

T H A M E S V A L L E Y

ARCHAEOLOGICAL

S E R V I C E S

S O U T H W E S T

**School Site A, West Camel Road,
Queen Camel, Somerset**

Geophysical (magnetometer) survey

by Marta Buzcek and Tim Dawson

Site Code: WQC12/152

(ST 5924 2461)

**School Site A, West Camel Road,
Queen Camel, Somerset**

Geophysical Survey (Magnetic)

For Somerset County Council

by Marta Buczek and Tim Dawson

Thames Valley Archaeological

Services Ltd

Site Code
AQC 12/152

September 2012

Summary

Site name: School Site A, West Camel Road, Queen Camel, Somerset

Grid reference: ST 5924 2461

Site activity: Gradiometer survey

Date and duration of project: 18th September 2012

Project manager: Steve Ford

Site supervisor: Tim Dawson

Site code: AQC 12/152

Area of site: 0.64ha

Summary of results: A moderate number of positive linear anomalies, possibly of archaeological origin were identified. Further anomalies recorded on site represent ferrous spikes, either archaeological or modern in origin, modern disturbances caused by wire fences and ridge and furrow which cover the majority of the site and show previous agricultural activity. The survey was carried out in dry conditions.

Location of archive: The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

*This report may be copied for bona fide research or planning purposes without the explicit permission of the copyright holder. All TVAS unpublished fieldwork reports are available on our website:
www.tvas.co.uk/reports/reports.asp.*

Report edited/checked by: Steve Ford✓ 19.09.12 Andrew Muddin✓ 19.09.12

School Site A, West Camel Road, Queen Camel, Somerset A Geophysical Survey (Magnetic)

by Marta Buczek and Tim Dawson

Report 12/152

Introduction

This report documents the results of a magnetic geophysical survey carried out at land at School Site A, West Camel Road, Queen Camel, Somerset (ST 5924 2461) (Fig. 1). The work was commissioned by Mr Peter Friend, Senior Development Officer at Hastoe Homes, Fleur de Lis, Middlemarsh Street, Poundbury, Dorchester, Dorset DT1 3GX. A planning application is to be made to South Somerset District Council for the construction of a new school on one of two sites in the village in conjunction with a proposed affordable housing scheme. A geophysical gradiometer survey was requested to enable subsequent trenching to target areas of archaeologically derived anomalies. The fieldwork was undertaken by Marta Buczek and Tim Dawson on 18th September 2012 and the site code is AQC 12/152.

The archive is presently held at Thames Valley Archaeological Services, Reading in accordance with TVAS digital archiving policies.

Location, topography and geology

The site is a 0.64ha field located immediately to the west of the village of Queen Camel, c.9km north-east of Yeovil, Somerset. The river Cam flows westwards c.300m to the north with the site lying near the crest of the hill on ground that gently rises up to the south. The site is covered with grass, soon to be put to pasture. The northern and eastern edges of the field are bounded by hedgerows of which the eastern one is also strengthened with wire fences. To the south, north and west there is further farmland and to the east, a playing field. The underlying geology is described as Langport Member, Blue Lias Formation and Charmouth Mudstone Formation (BGS 1973). The weather conditions during the survey were largely sunny with heavy showers earlier in the morning. Despite the precipitation, the ground itself was hard (Plates 1 and 2).

Site history and archaeological background

An area to the south of the present survey area within the same field was the subject of a geophysical survey (Payne 2008) after metal detectorists noted a concentration of Roman remains such as coins, fragments of building stone and mosaic tesserae. Subsequent exploratory excavation uncovered part of a well-preserved

mosaic pavement *c.*0.20m below the ground surface and was interpreted as indicative of a previously-unknown Roman villa site. The geophysical (magnetic and resistance) surveys mapped the outline of a large aisled hall building set within an extensive system of angular ditched enclosures. More information received from Somerset Historic Environment Record pointed out the presence of earthworks relating to a deserted medieval village *c.*500m to the south-east.

Methodology

Sample interval

Data collection required a temporary grid to be established across the survey area using wooden pegs at 30m intervals with further subdivision where necessary. Readings were taken at 0.25m intervals along traverses 1m apart. This provides 3600 sampling points across a full 30m × 30m grid (English Heritage 2008), providing an appropriate methodology balancing cost and time with resolution. The small but rather regular shape of the site allowed the set up of four complete and seven incomplete grids of which the latter are obstructed by the nearby boundary (Fig. 2).

The Grad 601-2 has a typical depth of penetration of 0.5m to 1.0m. This would be increased if strongly magnetic objects have been buried in the site. Under normal operating conditions it can be expected to identify buried features >0.5m in diameter. Features which can be detected include disturbed soil, such as the fill of a ditch, structures that have been heated to high temperatures (magnetic thermoremnance) and objects made from ferro-magnetic materials. The strength of the magnetic field is measured in nano Tesla (nT), equivalent to 10^{-9} Tesla, the SI unit of magnetic flux density.

Equipment

The purpose of the survey was to identify geophysical anomalies that may be archaeological in origin in order to inform a targeted archaeological investigation of the site prior to development. The survey and report generally follow the recommendations set out by both English Heritage (2008) and the Institute for Archaeologists (2002).

Magnetometry was chosen as a survey method as it offers the most rapid ground coverage and responds to a wide range of anomalies caused by past human activity. These properties make it ideal for fast yet detailed survey of an area.

The detailed magnetometry survey was carried out using a dual sensor Bartington Instruments Grad 601-2 fluxgate gradiometer. The instrument consists of two fluxgates mounted 1m vertically apart with a second set

positioned at 1m horizontal distance. This enables readings to be taken of both the general background magnetic field and any localised anomalies with the difference being plotted as either positive or negative buried features. All sensors are calibrated to cancel out the local magnetic field and react only to anomalies above or below this base line. On this basis, strong magnetic anomalies such as burnt features (kilns and hearths) will give a high response as will buried ferrous objects. More subtle anomalies such as pits and ditches, can be seen from their infilling soils containing higher proportions of humic material, rich in ferrous oxides, compared to the undisturbed subsoil. This will stand out in relation to the background magnetic readings and appear in plan following the course of a linear feature or within a discrete area.

A Trimble GeoXH 6000 handheld GPS system with sub-decimetre accuracy was used to tie the site grid into the Ordnance Survey national grid. This unit offers both real-time correction and post-survey processing; enabling a high level of accuracy to be obtained both in the field and in the final post-processed data.

Data gathered in the field was processed using the ArcheoSurveyorLite software package. This allows the survey data to be collated and manipulated to enhance the visibility of anomalies, particularly those likely to be of archaeological origin. The table below lists the processes applied to this survey, full survey and data information is recorded in Appendix 1.

Process	Effect
Clip	Enhance the contrast of the image to improve the appearance of possible archaeological anomalies.
Despike	Reduces the prominence of magnetic spikes caused by buried ferrous objects, improving clarity of other anomalies
DeStripe	Equalises underlying differences between grids. Removes the striping effect caused by directional effects, instrument set up, drift or orientation
Edge Match	Corrects changes in the reference probes caused by errors in transferring the probes to new position

Once processed, the results are presented as a greyscale plot shown in relation to the site (Fig. 3), followed by a second plan to present the abstraction and interpretation of the magnetic anomalies (Fig. 4). Anomalies are shown as colour-coded lines, points and polygons. The grid layout and georeferencing information (Fig. 2) is prepared in EasyCAD v.7.22.01, producing a .FC7 file format, and printed as a .PDF for inclusion in the final report.

The greyscale plot of the processed data is exported from ArcheoSurveyorLite in portable network graphics (.PNG) format, a raster image format chosen for its lossless data compression and support for transparent pixels,

enabling it to easily be overlaid onto an existing site plan. The data plot is rotated to orientate it to north and combined with grid and site plans in Adobe InDesign CS5.5, creating .INDD file formats. Once the figures are finalised they are exported in .PDF format for inclusion within the finished report.

Results

A small number of positive magnetic anomalies (possible cut features) have been identified within the survey area. The survey has also recorded magnetic disturbance and several ferrous spikes. Anomalies representing ridge and furrow ploughing are also recorded across the whole site (Fig. 4). Two positive anomalies with strong magnetic signal are more likely to be of archaeological origin, one of these is aligned west-east (grids 6, 7 and 11) and another one north-south (grids 6 and 9). Both are linear in form. These are perpendicular and create a corner and may represent rectangular enclosures or structural remains. To the south there is another linear anomaly with a weak positive magnetic signature parallel to the one mentioned above, also likely to be of archaeological origin (grids 6, 7 and 10). This also forms a corner with another linear anomaly with a strong magnetic signature and also may suggest enclosures or structural remains. Two strong positive anomalies located in the south (aligned north-south) (grids 9 and 10) match up with those found during the English Heritage survey to the south in 2008 (Payne 2008) (Fig. 6) as the survey overlaps the previously surveyed area. A number of stronger localised magnetic responses can be seen in grids 1 and 8 and may be indicative of a localized heating or a large ferrous debris response.

Several ferrous spikes have also been identified; these appear to be a relatively sparse scatter of iron objects, either archaeological or modern in origin. The majority of the spikes are concentrated in the northern zone of the surveyed area. The magnetic disturbances registered within the surveyed area are located in the eastern part of the field along its edge and are caused by nearby wire fences. Another patch of interference to the equipment can be seen in grid 1 may be caused by a large metallic object in the hedgerow (Fig. 6).

The surveyed field is covered by ridge and furrow which can be seen in the striped strong positive magnetic signal. They are aligned north-south and indicate agricultural activity most likely of post-medieval (post 1600's) origin (Fig. 3) and may mask archaeological features.

Conclusion

The survey undertaken has identified a few anomalies of possible archaeological origin. Three positive linear anomalies located in southern part of surveying area most likely represent archaeological features related to the

northern extent of the Roman villa situated to the south of the survey. Further positive anomalies may be interpreted as burnt structures or ferrous rich subsoil anomalies (such as archaeological pits). Other anomalies recorded include weak positive anomalies which are likely to be of archaeological origin, ferrous spikes caused by iron objects, either archaeological or modern in origin, and disturbances caused by nearby wire fences. Anomalies representing ridge and furrow ploughing are also recorded across the whole site. Due the ground conditions and the agricultural and ferrous interference that has occurred to the site, a moderate level of disturbance could have affected the confidence of the interpretation.

References

- BGS, 1973, *British Geological Survey*, 1:50,000, Sheet 196, Solid and Drift Edition, Keyworth
- English Heritage, 2008, *Geophysical Survey in Archaeological Field Evaluation*, English Heritage, Portsmouth (2nd edn)
- IFA, 2002, *The Use of Geophysical Techniques in Archaeological Evaluation*, IFA Paper No. 6, Reading
- Payne, A, 2008, 'Queen Camel, Somerset: Embargoed Letter Report on Geophysical Survey, November 2008', English Heritage report 000-2008, Portsmouth

Appendix 1. Survey and data information

Raw data

COMPOSITE
Filename: grids.xcp
Instrument Type: Bartington (Gradiometer)
Units: nT
Surveyed by: on 19/09/2012
Assembled by: on 19/09/2012
Direction of 1st Traverse: 45 deg
Collection Method: ZigZag
Sensors: 2 @ 1.00 m spacing.
Dummy Value: 32000

Dimensions

Composite Size (readings): 360 x 120
Survey Size (meters): 90 m x 120 m
Grid Size: 30 m x 30 m
X Interval: 0.25 m
Y Interval: 1 m

Stats

Max: 72.62
Min: -54.42
Std Dev: 2.13
Mean: 0.47
Median: 0.48
Composite Area: 1.08 ha
Surveyed Area: 0.6395 ha

PROGRAMME

Name: ArcheoSurveyor
Version: 2.5.19.6

Source Grids: 11

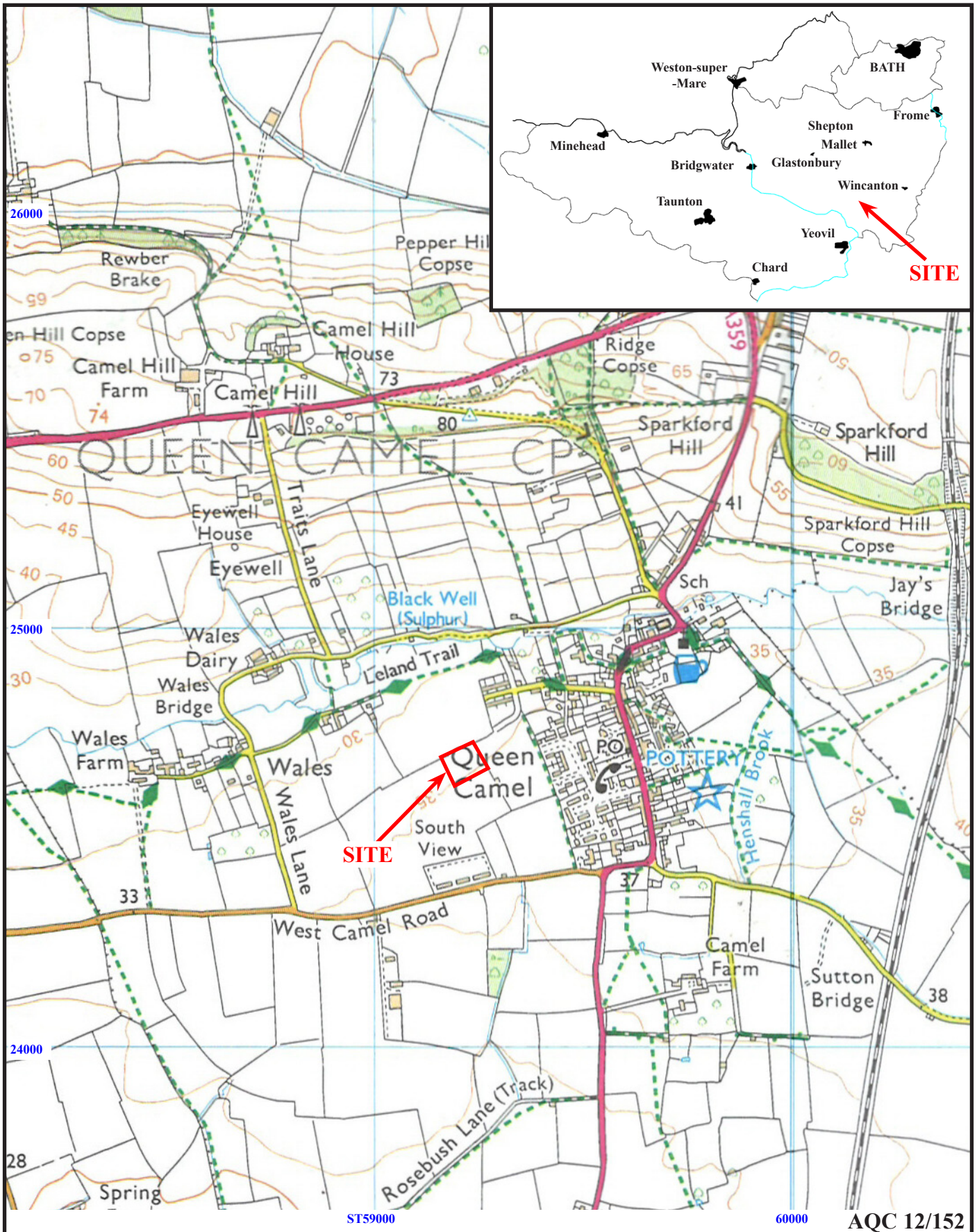
1 Col:0 Row:1 grids\01.xgd
2 Col:0 Row:2 grids\06.xgd
3 Col:0 Row:3 grids\09.xgd
4 Col:1 Row:0 grids\02.xgd
5 Col:1 Row:1 grids\03.xgd
6 Col:1 Row:2 grids\07.xgd
7 Col:1 Row:3 grids\10.xgd
8 Col:2 Row:0 grids\04.xgd
9 Col:2 Row:1 grids\05.xgd
10 Col:2 Row:2 grids\08.xgd
11 Col:2 Row:3 grids\11.xgd

Processed data

Stats
Max: 1.25
Min: -1.25
Std Dev: 0.52
Mean: -0.03
Median: -0.06
Composite Area: 1.08 ha
Surveyed Area: 0.6395 ha

Processes: 9

1 Base Layer
2 Clip from -5.00 to 5.00 nT
3 DeStripe Median Sensors: All
4 Despike Threshold: 1 Window size: 3x3
5 Edge Match (Area: Top 30, Left 240, Bottom 59, Right 359) to
Left edge
6 Clip from -5.00 to 5.00 nT
7 Clip from -2.00 to 2.00 nT
8 DeStripe Mean Traverse: Grids: 01.xgd 02.xgd 03.xgd 04.xgd
05.xgd Threshold: 2 SDs
9 Clip from -1.25 to 1.25 nT

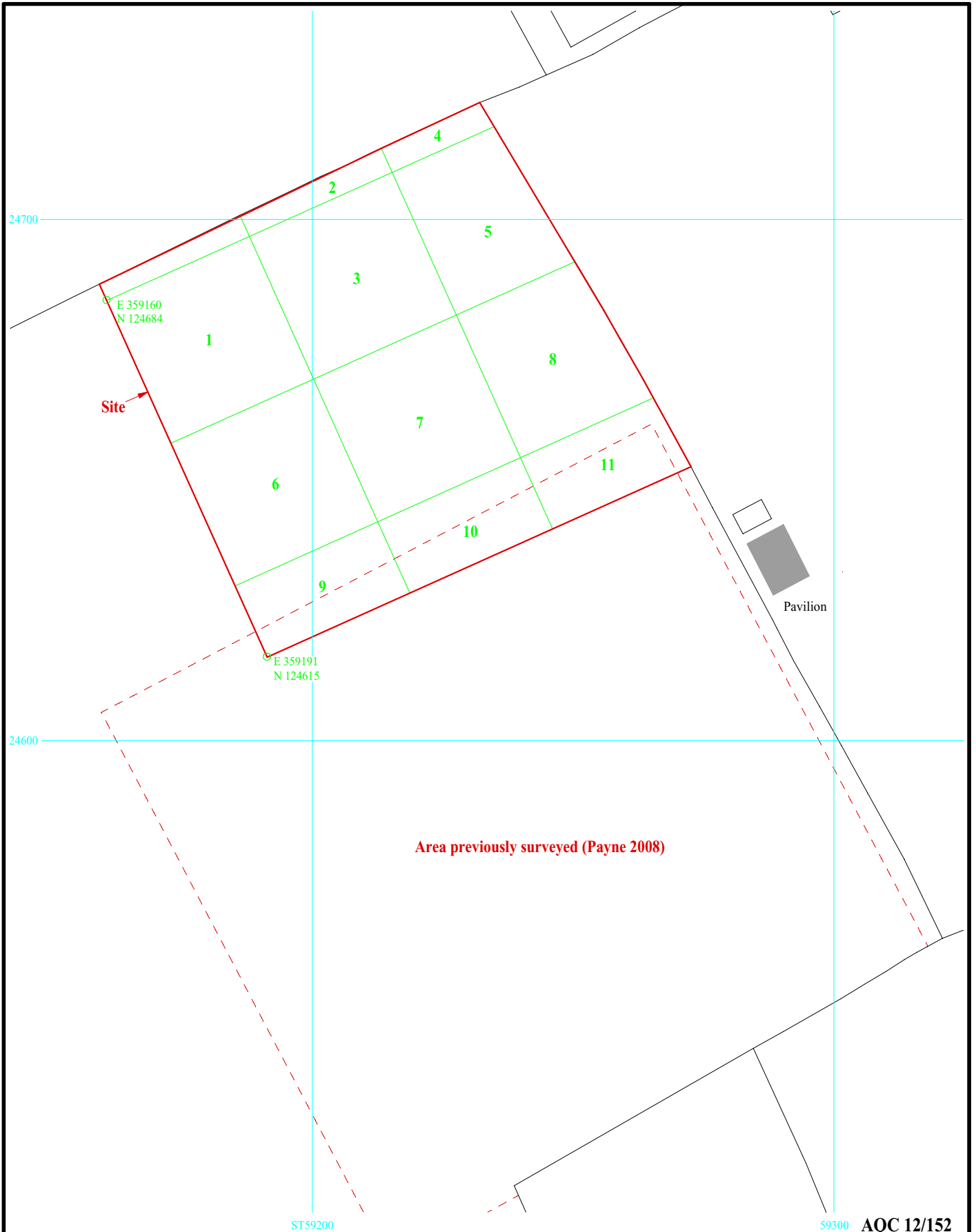


**School Site A, West Camel Road, Queen Camel,
Somerset, 2012**

Geophysical Survey (Magnetic)

Figure 1. Location of site within Queen Camel and Somerset.

Reproduced from Ordnance Survey Explorer 129 at 1:12500
Ordnance Survey Licence 100025880

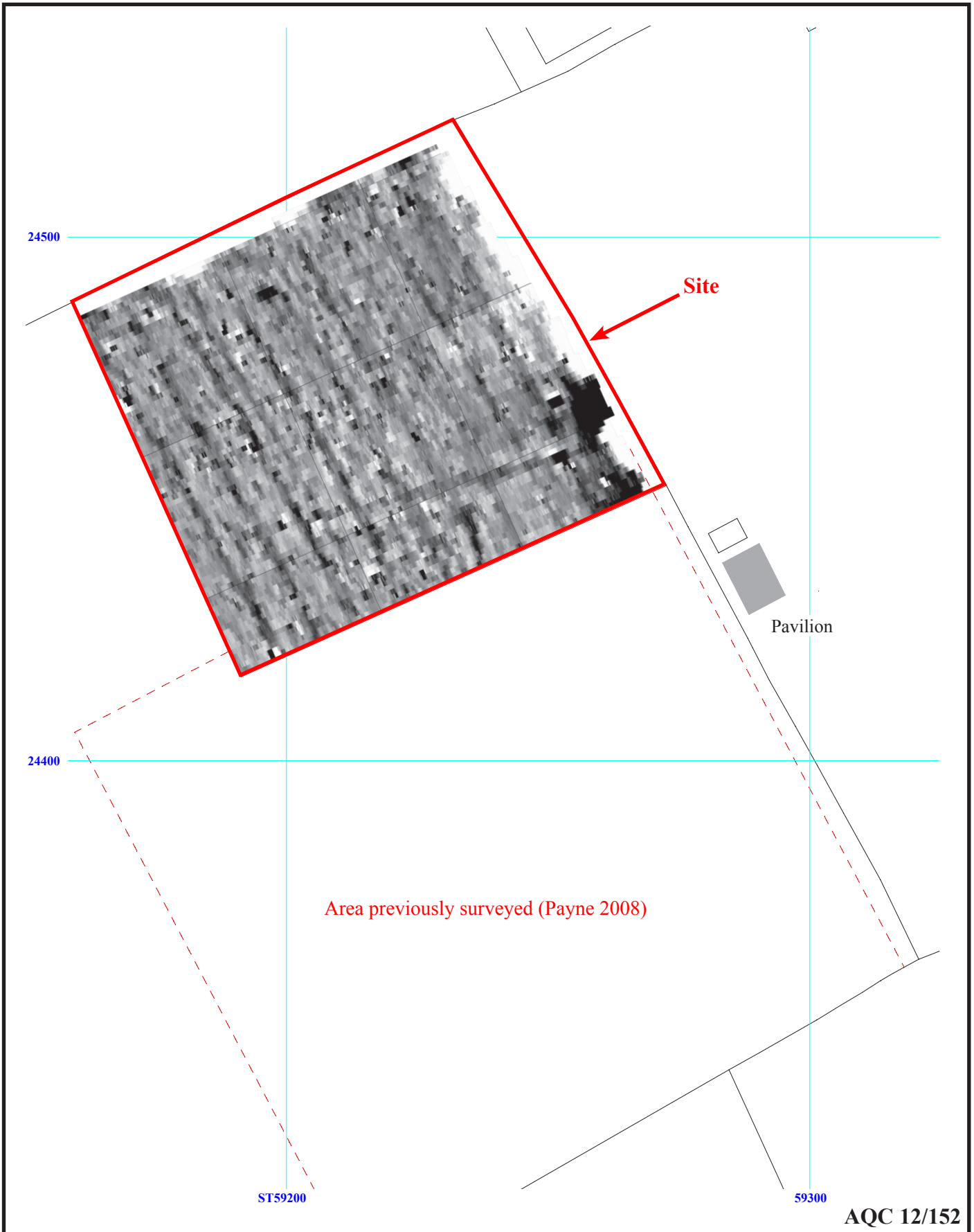


**School Site A, West Camel Road, Queen Camel,
Somerset, 2012
Geophysical Survey (Magnetic)**

Figure 2. Survey grid layout and georeferencing.



THAMES VALLEY
ARCHAEOLOGICAL
 SERVICES
 SOUTH WEST



AQC 12/152

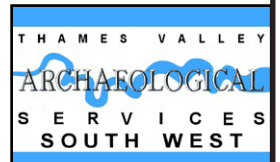
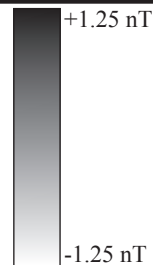
N

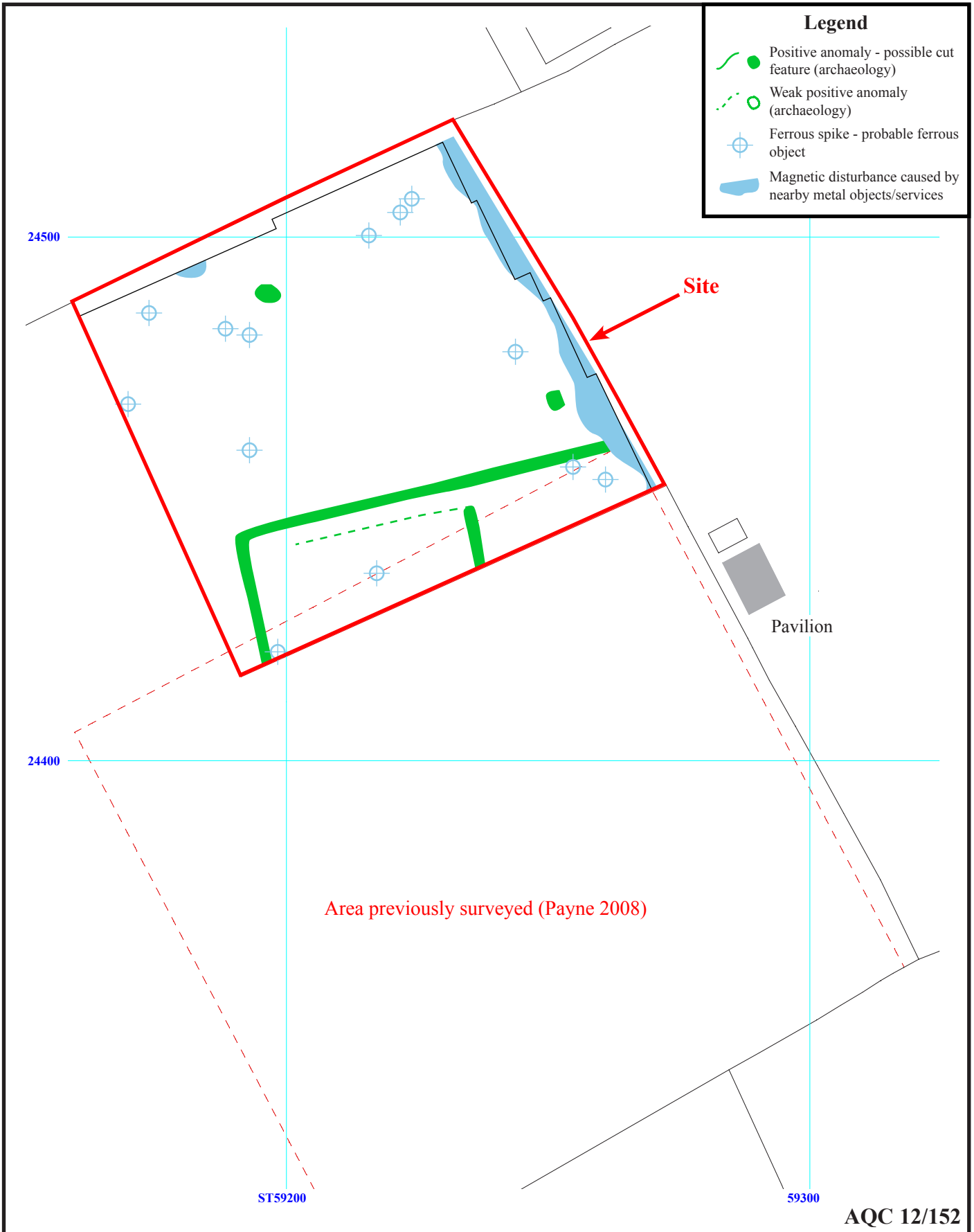


**School Site A, West Camel Road, Queen Camel,
Somerset, 2012**

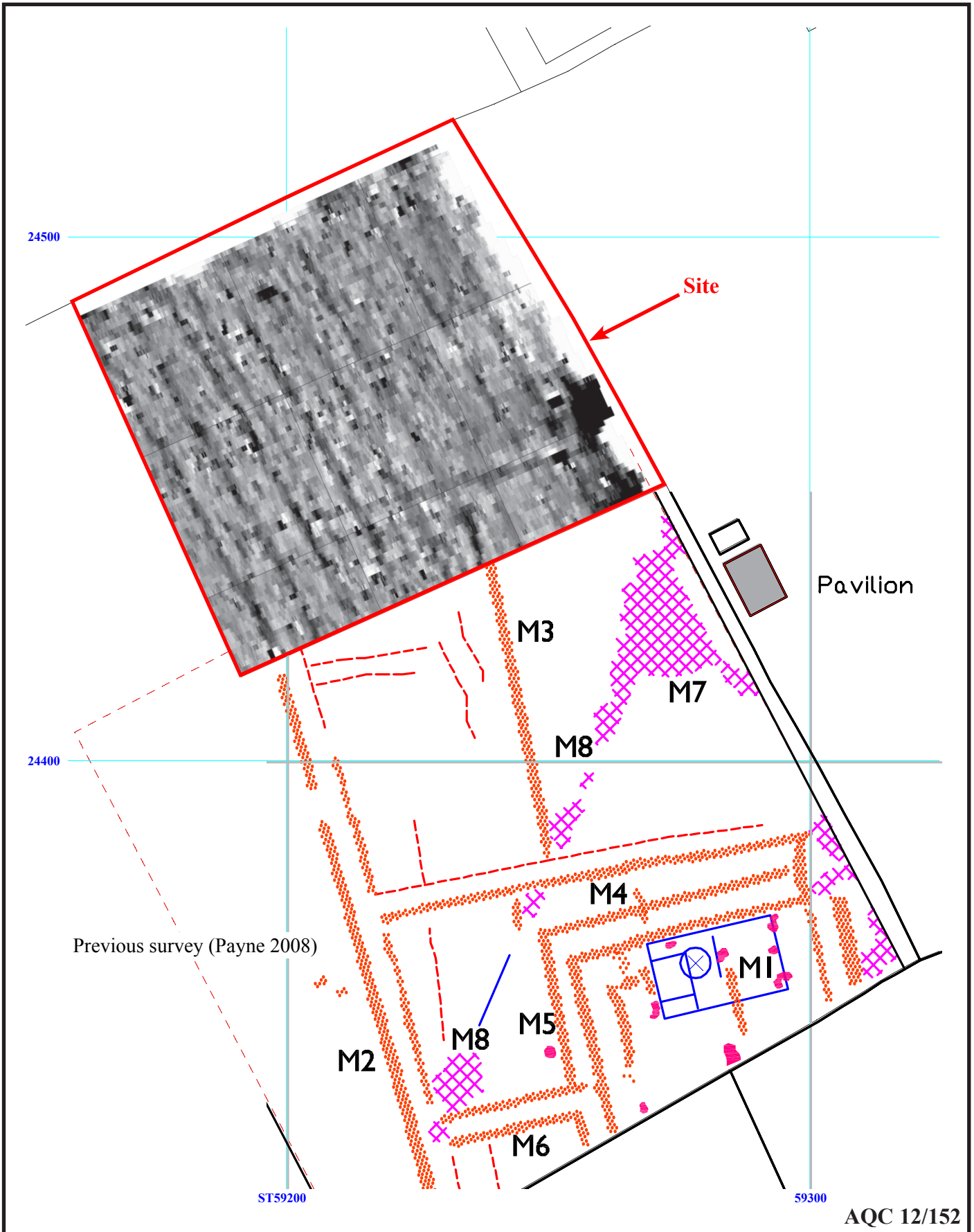
Geophysical Survey (Magnetic)

Figure 3. Plot of processed gradiometer data.





School Site A, West Camel Road, Queen Camel,
Somerset, 2012
Geophysical Survey (Magnetic)
Figure 4. Interpretation of processed gradiometer data.



N

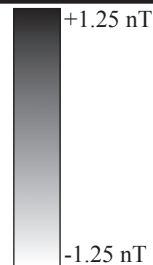


School Site A, West Camel Road, Queen Camel,
Somerset, 2012

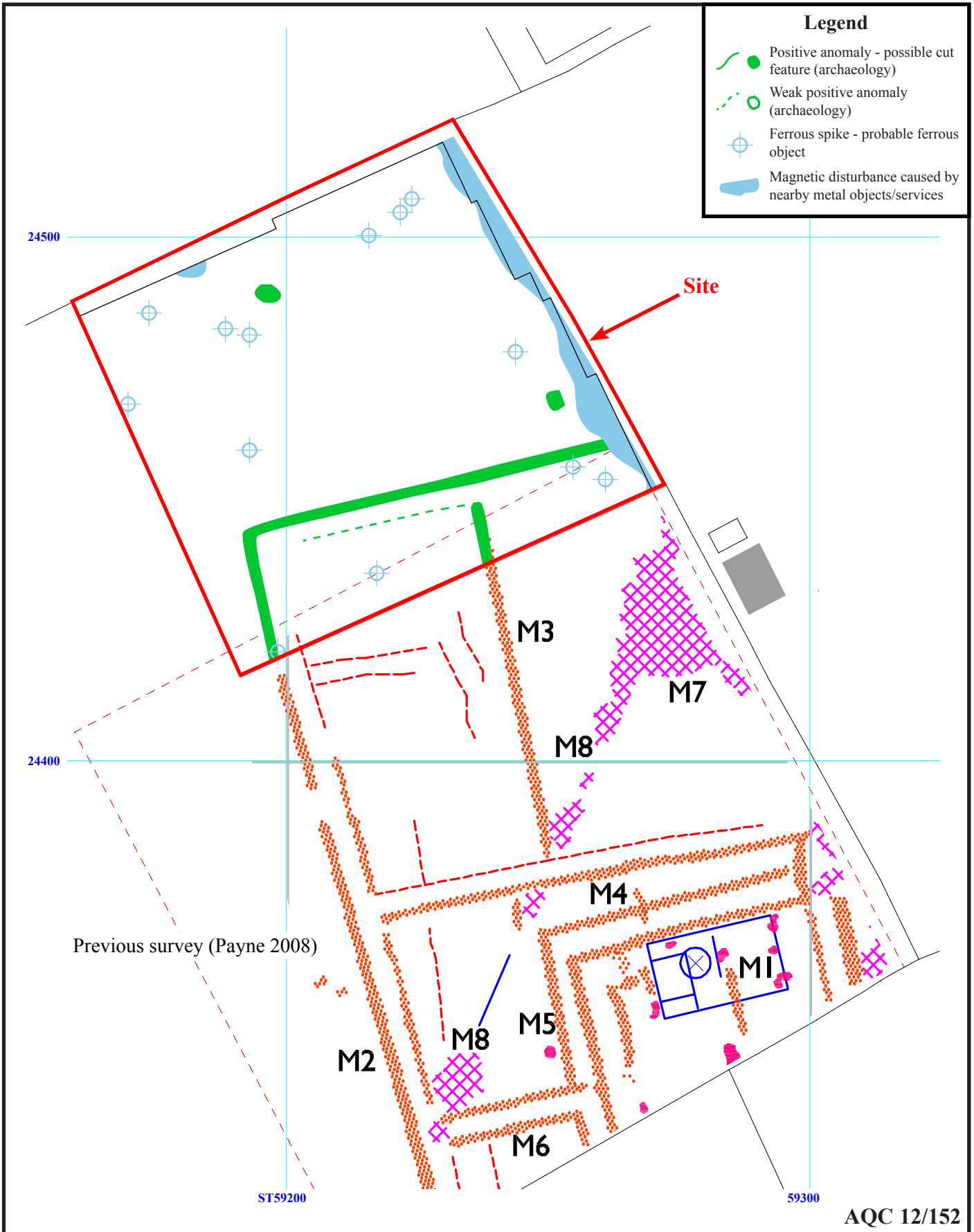
Geophysical Survey (Magnetic)

Figure 5. Plot of processed gradiometer data in relation to
survey of the villa area to the south.

0m 50m



THAMES VALLEY
ARCHAEOLOGICAL
SERVICES
SOUTH WEST



School Site A, West Camel Road, Queen Camel,
Somerset, 2012
Geophysical Survey (Magnetic)
Figure 6. Interpretation of processed gradiometer data.





Plate 1. The site, looking northwest.



Plate 2. The site, looking west.

AQC 12/151

**School Site A, West Camel Road, Queen Camel,
Somerset, 2012**

Geophysical Survey (Magnetic)

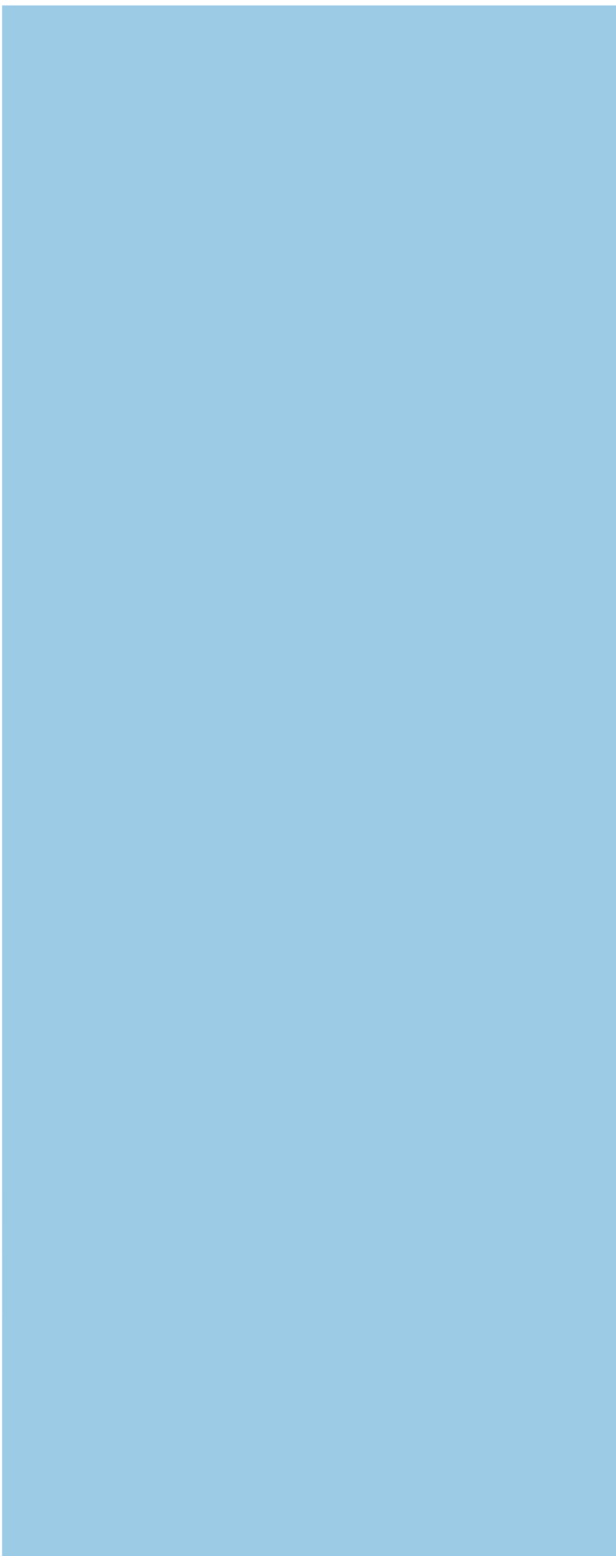
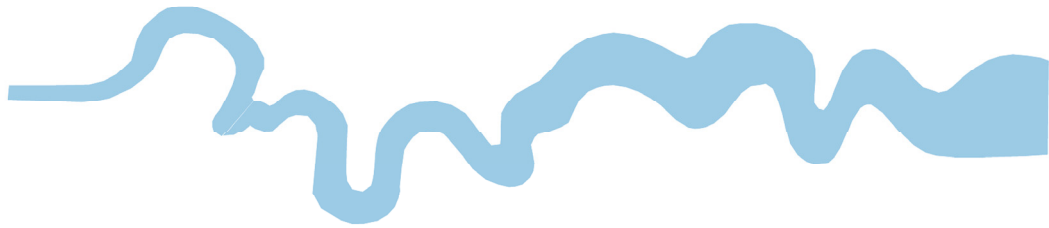
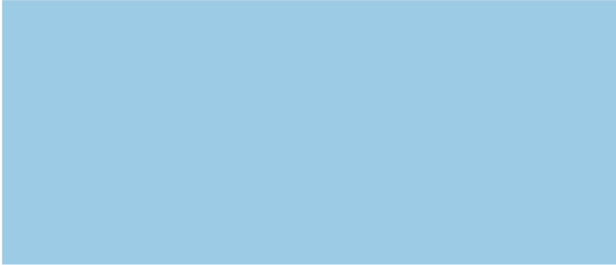
Plates 1 and 2.

THAMES VALLEY
ARCHAEOLOGICAL
SERVICES
SOUTH WEST

TIME CHART

	Calendar Years
Modern _____	AD 1901
Victorian _____	AD 1837
Post Medieval _____	AD 1500
Medieval _____	AD 1066
Saxon _____	AD 410
Roman _____	AD 43
Iron Age _____	BC/AD 750 BC
Bronze Age: Late -----	1300 BC
Bronze Age: Middle -----	1700 BC
Bronze Age: Early -----	2100 BC
Neolithic: Late	3300 BC
Neolithic: Early	4300 BC
Mesolithic: Late	6000 BC
Mesolithic: Early	10000 BC
Palaeolithic: Upper	30000 BC
Palaeolithic: Middle	70000 BC
Palaeolithic: Lower	2,000,000 BC





**TVAS (South West),
Unit 21 Apple Business Centre,
Frobisher Way, Taunton,
Somerset, TA2 6BB**

**Tel: 01823 288 284
Fax: 01823 272 462
Email: southwest@tvas.co.uk
Web: www.tvas.co.uk**