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LLANERCHAERON ESTATE, CEREDIGION
ENCLOSURE SITE

GEOPHYSICAL SURVEY REPORT

PROJECT CODE: LLC20041

MARCH 2005

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REPORT PRODUCED FOR
LLANERCHAERON ESTATE, THE NATIONAL TRUST IN WALES

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NON-TECHNICAL SUMMARY

A day of magnetic survey was commissioned from ArchaeoPhysica to map a potential enclosure site in detail, potentially in advance of further investigation by excavation. ArchaeoPhysica had detected a part of the archaeological remains during previous magnetic survey but this had not been sufficiently extensive to allow them to be identified.

The survey was able to demonstrate that almost the whole promontory into the Afon Mydyr at this point is occupied by a defended Iron Age farm with an enclosing ditch some 3m wide or more. The enclosure contains a single roundhouse about 15m in diameter showing signs of internal features. The preservation is likely to be excellent as the site has been spared the ravages of modern agriculture and is sealed beneath colluvium. This is also supported by indications in the magnetic data of surfaces contemporary with the occupation of the enclosure surviving beneath the topsoil.

Overall the monument could provide a valuable resource for study of the Iron Age in Wales and also for further geophysical investigation. It is under threat of erosion from the Afon Mydyr as this cuts into the river cliff to the south of the round house and this cliff is itself apparently fill material within an earlier river course.

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CONTENTS

Section 1: THE PROJECT

1.1 Introduction

1.1.1.1 Part of a previously unsuspected archaeological feature was detected in the parkland by ArchaeoPhysica in 2001 during a previous magnetic survey (ArchaeoPhysica, 2001) and the possibility was raised that an early medieval or prehistoric enclosure might have existed here, potentially unrelated to other archaeological features nearby. A proposal has been made to undertake some excavation at the site.

1.1.1.2 A day's magnetic survey was commissioned by the Llanerchaeron Estate to cover the whole area of the enclosure and provide more detailed information than was available from the previous magnetic survey. In addition, temporary datum markers were positioned and surveyed in around the site to enable accurate relocation of the features on the ground.

1.1.1.3 The site is located at OS grid reference SN 478 603, in the Llanerchaeron Estate parkland within a meander of the Afon Mydyr.

1.1.1.4 Fieldwork was carried out in March 2005, covering all the area contained by the meander.

1.2 Site description – an overview

1.2.1 Geology

1.2.1.1 The site is situated on the valley bottom with relict river terraces and deep fluvial and alluvial deposits. The topsoil is fairly thin as the site is part of a pastoral parkland setting and has not be cultivated for many years. Below this there is gritty subsoil which gives way almost immediately to deposits of glacial moraine material of variable depth. This is exposed along the banks of the Afon Mydyr and seems to overlie an unknown depth of silt-rich alluvium mixed with moraine.

1.2.1.2 Where ditches and other large negative features have been cut through the stony moraine they are often filled with soil derived from near surface material, e.g., topsoil. This tends to produce very strong magnetic anomalies but natural variations in the depth of soil above the moraine material can produce an equally large effect upon the magnetic field.

1.2.2 Hydrology

1.2.2.1 The parkland is well drained and from previous surveys by ArchaeoPhysica is known to contain an extensive network of stone drainage culverts probably installed in the early years of the nineteen century.

1.2.2.2 The drainage is therefore essentially artificial and has been so for the best part of 200 years. It can be assumed that before this the valley bottom was prone to becoming wet, perhaps even locally flooded during the Winter due to the proximity of steep hillsides.

1.2.3 Topography

1.2.3.1 The site is essentially flat but with low and eroded river terraces. There is a slight depression at the foot of one of these which would appear to have been a palaeochannel, a result also suggested by the magnetic data.

1.2.4 Land use

1.2.4.1 The fields are grazed improved pasture and have not been ploughed within recent times; whatever ploughing that has occurred in the past has been limited to the uppermost 0.2 - 0.3m.

1.3 Overview of known archaeology

1.3.1.1 With the survey area part of a large curving ditch-like feature had been detected by a previous magnetic survey. Enough had been surveyed to suggest it was a defensive feature perhaps some 3m wide, enclosing something adjacent to the current course of the Afon Mydyr. This appeared to have no spatial correlation with the multitude of other archaeological features discovered in the parkland during the geophysical surveys and excavation.

1.3.1.2 For further details, the reader is referred to the reports on the various geophysical surveys and excavation at the Llanerchaeron Estate.

Section 2: Methodology

2.1 Project background

2.1.1.1 The techniques and resolutions of a geophysical survey are chosen to optimise the likely recovery of information and the resources required to perform it. This varies according to a range of factors, including the potential geophysical nature of likely targets and their environment, priorities and constraints.

2.1.2 Data sources

2.1.2.1 QuintDraft supplied the mapping for this project for the Llanerchaeron Estate in 2001. Some minor changes have occurred in the parkland since then: namely the removal of fencing round the site of the bowling green and in a couple of other places.

2.2 Implementation

2.2.1.1 For a detailed discussion of soil magnetism and the detection of archaeological features using magnetic techniques please read the section entitled 'magnetic theory' in the appendices.

2.2.1.2 The survey was carried out by Anne and Martin Roseveare.

2.2.2 Survey set out

2.2.2.1 Survey set out was achieved using a TopCon total station working off points in the landscape that were clearly defined in the mapping provided. A temporary station was located by angular resection and used to measure in a set of points defining the edges of the survey and various fiducial lines across it. This was also used to survey in a set of temporary datum stakes to assist with the location of features in the future. Two additional points have been fixed using the centres of manhole covers on the sewerage pipeline passing to the east of the survey.

2.2.2.2 The set out was designed to fill the area adjacent to the river, including some overlap with previous magnetic surveys.

2.2.3 Magnetic survey

2.2.3.1 A two-channel wheeled caesium vapour magnetometer system 'Sabrina' based on a Geometrics G858 MagMapper was synchronised in time with a Scintrex ENVImag proton precession magnetometer used as a base station. The two sensors on Sabrina were positioned 0.5m apart and sampled at 10Hz and the base station sensor was mounted approximately 3m above the ground and measurements made at 0.5Hz.

2.2.3.2 The measured variable was the total magnetic field intensity at approximately 0.3m above the ground, units nano Tesla (nT). Measurements along each traverse were 0.2m apart or less. At the end of each traverse the array was rotated to facilitate survey in zigzag fashion. This resulted in a slight difference in overall amplitude between adjacent traverses known as a 'heading error', which was reduced in software later.

2.2.3.3 The survey was accomplished across two sets of data (files) separated by an east to west fiducial line.

2.2.3.4 Quality control consists of four parts. The first is a visual check by a skilled operator each time the instruments are switched on to ascertain the instrument has started up and is functioning correctly. Secondly, a visual assessment is made by the skilled operator during the data collection in real time to monitor the noise floor and spike intensities, etc. The third part is analysis of a 'static test' performed at regular intervals throughout the duration of the fieldwork. The fourth part is a detailed inspection of the data as part of the instrument download and data preparation processes.

2.3 Data preparation and analysis

2.3.1 General principles

2.3.1.1 Field survey should result in data of adequate quality for immediate imaging and that only minimal processing should be necessary for even a fairly detailed interpretation. Care is taken at ArchaeoPhysica to avoid many of the defects that can appear in the data through careless survey practice.

2.3.1.2 At the same time, it is important that analysis should not be regarded solely as a process of image production as this does not maximise the benefit to be had from a more analytical approach based on geophysical principles. For this reason, all of the data processing techniques used by ArchaeoPhysica have been specially developed to provide optimum performance with the particular type of data being studied.

2.3.2 Processing and visualisation (magnetic field data)

2.3.2.1 All processing of magnetic data at ArchaeoPhysica beyond basic image formation use techniques based around the property of a magnetic field known as its 'potential'. In the same way that a battery terminal has a certain potential, or voltage, associated with it, magnetic and gravitational fields share a similar property. Total field data from caesium magnetometers allows this property to be exploited so that several techniques allowing manipulation of the field are possible, e.g., simulating the effect of collecting the data at a different height, in a differently orientated ambient field, etc.

2.3.2.2 One immediate benefit of this is that the data can be visualised in two ways, either as total field measurements or as a synthetic vertical gradient 'pseudogradient'. The advantage of the total field visualisation is that the data is more directly related to susceptibility contrast (creating anomalies of a few 10s of nT) and the anomalies tend to be slightly simpler than a gradient measure. A gradient measure, however, is extremely effective at reducing the often very large magnetic fields (1000s of nT) associated with steel fences, buried services, etc.

2.3.2.3 Processing of the files that make up this project was as follows. Survey data from Sabrina had single-point spikes removed in MagMap. Heading error correction was also achieved using MagMap.

2.3.2.4 Each survey traverse was then interpolated by cubic spline into a regular grid with data 0.25m apart along each traverse, the traverses being 0.5m apart.

2.3.2.5 During processing it became evident that the temporal lock between the base station and roving magnetometers had failed. To remove diurnal variation from the individual traverses of the survey each was bandpass filtered to achieve a similar result.

2.3.2.6 Cross-traverse interpolation of the grid to 0.25m was achieved with proprietary software prior to imaging using Golden Software's Surfer 8.

2.3.2.7 The effect of single point spikes was reduced slightly by applying a 3x3 smoothing window triggered at central deviations greater than 2nT.

2.3.2.8 Data sets of pseudogradient data (1m sensor separation) and shallow magnetic field component were produced for inspection and analysis. In this report the pseudogradient and the measured total field data have both been imaged as they show different aspects of the magnetic properties of the site.

2.3.3 Presentation

2.3.3.1 All images in this report were produced in Golden Software's Surfer 8. CAD mapping data was manipulated in Autodesk's AutoCAD 2004 LT.

Section 3: Results & Discussion

3.1 Discussion

3.1.1.1 For this and the following sections, numbers in green refer to drawing DWG 04.

3.1.1.2 The survey is dominated by a large strongly positive anomaly 2 with a continuation at 1. It is of slightly variable thickness, e.g., at 3 and its form suggests a laminar causative body some 3m wide and close to the surface. The most convincing interpretation of this is a lenticular body of magnetic silt present in the upper regions of a substantial ditch fill which must, therefore, be 3m wide or more at the top.

3.1.1.3 Between sections 1 and 2 there seems to be an out-turned entrance 4 with an area of slightly reduced field intensity 5 within that could indicate an area of metalled surface or paving. Running centrally down this is a weak anomaly of enhanced intensity that is probably a small ditch, in this context perhaps a drainage gully.

3.1.1.4 Within the enclosure, at 6, 7, and 8 there are large pit-type anomalies while at 9 there is a spread of magnetic material that might be related to human activity, perhaps a midden deposit or simply an area of deeper soil. It has similarities with other anomalies outside the enclosure that would appear to be due to natural variations in soil depth.

3.1.1.5 Features 10 to 13 all relate to a ring ditch that has the character of a roundhouse some 15m in diameter, i.e., a substantial building likely to have been the principal structure within the complex. Feature 10 is the remains of the enclosing ditch, presumably an eaves drip around the wooden structure of the house. There is no sign of an entrance but this may have been in the side that has now apparently been lost to erosion. At 11 there is a strongly magnetic anomaly within the building, perhaps a large posthole or a fire pit; there are no clear indications of a hearth. A small number of pit-type anomalies are present, e.g., at 12 while between them areas 13 of reduced magnetic field strength might indicate the remains of a metalled or paved surface.

3.1.1.6 Area 14 is an area of fairly clean fill. It is within an area that had previously been eroded out by the river and the truncation of the enclosure ditch is readily apparent. At 15 there is a much more intensely magnetic area that probably has the same underlying origin; the magnetic enhancement may be due to accumulations of water-borne silt. The erosion of this area has removed part of the roundhouse and a large part of the surrounding enclosure and must therefore have happened after the monument was abandoned.

3.1.1.7 Features 16 through 19 are fairly amorphous areas of strongly enhanced magnetic intensity which probably relate to regions of deeper soil among the boulders of the moraine. These are likely to have once been stream channels and could be of any date after glacial retreat. Features 18 and 19 could be silt-filled gouges created by a retreating ice sheet as they are parallel while 17 would seem to correspond with a slight earthwork likely to be a former river terrace.

3.1.1.8 At 20 and possibly 24 there is a line of intense discrete anomalies typical of ferrous or ceramic material. Their alignment suggests these may be the remains of a fence. Similar anomalies occur at 21, 22, 23 and 25.

3.1.1.9 There are two possible relict field boundaries surviving as diffuse linear areas of enhanced magnetic intensity 26 and 27. These may be nothing more than an accumulation of soil in a small ditch or slightly deeper topsoil immediately uphill of the boundary.

3.1.1.10 At 28, 29 and 30 are examples of the stone culverts thought to date to the early years of the nineteenth century and created to keep the parkland drained. Number 29 is typical of the long straight drains crossing the parkland at many locations while 30 is typical of the shorter examples that may fulfil a more local function. At 28 a further example seems to curve around the top of the river terrace. Drain 29 cuts through the roundhouse and disappears in fill 15. The relationship between these is important because it may allow the fill (and hence the erosion hollow containing it) to be dated.

3.2 Conclusions

3.2.1.1 Drawing the various components together it would appear that they represent a well defined and probably well preserved Iron Age farm, nestling in the valley bottom. It's local context with regard to the Afon Mydyr is unclear as there are many features within the data that suggest the river has moved across the valley bottom since glacial retreat. It is possible that the west facing entrance was intended to overlook the river, making it more defensible but it is also possible that the river flowed at the foot of the river terrace at 16 and 17 where magnetic silts have been deposited.

3.2.1.2 The presence of the roundhouse is particularly important as in many locations these have been destroyed by agriculture, leaving only truncated ditches. There would also appear to be surviving internal detail, e.g., surfaces and pits. It is, however, perilously close to the edge of the river cliff on the eroding side of the river. The presence of fill material against the river bank at the same location would suggest the river has already encroached but has subsequently receded as the meanders have moved over time.

3.2.1.3 Once again the parkland at Llanerchaeron has demonstrated the excellent potential for the survival of structures beneath pasture in central Wales. It seems likely that contemporary features will survive elsewhere in this valley bottom.

3.3 Recommendations

3.3.1.1 The good survival of features here make the site good for multimethod approaches to survey and research into geophysical and excavation techniques. There is reason to believe that the condition of the monument is excellent as it is below colluvium in an area that has escaped deep ploughing. Some ploughing has occurred in the past as there are indicators in the data and this may have penetrated into the stony subsoil in some places.

3.3.1.2 It goes almost without saying that this site could never be ploughed without risking damage to features of archaeological interest. At the same time preservation for perpetuity is unreasonable as the Afon Mydyr is again encroaching upon the monument and has reached what might be an area of fairly soft fill.

3.3.1.3 Some targeted excavation would allow key aspects of the monument's survival to be ascertained, e.g., the roundhouse and the probable entrance through the enclosure ditch. The potential of the ditch to support water logged deposits where contemporary environmental evidence might survive should also be assessed. If a hearth was located this would be an ideal candidate for archaeomagnetic dating which would allow the last time it was used to become known. Thus the site might be important towards understanding the relationship between Iron Age and early medieval Wales.

3.3.1.4 Above all, it would be a good site to use other geophysical techniques on to try and ascertain more about the functionality of the monument and its immediate surroundings.

Section 4: APPENDICES

4.1 Datum positions surrounding this survey

Point ID	Point Type	Easting /mm	Northing /mm
118	Peripheral stake	788372	933170
119	Peripheral stake	764597	901339
120	Peripheral stake	738669	880774
121	Peripheral stake	746305	849341
122	Peripheral stake	771970	828498
123	Peripheral stake	801446	807954
124	Peripheral stake	825645	823611
125	Peripheral stake	845109	828365
126	Manhole centre	875549	854325
127	Manhole centre	814964	944055

4.1.1.1 The co-ordinates given above are in millimetres to reflect the units of the parkland plans provided by QuintDraft. Each stake is marked in a similar manner while the manholes have a small painted red mark at their centres.

4.2 General geophysical theory

4.2.1.1 The fundamental principle is that for features to be potentially detectable they must be capable of generating a geophysical anomaly, i.e., they must exhibit a significant difference in a geophysical properties from their immediate environment.

4.2.1.2 Secondly, the sensitivity of the technique, spatial resolution of data collection and accuracy of spatial location need to reflect the detail required in locating, mapping, identification and analysis of features to fulfil the purpose of the project.

4.3 Magnetic theory

4.3.1 Archaeogeophysical conditions

4.3.1.1 Burial beneath cultivated soil has a variable effect; the topsoil is nearly always more magnetic than the deeper soils and is often as magnetic as some of the fills of pits and ditches. If the cultivated soil is deep, some masking of deeper deposits might occur, however, if the site has regularly been deep ploughed it is likely that the topsoil will contain disturbed magnetic material from buried features, potentially producing a clearer result.

4.3.1.2 Ridge and furrow cultivation is nearly always detectable with magnetic survey due to the magnitude both spatially and magnetically of the resultant soil structure (a similar pattern is often formed by traditional orchard planting).

4.3.1.3 In some cases, features may exist magnetically that cannot be detected during excavation. This is normal, as some soils with enhanced magnetic properties do not exhibit any visible difference from their surroundings. In addition, some features survive as shadows in the topsoil after they have been physically removed by ploughing. The converse scenario is of course also true: there are many archaeological features that have no detectable magnetic component. Finally, sometimes it will be the case that the archaeological feature itself is not magnetic but some secondary characteristic still allows its detection by magnetic survey. An example is where a ditch has been filled, perhaps soon after excavation, with the same material as its surroundings and therefore lacks magnetic contrast with the surrounding material. As this fill settles, deeper topsoil (whether contemporary or modern) can accumulate in the resulting hollow, creating a local slightly positive magnetic anomaly. An example of this is a grave site where the grave itself is usually nonmagnetic but can occasionally be located by the disturbance of the contemporary surface. Of course if the top of the feature has been truncated by ploughing this effect will disappear and this is unfortunately often the case.

4.3.1.4 Hearths, burnt or fired soil and clay, and similar contexts involving the application of heat to soil, tend to be highly magnetic due to chemical changes in the soil, in particular the conversion of iron oxides to maghaemite and magnetite. Assuming there is adequate iron in the soil initially, the process results in a particularly strong enhancement that is effectively permanent (the degradation that does occur can be regarded as negligible over the archaeological time scales expected for this project). This means that any hearth can usually be detected with confidence. In addition the presence of domestic fires at settlement sites tends to lead to an accumulation of magnetic soil throughout the settled area and a little beyond. It is possible therefore that features that are undetectable away from a settlement will become more detectable the closer survey proceeds to the inhabited area, an effect that has been observed in large surveys in England.

4.3.1.5 A secondary effect of the same process is that the presence of non-magnetic features may become detectable if magnetic material has accumulated in or around them. A common example is wall footings where magnetic soil has built up against them, even in trace quantities.

4.3.2 Fundamental theory

4.3.2.1 A fundamental principle is that for features to be detectable they must be anomalous in a geophysical sense, i.e., have geophysical (as opposed to archaeological) properties different from their surroundings. In some cases it is the property itself that creates the anomaly, in others the difference. As an example, a horizontal uniformly magnetised slab will create a significant anomaly to a gradiometer principally at its edges but much less towards the centre. A magnetometer, however, will detect an anomaly that reflects the magnetisation of the slab as well.

4.3.2.2 This illustrates an important consideration; the data produced for a geophysical survey is a convolution of the measured variable (magnetic field strength) and the configuration of the instrument. The amplitude and shape of the anomaly associated with an archaeological feature will be different depending upon the instrument used. In addition, the shape is also highly dependent upon the survey resolution. In archaeology, where sampling intervals are usually asymmetric, (e.g., 1m x 0.25m), it is important that the highest resolution is aligned with the most diagnostic direction of the anomaly. This is for most archaeological anomalies in the north – south direction.

4.3.2.3 A second and no less important principle is that the sensitivity of the technique, spatial resolution of data collection and accuracy of spatial location need to reflect the detail required in locating, mapping, identification and analysis of features to fulfil the purpose of the project. Generally speaking, the more information that is required, the higher the survey resolution and the more sensitive the instrument has to be. For magnetic surveys, the height of the sensor above the ground is also important as the magnetic field exhibits a third order decrease with height. In general, the higher the horizontal resolution in the north – south direction, the lower the sensor needs to be. There is a way (Koppelt *et al*, 1999) of calculating the absolute error on a measurement depending upon resolution and height; for the purposes of this report it is sufficient to say that it is less than 2% for a caesium sensor at 0.3m height.

4.3.3 Geomagnetism

4.3.3.1 The geomagnetic field is at any location the four-dimensional (space and time) vector sum of several discrete components. The temporal component has categories separated by the time over which any variation in their intensity becomes noticeable. Archaeological surveys are concerned with the two most rapidly changing components, micropulsations and the diurnal field. The former may only last a few seconds and have amplitudes comparable with anomalies from archaeological sources, e.g., 2-5nT. The second is the daily fluctuation in the regional field that is broadly predictable and varies by some 30-40nT per day. This can be complicated by magnetic storms which can contribute field variations of well over 100nT or more in a day, frequently associated with intense bursts of magnetic noise within the spread of amplitudes associated with archaeological sources. A third temporal variation is due to variations in the distribution of magnetic sources within the Earth's core. Unlike the other two, these occur over years, influence both the amplitude and direction of the regional field and for archaeological purposes can be safely ignored.

4.3.3.2 The stationary (non-temporal) component of the magnetic field is the sum of all the myriad of magnetic sources within the Earth's crust. These range from deeply buried magnetic minerals deep in the crust through to changes in soil structure and properties due to environmental, agricultural and of course archaeological sources. To provide a sense of scale, the deeply buried sources can contribute anomalies of a few thousand nT across many kilometres of landscape, though visible as changes of only a few nT across the sizes of areas associated with many archaeological projects. In contrast, the environmental and archaeological sources may contribute just 0.5 to 20nT, detectable at distances of no more than perhaps 3m for the larger anomalies.

4.3.3.3 Where anomalies exist of a larger spatial extent than the survey area they form part of the *regional* field and are caused by the deepest magnetic components of the ground. The remaining field is called the *residual* and represents roughly the sum of the magnetic sources present within the survey area, whatever their depth of burial. In basic terms, the more sensitive the instrument used to generate this data and the less cluttered the soil, the deeper the source that can be imaged magnetically, perhaps ditch fills or settlement sites concealed beneath marginal peat for example. A branch of geophysical processing called *potential field analysis* allows the geophysicist to further subdivide these sources, allowing the very shallowest ones, indicative of archaeological sources, to dominate the deeper.

4.3.4 Instrument configuration

4.3.4.1 The magnetic field has a direction and intensity and hence it is possible to measure either the intensity of a directional component or the total intensity. The total intensity is measured using a total field magnetometer, e.g., a caesium magnetometer but it is common in UK archaeological surveys to measure just the vertical component, using a fluxgate gradiometer.

4.3.4.2 In addition, magnetometers can be configured in different ways, usually as single sensor magnetometers or as gradiometers. For this discussion it is assumed that the gradiometer is vertical. A single magnetic sensor measures all components of the ambient field, including the temporal which is not desired and hence needs to be removed from the data during processing. This is usually achieved either through reduction using software or by using a base station magnetometer, one that does not move and simply records the temporal variations so that they can be subtracted from the field data later.

4.3.4.3 A gradiometer avoids this by having two sensors measuring simultaneously, one sensor being mounted higher than the other. By subtracting the data from the upper sensor from the lower, the temporal component, common to both sensors, is removed. This has a disadvantage in that unless the upper sensor is quite high above the ground, e.g., 3m, the data from it contains a large component due to shallow and hence archaeological sources. When the data is subtracted this reduces the anomaly strength from shallow sources as well as deep and hence desensitises the survey. For gradiometers using widely spaced sensors, e.g., the Bartington Grad601-2, this is much less of a problem than for shorter ones, e.g., the Geoscan Research FM36.

4.3.4.4 One advantage of vertical gradiometers is that they provide slightly better defined edges of anomalies due to magnetic sources close to them, e.g., magnetic fills in the tops of pits and ditches. A magnetometer, however, will quite often provide slightly larger anomaly strength and the calculated vertical gradient is nearly always a good model of the measured gradient.

4.3.4.5 Conversely, magnetometers are better at imaging laminar structures and can hence differentiate between soils at the same depth but with different magnetic susceptibility. This is of particular benefit when imaging small areas or sites with complex magnetic properties, e.g., settlements.

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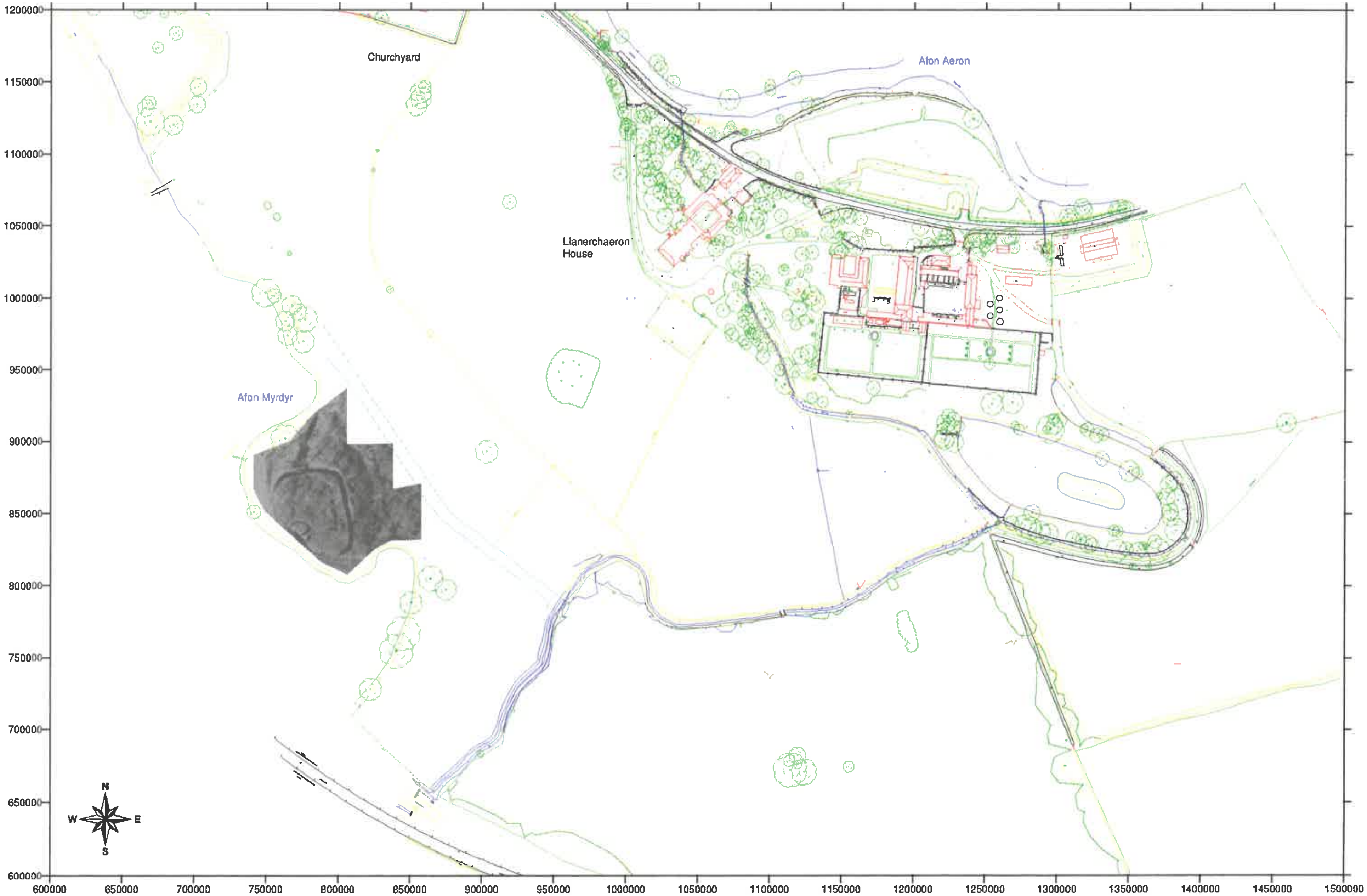

Project Name: Llanerchaeron Enclosure Site
Project Code: LLC20041

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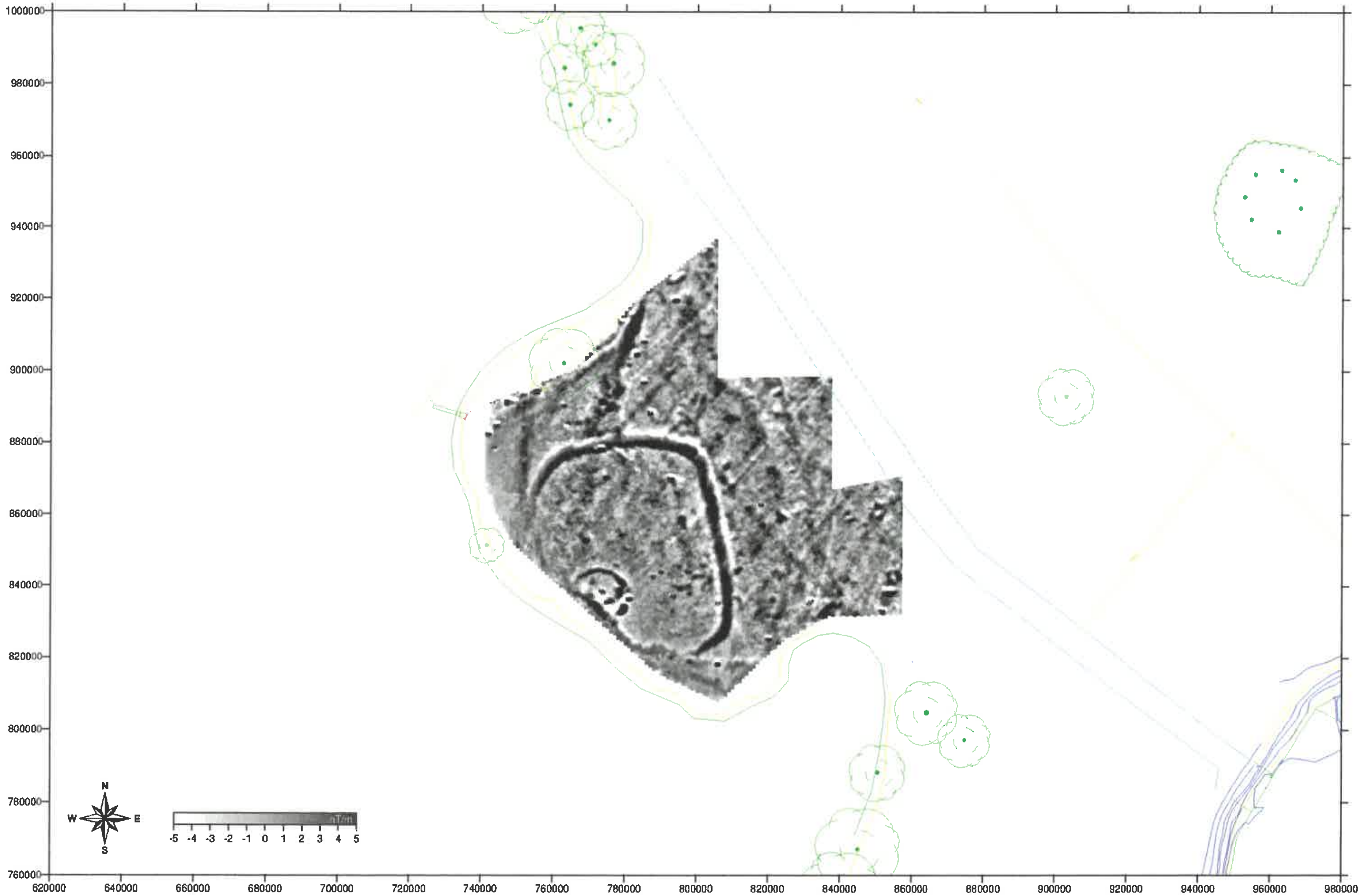
Image Resolution: N/A
Base Mapping: Quintdraft survey, 2000

Drawing Title: Location of Survey
Author: ACKR
Version: 1
PRN:

Drawing No.: DWG 01

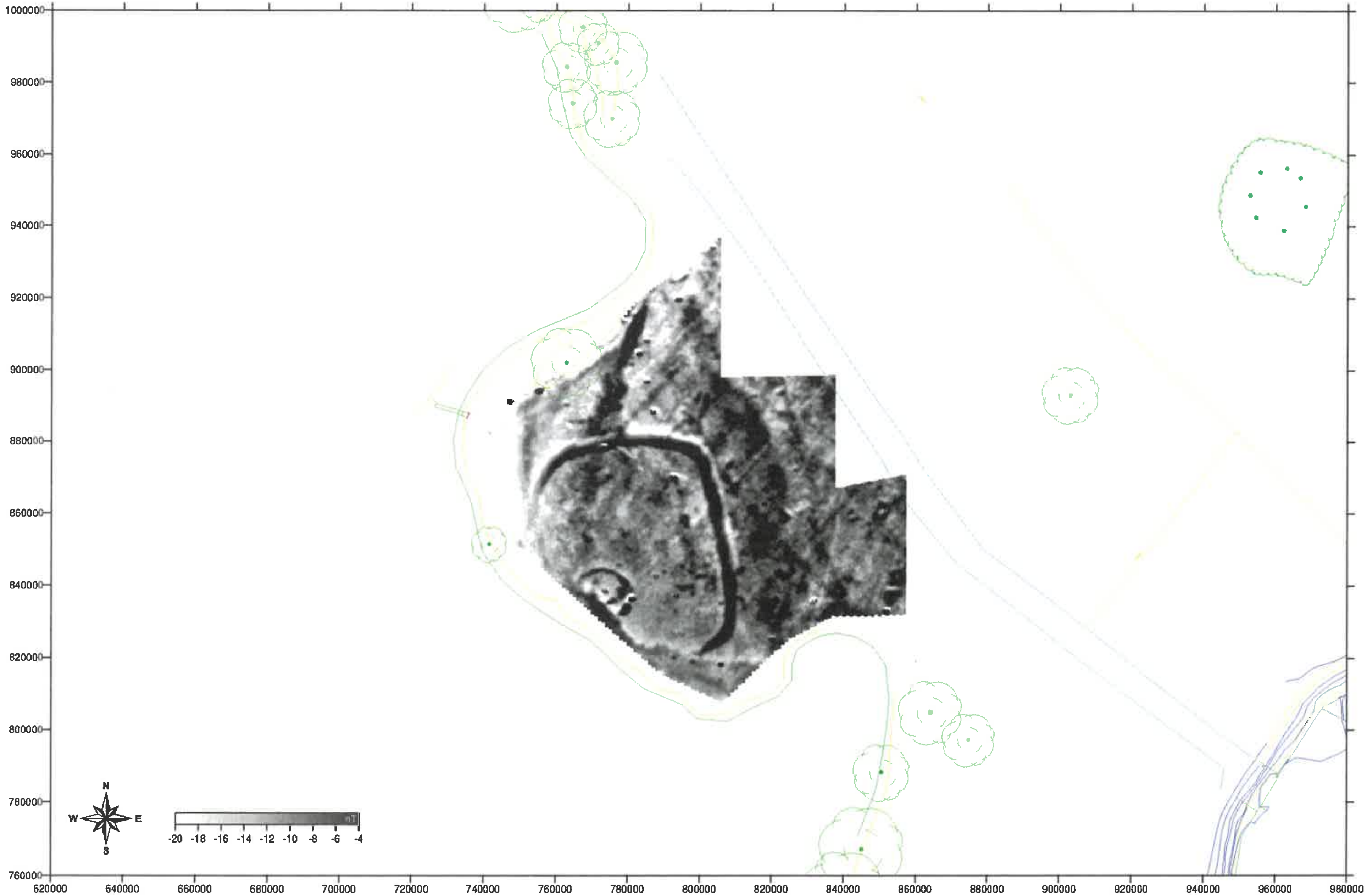


Project Name: Llanerchaeron Enclosure Site
Project Code: LLC20041

Plot Scale: 1:1000, coords. in mm
Data Resolution: 0.5m x 0.25m
Image Resolution: 0.25m x 0.25m
Base Mapping: Quintdraft survey, 2000

Drawing Title: Magnetic Pseudogradient Data (1m)
Autnor: ACKR
Version: 1
PRN:

Drawing No.: DWG 03

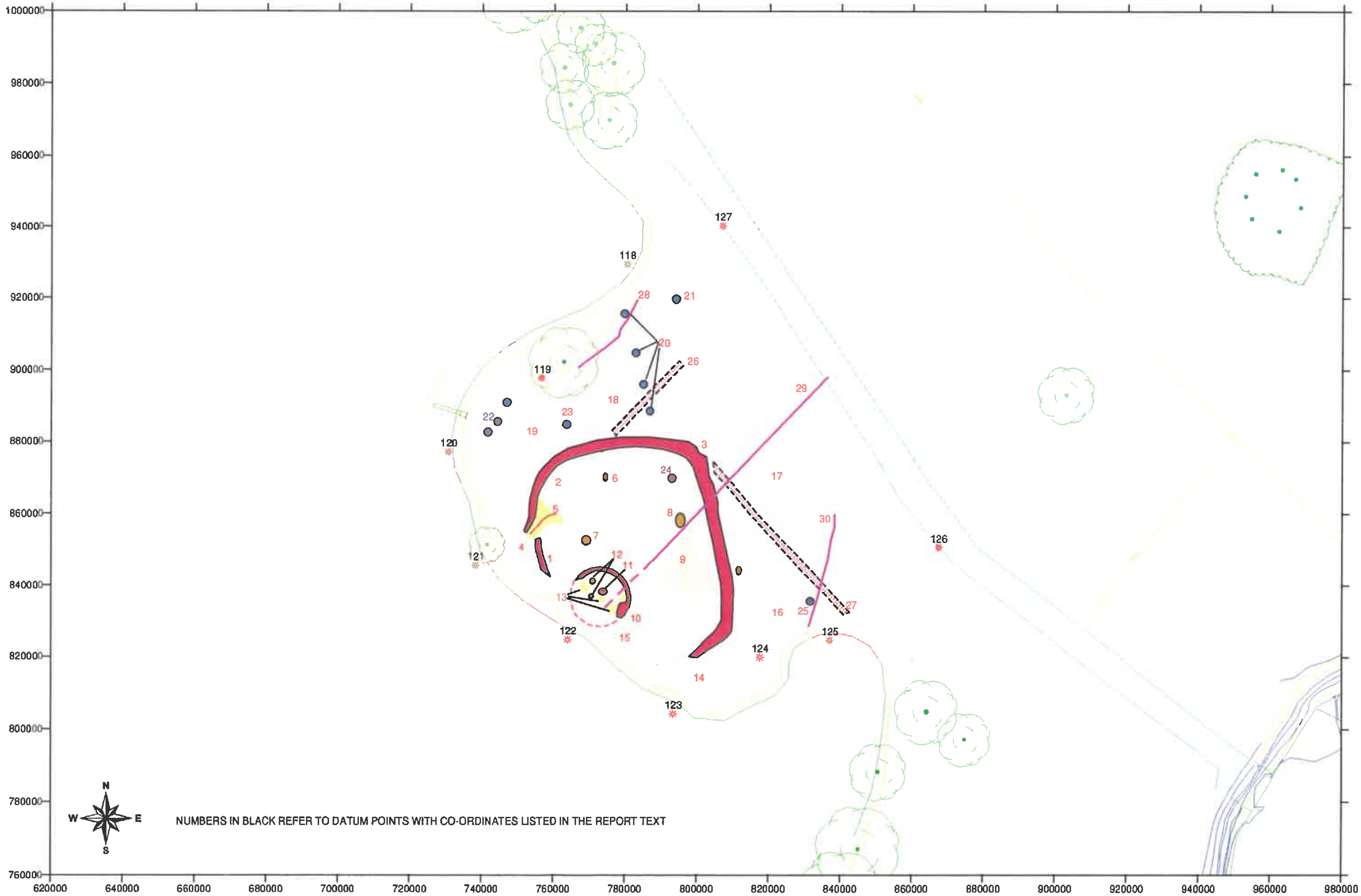


Project Name: Llanerchaeron Enclosure Site
Project Code: LLC20041

Plot Scale: 1:1000, coords. in mm
Data Resolution: 0.5m x 0.25m
Image Resolution: 0.25m x 0.25m
Base Mapping: Quintdraft survey, 2000

Drawing Title: Magnetic Total Field Data
Author: ACKR
Version: 1
PRN:

Drawing No.: DWG 02



Project Name: Llanerchaeron Enclosure Site
Project Code: LLC20041

Plot Scale: 1:1000, coords. in mm
Data Resolution: N/A
Image Resolution: N/A
Base Mapping: Quintdraft survey, 2000

Drawing Title: Interpretation of Magnetic Data
Author: MJR
Version: 1
PRN:

Drawing No.: DWG 04