map.

2.15.8 North-west of the survey area near Sandyford Cottage, a ring ditch and linear feature have been observed as cropmarks on aerial photographs and in the LiDAR data (SHERMST4286, LiDAR2300). Although undated these could suggest prehistoric activity in the wider area.

2.15.9 A group of irregular depression are visible in the LiDAR data within Closepit Plantation. These and the name of the wood are suggestive of former quarrying (LiDAR2296).

Results

2.15.10 The gradiometer survey carried out on the 28 November 2016 using hand-held systems has identified anomalies of archaeological and possible archaeological origin. Several anomalies relating to agricultural features and modern services, as well as evidence of variations in the underlying geology have also been identified.

2.15.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures 57 - 59). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous / burnt or fired objects, and magnetic trends (Figure 59).

Interpretation: archaeology

2.15.12 An area of widely spaced (5m – 9m), parallel linear anomalies (3-2223-001) has been detected in the north-west of the survey area. These are indicative of ridge and furrow cultivation. Given the relatively straight and uniform nature of these anomalies they are likely to be post-medieval in date.

2.15.13 Several small anomalies of possible archaeological origin have been identified in the south of the eastern portion of the surveyed area (3-2223-002). Interpretation of these anomalies is difficult due to the large amount of land drains in the area. However, it is possible that these relate to small ditch and pit features of an archaeological origin.

Interpretation: agricultural

2.15.14 Broadly spaced, high amplitude parallel linear anomalies aligned north-west to south-east have been identified across the eastern portion of the surveyed area (3-2223-003). The strength and arrangement of these anomalies is indicative of a land drainage system.

2.15.15 At acute and obtuse angles to the aforementioned land drain anomalies, several, weaker dipolar linear anomalies have been identified (3-2223-004). These anomalies

are more indicative of fired or burnt materials such as ceramics, and as such have been interpreted as ceramic land drains.

Interpretation: geological or natural

2.15.16 Three large dipolar (+/- 100 nT) linear anomalies have been identified aligned north-west to south-east across the centre of the western portion of the surveyed area (3-2223-005). These have been interpreted as a natural variation in the underlying bedrock geology. Of particular interest is the Butterton – Swynnerton Dykes (microgabbro) which comprises igneous bedrock formed from magma in high temperatures. This in turn is likely to result in a highly varied magnetic background response. However, this type of response is generally indicative of a modern utility, and therefore, this alternative interpretation should be considered.

2.15.17 Several smaller low magnitude anomalies have been identified in the north of the western portion (3-2223-006). These anomalies have been interpreted as natural in origin and are considered to be the result of variation in the underlying superficial geology and soils.

Interpretation: modern services

2.15.18 Several large, dipolar, high magnitude (+/- 100 nT) linear anomalies have been identified by the survey. 3-2223-007 is aligned north-west to south-east in the western portion of the survey. 3-2223-008 is on the same alignment in the eastern portion. 3-2223-009 is aligned north-east to south-west across the south-eastern boundary of the surveyed area. These anomalies are indicative of modern services and may form part of the wider network of drainage.

Interpretation: modern

2.15.19 Two areas of dipolar responses (3-2223-010 and 3-2223-011) have been detected in the south-west and north-east of the survey area. Whilst each of these may relate to post-medieval material extraction, evident in the surrounding area, they are thought to have a more modern origin. The position of 3-2223-010 on an extant field boundary suggests that it is a contemporary feature, possibly relating to a backfilled pond. 3-2223-011 lies along the route of a watercourse. This may be evidence that the now narrow stream of water was once wider, and the land has been reclaimed.

Conclusions

2.15.20 The detailed gradiometer survey has not identified any anomalies of definite archaeological origin. However, a small group of anomalies could relate to archaeological ditches and pits. Notably in this area, significant underlying variations in the bedrock geology appear to have been detected, however, some of these should be considered with caution as the anomalies present as similar to underground services. Agricultural activity is also noted in the area with the eastern portion being dominated by land drains.

2.16 CA3-2284 Swynnerton Heath Farm, Swynnerton

Site details

2.16.1 A geophysical survey was carried out over area CA3-2284 Swynnerton Heath Farm, Swynnerton (centred on NGR 384655, 336988 (Figure 60)).

2.16.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the possible presence of post-medieval quarrying activity seen in the surrounding area.

2.16.3 The survey area comprises four arable fields to the west of Bottom Lane, 1.5km north-west of Swynnerton, approximately 9km south-west of the centre of Stoke-on-Trent. The limits of the survey area are defined by hedgerow field boundaries. The gradiometer survey covered 4.1ha of the 21.7ha, with the remaining area to be surveyed at a later date.

2.16.4 This survey area lies on a west facing slope. The eastern boundary of the survey area lies at approximately 185m AOD and falls to 160m AOD at the western extent.

2.16.5 There are no overhead cables present over the survey area. There is a small pond in the south-eastern field of the survey area. The internal field boundaries are formed of hedgerows.

2.16.6 The underlying geology in the south-eastern corner of the survey area is recorded as the Wildmoor Sandstone Formation with sandstone and conglomerate of the Kidderminster Formation across the majority of the rest of the area. Three bands of the Butterton - Swynnerton Dykes (silica-poor magma) traverse the central part of the survey area. No superficial deposits are recorded[30]. The underlying soils for the majority of the area are likely to be typical brown sands of the Bridgnorth (551a) association, with typical brown earths of the Wick 1 (541r) association in the south-east[31].Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.16.7 The Grade II listed Swynnerton Heath farmhouse immediately to the west of the area dates from the early 19th century (NHLE 1190189). A possible enclosure and curvilinear ditch noted in the vicinity of the farmhouse on aerial photographs cannot be dated at this time but may represent post-medieval or modern activity.

2.16.8 Immediately to the south of the area is a cast iron milepost of late 19th century date, situated on the current A51 Stone Road (SHERMST12581).

2.16.9 A small area of woodland lies on the southern edge of the survey area, here depressions observed in the LiDAR data were concluded to most likely be the

[30] British Geological Survey (2015)
[31] Soil Survey of England and Wales (1983)

remnants of former quarrying (LiDAR2298). Three small ponds within the area visible on late 19th century Ordnance Survey maps may also be the remains of former extraction pits. Within Clifford Wood to the north-west, a number of linear features likely to represent tracks and boundaries were also visible in the LiDAR data (LiDAR2299).

Results

2.16.10 The gradiometer survey carried out between 6 – 7 September 2016 using a cart based system has identified anomalies likely to be of archaeological origin, along with agricultural activity, natural features, and ferrous responses.

2.16.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –61 - 62). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous / burnt or fired objects, and magnetic trends (Figure 62).

Interpretation: archaeology

2.16.12 Areas of widely spaced (8 – 11m), parallel linear anomalies (3-2284-001 – 3-2284-003) have been detected across the east of the surveyed area. These are indicative of medieval to post-medieval ridge and furrow cultivation. The anomalies are seen overlapping on north-west to south-east and north-east to south-west alignments, suggesting that there have been at least two phases of activity in the area.

2.16.13 Three discrete positive anomalies (3-2284-004 and 3-2284-005) have been identified in the centre of the area. These are indicative of pit-like features and may be of archaeological origin. 3-2284-004 is seen in an area of weak dipolar response, which may indicate an area of burning. It is not clear whether this is evidence of archaeological activity or modern debris.

Interpretation: agricultural

2.16.14 Areas of closely spaced (2m – 3m) parallel linear anomalies are seen across the dataset on a north-west to south-east orientation. These are likely to be evidence of modern ploughing activity.

Interpretation: geological or natural

2.16.15 A series of large magnetically strong (+/- 100 nT) linear anomalies (3-2284-007) has been identified aligned north-north-west to south-south-east across the west of the surveyed area. These anomalies have been interpreted as a natural variation in the underlying bedrock geology. Of particular interest is the Butterton – Swynnerton Dykes which comprises igneous bedrock formed from magma in high temperatures. This in turn is likely to result in a highly varied magnetic background response. However, this type of response is generally indicative of a modern utility, and therefore, this alternative interpretation should be considered.

2.16.16 An area of magnetic variation (3-2284-008) has been identified in the north-east of the area surveyed. The large area this covers and lack of discernible pattern suggests that this is likely to have a natural origin. It may relate to the change in bedrock in this area or unrecorded superficial deposits.

Conclusions

2.16.17 The survey has identified areas of ridge and furrow cultivation as the only anomalies that can be confidently classified as being of an archaeological origin. There are no anomalies indicative of post-medieval quarrying activity, for which there is limited evidence in the surrounding area. Several possible pit features, including one that may be surrounded by an area of burning, have also been identified. The remaining anomalies relate to natural variation and modern agricultural features.

2.17 CA3-2288 Swynnerton

Site details

2.17.1 A geophysical survey was carried out over area CA3-2288 Swynnerton, Staffordshire (centred on NGR 384805,336578 (Figure 63)).

2.17.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval and post-medieval activity seen in the LiDAR data and on aerial photography.

2.17.3 The survey area comprises two fields to the north of Swynnerton, approximately 1.1km north-north-west of Swynnerton centre and 6km to the north-west of the centre of Stone. The limits of the geophysical survey area are defined by hedgerow field boundaries and fenced field boundaries to the north and an open boundary to the south. The gradiometer survey covered 5.1 ha of the 6.2 ha area, with any remaining area deemed unsuitable for survey due to over grown field boundaries.

2.17.4 This survey area lies across a gentle north-west facing slope. The south-east extremity of the survey area lies at approximately 184m AOD and drops to approximately 173m AOD along the northern boundary.

2.17.5 A set of overhead cables are present traversing from the north-west to the south-east and across the centre of the irregular shaped survey area. No water courses are recorded within the survey area.

2.17.6 The solid geology is recorded in the west as Wildmoor sandstone formation and to the east as Kidderminster formation (conglomerate) with a band of Butterton Swynnerton Dyke (microgabbro) running north – south through the survey area. No superficial deposits are recorded within the survey area[32]. The underlying soils for the area are likely to be typical brown sands of the Bridgnorth (551a) association[33]. Soils in such

[32] British Geological Survey (2015)
[33] Soil Survey of England and Wales (1983)

geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.17.7 Evidence from aerial photographs indicates the presence of a large area of levelled earthworks from post-medieval ridge and furrow agriculture some 350m to the south-west of the survey area.

2.17.8 To the north-west of the survey area, an enclosure and curvilinear ditch of unknown date are visible on aerial photographs as slight earthworks while an area of probable former extraction has been identified from LiDAR data (LiDAR 2298).

2.17.9 The SHER records the location of the post-medieval Swynnerton Hall Park (SHERMST5993), a landscaped park designed by Lancelot 'Capability Brown', to the south of the survey area. It also records the location of a 19th century milestone (SHERMST12581) adjacent to the northern boundary of the survey area. The settlement of Swynnerton is located to the east of the area and is recorded in the Domesday Survey of 1086.

Results

2.17.10 The gradiometer survey carried out on 29 November 2016 using hand-held systems has identified anomalies of likely agricultural features and modern services, as well as evidence of variations in the underlying geology.

2.17.11 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –64 - 66). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous / burnt or fired objects, and magnetic trends (Figure 66).

Interpretation: agricultural

2.17.12 Areas of regularly spaced parallel linear anomalies are seen, predominantly to the east of the dataset (3-2288-001). These are indicative of modern agricultural activity, such as ploughing.

2.17.13 A single, weak dipolar linear anomaly (3-2288-002) has been identified in the centre of the surveyed area. This has been interpreted as a possible land drain; however, the fragmentation of the anomaly makes interpretation difficult.

Interpretation: geological or natural

2.17.14 A series of magnetically strong (+/- 100 nT), linear anomalies has been identified aligned north to south across the centre of the survey area (3-2288-003). This anomaly has been interpreted as a natural variation in the underlying bedrock geology. Of particular interest is the Butterton – Swynnerton Dykes (microgabbro), which comprises igneous bedrock formed from magma in high temperatures. This is likely to result in a highly varied magnetic background response. However, this type of

response is generally indicative of a modern utility, and therefore, this alternative interpretation should be considered.

2.17.15 Several smaller bands of geological variation have been identified (3-2288-004 – 3-2288-009). Similar to 3-2288-003, these anomalies are considered to be natural in origin and derived from the underlying bedrock geology and subsequent localised variation. More specifically, this type of anomaly is considered to relate to the Kidderminster Formation (conglomerate) comprised of fine sands and silts. Such deposits present as a variable magnetic background dependant on the frequency of magnetically susceptible sands and gravels within these deposits.

Interpretation: modern services

2.17.16 In the south-east of the survey area, a dipolar linear anomaly has been identified (3-2288-010). This type of anomaly is indicative of a modern utility.

Conclusions

2.17.17 The detailed gradiometer survey has not detected any anomalies of likely archaeological origin. There is no evidence of medieval or post-medieval agricultural activity in the dataset, such as that recorded in the surrounding area. Notably in this area, significant underlying variations in the bedrock geology appear to have been detected; however some of these should be considered with caution as the anomalies present as similar to modern services. Agricultural activity is also noted in the area in the form of ploughing.

2.18 CA3-2310 land north of Clifford's Wood, Hatton Farm

Site details

2.18.1 A geophysical survey was carried out over area CA3-2310 Land north of Clifford's Wood, Hatton Farm (centred on NGR 383544, 337651 (Figure 67)).

2.18.2 The area was selected for geophysical survey as it is considered to be an area with elevated archaeological potential due to the presence of medieval, post-medieval and wartime activity known in the area.

2.18.3 The survey area comprises six arable fields to the east and west of Common Lane, 1.1km north-east of Lower Hatton, approximately 8.8km south-west of the centre of Stoke-on-Trent. The limits of the survey area are defined by hedgerow field boundaries and wooded areas. The gradiometer survey covered 1.2ha of the 8ha the remaining area to be surveyed at a later date.

2.18.4 The survey area lies on a west facing slope. The eastern boundary of the survey area peaks at approximately 148m AOD and falls to 135m AOD at the north-western extent.

2.18.5 There are no overhead cables or water courses present at the survey area. The internal field boundaries are formed of hedgerows with some tall trees.

2.18.6 The underlying geology is recorded as the Wildmoor Sandstone Formation with superficial deposits of till mapped at the north-eastern and western edges of the area[34]. The soils underlying the survey area are likely to comprise the typical brown sands of the Bridgnorth (551a) association[35]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.18.7 Most of the survey area is thought to be part of a cold war military site (SHERMST19350). A series of four large, rectangular buildings within an enclosure and earthwork bund perhaps suggesting that they functioned as munitions stores or bunkers. They appear to have their origins in the late 1950s or early 1960s.

2.18.8 To the south end of the survey area eroded ridge and furrow has been detected from aerial photographs in the area under pasture. A field system with narrow ridge and furrow indicative of post-medieval agricultural use has also been identified immediately to the east of the area.

2.18.9 Most of the field boundaries shown on the 1st edition Ordnance Survey map still remain although there has been some loss with the addition of the post-war buildings and woodland.

2.18.10 The south-eastern part of the survey area is bounded by an area of woodland (Clifford Wood), containing numerous linear features, which are likely to include extant and former trackways, and possible internal divisions of the woodland. Between the survey area and the wood is an extant trackway or footpath, set within a wide linear depression; possibly a hollow-way or former watercourse (LiDAR2299).

Results

2.18.11 The gradiometer survey carried out on the 5 September 2016 using a cart based system has identified anomalies likely to be of archaeological origin, along with agricultural and ferrous responses.

2.18.12 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –68 - 69). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 69).

Interpretation: archaeology

2.18.13 Areas of widely spaced (8 – 12m) parallel linear anomalies (3-2310-001 – 3-2310-002) can be seen throughout the dataset. These are indicative of medieval to post-

[34] British Geological Survey (2015)
[35] Soil Survey of England and Wales (1983)

medieval ridge and furrow cultivation. The anomalies are seen on various orientations suggesting a number of phases of activity.

Interpretation: agricultural

2.18.14 A weak (+/-1 nT) dipolar linear anomaly (3-2310-003) has been detected in the west of the surveyed area. This response is indicative of a fired clay pipe, likely related to a land drain.

2.18.15 Small areas of closely spaced (2m – 4m) linear anomalies have been identified across the dataset. These are likely caused by modern agricultural activity, such as ploughing.

Interpretation: modern

2.18.16 An area of dipolar responses (3-2310-004) can be seen in the north of the surveyed area. This is indicative of an area of modern debris.

Conclusions

2.18.17 The survey has identified various phases of ridge and furrow cultivation as the only archaeological activity within the survey area. There is no additional evidence of the Cold War military site recorded in the area. Evidence of modern agricultural activity is also present in the form of ploughing and a land drain.

2.19 CA3-2354, south of Dog Lane, Stableford

Site details

2.19.1 A geophysical survey was carried out over area CA3-2354 South of Dog Lane, Stableford, Staffordshire (centred on NGR 382469, 338700 (Figure 70)).

2.19.2 The area was selected for geophysical survey as there is a small area of ridge and furrow in the vicinity which may extend into the survey area.

2.19.3 This survey area comprises multiple arable fields to the south of Dog Lane, east of Stableford and approximately 8.5km to the south-west of Stoke-on-Trent. The limits of the geophysical survey area are defined by hedgerow field boundaries and predefined survey boundaries. The gradiometer survey covered 24.7ha of the 29.9ha area.

2.19.4 This survey area lies on a gentle south-west facing slope. The north-eastern boundary of the survey area lies at approximately 140m AOD and drops to 130m AOD at the south-western extent.

2.19.5 There are no overhead cables present over the survey area and only a small pond recorded on the south-eastern boundary. Internal field boundaries are formed of hedgerows and dykes.

2.19.6 The underlying geology is mapped as the Mercia Mudstone Group with no superficial deposits recorded within the area[36]. The soils underlying the survey area are likely to comprise the typical brown sands of the Bridgnorth (551a) association[37]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.19.7 Two small blocks of possible ridge and furrow have been identified through LiDAR, one of which partially lies within the western edge of the survey area (LiDAR3186) and the other 120m away. Also to the west are three sub-circular mounds to the east of Stableford Bridge (LiDAR3027). The two northern assets measure 25m at their widest. The southern asset is larger, measuring 65m at its widest point. The assets origins are unknown but may represent spoil from extraction.

2.19.8 A large area of post-medieval water meadow lies to the west near to Meece Brook (AP148). Upper Rowe farm lies between the survey area and these water meadows (SHERMST21808). Two linear features, probably representing former field boundaries are also to the west of the survey area (LiDAR3005, 3007).

2.19.9 A series of linear banks are located to the east in Nursery Common (LiDAR3006), these may be related to woodland management, although one does follow the alignment of a former field boundary depicted on historic maps.

2.19.10 Swynnerton Old Park, an area of parkland of probable medieval in origin, lies 400m to the north of the survey area (SHERMST11260).

Results

2.19.11 The gradiometer survey carried out between 1 – 4 November 2016 using a cart based system has identified anomalies of archaeological and possible archaeological interest, as well as evidence of agricultural activity and areas of increased magnetic response, alongside numerous ferrous responses.

2.19.12 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures –71 - 74). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous / burnt or fired objects, and magnetic trends (Figure 72 and 74).

Interpretation: archaeological

2.19.13 A weak positive anomaly, indicative of a ditch, is evident at 3-2354-001 and 3-2354-002. The feature is approximately 2.8m – 3.0m in width and forms a crescent. Given the scale of the ditch and the potential diameter of the feature it is possible that this is evidence for a ringed enclosure ditch. The feature potentially continues to the north-

[36] British Geological Survey (2015)
[37] Soil Survey of England and Wales (1983)

east as a much weaker trend. Given the proximity to the survey extents, it is unclear whether the feature continues to the south-east.

2.19.14 An area of broadly spaced (7 m– 10m), parallel linear anomalies (3-2354-003) can be seen in the south-west of the area. This is indicative of an area of ridge and furrow cultivation, possibly dating back to the medieval period.

Interpretation: agricultural

2.19.15 Regularly spaced linear anomalies aligned north-west to south-east, north to south, and north-east to south-west have been identified across the area. These are interpreted as evidence for modern agricultural practises, such as ploughing.

2.19.16 The area around 3-2354-004 presents a number of dipolar linear anomalies. Such responses are consistent with those of burnt or fired objects and likely to be caused by ceramic drains. This is also supported by the arrangement of the anomalies.

Interpretation: geological or natural

2.19.17 Areas of weak magnetic variation (3-2354-005 and 3-2354-006) have been identified in the north-east of the area. These anomalies do not have any clear shape or pattern, suggesting they are likely related to natural variation in the background geology.

Interpretation: modern services

2.19.18 A series of dipolar linear anomalies (3-2354-007 to 3-2354-011) run along the west of the area on a north-west to south-east alignment. These likely relate to water pipes servicing drinking troughs along the route, seen as strong ferrous responses (+/-100 nT).

Interpretation: modern

2.19.19 Areas of magnetically strong dipolar responses (3-2354-012 to 3-2354-016) are seen across the area. The position of these along current field boundaries suggests that they are likely related to modern debris or made ground. A weaker band of dipolar response (3-2354-017) running north-west to south-east across a field is also thought to be modern debris.

Conclusions

2.19.20 The detailed gradiometer survey has detected anomalies of archaeological origin within the dataset alongside agricultural and geological features. A ditched enclosure has been identified in the south-west of the dataset. This is formed by sub-circular ditches of approximately 3m in width and could potentially have a diameter of 70 – 90m, consistent with smaller Iron Age settlement enclosures. Modern agricultural activity, modern services, and areas of made ground or modern debris can also be seen across the area.

2.20 CA3-2356, north of Dog Lane, Stableford, Staffordshire

Site details

2.20.1 A geophysical survey was carried out over area CA3-2356 north of Dog Lane, Stableford, Staffordshire (centred on NGR 382010, 339236 (Figure 75)).

2.20.2 The area was selected for geophysical survey as place name evidence suggests some potential for medieval or earlier settlement in the vicinity of the northern part of the survey area.

2.20.3 The survey area comprises four arable fields to the north of Dog Lane, north-east of Stableford and approximately 8.5km to the south-west of Stoke-on-Trent. The limits of the geophysical survey area are defined by hedgerow field boundaries for the majority of the survey area, with open boundaries to the east. The gradiometer survey covered 11.7ha of the 12.55ha area, with the remaining area to be surveyed at a later date.

2.20.4 This survey area lies on a west facing slope. The eastern boundary of the survey area lies at approximately 150m AOD and drops to 110m AOD at the north-western extent.

2.20.5 There are no overhead cables present over the survey area however a number of water filled ditches are evident along with a pond on the western boundary. Internal field boundaries are formed of hedgerows and dykes.

2.20.6 The underlying geology is mapped as the Mercia Mudstone Group with no superficial deposits recorded within the area[38]. The soils underlying the survey area are likely to comprise the typical brown sands of the Bridgnorth (551a) association[39]. Soils in such geological settings have been demonstrated to produce magnetic contrasts suitable for the detection of anomalies through gradiometer survey.

Archaeological background

2.20.7 Sections of former field boundaries, visible on the 1st edition Ordnance Survey map, have been identified within the survey area during assessments of LiDAR data (LiDAR3008, 3009). These form part of a series of smaller enclosures focused on Shelton under Harley Farm. Shelton under Harley is documented in the Domesday Survey (1086), as having land for two ploughs (SHERMST2555). Although described as 'waste', the place name, which means 'farmstead on a shelf of level ground', suggests previous occupation.

2.20.8 The north-eastern edge of the survey area coincides approximately with the south-western edge of Swynnerton Old Park, which is of probable medieval origin (SHERMST11260). Several gates or entranceways are known to have bordered to park, though only their approximate locations are known (SHERMST11265,

[38] British Geological Survey (2015)
[39] Soil Survey of England and Wales (1983)

MST11266, MST11267, and MST11268). One of the gates is recorded within the north-eastern limit of the survey area (SHERMST11268). Several areas of possible ridge and furrow earthworks have been identified within the LiDAR data to the south of the survey area (LiDAR3186).

Results

2.20.9 The gradiometer survey carried out between 18 – 21 October using a cart based system has identified anomalies of possible archaeological origin, as well as agricultural and geological features, and numerous ferrous responses and trends.

2.20.10 Results are presented as a series of greyscale and XY plots, and archaeological interpretations, at a scale of (1:2000) (Figures 76 - 79). The interpretation of the datasets highlights the presence of potential archaeological anomalies, ferrous/burnt or fired objects, and magnetic trends (Figure 77 and 79).

Interpretation: archaeology

2.20.11 A number of linear anomalies can be seen in the north-east of the dataset. 3-2356-001 is approximately 35m in length, aligned north-east to south-west and is approximately 2m in width. Almost parallel to this is 3-2356-002, which is approximately 40m in length and 1.8m in width. A probable 15m northerly extension of 3-2356-002 is also present. These are likely to be ditch features, possibly associated with land division.

2.20.12 A wider linear feature (3-2356-003) appears to cut across both 3-2356-001 and 3-2356-002 almost perpendicular, traversing north-west to south-east. This feature is approximately 22m by 3m and is represented by 0.5 – 1 nT responses. This is also likely to be evidence for a ditch feature.

Interpretation: agricultural

2.20.13 Regularly spaced linear anomalies aligned north-west to south-east or north-east to south-west, such as those highlighted at 3-2356-004 and 3-2356-005, have been interpreted as evidence for agricultural practises, such as ploughing.

Interpretation: geological or natural

2.20.14 Weak areas of magnetic variation (3-2356-006 and 3-2356-007) have been identified to the north-west of the area. Given that these anomalies do not have any discernible shape or pattern it is likely that they relate to natural geological or pedological variation.

Interpretation: modern utilities

2.20.15 Two modern services have been identified in the dataset; one to the north, traversing west-north-west to east-south-east at 3-2356-008 and 3-2356-009, and the second in the south of the dataset traversing north-north-west to south-south-east at 3-2356-010.

Conclusions

2.20.16 The detailed gradiometer survey has detected a small number of anomalies of likely archaeological origin within the dataset, along with ploughing trends and natural features. The archaeological anomalies relate to an undated area of possible land division and ditch-like features. These anomalies are likely relate to former agricultural activity and may form part of the hinterland of the medieval or earlier settlement recorded in the north of the area; however, no firm evidence of the settlement itself can be seen. Modern agricultural activity, natural geological or pedological variation, and modern utilities have also been detected.

3 Remote sensing report

3.1 Introduction

3.1.1 This report outlines the results of the archaeological remote sensing survey of the Stone and Swynnerton area. The survey involved the systematic mapping, recording, analysis and interpretation of potential archaeological sites from aerial photographs, multi-spectral imagery and LiDAR data.

3.1.2 The aim was to accurately map and record the form and extent of archaeological features visible as cropmarks, soil marks, earthworks or structures in order to inform the baseline assessment of the cultural heritage resource.

3.2 Study area

3.2.1 The study area comprised a 250m buffer for LiDAR and multi-spectral data, and a 350m buffer for aerial photographic survey extending from the limits of the land required (temporarily or permanently) for construction and/or operation of the Proposed Scheme.

3.3 Methodology

LiDAR data

3.3.1 Airborne LiDAR data is produced by an aircraft-mounted laser linked to a differential Global Positioning System (dGPS) and an Inertial Navigation System (INS). A cloud of measurement points is taken as the aircraft flies over the landscape by firing the laser at the ground in a regular pattern and measuring the time it takes for signals to be reflected to the instrument. The resultant 'point cloud' is typically recorded at spatial resolutions of between 0.25 m and 2 m, with a vertical tolerance of up to 0.2 m, and this can be used to generate highly detailed landscape visualisations.

3.3.2 These visualisations can be used to identify archaeological features which are expressed in the form of localised and often subtle variations in ground profile (e.g. earthworks). This can include features that are barely, if at all perceptible at ground level.

3.3.3 Point clouds can be presented in the form of a Digital Surface Model (DSM), which includes the heights of objects such as buildings, vegetation and vehicles, as well as the terrain surface.

3.3.4 The data can also be filtered digitally to create a Digital Terrain Model (DTM), filters out objects (e.g. vegetation cover) and models the underlying ground surface. multi-spectral imagery

3.3.5 The use of DTMs in archaeological prospection offers an advantage over conventional aerial photograph assessment as features can often be identified in areas of relatively dense tree or vegetation cover.

3.3.6 Where a laser pulse encounters multiple surfaces, such as a tree canopy and the ground beneath, multiple measurable reflections can be recorded. The first returned pulse represents the first surface encountered with the last return representing the final surface encountered. By filtering out all but the last returns the ground surface beneath vegetation can be represented.

3.3.7 Surface and terrain models can be processed to create shaded relief, or 'hillshade' images to visualise the LiDAR data. This process entails the casting of a simulated light source at a fixed altitude and azimuth across the landscape to create virtual shadows which emphasise variations in relief. The examination of hillshade images is particularly useful for the purposes of archaeological prospection, as features which retain some surface expression can appear more prominent when illuminated by an artificial light source.

Multi-spectral imagery

3.3.8 Multi-spectral data is gathered using an airborne sensor which is capable of detecting electromagnetic radiant energy from the ground surface in the form of reflected solar radiation or thermal radiation emitted by target objects. Data is typically collected within a number of discrete spectral bands, ranging from the visible to the longwave infra-red.

3.3.9 The resultant data can be used to generate a series of geo-referenced images within discrete regions of the electromagnetic spectrum, such as the Near-Infrared (NIR), or manipulated to generate a spectral transformation of two or more spectral bands. Subsequent examination of the multi-spectral imaging can enable the identification of archaeological features via a range of physical, chemical, biological and environmental signatures, including some which may be undetectable, or poorly resolved in visible wavelengths.

3.3.10 For example, it has long been recognised that contrasting patterns of vegetation stress or vigour can be correlated with sub-surface archaeological features. These proxy indicators have traditionally been detected via cropmarks visible on conventional aerial photography. However, wavelengths outside the visible spectrum are also sensitive to changes in vegetation health. Under certain conditions, vegetation stress and vigour responses can be expressed more clearly within these wavelengths than within visible spectra. Thus, examination of multi-spectral imaging offers the potential to improve detection rates of archaeological features over remote sensing techniques which rely solely on the narrow visible range of the electromagnetic spectrum.

Aerial photography

3.3.11 Two types of aerial photograph were used for this assessment. Vertical aerial photographs are taken for military, commercial and general-purpose survey using a camera mounted inside a modified aircraft. The aircraft is flown on a pre-planned set

of overlapping flight-lines which cover the survey area completely. The camera points straight towards the ground. The vertical viewpoint provides aerial photographic coverage from a fixed scale and constant 180° angles at the centre of each frame. The overlap between the areas covered by each consecutive frame is usually 60%. This overlap between frames enables the photo interpreter to study each pair of vertical photos under a stereoscope and see the landscape in 3D.

3.3.12 The stereoscope combines the two images to allow the interpreter to see a single three-dimensional image of the ground surface. Vertical aerial photographs carry inherent distortions introduced by variations in perspective and ground height, but are essentially 'map-like' in appearance. They are generally taken for non-archaeological, civil and military purposes and form the basic data from which most modern maps are compiled. Vertical aerial photographs are a very useful source of archaeological data, particularly in areas such as this, where features survive as earthworks

3.3.13 Oblique aerial photographs are taken using a hand held camera by an aerial archaeologist to portray features which have been identified during specialist survey. These photos are extremely useful, but contain inherent perspective distortions, which must be accounted for in rectification and mapping procedures. In this case, both vertical aerial photographs, and specialist obliques were available for interpretation. The sources of aerial photographs used for this assessment are detailed below.

3.4 Data sources

LiDAR

3.4.1 Two LiDAR datasets were acquired for the purposes of the assessment. The first of these, at 0.2 m horizontal cell resolution, was acquired specifically for the purposes of informing the design and EIA process for the Proposed Scheme. The 0.2 m LiDAR data was captured during a series of flights between June and July 2014 and covers an area of 500m either side of the Proposed Scheme centreline. This does not provide full coverage of the study area.

3.4.2 The second dataset, at 2m horizontal cell resolution, was sourced from the Environment Agency's LiDAR data archive and was consulted as it provided greater coverage of the study area.

3.4.3 Both LiDAR datasets were supplied in ASCII format as a DTM, processed to create a series of hillshade images lit from the north-west, north-east, south-east and south-west. A composite shaded relief image was also created from each of the LiDAR datasets using a technique known as Principal Component Analysis (PCA). No additional processing of the LiDAR data was undertaken for the purposes of this assessment.

Multi-spectral

3.4.4 The multi-spectral data used in this assessment was acquired in tandem with the 0.2 m LiDAR data. The imagery was supplied in the following spectral bands and indices: Simple Ratio Index (SR), Normalized Difference Vegetation Index (NDVI), Near Infra-Red (NIR), False Colour Infra-Red and Red-Green-Blue (RGB) (i.e. conventional imagery within the visible region of the electromagnetic spectrum). No additional processing of the multi-spectral data was undertaken for the purposes of this assessment.

Aerial photography

3.4.5 The following sources of aerial photographs and data were searched and used for this assessment:

- Historic England Archive: The Engine House, Fire Fly Avenue, Swindon. Air photo enquiry number 98517, undertaken in January 2016, identified 27 vertical aerial photographic sorties containing 371 frames taken between 1945 and 2000. Some of these frames were held as negatives, but the majority were available in the archive as prints. In contrast to the Fradley and Colton area and the Colwich to Yarlet area, only 5 oblique photos were identified, which were taken by Aerofilms in August 1939 around the village, hall and parkland at Swynnerton;
- Cambridge University Collection of Aerial Photographs (CUCAP): Department of Geography, University of Cambridge. This collection was closed during the timeframe of this project, however some irregular access was granted for limited periods during February and March 2016, prior to its full closure in June 2016. The CUCAP archive contains no aerial photographs which cover the Stone and Swynnerton area;
- Online aerial images: All timelines of ortho-rectified mosaics of vertical aerial photographs at www.earth.google.com (Google Earth) were consulted online for this assessment and used extensively between January and April 2016; and
- The HE National Mapping Programme (NMP) did not cover this area in the timeframe of this assessment.

Others

3.4.6 The following additional sources were used to aid the identification and interpretation of features:

- records contained within the Historic Environment Record (HER); and
- Ordnance Survey 25-inch scale (1:2,500) mapping, surveyed and published from the 1870s through to the 1920s, and six-inch (1:10,560) maps produced from the 1880s through to the 1950s.

3.5 Identification, digitisation and interpretation

LiDAR and multi-spectral

3.5.1 Features of potential archaeological interest were identified by detailed visual examination of both the multi-spectral and LiDAR imagery, in conjunction with other relevant datasets (outlined below). The 3D Analyst tool in ArcGIS 10.2.2 was used to examine changes in ground profile on the DTMs where features of potential interest were identified. Digitisation of identified features was then undertaken manually within ArcGIS 10.2.2.

3.5.2 Extant historical features within the landscape, such as field systems, ponds, roads, farms and other structures were excluded where these are recorded on current Ordnance Survey mapping. Exceptions were made where the assessment indicated that archaeological or historical landscape features might extend beyond their current mapped extents.

3.5.3 Identified features were assigned a unique numerical identifier and briefly described. The potential origin of each feature was interpreted based on a consideration of its form, landscape context and other relevant datasets, described below. Where possible, a broad date range was assigned to each feature by reference to conventionally defined archaeological periods.

Aerial photography

3.5.4 The oblique aerial photographs were sorted into individual sites, which later became the AP sites listed in the gazetteer, then examined in detail visually, either on screen or as paper prints. The stereo pairs or runs of vertical aerial photographs were examined using a magnifying mirror stereoscope to identify detail in 3D. Single vertical images were examined visually and under 4x magnification.

3.5.5 With permission from the archives, the paper photographs were captured digitally by re-photographing them and digital photographs were captured as JPG files. These images are very numerous, and may not be reproduced or published but have been used to derived the digitised interpretative data within the GIS. All timelines which were available at Google Earth were interpreted in detail and selected portions saved as JPG file images for geo-referencing and interpretation.

3.5.6 Following selection and sorting into site areas, photographs were filed and referenced as JPG images and were geo-referenced using control points derived from the 1:2500 scale OS Mastermap data layer, using the Quantum GIS 2.10 referencer tool and AirPhoto 3.58. The georeferenced raster files were set as a separate layer in QGIS and digitised to project standards to create SHP files for the line and polygon data which recorded the interpretations of ditched, embanked and other features which were identified during the survey.

3.5.7 As with the multi-spectral and LiDAR surveys, the aerial photographic survey excluded extant historical features within the landscape, such as field systems, ponds, roads, farms and other structures these are recorded on current Ordnance Survey mapping. Exceptions were made where the assessment indicated that archaeological or historical landscape features might extend beyond their current mapped extents or held some interest or significance to the survey.

3.5.8 Identified features were assigned a unique numerical identifier and briefly described within the GIS attribute tables assigned to each polygon which identified a 'site' or area of interest. As with the multi-spectral and LiDAR recording protocols, the potential origin of each feature was interpreted based on a consideration of its form, landscape context and other relevant datasets, described below. Where possible, a broad date range was assigned to each feature by reference to conventionally defined archaeological periods, or if this was not certain or possible, an 'unknown' date was assigned.

3.6 Limitations

Coverage

LiDAR and multi-spectral

3.6.1 The study area for the assessment of LiDAR and multi-spectral data was based on the area of the land required for the Proposed Scheme.

3.6.2 The 0.2 m LiDAR and multi-spectral data were collected within a 500m buffer extending from the centre of the Proposed Scheme.

3.6.3 The coverage of the 2m resolution LiDAR data was relatively comprehensive within the study area. However, coverage was lacking for a section of the study area north of Swynnerton approximately 3km long, and was largely incomplete for a distance of approximately 2km at the south-eastern end of the Stone and Swynnerton area, to the south of Stone.

Aerial photographs

3.6.4 The data from the aerial photographic cover search at HE were converted to CSV files and integrated to the working GIS to assess the coverage of both vertical and oblique aerial photos.

3.6.5 There are no obliques available for the Stone and Swynnerton area which result from modern archaeological aerial reconnaissance. This is in direct contrast to the Fradley to Colton area and the Colton to Yarlet area. There are 5 obliques which portray Swynnerton. As always, apparently 'blank' areas where no obliques are present may contain sub-surface features which will only become apparent when the topsoil is disturbed or removed.

3.6.6 The Stone and Swynnerton area was covered by sorties of vertical aerial photos dating from the 1940s and 1950s, and partially covered by more locally oriented surveys

since. The more recent images at Google Earth supplied full coverage of the area, and were used for this assessment in accordance with observations made by Scollar and Palmer[40].

Analysis

LiDAR and multi-spectral

3.6.7 Aside from gaps in the coverage of the datasets, outlined above, a number of other factors can be expected to have affected the detection rates and interpretation of archaeological features during the assessment.

3.6.8 One of the principal limitations of the assessment is that features were identified and interpreted in the absence of ground level observations. This can result in interpretation errors where localised variations in ground profile which are of very recent or natural origin resemble archaeological features. This issue was alleviated by comparing the LiDAR images against conventional aerial photographic imagery (i.e. within the visible region of the electromagnetic spectrum). In addition, the veracity of the survey results will be tested in the field during further stages of work.

3.6.9 There are also certain methodological limitations which are inherent to the remote sensing techniques employed during the assessment. For instance; multi-spectral imaging, unlike filtered LiDAR data, is rarely useful for identifying archaeological features within wooded environments.

3.6.10 Although shaded relief images can greatly aid visualisation of LiDAR data, no single direction of illumination can simultaneously reveal all relief features. For example, when a hillshade is lit from a single direction, any features aligned with the source of light can be hidden, since they do not cast any shadow. This technical imitation was overcome by examining a composite shaded relief image, alongside a series of hillshades illuminated from multiple directions.

3.6.11 The angle of illumination can also influence the visibility of relief features. For example, visualisation of subtle variations in relief may require low illumination elevation, which can in turn obscure detail in steeper areas of the image. As the imagery used during the assessment was illuminated from a single fixed angle, this may have influenced the detection rates of archaeological features. However, the effect of this is likely to be relatively slight, as the study area is not characterised by dramatic changes in relief.

3.6.12 The filtering process which is applied to LiDAR data when generating a DTM may not be able to entirely remove the masking effect of low-level vegetation, and can also result in some loss of detail. The latter effect was seen intermittently across the 0.2 m LiDAR imagery, where the filtering occasionally produced a greatly simplified

[40] Scollar, I. and Palmer, R. (2008), *Using Google Earth Imagery*, AARGnews 37, 15 – 21

geometric surface. This may have obscured some features of interest, although only within extremely localised areas.

3.6.13 The horizontal cell resolution of LiDAR data can also influence the detection rates of archaeological features. This can occur where the spacing of point measurements is sufficiently wide to conceal, or reduce the visibility of small archaeological features. However, this is unlikely to have affected the assessment due to the availability of highly detailed 0.2m resolution LiDAR data.

3.6.14 It was determined that some types of feature, particularly vestigial ridge and furrow landforms, were often more clearly visible on the LiDAR imagery generated from the 2m resolution data than the 0.2 m data. It is possible that, despite filtering, subtle changes in ground profile may have been masked by low level vegetation due to the fine granularity of the 20cm data, whereas this effect was 'evened out' in the images generated from the coarser 2m data. Consequently, the detection rates for some types of archaeological feature may have been reduced where 2m resolution LiDAR data was unavailable.

3.6.15 Multi-spectral signatures are widely used in other environmental disciplines to accurately classify and map vegetation and geology types. Unfortunately, archaeological sites and features have not been demonstrated to exhibit distinctive spectral signatures that can be used for generic detection purposes. The effectiveness of using multi-spectral data to identify archaeology can be significantly influenced by a range of factors, including the underlying geology, soil moisture content and vegetation cover. However, current understanding of the processes which determine whether and how archaeological features are expressed in the electromagnetic spectrum is incomplete. In practise, this means that it can be difficult to predict whether archaeological features will be identifiable in any given sensor.

3.6.16 Aerial photograph assessments are often based on sequences of historical imagery, which provide a series of 'snapshots' of the landscape under different conditions. In contrast, LiDAR and multi-spectral data are typically gathered at a single or series of closely spaced points in time. This can explain why features identified from aerial photographs cannot always be detected on LiDAR and multi-spectral images of the same area. For example, multi-spectral data collection may be undertaken outside of the window of opportunity where conditions are optimal for the detection of archaeological features which, as noted previously, can be difficult to predict.

3.6.17 Ploughing or development may have destroyed any surface expression of archaeological features that are recognisable on historical aerial photographs. This was evidently the case at a number of locations within the study area, where examination of the LiDAR and multi-spectral data was unable to replicate the results of conventional aerial photographic surveys.

3.6.18 Much of the study area coincides with arable fields which have been subject to intensive modern agricultural techniques. As a result, the prominence of archaeological features may have been greatly reduced by ploughing across large parts of the study area. This may have resulted in a differential in the detection rate of archaeological features between fields which have been intensively ploughed, and areas which have not, such as within parks (unless extensively landscaped) or land which has predominantly been under pasture.

Aerial photographs

3.6.19 Interpretation of aerial photographs relies on visual identification of heritage assets on aerial photos as typically, the effects they have on growing crops and other vegetation, marks in soils, or as extant features or earthworks which are more visible at times of clear low light which casts shadows.

3.6.20 It is important to note that aerial photographs usually only show part of the horizontal and vertical extent of buried and upstanding features. Their capacity to reveal features as crop marks, vegetation marks, soil marks or as the shadows cast by banks, ditches and walls, depends upon a number of environmental and agricultural factors prevalent at the time of the photographic survey. It is perfectly possible for many years photography over one site to show nothing at all, and then for one instance of survey to reveal complex buried crop marked features. The direction of light at the time of photography, with reference to shadows cast and crop or soil marked features highlighted, can also affect the visibility of features on aerial photographs. Unlike digitally processed LiDAR and other data, the azimuth of the sun cannot be changed on a conventional aerial photo.

3.6.21 Past and present land use also presents limitations to the visibility of features. A cropped arable regime of cereals often allows the formation of crop marks, whereas grassland, unless seen in times of extreme moisture stress, can mask the appearance of buried features.

3.6.22 Aerial photographs cannot be used to detect features in heavily wooded areas in the same manner as LiDAR surveys. LiDAR may penetrate gaps in the tree canopy to provide a digital model of the ground surface beneath.

3.6.23 Aerial photographic evidence is thus limited by seasonal, agricultural, land use, meteorological, lighting and environmental factors which affect the extent to which either buried or upstanding archaeological features and structures can be detected.

3.6.24 It is thus advantageous to examine a range of photos taken under a variety of environmental conditions to build up a comprehensive interpretation of the archaeological landscape. The visibility of archaeological features may differ from year to year and be obscured by differential depths of soil or differing types of vegetation, and individual photographs most often record only a small percentage of the actual extent of buried or upstanding features.

3.6.25 The aerial photos taken in the 1940s often recorded extant medieval fields and parkland features, and provided a starting point for the assessment of erosion and attrition of features due to modern ploughing. This ability to 'see back in time' and the use of aerial photos as historic documents is helpful when constructing landscape histories or tracing the progress of erosion.

3.6.26 Buried features are also 'masked' in areas of unsuitable land use for site visibility or the formation of crop marks, such as woodland, scrub, unimproved pasture or alluviated areas. Evidence for medieval ploughing can be seen in the landscape in the form of ridges and furrows caused by the turning of a heavy ox-drawn plough. These often mask underlying deposits on aerial imagery.

3.6.27 It is also important to note that the perception of the environment and expectation of what is to be found often may limit the interpreter's openness to all features which may be noticed and identified. This perception factor is mitigated by repeated examination of imagery taken in different years and under different conditions, and by teamwork between two or more interpreters checking the data. 'Photo fatigue' is also a factor in drop-off rates of discovery or perception of features and in this case could have been a very real limitation to consistent and accurate observation. This was mitigated by alternating activities, checking with team workers and taking adequate visual breaks particularly when using a stereoscope to see large sorties over extensive areas of land.

3.6.28 These limitations and advantages were considered carefully whilst interpreting features from aerial photographs and the interpretations are built up from observations of many photographs, if available, over a range of instances of photography by two or more air photo analysts.

3.6.29 The Stone and Swynnerton study area presented very little evidence for crop marked buried prehistoric sites, over a mixture of clayey substrates and a higher proportion of pastoral land use.

3.7 Results

LiDAR and multi-spectral

Overview

3.7.1 A total of 113 individual features, or groups of features of possible archaeological interest were identified within the study area. The majority of these were identified on the LiDAR imagery, with a smaller number also visible on the multi-spectral imagery. Very few features were visible solely on the multi-spectral imagery.

3.7.2 The features could predominantly be ascribed to one of three interpretative classes; vestigial ridge and furrow landforms, relict field boundaries or disused extractive pits. However, a small number of features of potentially elevated archaeological significance were identified during the assessment.

3.7.3 Features identified during the remote sensing assessment are described in Annex C, illustrated in Figures 80 - 96, and listed in Appendix CH-002-003. The principal findings of the assessment are presented below.

Possible enclosure east of Peasley Bank

3.7.4 Amongst the most notable features identified within the study area was a possible sub-oval enclosure (2172; Figure 81) which is located close to the south-eastern end of the Stone and Swynnerton area. The putative enclosure, which appears to encompass an area of approximately 0.6 hectares, was visible on the 0.2m LiDAR images (2m resolution data was unavailable in this location) and also on each of the multi-spectral images. The feature is perhaps most distinct on the NIR layer, which appears to show an entrance or break in the western side of the possible enclosure.

3.7.5 The date and purpose of the feature are uncertain. It is not recorded by the Staffordshire HER, and does not appear to have been detected during earlier assessments of aerial photographs. Its form suggests that it could be prehistoric in origin, although this interpretation is entirely speculative.

3.7.6 Early Ordnance Survey maps depict a small pond and a series of earthworks marked by hachures within the interior of the putative enclosure, suggesting some quarrying may have taken place. However, no traces of these features could be confidently identified on the LiDAR or multi-spectral imagery.

Ring ditch north of Sandyford Farm

3.7.7 A possible ring ditch (2300; Figure 81) of approximately 18-20m diameter, was identified within a pasture field north of Sandyford Farm and east of Sandyford Cottage. The feature appears to exhibit little surface expression and appeared only extremely faintly on the 0.2m LiDAR imagery. No trace of the feature could be identified on the multi-spectral imagery.

3.7.8 The feature has been previously identified via assessment of aerial photographs and is also recorded in the Staffordshire HER (MST4286). The possible ring ditch was interpreted, with a moderate degree of confidence, as forming part of a prehistoric funerary monument.

Possible enclosure south of Swynnerton Grange

3.7.9 A possible enclosure (2245; Figure 88) with internal features was identified at the edge of the study area, to the south of Swynnerton Grange. This area lies outside of the coverage of the 0.2m LiDAR and multi-spectral datasets, and so could only be examined via the 2m LiDAR data. The feature does not appear to correspond with any records contained within the Staffordshire HER.

3.7.10 The putative enclosure is slightly irregular in plan and encompasses an area of approximately 2.6 hectares. It appears to be formed by an infilled ditch, possibly with external and internal banks. Except for the extant land division which defines its

western edge, the enclosure does not appear to be recorded on late 19th or early 20th century Ordnance Survey maps.

3.7.11 The interior of the enclosure appears to be sub-divided by several linear depressions which may represent infilled drainage ditches or possibly trackways. A small sub-rectangular enclosure or possible building platform occupies the south-western edge of the enclosure. It is uncertain if the two extant ponds to the south of the enclosure were once associated with it.

3.7.12 The date and purpose of the enclosure and its internal features are uncertain. However, the widespread traces of vestigial ridge and furrow in the surrounding area (see below) suggest that they may be associated with medieval occupation.

Possible building platform north of Swynnerton Grange

3.7.13 A flattened sub-rectangular area (2244; Figure 88), approximately 45 by 40m in extent, was identified at the junction of two discrete parcels of relict ridge and furrow (2243; Figure 88). Though not conclusive, the levelled area could represent a building platform of medieval or post medieval date.

Unidentified mounds near Swynnerton Grange

3.7.14 Six circular or sub-circular mounds (2247-52; Figure 87) of 10-18m diameter were detected on land under pasture to the east south-east of Swynnerton Grange. The origin of the mounds is uncertain. They do not appear to be recorded in the Staffordshire HER, and cannot be correlated with any features recorded on late 19th or early 20th century Ordnance Survey maps. Although it is conceivable that the mounds represent a small dispersed barrow cemetery, alternative interpretations are equally plausible. For example, the mounds may be spoil heaps associated with post-medieval extraction/quarrying.

Darlaston Pool

3.7.15 Despite being obscured by tree cover and partially built over, the outline of the (now infilled) 'Darlaston Pool' (2214; Figure 85) was clearly visible on the LiDAR imagery to the south-west of Pool House Farm. Three small former islands, two of which were joined to the bank by a narrow east-west causeway (2282-3; Figure 85) also remain clearly evident. The pond or small lake is depicted, along with a nearby boathouse, by late 19th and early 20th century Ordnance Survey maps. Although clearly the product of human activity, the date and original purpose of Darlaston Pool are uncertain.

Ridge and furrow

3.7.16 Amongst the most common features identified during the assessment were characteristic landforms derived from medieval and/or post medieval ridge and furrow cultivation. These included groups of selions contained within individual parcels ('furlongs', 'gores' and 'butts') and, less commonly, the vestigial ploughing headlands, foreras (access routes) and baulks which divided them.

3.7.17 With the exception of two areas to the east of Blakelow (2264 and 2265; Figure 87), none of the ridge and furrow landforms identified from the LiDAR and multi-spectral data had previously been recorded in the Staffordshire HER.

3.7.18 The majority of the vestigial ridge and furrow landforms identified during the assessment were spatially isolated from one another and distributed intermittently across the study area. However, a notable concentration of ridge and furrow landforms (2243; Figure 88) was identified in the area surrounding Swynnerton Grange. This area contains numerous individual blocks of ridge and furrow, which vary in orientation and size. The selions are typically slightly sinuous in form, suggesting that they may be of relatively early date.

3.7.19 The distribution of these landforms across the study area is likely to reflect differential rates of preservation, which are likely to have been heavily influenced by the location and intensity of modern and historical ploughing. The aerial photograph assessment undertaken in association with the EIA for the Proposed Scheme identified considerably larger and more numerous expanses of relict ridge and furrow than were detected during the assessment of LiDAR and multi-spectral imagery. This could suggest that the prominence of vestigial ridge and furrow landforms across the Stone and Swynnerton area has been significantly diminished in the relatively recent past.

Field boundaries

3.7.20 A large proportion of the geographical expanse contained within the study area is composed of fields under a mixture of arable cultivation and pasture. It is probable that the spatial patterning of these field systems is largely the product of the Enclosure acts of the 18th and 19th centuries. However, some elements within the spatial patterning of these field systems may correspond with earlier land divisions, including fossilised components of medieval open field systems.

3.7.21 Subsequent opening out of previously enclosed fields, particularly during the 20th century, has resulted in the loss of numerous field boundaries, including numerous examples recorded on late 19th century and early 20th century Ordnance Survey maps.

3.7.22 At least 33 probable former field boundaries were detected within the study area. These were typically evident on the LiDAR imagery in the form of (often very faint) linear banks and depressions. Of these, 18 could be correlated with land divisions shown on early Ordnance Survey maps, while the remainder appeared to respect existing field systems.

Extractive pits and ponds

3.7.23 Amongst the most frequently identified features were small depressions, often sub-circular in plan and typically in the range of 20-50m in diameter. These depressions were distributed throughout the study area without any obviously meaningful spatial patterning. The features were most commonly identified within, or at the edges of

agricultural fields. However, a small number were also identified within woodland or in close proximity to areas of settlement.

3.7.24 Although a natural origin might be ascribed to some of the depressions, the majority of these features are likely to be the result of human activity. Although their date and original purpose often cannot be distinguished with certainty, it is likely that many of these features represent various forms of extractive pits, or open-cast workings. A total of 38 features were identified as possible former extraction pits within the study area. Many of the numerous ponds which exist across the rural landscape of the study area may also have originated as extractive pits.

3.7.25 A post-medieval date is likely for the majority of these features, although occasional examples could be earlier in origin. In many instances, a minimum age can be confirmed on the basis that they can be correlated with features depicted by late 19thand early 20th century Ordnance Survey mapping.

3.7.26 Where shown on early Ordnance Survey maps, these features are often labelled as 'Old Marl Pits' or 'Old Clay Pits'. Although these terms may have been used generically to refer to various types of disused extractive pit, a large proportion of the features may genuinely represent former marl pits. However, other pits may have been dug to quarry stone or aggregates, while some may have been used to extract clay for local brick production.

3.7.27 Corresponding mounds, which might represent the spoil heaps derived from these excavations were only occasionally identified in the vicinity of the depressions. This may corroborate the suggestion that these were predominantly dug with the aim of extracting material in bulk, rather than creating hollows in the land surface for some other purpose. However, subsequent levelling by ploughing or natural processes may have significantly reduced the visibility of any former spoil heaps.

3.7.28 Extractive pits were often associated with trackways, either deliberately constructed or formed naturally through use, for the hauling away of excavated material. However, few traces of any such features were identified. These depressions rarely exhibited any other characteristics in form that might be expected of former extractive pits, such as a shallow approach or access on one side, or steeper working faces. However, this might be readily explained by the fact that many have become substantially infilled.

3.7.29 In a few instances, the depressions identified during the assessment may have been deliberately excavated to create ponds rather than for extractive purposes, for example to provide access to water for farm animals, or for other agricultural uses.

3.7.30 Two features which correspond with 'Fishponds' (2240-1; Figure 90) recorded on late 19th century Ordnance Survey maps were also identified at the northern edge of Swynnerton. One of these appears to have been infilled, while the second, larger pond

is still extant. A third depression (2242; Figure 83) identified nearby within the grounds of Swynnerton Hall might also represent a former fishpond or ornamental pond.

Other features

3.7.31 Numerous linear features (2299; Figure 92) were detected on the LiDAR imagery within Clifford Wood, a large parcel of extant woodland approximately 2km north-west of Swynnerton. These features are likely to include a number of extant and former trackways, including examples depicted by late 19th century Ordnance Survey maps. Other linear features may be internal sub-divisions of the woodland. The parcel of woodland is bounded to the north, south and west by an extant trackway or footpath, set within a wide linear depression which may be a former watercourse or holloway.

3.7.32 A series of linear banks (3006; Figure 95) were identified in woodland on Nursery Common. Though presumably related to woodland management practises, the date of these features is uncertain. Numerous very regular and closely spaced parallel banks (3002; Figure 86) were also identified within an area of woodland to the north of The Hattons, although these may relate to modern woodland management practises.

3.7.33 Other features identified during the assessment included a trackway or land division (2238; Figure 90) and garden features associated with Micklow House (2208, and possibly 2210; Figure 84), both of which are shown on late 19th century Ordnance Survey maps.

3.7.34 A small number of linear features which do not clearly appear to respect existing field systems or correspond with land divisions shown on early Ordnance Survey maps were also identified (e.g. 2225, Figure 86; 2227, Figure 90; 2239, Figure 89; 2246, Figure 87; 2258-60, Figure 87; 2262, Figure 87; 2284-5, Figure 90). In many instances, the origins of these features are uncertain, although plausible interpretations include former field boundaries, drains and trackways or footpaths.

Aerial photographs

Overview

3.7.35 Features identified from aerial photographs during the remote sensing assessment are described in Annex C, illustrated in Figures 80 - 96 and listed in Appendix CH-002-003. The principal findings of the assessment are presented below.

3.7.36 The Stone and Swynnerton area had not, at the time of survey (January - May 2016), been surveyed by NMP projects, and contains only 5 oblique photos derived from non-archaeological survey.

3.7.37 The Stone and Swynnerton area contains extensive areas of extant and eroded medieval agricultural, which in places may overlie and mask earlier deposits.

3.7.38 A general, an absence or very low level of visible crop marked evidence for buried features presents a challenge to non-intrusive survey, which may not be as effective in

these environments as parts of the Fradeley to Colton area and the Colwich to Yarlet area, which lie over gravel substrates.

Undated

3.7.39 An area of fallen and mottled crops was recorded at site 135 (Figure 84), which lies just outside the boundary of the Stone and Swynnerton area to the south west of Stone. This showed on the 2003 timeline at Google Earth only, and could be either agricultural or archaeological features. The form indicates a possible former buried ditched enclosure, and it has been included in the project database as it possibly indicates some potential for buried features showing on aerial photos in this environment.

Prehistoric periods

3.7.40 No sites have been identified from aerial photos in the Stone and Swynnerton area which may date to the Prehistoric periods, other than the undated site described above which lies just outside the Stone and Swynnerton area boundary.

Iron Age/Roman

3.7.41 No sites have been identified from aerial photos in the Stone and Swynnerton area which may date to the Iron Age or Roman periods, other than the undated site described above which lies just outside the Stone and Swynnerton area boundary.

Medieval

3.7.42 The Stone and Swynnerton area was extensively farmed in the medieval period and there are widespread areas of eroded and slightly upstanding ridge and furrow. The area to the west of Stone (site 134; Figure 84) contains levelled earthworks which show an extensive and typical area of former medieval agricultural landscape. The designed post-medieval landscape at Swynnerton Park also overlies extensive areas of eroded medieval fields.

3.7.43 There are no visible areas of medieval settlement which may be defined from aerial photos and it is likely that these may lie beneath modern settlements and hamlets in this area.

Post-medieval

3.7.44 The post-medieval landscape is visible on aerial photographs as a series of crop marked and earthwork former field boundaries, which fit in with the modern 'post enclosure' boundary systems which now form the modern rural landscape in the Stone and Swynnerton area. Areas of narrow ridge and furrow are also visible, and garden earthworks are visible at Swynnerton Park.

3.7.45 An area of possible water meadows or drains is recorded at site 148 (Figure 94), between Stableford and The Rowe beside the railway.

Modern

3.7.46 To the west of Swynnerton Primary School, at site 140 (Figure 90), a group of H-shaped structures was recorded from 1940s aerial photos which may have been temporary military installations. They are no longer extant.

3.7.47 Site 171 (Figure 92), north of Clifford Wood is a group of four low sub-square structures connected by a formal access way. These features were first observed on aerial photos taken in 1948, and are still extant. It is likely that they are military bunkers or storage facilities.

3.8 Summary

LiDAR and multi-spectral

3.8.1 The results of the assessment were largely consistent with expectations based on the rural character of the study area. The majority of features identified during the assessment are likely to represent disused extractive pits or quarries of post-medieval date, or former field boundaries laid out, or formalised in the 18th or 19th centuries. The former field boundaries may, in some instances, also correlate with medieval land divisions.

3.8.2 The assessment also identified several areas containing vestigial ridge and furrow landforms which had not previously been recorded by the Staffordshire HER, including a significant concentration surrounding Swynnerton Grange.

3.8.3 Sites or features of potentially elevated significance included a possible enclosure located at the southern end of the Stone and Swynnerton area, a possible ring ditch north of Sandyford Farm, and a group of mounds, an enclosure and a possible building platform near Swynnerton Grange.

Aerial photographs

3.8.4 Aerial photographs taken between the 1940s and the present time show no firm evidence for crop marked pre-medieval landscapes in the Stone and Swynnerton area. This may be due to lack of specialist reconnaissance, coupoled with a less responsive more pastoral land use regime.

3.8.5 The Stone and Swynnerton area was farmed in the medieval period, with areas of medieval agricultural land use visible as residual earthworks and some marks in grass and crops.

3.8.6 Post-medieval boundaries and narrow ridge and furrow show within the Stone and Swynnerton area on aerial photos.

3.8.7 There is evidence for water meadows and possible drains at Stableford. Garden features are visible on aerial photos at Swynnerton Park, and some possible Second World War military installations were recorded at Swynnerton and to the north of Clifford wood.

3.8.8 The potential for further discovery within the Stone and Swynnerton area is unknown, and non-intrusive survey may not provide the correct level of detail to fully evaluate the potential for the presence of below-ground heritage assets.

3.9 Conclusions

3.9.1 Features identified within the Stone and Swynnerton area from the LiDAR and aerial photography largely relate to medieval and post-medieval agricultural activity and post-medieval quarrying activity.

3.9.2 Where there is a lack of correlation between the LiDAR and AP assessments this suggests that many of the features identified from APs no longer survive as extant earthwork features, however, this does not preclude the below ground survival of archaeological remains.

3.9.3 There are inherent difficulties involved in transcribing and accurately locating cropmark features. Accordingly, degree of caution should be exercised in relying on position of individual features, as these may in actually fact be located some distance from location indicated.

4 References

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Annex A: Survey equipment and data processing

Survey methods and equipment

The magnetic data for this project was acquired using both a Bartington 601-2 dual magnetic gradiometer system and a non-magnetic cart system. The handheld instrument has two gradiometer assemblies fixed horizontally 1m apart allowing two traverses to be recorded simultaneously. The cart instrument has four gradiometers fixed horizontally 1m apart allowing multiple traverses to be recorded simultaneously. The gradiometers are the same, each containing two fluxgate magnetometers arranged vertically with a 1m separation, and measure the difference between the vertical components of the total magnetic field within each sensor array. This arrangement of magnetometers suppresses any diurnal or low frequency effects.

The gradiometers have an effective resolution of 0.03nT over a ±100nT range, and measurements from each sensor are logged at intervals of 0.25m.

Wessex Archaeology conducts detailed handheld gradiometer surveys using an accurate 20m or 30m site grid, which is achieved using a Leica Viva RTK GNSS instrument. The cart-based system relies upon accurate GPS location data which is collected using a Leica Viva system with rover and base station. The Leica Viva systems receive corrections from a network of reference stations operated by the Ordnance Survey and Leica Geosystems, allowing positions to be determined with a precision of 0.02m in real-time and therefore exceed the level of accuracy recommended by HE for geophysical surveys.

The detailed surveys consist of 20m by 20m or 30m by 30m grids, and data are collected at 0.25m intervals along traverses spaced 1m apart. These strategies give 1600 or 3600 measurements per 20m or 30m grid respectively, and are the recommended methodologies for archaeological surveys of this type.

Data may be collected with a higher sample density where complex archaeological anomalies are encountered, to aid the detection and characterisation of small and ephemeral features. Data may be collected at up to 0.125m intervals along traverses spaced up to 0.25m apart, resulting in a maximum of 28800 readings per 30m grid, exceeding that recommended by HE for characterisation surveys.

Post-processing

The magnetic data collected during the detail survey are downloaded from the Bartington cart system for processing and analysis using both commercial and in-house software. This software allows for both the data and the images to be processed in order to enhance the results for analysis; however, it should be noted that minimal data processing is conducted so as not to distort the anomalies.

The cart-based system generally requires a lesser amount of post-processing than the handheld Bartington Grad 601-2 fluxgate gradiometer instrument. This is largely because mounting the gradiometers on the cart reduces the occurrence of operator error; caused by inconsistent walking speeds and deviation in traverse position due to varying ground cover and topography.

Typical data and image processing steps for hand-held data may include:

- destripe – applying a zero mean traverse in order to remove differences caused by directional effects inherent in the magnetometer;
- destagger – shifting each traverse longitudinally by a number of readings. This corrects for operator errors and is used to enhance linear features;
- despike – filtering isolated data points that exceed the mean by a specified amount to reduce the appearance of dominant anomalous readings (generally only used for earth resistance data);
- deslope - this function is used to remove a linear trend within a data set. It is most commonly used to remove grid edge discontinuities that can result from applying zero mean traverse to a data set; and
- multiply - the multiply function multiplies the data by a negative or positive constant value. It has a variety of functions but its typical use is to normalise data that has been collected with sensors at different heights from the ground.

Typical data and image processing steps for the non-magnetic cart fitted system may include:

- smooth – Applying a smooth function removes any small scale spiking or 'fuzziness', generally caused by internal system noise. This effectively 'destripes' the data and reduces the appearance of dominant anomalous readings; and
- spline interpolation – Gridding the data with splines allows the application of minimum and maximum data values and reduces oscillations for potential fields such as gravity or magnetic.

Typical displays of the data used during processing and analysis:

- XY Plot (hand-held data only) – Presents the data as a trace or graph line for each traverse. Each traverse is displaced down the image to produce a stacked profile effect. This type of image is useful as it shows the full range of individual anomalies; and
- greyscale – Presents the data in plan view using a greyscale to indicate the relative strength of the signal at each measurement point. These plots can be produced in colour to highlight certain features but generally greyscale plots are used during analysis of the data.

Annex B: Geophysical interpretation

Interpretation categories

The interpretation methodology used by Wessex Archaeology separates the anomalies into two main categories: archaeological and unidentified responses.

The archaeological category is used for features when the form, nature and pattern of the anomaly are indicative of archaeological material. Further sources of information such as aerial photographs may also have been incorporated in providing the final interpretation. This category is further sub-divided into three groups, implying a decreasing level of confidence:

- archaeology - used when there is a clear geophysical response and anthropogenic pattern; and
- possible archaeology - used for features which give a response but which form no discernible pattern or trend.

The unidentified category is used for features when the form, nature and pattern of the anomaly are not sufficient to warrant a classification as an archaeological feature. This category is further sub-divided into:

- agricultural - used for linear trends that can be shown to relate to agricultural activity including ridge and furrow, drainage and ploughing scars;
- industrial, burnt-fired, increased magnetic response - used for areas dominated by bipolar and dipolar anomalies which may have some archaeological potential;
- uncertain origin - used for low amplitude or indistinct linear anomalies;
- ferrous - used for responses caused by ferrous material. These anomalies are likely to be of modern origin; and
- natural - used for spreads of anomalies that are considered to be geological or more discrete anomalies considered to be natural.

Finally, services such as water pipes are marked where they have been identified along with ceramic land drains.

Annex C: Sites identified by remote sensing

Table 1: LiDAR and multi-spectral sites within the Stone and Swynnerton area

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2044	131		Unknown, possibly medieval /post-medieval	Area containing possible vestigial ridge and furrow. Slightly sinuous in form. Approximately 320m by 130m in extent. Orientated NW-SE. Possibly contains two or three individual parcels of ridge and furrow. However, may be the product of modern ploughing.
2165			Unknown, possibly post-medieval	Relatively clearly defined L-shaped linear bank or break of slope. Likely to represent a former field boundary
2166			Unknown, possibly post-medieval	Small sub-oval depression situated within an area containing numerous 'Old Clay Pits', 'Old Marl Pits' and 'Sand Pits', as depicted by late 19th and early 20th century Ordnance Survey maps. Likely to represent a former extraction pit or pond.
2168			Unknown, possibly post-medieval	Small sub-oval depression situated within an area containing numerous 'Old Clay Pits', 'Old Marl Pits' and 'Sand Pits', as depicted by late 19th and early 20th century Ordnance Survey maps. Likely to represent a former extraction pit or pond.
2169			Unknown, possibly post-medieval	Small sub-oval depression situated within an area containing numerous 'Old Clay Pits', 'Old Marl Pits' and 'Sand Pits', as depicted by late 19th and early 20th century Ordnance Survey maps. Likely to represent a former extraction pit or pond.
2170			Unknown, possibly post-medieval	Sub-oval depression, approximately 35m by 22m, situated at the edge of a field. Located within an area containing numerous 'Old Clay Pits', 'Old Marl Pits' and 'Sand Pits', as depicted by late 19th and early 20th century Ordnance Survey maps. Likely to represent a former pond or extraction pit.
2171			Unknown, possibly post-medieval	Small sub-oval depression situated within an area containing numerous 'Old Clay Pits', 'Old Marl Pits' and 'Sand Pits', as depicted by late 19th and early 20th century Ordnance Survey maps. Likely to represent a former extraction pit or pond.
2172		STS001	Unknown	Possible enclosure. Defined most clearly to the south-east by a slight raised bank. Encompasses an area of approximately 0.6ha. Late 19th and early 20th century Ordnance Survey maps show a small pond and two earthworks (possibly the result of quarrying) within the interior of the putative enclosure, although no trace of features is evident within the LiDAR data.
2175			Unknown, possibly post-medieval	Small sub-oval depression, likely to represent a former extraction pit or pond. One of several features depicted in this area by late 19th and early 20th century Ordnance Survey maps and labelled as a 'Clay Pit' or 'Old Marl Pit'.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2176			Unknown, possibly post-medieval	Small sub-oval depression, likely to represent a former extraction pit or pond. One of several features depicted in this area by late 19th and early 20th century Ordnance Survey maps and labelled as a 'Clay Pit' or 'Old Marl Pit'.
2185			Unknown, possibly post-medieval	Small sub-oval depression, likely to represent a former extraction pit or pond. One of several features depicted in this area by late 19th and early 20th century Ordnance Survey maps and labelled as a 'Clay Pit' or 'Old Marl Pit'.
2186			Unknown, possibly post-medieval	Small sub-oval depression, likely to represent a former extraction pit or pond. One of several features depicted in this area by late 19th and early 20th century Ordnance Survey maps and labelled as a 'Clay Pit' or 'Old Marl Pit'.
2187			Unknown, possibly medieval /post-medieval	Very slight NE-SW linear bank. Approximately 180m in length. Likely to represent a former field boundary or land division. Not shown on late 19th century Ordnance Survey maps. Possibly associated with areas of vestigial ridge and furrow in immediate vicinity.
2188			Unknown, possibly medieval /post-medieval	Very slight NE-SW linear bank. Approximately 125m in length. Likely to represent a former field boundary or land division. Not shown on late 19th century Ordnance Survey maps. Possibly associated with areas of vestigial ridge and furrow in immediate vicinity.
2204			Unknown	Very faint linear feature. Possibly represents the position of a former field boundary.
2205			Unknown	Very faint linear / L-shaped feature. Possibly represents the position of a former field boundary.
2206			Unknown, possibly post-medieval	Very faint linear feature. Corresponds with the position of a former field boundary, as depicted by late 19th century Ordnance Survey mapping.
2207			Unknown, possibly post-medieval	Very slight linear bank, slightly sinuous in plan. Corresponds with the position of a former field boundary recorded by late 19th century Ordnance Survey maps.
2208		STS015	Post-medieval	Area containing a number of regular linear features, arranged in an irregular grid. These features appear to correspond with a network of paths/gardens associated with Micklow House, as depicted by the first edition 25-inch Ordnance survey map.
2209			Unknown, possibly medieval /post-medieval	Area containing faintly detectable traces of possible E-W ridge and furrow. Approximately 50m by 25m in extent. Alternatively, these variations in topography may be relict features associated with the gardens attached to Micklow House.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2210			Unknown, possibly post-medieval	Area containing a number of very poorly defined linear features, arranged in a co-axial pattern. These features possibly correspond with a network of paths/gardens associated with Micklow House, and may represent a continuation of 2208.
2211		STS013	Unknown, possibly post-medieval	Sub-rectangular depression, approximately 33m by 30m. Corresponds with the position of an 'Old Marl Pit', shown on the First Edition six-inch Ordnance Survey map.
2212			Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 80m by 50m. A small pond is depicted in this location by late 19th century Ordnance Survey maps. Possibly represents a former extraction pit.
2213			Post-medieval	Pronounced bank or mound, approximately 110m by 30m. Possibly a spoil heap associated with the construction of the adjacent railway line
2214		STS016	Post-medieval	The outline of the (now infilled) 'Darlaston Pool' is visible, albeit heavily obscured by tree cover and partially built over. Three small islands, two of which were joined to the bank by a narrow east-west causeway remain clearly evident (2282 and 2283). The pond, which is depicted by late 19th and early 20th century OS maps, was clearly the product of human activity, although its original purpose is uncertain.
2215	134	STS013	Unknown	Short linear depression. Possibly represents a former land division.
2216	134	STS013	Unknown	Short linear depression. Possibly represents a former land division.
2217			Unknown	Short linear depression. Possibly represents a former land division or part of an old watercourse.
2218	136		Unknown, possibly post-medieval	Faint NE-SW linear depression. Partially corresponds with the position of a former land division shown on late 19th century Ordnance Survey maps.
2219			Unknown, possibly post-medieval	Sub-circular depression, approximately 55m in diameter. Likely to represent a former extraction pit or pond.
2220			Unknown, possibly post-medieval	Slightly sinuous linear bank and possible infilled ditch. Likely to represent a former field boundary.
2221			Unknown, possibly post-medieval	Sub-oval depression, approximately 60m by 50m in extent Possibly represents a former extraction pit or pond.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2222			Unknown, possibly post-medieval	Elongated, sub-oval depression, approximately 65m by 25m in extent. Possibly represents a former extraction pit or pond.
2223			Unknown, possibly post-medieval	Faint NW-SE linear feature. Corresponds approximately with the position of a former field boundary shown on late 19th and early 20th century Ordnance Survey maps.
2224			Unknown, possibly post-medieval	Faint, slightly sinuous linear feature. Possibly represents a former field boundary or trackway.
2225		STS027	Unknown	Very faint linear feature, visible for a distance of approximately 1.5km. Does not respect existing field boundaries. Possibly represents a former trackway or footpath.
2226		STS040	Unknown, possibly post-medieval	Linear feature, formed of a slight E-W bank and probable infilled ditch. Corresponds with the position of a former field boundary shown on late 19th century Ordnance Survey maps
2227		STS040, STS074	Unknown	Very faint linear feature, consisting of a slight raised bank. Visible for a distance of approximately 450m. Does not respect existing field boundaries. Possibly represents a former trackway or footpath.
2228		STS040, STS074	Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 75m by 60m in extent. Now obscured by tree cover within Swynnerton Park. Possibly represents a former extraction pit or pond (possibly an ornamental pond or fish pond).
2229			Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 32m by 20m in extent. Now obscured by tree cover. Labelled as an ' Old Marl Pit' on the first edition 25-inch Ordnance Survey map.
2230			Unknown, possibly post-medieval	Sub-oval depression, approximately 43m by 25m in extent. Now obscured by tree cover. Labelled as an ' Old Marl Pit' on the first edition 25-inch Ordnance Survey map.
2231			Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 94m by 57m in extent. Now obscured by tree cover. Labelled as an ' Old Clay Pit' on the first edition 25-inch Ordnance Survey map.
2232			Unknown, possibly post-medieval	Slightly irregular depression, approximately 83m by 50m in extent. Now obscured by tree cover. Labelled as an ' Old Clay Pit' on the first edition 25-inch Ordnance Survey map.
2233			Unknown, possibly post-medieval	Slightly irregular depression, approximately 58m by 53m in extent. Now obscured by tree cover. Labelled as an ' Old Clay Pit' on the first edition 25-inch Ordnance Survey map, also depicting a small rectangular structure within the interior of

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
				the quarry. Situated adjacent to an extant pond, which may also have originated as an extraction pit.
2234		STS040, STS074	Unknown, possibly post-medieval	One of a group of three possible former extraction pits situated within, and now obscured by woodland within Swynnerton Park. Alternatively, could be a former fish pond or ornamental pond.
2235		STS040, STS074	Unknown, possibly post-medieval	One of a group of three possible former extraction pits situated within, and now obscured by woodland within Swynnerton Park. Alternatively, could be a former fish pond or ornamental pond.
2236		STS040, STS074	Unknown, possibly post-medieval	One of a group of three possible former extraction pits situated within, and now obscured by woodland within Swynnerton Park. Alternatively, could be a former fish pond or ornamental pond.
2237		STS040, STS074	Medieval/post-medieval	Area containing very faint traces of possible ridge and furrow. Slightly sinuous in form, orientated ENE-WSW. Approximately 270m by 115m in extent.
2238		STS040, STS074	Unknown, possibly post-medieval	Very faint/slight linear variation in topography. Orientated ENE-WSW. Corresponds with the position of a trackway and land division demarcating the boundary of a parcel of land/ part of the grounds attached to Swynnerton Hall, as depicted by Late 19th century Ordnance Survey maps.
2239			Unknown	Slight linear bank, aligned N-S and approximately 100m long. Likely to represent a former land division.
2240		STS040	Post-medieval	One of two ornamental fish ponds associated with Swynnerton Hall. Still extant/recorded on current Ordnance Survey mapping. Recorded as a 'Fish Pond' by late 19th century Ordnance Survey mapping.
2241		STS040	Post-medieval	One of two ornamental fish ponds associated with Swynnerton Hall. Recorded on current Ordnance Survey mapping, though possibly partially infilled. Recorded as a 'Fish Pond' by late 19th century Ordnance Survey mapping.
2242		STS040	Post-medieval	Possible ornamental fish pond associated with Swynnerton Hall. Still extant/recorded on current Ordnance Survey mapping.
2243	138	STS037	Medieval/post-medieval	Extensive area containing numerous, relatively clearly defined parcels of ridge and furrow, set within pasture surrounding Swynnerton Grange. The individual blocks of ridge and furrow vary in orientation and size. Some of the blocks are subdivided by shallow banks, extant watercourses/drains or infilled ditches. Many of the selions (strip field) are slightly sinuous in form.
2244		STS031, STS037	Unknown, possibly	Small sub-rectangular level area, approximately 45m by 40m in extent. Located at the junction of two parcels of ridge

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
			medieval /post-medieval	and furrow assigned to 2243. May represent a building platform of medieval or post-medieval date.
2245			Unknown	Enclosure defined by a possible infilled ditch with external and internal bank. Partially defined to the east by an extant land division. Encloses an area of approximately 2.6ha. Internally subdivided by a number of linear depressions, which presumably relate to infilled ditches or trackways/holloways. A small sub-rectangular enclosure or building platform is evident within/at the south-western edge of the enclosure. Except for the extant land division which defines its eastern edge, the enclosure is not recorded on late 19th century Ordnance Survey maps. Given the widespread presence of relict ridge and furrow in the vicinity, it is possible that the enclosure may be related to medieval occupation.
2246		STS037	Unknown	Very slight linear depression. Possibly represents the former continuation of an extant watercourse or drain.
2247			Unknown, possibly prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. Approximately 18m in diameter. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2248			Unknown, possibly prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. Approximately 18m in diameter. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2249			Unknown, Possibly Prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. Approximately 13m in diameter. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2250			Unknown, Possibly Prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. Approximately 10m in diameter. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2251			Unknown, possibly prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. Approximately 13m in diameter. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2252			Unknown, possibly prehistoric	One of several circular mounds arranged in a N-S alignment within a pasture field. This example is slightly sub-oval in plan. Approximately 18m by 13m in extent. Possibly a prehistoric funerary monument (i.e. a Late Neolithic or Bronze Age

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
				barrow), forming part of a small dispersed cemetery. Alternatively, could be a spoil heap of more recent origin.
2253			Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 27m by 18m in extent. Possibly represents a former extraction pit or pond.
2254			Unknown, possibly post-medieval	Slightly irregular sub-oval depression, approximately 24m by 15m in extent. Possibly represents a former extraction pit or pond.
2255	138	STS037	Unknown, possibly post-medieval	Very faint/slight linear variation in topography. Orientated NE-SW. Likely to represent a former field boundary.
2256			Unknown, possibly post-medieval	Linear depression, slightly sinuous in plan. Corresponds with the position of a former field boundary recorded by late 19th and early 20th century Ordnance Survey maps.
2257			Unknown, possibly post-medieval	Slightly irregular depression, approximately 77m by 47m in extent. Possibly represents a former extraction pit or pond.
2258			Unknown, possibly post-medieval	Faint linear depression, approximately 15m in width. Possibly demarcates the position of a former field boundary, though could represent a former trackway/holloway.
2259		STS029, STS037	Unknown	Faint linear depression, approximately 15m in width, possibly flanked by slight banks. Becomes very diffuse to north. Possibly corresponds with the route of a former trackway/holloway, though could represent the position of a former watercourse and be natural in origin.
2260		STS029, STS037	Unknown	Faint linear variation in topography. Possibly corresponds with the route of a former trackway/holloway, though could be natural in origin, though could represent the position of a former watercourse and be natural in origin.
2261			Unknown, possibly post-medieval	Slight NE-SW linear bank. Possibly represents a former field boundary.
2262		STS029, STS038	Unknown	Faint linear depression. Becomes very diffuse to north. Possibly represents the route of a former trackway/holloway. Alternatively, the feature could represent the position of a former watercourse; possibly a continuation of 2259 or 2260.
2263		STS038	Unknown, possibly post-medieval	Irregular depression, now obscured by tree cover. Possibly represents a former extraction pit, or series of intercut extraction pits.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2264	151	STS038	Medieval/post-medieval	Rectangular area containing relict ridge and furrow. Slightly sinuous in form. Aligned ENE-WSW. Approximately 130m by 75m in extent. The northern and southern boundaries of the area are defined by slight linear banks and depressions, which correspond with field boundaries shown on late 19th century Ordnance Survey maps.
2265		STS038	Unknown, possibly medieval /post-medieval	Area containing possible relict ridge and furrow. Aligned ENE-WSW. Approximately 250m by240m in extent.
2266		STS027	Unknown, possibly medieval /post-medieval	Area containing possible relict ridge and furrow. Aligned ENE-WSW. The selions are slightly sinuous in form, as are the boundaries of the field which contains them. The area of ridge and furrow appears to have originally been contained within two parallel strip fields, which were divided by a possible bank and ditch, transcribed as 2220. Further medieval strip fields containing vestigial ridge and furrow are clearly evident to the north, beyond the survey area.
2267			Unknown, possibly post-medieval	Irregular depression, now obscured by tree cover. Possibly represents a former extraction pit, or series of intercut extraction pits.
2276		STS005	Unknown, possibly post-medieval	Irregular depression. Corresponds with the position of an 'Old Marl Pit' and a pond shown on late 19th and early 20th century Ordnance Survey maps.
2277			Unknown, possibly post-medieval	Irregular depression, likely to represent a former extractive pit or a pond.
2278			Unknown, possibly post-medieval	Irregular depression, likely to represent a former extractive pit or a pond.
2279		STS005	Unknown, possibly post-medieval	Irregular depression, likely to represent a former extractive pit or a pond.
2280			Unknown, possibly post-medieval	Very faint linear feature. Corresponds approximately with a field boundary depicted by late 19th and early 20th century Ordnance Survey maps
2281			Unknown, possibly post-medieval	Very faint linear feature. Corresponds approximately with a field boundary depicted by late 19th and early 20th century Ordnance Survey maps.

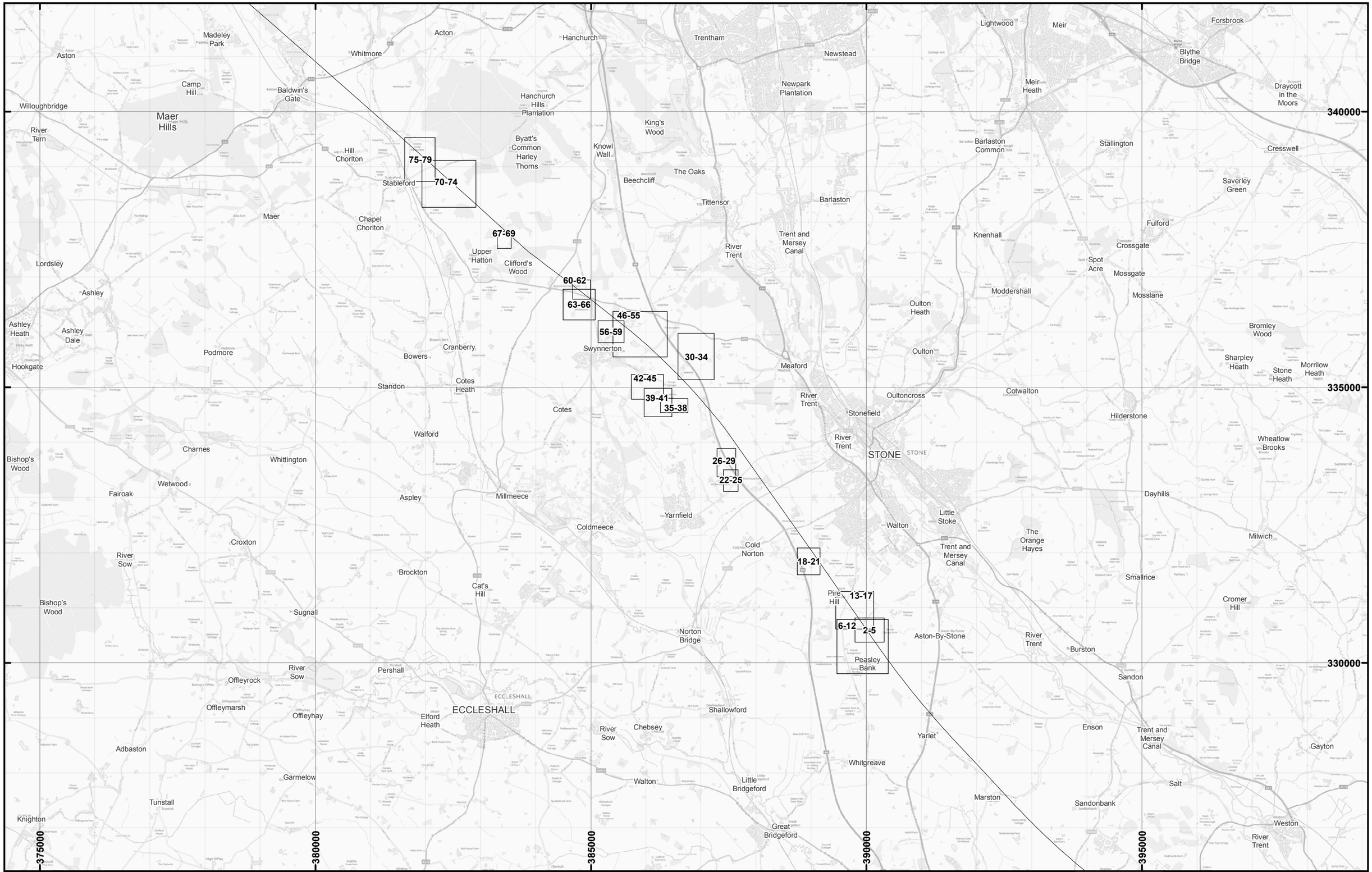
LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2282		STS016	Unknown, possibly post-medieval	Narrow linear E-W bank with raised mounds at each end. Corresponds with a pair of islands within, linked by a causeway, as depicted by late 19th and early 20th century Ordnance Survey maps within 'Darlaston Pool', a now infilled lake or pond transcribed as 2214.
2283		STS016	Unknown, possibly post-medieval	Small sub-circular mound. Corresponds with a small island within 'Darlaston Pool' (a now infilled lake or pond transcribed as 2214) as depicted by late 19th and early 20th century Ordnance Survey maps
2284		STS040, STS074	Unknown	Slight raised bank, approximately 140m long and 13m wide. Orientated ENE-WSW. The origin of the feature is uncertain, though it could represent a former land division.
2285		STS040139, STS074	Unknown	Slight raised bank, approximately 140m long and 13m wide. Orientated ENE-WSW. The origin of the feature is uncertain, though it could represent a former land division.
2288			Unknown, possibly post-medieval	Very faint linear feature. Corresponds approximately with a field boundary depicted by late 19th and early 20th century Ordnance Survey maps.
2289			Unknown, possibly post-medieval	Irregular depression, approximately 100m by 5m in extent. Labelled as an ' Old Clay Pit' on late 19th century Ordnance Survey maps, which also depict a series of small ponds within the interior of the quarry.
2290	134	STS013	Unknown, possibly post-medieval	Very faint linear bank and possible corresponding infilled ditch. Corresponds approximately with a field boundary depicted by late 19th and early 20th century Ordnance Survey maps.
2291		STS013	Unknown, possibly post-medieval	Sub-circular depression, approximately 60m in diameter. Likely to represent a former extractive pit or a pond.
2292			Unknown, possibly post-medieval	Very faint linear bank and possible corresponding infilled ditch. Corresponds approximately with a field boundary depicted by late 19th and early 20th century Ordnance Survey maps.
2296			Unknown, possibly post-medieval	Group of irregular depressions, now obscured by woodland. Likely to represent former extraction pits. Labelled as 'Closepit Plantation' on late 19th century Ordnance Survey maps.
2297			Unknown, possibly post-medieval	Group of irregular depressions, now obscured by woodland. Likely to represent former extraction pits.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2298			Unknown, possibly post-medieval	Group of irregular depressions, now obscured by woodland. Likely to represent former extraction pits. Labelled as 'Clash's Pit' on late 19th century Ordnance Survey maps.
2299			Unknown, possibly medieval /post-medieval	Parcel of extant woodland (Clifford Wood), containing numerous linear features, which are likely to include extant and former trackways (including examples depicted by late 19th century Ordnance Survey maps), and possible internal divisions of the woodland. The parcel of woodland is bounded to the north, south and west by an extant trackway or footpath, set within a wide linear depression; possibly a holloway or former watercourse. Note: the woodland and surrounding trackway extend beyond the extent of the study area.
2300		STS044	Prehistoric	Extremely faint sub-circular feature, approximately 18-20m in diameter. Possibly a ring-ditch forming part of a prehistoric funerary monument.
2303	136		Unknown, possibly medieval /post-medieval	Faint linear feature, slightly sinuous in form. Possibly represents a former field boundary or land division associated with medieval/post-medieval strip fields.
2304	136		Unknown, possibly medieval /post-medieval	Slight raised bank, possibly represents a ploughing headland associated with medieval/post-medieval strip fields.
2321			Medieval/post-medieval	Area containing possible relict ridge and furrow. Aligned ENE-WSW. Contained within the eastern extent of a field currently under pasture. Area is 190m by 115m and lies immediately to the west of former extraction pit or pond 2175 and area of similarly orientated ridge and furrow 2322.
2322		STS001	Medieval/post-medieval	Field containing possible relict ridge and furrow aligned ENE-WSW. Currently under pasture, field measures 300m by 160m. Lies immediately to the west of former extraction pit or pond 2175 and area of similarly orientated ridge and furrow 2321.
2323			Unknown, possibly post-medieval	Semi-circular depression, 55m in diameter. Feature is not depicted on Ordnance Survey mapping and is seemingly truncated at its south-eastern edge by a post-medieval field boundary. Possibly a former extractive pit or pond.
2324			Unknown, possibly post-medieval	Sub-elliptical depression, 50m in length. Feature is not depicted on Ordnance Survey mapping. Possibly a former extractive pit or pond.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
2325			Unknown, possibly post-medieval	Sub-elliptical depression, 70m in length. Feature is not depicted on Ordnance Survey mapping. Possibly a former extractive pit or pond.
2326			Unknown, possibly post-medieval	Sub-rectangular depression, 70m in length. Feature is not depicted on Ordnance Survey mapping. Possibly a former extractive pit or pond.
2327			Unknown, possibly post-medieval	Semi-circular depression, 46m in diameter. Feature is not depicted on Ordnance Survey mapping and is seemingly truncated at its north-western edge by a post medieval field boundary. Possibly a former extractive pit or pond.
2328			Unknown, possibly post-medieval	Area of undulating ground surface occupying the eastern edge of current pasture field. Feature is 110m by 60m and respects the field boundary along its north-eastern edge with its northern extent overlying the site of a former pond. Possibly the location of a series of previous ponds within the field.
2329			Unknown, possibly post-medieval	Sub-circular depression, 50m in diameter. Feature is not depicted on Ordnance Survey mapping. Possibly a former extractive pit or pond.
2330			Unknown, possibly post-medieval	Sub-rectangular depression, 85m by 50m, orientated east-west. Feature is not depicted on Ordnance Survey mapping and is truncated down its centre north-south by a current field boundary visible on the 1870s County Series map. Possibly a former extractive pit or pond.
2331			Unknown, possibly post-medieval	Sub-rectangular depression, 90m by 75m, orientated north-south. Feature is not depicted on Ordnance Survey mapping. Has an undulating surface suggesting it could be several features. Possibly the site of former extractive pits or ponds.
2332		STS027	Medieval/post-medieval	Area containing possible relict ridge and furrow, aligned NE-SW. Area is 230m by 160m and lies immediately to the south-east of linear feature 2261, which may represent a former field boundary that runs through this feature.
2333				Sub-circular depression, 33m in diameter. Lies in the approximate location of a feature listed as an 'old clay pit' on the 1870s County Series Ordnance Survey map. Probable former extractive pit.
2334				Irregularly shaped depression with undulating surface, 73m long and 45m wide. Not visible on Ordnance Survey mapping. Possibly represents a series of former ponds or extractive pits.
3000		STS055	Unknown	Slight bank features to the north of The Hattons, possibly representing former field boundaries, and composed of a 100m long south west – north east aligned feature abutting a north west – south east aligned feature.

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
3001		STS055	Post-medieval/modern	A 165m long dog-legged feature can be traced to the north of Hatton Farm and represents the location of a former field boundary.
3002		STS055	Modern	A block of bank features, on a SW-NE alignment, in woodland to the north of The Hattons. The features cover an area of 1.5 hectares and are possibly related to modern woodland management.
3003		STS055	Post-medieval/modern	A 150m long, E-W aligned historic field boundary. It is unrecorded on OS MasterMap data although still appears to be in use as a field boundary.
3004			Unknown	A large, irregularly shaped cut feature in woodland on Hatton Common, 95m in length and 50m at its widest. The feature possibly represents former extraction.
3005			Unknown	A 185m long, NW-SE aligned feature within a field. The feature is not present on historic mapping but may represent a former field boundary.
3006			Post-medieval/modern	A series of bank features in woodland on Nursery Common, located across 1.5 hectares and likely to be related to woodland management. A section of the N-S aligned feature follows the path of a former field boundary recorded on historic mapping.
3007			Post-medieval/modern	A slight feature, 145m in length, to the east of Yew Tree Park, appearing to represent the remains of a former field boundary.
3008		STS063	Post-medieval/modern	A 190m long, NNW-SSE aligned feature to the east of Shelton under Harley representing a former field boundary.
3009		STS062	Post-medieval/modern	Two slight sections of former field boundary on an approximate SE-NW alignment to the south of Shelton under Harley. The southern feature measures 115m in length and the northern one 95m in length.
3010		STS062	Post-medieval/modern	Two parallel sections of ditch, aligned west south west - east north east, to the east of the railway line near Chorlton Mill. The northern feature measures 130m in length and the southern measures 80m in length. The features represent former field boundaries.
3011		STS062	Post-medieval/modern	Bank features to the west of Shelton under Harley, the easternmost one of which represents a recorded former field boundary. It is abutted by SW-NE aligned feature that may also represent a former field boundary. To the east are an

LiDAR and multi-spectral site ID	Aerial photography site ID	Gazetteer ID	Period	Description
				additional two unrecorded parallel linear features on an E-W alignment.
3012		STS063	Post-medieval/modern	A sinuous, 375m long feature representing a section of a former field boundary to the north of Shelton under Harley. A further section of former field boundary is located to the east and can be traced for 75m.
3027			Unknown	Three sub-circular mounds to the east of Stableford Bridge. The two northern features measure 25m at their widest. The southern feature is larger, measuring 65m at its widest point. The features may represent spoil from extraction.
3186			Unknown, possibly medieval /post-medieval	Two blocks of possible ridge and furrow to the east of Stableford Bridge. The features are faint. They are aligned WSW-ENE. The western block is contained within a 95m by 85m area. The block to the east measures 150m by 30m at its greatest extent.



Legend

HS2 Phase 2a centre line

Map Number: Figure 1

Map Name: CA3 Surveyed Areas - Geophysics

Community Area: 3

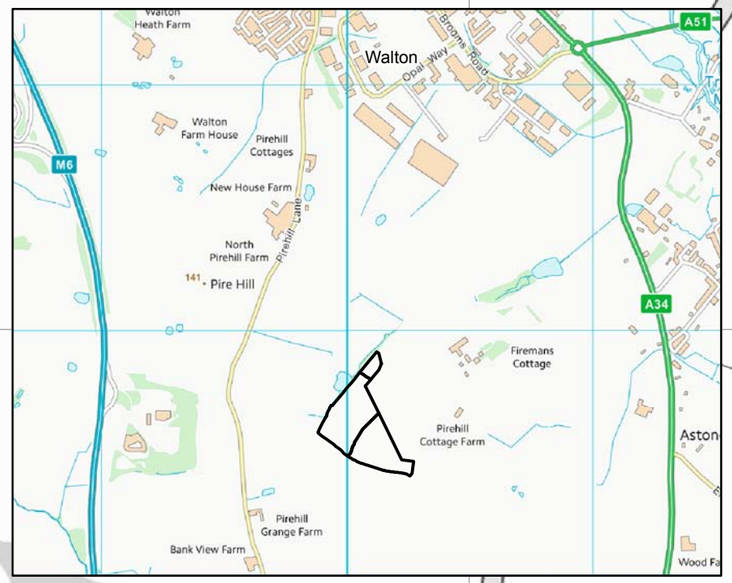
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:62,500

0 625 1,250 1,875 2,500 Metres

Doc Number: C861-ARP-EV-MAP-WE01-000001

Date: 24/05/17



Service Area

Pirehill House (Staffordshire Fire and Rescue Services Headquarters)

Pirehill Cottage Farm

Pirehill Grange

Pirehill Grange Farm

Bank View Farm

331000

330500

389500

390000

390500

391000

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 2

Map Name: CA3-1997 Site location

Community Area: 3-1997

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389700
389800
389900
390000
390100
390200
390300
390400

330800
330700
330600
330500
330400

Pirehill
Cottage
Farm

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 3

Map Name
CA3-1997 Greyscale plot

Community Area:
3-1997

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389700
389800
389900
390000
390100
390200
390300
390400

330800
330700
330600
330500
330400

Pirehill
Cottage
Farm

+25nT

-25nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 4

Map Name

CA3-1997 XY Trace

Community Area:
3-1997

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389700
389800
389900
390000
390100
390200
390300
390400
330800
330700
330600
330500
330400
3-1997-001
3-1997-002
3-1997-003
3-1997-004
3-1997-005
Pirehill Cottage Farm

Legend

- Site boundary
- Detail Survey Extents
- Archaeology
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous

Map Number: Figure 5

Map Name: CA3-1997 Interpretation

Community Area: 3-1997

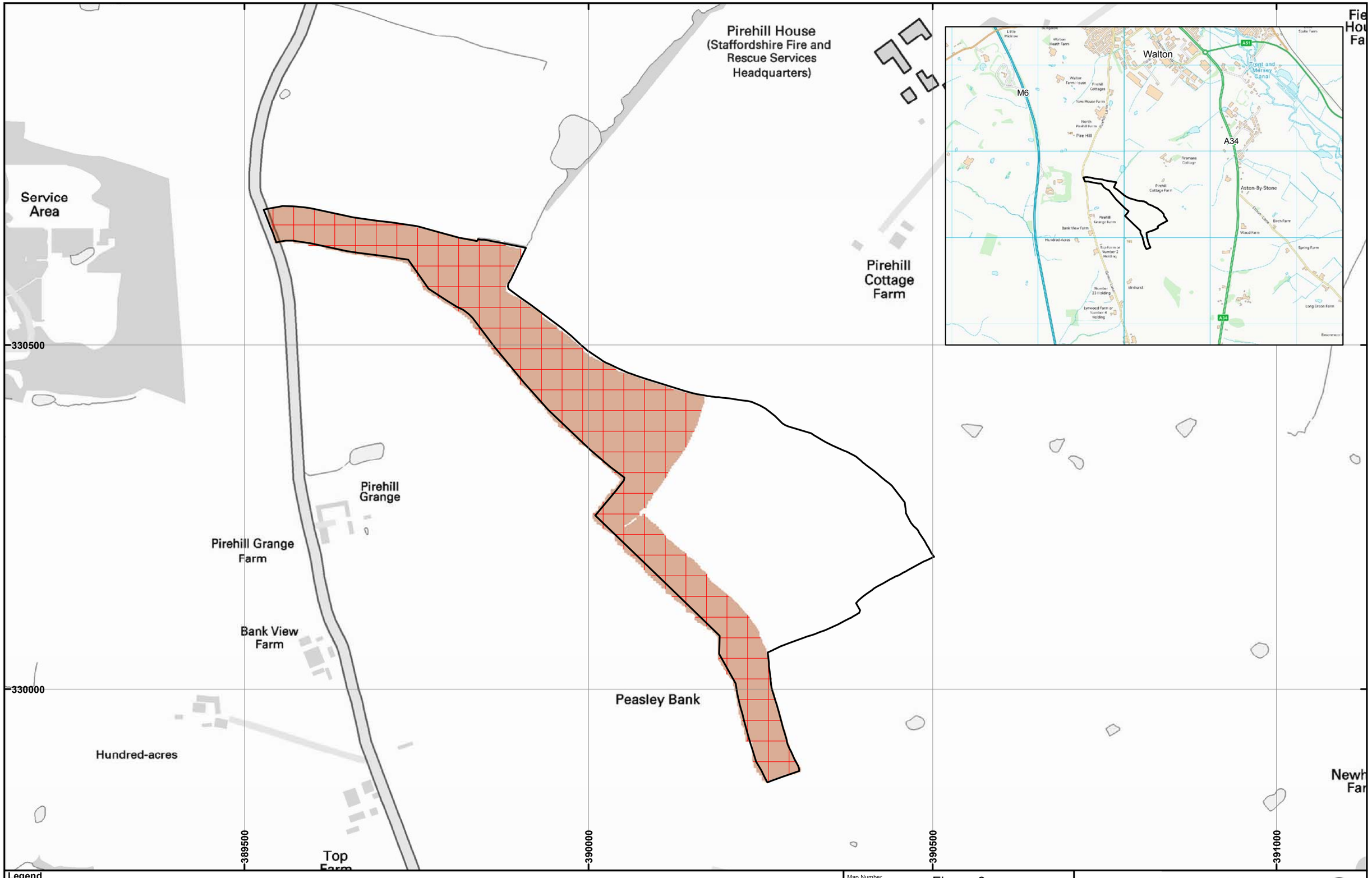
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 6

Map Name: CA3-2005 Site location

Community Area: 3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389500
389600
389700
389800
389900
390000
390100
390200

330700
330600
330500
330400
330300

+3nT

-2nT

Pirehill
Grange Farm

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 7

Map Name

CA3-2005 Greyscale plot (north)

Community Area:
3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

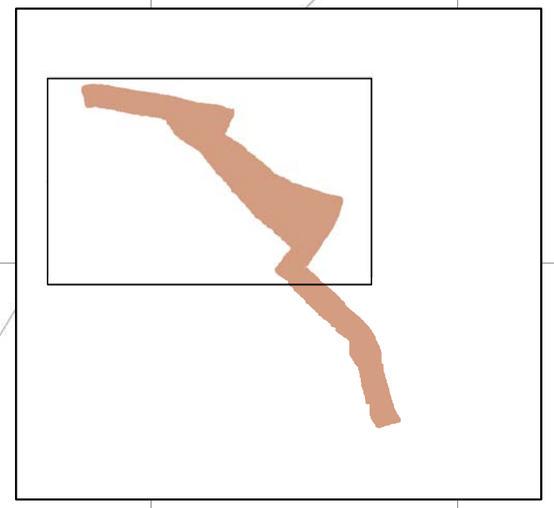
Date: 25/05/17

389500
389600
389700
389800
389900
390000
390100
390200

330700
330600
330500
330400
330300

+25nT
-25nT

Pirehill
Grange Farm



Legend

Site boundary
Detail Survey Extents

Map Number
Figure 8

Map Name
CA3-2005 XY Trace
(north)

Community Area:
3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389500 389600 389700 389800 389900 390000 390100 390200

330700 330600 330500 330400 330300

2-2005-005
2-2005-006
2-2005-002
2-2005-003
2-2005-004
2-2005-010
2-2005-007
2-2005-008
2-2005-012

Pirehill
Grange Farm

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Industrial, Burnt-Fired, Increased Magnetic Response
- Trackway
- Ferrous
- Former Field Boundary

Map Number
Figure 9

Map Name
CA3-2005 Interpretation (north)

Community Area:
3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:15,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389800
389900
390000
390100
390200
390300
390400
390500
330300
330200
330100
330000
329900
+3nT
-2nT
Peasley
Bank

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 10

Map Name
CA3-2005 Greyscale plot (south)

Community Area:
3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389800
389900
390000
390100
390200
390300
390400
390500
330300
330200
330100
330000
329900
Peasley Bank
+25nT
-25nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 11

Map Name
CA3-2005 XY Trace (south)

Community Area:
3-2005

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17

389800
389900
390000
390100
390200
390300
390400
390500
330300
330200
330100
330000
329900
2-2005-008
2-2005-012
2-2005-009
2-2005-011
2-2005-001
Peasley
Bank

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Industrial, Burnt-Fired, Increased Magnetic Response
- Trackway
- Ferrous
- Former Field Boundary

Map Number
Figure 12

Map Name
CA3-2005 Interpretation (south)

Community Area:
3-2005

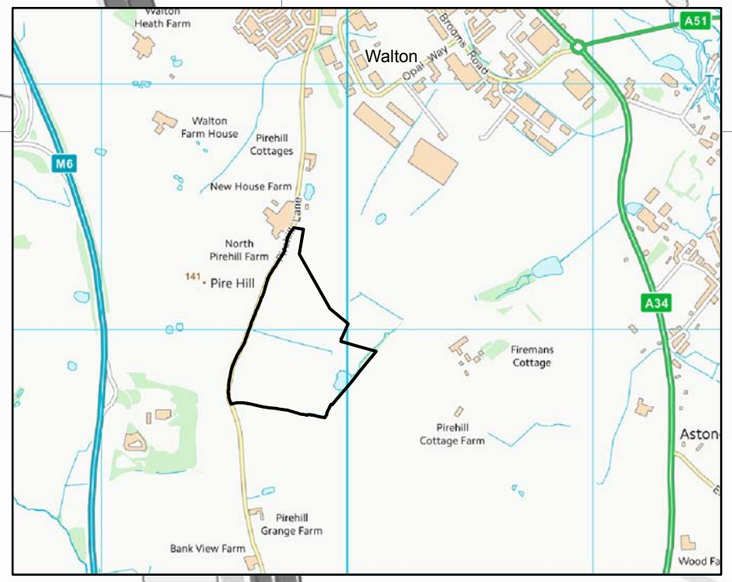
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:15,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 25/05/17



Farm

North Pirehill Farm

331500

Pire Hill

331000

Pirehill House (Staffordshire Fire and Rescue Services Headquarters)

Service Area

Pirehill Cottage Farm

330500

389000

389500

390000

390500

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 13

Map Name: CA3-2008 Site location

Community Area: 3-2008

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

389500
389600
389700
389800
389900
390000
390100

331200
Pire
Hill
331100
331000
330900
330800

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 14

Map Name
CA3-2008 Greyscale plot (north)

Community Area:
3-2008

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

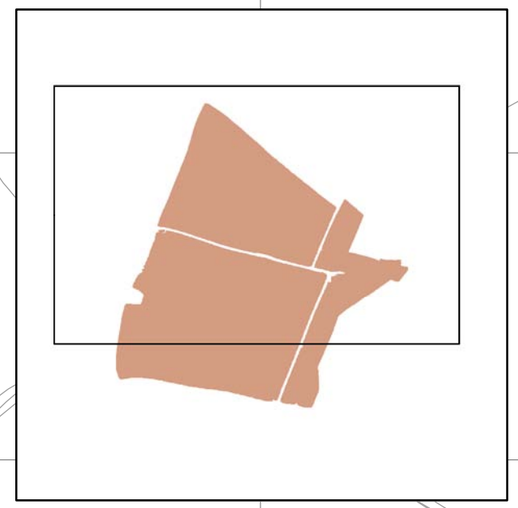
Scale at A3: 1:12,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

389500
389600
389700
389800
389900
390000
390100
331200
Pire
Hill
331100
331000
330900
330800
3-2008-002



Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Former Field Boundary
- Ferrous

Map Number
Figure 15

Map Name
CA3-2008 Interpretation (north)

Community Area:
3-2008

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

389500
389600
389700
389800
389900
390000
390100
390200
331100
331000
330900
330800
330700
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 16

Map Name
CA3-2008 Greyscale plot (south)

Community Area:
3-2008

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000
0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

389500
389600
389700
389800
389900
390000
390100
390200
331100
331000
330900
330800
330700
3-2008-002
3-2008-001

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Former Field Boundary
- Ferrous

Map Number
Figure 17

Map Name
CA3-2008 Interpretation (south)

Community Area:
3-2008

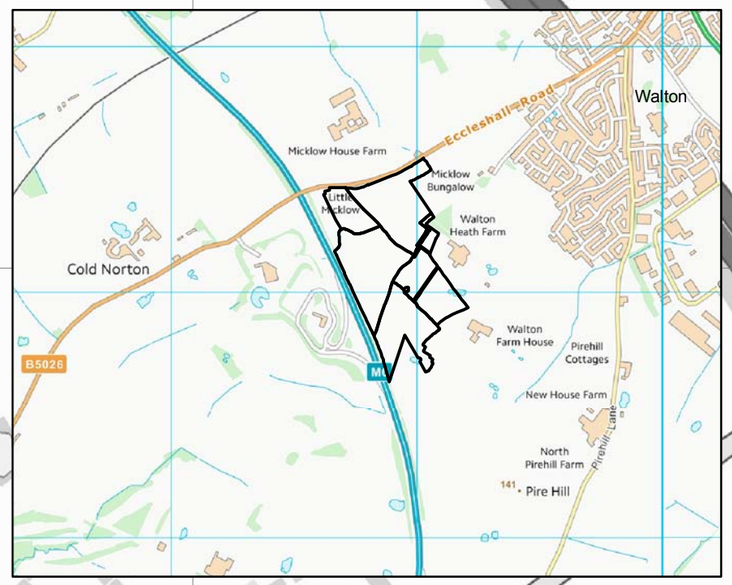
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



Micklow Bungalow

Hall

Walton Heath House

ECCLESHALL ROAD

Little Micklow

Walton Heath

Walton Heath Farm

Motel

Service Area

Clement Cottage

Walton House Farm

Pirehill Cottages

North Pirehill Farm

Cold Norton Gorse

orton

LAKESEDGE

COMMON LANE

WEDGEWOOD AVE

CRESTWOOD DRIVE

LEA ROAD

MEADOW

STUART

C (NORTH)

MARLBOROUGH ROAD

ESSEX DRIVE

FRASER CL

REDFERN ROAD

CHERRY TREE C

COOMBE PARK RO

332500

332000

331500

388000

388500

389000

389500

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 18

Map Name: CA3-2089 Site location

Community Area: 3-2089

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

388600
388700
388800
388900
389000
389100
389200
389300

332000
331900
331800
331700
331600

Walton
Farm
House

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 19

Map Name
CA3-2089 Greyscale plot

Community Area:
3-2089

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

388600
388700
388800
388900
389000
389100
389200
389300

332000
331900
331800
331700
331600

Walton
Farm
House

+25nT
-25nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 20

Map Name
CA3-2089 XY Trace

Community Area:
3-2089

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

388600
388700
388800
388900
389000
389100
389200
389300
332000
331900
331800
331700
331600
3-2089-001
3-2089-002
3-2089-003
3-2089-004
3-2089-005
3-2089-006
3-2089-007
3-2089-008
3-2089-009
Walton Farm House

Legend

- Site boundary
- Detail Survey Extents
- Archaeology
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Natural
- Ferrous
- Former Field Boundary
- Industrial, Burnt-Fired, Increased Magnetic Response

Map Number: Figure 21

Map Name: CA3-2089 Interpretation

Community Area: 3-2089

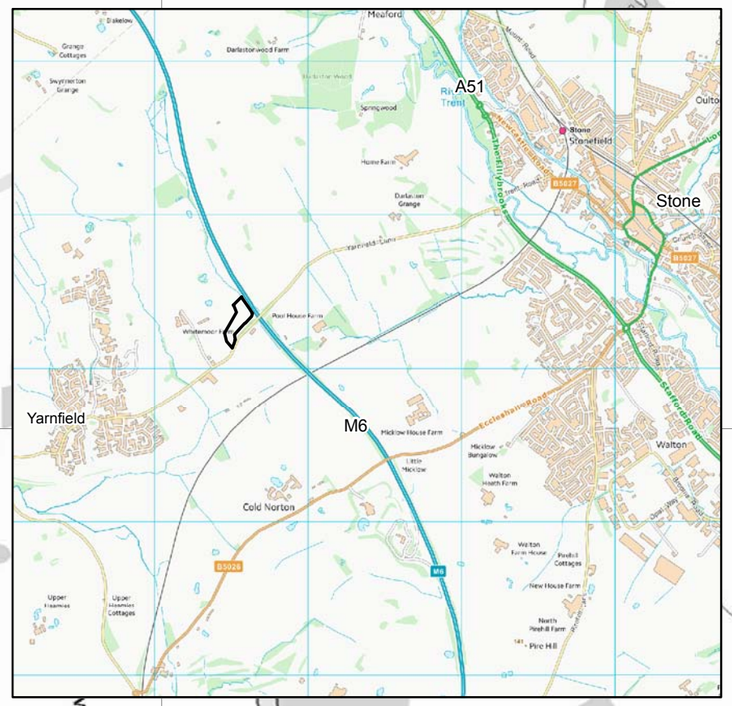
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



333500

333000

Yarnfield Park

Recn Gd

ws Lane (Track)

MOSS LANE

YARNFIELD LANE

Whitemoor Farm

Brook House

Pool House Farm

Victoria Cottage

Moss House

Moss Farm

Football Ground

Yarnfield

The Green

Sch

FORD DRIVE

HOLLY F

HIGH LOW'S LANE

MEADOW VIEW

THE PADDOCKS

PO

386500

387000

387500

388000

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 22

Map Name: CA3-2152 Site location

Community Area: 3-2152

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 23/03/17

387200
387300
387400
387500
387600
387700
387800
387900

333500
333400
333300
333200
333100

Whitemoor
Farm

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 23

Map Name
CA3-2152 Greyscale plot

Community Area:
3-2152

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

387200
387300
387400
387500
387600
387700
387800
387900

333500
333400
333300
333200
333100

Whitemoor
Farm

+25nT

-25nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 24

Map Name
CA3-2152 XY Trace

Community Area:
3-2152

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

387200
387300
387400
387500
387600
387700
387800
387900

333500
333400
333300
333200
333100

3-2152-001
3-2152-004
3-2152-002
3-2152-003

Whitemoor Farm

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Ferrous

Map Number
Figure 25

Map Name
CA3-2152 Interpretation

Community Area:
3-2152

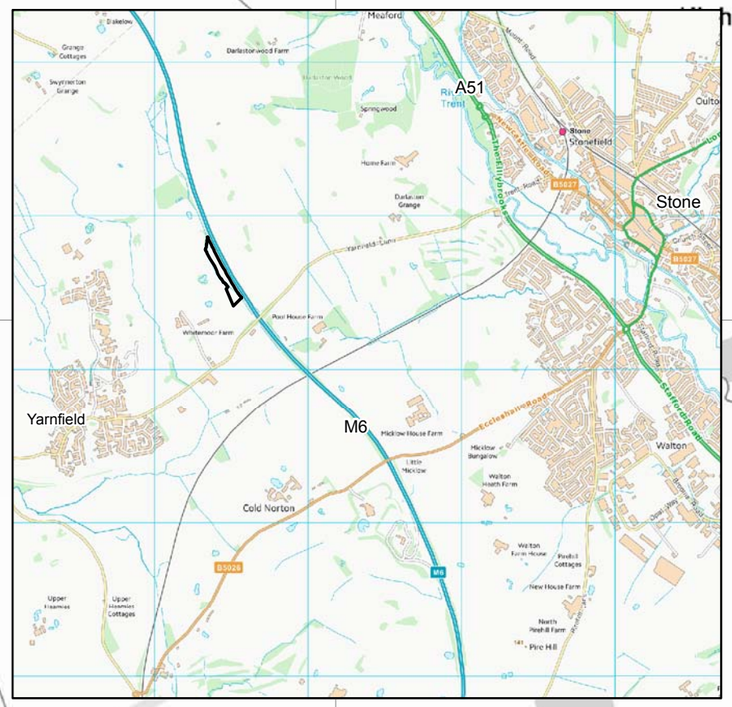
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



Fox Covert

334000

333500

LADYBOWER WAY
YARNFIELD PARKWAY
HOLLINGWORTH C
HAYEWATER
High Lows Lane (Track)
Recn Gd
Yarnfield Park
MOSS LANE
YARNFIELD LANE
Whitemoor Farm
Pool House Farm
Brook House
Victoria

386500
387000
387500
388000

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 26

Map Name: CA3-2155 Site location

Community Area: 3-2155

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

387100
387200
387300
387400
387500
387600
387700
387800

333800
333700
333600
333500
333400

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 27

Map Name
CA3-2155 Greyscale plot

Community Area:
3-2155

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

387100
387200
387300
387400
387500
387600
387700
387800

333800
333700
333600
333500
333400

+25nT

-25nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 28

Map Name

CA3-2155 XY Trace

Community Area:
3-2155

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

387100
387200
387300
387400
387500
387600
387700
387800

333800
333700
333600
333500
333400

3-2155-003
3-2155-002
3-2155-001

Legend

- Site boundary
- Detail Survey Extents
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Ferrous

Map Number
Figure 29

Map Name
CA3-2155 Interpretation

Community Area:
3-2155

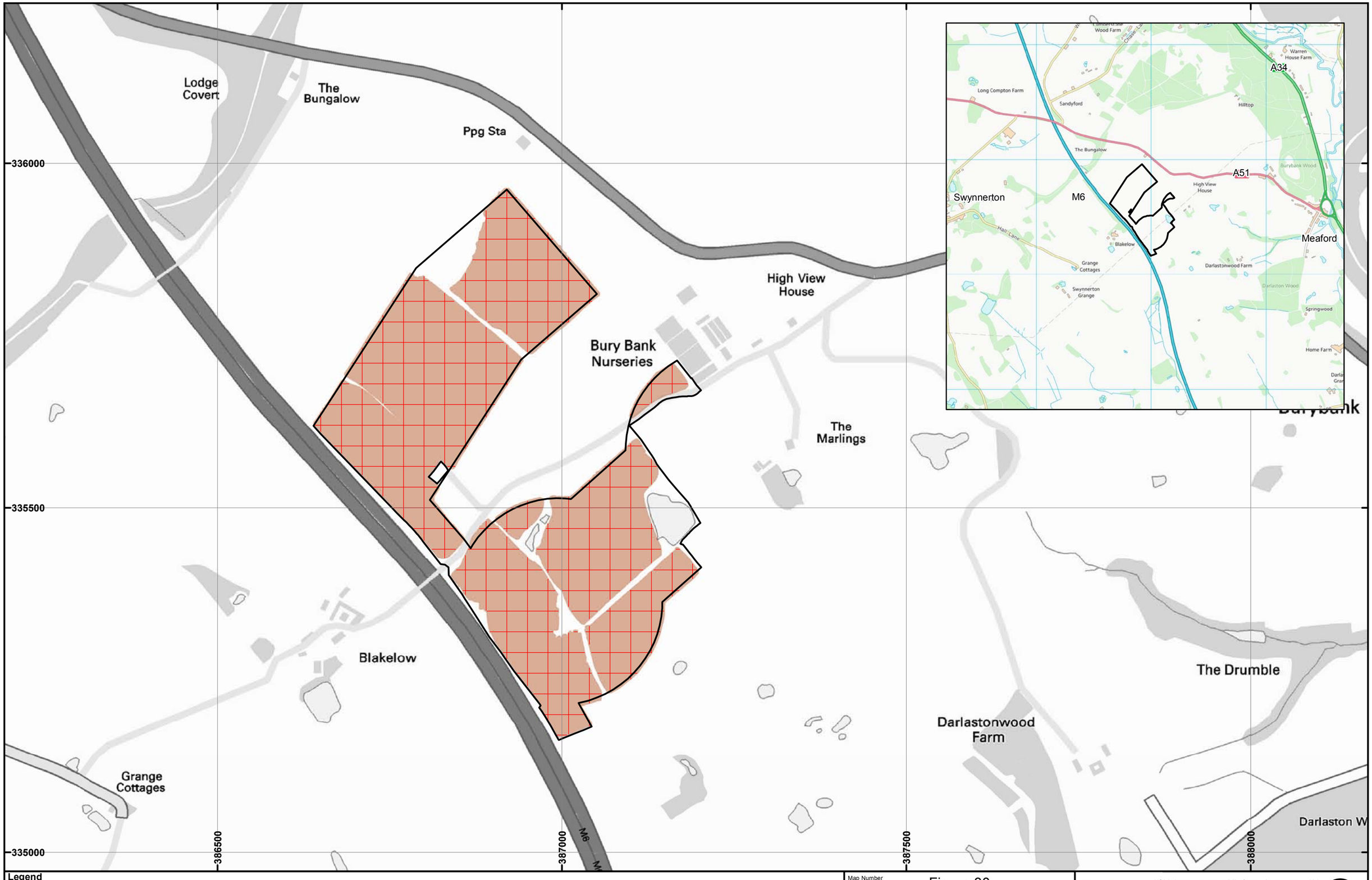
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 30

Map Name: CA3-2175 Site location

Community Area: 3-2175

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

386600 386700 386800 386900 387000 387100 387200 387300

336000 335900 335800 335700 335600

+3nT

-2nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 31

Map Name

CA3-2175 Greyscale plot (north)

Community Area:
3-2175

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

336000
386600
386700
386800
386900
387000
387100
387200
387300
335900
335800
335700
335600
3-2175-012
3-2175-003
3-2175-004
3-2175-001
3-2175-018
3-2175-013
3-2175-015
3-2175-016
3-2175-011

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 32

Map Name
CA3-2175 Interpretation (north)

Community Area:
3-2175

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

386700
386800
386900
387000
387100
387200
387300
387400
335600
335500
335400
335300
335200
Blakelow
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 33

Map Name
CA3-2175 Greyscale plot (south)

Community Area:
3-2175

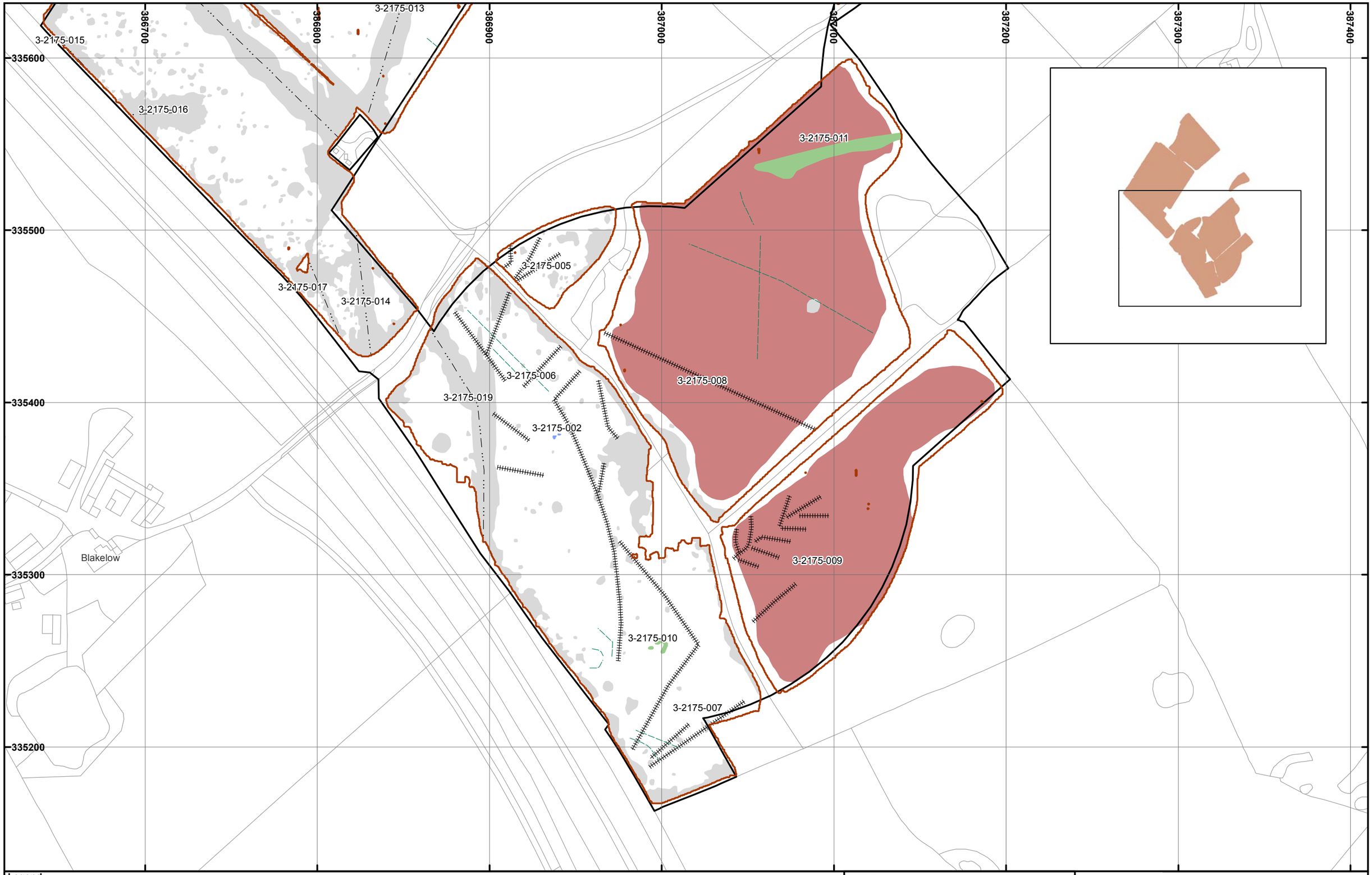
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number: Figure 34

Map Name: CA3-2175 Interpretation (south)

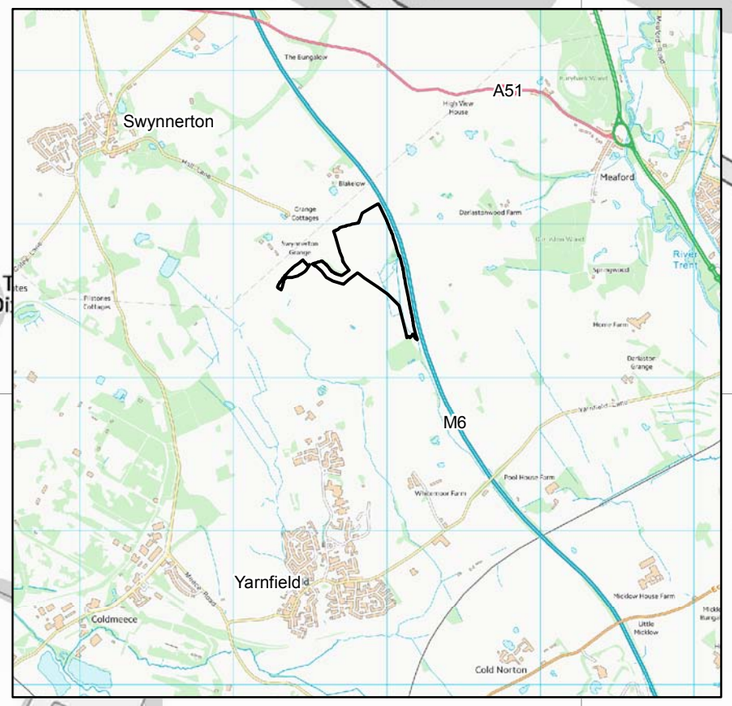
Community Area: 3-2175

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17



Blakelow

Grange Cottages

M6

335000

Swynnerton Grange

334500

The Doles

Withy Bed

Highlowbank

Fox Covert

386000

386500

387000

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 35

Map Name: CA3-2178 Site location

Community Area: 3-2178

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000002

Date: 21/04/17

386200
386300
386400
386500
386600
386700
386800
386900

334900
334800
334700
334600
334500

Swynnerton
Grange

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 36

Map Name
CA3-2178 Greyscale plot

Community Area:
3-2178

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

386200 386300 386400 386500 386600 386700 386800 386900

334900 334800 334700 334600 334500

Swynnerton Grange

+25nT

-25nT

Legend

Site boundary

Detail Survey Extents

Map Number: Figure 37

Map Name: CA3-2178 XY Trace

Community Area: 3-2178

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

386200 386300 386400 386500 386600 386700 386800 386900

334900 334800 334700 334600 334500

Swynnerton Grange

3-2178-001

3-2178-002

3-2178-003

3-2178-004

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ploughing
- Natural
- Ferrous

Map Number: Figure 38

Map Name: CA3-2178 Interpretation

Community Area: 3-2178

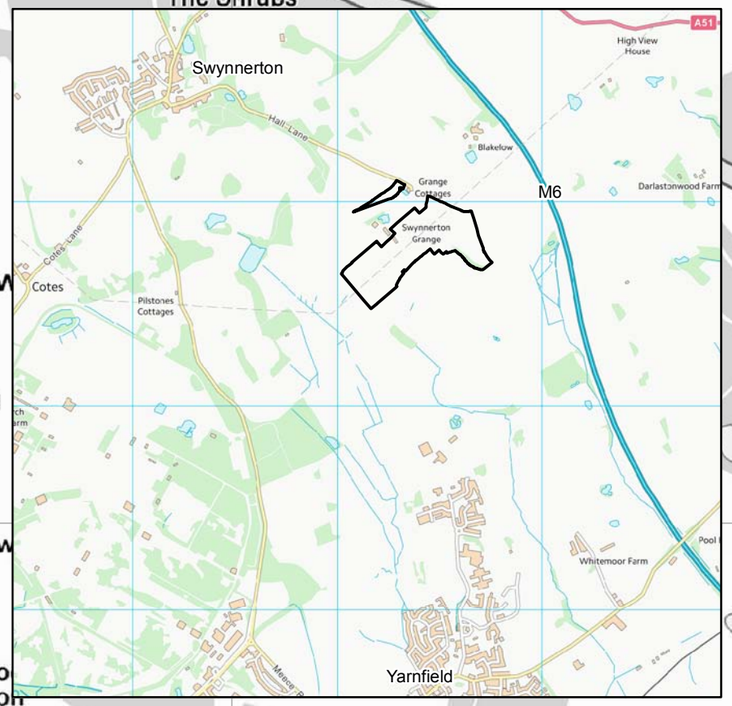
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Blakelow

Grange Cottages

M6

335000

Swynnerton Grange

334500

The Doles

Withy Bed

Highlowbank

385500

386000

386500

387000

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 39

Map Name: CA3-2192 Site location

Community Area: 3-2192

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385900
386000
386100
386200
386300
386400
386500
386600
334900
334800
334700
334600
334500
Swynnerton
Grange
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 40

Map Name
CA3-2192 Greyscale plot

Community Area:
3-2192

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000
0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385900
386000
386100
386200
386300
386400
386500
386600
334900
334800
334700
334600
334500
3-2192-005
3-2192-009
3-2192-016
3-2192-022
3-2192-018
3-2192-012
3-2192-011
3-2192-010
3-2192-007
3-2192-004
3-2192-001
3-2192-006
3-2192-021
Swynnerton Grange
3-2192-019
3-2192-013
3-2192-008
3-2192-017
3-2192-020
3-2192-002
3-2192-015
3-2192-003
3-2192-014

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Trackway
- Pipe, Modern Service
- Former Field Boundary

Map Number
Figure 41

Map Name
CA3-2192 Interpretation

Community Area:
3-2192

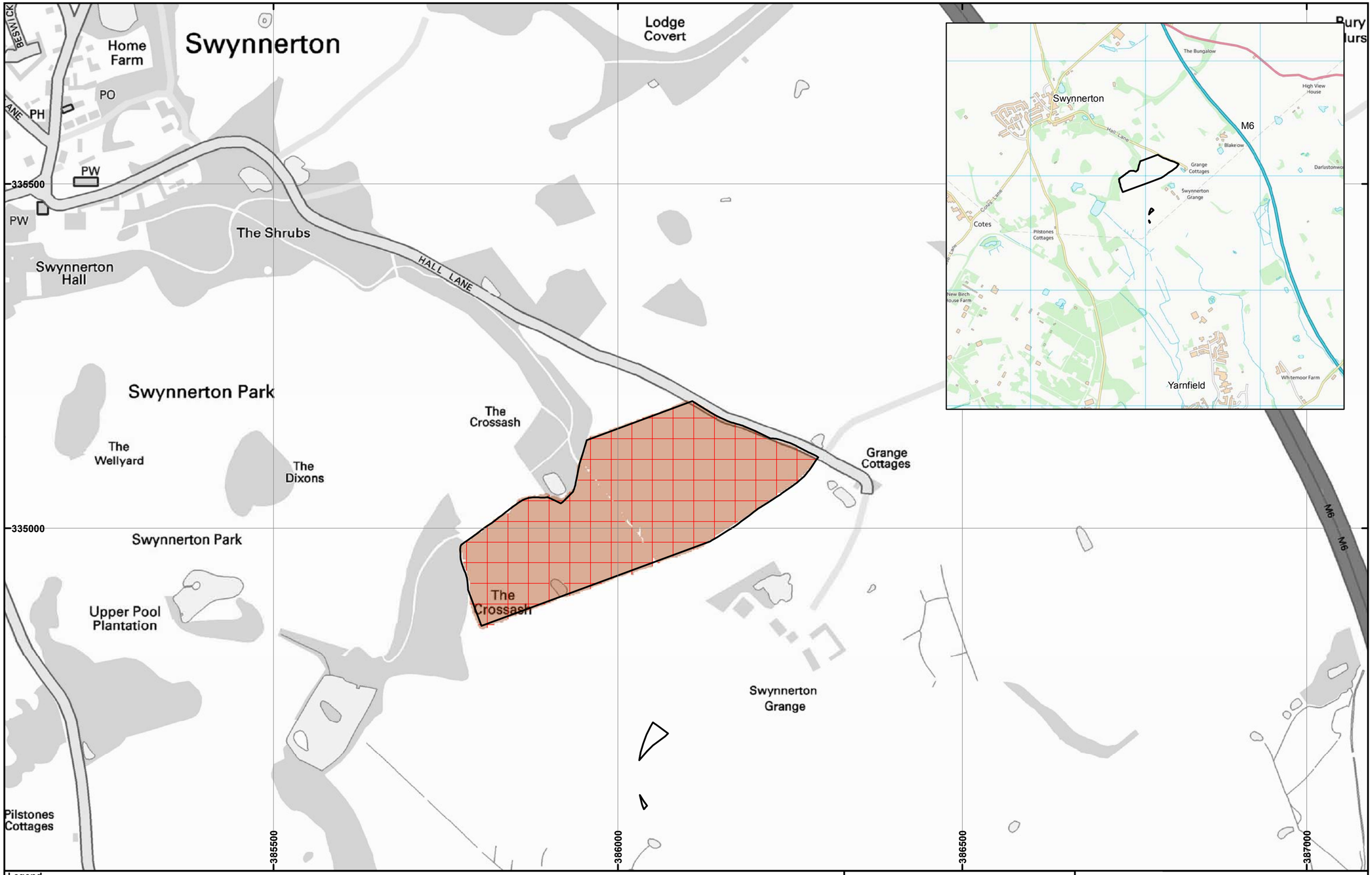
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 42

Map Name: CA3-2204 Site location

Community Area: 3-2204

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385700
385800
385900
386000
386100
386200
386300
386400

335200
335100
335000
334900
334800

Grange Cottages

Swynnerton Grange

+3nT

-2nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 43

Map Name

CA3-2204 Greyscale plot

Community Area:
3-2204

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385700
385800
385900
386000
386100
386200
386300
386400

335200
335100
335000
334900
334800

Grange Cottages

Swynnerton Grange

+25nT

-25nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 44

Map Name

CA3-2204 XY Trace

Community Area:
3-2204

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Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385700
385800
385900
386000
386100
386200
386300
386400

335200
335100
335000
334900
334800

3-2204-011
3-2204-009
3-2204-013
3-2204-012
3-2204-006
3-2204-008
3-2204-003
3-2204-007
3-2204-005
3-2204-002
3-2204-001
3-2204-010
3-2204-004

Grange Cottages

Swynnerton Grange

Legend

- Site boundary
- Detail Survey Extents
- Agriculture - Ridge & Furrow
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Natural
- Ferrous
- Pipe, Modern Service
- Former Field Boundary

Map Number
Figure 45

Map Name
CA3-2204 Interpretation

Community Area:
3-2204

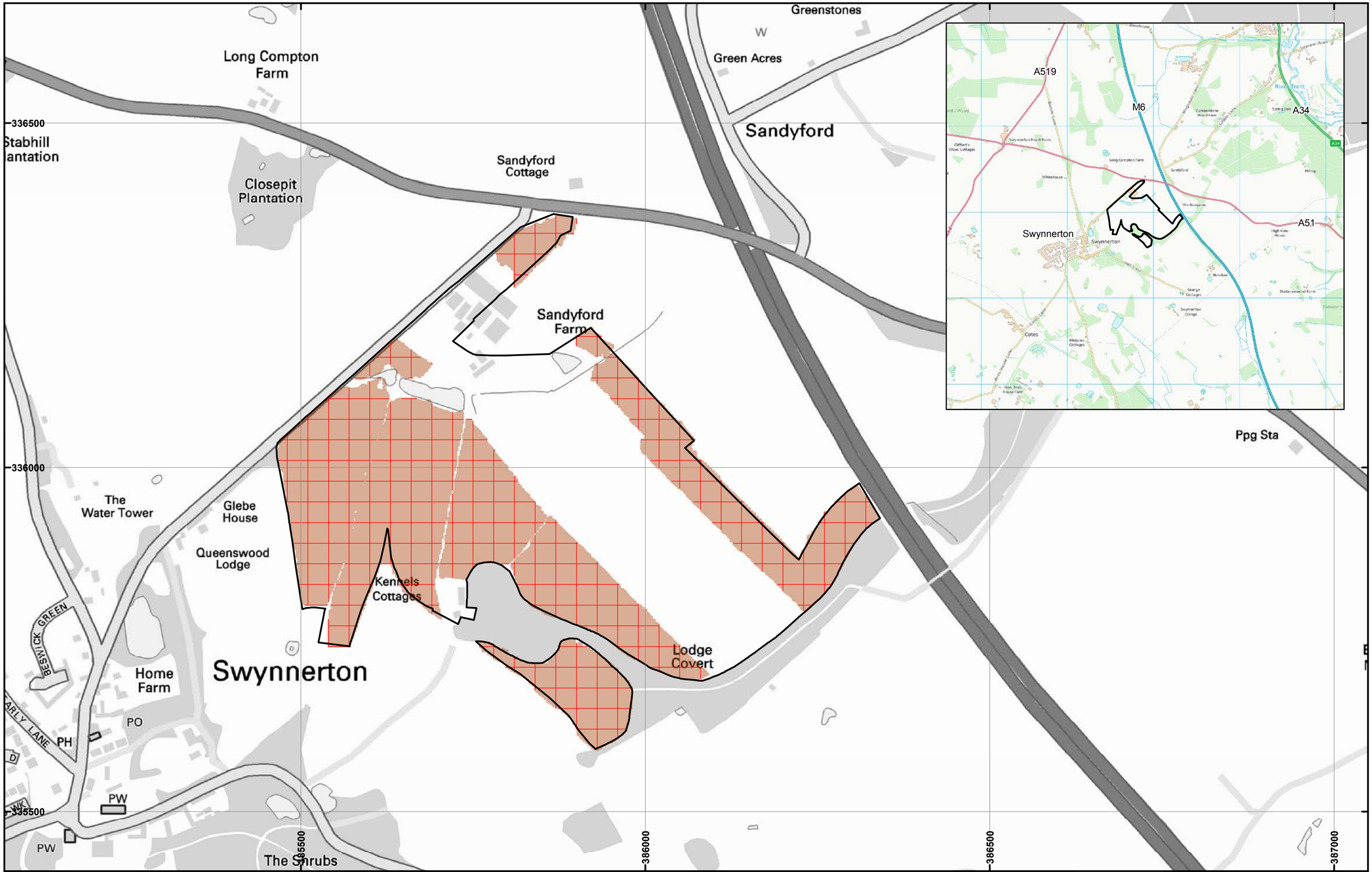
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 46

Map Name: CA3-2205 Site location

Community Area: 3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385500
385600
385700
385800
385900
386000
386100
386200

336400
336300
336200
336100
336000

+3nT
-2nT

Legend

Detail Survey Extents
Site boundary

Map Number
Figure 47

Map Name
CA3-2205 Greyscale plot (north-west)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385500
385600
385700
385800
385900
386000
386100
386200

336400
336300
336200
336100
336000

+25nT
-25nT

Legend

- Detail Survey Extents
- Site boundary

Map Number

Figure 48

Map Name

CA3-2205 XY Trace
(north-west)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385500 385600 385700 385800 385900 386000 386100 386200

336400 336300 336200 336100 336000

3-2205-024
3-2205-011
3-2205-013
3-2205-014
3-2205-010
3-2205-001
3-2205-002
3-2205-012
3-2205-022
3-2205-018
3-2205-003
3-2205-007

Legend

- Detail Survey Extents
- Site boundary
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Uncertain Origin
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 49

Map Name
CA3-2205 Interpretation (north-west)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385400
385500
385600
385700
385800
385900
386000
386100
336100
336000
335900
335800
335700

+3nT
-2nT

Legend

Detail Survey Extents
Site boundary

Map Number
Figure 50

Map Name
CA3-2205 Greyscale plot (central)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385400
385500
385600
385700
385800
385900
386000
386100
336100
336000
335900
335800
335700
+25nT
-25nT

Legend

- Detail Survey Extents
- Site boundary

Map Number: Figure 51

Map Name: CA3-2205 XY Trace (central)

Community Area: 3-2205

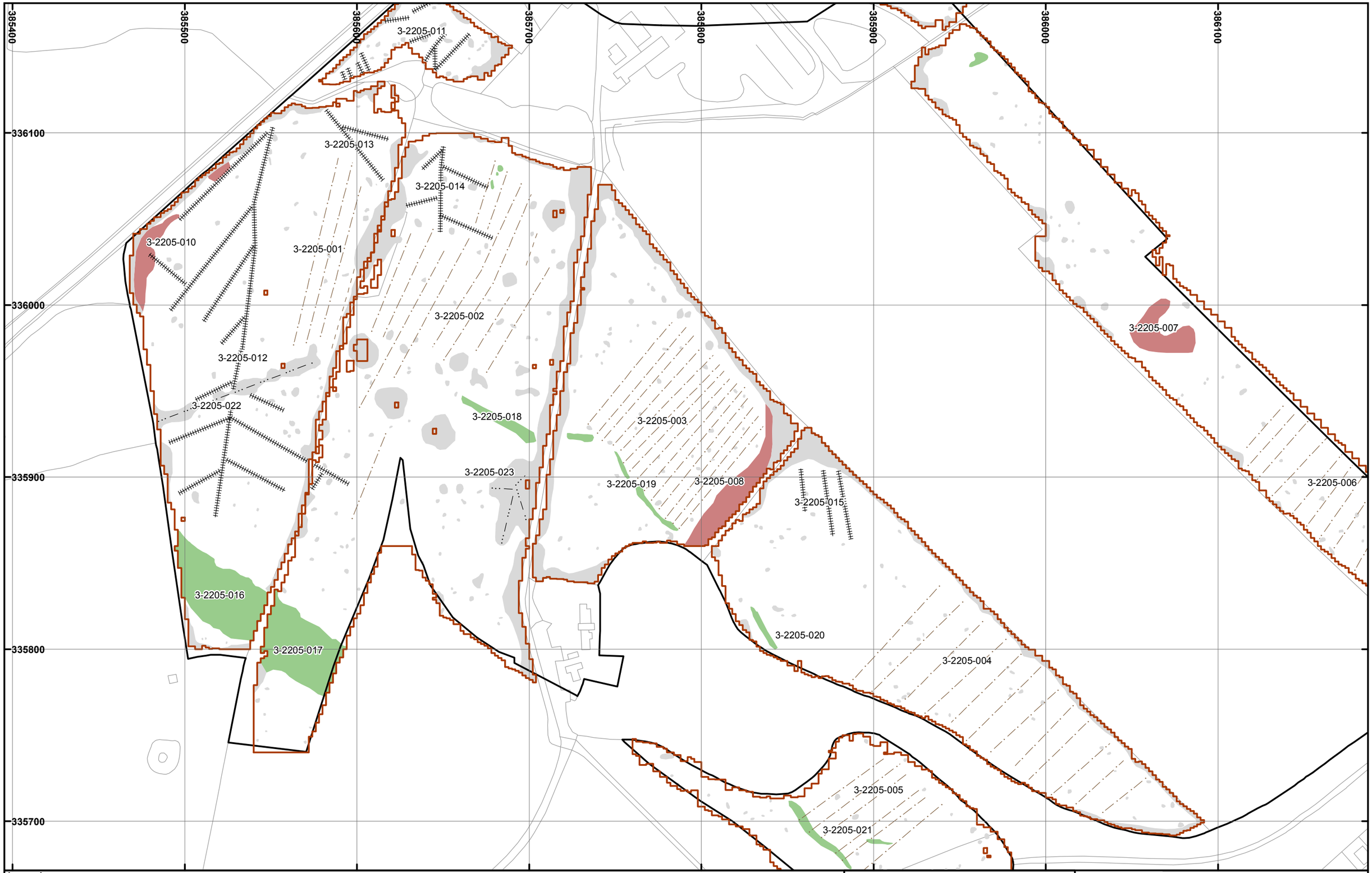
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Detail Survey Extents
- Site boundary
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Uncertain Origin
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number

Figure 52

Map Name

CA3-2205 Interpretation (central)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385600
385700
385800
385900
386000
386100
386200
386300
336000
335900
335800
335700
335600

+3nT
-2nT

Legend

Detail Survey Extents
Site boundary

Map Number
Figure 53

Map Name
CA3-2205 Greyscale plot (south-east)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385600
385700
385800
385900
386000
386100
386200
386300
336000
335900
335800
335700
335600

+25nT
-25nT

Legend

- Detail Survey Extents
- Site boundary

Map Number
Figure 54

Map Name
CA3-2205 XY Trace
(south-east)

Community Area:
3-2205

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385600
385700
385800
385900
386000
386100
386200
386300
336000
335900
335800
335700
335600
3-2205-002
3-2205-018
3-2205-023
3-2205-003
3-2205-019
3-2205-008
3-2205-015
3-2205-020
3-2205-004
3-2205-007
3-2205-006
3-2205-005
3-2205-021
3-2205-009

Legend

- Detail Survey Extents
- Site boundary
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Uncertain Origin
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 55

Map Name
CA3-2205 Interpretation (south-east)

Community Area:
3-2205

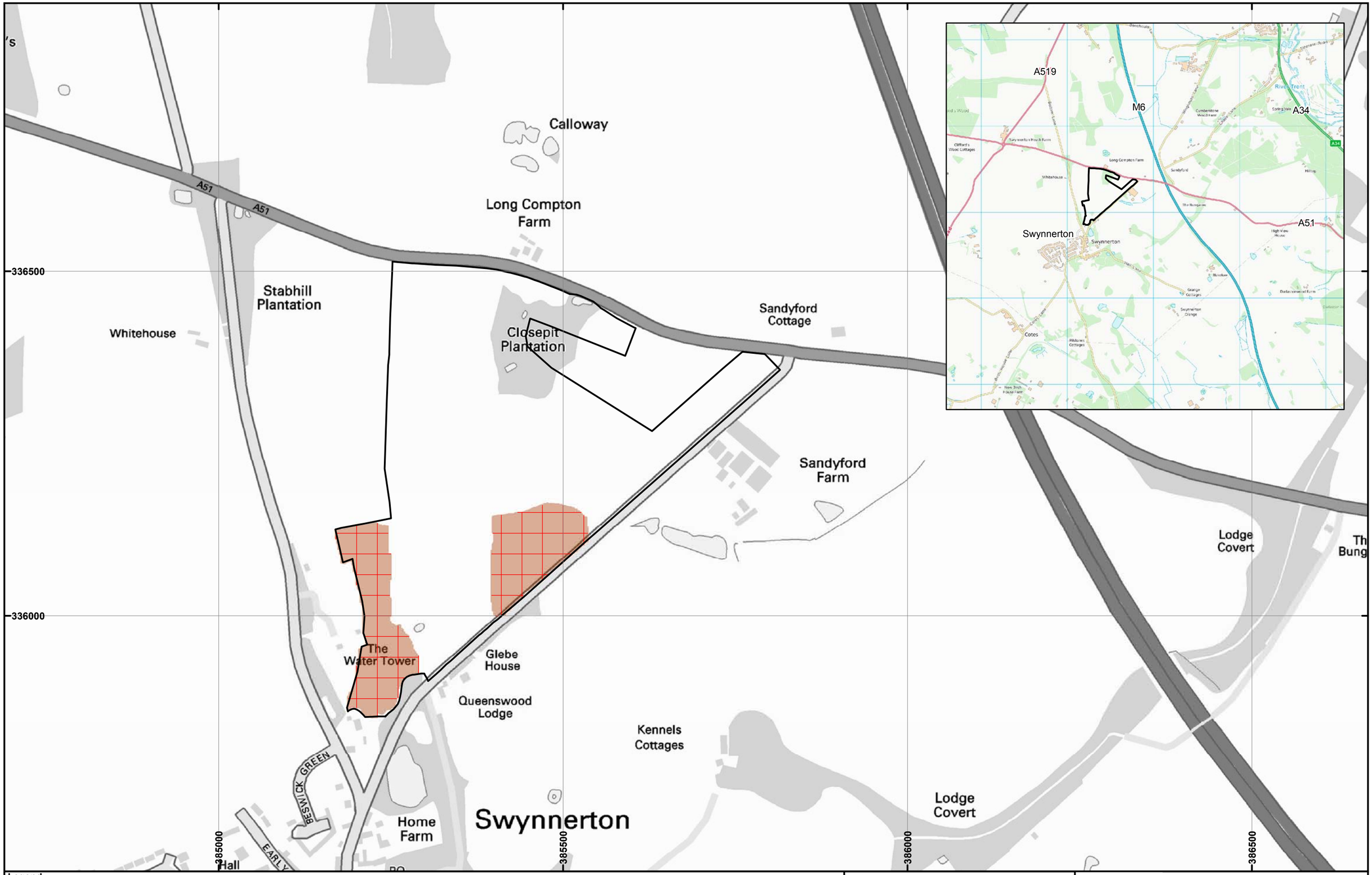
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 56

Map Name: CA3-2223 Site location

Community Area: 3-2223

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385000
385100
385200
385300
385400
385500
385600
385700

336200
336100
336000
335900
335800

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 57

Map Name
CA3-2223 Greyscale plot

Community Area:
3-2223

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385000
385100
385200
385300
385400
385500
385600
385700

336200
336100
336000
335900
335800

+25nT
-25nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 58

Map Name
CA3-2223 XY Trace

Community Area:
3-2223

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

385000
385100
385200
385300
385400
385500
385600
385700
336200
336100
336000
335900
335800
3-2223-001
3-2223-006
3-2223-005
3-2223-007
3-2223-010
3-2223-011
3-2223-003
3-2223-008
3-2223-004
3-2223-009
3-2223-002

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Agriculture - Ridge & Furrow
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 59

Map Name
CA3-2223 Interpretation

Community Area:
3-2223

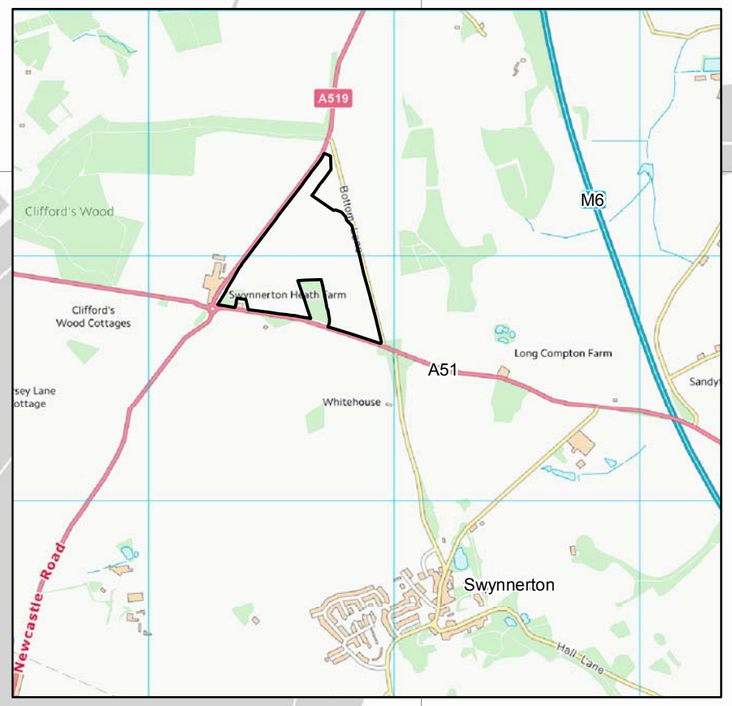
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Top Lane
Green Lane (Track)
337500
The Greathills
BOTTOM LANE
The Stretters
337000
Swynnerton Heath Farm
A519
Clifford's Wood Cottages
Cash's
A519
Eastwood
A51
A51
Calloway
Long Compton Farm
336500
384000
384500
385000
Stabhill Plantation
385500
Whitehouse
Closepit

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 60

Map Name: CA3-2284 Site location

Community Area: 3-2284

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

384500
384600
384700
384800
384900
385000
385100
385200

337000
336900
336800
336700
336600

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 61

Map Name
CA3-2284 Greyscale plot

Community Area:
3-2284

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

384500 384600 384700 384800 384900 385000 385100 385200

337000 336900 336800 336700 336600

3-2284-001
3-2284-002
3-2284-003
3-2284-004
3-2284-005
3-2284-006
3-2284-007

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Industrial, Burnt-Fired, Increased Magnetic Response
- Natural
- Ferrous

Map Number: Figure 62

Map Name: CA3-2284 Interpretation

Community Area: 3-2284

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 63

Map Name: CA3-2288 Site location

Community Area: 3-2288

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

384500
384600
384700
384800
384900
385000
385100
385200

336700
336600
336500
336400
336300

+3nT
-2nT

Whitehouse

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 64

Map Name
CA3-2288 Greyscale plot

Community Area:
3-2288

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

384500
384600
384700
384800
384900
385000
385100
385200

336700
336600
336500
336400
336300

Whitehouse

+25nT

-25nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 65

Map Name

CA3-2288 XY Trace

Community Area:
3-2288

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

384500 384600 384700 384800 384900 385000 385100 385200

336700 336600 336500 336400 336300

3-2288-004
3-2288-005
3-2288-003
3-2288-002
3-2288-006
3-2288-001
3-2288-007
3-2288-008
3-2288-009
3-2288-010
Whitehouse

Legend

- Site boundary
- Detail Survey Extents
- Uncertain Origin
- Agriculture - Ploughing
- Agriculture - Drain
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 66

Map Name
CA3-2288 Interpretation

Community Area:
3-2288

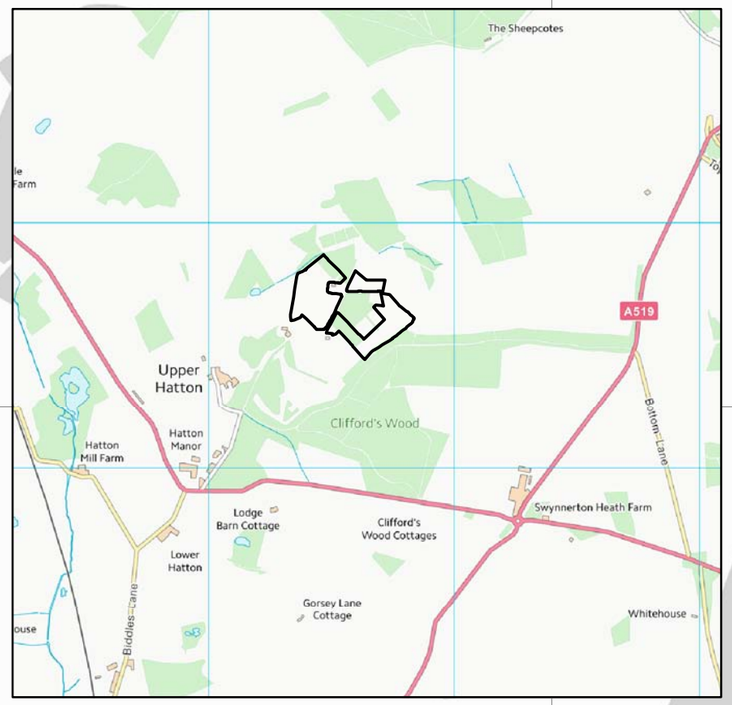
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Hatton Rough

Old Waste Plantation

New Waste Plantation

338000

337500

The Hattons

Hatton Farm

Hatton Waterworks Cottages

Clifford's Wood

383000

383500

384000

Ppg Sta

Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 67

Map Name: CA3-2310 Site location

Community Area: 3-2310

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

383100
383200
383300
383400
383500
383600
383700
383800

337900
337800
337700
337600
337500

+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 68

Map Name
CA3-2310 Greyscale plot

Community Area:
3-2310

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

383100
383200
383300
383400
383500
383600
383700
383800

337900
337800
337700
337600
337500

3-2310-004
3-2310-001
3-2310-003
3-2310-002

Legend

- Site boundary
- Detail Survey Extents
- Agriculture Ridge & Furrow
- Agriculture Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Ferrous

Map Number
Figure 69

Map Name
CA3-2310 Interpretation

Community Area:
3-2310

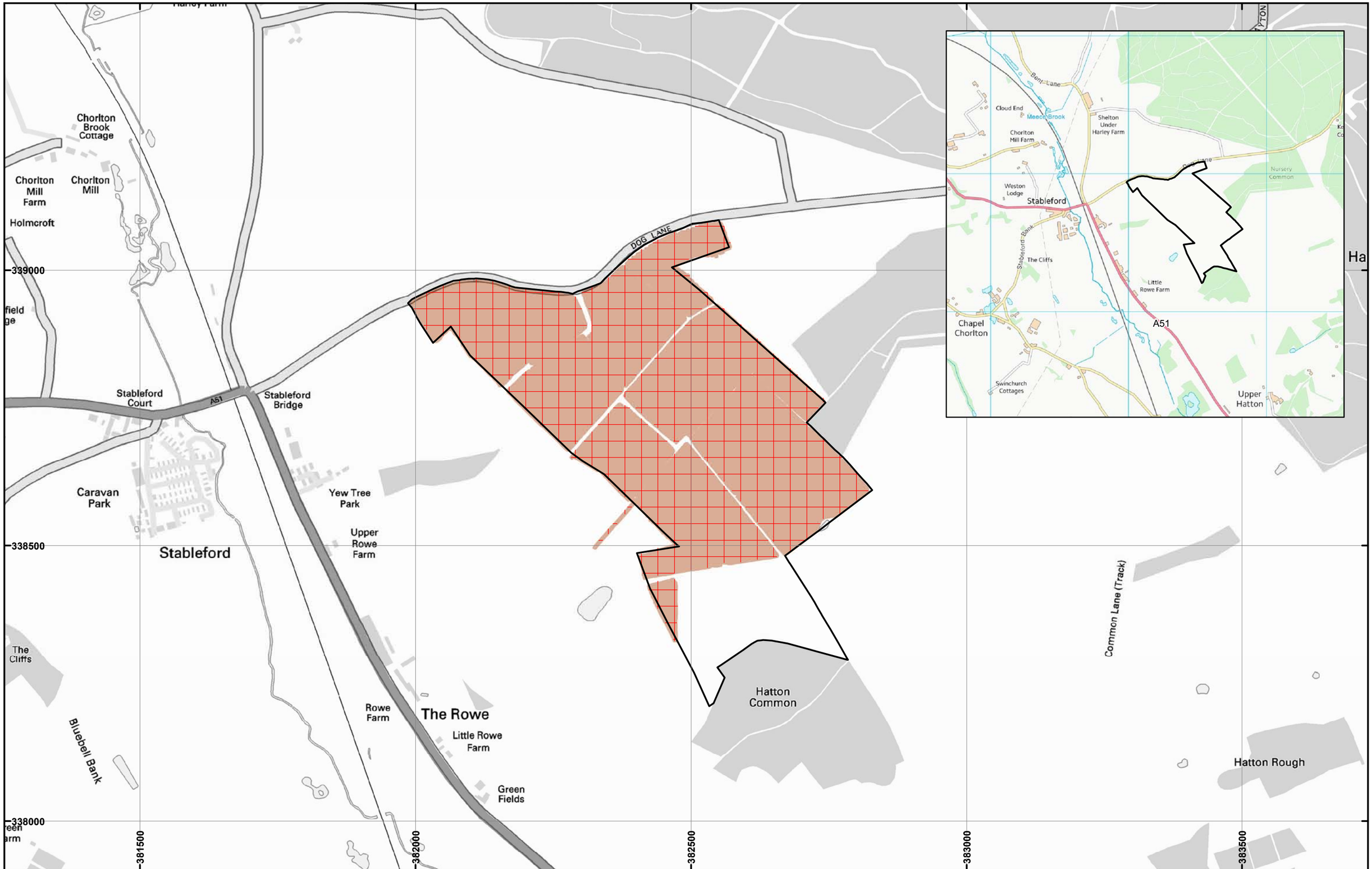
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 70

Map Name: CA3-2354 Site location

Community Area: 3-2354

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:6,250

0 60 120 180 240 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

339100
339000
338900
338800
338700
382000
382100
382200
382300
382400
382500
382600
382700
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 71

Map Name
CA3-2354 Greyscale plot (north)

Community Area:
CA3-2354

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

339100
339000
338900
338800
338700
382000
382100
382200
382300
382400
382500
382600
382700
3-2354-005
3-2354-006
3-2354-007
3-2354-012
3-2354-014
3-2354-013
3-2354-017
3-2354-009
3-2354-015
3-2354-010
3-2354-016

Legend

- Site boundary
- Detail Survey Extents
- Archaeology
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Ferrous
- Pipe, Modern Service
- Natural
- Former Field Boundary

Map Number
Figure 72

Map Name
CA3-2354 Interpretation (north)

Community Area:
CA3-2354

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:12,000

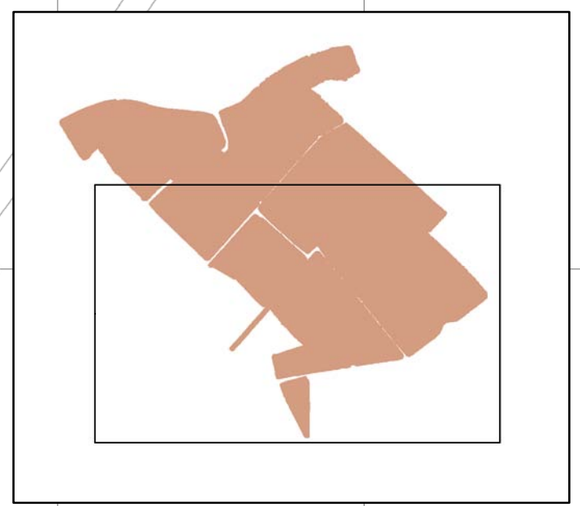
0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

382100
382200
382300
382400
382500
382600
382700
382800

338800
338700
338600
338500
338400



+3nT

-2nT

Legend

Site boundary

Detail Survey Extents

Map Number

Figure 73

Map Name

CA3-2354 Greyscale plot (south)

Community Area:
CA3-2354

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

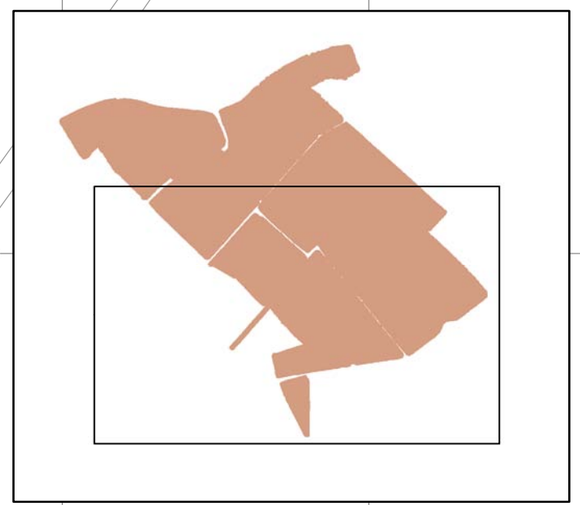
Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

382100
382200
382300
382400
382500
382600
382700
382800
338800
338700
338600
338500
338400
3-2354-012
3-2354-009
3-2354-017
3-2354-015
3-2354-013
3-2354-010
3-2354-016
3-2354-003
3-2354-004
3-2354-011
3-2354-001
3-2354-002



Legend

- Site boundary
- Detail Survey Extents
- Archaeology
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Agriculture - Drain
- Industrial, Burnt-Fired, Increased Magnetic Response
- Ferrous
- Pipe, Modern Service
- Natural
- Former Field Boundary

Map Number
Figure 74

Map Name
CA3-2354 Interpretation (south)

Community Area:
CA3-2354

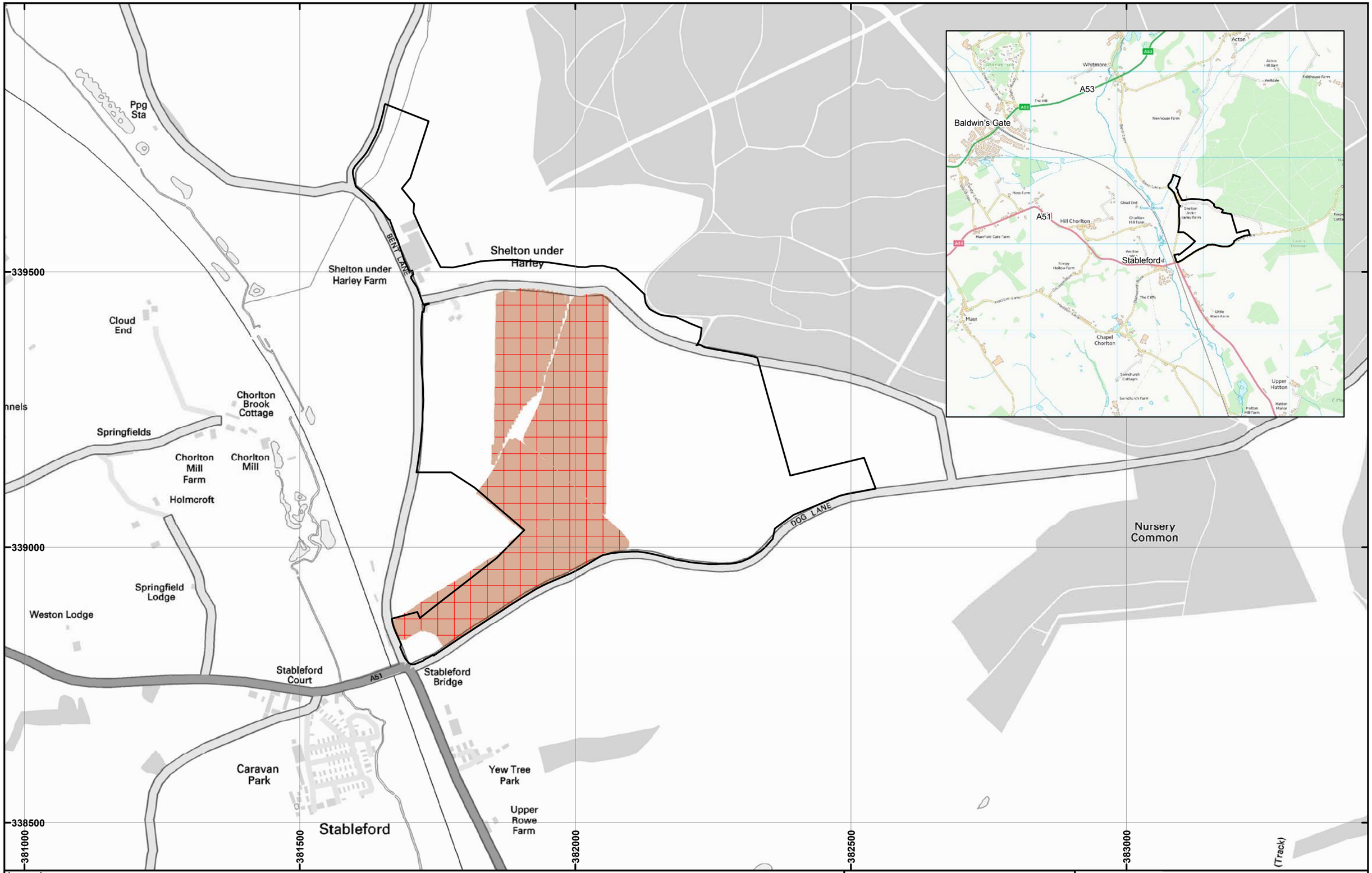
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- Site boundary
- Detail Survey Extents
- Survey grid divisions

Map Number: Figure 75

Map Name: CA3-2356 Site location

Community Area: 3-2356

HS2 Ltd accept no responsibility for any circumstances, which arise from the reproduction of this map after alteration, amendment or abbreviation or if it is issued in part or issued incomplete in any way.

Scale at A3: 1:6,250

0 60 120 180 240 Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

381600
381700
381800
381900
382000
382100
382200
382300
339500
339400
339300
339200
339100
Shelton Under Harley Farm
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 76

Map Name
CA3-2356 Greyscale plot (north)

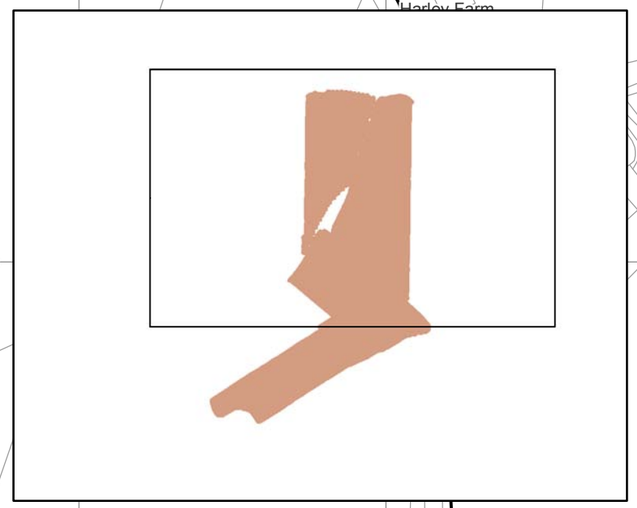
Community Area:
3-2356

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000
0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



339500
339400
339300
339200
339100
381600
381700
381800
381900
382000
382100
382200
382300
Shelton Under Harley Farm
3-2356-008
3-2356-009
3-2356-006
3-2356-007
3-2356-005
3-2356-003
3-2356-001
3-2356-002
3-2356-004

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 77

Map Name
CA3-2356 Interpretation (north)

Community Area:
3-2356

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17

381500
381600
381700
381800
381900
382000
382100
382200
339200
339100
339000
338900
338800
+3nT
-2nT

Legend

Site boundary
Detail Survey Extents

Map Number
Figure 78

Map Name
CA3-2356 Greyscale plot (south)

Community Area:
3-2356

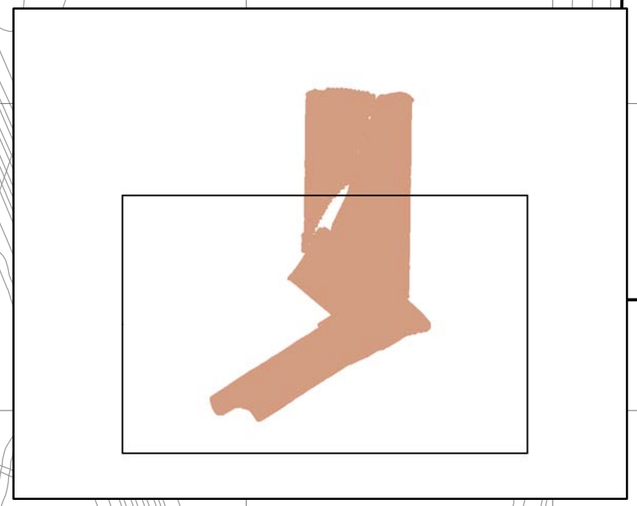
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



381500
381600
381700
381800
381900
382000
382100
382200
339200
339100
339000
338900
338800
3-2356-001
3-2356-002
3-2356-003
3-2356-004
3-2356-010

Legend

- Site boundary
- Detail Survey Extents
- Possible Archaeology
- Uncertain Origin
- Agriculture - Ridge & Furrow
- Agriculture - Ploughing
- Natural
- Ferrous
- Pipe, Modern Service

Map Number
Figure 79

Map Name
CA3-2356 Interpretation (south)

Community Area:
3-2356

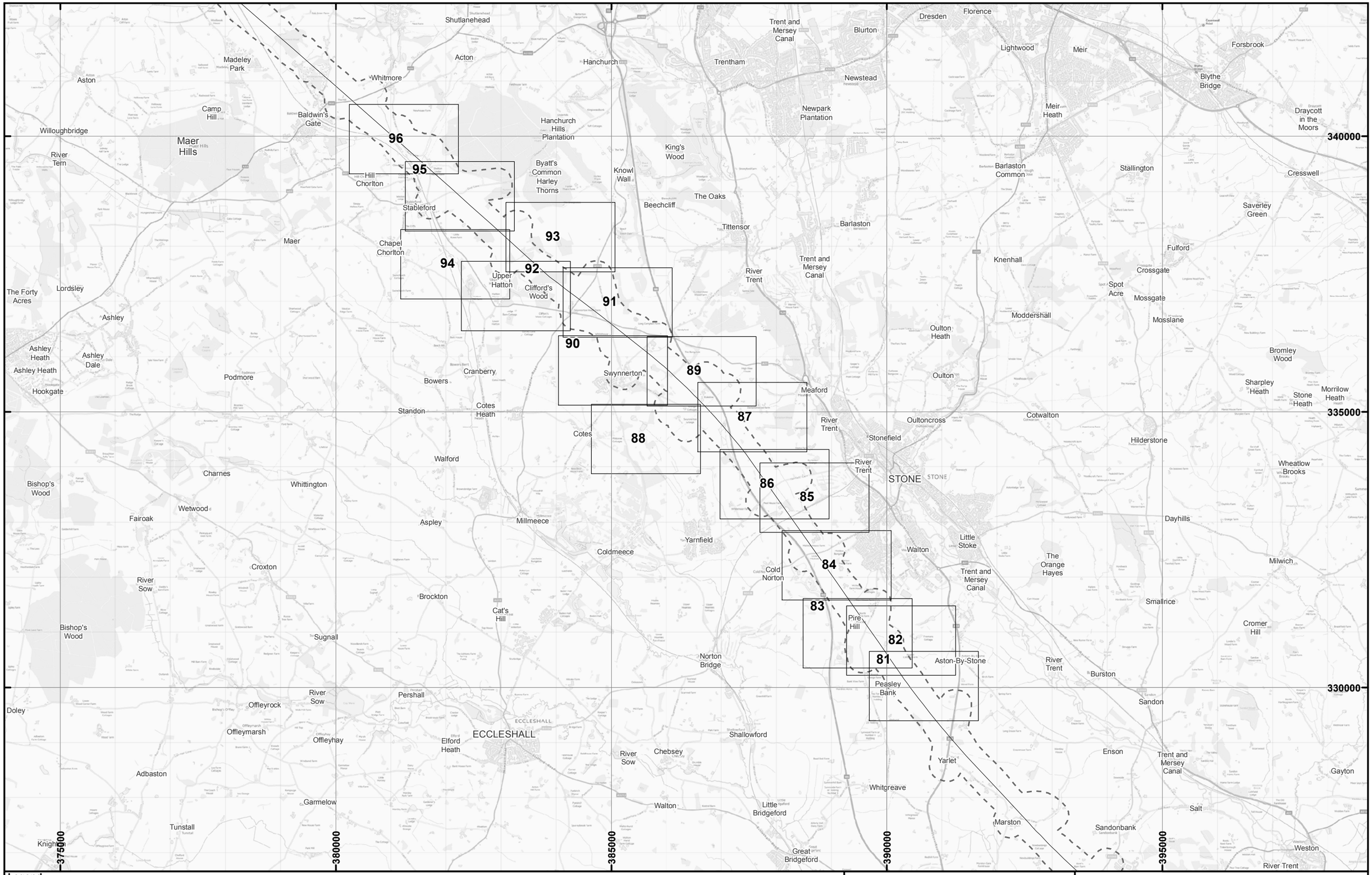
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:2,000

0 20 40 60 80
Metres

Doc Number: C861-ARP-EV-MAP-WS03-000003

Date: 21/04/17



Legend

- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line

Map Number: Figure 80

Map Name: CA3 Remote Sensing Map Index

Community Area: 3

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:62,500

0 625 1,250 1,875 2,500 Metres

Doc Number: C861-ARP-EV-MAP-WE01-000001

Date: 24/05/17

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling
42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 81

Map Name: Remote Sensing Survey Data CA3 (Map 1)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

390000
391000
331000
2278
2276
2188
2187
STS005
2277
2279
218+800
218+700
2186
2328
218+600
2044
131
2329
218+500
218+400
2327
2325
218+300
2326
218+200
2331
218+100
218+000
132
2185
217+900
217+800
217+700
2330
128
130
2324
217+600
2206
2323
217+500
129
217+400
2321

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling
42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 82

Map Name: Remote Sensing Survey Data CA3 (Map 2)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

389000

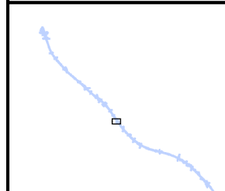
390000

331000

219+000
218+900
218+800
218+700
218+600
218+500
218+400
218+300
218+200
218+100
218+000
217+900
217+800
217+700
217+600

150
132
131
130
130

2334
2278
2276
STS005
2277
2279
2188
2187
2186
2328
2044
2329
2327
2326
2331
2325
2185
2330
2324
2206



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch

- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number

Figure 83

Map Name

Remote Sensing Survey Data
CA3 (Map 3)

Community Area:
03

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17

389000

390000

332000

2290
2291
2208
2210
2209
2212
2288
2289
2281
2280
2207
2292
2334
STS078
STS015
STS013
134
135
133
150
220+500
220+400
220+300
220+200
220+100
220+000
219+900
219+800
219+700
219+600
219+500
219+400
219+300
219+200
219+100

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling
42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number
Figure 84

Map Name
Remote Sensing Survey Data
CA3 (Map 4)

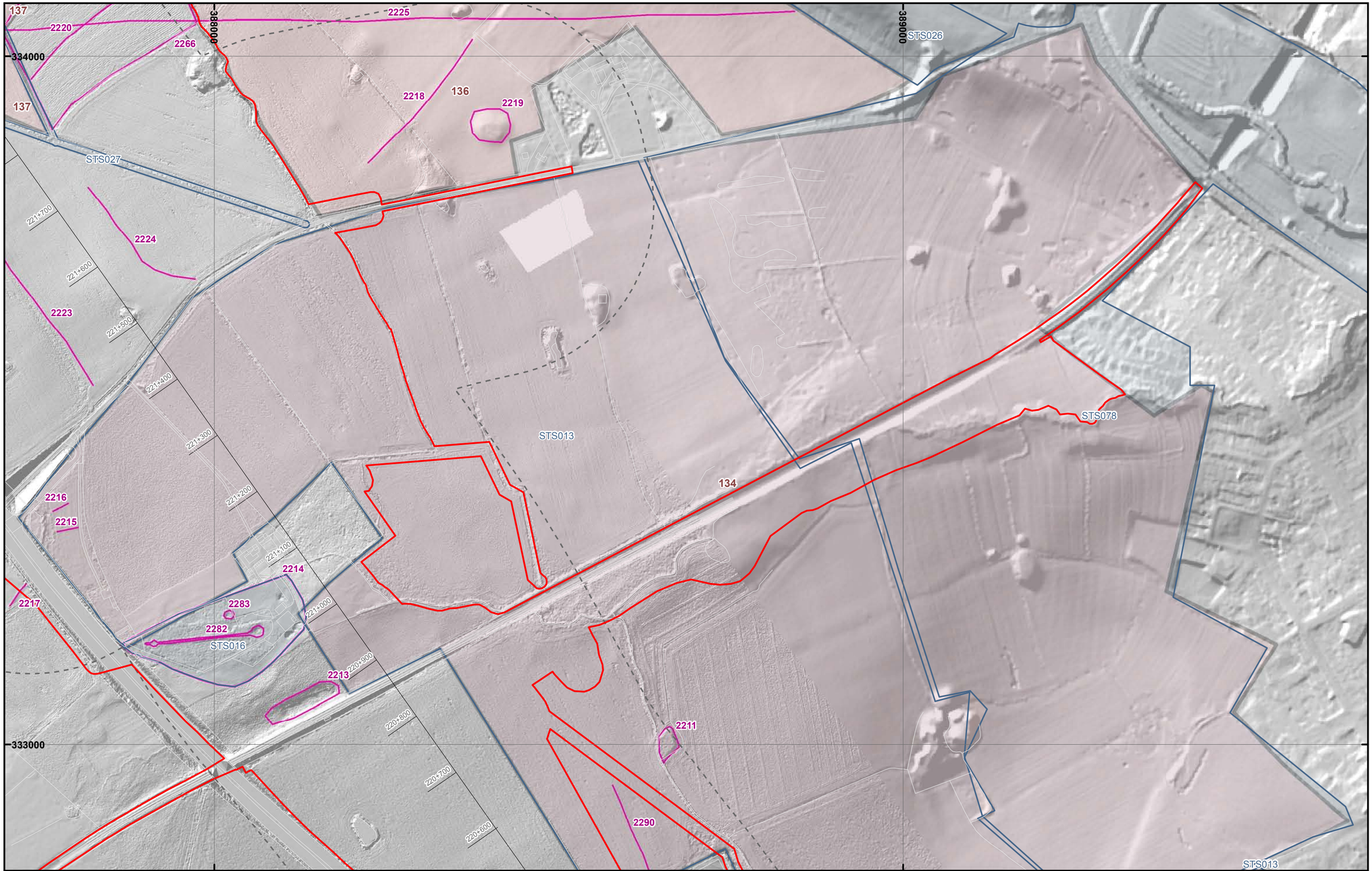
Community Area:
03

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number
Figure 85

Map Name
Remote Sensing Survey Data
CA3 (Map 5)

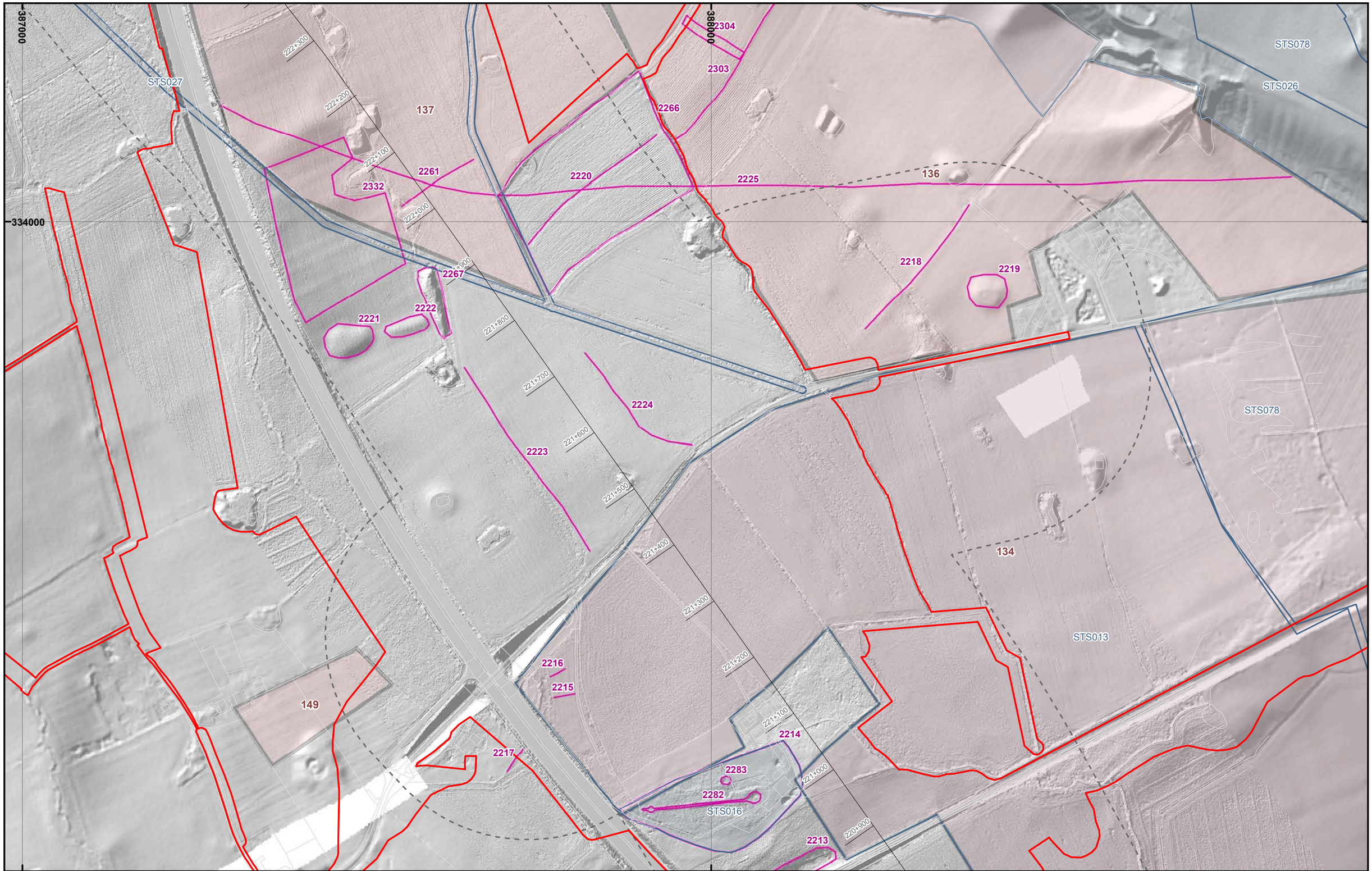
Community Area:
03

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 86

Map Name: Remote Sensing Survey Data CA3 (Map 6)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

387000

388000

335000

STS030

STS029

STS038

STS037

STS027

STS026

2262

2260

2259

2264

2263

151

2265

2257

2256

138

2255

2246

2258

2250

2249

2248

2254

2253

2247

137

2252

2251

136

2303

2304

223+500

223+400

223+300

223+200

223+100

223+000

222+900

222+800

222+700

222+600

222+500

222+400

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number

Figure 87

Map Name

Remote Sensing Survey Data
CA3 (Map 7)

Community Area:
03

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17

385000

386000

335000

334000

STS041

STS073

STS031

STS037

STS032

STS027

STS033

2243

2244

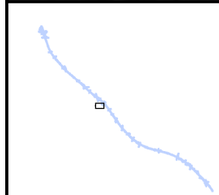
2233

2245

138

139

147



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number

Figure 88

Map Name

Remote Sensing Survey Data
CA3 (Map 8)

Community Area:
03

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17

386000

387000

336000

145

224+700

224+600

224+500

224+400

224+300

224+200

224+100

224+000

223+900

223+800

223+700

223+600

223+500

2234

2236

2235

2238

2237

2227

STS074

STS040

2229

2228

2284

2285

2230

2239

2231

2232

STS041

139

STS073

2243

STS037

2262

STS030

STS038

STS037

2259

138

2260

STS029

151

2264

2263

Legend

Land required for the Proposed Scheme

LiDAR/multi-spectral study area

HS2 Phase 2a centre line

Gazetteer entry with overlapping features

NMP

Bank

Ditch

Extent of feature

Ridge and furrow

Structure

Monument polygon

AP

Bank

Ditch

Possible feature

Structure

Monument polygon

LiDAR/multi-spectral

Polygons

Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number

Figure 89

Map Name

Remote Sensing Survey Data
CA3 (Map 9)

Community Area:
03

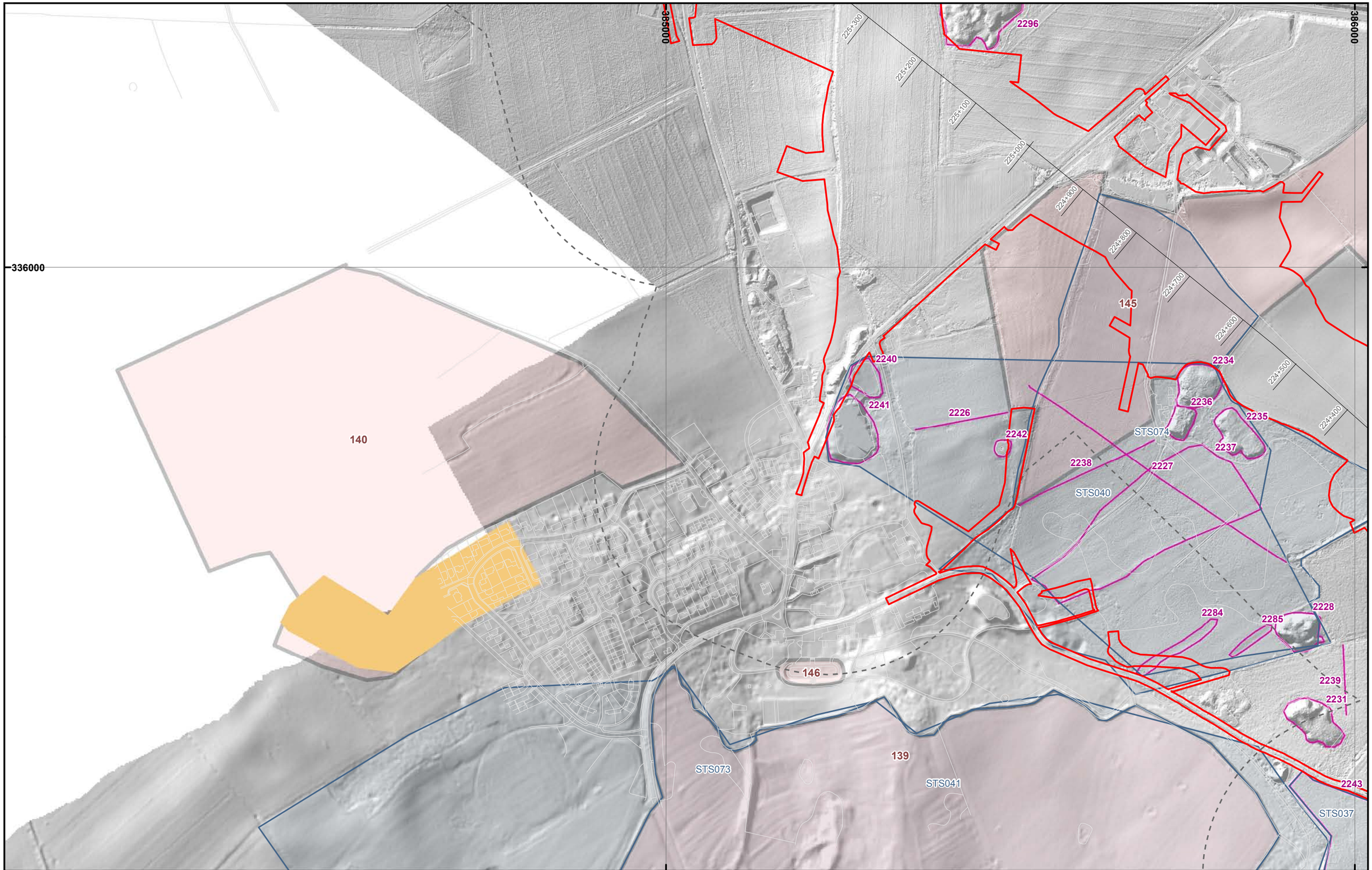
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 90

Map Name: Remote Sensing Survey Data CA3 (Map 10)

Community Area: 03

Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

385000

386000

337000

143

STS050

2299

141

STS046

142

171

2297

2298

2296

2300

STS044

226+700

226+600

226+500

226+400

226+300

226+200

226+100

226+000

225+900

225+800

225+700

225+600

225+500

225+400

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number

Figure 91

Map Name

Remote Sensing Survey Data
CA3 (Map 11)

Community Area:
03

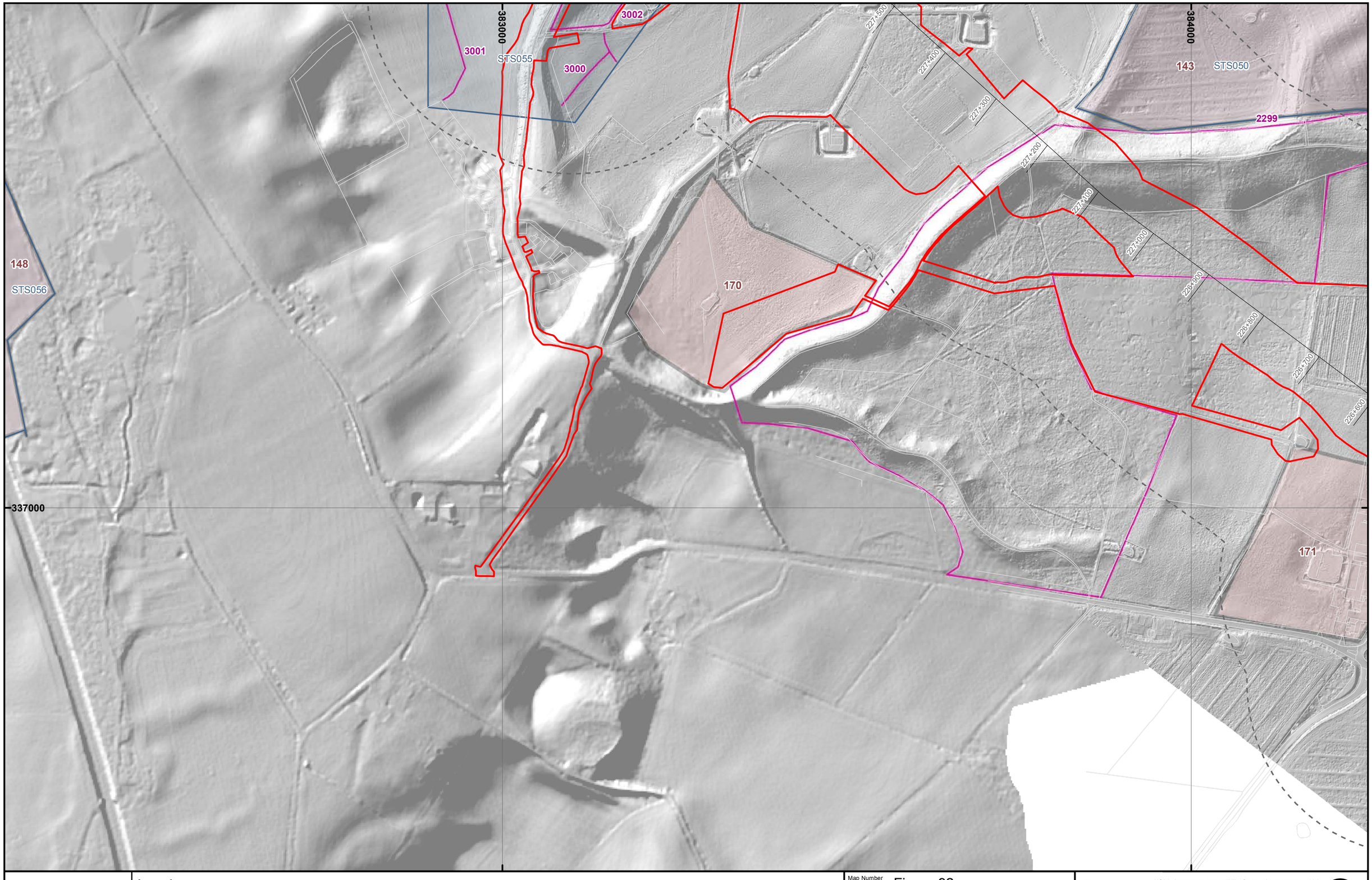
Registered in England. Registration number 06791686.
Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200
Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 92

Map Name: Remote Sensing Survey Data CA3 (Map 12)

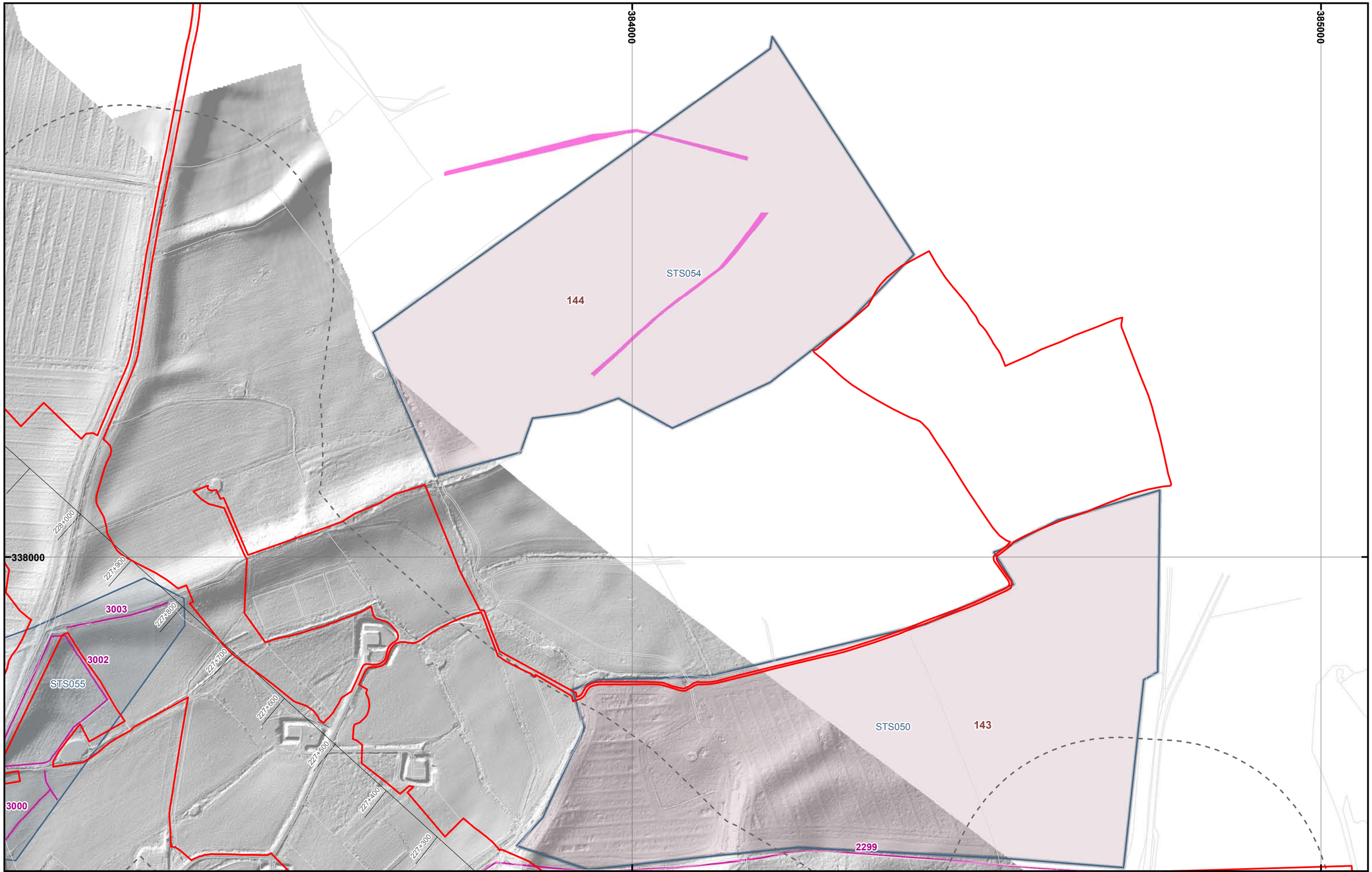
Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling
42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 93

Map Name: Remote Sensing Survey Data CA3 (Map 13)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

382000

383000

338000

148

STS056

3004

228+300

228+200

228+100

3002

STS055

3001

3000

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP

- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP

- Bank
- Ditch

- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral

- Polygons
- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number: Figure 94

Map Name: Remote Sensing Survey Data CA3 (Map 14)

Community Area: 03

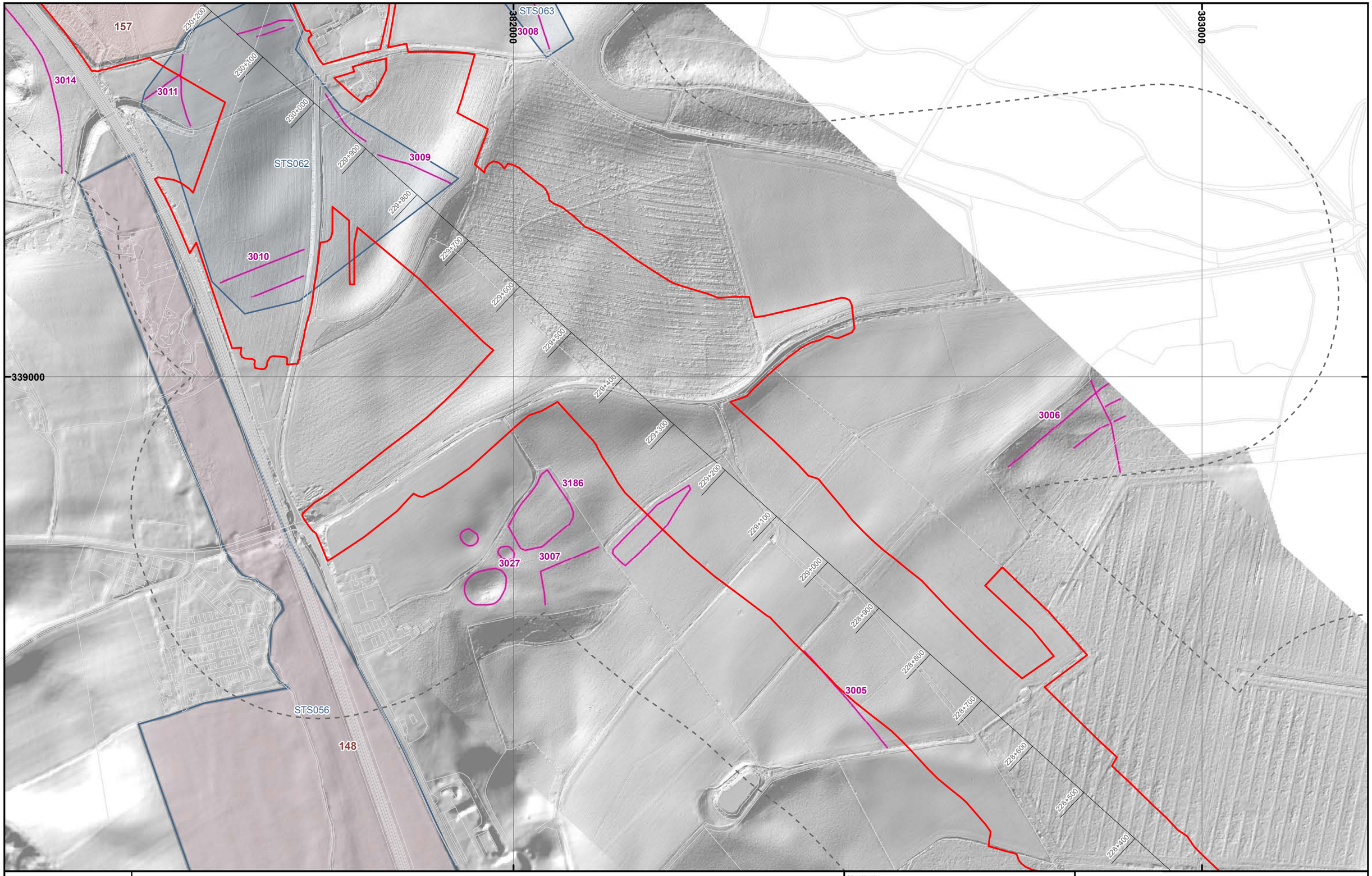
Registered in England. Registration number 06791686. Registered office: Eland House, Bressenden Place, London SW1E 5DU.

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17



Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow
- Structure
- Monument polygon

AP
- Bank
- Ditch
- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons
- Lines

Feature labelling
42 = AP/NMP
FRC001 = Gazetteer
1102 = Remote Sensing

Map Number: Figure 95

Map Name: Remote Sensing Survey Data CA3 (Map 15)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

381000

382000

340000

3023

3013

3013

3016

3012

STS063

3008

3014

3011

STS062

3009

157

STS056

231+700
231+600
231+500
231+400
231+300
231+200
231+100
231+000
230+900
230+800
230+700
230+600
230+500
230+400
230+300
230+200
230+100
230+000

Legend

- Land required for the Proposed Scheme
- LiDAR/multi-spectral study area
- HS2 Phase 2a centre line
- Gazetteer entry with overlapping features

NMP
- Bank
- Ditch
- Extent of feature
- Ridge and furrow

- Structure
- Monument polygon

AP
- Bank
- Ditch

- Possible feature
- Structure
- Monument polygon

LiDAR/multi-spectral
- Polygons

- Lines

Feature labelling

42 = AP/NMP

FRC001 = Gazetteer

1102 = Remote Sensing

Map Number: Figure 96

Map Name: Remote Sensing Survey Data CA3 (Map 16)

Community Area: 03

Scale at A3: 1:5,000

0 50 100 150 200 Metres

Doc Number:

Date: 25/05/17

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