Tombs of the Isles:

Castle Bloody, Shapinsay, Lingro, Rousay & Cutters Tuo, Stronsay

Orkney

Geophysical Survey Report

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Geophysical Survey Report

Project No: 842

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1 Introduction

Orkney Research Centre for Archaeology (ORCA) is undertaking a project celebrating, researching and sharing stories of the Neolithic tombs of the North Isles of Orkney. The project is funded through the North Isles Landscape Project Scheme (NILPS) and is community-focused. Activities are centred on a programme of research, walks, arts workshops, archaeological fieldwork (survey, geophysics) and school workshops. These activities will explore the well-known and lesser-known burial monuments and set them within their wider context. The results will form island-specific 'tomb archives', which, together with results of new fieldwork, will feed into the creation of an online digital atlas.

In 2022, geophysical survey was carried out at two tomb sites, Whale Point and Rethie Taing, in Sanday as part of the Tombs of the Isles project (Brend 2023). The present report focuses on three new sites which were chosen for geophysical survey following consultation from islanders during launch events and walks: Castle Bloody in Shapinsay, Knowe of Lingro in Rousay and Cutters Tuo in Stronsay (**Figure 1**). Magnetometer survey was undertaken at each site to understand more about the nature of the individual sites and to situate them within their broader landscape, followed up by targeted earth resistance survey. Surveys were undertaken by an ORCA team with the support of island residents who volunteered (18).

All work was carried out according to the Standards and Code of Practice of the Chartered Institute for Archaeologists (CIfA 2014a), EAC (Schmidt *et al* 2015) and the ORCA project design (Brend & Lee 2023). All three sites are Scheduled Ancient Monuments (SAM) and Metal and Mineral Detecting Consent (MMDC) permissions were granted by Historic Environment Scotland (see below).

2 Site Location, Topography and Geology

The fieldwork was carried out during April and May 2023. The weather conditions during fieldwork were generally dry, with light winds and occasional light snow showers.

2.1 Castle Bloody, Shapinsay

The site of Castle Bloody (Canmore ID: 3096) is located at National Grid Reference (NGR) HY 5359 1643, on a summit at 35m Above Ordnance Datum (mAOD). The mound is situated within an area of unimproved grazing and peat moorland, which borders rough grazing to the south, on the southeast portion of Shapinsay, *c*. 200m west of the coast, which is defined by sheer cliffs (**Figure 2**). The mound is heather-covered but the surrounding soil is very thin, and bedrock is exposed in several places. Three wire fences with gates converge on the site.

The solid geology is Lower Eday Sandstone Formation (BGS Geology Viewer).

2.2 Knowe of Lingro, Rousay

The Knowe of Lingro (Canmore ID: 2289) is situated at National Grid Reference (NGR) HY 39648 32378 in a fairly level terrace within rough grazing land on the north side of Rousay, *c*. 0.7km south of the Loch of Wasbister. The site lies on a north-facing slope at *c*. 50m AOD (see **Figure 9**), with a fenceline running east-west on the north side of the tomb.

The solid geology is Upper Stromness Flagstone Formation (BGS Geology Viewer).

2.3 Cutters Tuo & Grice Ness, Stronsay

Cutters Tuo (Canmore ID: 3297) is situated at National Grid Reference (NGR) HY 6725 2847 on Grice Ness, a headland in the northeast part of Stronsay, immediately east of Whitehall Village (see **Figure 15**). The site is set in improved grazing on the eastern extent of the headland at *c*. 5m AOD.

A second site, situated on Grice Ness, 340m west of Cutters Tuo, was also surveyed. This site is situated on a natural rise on the headland. As this site was previously unrecorded, it has been named Grice Ness settlement for the purposes of this report.

The solid geology is Caithness Flagstone Group (BGS Geology Viewer).

2.4 Designations

Three of the selected sites are Scheduled Ancient Monuments: Castle Bloody, chambered cairn (SM1325), Knowe of Lingro, chambered cairn (SM1301) and Grice Ness, cairn (SM1391).

As Metal and Mineral Detecting Consent (MMDC) was required in order to carry out geophysical survey at all three sites, permission was sought from Historic Environment Scotland (HES). This was granted without conditions (Case ID: 300062779, 300062776, 300062775) with approval of the geophysical survey rationale and methodology outlined below (**Section 5**).

3 Archaeological Background

The following section provides a brief summary of archaeological records for the areas covered by the geophysical surveys.

3.1 Castle Bloody, Shapinsay

The site of Castle Bloody (Canmore ID 3096) is a prominent turf-covered mound measuring 13m in diameter and standing up to 1.2m high (**Plate 1**). At some stage, the flat slabbed roof was broken through revealing portions of walling forming a passageway and chamber and it is thought that the chamber walls leading to the roof were corbelled. The chamber is now masked by subsequent disturbance and/or collapse. While the site is classified as a Neolithic chambered cairn on Canmore, its interpretation remains uncertain with some suggestion that it may be an Iron Age souterrain (Davidson & Henshall 1989, 5). A modern marker cairn has been built on top of the mound.

A number of prehistoric sites are situated in the vicinity of Castle Bloody. These include Mor Stein (Canmore ID 3065), a substantial standing stone lying *c*. 1.2km to the west of Castle Bloody, and Stentlaquoy (Canmore ID 3087), a group of cairns situated 0.8km to the northwest that may represent prehistoric burial mounds. Approximately 0.4km to the west of the Site is a possible prehistoric building (Canmore ID 3085) of oval form, with a possible annexe.

A field-system (Canmore ID 3085) comprising irregular, turf-covered field boundaries is located at Stentlaquoy, apparently incorporating the possible burial mounds located there.

Plate 1: Castle Bloody mound with modern marker cairn.

3.2 Knowe of Lingro, Rousay

The Knowe of Lingro (Canmore 2289) survives as a substantial rectangular, turf-covered mound (**Plate 2**). The mound measures *c*. 21m east-west and 12m north-south and survives to a height of approximately 1.5m. The long orientation of the tomb follows the east-west contour of the slope on which it is situated.

Unlike many other tombs on Rousay, the Knowe of Lingro was not formally excavated. When the tomb was visited by RCAHMS in the 1920s, the top of the tomb was described as having been removed, revealing a series of 'compartments' formed by upright slabs in the centre of the mound (RCAHMS 1946, 203, No. 562 Fig. 15). The slabs, which were aligned at right angles to the main axis, represented dividing slabs for a stalled chamber. Five stones were recorded on the north side of the chamber and three on the opposite side. The paved stones were set c. 1m apart and the compartments were about 1.5m long. A short length of the north wall-face of the chamber was visible in the centre of the north side, but the full extent of the chamber was undetermined (ibid.).

A possible Bronze Age barrow (Canmore 2308) is situated *c*. 400m to the northeast of the Knowe of Lingro.

The area around Lingro tomb is rich in post-medieval farmsteads and associated features, such as Feolquoy (Canmore ID 182055) and Ploverhall (Canmore ID 302242). The remains of the farmstead of Lingro, which is not recorded on Canmore, but is visible on the 1st edition OS map of 1882, is situated *c*. 50m west of the tomb.

Plate 2: Lingro tomb, Rousay.

3.3 Cutters Tuo

The mound of Cutters Tuo, also known as Grice Ness (**Plate 3**) (Canmore ID 3297), survives as a turf-covered 'bell-type' cairn measuring approximately 13m in diameter and surviving up to 0.9m in height. The mound is centrally placed on a circular platform measuring approximately 21m in diameter and up to 0.3m high. Cattle-damage has exposed the tips of two pairs of upright slabs, which are set *c*. 2.7m apart. Portions of a possible surrounding retaining wall or kerb is visible around the platform perimeter. A modern structure, probably a marker cairn, was once situated on the summit of the mound.

There are no known prehistoric sites in the immediate vicinity of Cutters Tuo, but a post-medieval kelp-working site (Canmore ID 3300) is situated on the headland *c*. 0.4km to the southwest.

Approximately 340m to the west of Cutters Tuo, a low rise and earthworks were noted during the fieldwork. This site is situated on the top of a natural hill in the field (**Plate 4**) and the earthworks appear to form a round enclosure. An area of cattle poaching in the east of these remains revealed some large, horizontally laid stones, which may be heat-affected. The site has been called Grice Ness settlement for the purposes of the report.

Plate 3: Cutters Tuo, Stronsay.

Plate 4: The site of Grice Ness settlement, Stronsay

4 Fieldwork Aims

4.1 Site-Specific Objectives

The geophysical survey was carried out with the following aims:

- To improve understanding of the character and extent of individual tombs.
- To help contextualise the tombs and their immediate environs.
- To provide potential targets for subsequent survey and excavation.
- To provide opportunities for community training and engagement.

4.2 Research questions

- What is the layout of the site and are there any buried features or structures that many relate to its construction, use or abandonment?
- How do any visible structural and earthwork remains relate to potential buried archaeological features?
- How has the site changed (Cutters Tuo)?
- Are the sites Neolithic chambered tombs as previously interpreted (Castle Bloody)?

5 Fieldwork Methodology

The surveys were carried out in accordance with the project design (Brend & Lee 2023) and the standards and guidance issued by CIfA (2014a) and EAC (Schmidt *et al* 2016). Magnetometer survey was carried out across areas of between 0.3ha and 0.5ha at all sites, followed by targeted areas of earth resistance survey (see Figures 2, 9 and 15). The results are presented in greyscale plots of the raw data, processed data and the anomalies are presented in annotated interpretation diagrams. **Table 1** summarises the equipment and methodology used in the field. A more detailed methodology for data collection, processing and display is presented in **Appendix 1**.

Set Out		
Instrument	Trimble 5800/R8	
Type of correction	N/A	
Magnetometer Survey		
Instrument	Bartington Grad601-2	
Grid size	20x20m	
Sampling along the traverses	0.25m	
Traverse intervals	1m	
Collection mode	Zig-Zag	
Earth Resistance Survey		
Instrument	Geoscan RM15 with multiplexer	
Grid size	20x20m	
Sampling	0.5x0.5m	
Probe spacing	0.5m	
Array	Parallel twin probes	

Table 1: The equipment and methodology used in the field.

Plate 5: Survey with the community, at Castle Bloody, Shapinsay.

Plate 6: Community members undertaking magnetometer survey at Lingro, Rousay.

Plate 7: Community members trying out earth resistance survey, Stronsay.

6 Fieldwork Results

Anomaly numbers are highlighted in **bold** where first mentioned. Magnetometer anomalies are referred to by numbers and earth resistance anomalies by letters.

6.1 Castle Bloody, Shapinsay

MAGNETOMETER SURVEY

The raw and processed survey data are presented in **Figures 3** and **4** and an interpretation diagram is provided in **Figure 5**.

In general, the area across the mound is relatively magnetically quiet with a few positive responses, **Anomaly 1**, visible across the mound. The lack of strong responses suggests that the mound at Castle Bloody is not a domestic site or somewhere that has been intensively occupied.

To the west of the mound, a trend, **Anomaly 2**, running north-south for *c*. 15m, corresponds with a probable geological feature, Anomaly E, in the earth resistance survey.

The survey results are dominated by ferrous noise, **Anomaly 3**, from the fences and posts across the Survey Area. The strength of this noise may mask more subtle features.

EARTH RESISTANCE SURVEY

The raw and processed survey data for Castle Bloody are presented in **Figures 6** and **7** and an interpretation diagram is provided in **Figure 8**.

The earth resistance survey shows (Figure 17), a sub-square feature of moderate low resistance, **Anomaly A**. The feature measures 20m by 20m, just slightly larger than the extant mound, and the low resistance values may reflect its soil-rich nature. In the northwest and centre-east portions of Anomaly A, amorphous areas of high and moderate high resistance, **Anomaly B**, measuring *c*. 6.5m in length and 3m wide, are likely to reflect structural elements and/or rubble infill. A moderate high resistance anomaly, **Anomaly C**, *c*. 4m long and aligned northwest-southeast, on the west side of Anomaly A may be a stone revetment or external wall. A moderate low resistance feature, **Anomaly D**, measuring 4m east-west by 2m, may represent a more soil-rich area.

Faint curving trends, **Anomaly E** and **Anomaly F**, are visible on the west of the mound. Anomaly E, which measures *c*. 9m long may represent a feature within the mound, such as a revetment wall. Anomaly F measures *c*. 10m in length and is orientated NNW-SSE. This feature lies just beyond the visible extent of the mound but could be archaeological in nature.

Areas of higher resistance, **Anomaly G**, around the mound are likely to represent bedrock close to the ground surface. During survey, areas of exposed bedrock were noted, suggesting that the surrounding soils are thin, and that the monument is located on a geological feature, such as an outcrop or spur.

A lower resistance linear feature in the west of the Survey Area, **Anomaly H**, is also likely to be geological in origin.

6.2 Lingro, Rousay

MAGNETOMETER SURVEY

The raw and processed survey data are presented in **Figures 6** and **7** and an interpretation diagram is provided in **Figure 8**.

The magnetometer data is relatively quiet on and around the tomb. A positive anomaly, **Anomaly 1**, corresponds with the top of the mound, while other positive and negative responses, **Anomaly 2**, are also visible. It is not possible to determine whether these are archaeological in nature or if they relate to the activities and disturbance that exposed the top of the mound.

To the north of the tomb are a series of trends, **Anomaly 3**, curving gently from west to southeast for approximately 60m. Several positive and strong responses, **Anomaly 4**, are situated to the south and echo this alignment. These trends appear to coincide with the edge of a natural terrace visible on satellite imagery (Bing Maps), but it is possible that these represent traces of a circular enclosure.

Several positive responses, **Anomaly 5**, situated to the south of the tomb, may represent agricultural drainage features or cultivation remains. These are situated in a broader area of north-south aligned rig and furrow, **Anomaly 6**, which are extends up to the edge of the tomb.

Three areas of increased magnetic response, **Anomaly 7**, are visible to the north and south of the tomb. While these may relate to agricultural activity in this area, it is possible that they are archaeological in nature.

Further trends, **Anomaly 8**, are visible to the south of Anomaly 3, and in the south of the Survey Area, which may relate to the sloping ground in this area.

EARTH RESISTANCE SURVEY

The raw survey data for Lingro is presented in **Figure 13** and an interpretation diagram is provided in **Figure 14**.

A high resistance feature, **Anomaly A**, orientated east-west, represents the stone structure of the tomb within the mound. This feature is slightly trapezoidal in form, measuring 17m in length, by 6.7m wide at the east end and 4.6m wide at the west end. The interior of the tomb has slightly lower resistance, indicating a less stony, more soil-like fill and there are suggestions of divisions, **Anomaly B**, within the interior of the tomb.

Curving trends in the data, **Anomaly C**, correspond with the base of slope of the mound around the tomb structure.

6.3 Cutters Tuo, Stronsay

MAGNETOMETER SURVEY

The raw and processed survey data for Cutters Tuo are presented in **Figures 16** and **17** and an interpretation diagram is provided in **Figure 18**.

A curvilinear positive response, with a negative halo, **Anomaly 1**, is visible in the magnetic data. This feature corresponds with the location of the mound of Cutters Tuo. Anomaly 1 is clearest on the eastern side of the mound, measuring *c*. 24m in length and between 1m and 1.8m wide, with a possible terminal at its southern extent. The anomaly is also present on the west and south sides of the mound, visible as a fainter, less continuous curvilinear response. Negative responses, **Anomaly 2**, are visible adjacent to portions of Anomaly 1, which may reflect the presence of stony material, such as the kerb, in this area. Overall, the curvilinear feature is oval in form, measuring 29m north-south by 24m transversely. Despite its inconsistent appearance on the west and south sides, the strength and overall form of Anomaly 1 suggests that this is a curvilinear ditch which has been filled with enhanced material. Cutters Tuo is strongly reminiscent of magnetometer survey results from Bronze Age barrows in other parts of Orkney, such as Linga Fold, Sandwick (Challands 1994) and the Knowes of Trotty (Downes *et al* 2001).

A cluster of amorphous positive features, **Anomaly 3**, is visible in the centre of Anomaly 1. The largest of these measures 6.7m north-south by 4.6m, while the others, situated to the south, measure between 3.5m long and 1.5m wide. A series of small circular positive anomalies, **Anomaly 4**, are visible within the inner north and northeastern arc of Anomaly 1, which are likely to be archaeological in nature. If this is a barrow site or has been reused for burial in the Bronze Age, these features may represent the remains of cremations and cremation pyre material within the mound, as found during excavation at Linga Fold (Downes & MacGregor 2005).

A cluster of small positive sub-circular anomalies, **Anomaly 5**, is visible on the west, north and east sides of Anomaly 1. These feature, some of which produced very strong responses, measure *c*. 1.3m in diameter with occasional larger anomalies measuring up to 2.3m by 1.5m. It is uncertain how these features relate to Anomaly 1, if they do at all, and some may represent ferrous debris in the topsoil. Their concentration around the mound, however, bears a strong resemblance to the magnetometer results from Mound 7 at Linga Fold, Sandwick, Orkney, a large multiphase Bronze Age burial mound (Challands 1994).

Two strong responses, **Anomaly 6**, *c*. 15m and *c*. 30m to the south of the mound may represent intense burning within kelp-pits, which were observed as circular hollows in the area.

A further strong response, **Anomaly 7**, which is situated immediately southeast of Anomaly 1, could represent another kelping-related feature, although there was no apparent trace of this on the ground during survey. It is also possible that this feature is related to Anomaly 1. Several other amorphous positive features, **Anomaly 8**, may represent further kelp pits, but this cannot be determined from the results alone.

Several trends, **Anomaly 9**, orientated NE-SW and NW-SE around the mound, may represent the traces of former kelp-drying walls, the remains of which were noted during survey on the north side of Cutters Tuo. The regularity and spacing of some of these trends suggests, however, they are plough-lines.

Strong magnetic responses, **Anomaly 10**, concentrated in the southern portion of the Survey Area, may represent ferrous debris in the topsoil or may relate to the kelping activity in the vicinity.

EARTH RESISTANCE SURVEY

The raw and processed survey data for Cutters Tuo are presented in **Figures 19** and **20** and an interpretation diagram is provided in **Figure 21**.

The high pass filter (see Figure 20) reveals more detail across the site. A high resistance feature, **Anomaly A**, is visible, situated within a broader area of moderate high resistance, **Anomaly B**. Anomaly A measures 10m northeast-southwest by 8.5m transversely. This feature is likely to reflect the presence of structural remains within the mound. A high pass filter was applied to the data and the results (see Figure 24) show a smaller area of moderate high resistance, **Anomaly C**, set within the eastern portion of Anomaly A, measuring 5.8m northwest-southeast by 2.3m transversely, which may represent a chamber.

A sub-circular area of moderate low resistance, **Anomaly D**, measuring *c*. 20m in diameter, surrounding Anomaly A. While this may represent a ditch, it is more likely to reflect the soil-rich platform on which the mound is located, and which is visible on the ground surface.

A thin outer, concentric ring of moderate high resistance, **Anomaly E**, more clearly defined in the north portion of the site, seems to correspond with stones visible around parts of the platform edge, which represents a kerb feature.

6.4 Grice Ness Settlement, Stronsay

MAGNETOMETER SURVEY

The raw and processed survey data for Grice Ness are presented in **Figures 22** and **23** and an interpretation diagram is provided in **Figure 24**.

The magnetometer data are dominated by strong positive and negative responses, **Anomaly 1**, across the Survey Area. In the northernmost area, a more defined cluster of responses, **Anomaly 2**, measuring 25m northeast-southeast by 20m, may represent a separate feature, such as a building. There is a defined edge to Anomalies 1 and 2 where they meet a magnetically quiet area to the east and northeast. The strength of Anomalies 1 and 2 indicates that they are likely related to settlement and/or industrial activity. The positive features are likely to represent enhanced soils, such as midden, occupation and/or industrial-related deposits, and the negative responses, stone features, such as walls. The date of this site is unknown, but as nothing is depicted at this location on either the 1st or 2nd Edition OS maps of 1882 and 1903, respectively, it could be medieval or prehistoric in origin. The relatively small scale of the survey area precludes more definitive interpretation.

A curving positive feature, **Anomaly 3**, which is interrupted by lines of negative response, may represent the remains of a feature, such as a ditch, situated in the west and south portions of the Survey Area. This features curves roughly northwest to east for approximately 34m and measures between 3m and 5m wide. The negative anomalies running across Anomaly 2, are likely to represent stone features, such as walls.

A cluster of sub-circular positive anomalies, **Anomaly 4**, measuring 1-2m in length, is situated to the north of Anomaly 2. These features are situated in an area of increased magnetic response, **Anomaly 5**. Given the proximity of Anomalies 4 and 5 to Anomaly 2, it is likely that they are archaeological in nature.

A further group of faint positive responses, **Anomaly 6**, in the northeast of the Survey Area may be archaeological in origin, given their relative proximity to Anomaly 2.

Cultivation remains, **Anomaly 7**, are visible running NE-SW across the Survey Area. They run for up to *c*. 38m and are spaced approximately 3-5m apart. Given their relatively narrow spacing, they are unlikely to represent the type of rig-and-furrow cultivation normally associated with the post-medieval period in Orkney and may, therefore, be more recent.

EARTH RESISTANCE SURVEY

The raw survey data for Grice Ness is presented in **Figure 25** and an interpretation diagram is provided in **Figure 26**.

Two areas of moderate low resistance, **Anomaly A**, are situated in the south portion of the Survey Area. The southernmost of these measures *c*. 15m north-south by 12m and appears to correspond with Anomaly 3 in the magnetometer data. The northernmost area measures 8m northeast-southwest by 6m and corresponds with an area of positive response amidst Anomaly 1. Both responses suggest they are soil-rich areas.

Two short trends, **Anomaly B**, running northeast-southwest, are situated to the north of Anomaly A. These may represent part of the ploughing trends present in the magnetometer data.

7 Discussion

7.1 Castle Bloody

While the magnetometer results are dominated by noise from the modern fences and gates, the mound at Castle Bloody is magnetically quiet suggesting that this is not a settlement site. The quiet nature of the magnetometer data in conjunction with the earth resistance data and the known accounts of the remains there, support its interpretation as a Neolithic tomb.

7.2 Knowe of Lingro

The tomb at Lingro produced a quiet magnetic response, typical of funerary monuments (e.g. Roeberry Barrow, South Walls, which contained a Neolithic stalled tomb and Bronze Age cremation burials (Lee 2012). The small number of magnetic responses from the top of the mound may reflect the more recent disturbance at the site, which involved the removal of the topsoil and exposure of masonry and upright stones. The resistance survey revealed the form of the stone structure within the mound, consistent with a stalled chamber, the orthostatic dividers of which are visible on the surface.

In the wider area, a curvilinear feature in the magnetometer data to the north of the tomb, may represent the remains of an enclosure, although its correlation with a terrace visible on aerial imagery suggests it is probably natural. The post-medieval farming activity, evident in the numerous farmsteads around Lingro tomb, is further highlighted by the rig and furrow cultivation visible running up to the south side of the tomb.

The survey of an apparently undisturbed Neolithic stalled tomb at Lingro, given that most have been previously excavated in Rousay, provides a useful insight into the geophysical responses from such a monument, its make-up and internal structures.

7.3 Cutters Tuo & Grice Ness Settlement

Cutters Tuo

The magnetometer results from Cutters Tuo suggest the remains of a Bronze Age burial mound or barrow. The results resemble geophysical survey data from other barrow sites across Orkney. At Linga Fold, Sandwick, the geophysical survey was followed by extensive excavation of several of the mounds. It was clear that the survey detected the presence of burials, cremation pyres and deposits of pyre material within the mounds and, sometimes, beyond them (Downes & MacGregor 2005). For example, later burials and pyres were clustered around the north and northwest side of Mound 7 (Downes & MacGregor 2005, 18).

The results suggest that the barrow at Cutters Tuo is ditched (Anomaly 1). The possible ditch is clearly defined on the east side but much less so on the west and north sides, suggesting that it has been disturbed. It is possible, however, that this enhanced material may represent slippage of mound material as was found during excavation at Linga Fold Mound 2. Excavation would be required to establish more of the character of this feature. As with other barrow mounds in Orkney, the mound is demarcated by an external ring of stone or a 'kerb', portions of which were visible on the ground surface and in the earth resistance results (Anomaly E). Parts of the kerb in the northern portion of the site appear to lie just outside, and echo the line of, the possible ditch, but its extent is less clear to the south.

The earth resistance results show that the platform the mound is situated on is soil-rich and that there is a stone structure within the mound, with a possible chamber. This supports the interpretation of the site as a tomb and, taken together, the magnetometer and earth resistance survey results for Cutters Tuo suggest that this the tomb has been reused and modified during the Bronze Age as a burial mound. A similar instance of this practice of reuse is from Roeberry, Hoy, where three cists were inserted into the mound of the Neolithic tomb and the tomb partially incorporated within a Bronze Age square barrow with a central cist containing an inhumation burial (Lee 2012).

Grice Ness Settlement

The strength of the magnetic responses visible across the site indicate settlement or industrial activity, although the relatively small scale of the survey area precludes more definitive interpretation of these strong responses in terms of date, overall form and extent. Anomaly 2, in the north of the Survey Area, may indicate the remains of a building. More extensive survey and/or excavation would be needed to determine further information about this site.

8 Conclusions & Recommendations

The geophysical surveys were successful in confirming the presence of the Neolithic tombs at Castle Bloody, Knowe of Lingro and Cutters Tuo, and adding to our understandings of the monuments and their local environs. Using both techniques has been particularly valuable as the datasets complement each other.

Despite the large amount of noise from the modern fences and gates, the quiet magnetic signature of Castle Bloody is typical of a tomb rather than the souterrain as previously suggested. At Lingro, the tomb is similarly quiet magnetically, although many of the adjacent features reflect the rich post-medieval agricultural landscape of the area.

Taken together, both the magnetometer and earth resistance results suggest that Cutters Tuo has a lengthy history of use, with an earlier tomb reused and modified during the Bronze Age. The headland is rich in extant features associated with the kelp industry, such as drying walls and kelp pits, and some of these features are visible surrounding Cutters Tuo in the magnetometer data.

The survey revealed a new site of possible medieval or prehistoric date on the headland of Grice Ness to the west of Cutters Tuo. While the signature of the site is likely to represent settlement or industrial activity, the site would benefit from further work in order to understand more of its form and extent.

9 Dissemination and Archiving

Findings will be submitted to the national record via the OASIS system, and a short report for *Discovery and Excavation Scotland* will be generated. The results will also be shared in the project digital atlas online: Tombs of the Isles - Archaeology Orkney

Information on the results of the report will be made public in digital form, to be included in any further research into the archaeology, history and development of Orkney.

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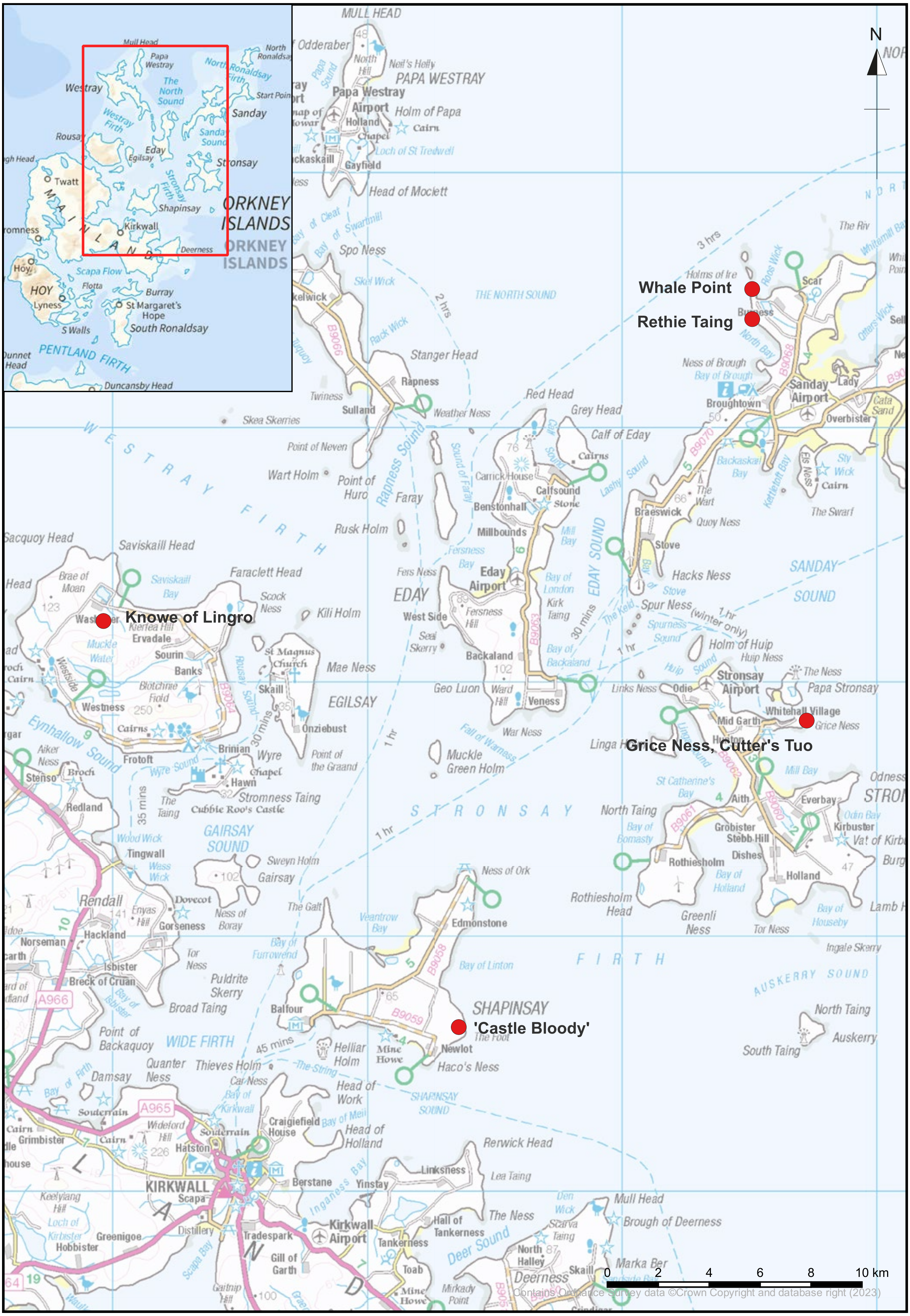
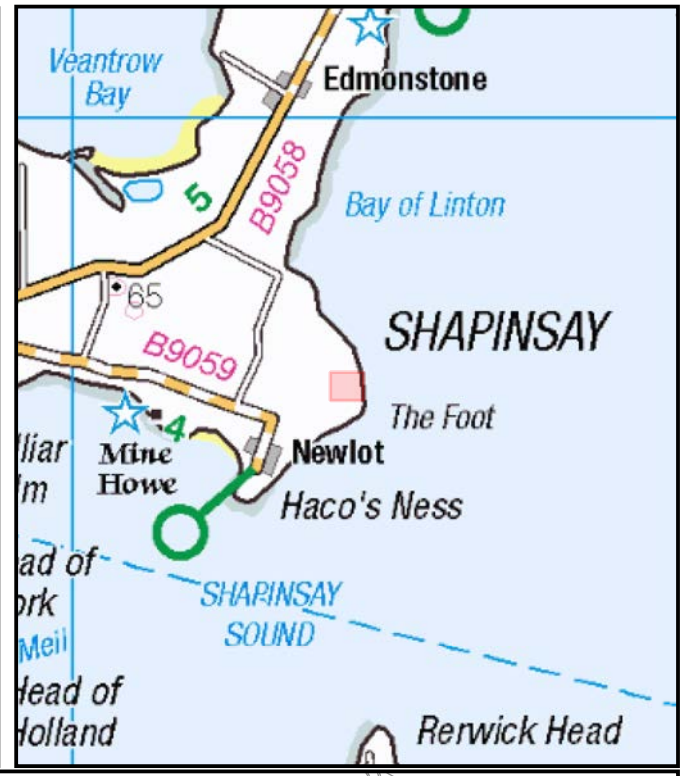
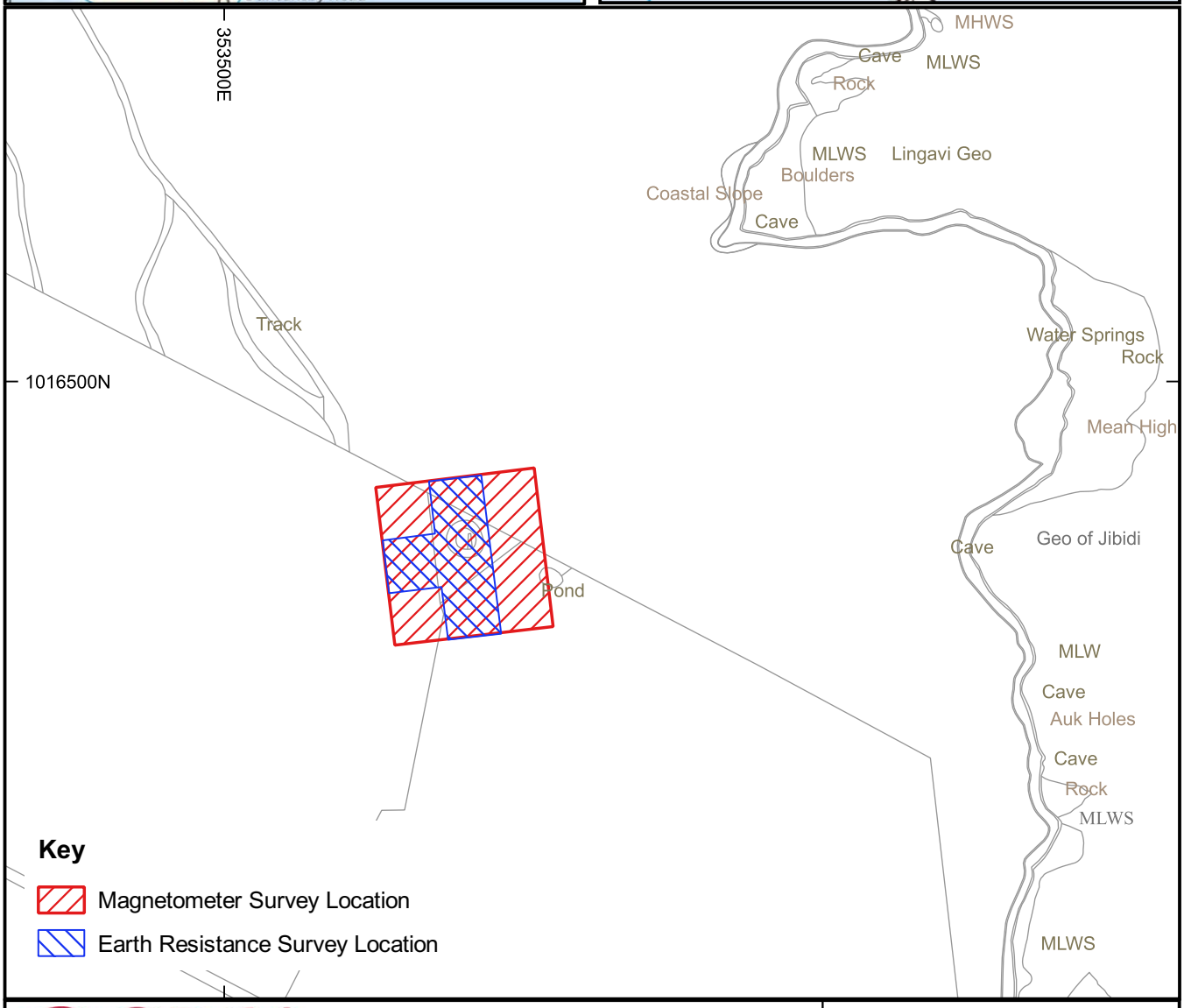


Whale Point
Rethie Taing
Knowe of Lingro
Grice Ness, Cutter's Tuo
'Castle Bloody'
N
0 2 4 6 8 10 km
Contains Ordnance Survey data ©Crown Copyright and database right (2023)
ORKNEY ISLANDS
Westray
Papa Westray
Sanday
Stronsay
Eday
Egilsay
Shapinsay
Kirkwall
MAINLAND
Hoy
Burray
South Ronaldsay
PENTLAND FIRTH
WESTRAY FIRTH
THE NORTH SOUND
SANDAY SOUND
STRONSAY FIRTH
SHAPINSAY
EDAY
EGILSAY
GAIRSAY SOUND
WIDE FIRTH
KIRKWALL





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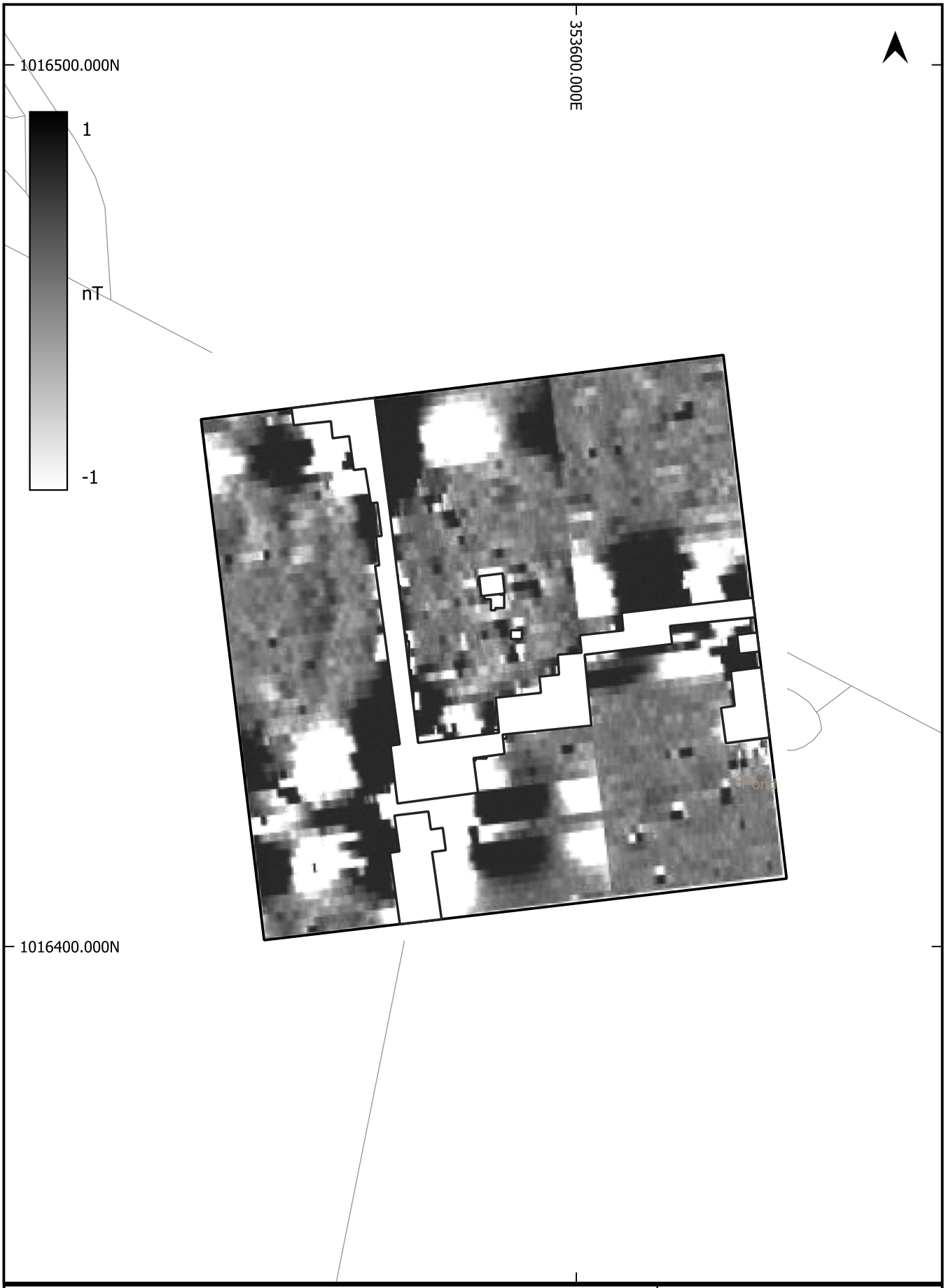
0 50 100 150 m

Figure 2. Survey Location, Castle Bloody, Shapinsay

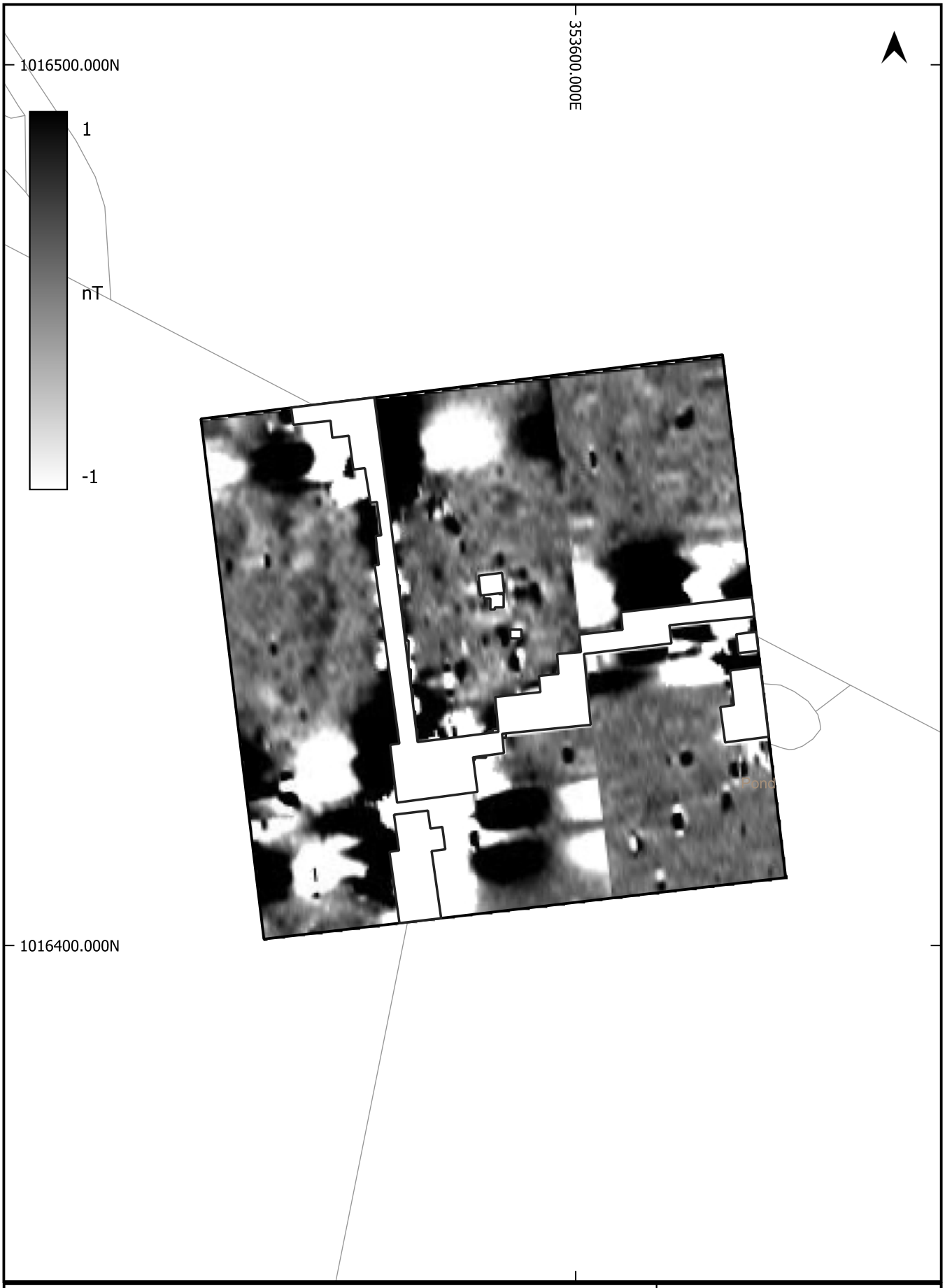
Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/2023	Initials: AB	Rev. No. 1.00



0 10 20 30 m

Figure 3. Castle Bloody: Raw magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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0 10 20 30 m

Figure 4. Castle Bloody: Processed magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

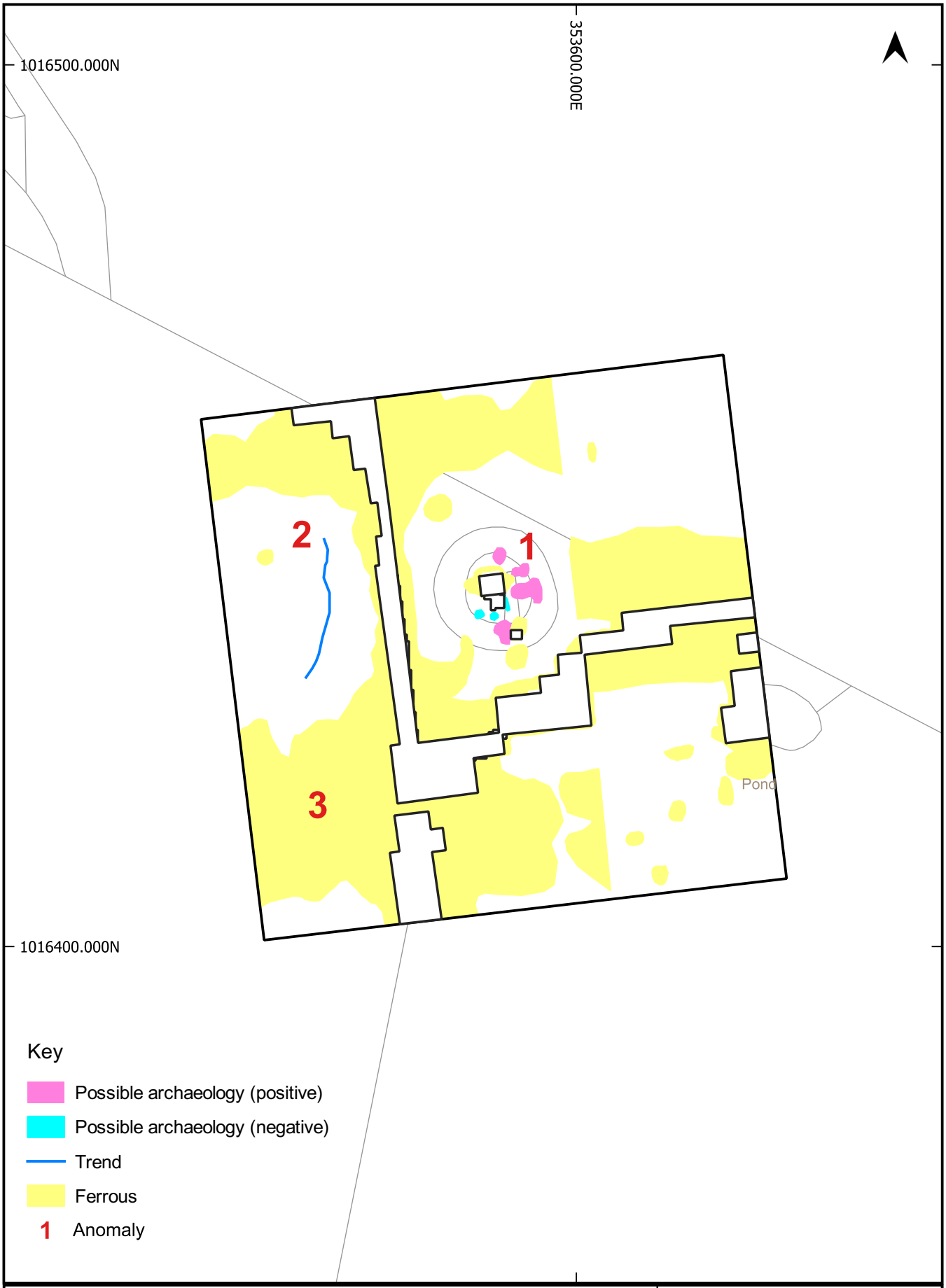

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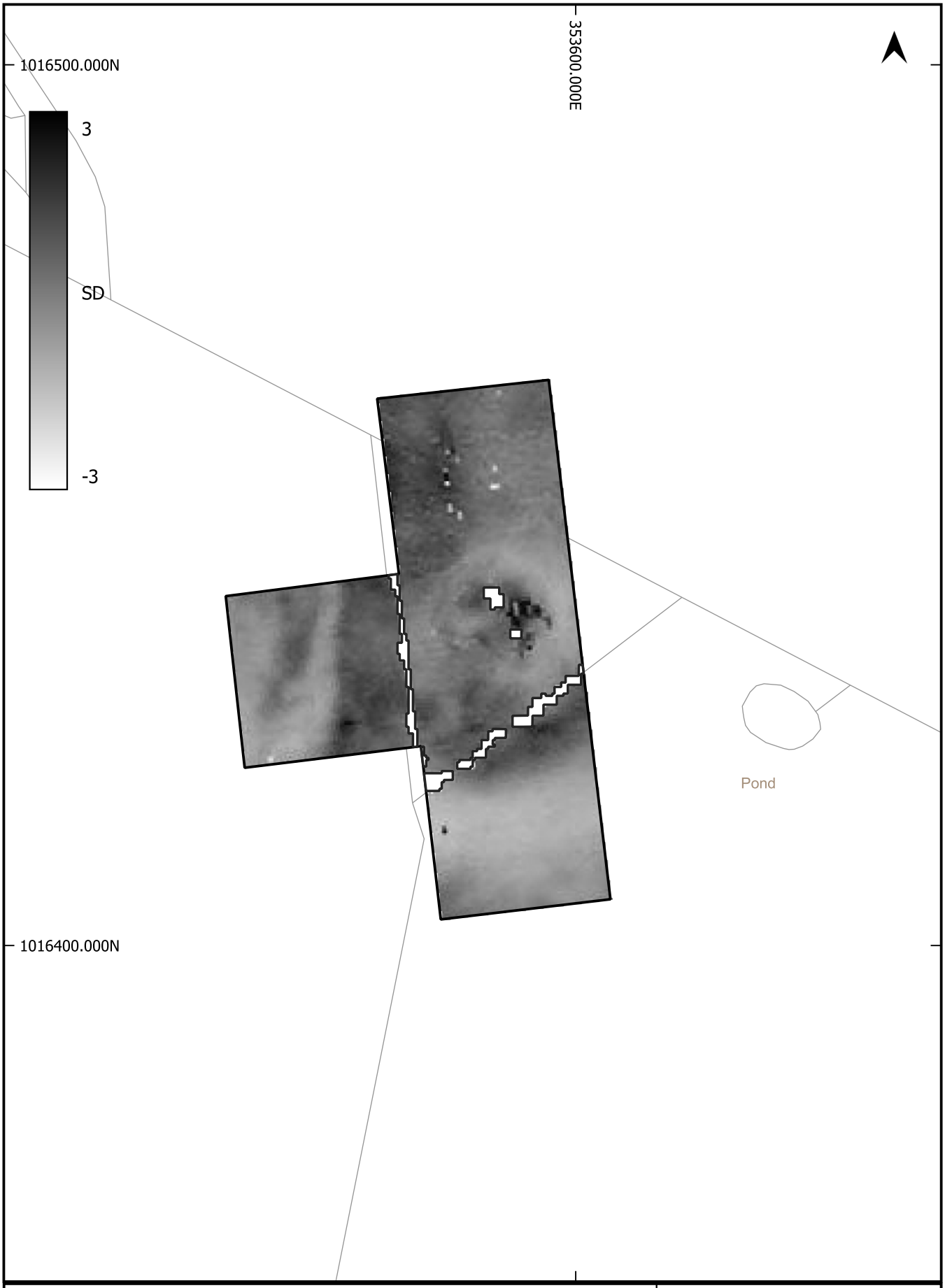
Figure 5. Castle Bloody: Magnetometer interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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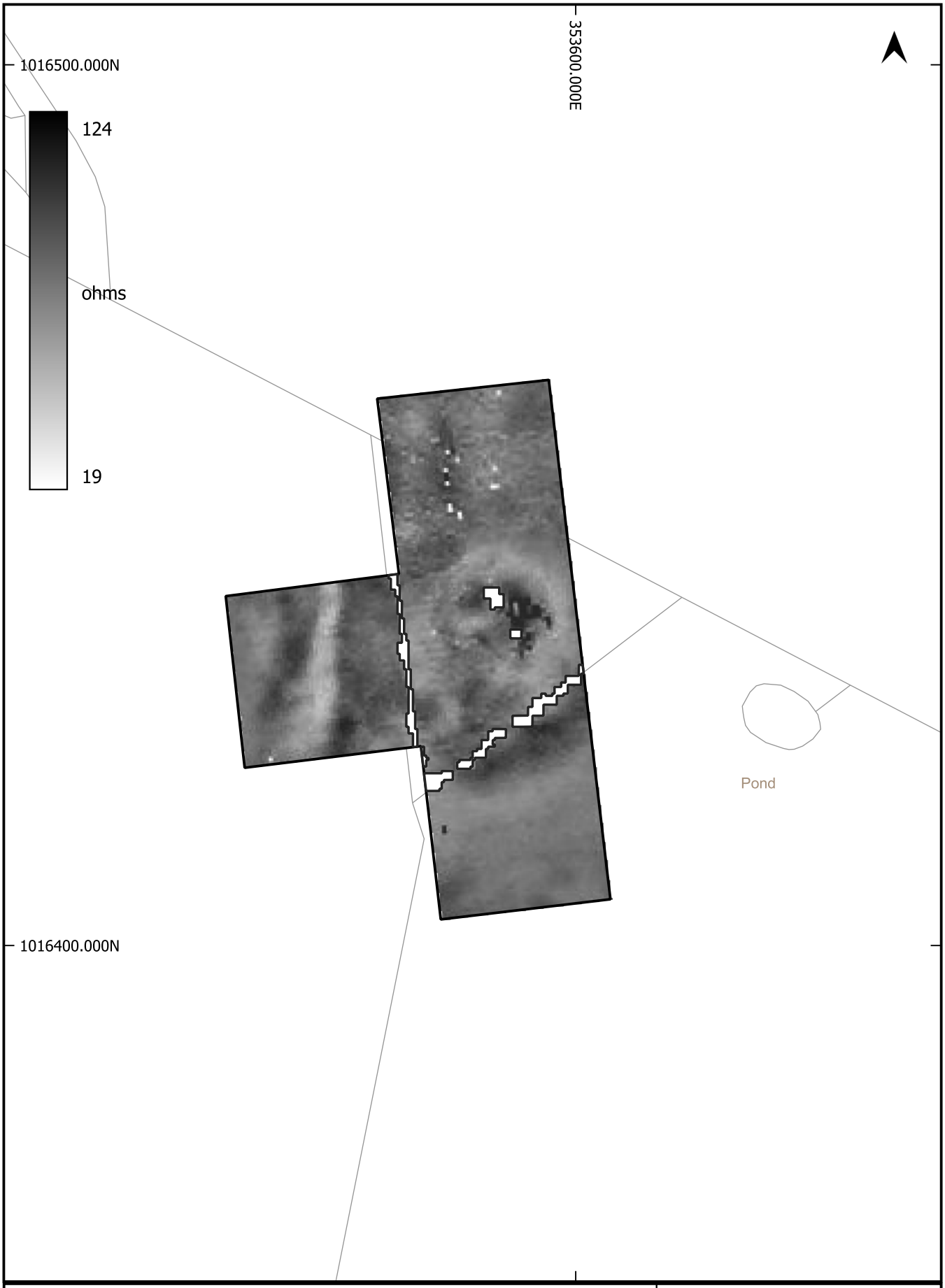
0 10 20 30 m

Figure 6. Castle Bloody: Raw earth resistance data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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0 10 20 30 m

Figure 7. Castle Bloody: HPF earth resistance data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

Key

- Archaeology - high resistance
- Archaeology - moderate high resistance
- Archaeology - moderate low resistance
- Trend
- Geology - low resistance
- Geology - moderate high resistance
- A Anomaly

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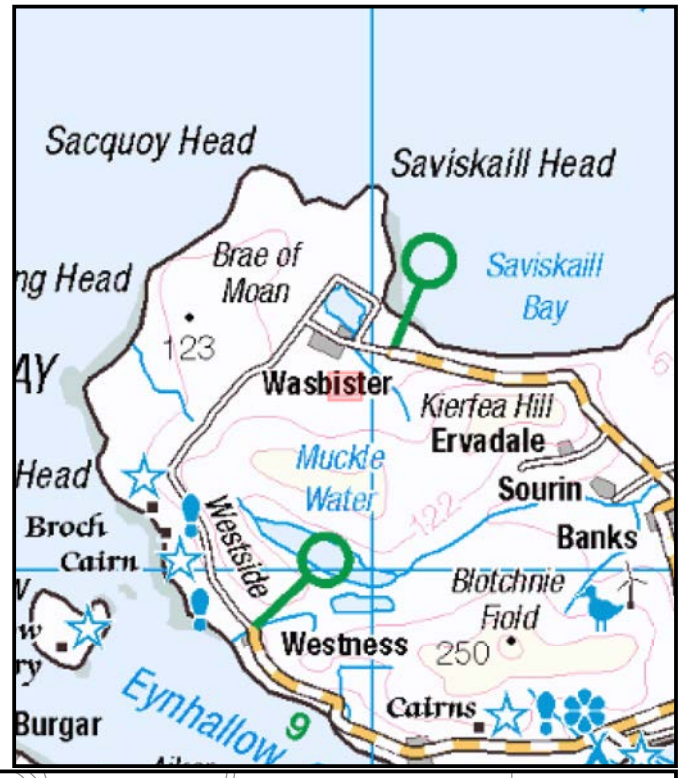
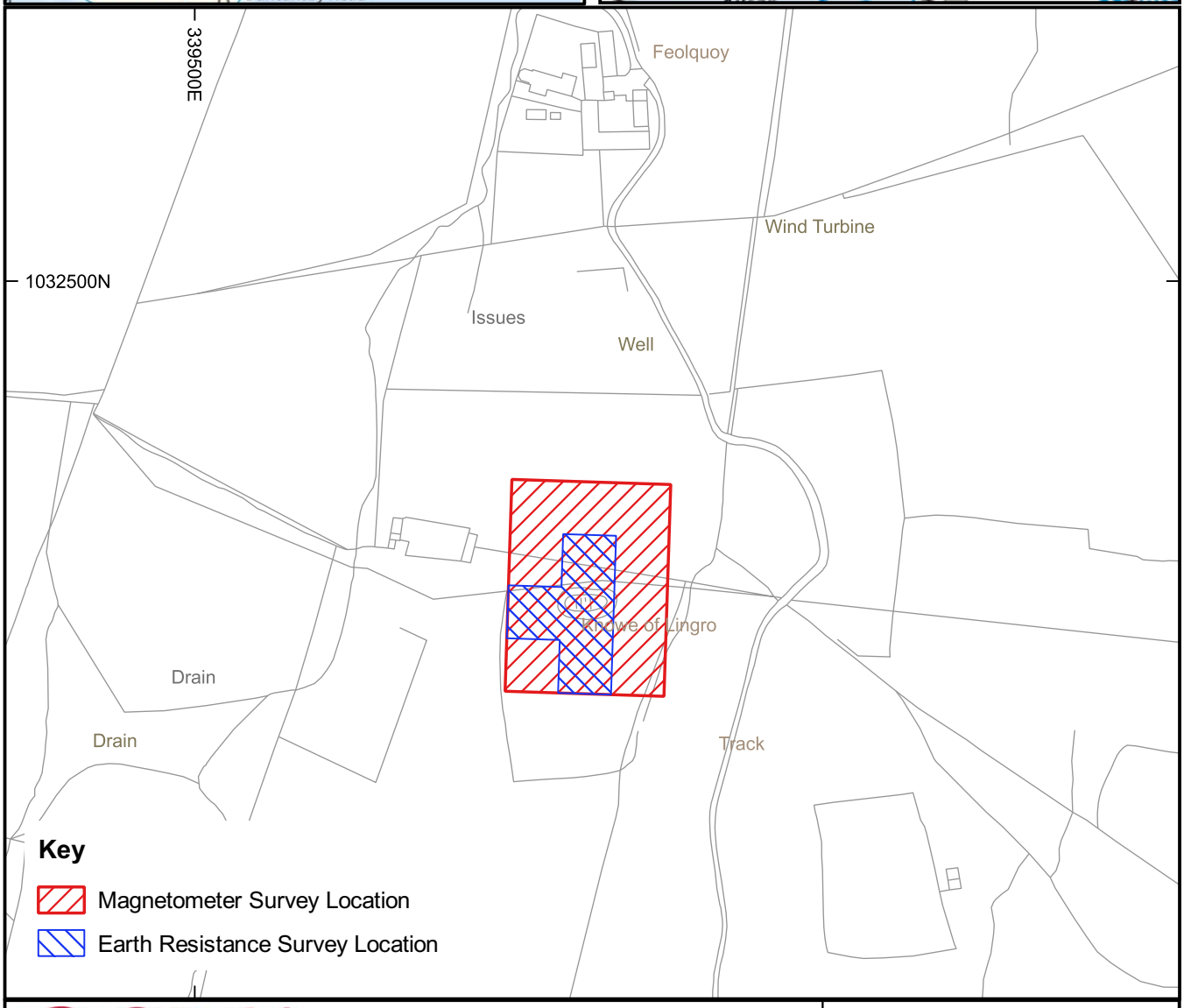
0 10 20 30 m

Figure 8. Castle Bloody: Earth resistance interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1





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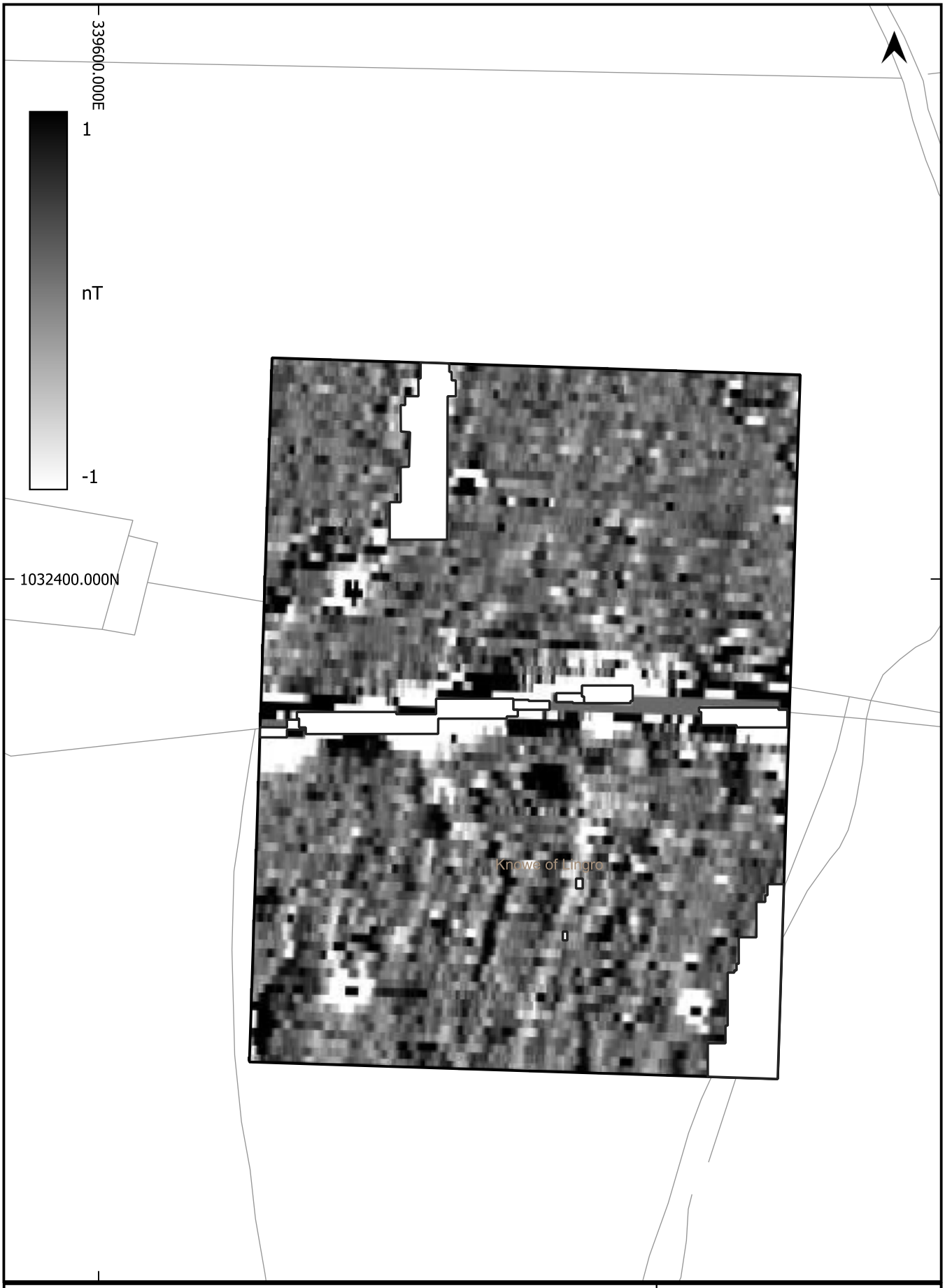
0 50 100 150 m

Figure 9. Survey Location, Lingro, Rousay

Project Name: Tombs of the Isles

Project No: 842	Scale @A4 1:1	
Date: 07/2023	Initials: AB	Rev. No. 1.00



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0 10 20 30 m

Figure 10. Lingro: Raw magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

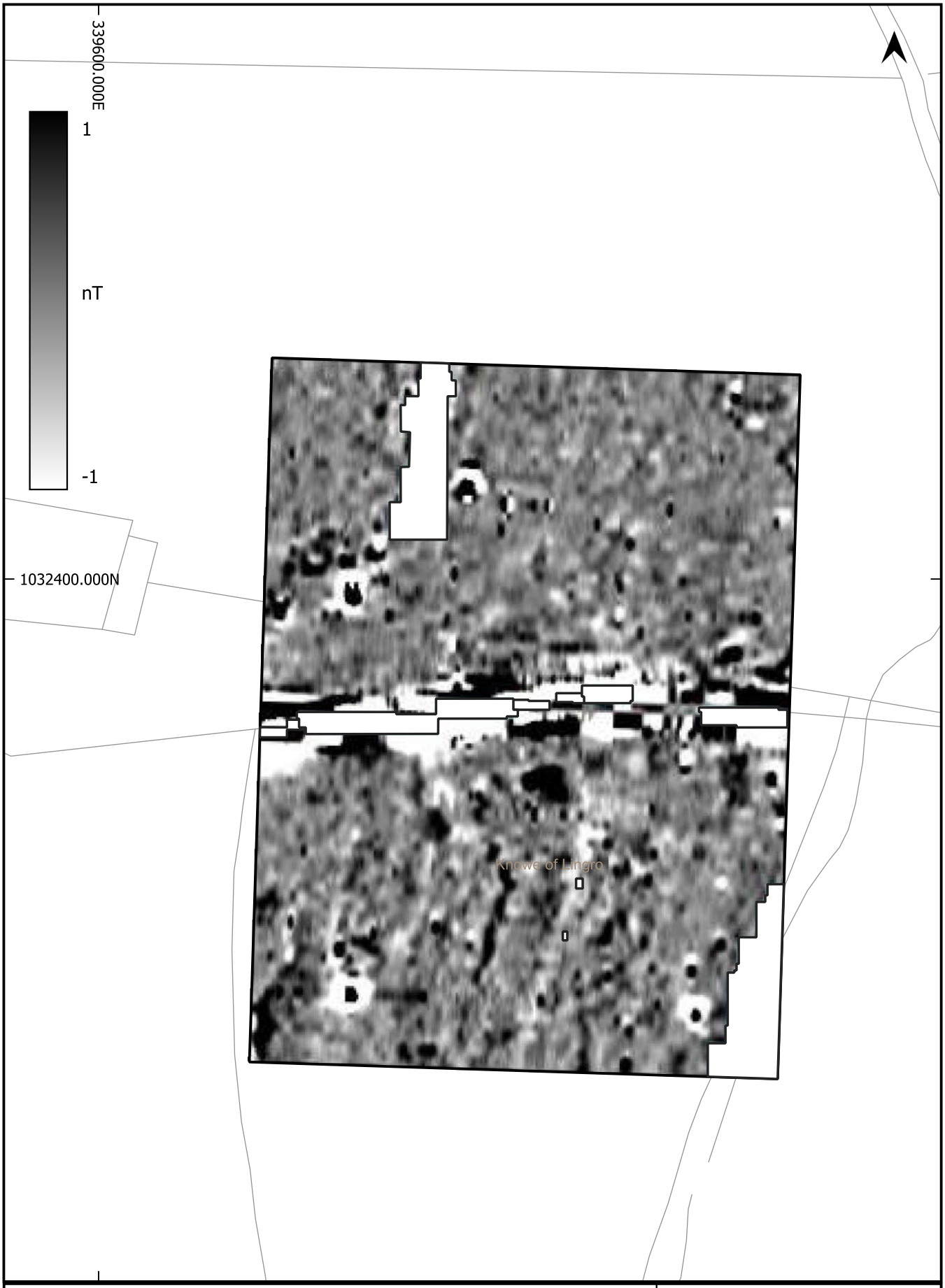

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Figure 11. Lingro: Processed magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

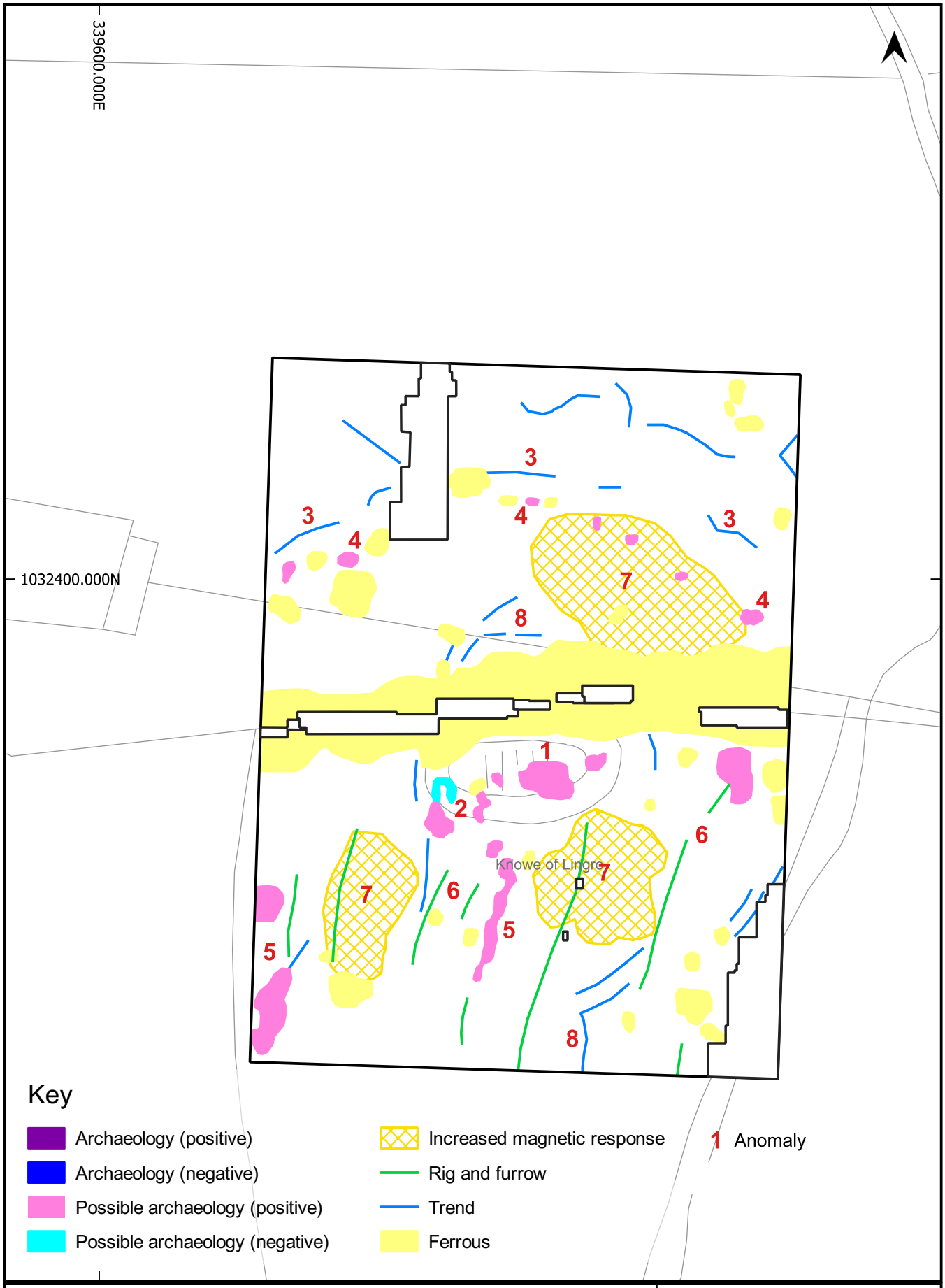

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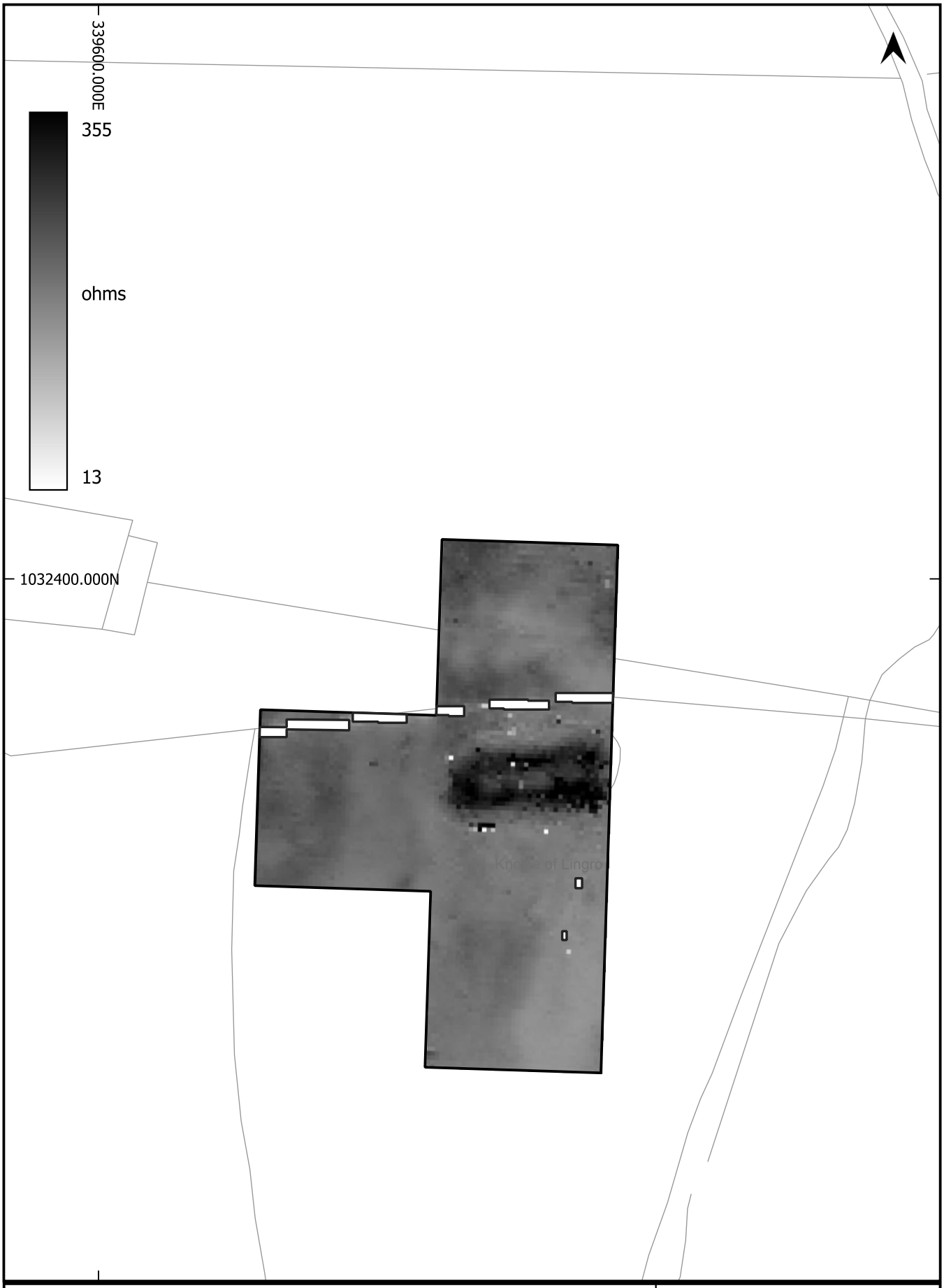
Figure 12. Lingro: Magnetometer interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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0 10 20 30 m

Figure 13. Lingro: Earth resistance data (despiked)

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

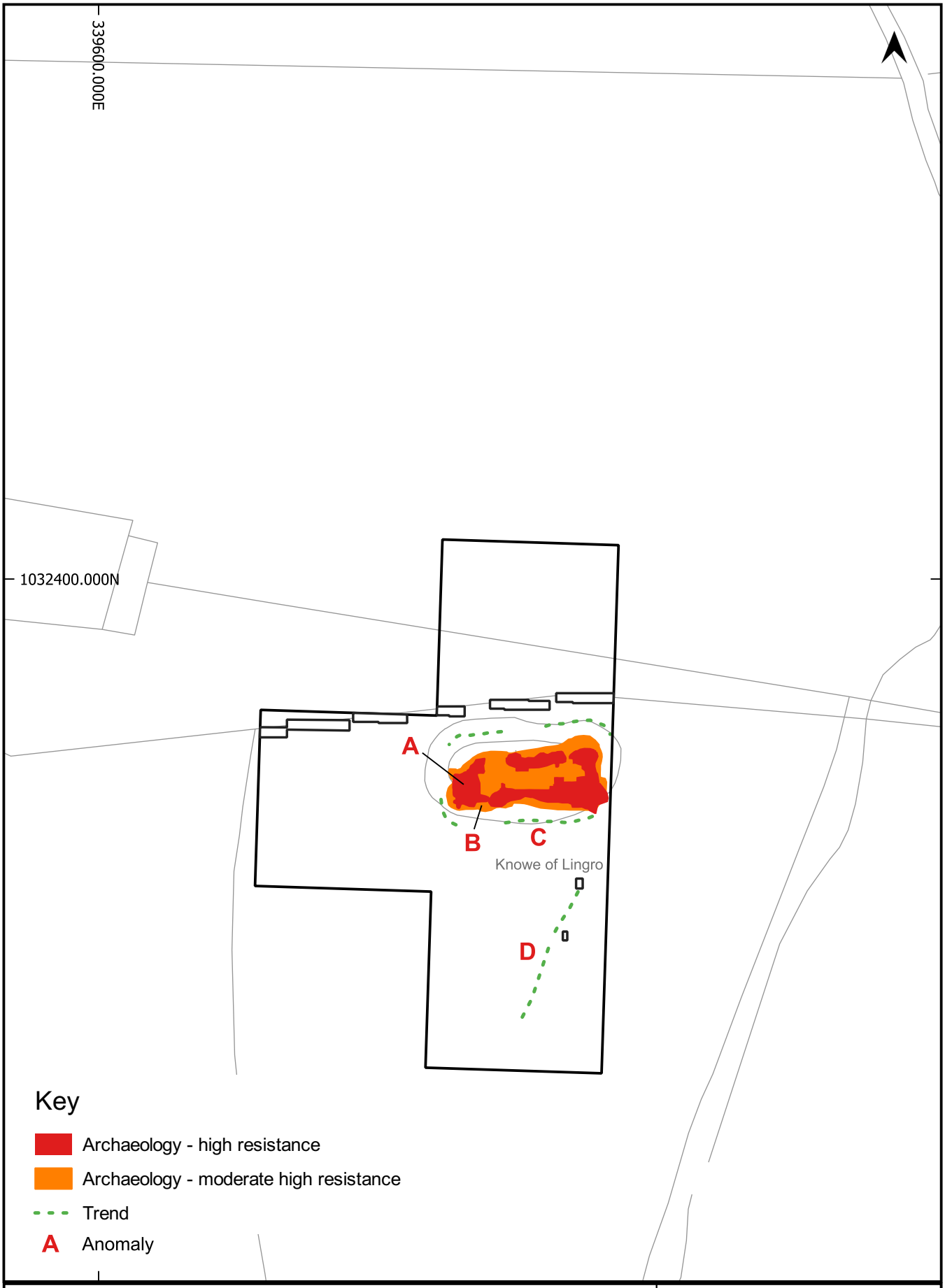

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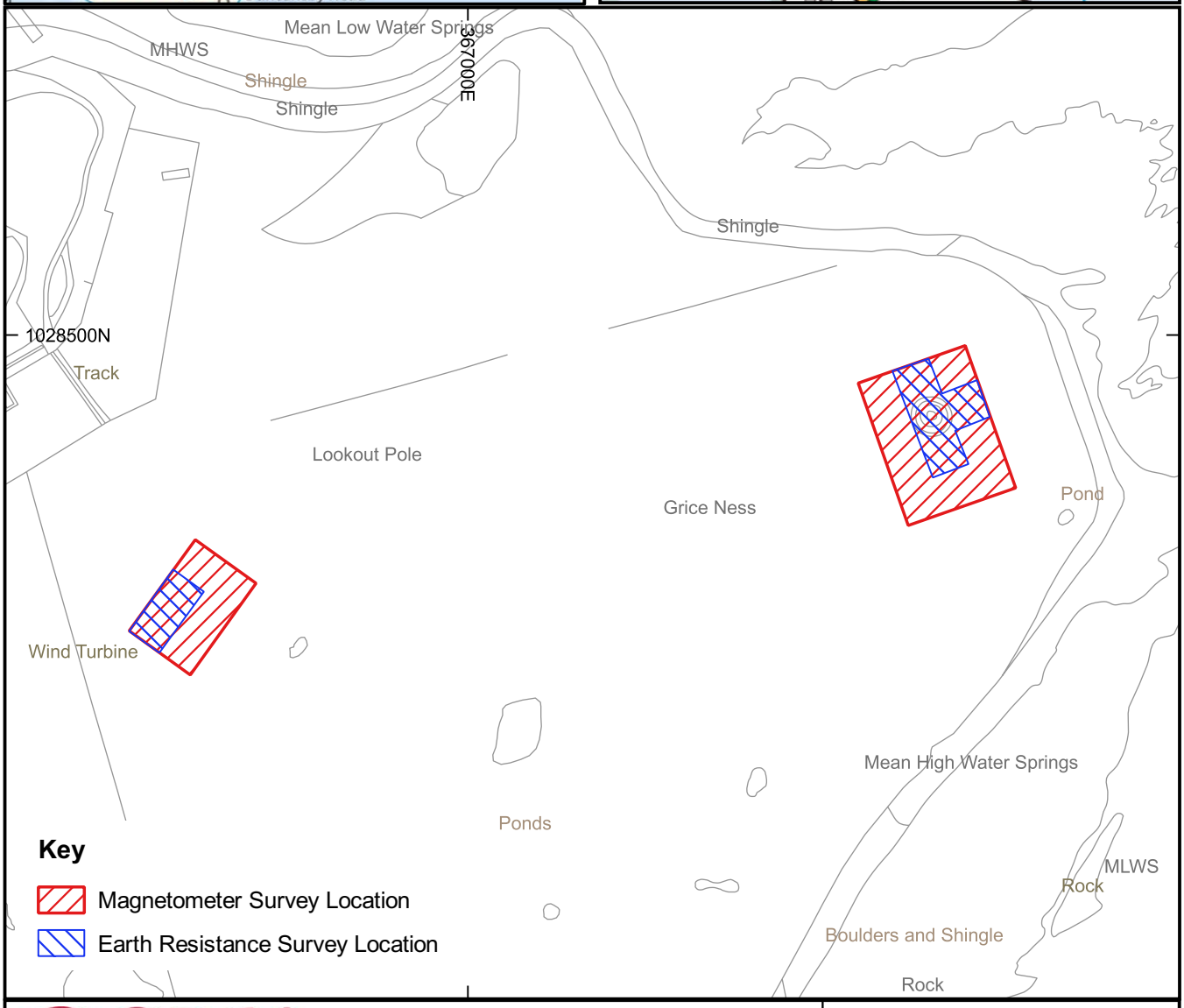
Figure 14. Lingro: Earth resistance data interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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0 50 100 150 m

Figure 15. Survey Location, Cutters Tuo & Grice Ness, Stronsay

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/2023	Initials: AB	Rev. No. 1.00

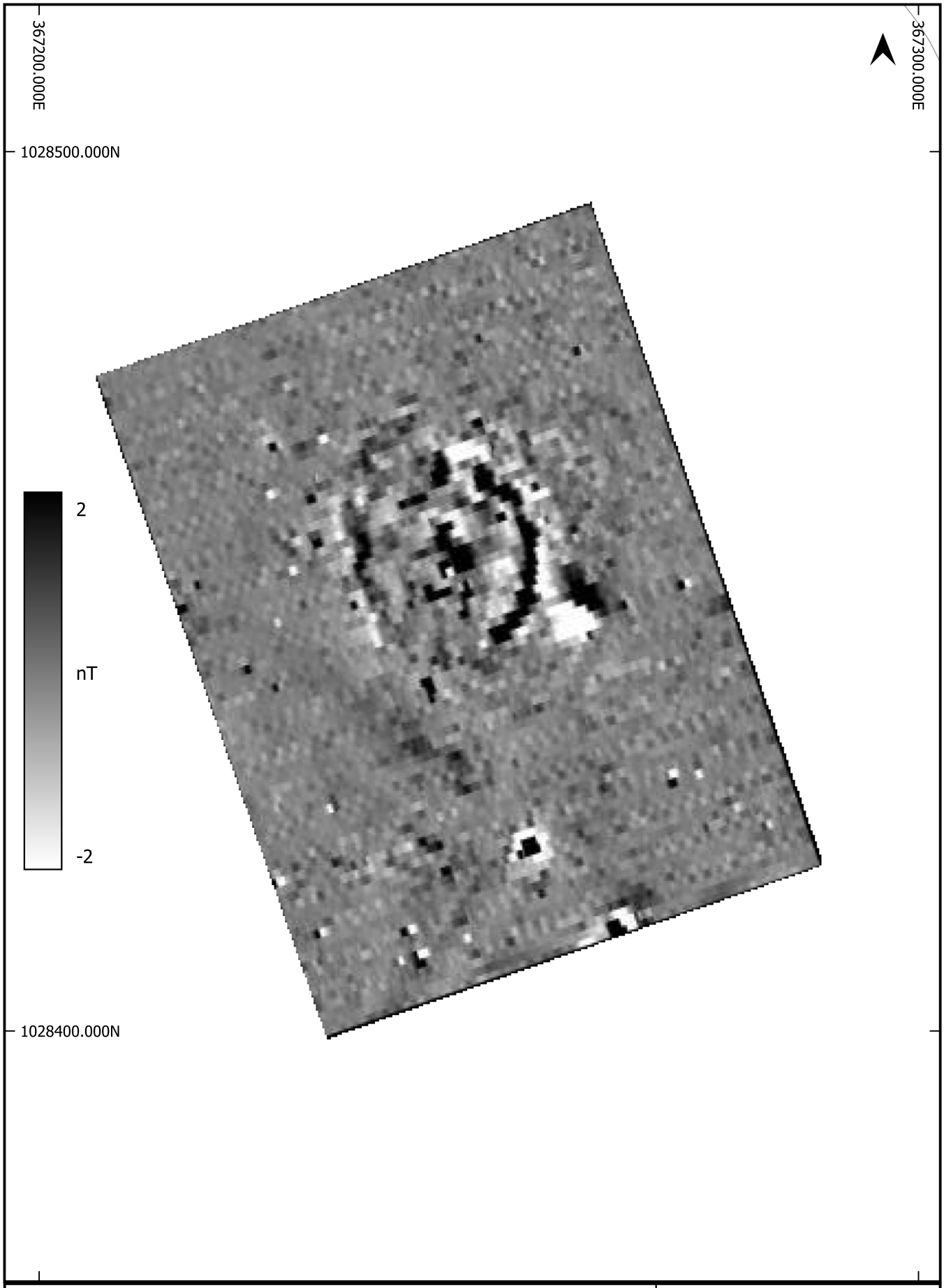

Figure 16. Cutters Tuo: Raw magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

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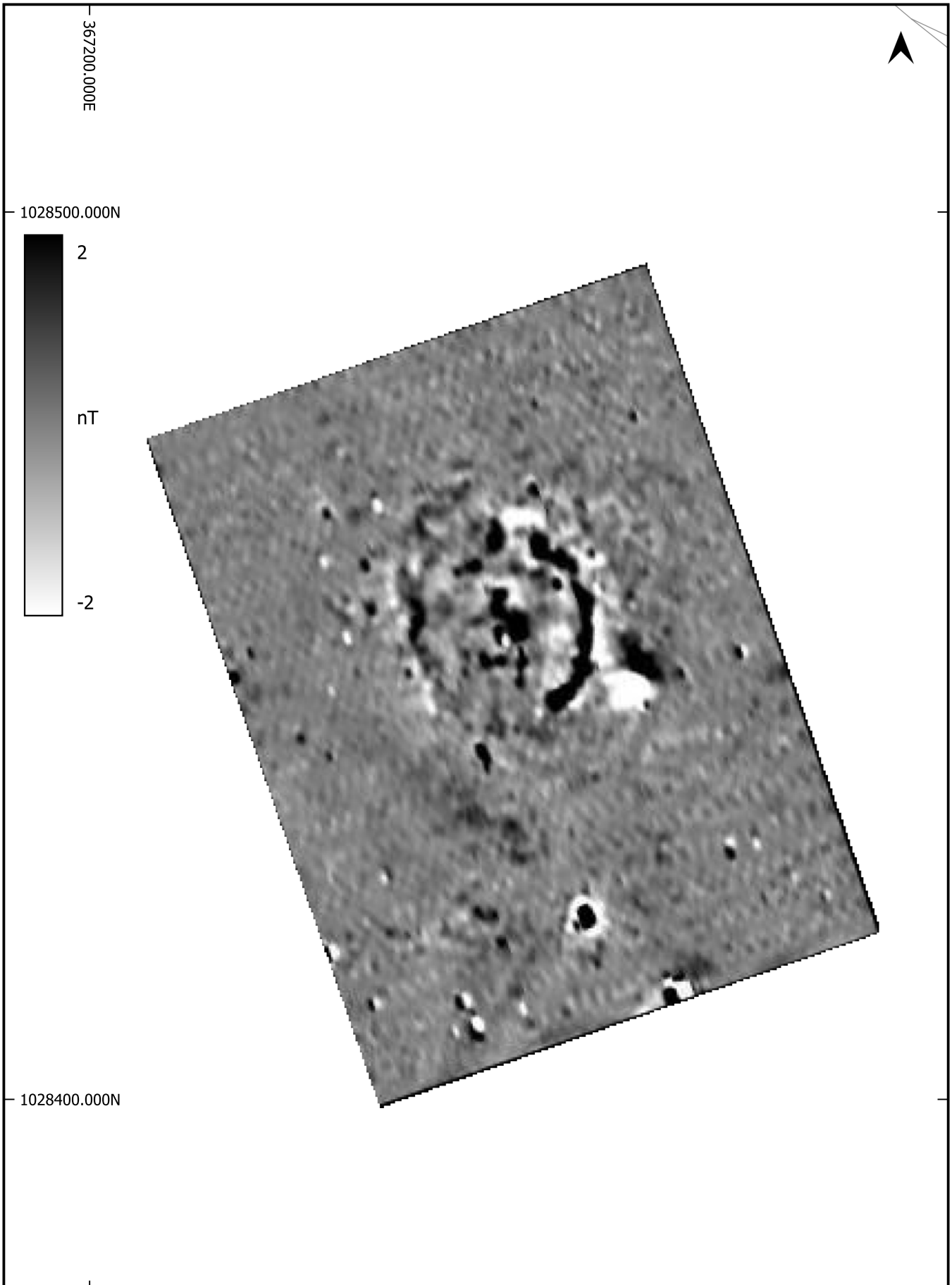

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0 10 20 30 m

Figure 17. Cutters Tuo: Processed magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

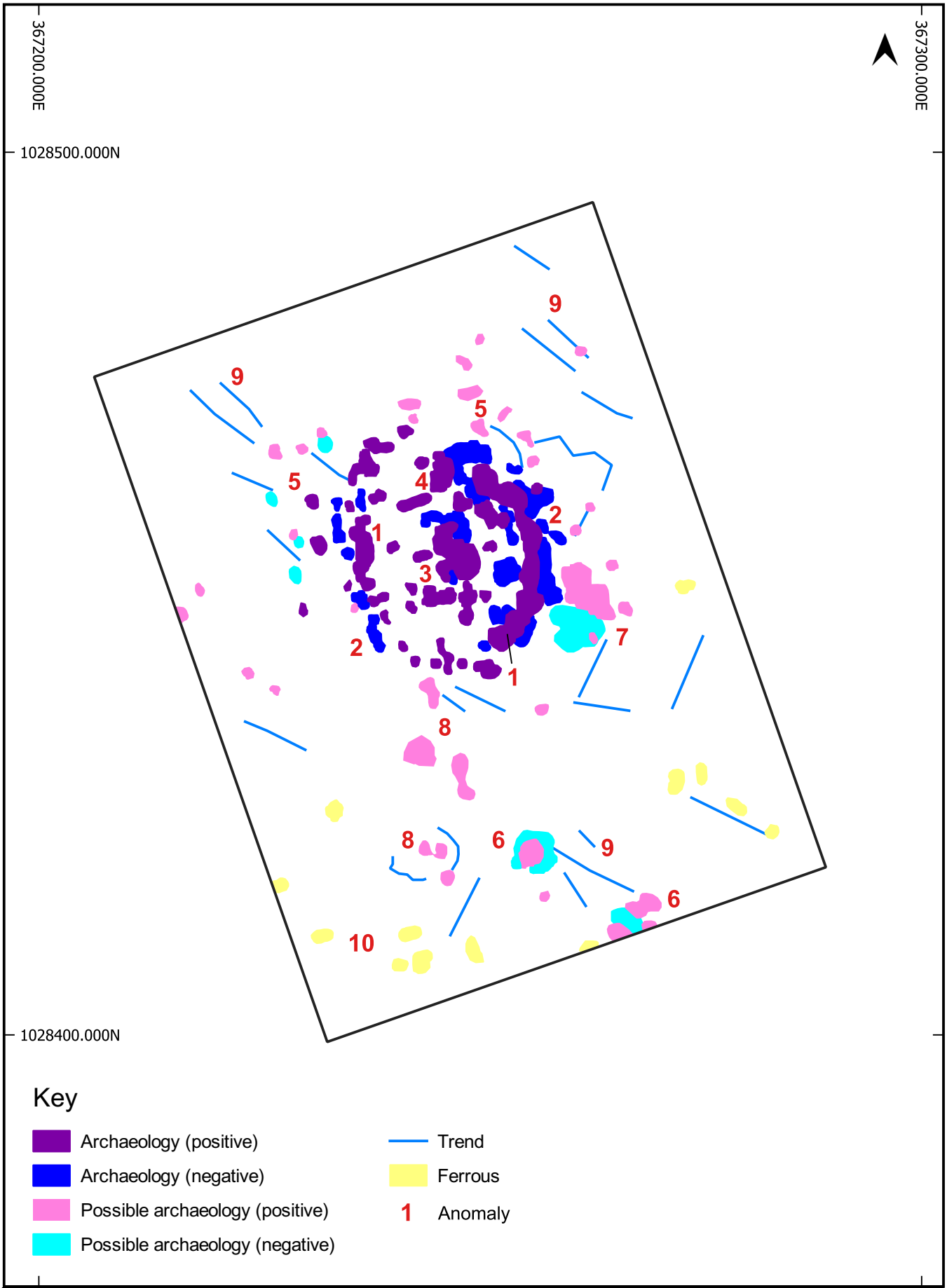

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Figure 18. Cutters Tuo: Magnetometer interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

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Figure 19. Cutters Tuo: Raw earth resistance data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

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Figure 20. Cutters Tuo: HPF earth resistance data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

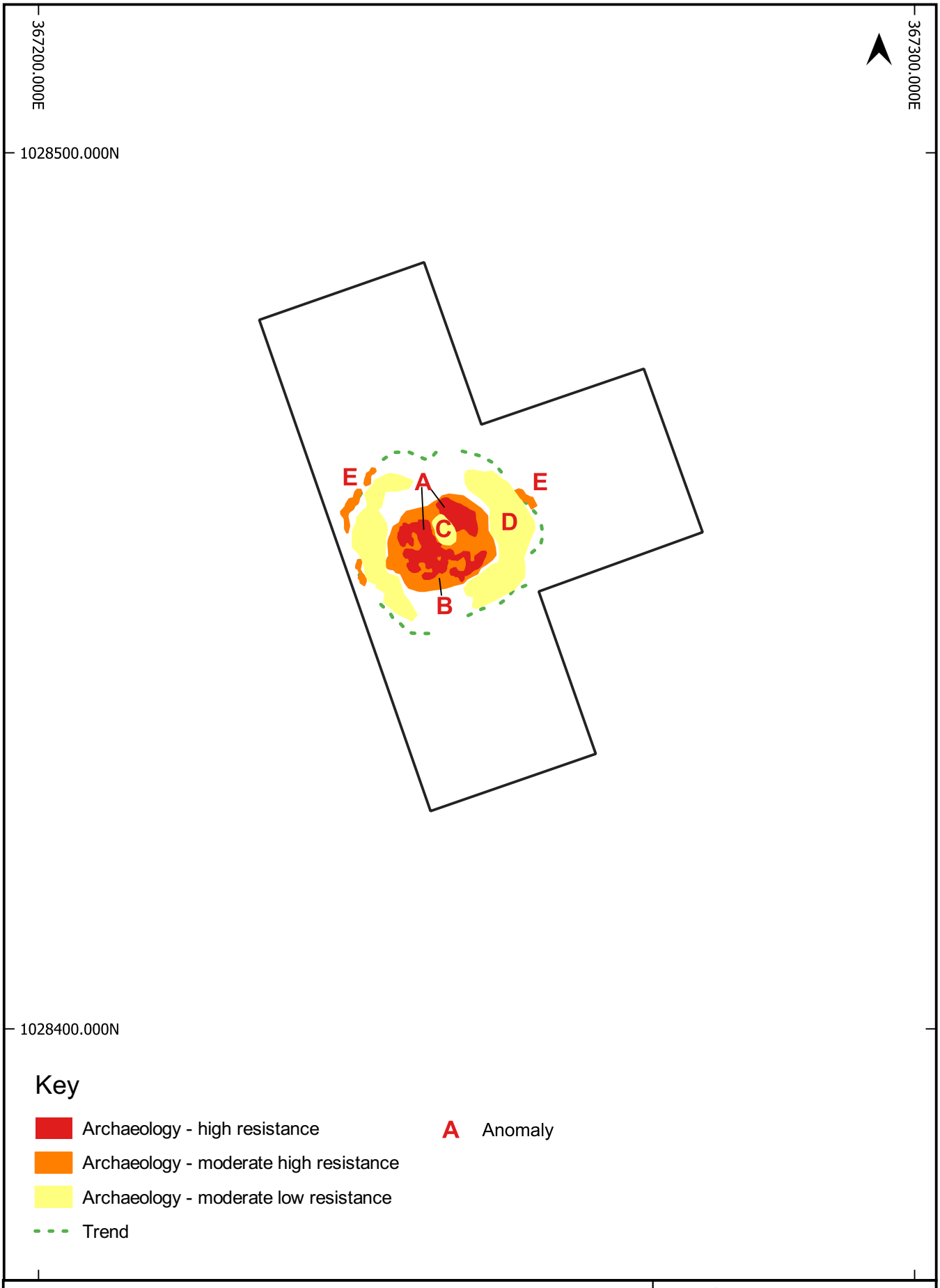

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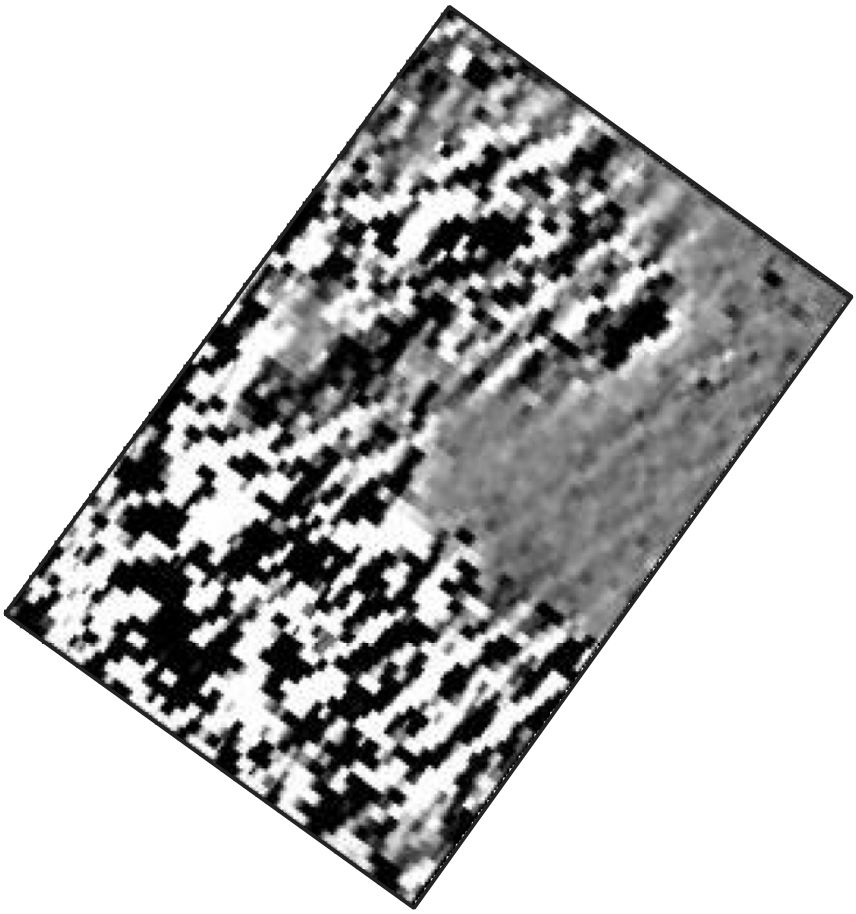
Figure 21. Cutters Tuo: Earth resistance interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

366800.000E

366900.000E

1028400.000N



2

nT

-2

1028300.000N

0 10 20 30 m

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Figure 22. Grice Ness Settlement: Magnetometer interpretation diagram

Project Name: Tombs of the Isles

Project No: 842 | Scale @A4 1:1

Date: 07/23 | Initials: AB | Rev. No. 1

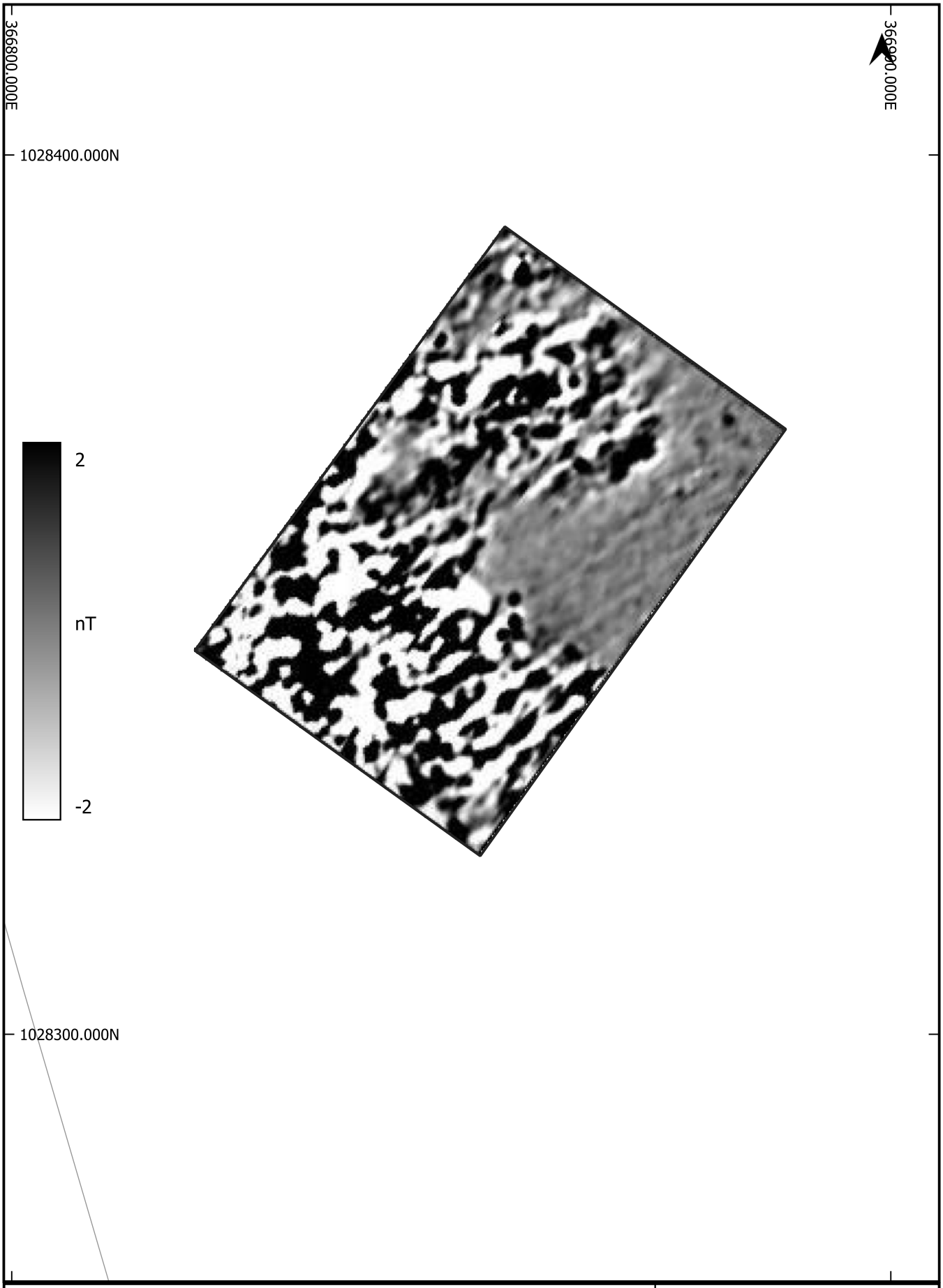

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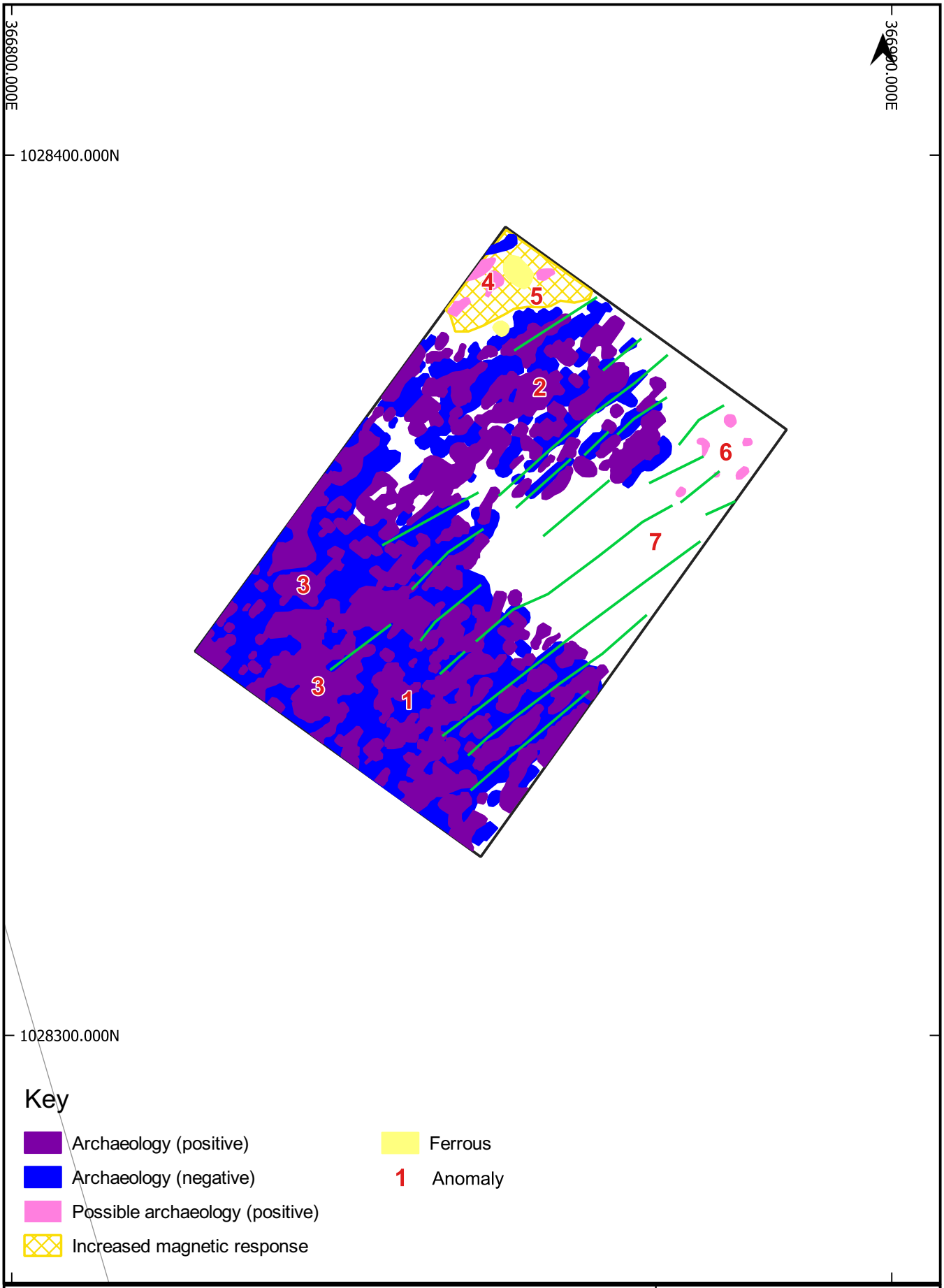
Figure 23. Grice Ness Settlement: Processed magnetometer data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1



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0 10 20 30 m

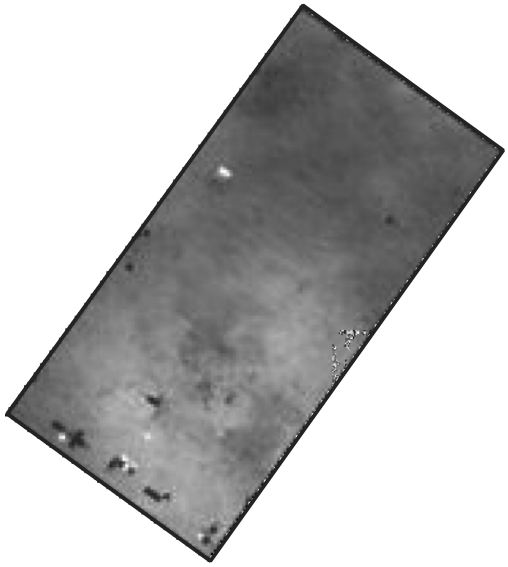
Figure 24. Grice Ness: Magnetometer interpretation diagram

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

366800.000E

366900.000E

1028400.000N



2

nT

-2

1028300.000N

0 10 20 30 m

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Figure 25. Grice Ness Settlement: Raw earth resistance data

Project Name: Tombs of the Isles		
Project No: 842	Scale @A4 1:1	
Date: 07/23	Initials: AB	Rev. No. 1

12 Appendix 1

12.1 Metric Survey

Metric survey was undertaken using a Leica GNSS system.

Data Processing

Most data processing involves the manufacture's software applicable to each instrument.

12.2 Methodology

Gradiometer Survey

Data Collection

Gradiometer survey was undertaken using a Bartington Grad601 gradiometer. The gradiometer comprises two fluxgate sensors mounted 1m apart on a vertical axis. Each sensor measures the earth's magnetic field, in nano-Tesla (nT), and the instrument records the difference between the observed readings for each sensor. By measuring the magnetic field in this manner, the dependency of fluxgate sensors upon the angle between the sensor and the earth's magnetic field and the variations due to large-scale geological variations and diurnal fluctuations are filtered out. By doing so the instrument is recording subtle changes or anomalies in the earth's magnetic field caused by material in the top metre or so of the earth's surface.

Data were collected at 0.25m intervals along traverses 1m apart, in 'zig-zag' fashion i.e. the direction of the traverse alternating between adjacent traverses, within a series of 20m by 20m grids which were later merged together.

Fieldwork

Data were collected at 0.25m intervals along traverses 1m apart, in 'zig-zag' fashion i.e. the direction of the traverse alternating between adjacent traverses, within a series of 20m by 20m grids which were later merged together.

Data processing

The data were processed using Geoplot 4.0.

'Zero mean traverse' corrections have been applied to all the data. This process sets the mean of each line to zero. These corrections remove discontinuities between adjacent grids and striping effects within grids caused by 'zig-zag' collection of data.

The processed data has been interpolated twice in the Y direction to create a 'square' data set. This has the overall effect of smoothing the data.

Data Display

Greyscale images: Greyscale images display the data within a predefined range with all values below the minimum being white and all values over the maximum being black with gradual increments between these two extremes.

Earth Resistance Survey

Data Collection

The earth resistance survey was undertaken using an RM15, system manufactured by Geoscan Research. This device has up to 6 probes mounted on a fixed frame (mobile), 3 were used during this survey. Two additional (remote) probes are place in a fixed position. The

console of the RM15 allowed automatic reading when the contact is made with the ground and the multiplexer MPX15 dispatch the current between probes configuration using a pair of electrodes. For each reading two probes are used to inject the current and the two others are used to measure the voltage. The measurement is then used to determine the apparent resistivity. The data shown are the resistance values in ohms.

Fieldwork

Readings have been collected using the twin parallel configuration allowing the collection of two parallel traverses continuously. The use of this configuration involves positioning two fixed remote probes at a distance of 30 times the mobile electrode separation. This probe separation used during this survey being 50cm the remote probes have to be kept at least 15m from the survey area.

Data were collected with a probe spacing of 0.5m, at 0.5m intervals along traverses 0.5m apart, in 'zig-zag' fashion.

Data Processing

The data were processed using Geoplot 4.0.

Despiking is generally applied to the data to remove individual extreme value called "spikes". Spikes are mainly due to poor contact with the ground during collection.

A high pass filter was applied to some of the datasets to remove large variations in the dataset that are often the product of underlying geological factors in order to clarify anomalies of a potentially archaeological nature.