# Eastern Villages Southern Connector Road 

 SwindonMAGNETOMETER SURVEY REPORT
for

## Swindon Borough Council

ARCHAEOLOGICAL SURVEYS LTD

# Eastern Villages Southern Connector Road Swindon 

Magnetometer Survey Report

for

## Swindon Borough Council

Fieldwork by David Sabin BSc (Hons) MCIfA
Report by Kerry Donaldson BSc (Hons)
Report checked by David Sabin
Primary archive location - Archaeological Surveys Ltd, Yatesbury, Wiltshire
Survey dates - June 2016 to May 2017
Ordnance Survey Grid Reference - SU 2007085265 to SU 1944582385


## CONTENTS

SUMMARY ..... 1
1 INTRODUCTION .....  2
1.1 Survey background ..... 2
1.2 Survey objectives and techniques ..... 2
1.3 Survey location, description and conditions ..... 2
1.4 Site history and archaeological potential ..... 4
1.5 Geology and soils ..... 6
2 METHODOLOGY .....  6
2.1 Technical synopsis ..... 6
2.2 Equipment configuration, data collection and survey detail ..... 7
2.3 Data processing and presentation. ..... 7
3 RESULTS ..... 9
3.1 General assessment of survey results ..... 9
3.2 Statement of data quality and factors influencing the interpretation of anomalies ..... 9
3.3 Data interpretation ..... 9
3.4 List of anomalies - Area 1 ..... 10
3.5 List of anomalies - Area 2 ..... 11
3.6 List of anomalies - Area 3 ..... 12
3.7 List of anomalies - Area 4 ..... 13
3.8 List of anomalies - Area 5a ..... 13
3.9 List of anomalies - Area 5b-f ..... 14
3.10 List of anomalies - Area 6 ..... 15
3.11 List of anomalies - Area 7 ..... 163.12 List of anomalies - Area 817
3.13 List of anomalies - Area 9 ..... 17
3.14 List of anomalies - Area 10 ..... 18
3.15 List of anomalies - Area 11 ..... 18
3.16 List of anomalies - Area 12 ..... 18
3.17 List of anomalies - Area 13 ..... 19
3.18 List of anomalies - Area 14 ..... 19
3.19 List of anomalies - Area 15 ..... 20
3.20 List of anomalies - Area 16 ..... 20
3.21 List of anomalies - Area 17 ..... 21
3.22 List of anomalies - Area 18 ..... 21
3.23 List of anomalies - Area 19 ..... 22
4 DISCUSSION ..... 23
5 CONCLUSION ..... 25
6 REFERENCES ..... 26
Appendix A - basic principles of magnetic survey ..... 27
Appendix B - data processing notes ..... 27
Appendix C - survey and data information. ..... 28
Appendix D - digital archive. ..... 32
Appendix E - copyright and intellectual property. ..... 33

## LIST OF FIGURES

Fig 01 Map of survey area (1:25 000)
Fig 02 Referencing information - north (1:6000)
Fig 03 Referencing information - south (1:6000)

Fig 04 Greyscale plot of minimally processed magnetometer data - Area 1 (1:1500)
Fig 05 Abstraction and interpretation of magnetic anomalies - Area 1 (1:1500)
Fig 06 Greyscale plot of minimally processed magnetometer data - Area 2 (1:1500)
Fig 07 Abstraction and interpretation of magnetic anomalies - Area 2 (1:1500)
Fig 08 Greyscale plot of minimally processed magnetometer data - Areas 3 \& 4 (1:1500)
Fig 09 Abstraction and interpretation of magnetic anomalies - Areas 3 \& 4 (1:1500)
Fig 10 Greyscale plot of minimally processed magnetometer data - Areas 5a \& 6 (1:1500)
Fig 11 Abstraction and interpretation of magnetic anomalies - Areas 5a \& 6 (1:1500)
Fig 12 Greyscale plot of minimally processed magnetometer data - Area 5 (1:1500)
Fig 13 Abstraction and interpretation of magnetic anomalies - Area 5 (1:1500)
Fig 14 Greyscale plot of minimally processed magnetometer data - Areas 7 to 10 (1:1500)
Fig 15 Abstraction and interpretation of magnetic anomalies - Areas 7 to 10 (1:1500)
Fig 16 Greyscale plot of minimally processed magnetometer data - Areas 11 to 13 (1:1500)
Fig 17 Abstraction and interpretation of magnetic anomalies - Areas 11 to 13 (1:1500)
Fig 18 Greyscale plot of minimally processed magnetometer data - Areas 14 to 17 (1:1500)
Fig 19 Abstraction and interpretation of magnetic anomalies - Areas 14 to $17 \quad$ (1:1500)
Fig 20 Greyscale plot of minimally processed magnetometer data - Areas 16 \& 17 south (1:1500)
Fig 21 Abstraction and interpretation of magnetic anomalies - Areas 16 \& 17 south (1:1500)
Fig 22 Greyscale plot of minimally processed magnetometer data - Area 17 (1:2500)
Fig 23 Abstraction and interpretation of magnetic anomalies - Area 17 (1:2500)
Fig 24 Greyscale plot of minimally processed magnetometer data - Areas 18 \& 19 (1:2500)
Fig 25 Abstraction and interpretation of magnetic anomalies - Areas 18 \& 19 (1:2500)

## LIST OF TABLES

Table 1: List of ground survey and observations within survey areas................................... 4
Table 2: Observations of material/feature of archaeological potential.................................. 5
Table 3: List and description of interpretation categories................................................... 10

## SUMMARY

Archaeological Surveys Ltd was commissioned by Swindon Borough Council to undertake a magnetometer survey of approximately 110 ha within the parishes of Wanborough and Liddington, to the south east of Swindon. The survey assesses the archaeological potential of land for the proposed development of the new Eastern Villages Southern Connector Road. Several previously unknown sites and features of archaeological potential were located along with features relating to the extension of known archaeological sites.

In the northern part of the survey corridor, around the southern end of the Roman town at Wanborough, either side of the Wanborough Road (Ermin Street), the results indicate the presence of a series of enclosures, linear ditches and pits associated with settlement features that indicate a continuation of the Roman town. The anomalies indicate a potential extension to the Roman settlement of over 300 m to the south east beyond the scheduled boundary. At least two ring ditch features were located slightly further to the south.

Further south east, immediately adjacent to Wanborough Road (Ermin Street) and 260m to the north east of Foxbridge Farm, a cluster of linear and discrete anomalies may also relate to Roman settlement. A second group of anomalies located to the north of Foxbridge Farm may also indicate remains of archaeological potential. Situated 260 m to the north west of the farm a small rectilinear enclosure was located along with other linear anomalies of archaeological potential. It is possible that these features indicate the eastern limit of an Iron Age/Roman settlement site that extends south west to the A419 as several enclosures and ring ditches were located over an area of approximately 3ha. A short distance further south, numerous anomalies of archaeological potential associated with former Wanborough Mill were located.

A series of archaeological features to the north of Great Moor Leaze Farm and north west of The Marsh were primarily located during the geophysical survey of a water pipeline route in 2015. Several possible Roman and/or prehistoric enclosures were located and the remains of a substantial Roman building. The current survey within arable land immediately to the south east of The Marsh demonstrates the continuation of enclosures associated with the building.

The results within earthworks adjacent to Pack Hill demonstrate the presence of an internal zone of magnetic debris which is likely to relate to dumping/ground consolidation, with other zones of magnetic debris and possible former fluvial features to the north.

Most survey areas produced linear and discrete anomalies of uncertain origin and frequently anomalies of agricultural origin including zones of ridge and furrow cultivation. Numerous palaeochannels in the vicinity of the Liden Brook are also visible within the data and although of uncertain date, may be a resource for paleoenvironmental remains.

## 1 INTRODUCTION

### 1.1 Survey background

1.1.1 Archaeological Surveys Ltd was commissioned by Swindon Borough Council to undertake a magnetometer survey of a large area of land within the parishes of Wanborough and Liddington, Swindon. The survey assesses the archaeological potential of land outlined for the proposed development of the new Eastern Villages Southern Connector Road.
1.1.2 The geophysical survey has been carried out with reference to the terms of a written specification provided during the tendering process. The specification has been submitted to the client and provides a framework against which the results of the survey can be measured.
1.1.3 The northern part of the survey area lies immediately adjacent to the scheduled Roman Town West of Wanborough House (List Entry No: 1004684/ AM 888), understood to be Durocornovium. The archaeological potential of land surrounding the Roman town and outside the scheduled area is considered high.

### 1.2 Survey objectives and techniques

1.2.1 The objective of the survey was to use magnetometry to locate geophysical anomalies that may be archaeological in origin so that they may be assessed prior to development of the site. The methodology is considered an efficient and effective approach to archaeological prospection.
1.2.2 The survey and report generally follow the recommendations set out by: English Heritage (2008) Geophysical survey in archaeological field evaluation; European Archaeological Council (2015) Guidelines for the Use of Geophysics in Archaeology; Institute for Archaeologists (2002) The use of Geophysical Techniques in Archaeological Evaluations. The work has been carried out to the Chartered Institute for Archaeologists (2014) Standard and Guidance for Archaeological Geophysical Survey.

### 1.3 Survey location, description and conditions

1.3.1 The surveyed land is located within the north western part of the parish of Wanborough and the far north western end of the parish of Liddington, Swindon. The northern limit includes land to the south of Lotmead Farm, Wanborough, with a wide zone of survey extending south to land east of the Commonhead Roundabout on the A419 and north west of Glebe Farm, Liddington. The survey covers approximately 110ha in total, see Figs 01 and 02. The route of the Southern Connector Road had not been finalised at the time of survey.
1.3.2 The geophysical survey was carried out in 54 separate land parcels; however, some of these were small subdivisions of larger fields, and the survey areas have been simplified by numbering from Area 1 in the north to Area 19 in the south based on land ownership plots. Table 1 lists each area and any subdivision with an Ordnance Survey National Grid Reference (OS NGR), ground cover and additional notes or
observations. A small number of datasets were combined into a single area or subdivision resulting in a list of 51 .

| Area | Central OS NGR |  | Ground cover | Notes/observations |
| :---: | :---: | :---: | :---: | :---: |
| 1 | 419970 | 185045 | Stubble. | Dark soil and Roman pottery visible towards south western end of field. |
| 2 a \& 2 b | 420050 | 184775 | Long grass. | Areas separated by water pipeline under construction. Pipeline route subject to previous survey. |
| 3 a | 419778 | 184832 | Roughly ploughed soil, very dry. | Very dark soil and many sherds of Roman pottery etc. along north eastern side. Survey abandoned due to rough ground. |
| $\begin{gathered} 3 \mathrm{~b}, 3 \mathrm{c} \& \\ 3 \mathrm{~d} \end{gathered}$ | 419691 | 184576 | Stubble. | Areas separated by water pipeline under construction. Pipeline route subject to previous survey. |
| 4 a | 419883 | 184571 | Grass. | Area used as horse paddocks and separated by water pipeline under construction. Pipeline route subject to previous survey. |
| 4b | 420013 | 184562 | Grass. |  |
| 5a | 419751 | 184337 | Grass. |  |
| 5b | 419973 | 184291 | Grass. |  |
| 5c | 420032 | 184175 | Grass. | Undulating ground. |
| 5d | 420045 | 184402 | Grass. |  |
| 6a | 419846 | 184185 | Long grass. | Land slopes down to the south. |
| 6 b | 419647 | 184109 | Long grass. | Pipeline along western side under construction - route previously surveyed. |
| 7a | 419726 | 184043 | Long grass. | Land slopes down to the south. |
| 7b | 419770 | 183954 | Grass. |  |
| 8 | 419653 | 183953 | Long grass. | Pipeline along western side under construction - route previously surveyed. Small area west of pipeline unsurveyable due to tall and rough ground cover. |
| 9 | 419953 | 183753 | Tall and rough vegetation. | Unsurveyable due to tall and rough vegetation. |
| 10 | 419768 | 183867 | Grass. | Some undulations and worked sarsen slabs. |
| 11a \& 11b | 419727 | 183710 | Grass. | Substantial volume of $19^{\text {th }} / 20^{\text {th }} \mathrm{C}$ dumping to north of 11 a . |
| 12 | 419765 | 183625 | Grass. |  |
| $\begin{gathered} \text { 13a \& } \\ \text { 13b } \end{gathered}$ | 419658 | 183578 | Grass. | Parts of both areas include a water pipeline previously surveyed. |
| 14a | 419526 | 183469 | Long grass. |  |
| $\begin{gathered} 14 \mathrm{~b}, \\ 14 \mathrm{c}, 14 \mathrm{~d}, \\ 14 \mathrm{e} \& 14 \mathrm{f} \end{gathered}$ | 419685 | 183418 | Grass. | Areas 14 b and 14 e crossed by previously surveyed water pipeline under construction. |
| 15 | 419493 | 183346 | Long grass. | Field to the east of Area 15 surveyed previously. Initial pipeline survey located archaeological features and survey extended to cover land bounded by March Lane to the east. Red coloured soil noted. |
| $\begin{gathered} 16 a, 16 b \\ \& 16 e \end{gathered}$ | 419636 | 183186 | Grass. | Fields immediately east of A419. |
| $\begin{gathered} 16 c \& \\ 16 d \end{gathered}$ | 419626 | 183014 | Grass. | Areas separated by previously surveyed water pipeline. The previous survey was extended across the full width of the northern half of the field due to the location of archaeological anomalies. |
| 17 a \& | 419814 | 183070 | Stubble. | Initial survey of Area 17a was extended due to changes in the position |


| 17b |  |  | of the proposed road. Additional survey labelled Area 17b. Areas not <br> combined due to large datasets. South west corner of Area 17b <br> contained water pipeline under construction but previously surveyed. |
| :---: | :---: | :--- | :--- |
| 17c | 420032 | 182954 | Short arable <br> crop. |

Table 1: List of ground survey and observations within survey areas
1.3.3 The ground conditions across the site were generally considered to be favourable for the collection of magnetometry data. However, roughly ploughed ground within Area 3a prevented survey across the whole field and work was abandoned once dark soil associated with the adjacent Roman town had been covered. In addition, survey was not possible in the western part of Area 8 and within two fields to the south of this (allocated Area 9) due to tall and dense vegetation. Several other land parcels contained trees and were therefore unsurveyable. Weather conditions during the survey were variable, but unlikely to have influenced the results.

### 1.4 Site history and archaeological potential

1.4.1 The northern part of the survey lies immediately south of the scheduled monument of the Roman Town West of Wanborough House (List Entry No: 1004684/ AM 888), understood to be Durocornovium. Previous surveys have been carried out within the scheduled area indicating that a Roman roadside settlement extends along the line of Ermin Street with a continuation further to the south east, well beyond the boundary of the current designation (GSB, 2004; ASUD, 2006; Archaeological Surveys, 2015).
1.4.2 Archaeological works ahead of the Swindon to Wanborough gas pipeline, which crosses the central part of the site, included a geophysical survey which located a number of possible linear ditches and pits (Stratascan, 2002), although no significant remains were identified during recording (Cotswold Archaeology, 2003). Geophysical survey along the line of a new water pipeline recorded a number of linear and possible curvilinear anomalies within this area; however, their archaeological potential was not clear due to the limited extent of the survey corridor and the presence of
magnetic disturbance from existing pipes (Archaeological Surveys, 2015).
1.4.3 Further to the south is the site of Wanborough Mill first recorded in Domesday and later during the $13^{\text {th }}$ and $14^{\text {th }}$ centuries (Dunning et al, 1970). The last miller is recorded in 1876, and it is recorded as a corn mill on the 1884 First Edition Ordnance Survey map. Subsequent mapping indicates that it was mostly demolished by 1922, where only an outbuilding remains. During the course of the survey, low earthworks were noted along with two worked sarsen slabs.
1.4.4 On land to the east of The Marsh are the remains of an Iron Age and Roman site at Great Moor Leaze, located during construction of an existing water pipeline in 1988, where an occupation layer and building material were revealed. Geophysical survey carried out over the line of a new pipeline located a number of enclosures and ring ditches and also structural remains were revealed upon wider survey surrounding the archaeological features (Archaeological Surveys, 2015). Observations during the survey indicate the presence off a reddish-brown, sandy soil that is unmapped and does not relate to the underlying clay geology. The material is likely to be a localised Pleistocene deposit that may have been attractive for early settlement.
1.4.5 At the southern end of the road scheme, close to the Commonhead Roundabout, is the location of earthworks which were subject to a topographic survey in 2002 (Hedge et al, 2002). They are generally oval in plan, bivallate on the eastern side and univallate on the west bordering a stream that meets the Liden Brook immediately to the north of the earthworks. The origin of the site is uncertain and may be archaeologically significant.
1.4.6 The majority of the survey areas were unsuitable for the observation of cultural material due to the majority having grass cover. However, soil was visible on some of the arable fields and some surface features were noted on grassland. Table 2 sets out a summary of these observations and can be cross referenced to Table 1.

| Area | Material/feature of archaeological potential |
| :---: | :--- |
| 1 | Dark soil and Roman pottery sherds with stone fragments close to the south western end of the <br> surveyed area. The dark soil is similar to that observed on other parts of the adjacent Roman <br> town. The surface was not clear due to stubble cover. |
| 3a | Well defined zone of dark soil extending approximately 80m south west of Ermin Street. Recent <br> cultivation had revealed numerous Romano-British pottery sherds representing a wide range of <br> fabrics. Some large amphora sherds noted. Terracotta tile and Pennant sandstone tile fragments. <br> Oyster shell fragments. Zones of flint, chalk and numerous pottery fragments indicative of plough <br> disturbance into previously undisturbed layers. |
| 10 | The site of Wanborough Mill. Sarsen slabs visible within the grass and some low earthworks. <br> Large mound of 19 1"/20 |
| 17 C | C dumped material to the south west. |

Table 2: Observations of material/feature of archaeological potential
Archaeological Surveys Ltd Eastern Villages, Southern Connector Road, Swindon Magnetometer Survey Report

### 1.5 Geology and soils

1.5.1 The underlying geology in the northern part of site Kimmeridge Clay and in the south, Gault Clay with overlying alluvial deposits along the floodplain of the Liden Brook (BGS, 1974). In the vicinity of The Marsh, a reddish soil appears to be derived from a similarly coloured sandy material overlying clay to a depth of approximately 1 m as observed within a water pipeline trench. The deposit appears to thin towards the east and south but its full extent could not be ascertained. The material is likely to be Pleistocene in date and has not been mapped. Sarsen fragments were frequently observed on areas where soil was visible with large examples noted within some of the field boundaries.
1.5.2 The overlying soil across the site is from the Denchworth association and is a pelostagnogley soil. It consists of a slowly permeable, seasonally waterlogged, clayey soil (Soil Survey of England and Wales, 1983). The reddish material noted above (1.5.1) appears very different to the pelo-stagnogley and is similar to a sandy loam. It has not been mapped by the soil survey. Soil on areas of Roman settlement appears much darker when compared to the surrounding land, and it has clearly been altered probably by the inclusion of significant amounts of burnt and organic material. The magnetic susceptibility of both the reddish soil and dark occupation soil may be enhanced compared to the surrounding pelo-stagnogley.
1.5.3 Clay geologies can often result in a poor contrast between the fill of cut features and the material into which they are cut, However previous magnetometry carried out in the area on the similar geology and soil has produced useful results. The site is, therefore, considered suitable for magnetic survey.

## 2 METHODOLOGY

### 2.1 Technical synopsis

2.1.1 Magnetometry survey records localised magnetic fields that can be associated with features formed by human activity. Magnetic susceptibility and magnetic thermoremnance are factors associated with the formation of localised fields. Additional details are set out below and within Appendix A.
2.1.2 Iron minerals within the soil may become altered by burning and the break down of biological material; effectively the magnetic susceptibility of the soil is increased, and the iron minerals become magnetic in the presence of the Earth's magnetic field. Accumulations of magnetically enhanced soils within features, such as pits and ditches, may produce magnetic anomalies that can be mapped by magnetic prospection.
2.1.3 Magnetic thermoremnance can occur when ferrous minerals have been heated to high temperatures such as in a kiln, hearth, oven etc. On cooling, a permanent magnetisation may be acquired due to the presence of the Earth's magnetic field. Certain natural processes associated with the formation of some igneous and metamorphic rock may also result in magnetic thermoremnance.
2.1.4 The localised variations in magnetism are measured as sub-units of the Tesla, which is a SI unit of magnetic flux density. These sub-units are nano Teslas ( nT ), which are equivalent to $10^{-9}$ Tesla (T).

### 2.2 Equipment configuration, data collection and survey detail

2.2.1 The detailed magnetic survey was carried out using a SENSYS MAGNETO®MXPDA 5 channel cart-based system. The instrument has 5 fluxgate gradiometers (FGM650) spaced 0.5 m apart with readings recorded at 20 Hz . The cart is pushed at walking speed and not towed. Each sensor is not zeroed in the field as the vertical axis alignment is precisely fixed leaving sensor offsets that are removed during data processing. The fixing of the vertical alignment ensures the sensors are not unduly influenced by localised magnetic fields and that the vertical component of a magnetic anomaly is measured. The gradiometers have a range of recording data between $\pm 0.1 \mathrm{nT}$ and $\pm 10,000 \mathrm{nT}$. They are linked to a Leica GS10 RTK GPS with data recorded by SENSYS MAGNETO®MXPDA software on a rugged PDA computer system.
2.2.2 Due to the fixed offsets within the fluxgate sensors, as a result of the manufacturing and tensioning process, the survey data do not provide a visually useful dataset until a zero median traverse algorithm is applied. It is recognised that this has the potential to affect some anomalies detrimentally by removing linear features orientated parallel to survey transects. However, this has not been noted as a particular problem with the system due to the high resolution data collection, generally long length of traverses and variability within the magnetic characteristics of a linear anomaly.
2.2.3 Data are collected along a series of parallel survey transects to achieve $100 \%$ coverage of the surveyable land. The length of each transect is variable and relates to the size of the survey area and other factors including ground conditions. A visual display allows accurate placing of transects and helps maintain the correct separation between adjacent traverses. Data are not collected within fixed grids and data points are considered to be random even though the data are collected in a systematic manner covering all accessible areas (Aspinall, Gaffney and Schmidt, 2009).
2.2.4 Fluxgate sensors are highly sensitive to temperature change and this is manifest as drift during the course of a survey. This can be particularly noticeable during the morning as temperatures rise and the equipment warms or cools. Sensor drift within the course of a traverse will appear as a line trending from negative to positive after processing with a zero median traverse algorithm. To remove the potential for temperature drift data were collected after a 20 minute stabilisation period and traverses were limited to a time of generally <100s.

### 2.3 Data processing and presentation

2.3.1 Magnetic data collected by the MAGNETO®MXPDA cart-based system are initially prepared using SENSYS MAGNETO®DLMGPS software. The software effectively allocates a geographic position for each data point and can compensate for fixed offsets present within the FGM650 sensors. The offsets are positive or negative values present on all fluxgate gradiometer sensors. Some systems use manual or electronic balancing to effectively zero the sensors; however, this is a short term measure that is prone to drift through temperature changes and vibration and can easily be incorrectly set due to localised magnetic fields. The FGM650 sensors are very accurately aligned to the vertical magnetic gradient and are highly stable showing negligible drift on long traverses. The offset values are removed using TerraSurveyor software.

> 2.3.2 Survey tracks are analysed and georeferenced raw data (UTM Z30N) are then exported in ASCII format for further analysis and display within TerraSurveyor. The removal of offset values (compensation) of the sensors is also carried out in TerraSurveyor using a zero median traverse function. Data are then considered to be minimally processed. Note: without the zero median traverse function it is not possible to create a meaningful data plot as all sensors have a different offset value. Although a zero median traverse algorithm can remove anomalies aligned with the survey tracks, in practice this rarely occurs due to the use of long traverses, high resolution measurement and variability within the magnetic susceptibility of long linear features.
2.3.3 The minimally processed data are collected between limits of $\pm 10000 \mathrm{nT}$ and clipped for display at $\pm 3 \mathrm{nT}$. Data are interpolated to a resolution of effectively 0.5 m between tracks and 0.15 m along each survey track.
2.3.4 Appendix C contains metadata concerning the survey and data attributes and is derived directly from TerraSurveyor. Reference should be made to Appendix B for further information on processing.
2.3.5 A TIF file is produced by TerraSurveyor software along with an associated world file (.TFW) that allows automatic georeferencing (OSGB36 datum) when using GIS or CAD software. The main form of data display used in the report is the minimally processed greyscale plot. With regard to the Sensys MXPDA, minimally processed data is considered by the manufacturer to be data that is compensated by SENSYS MAGNETO DLMGPS software, see 2.3.1 and 2.3.2. Note: traceplots are not considered to be appropriate as they do not provide an accurate or useful assessment of the magnetic anomalies due to very high density of data collection.
2.3.6 The raster images are combined with base mapping using ProgeCAD Professional 2016, creating DWG (2010) file formats. All images are externally referenced to the CAD drawing in order to maintain good graphical quality. The CAD plots are effectively georeferenced facilitating relocation of features using GPS, resection method, etc.
2.3.7 An abstraction and interpretation is also drawn and plotted for all geophysical anomalies located by the survey. Anomalies are abstracted using colour coded points, lines and polygons. All plots are scaled to landscape A3 for paper printing.
2.3.8 A brief summary of each anomaly, with an appropriate reference number, is set out in list form within the results (Section 3) to allow a rapid and objective assessment of features within each survey area. Where further interpretation is possible, or where a number of possible origins should be considered, more subjective discussion is set out in Section 4.
2.3.9 A digital archive is produced with this report, see Appendix $D$ below. The main archive is held at the offices of Archaeological Surveys Ltd.

## 3 RESULTS

### 3.1 General assessment of survey results

3.1.1 The detailed magnetic survey was carried out over a 51 land packages representing 19 areas and their subdivisions. In total approximately 110 ha were covered.
3.1.2 Magnetic anomalies located can be generally classified as positive linear and discrete positive responses of archaeological potential, positive and negative linear anomalies of an uncertain origin,anomalies associated with land management, linear anomalies of an agricultural origin, areas of magnetic debris and disturbance, strong discrete dipolar anomalies relating to ferrous objects, strong multiple dipolar linear anomalies relating to buried services or pipelines and anomalies with a natural origin.
3.1.3 Anomalies located within each survey area have been numbered and are described below with subsequent discussion in Section 4 . Many of the survey areas partly contain data collected during a previous geophysical survey along the line of a new water pipe (Archaeological Surveys, 2015). The previous greyscale results from the pipeline are included with the surrounding data collected for this project in order to show a complete data set.

### 3.2 Statement of data quality and factors influencing the interpretation of anomalies

3.2.1 Data are considered representative of the magnetic anomalies present within the site. There are no significant defects within the datasets.

### 3.3 Data interpretation

3.3.1 The list of sub-headings below attempts to define a number of separate categories that reflect the range and type of features located during the survey. A basic explanation of the characteristics of the magnetic anomalies is set out for each category in order to justify interpretation, a basic key is indicated to allow cross referencing to the abstraction and interpretation plot. CAD layer names are included to aid reference to associated digital files (.dwg/.dxf). Sub-headings are then used to group anomalies with similar characteristics for each survey area.

| Report sub-heading CAD layer names and plot colour | Description and origin of anomalies |
| :---: | :---: |
| Anomalies with archaeological potential <br> AS-ABST MAG POS LINEAR ARCHAEOLOGY AS-ABST MAG POS DISCRETE ARCHAEOLOGY AS-ABST MAG POS ARCHAEOLOGY AS-ABST MAG POS CURVILINEAR RING DITCH AS-ABST MAG NEG STRUCTURAL ARCHAEOLOGY AS-ABST MAG NEG LINEAR ARCHAEOLOGY AS-ABST MAG POS ENCLOSURE DITCH | Anomalies have the characteristics (mainly morphological) of a range of archaeological features such as pits, ring ditches, enclosures, etc. |
| Anomalies with an uncertain origin <br> AS-ABST MAG POS LINEAR UNCERTAIN AS-ABST MAG NEG LINEAR UNCERTAIN AS-ABST MAG POS DISCRETE UNCERTAIN AS-ABST MAG POS UNCERTAIN | The category applies to a range of anomalies where there is not enough evidence to confidently suggest an origin. Anomalies in this category may well be related to archaeologically significant features, but equally relatively modern features, geological/pedological features and agricultural features should be considered. Positive anomalies are indicative of magnetically enhanced soils that may form the fill of 'cut' features or may be produced by accumulation within layers or 'earthwork' features; soils subject to burning may also produce positive anomalies. Negative anomalies are produced by material of comparatively low magnetic susceptibility such as stone and subsoil. |


| Anomalies relating to land management <br> AS-ABST MAG BOUNDARY <br> AS-ABST MAG LAND DRAIN |  | Anomalies are mainly linear and may be indicative of the magnetically enhanced fill of cut features (i.e. ditches). The anomalies may be long and/or form rectilinear elements and they may relate to topographic features or be visible on early mapping. Associated agricultural anomalies (e.g. headlands, plough marks and former ridge and furrow) may support the interpretation. Land drains can appear in a classic herringbone pattern of interconnected multiple dipolar linear anomalies, or as parallel linear anomalies. The multiple dipolar response indicates a ceramic land drain. |
| :---: | :---: | :---: |
| Anomalies with an agricultural origin <br> AS-ABST MAG AGRICULTURAL AS-ABST MAG RIDGE AND FURROW |  | The anomalies are often linear and form a series of parallel responses or are parallel to extant land boundaries. Where the response is broad, former ridge and furrow is likely; narrow response is often related to modern ploughing. |
| Anomalies associated with magnetic debris <br> AS-ABST MAG DEBRIS AS-ABST MAG STRONG DIPOLAR | $\frac{\square x+x \times y}{\square}$ | Magnetic debris often appears as areas containing many small dipolar anomalies that may range from weak to very strong in magnitude. It often occurs where there has been dumping or ground make-up and is related to magnetically thermoremnant materials such as brick or tile or other small fragments of ferrous material. This type of response is occasionally associated with kilns, furnace structures, or hearths and may therefore be archaeologically significant. It is also possible that the response may be caused by natural material such as certain gravels and fragments of igneous or metamorphic rock. Strong discrete dipolar anomalies are responses to ferrous objects within the topsoil. |
| Anomalies with a modern origin <br> AS-ABST MAG DISTURBANCE AS-ABST MAG SERVICE | 271717 | The magnetic response is often strong and dipolar indicative of ferrous material and may be associated with extant above surface features such as wire fencing, cables, pylons etc.. Often a significant area around such features has a strong magnetic flux which may create magnetic disturbance; such disturbance can effectively obscure low magnitude anomalies if they are present. Fluxgate sensors may respond erratically and with hysteresis adjacent to strong magnetic sources. Buried services may produce characteristic multiple dipolar anomalies dependant upon their construction. |
| Anomalies with a natural origin <br> AS-ABST MAG NATURAL (PALAEOCHANNEL) AS-ABST MAG NATURAL (GEOLOGY/SOILS) | -6.300\% | Naturally formed magnetic anomalies are are caused by localised variability in the magnetic susceptibility of soils, subsoils and other drift or solid geologies. Anomalies may be amorphous, linear or curvilinear and may appear 'fluvial' or discrete; the latter are almost impossible to distinguished from pit-like anomalies with an anthropogenic origin. Fluvial, glacial and periglacial processes may be responsible for their formation within drift material and subsoil. I |

Table 3: List and description of interpretation categories

### 3.4 List of anomalies - Area 1

Area centred on OS NGR 419985 185045, see Figs 04 \& 05.

## Anomalies of archaeological potential

(1.1) - Located along the south western edge of the survey area are a series of rectilinear enclosures relating to boundaries associated with the Roman roadside settlement located immediately to the west and north west. The enclosures contain a number of pits and other linear cut features. There appears to be a well defined north eastern edge, parallel with the Roman road, Ermin Street, located approximately 82 m to the south west. It is not clear if any of the other anomalies to the north east are associated but it is possible. Some dark soil and Romano-British pottery sherds were noted in the vicinity.

## Anomalies with an uncertain origin

(1.2) - There are a number of positive linear anomalies that extend towards anomalies (1.1) and are parallel with the internal divisions within the enclosures. However, they are also parallel with agricultural anomalies, possibly indicating ridge and furrow, so it is not clear if
they are agricultural features, or if they are associated with the enclosure features.
(1.3) - The survey area contains several pit-like responses. It is not certain if they are natural or anthropogenic features, but given the proximity of some to the enclosures, their archaeological potential should be considered.

Anomalies with an agricultural origin
(1.4) - The survey area contains a number of linear anomalies parallel with the eastern and western field boundaries. It is possible that they are associated with ridge and furrow cultivation and that some of them have incorporated magnetically enhanced material from the nearby archaeological features into the furrows.

Anomalies associated with magnetic debris
(1.5) - The site contains widespread strong, discrete dipolar anomalies and patches of magnetic debris. It is likely that these relate to dumped material and material spread through manuring.

### 3.5 List of anomalies - Area 2

Area centred on OS NGR 420040 184840, see Figs 06 \& 07.

## Anomalies of archaeological potential

(2.1) - The enclosures seen immediately north west in Area 1 continue into Area 2 for 173m where they appear to end. The enclosures are more complex towards the Roman Road, indicating a zone of occupation extending 50 m from the Roman road with a series of larger paddocks to the rear.

## Anomalies with an uncertain origin

(2.2) - A number of positive discrete, linear and possible curvilinear anomalies in the northern part of the site. Other isolated discrete positive responses can also be seen in the south eastern part of the survey area. It is possible that they relate to cut features.

## Anomalies associated with land management

(2.3) - A positive linear anomaly, associated with patches of magnetic debris, relates to a formerly mapped field boundary.

Anomalies with an agricultural origin
(2.4) - A number of linear anomalies, parallel with the eastern and western field boundaries, appear to relate to ridge and furrow. They have truncated and disturbed the archaeological features.

### 3.6 List of anomalies - Area 3

Area centred on OS NGR 419710 174583, see Figs 08 \& 09.

## Anomalies of archaeological potential

(3.1) - A group of positive linear, rectilinear and discrete responses is a continuation of the Roman roadside settlement, extending 50 m parallel with and on the south western side of Ermin Street. It has a well defined back ditch, parallel with the Roman road, which delimits the archaeological features. It is likely that structural remains are present although they are not clear within the data. Site observations confirmed the anomalies correlate with dark soil and a large number of Romano-British pottery sherds and other material had been recently revealed by ploughing.
(3.2) - An enclosure feature oriented north to south, not parallel or orthogonal to Ermin Street or the other enclosures within the Roman town.

Anomalies with an uncertain origin
(3.3) - Negative linear anomalies extend through the archaeological features on a different orientation. It is not clear if they have an archaeological origin or if they relate to a service or pipe. Several negative anomalies are parallel with the archaeological features, possibly indicating structural remains, but this is not certain.
(3.4) - A number of discrete positive responses appear to relate to pit-like features beyond the confines of the enclosures. It is possible that they relate to archaeological features.
(3.5) - In the southern part of Area 3 are a number of short, weakly positive, linear anomalies and several discrete, positive responses. It is not clear if these relate to cut features.

## Anomalies associated with land management

(3.6) - A positive linear anomaly, with strong dipolar responses along its length, relates to a former field boundary.

Anomalies with an agricultural origin
(3.7) - A series of parallel linear anomalies relate to former ridge and furrow.

## Anomalies with a modern origin

(3.8) - A buried service is located in the north western part of the survey area.
(3.9) - Strongly magnetic responses adjacent to the western field boundary are a response to steel collars on the existing water pipe.

### 3.7 List of anomalies - Area 4

Area centred on OS NGR 419905 184345, see Figs 08 \& 09.

## Anomalies of archaeological potential

(4.1) - Positive rectilinear anomalies enclosing discrete positive responses relate to a continuation of the Roman settlement features located immediately to the north west (3.1). There does appear to be a definite end to the features as although there are weak anomalies to the south east (4.5), they do not have the same strength of response or orientation.
(4.2) - A number of positive curvilinear responses, split by a modern fence, can be seen in the centre of the survey area. They either relate to a group of responses forming an irregularly shaped enclosure, or a number of ring ditch features either conjoined or intercutting. There is evidence for discrete responses regularly spaced along the westernmost ring ditch feature, possibly indicating a series of pits or post-holes.
(4.3) - Towards the south eastern edge of the survey area is a positive curvilinear anomaly that forms a ring ditch with a 10 m diameter. It also appears to have a number of pits or post-holes around its perimeter. They have a similar strength of response to (4.2), with the ring ditch at around 3 nT but with the pits or post-holes 5-9nT.

Anomalies with an uncertain origin
(4.4) - Very weakly positive curvilinear anomalies are located to the south west of anomaly (4.3) with others to the north of (4.2). They are much weaker at 1 nT than the ring ditch features and are poorly defined.
(4.5) - A small number of positive linear anomalies located to the south east of archaeological features (4.1). They are weak and not parallel with the Roman road or settlement features; however, their origin is uncertain.
(4.6) - A negative linear anomaly parallel with Ermin Street, but due to presence of nearby magnetic disturbance it it not possible to determine its origin. Other negative linear anomalies are located to the south.

### 3.8 List of anomalies - Area 5a

Area centred on OS NGR 419755 184345, see Figs 10 \& 11.

## Anomalies with an uncertain origin

(5.1) - The survey area contains a small number of weakly positive and negative linear and possible rectilinear anomalies. The anomalies are weak ( $\pm 1 \mathrm{nT}$ ) and indistinct.
(5.2) - A number of discrete positive responses can be seen in the survey area. They are moderately enhanced ( 5 nT ) and appear to relate to pits. The survey area lies 140 m north of a zone containing a number of archaeological features in Areas 6 and 7, and a continuation is possible.

## Anomalies with an agricultural origin

(5.3) - A series of parallel linear anomalies may indicate agricultural activity or land drainage.

## Anomalies associated with magnetic debris

(5.4) - A linear zone of magnetic debris appears to be located along the line of an agricultural anomaly or land drain. It may relate to material used for ground consolidation.

### 3.9 List of anomalies - Area 5b-f

Area centred on OS NGR 420107 184532, see Figs 12 \& 13.
Anomalies of archaeological potential
(5.5) - Situated on the western edge of Area 5d are a number of positive responses that appear to relate to cut features that have been truncated by a later pipe. Extending towards the north east is a fragmented positive linear anomaly that bounds the features, appearing to form an enclosure ditch that has been truncated by ridge and furrow. An outfarm is recorded immediately to the west and relates to magnetic debris (5.14), although there is no mapped record of any extension to it within this field. The truncation by the ridge and furrow indicates that the features pre-date this cultivation and they are, therefore, considered to have archaeological potential.
(5.6) - Near the northern corner of Area $5 f$ are a number of positive linear and discrete responses that relate to cut features that may indicate a Roman site. There is evidence for truncation by later ridge and furrow, and a fragmented linear ditch, parallel with the Roman road just to the north that may indicate the original line of the southern road ditch. It is possible that they continue westwards into Area 5e as anomalies 5.7.

## Anomalies of uncertain origin

(5.7) - A number of positive linear anomalies may be associated with archaeological anomalies (5.6) to the east. However, they are weaker and poorly defined. It is not possible to determine if the curvilinear anomaly relates to a cut feature as it is possible that it is associated with the former palaeochannel (5.16).
(5.8) - A number of positive and negative linear anomalies are evident within Areas 5d and 5 e . It is possible that the positive responses relate to cut features and the negative to material such as subsoil.
(5.9) - A positive curvilinear response is located in the south eastern part of Area 5d. It is very weak and indistinct.
(5.10) - Within Area 5b, a short positive linear anomaly may relate to a continuation of the southern rectilinear ditch seen immediately to the east in Area 5d. To the north is a curvilinear anomaly which may also have an association with anomalies (5.5).
(5.11) - Along the edges of Area $5 f$ are a number of patches of magnetic enhancement. This
may relate to modern burning.

## Anomalies associated with land management

(5.12) - One single drain or pipe extends across Area $5 f$ eastwards into Area 5e where it forks into a series of drains. This appears to relate to a drainage system that drains into the Liden Brook and extends from a small land parcel at the north eastern edge of the site. This land parcel, beyond the survey area, once housed a number of wartime Nissen Huts associated with the anti-aircraft battery to the north east and which were later utilised as an Italian POW camp.
(5.13) - Positive and adjacent negative linear anomaly relate to a boundary ditch and bank parallel with the ridge and furrow.

## Anomalies associated with magnetic debris

(5.14) - Magnetic debris related to an outfarm recorded on Ordnance Survey mapping from the late $19^{\text {th }}$ and earth $20^{\text {th }}$ centuries.
(5.15) - Magnetic debris that may relate to dumped or demolition material; however, no buildings are recorded on any Ordnance Survey mapping.

## Anomalies with a natural origin

(5.16)- Located primarily within Area $5 e$, but with a small section in 5 c , are a number of positive anomalies that relate to former palaeochannels of the Liden Brook. Ridge and furrow appears to overlie it which may indicate that the stream was canalised in antiquity as it is now between 40 m and 85 m further west.
(5.17) - A zone containing numerous pit-like responses can be seen in Area 5d. There is no coherent form or pattern to the pit-like responses and they appear to relate to natural features.

## Anomalies with a modern origin

(5.18) - A negative linear anomaly in Areas $5 e$ and $5 f$ relate to a gas pipeline also seen within Area 6 to the west.
(5.19) - A strongly magnetic linear responses seen in Area 5d and also along the eastern edge of 5 c relates to an iron or possibly steel pipe that continues at a different orientation in Area 4b.

### 3.10 <br> List of anomalies - Area 6

Area centred on OS NGR 419825184200 Area 6a \& 419625184115 Area 6b, see Figs 10 \& 11 .

Anomalies of archaeological potential
(6.1) - A positive rectilinear anomaly within Area 6a relates to an enclosure feature. It has dimensions of 19.5 m by 12.5 m , with a 3.2 m entrance on the western side. It may relate to a
continuation of archaeological features associated with those located less than 200 m to the south west in Areas 7 and 8.

## Anomalies with an uncertain origin

(6.2) - To the north of (6.1) is a linear feature that appears to have been partially truncated by the ridge and furrow (6.6). It is possible, therefore, that it relates to a linear ditch with archaeological potential.
(6.3) - Located within Area $6 b$ is a fragmented positive linear anomaly. It appears to be confined within and orthogonal to the ridge and furrow (6.7); however, it has a similar orientation to anomaly (7.2) located 40 m to the south, and it may, therefore, relate to an archaeological feature.
(6.4) - Very weakly positive linear anomaly with a sinuous form may extend north westwards from anomaly (6.3) and may be associated. A number of pit-like responses are located close by.
(6.5) - Within Area 6 a there are a number of weakly positive linear and discrete responses. It is possible that they relate to further cut features.

## Anomalies with an agricultural origin

(6.6 \& 6.7) - Parallel linear anomalies relating to ridge and furrow.

### 3.11 List of anomalies - Area 7

Area centred on OS NGR 419745 184025, see Figs 14 \& 15.

## Anomalies of archaeological potential

(7.1) - A group of positive curvilinear anomalies located within Area 7a relates to a number of ring ditches surrounded on the northern side by a pair of larger enclosure ditches. These type of responses could be consistent with an Iron Age settlement site and are associated with anomalies (8.1) seen immediately to the west. They have been truncated by a gas pipeline put in the ground in 2003.
(7.2) - Positive linear, rectilinear and discrete anomalies are located to the north, east and west of anomalies (7.1). They are not as clearly defined, partly due to truncation by ridge and furrow.

## Anomalies with an uncertain origin

(7.3) - Area 7b contains a linear zone of discrete positive responses. They are adjacent to a linear ditch or drain (7.4) and north of the Liden Brook. Their strength may indicate magnetically enhanced material within pit-like features, given the close proximity of archaeological features 50m to the north; however, an association with a former watercourse is possible.

Anomalies associated with land management
(7.4) - A negative linear anomaly within Area 7 b relates to a drainage ditch or channel that appears to have truncated the ridge and furrow (7.5).

Anomalies with an agricultural origin
(7.5) - Both survey areas contain evidence for ridge and furrow.

Anomalies associated with magnetic debris
(7.6) - A patch of magnetic debris at the south western corner of Area 7b may relate to material used to infill a former meander in the Liden Brook.

### 3.12 List of anomalies - Area 8

Area centred on OS NGR 419630 183950, see Figs 14 \& 15.
Anomalies of archaeological potential
(8.1) - A group of rectilinear anomalies, truncated by gas pipeline (8.5) and water pipelines (8.6). The features would indicate an Iron Age and/or Romano-British site.
(8.2) - To the west of anomalies (8.1) are other linear and curvilinear anomalies including a ring ditch feature.

Anomalies with an uncertain origin
(8.3) - A number of short positive linear anomalies are located in the vicinity of anomalies (8.2) and may also relate to further archaeological features.

## Anomalies associated with magnetic debris

(8.4) - The southern part of the survey area contains a widespread zone of strongly magnetic debris which relates to dumped material. This is likely to have obscured weaker features, should they be located within this part of the site.

## Anomalies with a modern origin

( 8.5 \& 8.6) - Gas and water pipelines have truncated the archaeological features with the water pipelines associated with strongly magnetic disturbance which is likely to have obscured weaker anomalies.

### 3.13 List of anomalies - Area 9

Area centred on OS NGR 419585183735
Area 9 consisted of two fields containing overgrown vegetation which could not be surveyed.

### 3.14 List of anomalies - Area 10

Area centred on OS NGR 419775 183865, see Figs 14 \& 15.

## Anomalies of archaeological potential

(10.1) - A group of negative linear and rectilinear anomalies enclose areas containing magnetically enhanced anomalies and magnetic debris (10.4). These relate to structural remains associated with Wanborough Mill and its associated outbuildings and garden plots. Although demolished in the early $20^{\text {th }}$ century, with the garden plots and an outbuilding still recorded in 1923, the mill however is mentioned in Domesday.
(10.2) - A positive linear anomaly extends northwards from anomalies (10.1), parallel with the line of the existing footpath. It appears to relate to a linear bank, and it is likely to have some association with the mill complex.
(10.3) - Two positive linear anomalies are located in the eastern part of the survey area, just beyond the limit of the application area. They are close to, and parallel with, the mill stream that surrounded the mill, and although an association is possible, they may relate to other archaeological features.

Anomalies associated with magnetic debris
(10.4) - Magnetic debris is associated with demolition material from the Wanborough Mill complex.

### 3.15 List of anomalies - Area 11

Area centred on OS NGR 419722 183722, see Figs 16 \& 17.
Anomalies with an uncertain origin
(11.1) - A small number of short, weakly positive linear and discrete positive responses have been located. They lack a coherent morphology preventing confident interpretation.

Anomalies with an agricultural origin
(11.2) - Linear anomalies relating to ridge and furrow.

### 3.16 List of anomalies - Area 12

Area centred on OS NGR 419713 183630, see Figs 16 \& 17.
Anomalies of archaeological potential
(12.1) - A weakly positive linear anomaly appears to be a continuation of rectilinear
Archaeological Surveys Ltd Eastern Villages, Southern Connector Road, Swindon Magnetometer Survey Report
enclosure (13.1) to the west.

## Anomalies with an uncertain origin

(12.2) - A negative linear anomaly and weakly positive anomalies are located within the survey area.

### 3.17 List of anomalies - Area 13

Area centred on OS NGR 419695 183550, see Figs 16 \& 17.

## Anomalies of archaeological potential

(13.1) - There appears to be a series of rectilinear and sub-rectilinear positive anomalies. The northern linear anomaly does appear to extend into Area 12; however, the western linear does not appear to extend southwards into Area 14. Their morphology indicates that they relate to enclosures.

Anomalies with an uncertain origin
(13.2) - A number of discrete positive responses are located within and outside of the confines of anomalies (13.1). It is possible that they relate to pits with an archaeological origin, but this is not certain.
(13.3) - Two negative linear anomalies partly cross the survey area with one a continuation of a similar feature in Area 14.
3.18 List of anomalies - Area 14

Area centred on OS NGR 419685 183427, see Figs 18 \& 19.

## Anomalies with an uncertain origin

(14.1) - The survey area contains a number of positive linear and discrete anomalies. They lack clarity and a coherent morphology; however, the presence of archaeological features to the north and south may indicate that these also relate to cut features with archaeological potential.
(14.2) - A number of negative linear anomalies are located within the survey area. It is a response to material that is less magnetically enhanced than the surrounding soils, which can indicate a buried service, drainage gully, rilling caused by water erosion or a feature constructed from subsoil. The origin of these anomalies is, therefore, uncertain.

Anomalies with an agricultural origin
(14.3) - Ridge and furrow has truncated other linear anomalies.

Anomalies with a modern origin

Archaeological Surveys Ltd Eastern Villages, Southern Connector Road, Swindon Magnetometer Survey Report
(14.4) - Two negative linear anomalies, often associated with strong dipolar responses, extend southwards through several survey areas and are a response to two existing buried water pipes.

### 3.19 List of anomalies - Area 15

Area centred on OS NGR 419625 183305, see Figs 18 \& 19.
Anomalies of archaeological potential
(15.1) - The survey area contains a number of rectilinear enclosures, ring ditches, linear ditches and pits. Anomalies extend southwards into Area 16 and also eastwards into Area 17 and relate to a Romano-British occupation site, with possible Iron Age origins.
(15.2) - Negative rectilinear anomalies relate to the walling foundations of a former building. It appears to be associated with other possible structural remains and also areas of burning. The morphology indicates that this is a Roman building of some status.

Anomalies with an uncertain origin
(15.3) - Negative linear anomalies probably associated with land drainage are located in the survey area.

List of anomalies - Area 16

Area centred on OS NGR 419595 183120, see Figs 18-23.

## Anomalies of archaeological potential

(16.1) - Positive linear, rectilinear and curvilinear anomalies are a continuation of enclosures seen in Area 15 to the north.

## Anomalies with an uncertain origin

(16.2) - A number of short weakly positive linear anomalies have been located in the southern part of the survey area. A small number of discrete positive responses have been located in the western part of the survey area. These anomalies lack a coherent morphology and it is not clear if they relate to cut features.

## Anomalies associated with land management

(16.3) - A linear zone of magnetic debris is associated with the line of a removed field boundary.
(16.4) - Anomalies associated with land drainage can be seen in the far western part of the survey area.

## Anomalies with an agricultural origin

(16.5) - Ridge and furrow is mainly evident in the northern part of the survey area. It has truncated the earlier archaeology.

Anomalies with a natural origin
(16.6) - Positive responses in the western part of the survey area relate to former palaeochannels of the Liden Brook, now situated at the western edge of the site.

### 3.21 List of anomalies - Area 17

Area centred on OS NGR 419780 183065, see Figs 18-23.
Anomalies of archaeological potential
(17.1) - A series of positive rectilinear anomalies forms an arc of small enclosures. This is a continuation of features (15.1) seen immediately to the west of The Marsh that separates the two survey areas. Another fragmented enclosure is located just to the east, but the main zone of archaeological features are contained within the arc of enclosures.

Anomalies with an uncertain origin
(17.2) - The northern part of the survey area contains a number of negative linear and rectilinear anomalies. Similar anomalies are located within Area 14 to the west (14.2) with one linear extending into that survey area. Although this may indicate features that predate the construction of The Marsh, a continuing linear anomaly can relate to a buried service. However, the origin of the negative anomalies is uncertain, and they are likely to need further intrusive investigation to ascertain their date and function.
(17.3) - Positive and negative linear anomalies are located to the south of anomalies (17.1) (see Figs 20 \& 21), but it is not possible to determine their origin.
(17.4) - A number of groups of positive responses, often associated with magnetic debris, are located in a line extending in a north west to south east direction across the centre of the survey area. This corresponds to the line of a former field boundary. The site had been previously subject to removal of mature trees, this is likely to have caused such responses.
(17.5) - A negative linear anomaly is located in the eastern part of the site, a shorter negative linear anomaly extends towards it. It is not possible to determine if they are associated with land drainage or buried services.

## Anomalies with a modern origin

(17.6) - A buried sewage pipe extends through the western part of the survey area.

### 3.22 List of anomalies - Area 18

Area centred on OS NGR 419655 182640, see Figs 24 \& 25.

## Anomalies with an uncertain origin

(18.1) - The eastern part of the survey area contains a number of weakly positive short linear and discrete responses. It is not possible to determine their origin.
(18.2) - A positive linear anomaly extends partially across the northern part of the survey area towards a former field boundary (18.5). It appears to be associated with a low bank in the field, and it may indicate a former service or unmapped boundary.
(18.3) - A negative linear anomaly may indicate a pipe, gully or drain but its origin is uncertain.
(18.4) - Located to the north of the oval earthworks are a number of positive linear and discrete anomalies. They are partially obscured by magnetic debris and are surrounded by watercourses which may indicate an association with water management; however, they may relate to cut features containing magnetically enhanced material and an association with the earthworks is possible. They may, therefore, have archaeological potential.

Anomalies associated with land management
(18.5 \& 18.6) - Positive linear anomalies associated with magnetic debris are responses to formerly mapped field boundaries.

Anomalies with an agricultural origin
(18.7) - Ridge and furrow is evident in the south western part of Area 18.

## Anomalies associated with magnetic debris

(18.8) - The earthworks at the western edge of the survey area contain magnetic debris which indicates that ferrous and other magnetically thermoremnant material has been dumped within there confines and to the north.

Anomalies with a natural origin
(18.9) - Amorphous positive responses relate to former palaeochannels.

Anomalies with a modern origin
(18.10) - Strong magnetic responses relate to steel collars used on a buried water pipe.

### 3.23 List of anomalies - Area 19

Area centred on OS NGR 419890 182430, see Figs 24 \& 25.

## Anomalies with an uncertain origin

(19.1) - In the northern part of the survey area (19d) is a fragmented negative and parallel positive linear anomaly. It is generally parallel with anomaly (17.4) seen to the north, and although cut features are possible, its origin is uncertain.
(19.2) - A number of short and fragmented weakly positive linear anomalies have been located within Area 19, mainly in the north east and south west.

Anomalies associated with land management
(19.3) - Weakly multiple dipolar linear anomalies relate to ceramic land drains.
(19.4) - A negative sinuous linear anomaly within Area 19c relates to a drainage gully within the field.

Anomalies with a natural origin
(19.5) - Sinuous, weakly positive response relates to a palaeochannel.

Anomalies with a modern origin
(19.6) - Positive linear anomaly relates to buried sewer pipe.

## 4 DISCUSSION

4.1.1 In the northern part of the site, within Areas $1-4$ is a zone covering 3.5ha which contains a large number of enclosures, ditches and pits relating to a continuation of the Roman town at Wanborough. The complexity of the anomalies indicates phases of use and development and although responses to buildings are not obvious in the data, they are likely to be associated with the pits, ditches and areas of magnetic enhancement.
4.1.2 The enclosures straddle either side of Ermin Street (Wanborough Road), extending 100 m back from the road on the north eastern side and over 50 m on the south western side. The Roman town can be seen to continue south eastwards for another 260 m beyond the current scheduled area on the south western side and over 320 m on the north eastern side, where it does appear to end abruptly. Although weakly positive anomalies can be seen to continue further south eastwards in Areas 2 b and 4b, they are poorly defined. However, further archaeological features, such as burials, could be present outside of the confines of the Roman town and the archaeological potential of the anomalies within these areas cannot be dismissed.
4.1.3 Also within Area 4 are positive curvilinear anomalies relating to ring ditch features. There is some complexity to the northernmost feature (4.2) suggesting possible phasing. A series of what may be post-holes can also be seen within the ring ditch features. These type of responses may indicate prehistoric round houses, but the origin of these anomalies is not certain.
4.1.4 Area 5, within land around Foxbridge Farm, contains two zones of archaeological features. One (5.6), lies adjacent to and parallel with Ermin Street, close to a former palaeochannel, and it is not clear if anomalies (5.7) are a continuation of the archaeology or directly associated with the palaeochannel. It should be considered that these features relate to a Roman site adjacent to the Roman road. Located 200m to the west are another group of positive responses (5.5) that appear to relate to
enclosures and linear ditches that have been truncated by and pre-date the ridge and furrow.
4.1.5 Another group of archaeological features can be seen within Areas 6, 7 and 8. Area 6a contains a small rectilinear enclosure with an entrance on the western side. Other linear anomalies may also relate to archaeological features but they are poorly defined. To the west of this, within Areas 7a and 8, is a zone of enclosures, ring ditches, linear ditches and pits which indicate a possible Iron Age/Roman settlement. A gas pipeline has truncated these features from east to west and a water pipe from north to south.
4.1.6 Area 10 is located on the site of Wanborough Mill which is recorded in the Domesday Book of 1086 and within other records throughout the medieval period. By 1731 it comprised of a mill house, a water grist-mill and mill bank, an orchard called Court Close and two Mill Closes. The last miller died in 1876 and the mill is recorded on the 1884 First Edition OS map. The response shows walls, buildings and gardens as well as magnetic debris associated with the demolished mill buildings.
4.1.7 A zone of archaeological features is clustered to the north of Great Moor Leaze within survey Areas 13 to 17 . Much of this survey was carried out as part of the wider survey for the Thames Water pipeline (Archaeological Surveys, 2015), where a series of enclosures, ring ditches, linear ditches, pits and a Roman building were located. This survey shows that the Roman enclosure features continue to the east of The Marsh within Area 17 and these features are located on a zone of unmapped red, sandy soil not indicated on the soil maps.
4.1.8 To the north of the zone of archaeological features within Area 17 are a number of negative linear and rectilinear anomalies. They also extend westwards into Areas 14 and 15 , but it is not clear if they relate to modern features, possibly pipes, or if they relate to ancient features such as a land divisions. Similar anomalies can be seen further south east in Area 17 (17.5) and again their origin is uncertain. A linear group of positive responses and magnetic debris are located in the vicinity of a removed field boundary and are likely to be associated with removal of mature trees.
4.1.9 At the southern end of the corridor route Areas 18 contains an earthwork feature, and the survey results show a possible association with a number of positive linear and discrete anomalies (18.4) as well as magnetic debris (18.8). It is not clear what the purpose of the earthwork is, but it lies close to a zone containing palaeochannels of the Liden Brook.

## 5 CONCLUSION

5.1.1 The detailed magnetometry has indicated a number of zones of archaeology within the survey area. In the north, a zone extending for over 300 m south east beyond the scheduled limit of the Roman town contains a series of enclosures, ditches and pits indicative of Roman settlement continuing into Areas 1-4. Ring ditch features can also be seen further to the south in Area 4, with further possible Iron Age and Roman settlement within Areas 6-8. Area 5, around Foxbridge Farm, also contains fragmented enclosures, linear ditches and pits that relate to two sites, one adjacent to the Wanborough Road (Ermin Street) which may suggest Roman occupation and another to the west, which appear to have been fragmented by ridge and furrow indicating that is pre-dates this agricultural activity. Features associated with Wanborough Mill ancillary buildings and gardens have also been located within Area 10.
5.1.2 Another zone of archaeological features relating to probable prehistoric and Roman settlement can be seen to the north of Great Moor Leaze. A Roman building, enclosures and ring ditches were located during a previous survey for a water pipe, but this survey demonstrates that it continues within a small zone to the south east of The Marsh within Area 17.
5.1.3 Many of the survey areas contain positive and negative anomalies that are of uncertain origin and their archaeological potential should be considered. Agricultural anomalies are also frequently visible within the data including former ridge and furrow cultivation. Several survey areas contain anomalies typically indicative of paleochannels probably formed by former courses of the Liden Brook. Although of uncertain date, these features can be associated with paleoenvironmental remains.

## 6 REFERENCES

Archaeological Surveys, 2015. Axford \& Ogbourne Licence Reduction Scheme (Axford Pipeline), Magnetometer Survey Report. Ref J619. Unpublished typescript document.

Aspinall, A., Gaffney, C. and Schmidt, A. 2009. Magnetometry for Archaeologists. Lanham (US), AltaMira Press.

ASUD, 2006. Land at east Swindon, Wiltshire, geophysical surveys. Report ref 1551. Archaeological Services University of Durham. Unpublished typescript document.

British Geological Survey, 1974. Swindon, Sheet 252, Solid and Drift edition.
Chartered Institute for Archaeologists, 2014. Standard and Guidance for archaeological geophysical survey. IfA, University of Reading.

Cotswold Archaeology, 2003. Swindon to Wanborough Gas Pipeline, Wiltshire, Programme of Archaeological Recording. Report ref. 03161. Unpublished typescript document.

Dunning, R. W., Rogers, K.H., Spalding, P.A., Shrimpton, C., Stevenson, J.H., \& Tomlinson,, M. Parishes: Wanborough, in A History of the County of Wiltshire: Volume 9, ed. Elizabeth Crittall (London, 1970), pp. 174-186. British History Online http://www.british-history.ac.uk/vch/wilts/vol9/pp174-186 [accessed 25/11/2016].

English Heritage, 2008. Geophysical survey in archaeological field evaluation. Research and Professional Service Guideline No.1. $2^{\text {nd }}$ ed. Swindon: English Heritage.

European Archaeological Council, 2015. EAC Guidelines for the Use of Geophysics in Archaeology: Questions to Ask and Points to Consider. Europae Archaeologia Consilium and Association Internationale sans But Lucratif, Belgium.

GSB, 2004. Land East of Swindon, Wiltshire. Unpublished typescript document.
Hedge, B., Hughes, D., Luft, N., \& Clarke, B., 2002. Earthwork at Commonhead, Liddington, Swindon, Wiltshire. Unpublished typescript document.

Institute for Archaeologists, 2002. The use of Geophysical Techniques in
Archaeological Evaluations. IfA Paper No. 6. IfA, University of Reading.
Soil Survey of England and Wales, 1983. Soils of England and Wales, Sheet 5 South West England.

Stratascan, 2002. Dorcan Way, Swindon-Wanborough pipeline, Geophysical Survey Report. Unpublished typescript document.

## Appendix A - basic principles of magnetic survey

Iron minerals are always present to some degree within the topsoil and enhancement associated with human activity is related to increases in the level of magnetic susceptibility and thermoremnant material.

Magnetic susceptibility is an induced magnetism within a material when it is in the presence of a magnetic field. This can be thought of as effectively permanent due to the presence of the Earth's magnetic field.

Thermoremnant magnetism occurs when ferrous material is heated beyond a specific temperature known as the Curie Point. Demagnetisation occurs at this temperature with re-magnetisation by the Earth's magnetic field upon cooling.

Enhancement of magnetic susceptibility can occur in areas subject to burning and complex fermentation processes on biological material; these are frequently associated with human settlement. Thermoremnant features include ovens, hearths, and kilns. In addition thermoremnant material such as tile and brick may also be associated with human activity and settlement.

Silting and deliberate infilling of ditches and pits with magnetically enhanced soil can create an area of enhancement compared with surrounding soils and subsoils into which the feature is cut. Mapping enhanced areas will produce linear and discrete anomalies allowing an assessment and characterisation of hidden subsurface features.

It should be noted that areas of negative enhancement can be produced from material having lower magnetic properties compared to the topsoil. This is common for many sedimentary bedrocks and subsoils which were often used in the construction of banks and walls etc. Mapping these 'negative' anomalies may also reveal archaeological features.

Magnetic survey or magnetometry can be carried out using a fluxgate gradiometer and may be referred to as gradiometry. The SENSYS gradiometer is a passive instrument consisting of two fluxgate sensors mounted vertically 65 cm apart. The instrument is carried about $10-20 \mathrm{~cm}$ above the ground surface and the upper sensor measures the Earth's magnetic field as does the lower sensor but this is influenced to a greater degree by any localised buried field. The difference between the two sensors will relate to the strength the magnetic field created by the buried feature.

There are a number of factors that may affect the magnetic survey and these include soil type, local geology and previous human activity. Situations arise where magnetic disturbance associated with modern senvices, metal fencing, dumped waste material etc., obscures low magnitude fields associated with archaeological features.

## Appendix B - data processing notes

## Clipping

Minimum and maximum values are set and replace data outside of the range with those values. Extreme values are removed improving colour or greyscale contrast associated with data values that may be archaeologically significant. It has been found that clipping data to ranges between $\pm 5 n T$ and $\pm 3 n T$ often improves the appearance of features associated with archaeology. Different ranges are applied to data in order to determine the most suitable for anomaly abstraction and display.

## Zero (destripe) Median/Mean Traverse

The median (or mean) of each traverse is calculated ignoring data outside a threshold value, the median (or mean) is then subtracted from the traverse. The process is used to equalise differences between the baseline value of gradiometer sensors.

High Pass Filtering
A mathematical process used to remove low frequency anomalies relating to survey tracks, modern agricultural features and other large magnetic bodies within or adjacent to survey areas.

## Low Pass Filtering

A mathematical process used to remove high frequency anomalies relating to uneven ground, vibration, etc.

## Appendix C - survey and data information

| Area 1 |  |
| :---: | :---: |
| Filename: | J669-mag-Area1-proc.xcp |
| Description: | Imported as Composite from: J669-mag- |
| Area1.asc |  |
| Instrument Type: | Sensys DLMGPS |
|  | nT |
| UTM Zone: | 30 U |
| Survey corner coordinates (XY):OSGB36 |  |
| Northwest corner: | $419816.879570944,185268.25658474$ m |
| Southeast corner: $\quad 420087.599570944,184872.79658474 \mathrm{~m}$ |  |
| Collection Method: | : Randomised |
| Sensors: 5 |  |
| Dummy Value: | 32702 |
| Source GPS Points: 1574300 |  |
| Dimensions |  |
| Composite Size (readings): $1504 \times 2197$ |  |
| Survey Size (meters): $271 \mathrm{~m} \times 395 \mathrm{~m}$ |  |
| $\begin{array}{ll}\text { Grid Size: } \\ \text { X Interval: } & \\ \text { l } & \\ 0.181 \mathrm{~m} \times 395 \mathrm{~m}\end{array}$ |  |
| X Interval: | 0.18 m |
| Y Interval: $\quad 0.18 \mathrm{~m}$ |  |
|  |  |
| Max: $\quad 2.00$ |  |
| Min: $\quad-2.00$ |  |
| Std Dev: | 0.53 |
| Mean: 0.02 |  |
| Median: | 0.01 |
| Composite Area: | 10.706 ha |
| Surveyed Area: $\quad 4.8971$ ha |  |
| PROGRAM |  |
| Name: | TerraSurveyor |
| Processes: 2 |  |
|  |  |
| 1 Base Layer |  |
| 2 Clip from -2.00 to 2.00 nT |  |
| GPS based Proce5 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from -3.00 to 3.00 nT |  |
| 5 Lo pass Uniform (median) filter: Window dia: 13 |  |
| Area 2a |  |
|  | J669-mag-Area2-proc.xcp |
| Description:Area | Imported as Composite from: J669-mag- |
|  |  |
| Northwest corner: | $419889.77549134,185023.398395126 \mathrm{~m}$ |
| Southeast corner:Source GPS Points: | 420116.57549134, 184669.998395126 m |
|  | s: 1309800 |
| Composite Size (readings): $1512 \times 2356$ |  |
| Survey Size (meters): $227 \mathrm{~m} \times 353 \mathrm{~m}$ |  |
| Grid Size: | $227 \mathrm{~m} \times 353 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: $\quad 0.15 \mathrm{~m}$ |  |
| Stats |  |
| Max: $\quad 5.53$ |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
| 3 DeStripe Median |  |
|  |  |
| Area 2b |  |
| Filename: | J669-mag-Area2b-proc.xcp |
| Northwest corner:Southeast corner: | $420039.299337702,184760.559464685 \mathrm{~m}$ |
|  | $420168.749337702,184549.209464685 \mathrm{~m}$ |
| Southeast corner: Source GPS Points: | s: 452700 |
| Dimensions |  |
| Composite Size (readings): $863 \times 1409$ |  |
| Survey Size (meters): $129 \mathrm{~m} \mathrm{\times 211} \mathrm{~m}$ |  |
| Grid Size: | $129 \mathrm{~m} \times 211 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| $Y$ Interval: $\quad 0.15 \mathrm{~m}$ |  |
| Stats |  |
| Max: $\quad 3.32$ |  |
| Min: $\quad-3.30$ |  |
| Std Dev: 0.92 |  |
| Mean: 0.02 |  |
| Median: ${ }_{\text {Composite Area: }} \quad 0.03{ }_{2} 7359 \mathrm{ha}$ |  |
|  |  |
| Surveyed Area: $\quad 1.5138 \mathrm{ha}$ |  |
| GPS based Proce6 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion | on Layer (to OSGB36). |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from -5.00 to 5.00 nT |  |
| Clip from -3.00 to 3.00 nT |  |
| 6 Lo pass Uniform (median) filter: Window dia: 13 |  |
| Area 3a |  |
| ilename: | J669-mag-Area3a.xcp |
| Description: | Imported as Composite from: J669-mag- |
|  |  |
| Northwest corner: | $419594.875794138,184870.631033928 \mathrm{~m}$ |
| outheast corner: | $419845.675794138,184658.231033928 \mathrm{~m}$ |
| Source GPS Points: | s: 379700 |
| Dimensions |  |
| Composite Size (rea | eadings): $1254 \times 1062$ |
| Survey Size (meters) | rs): $\quad 251 \mathrm{~m} \times 212 \mathrm{~m}$ |
| Grid Size: | $251 \mathrm{~m} \times 212 \mathrm{~m}$ |
| X Interval: | 0.2 m |
| Y Interval: Stats | 0.2 m |


| Max: | 3.32 |
| :---: | :---: |
| Min: | -3.30 |
| Std Dev: | 1.31 |
| Mean: | 0.02 |
| Median: | -0.01 |
| Composite Area: | 5.327 ha |
| Surveyed Area: | 0.82074 ha |
| Processes: 1 |  |
| 1 Base Layer |  |
| GPS based Proce 4 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB3 |  |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from -3.00 to 3.00 nTArea |  |
|  |  |


| Filename: | J669-mag-Area3b-proc.xcp |
| :---: | :---: |
| Description: Imported as Composite from: J669-mag-Area3b.asc |  |
|  |  |
| Northwest corner: | $419588.316276851,184814.95301925 \mathrm{~m}$ |
| Southeast corner: | 419859.966276851, 184595.65301925 m |
| Source GPS Points: | S 320500 |
| Composite Size (readings): $1811 \times 1462$ |  |
| Survey Size (meters) | s): $272 \mathrm{~m} \times 219 \mathrm{~m}$ |
| Grid Size: | $272 \mathrm{~m} \times 219 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: | 11.05 |
| Min: | -11.00 |
| Std Dev: | 2.00 |
| Mean: | -0.03 |
| Median: | 0.01 |
| Composite Area: | 5.9573 ha |
| Surveyed Area: | 0.94013 ha |
| GPS based Proce 4 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 4 Clip from-10.00 to 10.00 nT |  |
|  |  |


| Area 3c |  |
| :---: | :---: |
| Filename: | J669-mag-Area3c-proc.xcp |
| Description: | Imported as Composite from: J669-mag- |
| Area3c.asc |  |
| Northwest corner: | 419621.491547773, 184765.197206871 m |
| Southeast corner: | $419930.791547773,184520.697206871$ m |
| Source GPS Points: | : 1068200 |
| Composite Size (readings): $2062 \times 1630$ |  |
| Survey Size (meters): 309 mx 245 m |  |
| Grid Size: | $309 \mathrm{~m} \times 245 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: $\quad 3.00$ |  |
| Min: $\quad-3.00$ |  |
| Std Dev: 0.90 |  |
| Mean: 0.04 |  |
| Median: 0.00 |  |
| Composite Area: $\quad 7.5624 \mathrm{ha}$ |  |
|  |  |
| Processes: 2 |  |
| 1 Base Layer |  |
| 2 Clip from -3.00 to 3.00 nT |  |
| GPS based Proce 4 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from-10.00 | to 10.00 nT |


| Area 3d |  |
| :---: | :---: |
| Filename: | J669-mag-Area3d-proc.xcp |
| Description: | Imported as Composite from: J669-mag- |
| Area3d.asc |  |
| Northwest corner: | 419604.259279716, 184501.848763833 m |
| Southeast corner: | 419811.859279716, 184326.348763833 |
| Source GPS Points: | : 588700 |
| Dimensions |  |
| Composite Size (readings): $1384 \times 1170$ |  |
| Survey Size (meters): 208 mx 176 m |  |
| Grid Size: | $208 \mathrm{~m} \times 176 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: 3.32 |  |
| Min: $\quad-3.30$ |  |
| Std Dev: 0.78 |  |
| Mean: $\quad 0.00$ |  |
| Median: 0.00 |  |
| Composite Area: | 3.6434 ha |
| Surveyed Area:GPS based Proce4 |  |
|  |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from-3.00 to 3.00 nT |  |
| Area 4a |  |
| Filename: | J669-mag-Area4a-proc.xcp |
| Description: | Imported as Composite from: J669-mag- |
| Area4a.asc |  |
| Northwest corner: | 419799.477658365, 184699.123362724 m |
| Southeast corner: | $419976.777658365,184457.473362724$ m |
| Dummy Value: | 32702 |
| Source GPS Points: | : 881300 |
| Composite Size (readings): $1182 \times 1611$ |  |
| Survey Size (meters): $177 \mathrm{~m} \times 242 \mathrm{~m}$ |  |
| Grid Size: | $177 \mathrm{~m} \times 242 \mathrm{~m}$ |



## Area 5b

| Filename: | J669-mag-Area5b.xcp |
| :---: | :---: |
| Description: | Imported as Composite from: J669-mag- |
| Area5b.asc |  |
| Northwest corner: | 419939.297206096, 184331.622341774 m |
| Southeast corner: | 420007.697206096, 184248.102341774 m |
| Source GPS Points: | : 59700 |
| Composite Size (readings): $380 \times 464$ |  |
| Survey Size (meters | s): $68.4 \mathrm{~m} \times 83.5 \mathrm{~m}$ |
| Grid Size: | 68.4 m x 83.5 m |
| X Interval: | 0.18 m |
| Y Interval: | 0.18 m |
| Stats |  |
| Max: | 3.32 |
| Min: | -3.30 |
| Std Dev: | 1.41 |
| Mean: | -0.09 |
| Median: | 0.04 |
| Composite Area: | 0.57128 ha |
| Surveyed Area: | 0.23558 ha |
| GPS based Proce 4 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Media | an Traverse: |
| 4 Clip from-3.00 to 3.00 nT |  |
| Area 5c |  |
| Filename: | J699-mag-Area5c.xcp |
| Survey corner coordinates (X/Y): |  |
| Northwest corner: | $419970.121804787,184243.540537371 \mathrm{~m}$ |
| Southeast corner: | 420072.721804787, 184071.340537371 m |
| Source GPS Points: | : 211400 |
| Composite Size (readings): $684 \times 1148$ |  |
| Survey Size (meters): $103 \mathrm{~m} \times 172 \mathrm{~m}$ |  |
| Grid Size: | $103 \mathrm{~m} \times 172 \mathrm{~m}$ |
| X Interval: | 0.15 m |



| Filename: | J669-mag-Area-13a-proc.xcp | Source GPS Points: 139700 |  | Std Dev: | 0.72 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Description: | Imported as Composite from: J669-mag-Area- | Survey Size (meters): $\quad 95.2 \mathrm{~m} \times 73.1 \mathrm{~m}$ |  | Mean: | 0.01 |
| 13a.asc |  |  |  | Median: | -0.02 |
| Northwest corner: | $419544.260752262,183660.028411458 \mathrm{~m}$ | Grid Size: | $95.2 \mathrm{~m} \times 73.1 \mathrm{~m}$ | Composite Area: | 1.292 ha |
| Southeast corner: $\quad 419675.360752262,183571.228411458 \mathrm{~m}$ | 419675.360752262, 183571.228411458 m |  | 0.18 m0.18 m | Surveyed Area: | 0.7862 ha |
| Source GPS Points: 86200 |  |  |  | GPS based Proce 4 |  |
| Composite Size (readings): $874 \times 592$ |  | Y Interval:Stats |  | 1 Base Layer. |  |
| Survey Size (meters): $131 \mathrm{~m} \times 88.8 \mathrm{~m}$ |  | Max: | 3.32 | 2 Unit Conversion Layer (LatLong to OSGB36). |  |
| Grid Size: | $131 \mathrm{~m} \times 88.8 \mathrm{~m}$ | Min: | -3.30 | 3 DeStripe Median Traverse:4 |  |
| X Interval: | 0.15 m | $\begin{array}{ll}\text { Std Dev: } & 1.19 \\ \text { Mean: } & 0.04\end{array}$ |  |  |  |
| Stats $\quad 0.15 \mathrm{~m}$ |  |  |  | 4 Clip from -3.00 to 3.00 nT |  |
|  |  | Median: | -0.06 | Area 16a |  |
| Max: | 3.32 |  |  | Filename: J669-mag-Area16a-proc $\times$ cp |  |
| Min: | 3.30 | Surveyed Area: $\quad 0.38224$ ha |  |  |  |
| Std Dev: | 1.25 |  |  | Description: Imported as Composite from: J669-mag-Area16a.asc |  |
| Mean: | -0.10 | GPS based Proce 4 1 Base Layer. |  |  |  |
| Median: | 0.01 |  |  | Northwest corner: Southeast corner: | $419439.974152904,183228.221821267 \mathrm{~m}$ |
| Composite Area: | 1.1642 ha | ${ }_{3}{ }_{3}$ Unit Conversion Layer (Lat/Long to OSGB36). |  |  | Southeast corner: $\quad 419516.324152904,183109.421821267 \mathrm{~m}$ |
| Surveyed Area: GPS based Proce 4 | 0.24525 ha | 4 Clip from -3.00 to 3.00 nT |  |  | : 180000 |
| GPS based Proce 4 |  | Area 14d |  | Composite Size (readings): $509 \times 792$ |  |
| 1 Base Layer. ${ }_{2}$ Unit Conversion Layer (Lat/Long to OSGB36). |  |  |  | Survey Size (meters): $76.4 \mathrm{~m} \times 119$ |  |
| 3 DeStripe Median Traverse: |  | Filename:Description:Imported as composite from: J669-mag- |  | X Interval: | 0.15 m |
| 4 Clip from-3.00 to 3.00 nT |  |  |  | Y Interval: | 0.15 m |
| Area 13b |  | Description: Imported as Composite from: J669-mag-Area14d.asc |  | Stats |  |
|  |  | Northwest corner: Southeast corner: $\quad \begin{aligned} & 419750.854531965,183434.715902467 \mathrm{~m} \\ & 419842.654531965,183349.575902467 ~\end{aligned}$ | $419842.654531965,183349.575902467 \mathrm{~m}$ | Min: | -3.30 |
| Filename: | J669-mag-Area 13 b -proc.xcp | Source GPS Points: ${ }_{\text {Composite Size (readings): }}{ }^{1339000}$ |  | Std Dev: | 0.74 |
|  |  |  |  | Mean: | 0.01 |
| Description: Imported as Composite from: J669-mag-Arealibiasc |  | Survey Size (meters): $91.8 \mathrm{~m} \times 85.1 \mathrm{~m}$ |  | Median: | -0.01 |
|  |  | Grid Size: $\quad 91.8 \mathrm{~m} \times 85.1 \mathrm{~m}$ |  | Composite Area: | 0.90704 ha |
| Southeast corner: $\quad 419814.017721289,183444.527170122 \mathrm{~m}$ |  | Y Interval: $\quad 0.18 \mathrm{~m}$ |  | Surveyed Area: ${ }^{\text {GP based Proce } 4} 0.56596$ ha |  |
| Source GPS Points: 623500 |  |  |  |  |  |  |
| Composite Size (readings): $1231 \times 1139$ |  | Stats |  | 1 Base Layer. |  |
| Survey Size (meters): $185 \mathrm{~m} \mathrm{\times 171m}$ |  | $\begin{array}{ll}\text { Max: } & 3.32 \\ \text { Min: } & -3.30\end{array}$ |  | 2 Unit Conversion Layer (LatLong to OSGB36). |  |
| Grid Size: $\quad 10$ |  |  |  | 344DeStripe Median Traverse:Cliom -3.00 to 3.00 nT T |  |
|  |  | $\begin{array}{ll}\text { Min: } & \\ \text { Std Dev: } & -3.30 \\ \text { Med }\end{array}$ |  |  |  |
| Y Interval:Stats |  |  |  |  |  |
|  |  | $\begin{array}{ll}\text { Mean: } & 0.00 \\ \text { Median: } & 0.04\end{array}$ |  | Area 16b |  |
| Max: | 2.00 | Composite Area: 0.78159 ha <br> Surveyed Area: 0.43595 ha |  | Filename: J669-mag-Area16b-proc.xcp |  |
| Min: $\quad-2.00$ |  |  |  |  |  |  |
| Std Dev: $\quad 0.68$ |  | GPS based Proce1Base Layer. |  | Description: Imported as Composite from: J669-mag-Area16b.asc |  |
| $\begin{array}{ll}\text { Mean: } & 0.00 \\ \text { Median: } & 0.00\end{array}$ |  |  |  |  |  |  |
|  |  | $3{ }^{2}$ Unitstripe Mesian Traverse: |  | Northwest corner: Southeast corner: | $419441.727507357,183136.7593883704 \mathrm{~m}$ |
| Surveyed Area: $\quad 1.8705$ ha |  |  |  | 419568.177507357, 182918.059383704 m |
|  |  | Surveyed Area:Processes: 22 $\quad 1.8705$ ha 4 Clip from -3.00 to 3.00 nT |  |  |  | Source GPS Points: | : 581000 Composite Size (readings): $843 \times$ |
|  |  |  |  |  |  | 1458 ( ${ }^{\text {a }}$ |  |
|  |  | Area 14 e |  |  | Survey Size (meters): $126 \mathrm{~m} \times 219 \mathrm{~m}$ |  |
|  |  |  |  | Grid Size: | $126 \mathrm{~m} \times 219 \mathrm{~m}$ |
| 2 Clip from - 2.00 to 2.00 nTGPS based Proce5 |  | Filename: J669-mag-Area14e. xcp |  |  | 0.15 m |
|  |  | Description: Imported as Composite from: J669-mag-Area14e.asc |  | Y Interval: $\quad 0.15 \mathrm{~m}$ |  |
| 12 Uase Layer. |  |  |  | Stats |  |
|  |  | $\begin{aligned} & \text { Area14e.asc } \\ & \text { Northwest corner: }\end{aligned} \quad 419558.156821289,183459.561500594 \mathrm{~m}$ |  | Max: | 3.32 |
| 3 DeStripe Median Traverse: <br> 4 Clip from - 3.00 to 3.00 nT |  |  |  | Min: | -3.30 |
| 5 Lo pass Uniform (median) filter: Window dia: 13 |  | Southeast corner:Source GPS Poins: $\quad \begin{gathered}419711.756821289,183350.361500594 ~ \\ 243000\end{gathered}$ |  | Mean: $\quad 0.01$ |  |
|  |  |  | adings): $1024 \times 728$ |  |  |
| Area 14a |  | Survey Size (meters): 154 mx 109 m Grid Size: $\quad 154 \mathrm{mx} 109 \mathrm{~m}$ |  | Composite Area: | 0.01 -0.01 |
|  |  | 2.7655 ha 1.8172 ha |  |  |
| Filename: |  |  | X Interval: $\quad 0.15 \mathrm{~m}$ |  | Surveyed Area: |
| Description: Imported as Composite from: J669-mag- |  | Y Interval:Stats |  | GPS based Proce 4 |  |
| Area14a.asc $\quad$ N $\quad 419471.52336217 .183560 .232199917 \mathrm{~m}$ |  |  |  | 1 Base Layer. |  |
| Northwest corner: $\quad 419471.52336217,183560.232199917 \mathrm{~m}$ |  | $\begin{array}{ll}\text { Max: } & \\ \text { Min: } & \\ & 3.11 \\ -3.13\end{array}$ |  | 2 Unit Conversion | Layer (LatLong to OSGB36). |
| Southeast corner:Source GPS Points:419592.42336217,380200 |  |  |  | 3 DeStripe Median | Traverse: |
|  |  | $\begin{array}{ll}\text { Std Dev: } & 1.28 \\ \text { Mean: } & -0.02\end{array}$ |  | 4 Clip from -3.00 to | to 3.00 nT |
|  |  |  |  |  |  |
| Survey Size (meters): 121 mx 158 m |  | $\begin{array}{ll}\text { Mean: } & -0.02 \\ \text { Median: } & 0.02\end{array}$ |  | Area 16c |  |
| Grid Size: $\quad 121 \mathrm{~m} \mathrm{\times 158m}$ |  | Composite Area:Surveyed Area: $\quad \begin{aligned} & 1.6773 \mathrm{ha} \\ & 0.68825 \mathrm{ha}\end{aligned}$ |  | Filename: |  |
| Y Interval: $\quad 0.15 \mathrm{~m}$ |  | GPS based Proce 41 Base Layer. |  | Description: Imported as Composite from: J669-mag-Area16c.asc |  |
|  |  |  |  |  |  |  |
| Max: | 3.32 | 2 Unit Conversion | $n$ Layer (to OSGB36). | Northwest corner: | $419559.027563131,183070.081255202 \mathrm{~m}$ |
| Min: Std $^{\text {dev: }}$ | 3.30 | 3 DeStripe Media | an Traverse: | Southeast corner: | 419614.227563131, 182961.331255202 m |
| Std Dev: | 0.80 | 4 Clip from -3.00 | to 3.00 nT | Source GPS Points: | : 164800 |
| Mean: | 0.01 |  |  | Composite Size (rea | adings): $368 \times 725$ |
| Median: | 0.01 | Area 14f |  | Survey Size (meters | ): $55.2 \mathrm{~m} \times 109 \mathrm{~m}$ |
| Composite Area: | 1.9114 ha |  |  | Grid Size: | $55.2 \mathrm{~m} \times 109 \mathrm{~m}$ |
| Surveyed Area: | 0.9037 ha | Filename: | J669-mag-Area 14-proc.xcp | $X$ Interval: | 0.15 m |
| GPS based Proce4 |  | Description: | Imported as Composite from: J669-mag- | Y Interval: | 0.15 m |
| 1 1 ${ }^{1}$ Base Layer. |  | Area14f.asc |  | Stats |  |
| ${ }_{3}{ }^{2}$ Unit Conversion | Layer (Lat/Long to OSGB36). | Northwest corner: Southeast corner: | 419689.935598218, 183393.06796961 m 419815.635598218, 183309.96796961 m | Max: <br> Min: | 3.32 3.30 |
| 4 Clip from -3.00 to | to 3.00 nT | Source GPS Points: | : 175500 | Std Dev: | 1.05 |
|  |  | Composite Size (rea | adings): $838 \times 554$ | Mean: | 0.02 |
| Area 14b |  | Survey Size (meters | s): $126 \mathrm{~m} \times 83.1 \mathrm{~m}$ | Median: | 0.02 |
|  |  | Grid Size: | $126 \mathrm{~m} \times 83.1 \mathrm{~m}$ | Composite Area: | 0.6003 ha |
| Filename: | J669-mag-Area 14b.xcp | X Interval: | 0.15 m | Surveyed Area: | 0.47386 ha |
| Description: Area14b.asc | Imported as Composite from: J669-mag- | Y Interval: | 0.15 m | GPS based Proce4 |  |
| Areal4b.asc Northwest corner: |  | Stats |  | 1 Base Layer. |  |
| Northwest corner: Southeast corner: | $419580.269248349,183538.955737035 \mathrm{~m}$ | Max: | ${ }^{3} 3.32$ | 2 Unit Conversion | Layer (LatLong to OSGB36). |
| Southeast corner: Source GPS Points: | ${ }_{212500}^{419695.319248349,183431.105737035 ~ m ~}$ | $\mathrm{Min}_{\text {Std }}$ | ${ }^{-3.30}$ | ${ }^{3}$ DeStripe Median | Traverse: to 3.00 nT ] |
| Source GPS Points: Composite Size (rea | 212500 | Std Dev: Mean: | 1.06 0.01 | 4 Clip from -3.00 | to 3.00 nT |
| Survey Size (meters) | ): 115 mx 108 m | Median: | 0.02 | Area 16d |  |
| Grid Size: | $115 \mathrm{~m} \times 108 \mathrm{~m}$ | Composite Area: | 1.0446 ha |  |  |
| $X$ Interval: | 0.15 m | Surveyed Area: | 0.51012 ha | Filename: | J669-mag-Area16d-proc.xcp |
| Y Interval: | 0.15 m | GPS based Proce 4 |  | Description: | Imported as Composite from: J669-mag- |
| Stats |  | 1 Base Layer. |  | Area16d.asc |  |
| Max: Min: | 3.07 | 2 Unit Conversion | $n$ Layer (LatLong to OSGB36). | Northwest corner: |  |
| Min: Std Dev: | 3.09 1.24 | 3 4 | an Traverse: | Southeast corner: Source GPS Points: | $419693.488721451,182968.486252355 \mathrm{~m}$ 131800 |
| Mean: | 0.00 |  |  | Composite Size (rea | ading): $358 \times 668$ |
| Median: | 0.00 | Area 15 |  | Survey Size (meters | ): $53.7 \mathrm{~m} \times 100 \mathrm{~m}$ |
| Composite Area: | 1.2408 ha |  |  | Grid Size: | 53.7 mx 100 m |
| Surveyed Area: | 0.49779 ha | Filename: | J677-mag-Area 15-proc.xcp | X Interval: | 0.15 m |
| GPS based Proce4 |  | Description: | Imported as Composite from: J677-mag- | Y Interval: | 0.15 m |
| $1{ }^{1}$ Base Layer. | Layer (Lat/Long to OSGB36). | Area 15.asc Northwest corner: | 419454.73928974, 183425.107610572 m | Stats | 3.32 |
| 3 DeStripe Median | n Traverse: | Southeast corner: | 419543.53928974, 183279.607610572 m | Min: | ${ }_{-3.30}$ |
| 4 Clip from -3.00 to | to 3.00 nT | Source GPS Points: | : 259000 | Std Dev: | 1.41 |
|  |  | Composite Size (rea | adings): $592 \times 970$ | Mean: | -0.08 |
| Area 14c |  | Survey Size (meters | s): $88.8 \mathrm{~m} \times 146 \mathrm{~m}$ | Median: | 0.04 |
|  |  | Grid Size: | ${ }_{\substack{\text { c }}}^{88.8 \mathrm{~m}} \mathrm{~m} \times 146 \mathrm{~m}$ | Composite Area: | 0.53807 ha |
| Filename: Description: | J669-mag-Area14c-proc.xcp ${ }^{\text {Imported as Composite from: J669-mag- }}$ | X Interval: Y Interval: | 0.15 m 0.15 m | Surveyed Area: GPS based Proce4 |  |
| Area14c.asc |  | Stats |  | 1 Base Layer. |  |
| Northwest corner: | 419668.603277207, 183481.859723917 m | Max: | 3.32 | 2 Unit Conversion | Layer (Lat/Long to OSGB36). |
| Southeast corner: | 419763.823277207, 183408.779723917 m | Min: | -3.30 | 3 DeStripe Median | a Traverse: |

\begin{tabular}{|c|c|c|c|}
\hline \multicolumn{2}{|l|}{4 Clip from -3.00 to 3.00 nT} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Area 18a}} \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Area 16e}} \& \& \\
\hline \& \& Filename: \& J668-mag-Area 18a-proc.xcp \\
\hline Filename: \& J669-mag-Area16e.xcp \& Description: \& Imported as Composite from: J668-mag- \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Description: Imported as composite from: J669-mag-
Area16e.asc}} \& \multicolumn{2}{|l|}{Description: Imported as Composite from: J668-mag-
Area18.asc} \\
\hline \& \& Northwest corner: \& 419549.375707146, 182807.021632581 m \\
\hline \multicolumn{2}{|l|}{Northwest corner: \(\quad 419452.113556666,183293.654181271 \mathrm{~m}\)} \& \multirow[t]{2}{*}{Southeast corner:
Source GPS Points:} \& 419886.275707146, 182564.621632581 m \\
\hline \multicolumn{2}{|l|}{Southeast corner: \(\quad 419504.163556666,183238.304181271\) m} \& \& 1812000 \\
\hline \multicolumn{2}{|l|}{Source GPS Points: 88000} \& \multicolumn{2}{|l|}{Composite Size (readings): \(2246 \times 1616\)} \\
\hline \multicolumn{2}{|l|}{Composite Size (readings): \(347 \times 369\)} \& \multicolumn{2}{|l|}{Survey Size (meters): \(337 \mathrm{~m} \times 242 \mathrm{~m}\)} \\
\hline \multicolumn{2}{|l|}{Survey Size (meters): \(52.1 \mathrm{~m} \times 55.4 \mathrm{~m}\)} \& \multirow[t]{2}{*}{Grid Size:} \& \(337 \mathrm{~m} \times 242 \mathrm{~m}\) \\
\hline \& \(52.1 \mathrm{~m} \times 55.4 \mathrm{~m}\) \& \& 0.15 m \\
\hline \(X\) Interval: \& 0.15 m \& Y Interval: \& 0.15 m \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Y interval. \(\quad 0.15 \mathrm{~m}\)}} \& \multicolumn{2}{|l|}{Stats} \\
\hline \& \& Max: \& 3.32 \\
\hline Max: \& 3.32 \& \& -3.30 \\
\hline Min: \& -3.30 \& Std Dev: \& 1.13 \\
\hline Std Dev: \& 1.05 \& Mean: \& -0.01 \\
\hline Mean: \& 0.05 \& Median: \& 0.00 \\
\hline \multirow[t]{2}{*}{Median:
Composite Area:} \& -0.01 \& \multirow[t]{2}{*}{} \& 8.1665 ha \\
\hline \& 0.2881 ha \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Surveyed Area:
GPS based Proce4}} \\
\hline \multicolumn{2}{|l|}{Surveyed Area: \(\quad 0.21143\) ha} \& \& \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{GPS based Proce4}} \& \multicolumn{2}{|l|}{1 Base Layer.} \\
\hline \& 1 Base Layer. \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{2
3}} \\
\hline \multicolumn{2}{|l|}{2 Unit Conversion Layer (Lat/Long to OSGB36).} \& \& \\
\hline \multicolumn{2}{|l|}{3 Destripe Median Traverse:} \& \multicolumn{2}{|l|}{4 Clip from -3.00 to 3.00 nT .} \\
\hline \multicolumn{2}{|l|}{4 Clip from -3.00 to 3.00 nT} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Area 18b}} \\
\hline \multicolumn{2}{|l|}{Area 17 a} \& \& \\
\hline \multicolumn{2}{|l|}{Area 17 a} \& Filename: \& J669-mag-Area 18b-proc.xcp \\
\hline Filename: \& J669-mag-Area 17a-proc-hpf-lpf.xcp \& \multirow[t]{2}{*}{Description: Area18b.asc} \& Imported as Composite from: J669-mag- \\
\hline Description: \& Imported as Composite from: J669-mag- \& \& \\
\hline \multicolumn{2}{|l|}{Area17.asc} \& Northwest corner: \& 419527.357872422, 182656.23838012 m \\
\hline Northwest corner: \& 419652.017917676, 183361.20494982 m \& \multirow[t]{2}{*}{Southeast corner:
Source GPS Points:} \& 419585.257872422, 182511.18838012 m \\
\hline \multicolumn{2}{|l|}{Southeast corner: \(\quad 419889.167917676,182812.50494982 \mathrm{~m}\)} \& \& Source GPS Points: 161100 \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{\begin{tabular}{ll} 
Source GPS Points: \(\quad 2188800\) \\
Composite Size (readings): \& \(1581 \times 3658\)
\end{tabular}}} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Composite Size (readings):
Survey Size (meters):
\(57.9 \mathrm{~m} \times 145 \mathrm{~m}\)}} \\
\hline \& \& \& \\
\hline \multicolumn{2}{|l|}{Survey Size (meters): \(\quad 237 \mathrm{~m} \times 549 \mathrm{~m}\)} \& \multirow[t]{2}{*}{X Interval:} \& \(57.9 \mathrm{~m} \times 145 \mathrm{~m}\) \\
\hline Grid Size: \& \(237 \mathrm{~m} \times 549 \mathrm{~m}\) \& \& \multirow[t]{2}{*}{0.15 m} \\
\hline \(X\) Interval: \& 0.15 m \& Y Interval: \(\quad 0\) \& \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Y Interval:
Stats}} \& \multicolumn{2}{|l|}{Stats} \\
\hline \& \& Max: \& 5.53 \\
\hline \multicolumn{2}{|l|}{Max: \(\quad 3.00\)} \& \multicolumn{2}{|l|}{Min: \(\quad-5.50\)} \\
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{\(\begin{array}{ll}\text { Min: } \& -3.00 \\ \text { Std Dev: } \& 0.69\end{array}\)}} \& Std Dev: \& -5.50

2.36 <br>
\hline \& \& Mean: \& -0.08 <br>
\hline \multicolumn{2}{|l|}{$\begin{array}{ll}\text { Std Dev: } & 0.69 \\ \text { Mean: } & 0.00\end{array}$} \& Median: \& 0.03 <br>

\hline \multicolumn{2}{|l|}{Median: 0.01} \& Composite Area: \& \multirow[t]{2}{*}{$$
\begin{aligned}
& 0.83984 \text { ha } \\
& 0.35615 \text { ha }
\end{aligned}
$$} <br>

\hline Composite Area: \& \& Surveyed Area: \& <br>

\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{| Surveyed Area: |  |
| :--- | :--- |
| Processes: 2 | 7.1058 ha |}} \& \multicolumn{2}{|l|}{GPS based Proce 4} <br>

\hline \& \& \multicolumn{2}{|l|}{1 Base Layer.} <br>
\hline \multicolumn{2}{|l|}{1 Base Layer} \& \multicolumn{2}{|l|}{2 Unit Conversion Layer (Lat/Long to OSGB36).} <br>

\hline \multicolumn{2}{|l|}{2 Clip from -3.00 to 3.00 nT GPS based Proce6} \& \multicolumn{2}{|l|}{| 3 DeStripe Median Traverse: |
| :--- |
| 4 Clip from -5.00 to 5.00 nT |} <br>

\hline \multicolumn{2}{|l|}{${ }_{1}$ GPS Base Layer.} \& \multicolumn{2}{|l|}{4 Clip from - 5.00 to 5.00 nT} <br>
\hline \multicolumn{2}{|l|}{2 Unit Conversion Layer (Lat/Long to OSGB36).} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Area 18c}} <br>
\hline \multicolumn{2}{|l|}{3 DeStripe Median Traverse:} \& \& <br>
\hline 4 High pass Uni \& form (median) filter: Window dia: 300 \& Filename: \& J669-mag-Area 18c-proc.xcp <br>
\hline 5 Lo pass Unifo \& rm (median) filter: Window dia: 13 \& Description: \& Imported as Composite from: J669-mag- <br>
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{6 Clip from -3.00 to 3.00 nT}} \& Area18c.asc \& <br>
\hline \& \& \& $419562.995139077,182634.759815901 \mathrm{~m}$ <br>
\hline \multicolumn{2}{|l|}{Area 17b} \& Southeast corner: Source GPS Points: \& $419619.395139077,182511.459815901 \mathrm{~m}$
154700 <br>
\hline \multicolumn{2}{|l|}{Filename: J669-mag-Area17b.xcp} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{}} <br>
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Description: Imported as Composite from: J669-mag-
Area17b.asc}} \& \& <br>
\hline \& \& Grid Size: \& $56.4 \mathrm{~m} \times 123 \mathrm{~m}$ <br>
\hline Northwest corner: \& $419826.531232643,183353.561106016 \mathrm{~m}$ \& X Interval: \& 0.15 m <br>
\hline \multicolumn{2}{|l|}{} \& Y Interval: $\quad 0.15 \mathrm{~m}$ \& 0.15 m <br>
\hline \multicolumn{2}{|l|}{} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Max: $\quad 3.32$}} <br>
\hline \multicolumn{2}{|l|}{Composite Size (readings): $1080 \times 3464$} \& \& <br>
\hline \multicolumn{2}{|l|}{Survey Size (meters): $162 \mathrm{~m} \mathrm{\times 520m}$} \& \multicolumn{2}{|l|}{Min: $\quad-3.30$} <br>
\hline \multicolumn{2}{|l|}{Grid Size: $\quad 162 \mathrm{~m} \times 520 \mathrm{~m}$} \& Std Dev: \& 1.04 <br>
\hline X Interval: \& 0.15 m \& Mean: \& 0.00 <br>
\hline \multicolumn{2}{|l|}{Y Interval: $\quad 0.15 \mathrm{~m}$} \& Median: \& \multirow[t]{2}{*}{${ }^{0.01} 0.69541 \mathrm{ha}$} <br>
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{$\begin{array}{ll}\text { Stats } & \\ \text { Max: } & 3.32\end{array}$}} \& Composite Area: \& <br>
\hline \& \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Surveyed Area:
GPS based Proce4}} <br>
\hline \multicolumn{2}{|l|}{$\begin{array}{ll}\text { Max: } & \\ \text { Min: } & -3.32 \\ -3.30\end{array}$} \& \& <br>
\hline \multicolumn{2}{|l|}{Std Dev: $\quad 0.75$} \& \multicolumn{2}{|l|}{GPS based Proce4
1 Base Layer.} <br>
\hline \multicolumn{2}{|l|}{Mean: $\quad 0.00$} \& \multicolumn{2}{|l|}{} <br>
\hline \multicolumn{2}{|l|}{Median: 0.01} \& \multicolumn{2}{|l|}{${ }_{3}{ }_{3}$ Unit Conversion Layer (Lat/Long to OSGB36).} <br>
\hline \multicolumn{2}{|l|}{Composite Area: $\quad 8.4175 \mathrm{ha}$} \& \multicolumn{2}{|l|}{\multirow[t]{2}{*}{4 Clip from -3.00 to 3.00 nT}} <br>
\hline \multicolumn{2}{|l|}{Surveyed Area: $\quad 3.5497$ ha} \& \& <br>
\hline \multicolumn{2}{|l|}{1 Base Layer.} \& \multicolumn{2}{|l|}{\multirow[b]{2}{*}{Filename: J669-mag-Area18d.xcp}} <br>
\hline \multicolumn{2}{|l|}{2 Unit Conversion Layer (Lat/Long to OSGB36).} \& \& <br>
\hline \multicolumn{2}{|l|}{3 Destripe Median Traverse:} \& \multicolumn{2}{|l|}{Description: Imported as Composite from: J669-mag-} <br>
\hline \multicolumn{2}{|l|}{4 High pass Uniform (median) filter: Window dia: 300} \& Area18d.asc \& <br>
\hline \multicolumn{2}{|l|}{5 Lo pass Uniform (median) fitter: Window dia: 13} \& \multicolumn{2}{|l|}{Northwest corner: $\quad 419643.543256666,182604.051493899 \mathrm{~m}$} <br>
\hline 6 Clip from-3.00 \& to 3.00 nT \& Southeast corner: Source GPS Points: \& 419737.893256666, 182507.601493899 m 258300 <br>
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Area 17c}} \& \multicolumn{2}{|l|}{Composite Size (readings): $629 \times 643$} <br>
\hline \& \& Survey Size (meters) \& s): $\quad 94.4 \mathrm{~m} \times 96.5 \mathrm{~m}$ <br>
\hline \multicolumn{2}{|l|}{Filename: J669-mag-Area17c.xcp} \& Grid Size: \& $94.4 \mathrm{~m} \times 96.5 \mathrm{~m}$ <br>
\hline \multicolumn{2}{|l|}{Description: Imported as Composite from: J669-mag-} \& $X$ Interval: \& 0.15 m <br>
\hline \multicolumn{2}{|l|}{Area17c.asc} \& Y Interval: \& 0.15 m <br>
\hline \multicolumn{2}{|l|}{Northwest corner: $\quad 419846.566367337,183227.458336321 \mathrm{~m}$} \& Stats \& 3.32 <br>
\hline \multicolumn{2}{|l|}{Source GPS Points: 2766900} \& Min: -3 \& -3.30 <br>
\hline \multicolumn{2}{|l|}{Composite Size (readings): $2548 \times 3157$} \& Std Dev: \& 0.94 <br>
\hline \multicolumn{2}{|l|}{Survey Size (meters): $382 \mathrm{~m} \times 474 \mathrm{~m}$} \& Mean: \& 0.01 <br>
\hline \multicolumn{2}{|l|}{Grid Size: $\quad 382 \mathrm{~m} \times 474 \mathrm{~m}$} \& Median: \& 0.01 <br>

\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{| X Interval: | 0.15 m |
| :--- | :--- |
| Y Interval: | 0.15 m |}} \& Composite Area: \& \multirow[t]{2}{*}{0.91001 ha

0.74676 ha} <br>
\hline \multicolumn{2}{|l|}{\multirow[t]{2}{*}{Y Interval:
Stats}} \& Surveyed Area: \& <br>
\hline \& \& \multicolumn{2}{|l|}{GPS based Proce 4} <br>
\hline \multicolumn{2}{|l|}{Max: $\quad 3.32$} \& 1 Base Layer. \& <br>
\hline \multicolumn{2}{|l|}{Min: $\quad-3.30$} \& 2 Unit Conversion \& Layer (LatLong to OSGB36). <br>
\hline Std Dev:
Mean: \& 0.61
0.00 \& 3
4
4
DeStripe Mrem \& Traverse:
to 3.00 nT T <br>
\hline Median: \& 0.02 \& \& <br>
\hline Composite Area: \& 18.099 ha \& Area 18e \& <br>
\hline Surveyed Area:
GPS based Proce5 \& 10.05 ha \& \& <br>
\hline 1 Base Layer. \& \& ${ }_{\text {Dilename: }}$ Description: \& Imported as Composite from: J669-mag- <br>
\hline 2 Unit Conversio \& Layer (Lat/Long to OSGB36). \& Area18e.asc \& <br>
\hline 3 DeStripe Media \& an Traverse: \& Northwest corner: \& $419637.000758615,182504.387620797 \mathrm{~m}$ <br>
\hline ${ }_{4}^{4}$ Lo pass Unito \& rm (median) filter: Window dia: 13 \& Southeast corner: \& $419719.650758615,182429.387620797 \mathrm{~m}$
172700 <br>
\hline
\end{tabular}

|  |  |
| :---: | :---: |
|  |  |
| Survey Size (meters) | rs): $82.7 \mathrm{~m} \times 75 \mathrm{~m}$ |
| Grid Size: | 82.7 mx 75 m |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: | 3.32 |
| Min: | -3.30 |
| Std Dev: | 0.86 |
| Mean: | 0.01 |
| Median: | 0.01 |
| Composite Area: | 0.61988 ha |
| Surveyed Area: | 0.52309 ha |
| GPS based Proce 4 |  |
| Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Clip from-3.00 | to 3.00 nT |


| Area 18ef |  |
| :---: | :---: |
| Filename: | J669-mag-Area18ef.xcp |
| Description: | Imported as Composite from: J669-mag- |
| Area18ef.asc |  |
| Northwest corner: | 419566.020536778, 182508.127437511 m |
| Southeast corner: | $419719.770536778,182427.727437511 \mathrm{~m}$ |
| Source GPS Points: | : 357600 |
| Composite Size (readings): $1025 \times 536$ |  |
| Survey Size (meters) | S): $154 \mathrm{~m} \times 80.4 \mathrm{~m}$ |
| Grid Size: | $154 \mathrm{~m} \times 80.4 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: | 3.32 |
| Min: -3 | -3.30 |
| Std Dev: | 0.83 |
| Mean: | -0.01 |
| Median: | 0.01 |
| Composite Area: | 1.2362 ha |
| Surveyed Area: | 1.0364 ha |
| GPS based Proce5 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Lo pass Uniform (median) filter: Window dia: 13 |  |
| 5 Clip from-3.00 to | to 3.00 nT |

## Area 18 g

| Filename: | J669-mag-Area18g.xcp |
| :---: | :---: |
| Description: | Imported as Composite from: J669-mag- |
| Area18g.asc |  |
| Northwest corner: | $419439.583478984,182576.50588128 \mathrm{~m}$ |
| Southeast corner: | $419584.933478984,182301.85588128 \mathrm{~m}$ |
| Source GPS Points: | : 636300 |
| Composite Size (readings): $969 \times 1831$ |  |
| Survey Size (meters | s): $145 \mathrm{~m} \times 275 \mathrm{~m}$ |
| Grid Size: | $145 \mathrm{~m} \times 275 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: | 3.32 |
| Min: | -3.30 |
| Std Dev: | 1.02 |
| Mean: | 0.03 |
| Median: | -0.01 |
| Composite Area: | 3.992 ha |
| Surveyed Area: | 1.896 ha |
| GPS based Proce4 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 344 DeStripe Median Traverse: |  |
|  |  |

## Area 18h

| Filename: | J669-mag-Area18h.xcp |
| :---: | :---: |
| Description: | Imported as Composite from: J669-mag- |
| Area18h.asc |  |
| Northwest corner: | 419587.110436126, 182424.969587666 m |
| Southeast corner: | $419698.860436126,182262.519587666 \mathrm{~m}$ |
| Direction of 1st Traverse: 90 deg |  |
| Source GPS Points: 431100 |  |
| Composite Size (readings): $745 \times 1083$ |  |
| Survey Size (meters): $112 \mathrm{~m} \times 162 \mathrm{~m}$ |  |
| Grid Size: | $112 \mathrm{~m} \times 162 \mathrm{~m}$ |
| X Interval: | 0.15 m |
| Y Interval: | 0.15 m |
| Stats |  |
| Max: 3.32 |  |
| Min: $\quad-3.30$ |  |
| Std Dev: 0.92 |  |
| Mean: 0.00 |  |
| Median: 0.01 |  |
| Composite Area: | 1.8154 ha |
| Surveyed Area: 1.2735 ha |  |
| GPS based Proce6 |  |
| 1 Base Layer. |  |
| 2 Unit Conversion Layer (Lat/Long to OSGB36). |  |
| 3 DeStripe Median Traverse: |  |
| 4 Lo pass Uniform (median) filter: Window dia: 13 |  |
| 5 High pass Uniform (median) filter: Window dia: 300 |  |
| 6 Clip from -3.00 | to 3.00 nT |

## Area 19a

| Filename: | J669-mag-Area19a.xcp |
| :---: | :---: |
| Description: | Imported as Composite from: J669-mag- |
| Area19a.asc |  |
| Northwest corner: | $419658.833559171,182430.310827689 \mathrm{~m}$ |
| Southeast corner: | $419954.333559171,182074.210827689 \mathrm{~m}$ |
| Source GPS Points: | 1739600 |
| Composite Size (readings): $1970 \times 2374$ |  |
| Survey Size (meters) | $296 \mathrm{~m} \times 356 \mathrm{~m}$ |
| Grid Size: | 296 m x 356 m |



Appendix D - digital archive

Archaeological Surveys Ltd hold the primary digital archive at their offices in Wiltshire. Data are backed-up onto an on-site data storage drive and at the earliest opportunity data are copied to CD ROM for storage on-site and off-site.

A printed copy of the report and a PDF copy will be supplied to the Wiltshire Historic Environment Record. The report will also be uploaded to the Online AccesS to the Index of archaeological investigationS (OASIS).

## Archive index:

| Geophysical data - path: J669 Swindon Southern Connector Road Datal |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| Path and Filename | Software | Description | Date | Creator |
| swroad1\MX. prm,.dgb,.disp to swroad54\MX\.prm,.dgb,.disp | Sensys MXPDA | Proprietary data formats representing magnetometer survey traverses logged to a PDA. | $\begin{array}{\|l} 28 / 06 / 16 \text { to } \\ 05 / 05 / 17 \end{array}$ | D.J.Sabin |
| swroad1\MXV669-mag-Area7b.asc swroad2\MXVJ669-mag-Area2.asc swroad3\MXU669-mag-Area16a.asc swroad4\MXW669-mag-Area16b.asc swroad5MXV669-mag-Area16c.asc swroad6\MXV669-mag-Area16c.asc swroad7\MXVJ669-mag-Area10.asc swroad8\MXW669-mag-Area11a.asc swroad9\MXV669-mag-Area11b.asc swroad10\MX\J669-mag-Area14f.asc swroad11\MXV6669-mag-Area14e.asc swroad12\MX\J669-mag-Area14b.asc swroad13\MX\J669-mag-Area14c.asc swroad14\MXVJ669-mag-Area14a.asc swroad15\MX\J669-mag-Area14d.asc swroad16\MX\J669-mag-Area15.asc swroad17\MX\J669-mag-Area16e.asc swroad18\MX\J669-mag-Area17.asc swroad19\MX\J669-mag-Area18.asc swroad20\MX\J669-mag-Area18b.asc swroad21 \MX\J669-mag-Area18c.asc swroad22\MX\J669-mag-Area18d.asc swroad23\MX\J669-mag-Area18e.asc swroad24\MX\J669-mag-Area18f.asc swroad25\MX\J669-mag-Area18g.asc swroad26\MX\J669-mag-Area4a.asc swroad27\MXVJ669-mag-Area13a.asc swroad28\MX\J669-mag-Area13b.asc swroad29\MX\J669-mag-Area12.asc swroad30\MX\J669-mag-Area1.asc swroad31 \MX\J669-mag-Area6a.asc swroad32\MX\J669-mag-Area6b.asc swroad33\MX\J669-mag-Area7a.asc swroad34\MX\J669-mag-Area5.asc swroad35\MX\J669-mag-Area3d.asc swroad36\MX\J669-mag-Area3c.asc swroad37\MX\J669-mag-Area3b.asc swroad38\MX\J669-mag-Area8.asc swroad39\MX\J669-mag-Area5f.asc swroad40\MX\J669-mag-Area5e.asc swroad41 \MX\J669-mag-Area5d.asc swroad42\MX\J669-mag-Area4b.asc swroad43\MX\J669-mag-Area5b.asc | Sensys DLMGPS | ASCII CSV (tab) file representing survey area in eastings, northings (UTM Z3ON), magnetic measurement, traverse file and sensor numbe |  | D.J.Sabin |


| swroad44\MX\J669-mag-Area5c.asc swroad45\MX\J669-mag-Area17b.asc swroad46\MX\J669-mag-Area17c.asc swroad47\MX\J669-mag-Area2b.asc swroad48\MX\J669-mag-Area18h.asc swroad49\MX\J669-mag-Area18h.asc swroad50\MX\J669-mag-Area19a.asc swroad51 \MX\J669-mag-Area19b.asc swroad52\MX\J669-mag-Area19c.asc swroad54\MX\J669-mag-Area3a.asc |  |  | 30/01/17 <br> 30/01/17 <br> 10/04/17 <br> 11/04/17 <br> 24/04/17 <br> 27/04/17 <br> 27/04/17 <br> 05/05/17 |  |
| :---: | :---: | :---: | :---: | :---: |
| Area1 \comps\J669-mag-Area1.xcp to Area 19dicomps V669-mag-Area19d.xcp | $\begin{array}{\|l} \hline \text { TerraSurveyor } \\ \text { 3.0.23.0 } \end{array}$ | Composite data file derived from ASCII CSV. | $\begin{aligned} & 01 / 08 / 16 \text { to } \\ & 05 / 05 / 17 \end{aligned}$ | D.J.Sabin |
| Area 1 Ccomps $\backslash$ J669-mag-Area1-proc.xcp to Area 19dicomps W 669 -mag-Area19d-proc.xcp | $\begin{aligned} & \text { TerraSurveyor } \\ & \text { 3.0.23.0 } \end{aligned}$ | Processed composite data file (zmt and clipping to $\pm 3 \mathrm{nT}$ ). | $\begin{array}{\|l} \hline 01 / 08 / 16 \text { to } \\ 05 / 05 / 17 \end{array}$ | D.J.Sabin |
| Graphic data - path: J669 Swindon Southern Connector Road\Data\ |  |  |  |  |
| Area1 \graphics U6669-mag-Area1-proc.tif to Area19dlgraphicssU669-mag-Area19d.tif | $\begin{aligned} & \text { TerraSurveyor } \\ & \text { 3.0.23.0 } \end{aligned}$ | TIF file showing a minimally processed greyscale plot clipped to $\pm 3 \mathrm{nT}$. | $\begin{aligned} & \text { 01/08/16 to } \\ & 05 / 05 / 17 \end{aligned}$ | K.T.Donaldson |
| Area1 \graphics J669-mag-Area1-proc.ffwto Area19dIgraphics \( |  |  |  |  |
| ) U669-mag-Area19d.tfw | $\begin{aligned} & \text { TerraSurveyor } \\ & \text { 3.0.23.0 } \end{aligned}$ | World file for georeferencing TIF to OSGB36. | $\begin{aligned} & \text { 01/08/16 to } \\ & 05 / 05 / 17 \end{aligned}$ | K.T.Donaldson |
| CAD data - path: J669 Swindon Southern Connector Road \ICAD |  |  |  |  |
| J669 version 5. dwg | $\begin{aligned} & \text { ProgeCAD } \\ & 2016 \end{aligned}$ | CAD file for creating plots of greyscales, abstraction, interpretation and mapping. Grid coordinates as OSGB. AutoCAD 2010 format. | 25/04/17 | K.T.Donaldson |
| {Text data - path: J669 Swindon Southern Connector Road |  |  |  |  |
| Documentation\}} |  |  |  |  |
| J669 report.odt | OpenOffice.org <br> 3.0.1 Writer | Report text as an Open Office document. | 01/12/16 | K.T.Donaldson |

## Appendix E - copyright and intellectual property

This report may contain material that is non-Archaeological Surveys Ltd copyright (eg Ordnance Survey, Crown Copyright) or the intellectual property of third parties, which we are able to provide for limited reproduction under the terms of our own copyright licences, but for which copyright itself is non-transferable by Archaeological Surveys Ltd. Users remain bound by the conditions of the Copyright, Design and Patents Act 1988 with regard to multiple copying and electronic dissemination of this report.

Archaeological Surveys Ltd shall retain intellectual property rights for the materials and records created as part of this project. A non-exclusive, transferable, sub-licensable, perpetual and royalty-free licence shall be granted to the client on full payment of works in order for them to use, reproduce and enhance the reports, documentation, graphics and illustrations produced as part of this project for the purpose for which they were commissioned. Copyright licence will also be granted to the local authority for planning use and within in the Historic Environment Record for public dissemination upon payment by the client. Any document produced to meet planning requirements may be freely copied for planning, development control, research and outreach purposes without recourse to the originator, subject to all due and appropriate acknowledgements being provided and to the terms of the original contract with the client. Archaeological Surveys Ltd shall retain the right to be identified as the author and originator of the material.

The report, data and any associated material produced by Archaeological surveys Ltd cannot be freely used for any commercial activity other than those set out above. Any unauthorised use will be considered to be in breach of copyright.

Title of Goods remains with Archaeological Surveys Ltd until payment has cleared. Late payment may jeopardise any planning decision as there will be no transfer of title, licensing or any other right of copy or use of this report. Archaeological Surveys Ltd do not give permission for use of the report and associated data in cases of late payment. Any such use will be considered to be in breach of copyright. Late payment may also incur interest at 8\% over the Bank of England base rate. Non-payment will be pursued by legal action.


## Geophysical Survey Eastern Villages Southern Connector Road <br> <br> Swindon

 <br> <br> Swindon}
## Map of survey area

 Reproduced from OS Explorer map nos. 169 \& $1701: 25$000 by permission of Ordnance Survey on behafl of The
Controller of Her Maisty's Stationery Office Controller of Her Majesty's Stationery offic
$\bigcirc$ Crown copyright. All rights resened.

$$
\begin{gathered}
\text { crown copyrignt. All ghnis ess } \\
\text { Licence number 100043799. }
\end{gathered}
$$



- Survey location

Site centred on OS NGR SU 1966583835

## SCALE <br> 1:25 000



























