

LAND OFF BOSCOPPA ROAD

ST AUSTELL

CORNWALL

Results of a Geophysical Survey



South West Archaeology Ltd. report no. 230207



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LAND OFF BOSCOPPA ROAD, ST AUSTELL, CORNWALL

RESULTS OF A GEOPHYSICAL SURVEY

By P. Bonvoisin & P. Webb
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Work undertaken by SWARCH for Cornwall Archaeological Unit.

SUMMARY

This report presents the results of a geophysical survey carried out by South West Archaeology Ltd. (SWARCH) for a proposed development of land off Boscoppa Road, St Austell, Cornwall. This work was carried out on behalf of Cornwall Archaeological Unit (CAU) in advance of a planning application.

The site is located south-west of the historic settlement of Boscoppa, on the north-eastern fringes of the town of St Austell, between Boscoppa Road and the A391. It comprises a single pastoral field situated on moderately sloping ground to the south-west of the medieval settlement of Boscoppa, in the parish of St Austell. Settlement at Boscoppa is first recorded in 1284. In 1842 the proposal site was part of the Boscoppa Estate, the site and surrounding lands under the ownership of Lord Mount Edgumbe.

The proposal site sits within a fieldscape characterised as medieval farmland, in an area where archaeological fieldwork has been relatively limited, largely to landscape wide surveys, but including assessment and evaluation ahead of the construction of the A391; the proposal site having undergone a previous desk-based assessment. The site sits within a wider prehistoric funerary and post-medieval mining landscape.

The geophysical survey identified five groups of anomalies across the field. These were predominantly linear ditch and/or bank boundary features associated with phases of the existing and historic field-system. Anomalies associated with agricultural activity, modern services, metallic debris and ground disturbance were also apparent. The degree of preservation of the identified features appears to be poor. The majority of the anomaly responses are weak, with some intermittent and barely discernible from the background geology. This suggests that many of the identified features only survive to a shallow depth, their intermittent nature suggesting only partial survival. However, it is possible that additional, even more ephemeral features, are masked by the background geology and modern disturbances.

The results of the geophysical survey would suggest that the archaeological potential for the site is low. The majority of the identified features relate to historic phases of the existing field-system which are tentatively suggested as being medieval, or more likely post-medieval in date. Any development of the site is likely to encounter and destroy the buried archaeological resource (should it be present). Further mitigation through targeted evaluation trenching may therefore be required to validate and clarify the results of the geophysical survey and the dating of any features, if present.



February 2023

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THE LANDOWNER AND TENANT FOR ACCESS
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GRAPHICS: PETER BONVOISIN, PETER WEBB

1.0 INTRODUCTION

LOCATION:	(NORTH OF) BOSCOPPA ROAD
PARISH:	ST AUSTELL
DISTRICT:	ST AUSTELL & NEWQUAY
COUNTY:	CORNWALL
NGR:	CENTRED ON SX 203613 53551
PLANNING NO.:	PRE-APPLICATION
SWARCH REF.	ALBR22
OASIS REF:	SOUTHWES1-512304

1.1 PROJECT BACKGROUND

South West Archaeology Ltd. (SWARCH) was commissioned by Cornwall Archaeological Unit (the Client) to undertake a geophysical survey on land off Boscoppa Road, St Austell, Cornwall as part of a planning application for development of the land. This work was undertaken in accordance with best practice and ClfA guidance in order to assess the potential impact of the development.

1.2 TOPOGRAPHICAL AND GEOLOGICAL BACKGROUND

The site is located to the south-west of the historic settlement of Boscoppa, on the north-eastern fringes of St Austell as it exists today, c.2km north-east of the historic core of the town. It sits on moderately sloping land at a height of between approximately 88m and 100m AOD (Figure 1). Although the site is within the unsurveyed urban/industrial limits of St Austell, the predominant soils of this area are the well-drained fine loamy soils of the Denbigh 2 Association (SSEW1983). These overlie the Hornfelsed slate and sandstone of the Tredrean Mudstone Formation (BGS 2023).

1.3 HISTORICAL AND ARCHAEOLOGICAL BACKGROUND

The site lies in the parish of St Austell, in the deanery and eastern division of the historic hundred of Powder. The manor of St Austell belonged to the prior and convent of Tywardreth and following the dissolution was annexed in 1540 to the Duchy of Cornwall and subsequently sold to Edmund Bourne, though later restored to the Duchy. In 1799 the manor was purchased by Charles Rashleigh. During the Civil War, the town had quartered the Earl of Essex's army before being taken by King Charles I in 1644. A market was granted in 1661 to Oliver Sawle and Henry Carlyon along with two fairs, though the town only really grew to prominence as a result of the surrounding mines such as Polgooth (Lysons 1814).

Settlement at Boscoppa, formerly a separate village to that of St Austell, is first recorded in 1284 as *Boscoppe* from the Cornish *bod* meaning 'dwelling' and an unknown second element (Watts 2010).

The proposal site lies within an area recorded on the Historic Landscape Characterisation (HLC) as *medieval farmland*: the agricultural heartland, with farming settlements documented before the 17th century AD and whose field patterns are morphologically distinct from the generally straight-sided fields of later enclosure; either medieval or prehistoric origins. At the time of the tithe survey (c.1840), the field in which the site lies, along with much of the surrounding landscape was owned by the Lord Mount Edgcumbe as part of the Boscoppa Estate. The site itself was within a field named *Down Park* which was leased to Mary and Jane Snell and occupied by William Hocken.

The Cornwall and Scilly Historic Environment Record (HER) notes that the surrounding area is littered with and china clay extraction and mining activity, including the 19th century Boscoppa (MCO11867), Minear (MCO13047) Fatwork (MCO11837) and West Wheal Eliza (MCO11838) mines.

However, these sit within a prehistoric landscape, the sites of numerous barrows located within the region (MCO1935-6, MCO2433-9) as well as excavated settlement features (MCO7629, MCO55250) to the north and south-east.

Whilst substantial archaeological work has been carried out in the area, this has mostly been associated with landscape scale surveys of mining features and geological conditions, along with an assessment (ECO135) and archaeological evaluations (ECO836) along the route of the A391. The site itself has previously been subject to a desk-based assessment (ECO5703).

1.4 METHODOLOGY

The geophysical (gradiometer) survey was undertaken in accordance with current best practice and ClfA guidance; and follows the guidance outlined in *Geophysical Survey in Archaeological Field Evaluation* (English Heritage 2008); *Standard and Guidance for Archaeological Geophysical Survey* (ClfA 2014); *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016).

'Archaeological geophysical survey uses non-intrusive and non-destructive techniques to determine the presence or absence of anomalies likely to be caused by archaeological features, structures or deposits, as far as reasonably possible, within a specified area or site on land, in the inter-tidal zone or underwater. Geophysical survey determines the presence of anomalies of archaeological potential through measurement of one or more physical properties of the subsurface.' (Standard and Guidance for Archaeological Geophysical Survey 2014).

The results of the survey will, as far as possible, inform on the presence or absence, character, extent and in some cases, apparent relative phasing of buried archaeology to inform a strategy to mitigate any threat to the archaeological resource.

LAND OFF BOSCOPPA ROAD, ST AUSTELL, CORNWALL



FIGURE 1: SITE LOCATION (THE SITE IS INDICATED). CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT AND DATABASE RIGHT 2023. LICENCE NUMBER 100022432.

2.0 GEOPHYSICAL SURVEY

2.1 INTRODUCTION

An area of c.2.4ha was the subject of a magnetometry (gradiometer) survey. The purpose of this survey was to identify and record magnetic anomalies within the proposed site. While identified anomalies may relate to archaeological deposits and structures the dimensions of recorded anomalies may not correspond directly with any associated features. The following discussion attempts to clarify and characterise the identified anomalies. The survey was undertaken on 16th December 2022 by P. Bonvoisin; and the survey data was processed by P. Bonvoisin. Supporting photographic evidence from the site inspection can be seen in Appendix 1; detailed survey data in Appendix 2; and additional graphic images of the survey data and numbered grid locations can be found in Appendix 3.

2.2 SITE INSPECTION

The site comprises a single sub-rectangular field (F1, c.2.4ha) orientated approximately north-west to south-east between Boscoppa Road and the A391. The site slopes moderately down from the north-west, becoming steeper at its south-eastern end and is bounded by a combination of hedgerows and hedges. At the time of survey the site was under pasture.

No earthworks were identified on the site, though evidence of the recent agricultural activity was identified through the grass.

2.3 METHODOLOGY

The gradiometer survey follows the general guidance as outlined in: *EAC Guidelines for the use of geophysics in Archaeology: Questions to Ask and Points to Consider* (Europae Archaeologiae Consilium/European Archaeological Council 2016) and *Standard and Guidance for Archaeological Geophysical Survey* (ClfA 2014).

The survey was carried out using a twin-sensor fluxgate gradiometer (Bartington Grad601). These machines are sensitive to depths of up to 1.50m. The survey parameters were: sample intervals of 0.25m, traverse intervals of 1m, a zigzag traverse pattern, traverse orientation was circumstantial, grid squares of 30×30m. The gradiometer was adjusted ('zeroed') every 0.5-1ha. The survey grid was tied into the Ordnance Survey National Grid- and set out using a Leica CS15 GNSS Rover GPS. The data was downloaded onto *Grad601 Version 3.16* and processed using *TerraSurveyor Version 3.0.36.0*. The primary data plots and analytical tools used in this analysis were *Shade* and *Metadata*. The details of the data processing are as follows:

Processes:

Clip +/- 1SD; removes extreme data point values.

DeStripe all traverses, median; used to equalise underlying differences between grids (potentially caused by instrument drift or orientation, directional effects inherent in magnetic instrument, or differences in instrument set up during survey e.g. using two gradiometers).

DeStagger selected grids, all traverses out- and inbound by 0.25m reduces staggering effects within data derived from zig-zag collection method.

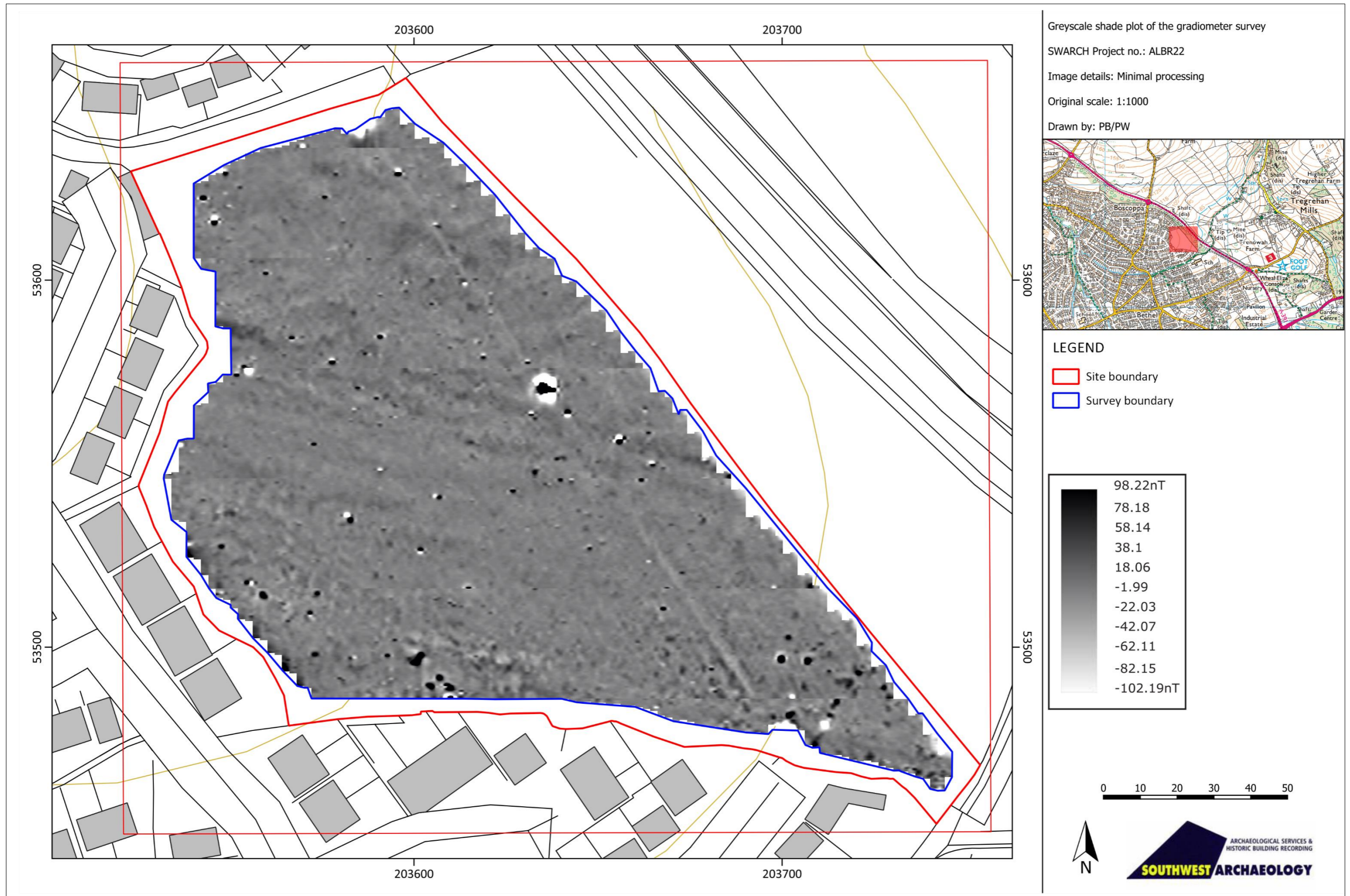


FIGURE 2: GREYSCALE SHADE PLOT OF THE GRADIOMETER SURVEY DATA; MINIMAL PROCESSING (CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT 2023. LICENCE NUMBER 100022432).

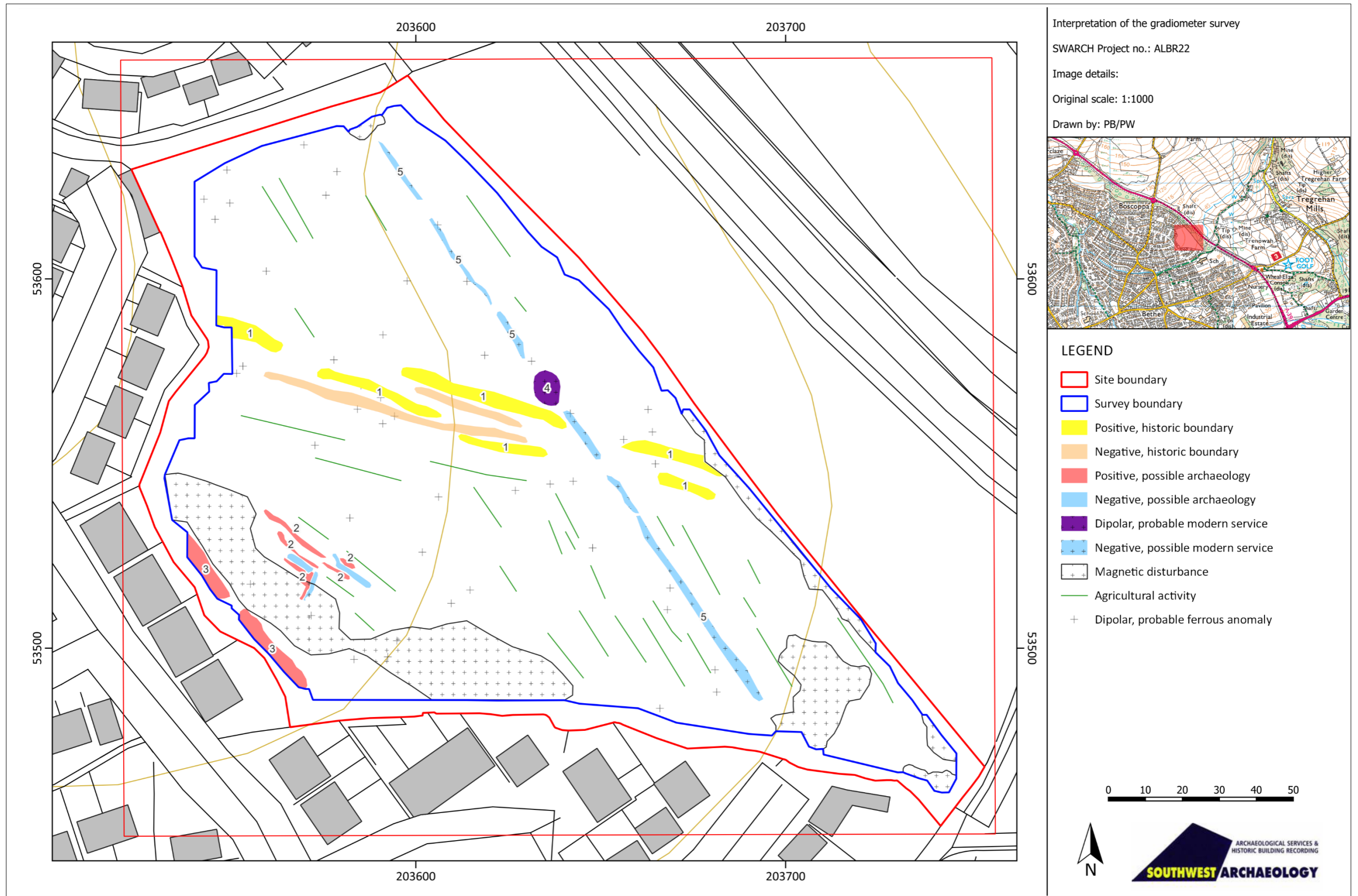


FIGURE 3: INTERPRETATION OF THE GRADIOMETER SURVEY DATA (CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT 2023. LICENCE NUMBER 100022432).

TABLE 1: SURVEY DETAILS (UN-ADJUSTED)

Field	Area Surveyed (ha)	Max (nT)	Min (nT)	Standard Deviation (nT)	Mean (nT)	Median (nT)
F1	2.0335	98.22	-102.19	4.13	0.06	0.00

2.4 RESULTS

Table 3 with the accompanying Figures 6-7 show the analyses and interpretation of the geophysical survey data.

TABLE 2: INTERPRETATION OF GRADIOMETER SURVEY DATA.

Anomaly Group	Class and Certainty	Form	Archaeological Characterisation	Comments
1	Weak positive & negative, possible	Linear	Double ditch & bank – historic boundary	Indicative of cut and infilled features such as ditches flanking central banked/compacted material typical of traditional Cornish hedgebank construction. Orientated approximately west-north-west to east-south-east. Depicted on historic mapping. Responses of between -6.96nT to -0.14nT and +0.16nT to +6.22nT.
2	Weak to moderate positive, possible	Linear	Ditch	Indicative of a cut and infilled feature such as a ditch. Orientated approximately north-west to south-east +0.28nT and +11.43nT.
3	Weak positive & negative, possible	Linear	Ditch & bank	Indicative of cut and infilled features such as ditches with flanking banked/compacted material. Orientated approximately north-west to south-east and north-east to south-west. Responses of between -3.05nT to -0.01nT and +0.01nT to +2.20nT.
4	Very strong positive to negative, probable	Discrete ovoid	Modern utility	Indicative of a metallic object such as a drain cover. Responses of between -101.88nT and +98.22.
5	Weak negative, possible	Linear	Buried pipe or service	Indicative of a buried modern service such as a drain or water pipe. Orientated approximately north-west to south-east. Responses of between -5.17nT and -0.04nT.
	Weak positive & negative, possible	Linears	Agricultural activity	Linear striations covering the field with regularity. Indicative of shallow ploughing. Aligned approximately north-west to south-east. Responses of between -2.43nT to -0.04nT and +0.03nT to +2.70nT.
	Strong dipolar (mixed response)	Discrete	Ferrous anomaly	Indicative of metallic objects, or ferrous based responses. Responses of -100.61nT and +96.49nT.
	Strong bipolar (mixed response)	Irregular areas	Modern disturbance	Indicative of disturbed ground and disturbance caused by proximity to metallic fences and debris. Responses of between -81.90nT and +93.52nT.

2.5 DISCUSSION

The survey identified five groups of anomalies across the field. These were predominantly linear ditch and/or bank boundary features associated with phases of the existing and historic field-system. Anomalies associated with agricultural activity, modern services, metallic debris and ground disturbance were also apparent.

The general response variation across the site was between +/-3nT. The response strength of probable archaeological activity was low (typically between +/-10nT). The weaker responses of many of the anomalies may indicate that features only survive to a shallow depth; the stronger responses perhaps indicating the presence of more recent disturbance.

The anomaly groups identified include: historic ditch and bank boundaries removed during the 20th century (Group 1); further possible ditch and bank features associated with phases of the existing and historic field boundaries (Groups 2-3); anomalies likely associated with modern utility services (Groups 4-5) and agricultural activity.

2.6 ARCHAEOLOGICAL POTENTIAL

Whilst none of the identified features can at this stage be dated, the location of some anomalies (Group 1) broadly corresponds with boundaries depicted on historic mapping (see Appendix 4), indicating that this feature formed part of the mid- to late-19th century enclosure of common land. It was removed during the 20th century. The surrounding historic field-pattern is characterized as *medieval farmland*; the more gently curving boundaries likely forming part of this earlier field-system are visible in both the southern and western site boundaries, the adjacent parallel anomalies (Group 2) perhaps forming an earlier phase of the same boundary.

It is possible that many of the remaining ditch and/or bank features form part of these earlier field-systems, having been removed by the mid-19th century. In some cases these boundaries are clearly congruent with this field-system (Group 3) and may have origins during this period; though their weak and partial nature may indicate that they are deeper cut examples of agricultural activity associated with these field-systems.

A modern service formed of a discrete strong dipolar (Group 4) and negative liner (Group 5) anomalies runs inside the north-western site boundary.

The degree of preservation of the identified features appears to be poor. The majority of the anomaly responses are weak, with some intermittent and barely discernible from the background geology. This suggests that many of the identified features only survive to a shallow depth, their intermittent nature suggesting only partial survival. However, it is possible that additional, even more ephemeral features, are masked by the background geology and modern disturbances.

The results of the geophysical survey would suggest that the archaeological potential for the site is *low*. The majority of the identified features relate to historic phases of the existing field-system which are tentatively suggested as being medieval and post-medieval in date, though the presence of prehistoric activity in the surrounding area means that a prehistoric or Romano-British date cannot be ruled out.

Any development of the site is likely to encounter and destroy the buried archaeological resource (should it be present). Further mitigation through targeted evaluation trenching would be required to validate and clarify the results of the geophysical survey and the dating of any features, if present.

3.0 CONCLUSION

The site comprises a single field between Boscoppa Road (south) and the A391 (north-east). It sits on moderately sloping ground to the south-west of the medieval settlement of Boscoppa, in the parish of St Austell.

The development site lies within an area recorded on the Historic Landscape Characterisation as *medieval farmland*: the agricultural heartland, with farming settlements documented before the 17th century AD and whose field patterns are morphologically distinct from the generally straight-sided fields of later enclosure; either medieval or prehistoric origins.

The survey identified five groups of anomalies across the field. These were predominantly linear ditch and/or bank boundary features associated with phases of the existing and historic field-system. Anomalies associated with agricultural activity, modern services, metallic debris and ground disturbance were also apparent.

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The results of the geophysical survey would suggest that the archaeological potential for the site is *low*. The majority of the identified features relate to historic phases of the existing field-system which are tentatively suggested as being medieval or more likely post-medieval in date.

Any development of the site is likely to encounter and destroy the buried archaeological resource (should it be present). Further mitigation through targeted evaluation trenching may be required to validate and clarify the results of the geophysical survey and the dating of any features, if present.

5.0 BIBLIOGRAPHY & REFERENCES

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Chartered Institute for Archaeologists 2014 (revised 2017): *Standard and Guidance for Archaeological Geophysical Survey*.

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<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

APPENDIX 1: SUPPORTING PHOTOGRAPHS – SITE INSPECTION



1. F1, VIEW ACROSS THE SITE; VIEWED FROM THE NORTH-WEST (NO SCALE).



2. F1, VIEW ACROSS THE SITE; VIEWED FROM THE EAST (NO SCALE).



3. F1, VIEW ACROSS THE SITE; VIEWED FROM THE SOUTH-EAST (NO SCALE).



4. F1, VIEW ACROSS THE SITE; VIEWED FROM THE WEST (NO SCALE).



5. F1, VIEW ALONG THE NORTHERN BOUNDARY; VIEWED FROM THE EAST (NO SCALE).



6. F1, VIEW ALONG THE NORTH-EASTERN BOUNDARY; VIEWED FROM THE SOUTH-EAST (NO SCALE).



7. F1, VIEW ALONG THE NORTH-WESTERN BOUNDARY; VIEWED FROM THE WEST-NORTH-WEST (NO SCALE).



8. F1, DETAIL OF THE NORTH-WESTERN CORNER OF THE SITE; VIEWED FROM THE SOUTH-EAST (NO SCALE).



9. F1, DETAIL OF THE WESTERN BOUNDARY; VIEWED FROM THE EAST (NO SCALE).



10. F1, DETAIL OF THE WESTERN BOUNDARY; VIEWED FROM THE EAST (NO SCALE).



11. F1, VIEW ALONG THE SOUTHERN BOUNDARY; VIEWED FROM THE WEST (NO SCALE).



12. F1, VIEW ALONG THE SOUTHERN BOUNDARY (WESTERN END); VIEWED FROM THE EAST (NO SCALE).



13. F1, DETAIL OF THE GATED ACCESS AT THE SOUTHERN END OF THE SITE; VIEWED FROM THE NORTH-WEST (NO SCALE).

APPENDIX 2: METADATA FOR GEOPHYSICAL SURVEY PROCESSING

GRADIOMETRY

GENERAL DATA FOR ALL FIELDS/SITE:

SITE

NAME: ALBR22
LOCATION: North of Boscoppa Road, St Austell
COLLECTION METHOD: ZigZag
SENSORS: 2 @1m spacing
DUMMY VALUE: 32702
X&Y INTERVAL: 0.25m
INSTRUMENT TYPE: Bartington Grad 601
UNITS: nT
SURVEYED AREA: 2.0335ha

PROGRAM

NAME: TerraSurveyor
VERSION: 3.0.37.30

STATISTICS ADJUSTED AFTER PROCESSING

PROCESSES USED:

DeStripe: used to equalise underlying differences between grids (potentially caused by instrument drift or orientation, directional effects inherent in magnetic instrument, or differences in instrument set up during survey e.g. using two gradiometers).

DeStagger: reduces staggering effects within data derived from zig-zag collection method.

FIELD F1

STATS

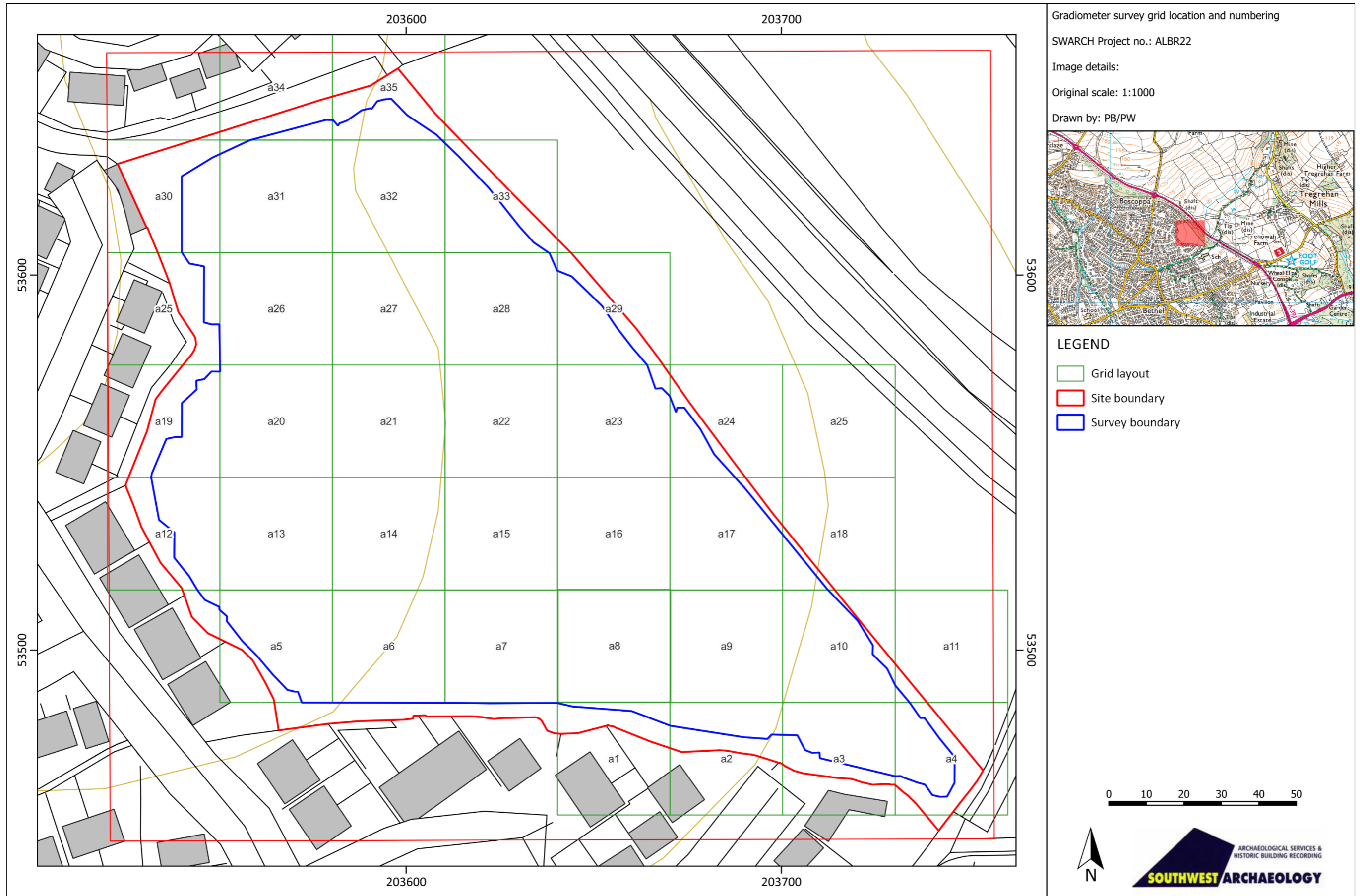
MAX: 98.22
MIN: -102.19
STD. DEV.: 4.13
MEAN: 0.06
MEDIAN: 0.00
COMPOSITE AREA: 5.04ha
SURVEYED AREA: 2.0335ha

PROCESSES

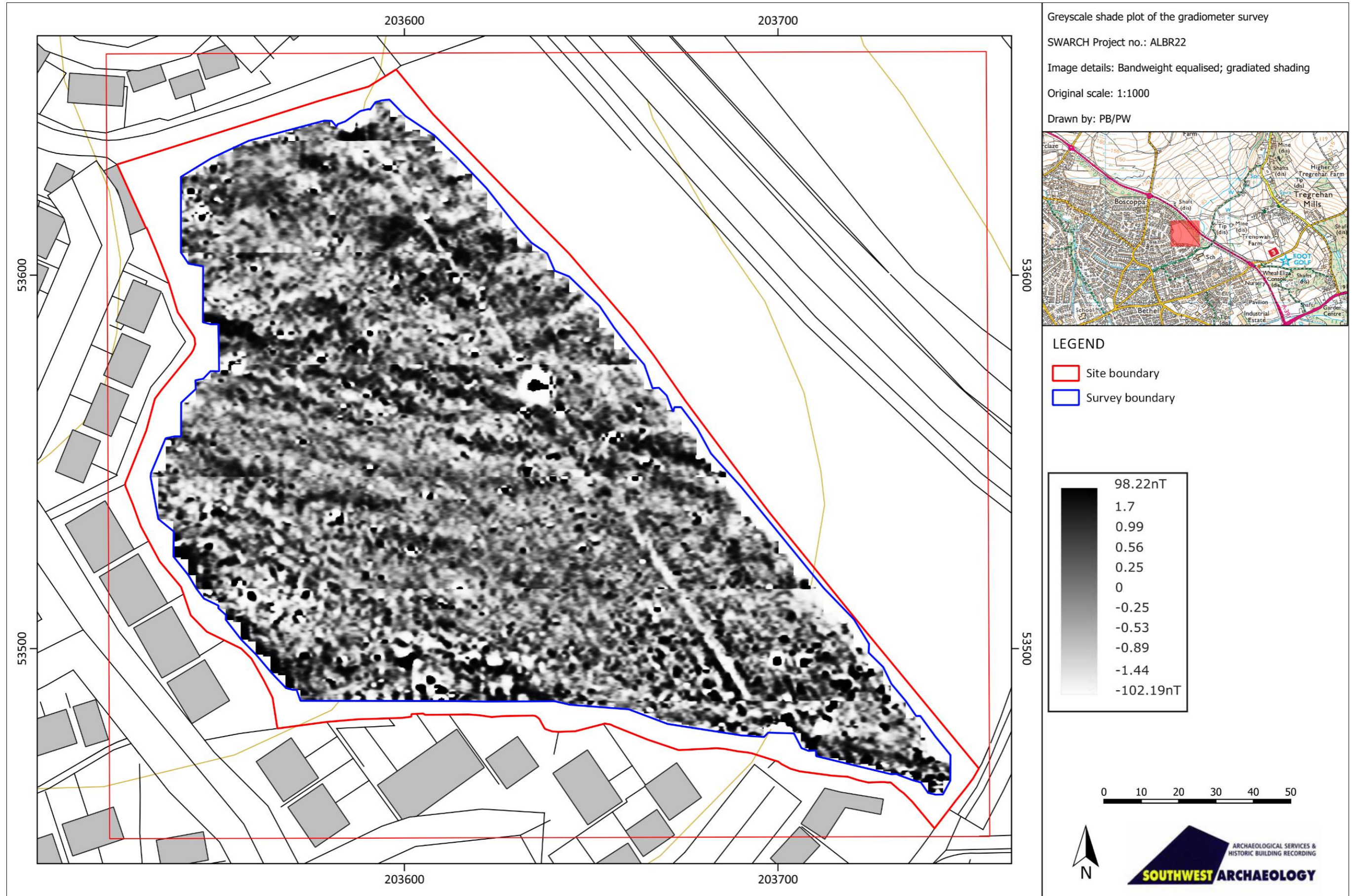
PROCESSES: 3

- 1 Base Layer
- 2 DeStripe Median Traverse: Grids: All
- 3 DeStagger: Grids: All By: 0 intervals, 25.00cm

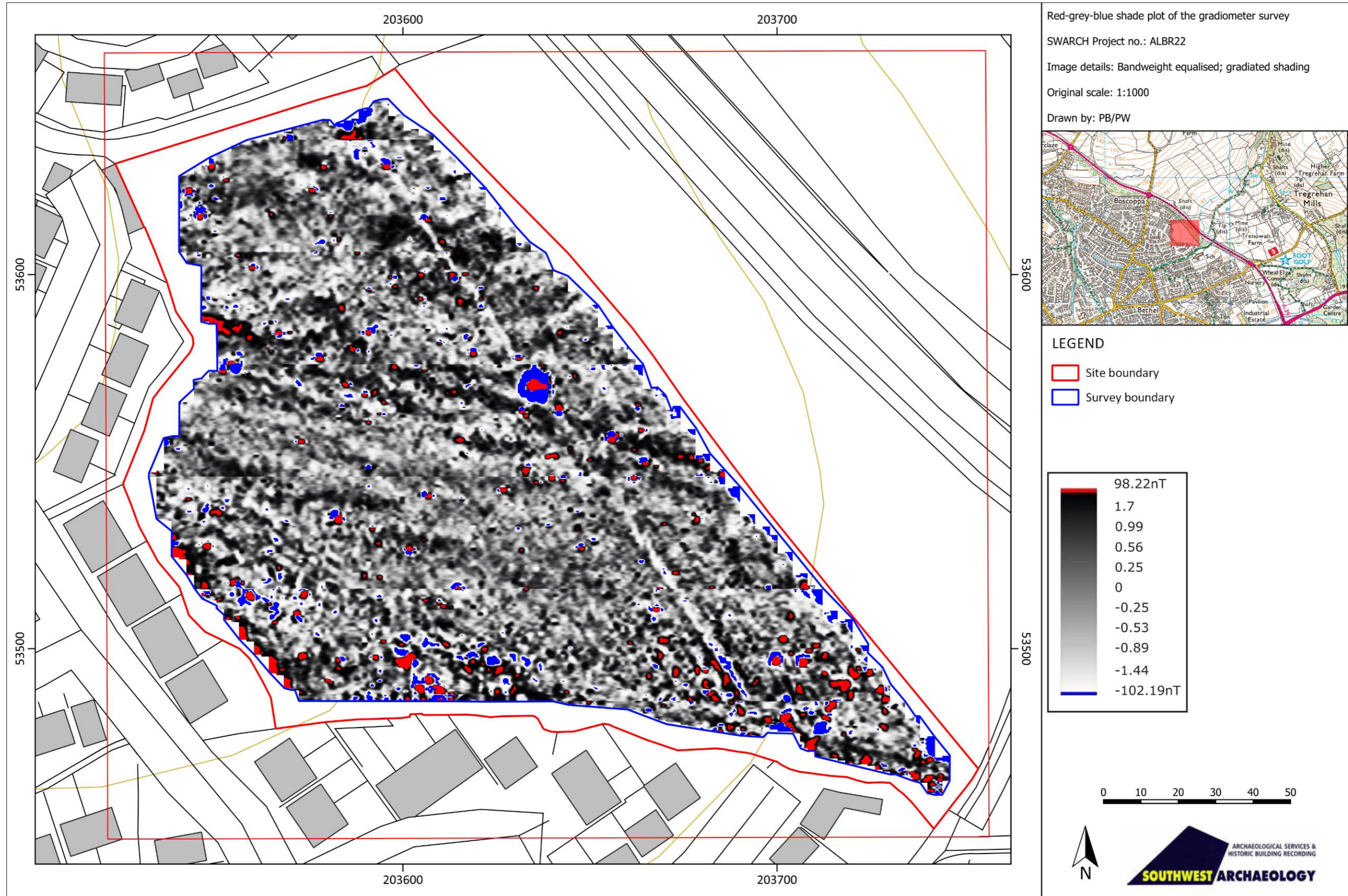
APPENDIX 3: ADDITIONAL GRAPHICAL IMAGES OF THE GRADIOMETER SURVEY



1. GEOPHYSICAL SURVEY GRID LOCATION AND NUMBERING. (CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT 2023. LICENCE NUMBER 100022432).

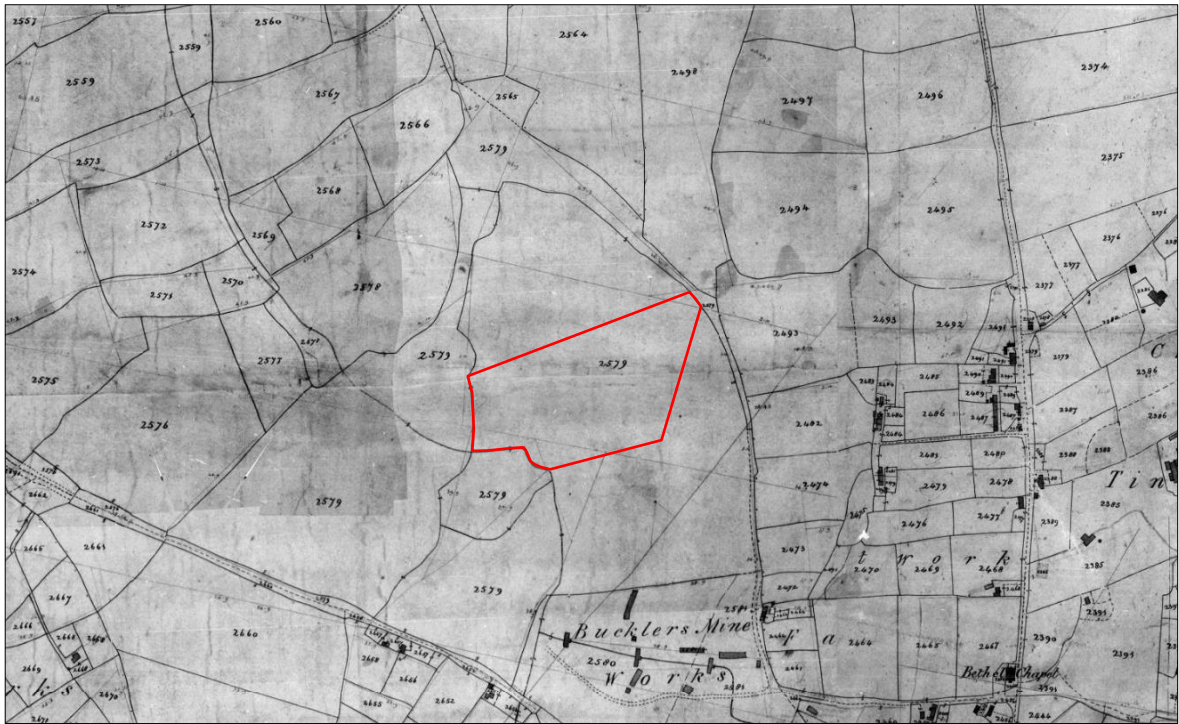


2. GREYSCALE SHADE PLOT OF GRADIOMETER SURVEY DATA; BANDWEIGHT EQUALIZED, GRADIATED SHADING (CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT 2023. LICENCE NUMBER 100022432).

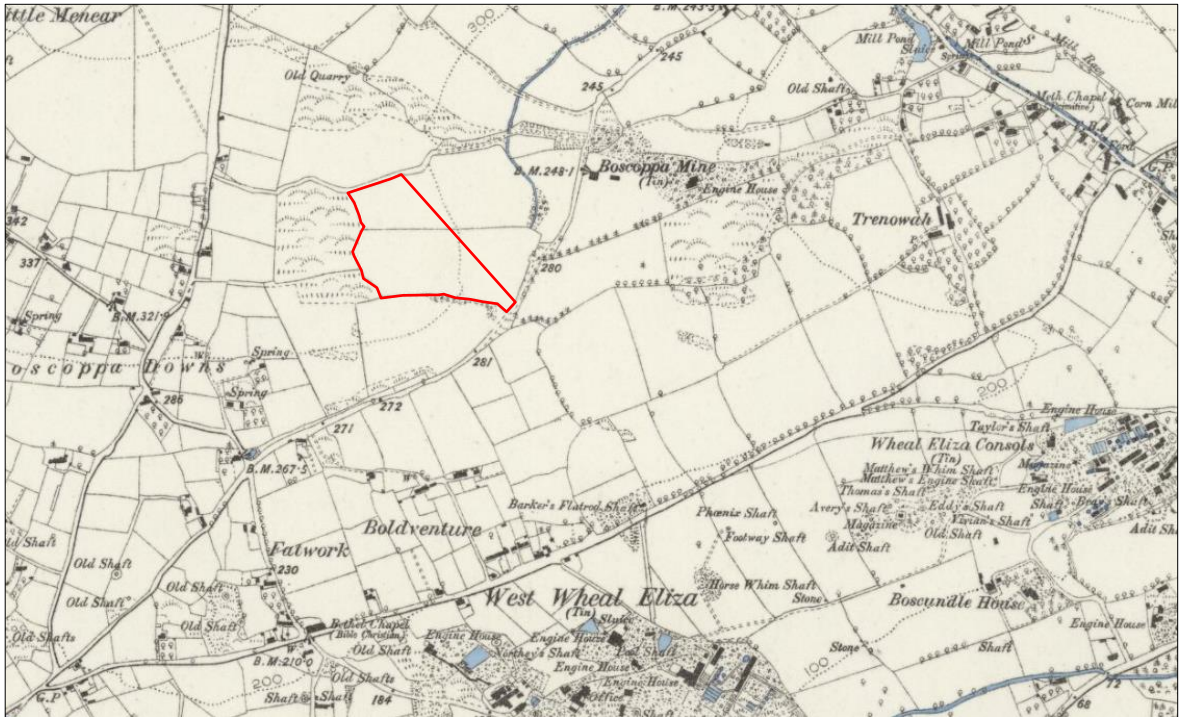


3. RED-GREY-BLUE SHADE PLOT OF GRADIOMETER SURVEY DATA; BANDWEIGHT EQUALIZED, GRADIATED SHADING (CONTAINS ORDNANCE SURVEY DATA © CROWN COPYRIGHT 2023. LICENCE NUMBER 100022432).

APPENDIX 4: SUPPORTING CARTOGRAPHIC SOURCES



1. EXTRACT FROM THE 1842 TITHE MAP FOR ST AUSTELL (TNA); THE APPROXIMATE OUTLINE OF THE SITE IS INDICATED.



2. EXTRACT FROM THE ORDNANCE SURVEY 1ST EDITION 6 INCH MAP SURVEYED IN 1881 AND PUBLISHED IN 1888 (NLS); THE APPROXIMATE OUTLINE OF THE SITE IS INDICATED.



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