GEOPHYSICAL SURVEY

REPORT

Sigginstown Castle,

Sigginstown,

Co. Wexford

Date:
09/08/2017

Licence: 17R0125

J. M. Leigh Surveys Ltd.
124 Oaklawn West
Leixlip
County Kildare
www.jmlsurveys.com
01 615 4647

J. M. Leigh Surveys Ltd.
124 Oaklawn West,
Leixlip, Co. Kildare
Tel: 01 615 4647
Mobile: 0879062729
www.jmlsurveys.com

GEOPHYSICAL SURVEY SUMMARY SHEET
SIGGINSTOWN CASTLE, SIGGINSTOWN, COUNTY WEXFORD

Site Name	Sigginstown Castle	**Ref No.**	17032
Townland	Sigginstown	**Licence No.**	17-R-0125
County	Wexford	**Licence Holder**	Joanna Leigh
ITM (centre)	E706255, N607126	**Purpose**	Research
Client	Elizabeth Jones	**Reference No.**	N/A

Closest RMP	WX053-001	**Classification**	Castle
ITM	E706249, N607087	**Location**	Within study area
Townland	Sigginstown		

Ground Conditions	Survey area comprised of cut pasture
Survey Type	Detailed gradiometer survey and targeted resistance survey totalling 1.2ha

Summary of Results

The data to the east of the castle site suggests features correlating with the castle structure extend here, possibly representing former garden features or an outer rectilinear ditched enclosure. This appears to extend from the extant structure of the castle.

A large pit type response in the field to the north is indicative of a former fish pond. In the north-western field, the gradiometer survey suggests the possible location of a former structure, with the resistance survey identifying corresponding agricultural trends. In the far north of this field both the gradiometer and resistance survey suggest the location of a circular feature, perhaps representing the remains of a small enclosure.

Report Date	09/08/2017	**Report Author**	Joanna Leigh

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Geophysical Survey Report
Sigginstown Castle, Sigginstown, County Wexford

1 Introduction

1.1 A geophysical survey has been conducted by J. M. Leigh Surveys at the site of Sigginstown Castle. The survey has been commissioned by Elizabeth Jones and is funded by The Heritage Council. The results of the geophysical survey form part of a wider archaeological study by Stafford Mcloughlin Archaeology.

1.2 The Study Area is situated across three fields (Areas A, B and C) in the surroundings of Sigginstown Castle. Figure 1, at a scale of 1:1,500, presents the location of the castle and the subsequent areas of gradiometer and resistance survey. Sigginstown Castle is located c.9km to the south-west of Rosslare Harbour and c.10km to the north-east of Kilmore Quay.

1.3 Sigginstown Castle (WX053-001) is recorded as a 17th Century House, built by the Siggins Family in the 15th Century and became the property of the Jacob family who lived here into the 19th century. The tower house has a rectangular two story house attached to the north which may date to the 17th or 18th Century. The castle lies in a ruinous state. Photographs of the site at the time of survey are presented in Plates 1-5.

1.4 The main aim of the survey is to identify any geophysical responses indicative of archaeological features associated with the recorded Castle. A detailed gradiometer survey was conducted in all available areas (Areas A-C) and targeted resistance survey (Areas 1 and 2) were positioned to investigate responses recorded in the gradiometer survey.

1.5 Survey fieldwork was conducted under licence 17R0125 issued by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

2 Survey ground conditions and further information

2.1 Survey ground conditions were good at the time of the survey. The grass had been cut and mostly cleared for the purposes of this survey.

2.2 In Area C a mound of cleared vegetation in the centre of the field could not be surveyed. This has not affected the overall interpretation of the results.

3 Survey Methodology

Gradiometer Survey

3.1 A detailed gradiometer survey detects subtle variations in the local magnetic field and measurements are recorded in nano-Tesla (nT). Some archaeological features such as ditches, large pits and fired features have an enhanced magnetic signal and can be detected through recorded survey.

3.2 Data was collected with a Bartington Grad 601-2 instrument. This is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey fast and effective.

3.3 The instrument is calibrated in the field to ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.01nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

3.4 All data was collected in 'zigzag' traverses. Grid orientation remained constant throughout each field to facilitate the data display and interpretation.

3.5 Data was collected with a sample interval of 0.25m and a traverse interval of 1m, providing 3200 readings per 20m x 20m grid. The survey grid was set-out using a GPS VRS unit. Survey tie-in information is available upon request.

3.6 Detailed gradiometer survey was positioned in Areas A, B and C (Figure 1).

Detailed Resistance Survey

3.7 The resistance survey was targeted on the results of the gradiometer survey. Detailed resistance survey Areas 1 and 2 were positioned in gradiometer survey Areas B and C.

3.8 A detailed resistance survey is used to record variations in electrical resistance by passing an electrical current through the ground. The subsequent earth resistance (measured in ohms) is recorded and presented in map form for interpretation. Resistance surveys are typically conducted on sites where structural or stone features are anticipated.

3.9 Detailed resistance survey was conducted with a Geoscan RM15 instrument. Data was collected with a parallel twin-probe array of mobile and remote electrodes. The resistance survey mobile probes were separated by 0.5m. Data was collected with a sample interval of 1.0m and a traverse interval of 1.0m.

3.10 The survey grid was set-out using a GPS VRS unit. Survey tie-in information is available upon request.

3.11 The survey methodology, data display and analysis complies with the European Archaeological Council (EAC, 2015) '*Guidelines for the use of Geophysics in Archaeology*'.

4 Data display

4.1 A summary greyscale image and accompanying interpretation diagram for both the gradiometer and resistance survey are presented in Figures 2-5. The gradiometer data is presented at a scale of 1:1,000 (Figures 2 & 3) and the resistance data is presented at a scale of 1:750 (Figures 4 & 5).

4.2 Letters and numbers in parenthesis in the test refer to specific responses highlighted in the interpretation diagrams (Figures 3 & 5).

4.3 A combined interpretation diagram is presented in Figure 6 at a scale of 1:1,000.

4.4 Isolated ferrous responses in the gradiometer survey most likely represent modern ferrous litter and debris and are not of archaeological interest. These are not discussed in the text unless considered relevant.

4.5 The raw gradiometer data is presented in archive format in Appendix A1.01 – A1.05. The gradiometer raw data is displayed as a greyscale images and xy-trace plots at a scale of 1:500. The resistance raw data is presented as raw and processed data greyscale images, also at a scale of 1:500. The archive plots are used to aid interpretation of the results and are for reference only. The archive plots are available as PDF images upon request.

4.6 The display formats referred to above and the interpretation categories are discussed in the summary technical information section at the end of this report.

5 Gradiometer Survey Results (Figures 2 & 3)

Area A

5.1 Detailed gradiometer survey in Area A presented a low level of background variation. A faint linear trend (1) in the north of the data set most likely represent a former boundary division or drainage feature.

5.2 In the south of Area A there is a broad positive response (2). This is unusual, and may represent a large pit feature. It is possible that this represents a former small fish pound, although this is speculative.

5.3 Isolated ferrous responses in the data and at the field entrance are interpreted as modern in origin and not of archaeological interest.

Area B

5.4 Area B comprises of responses suggestive of agricultural activity, possibly associated with the castle site.

5.5 A series of responses (3) forms a rectilinear pattern. The positive and negative responses are all indicative of archaeological activity and it is possible that the remains of a former structure are located here.

5.6 To the north of (3), there is a clear curvilinear trend (4) in the data. This is suggestive of a curving ditched feature. The purpose of this is unclear, but it is possible that the remains of a small enclosure feature are represented here.

5.7 Isolated responses (5) are also of potential interest, perhaps representing isolated pit-type features. These may be associated with the curvilinear trend (4), although this is speculative.

5.8 In the south of Area B, there are curvilinear trends and isolated responses (6). These appear fragmented and may represent plough damaged features. Interpretation is unclear due to the incomplete nature of these responses.

Area C

5.9 Area C is located to the immediate east of the castle site. Clear responses of interest were recorded here.

5.10 A clear positive linear response (7) is located in the west of the data set, and directly east of the castle remains. The response is indicative of a ditched feature and runs parallel with the castle walls. This is considered to be clearly associated with the castle structure. It is possible that the response (7) forms the eastern extent of the

castle site, either forming a ditched enclosure feature, or possibly representing the extent of an associated garden.

5.11 Further responses (8) appear fragmented and interpretation is tentative. However, these may represent pit features and should be considered to be of archaeological potential.

5.12 A negative linear response (9) appears to run through the data set. This may represent a former boundary feature or perhaps a stone lined drain.

5.13 A faint curvilinear negative trend (10) is evident in the data. Interpretation is cautious. This is at the limits of instrument detection and has no clear association with the other responses identified in the data. However, it is possible that this represents the remains of an outer enclosure feature of the castle.

6 Resistance Survey Results (Figures 4 & 5)

Area 1

6.1 There are no clear responses indicative of structural remains in Area 1. However, in the north of the data set there is a circular area of high resistance (A). This may represent a spread of material and could signify the remains of an archaeological feature.

6.2 Elsewhere in Area 1, there are linear trends (B). These are indicative of agricultural activity.

Area 2

6.3 An area in Area 2 was not suitable for survey (C). A pile of cleared vegetation was located here.

6.4 Responses of archaeological interest were recorded in Area 2. A curvilinear low resistance response (D) is located in close proximity to the castle remains. Interpretation is unclear but this may represent a stone lined feature.

6.5 A high resistance response (E) was recorded in the east of Area 2. Interpretation is unclear. The response has an irregular shape and may represent a spread of structural material, perhaps stone material from the castle site is located here. This is speculative but is considered most likely.

7 Discussion (Figure 6)

7.1 The results of both the gradiometer and resistance survey have highlighted responses of archaeological potential and suggest the location of features associated with the remains of Sigginstown Castle.

7.2 In the gradiometer survey, the possible remains of a large pit have been identified in Area A. It is possible that this response represents the location of a former small fish pond, although this is speculative.

7.3 Detailed gradiometer and resistance survey in was conducted in Area B (resistance survey Area 1). Here, the gradiometer and resistance survey show some correlation with a curvilinear response (4) identified in the north of the gradiometer data. This presents in the resistance survey as an area of high resistance (A). It is possible that the plough damaged remains of a small enclosure are represented here.

7.4 To the south of the possible enclosure, the gradiometer survey identified a rectilinear area of responses (3). These are indicative of possible structural remains. However, the resistance survey did not correspond with this, although there are linear trends with a similar orientation to (3). The absence of responses in the resistance survey may suggest these features are plough damaged.

7.5 In the survey to the east of the castle (gradiometer Area C and resistance Area 2). The survey results show good correlation. The gradiometer survey identified a clear ditch type response 7 which has the same orientation as the castle site. In the resistance data, a U-shaped low resistance response (D) corresponds with the gradiometer results. This suggests ditched features are located here. It is possible they mark an enclosure for the castle site, or perhaps represent garden features associated with the castle grounds.

8 Conclusion

8.1 Although the survey data presents fragmented responses, the results suggest the location of plough damaged and robbed out features associated with the Sigginstown Castle.

8.2 The data to the east of the castle site suggests features correlating with the castle structure extend here, possibly representing former garden features or an outer rectilinear ditched enclosure. This appears to extend from the extant structure of the castle.

8.3 A large pit type response in the field to the north is indicative of a former fish pond. In the north-western field, the gradiometer survey suggests the possible location of a former structure, with the resistance survey identifying corresponding agricultural trends. In the far north of this field both the gradiometer and resistance survey suggest the location of a circular feature, perhaps representing the remains of a small enclosure.

8.4 Consultation with a licensed archaeologist and with the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs is recommended to establish if any additional archaeological works are required.

Technical Information Section

Instrumentation & Methodology

Detailed Gradiometer Survey

This is conducted to clearly define any responses detected during scanning, or can be applied as a stand-alone methodology. Detailed survey is often applied with a sample interval of 0.25m and a traverse interval of 1m. This allows detection of potential archaeological responses. Data is collected in grids 40m x 40m, and data is displayed accordingly. A more detailed survey methodology may be applied where archaeological remains are thought likely. A survey with a grid size of 10m x 10m and a traverse interval of 0.5m will provide a data set with high resolution.

Bartington GRAD 601-2

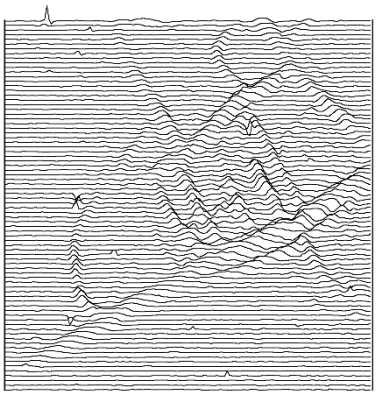
The Bartington Grad 601-2 instrument is a specifically designed gradiometer for use in archaeological prospection. The gradiometer operates with a dual sensor capacity making survey very fast and effective. The sensors have a separation of 1m allowing greater sensitivity.

Frequent realignment of the instruments and zero drift correction; ensure a constant high quality of data. Extremely sensitive, these instruments can detect variations in soil magnetism to 0.1nT, affording diverse application throughout a variety of archaeological, soil morphological and geological conditions.

Data Display & Presentation

Gradiometer Survey

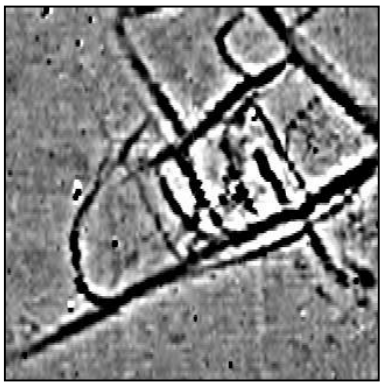
XY Trace



The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.

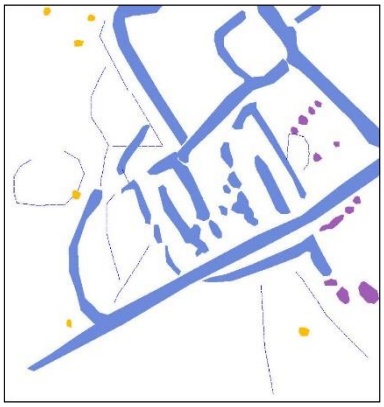
Greyscale*

As with dot density plots, the greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the full range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection. In the summary diagrams processed, interpolated data is presented. Raw data is presented in the archive drawings along with the xy-trace plots.



Interpretation

An interpretation of the data is made using many of the plots presented in the final report, in addition to examination of the raw and processed data. The project managers' knowledge and experience allows a detailed interpretation of the survey results with respect to archaeological potential.



**XY Trace and raw greyscale plots are presented in archive form for display of the raw survey data. Summary greyscale images of the interpolated data are included for presentation purposes and to assist interpretation.*

Electrical Resistance

The technique is used to record variations in electrical resistance by passing an electrical current through the ground. The standard instrument for archaeological investigations is a twin-probe array of mobile and remote electrodes maintained at a distance of about 20m.

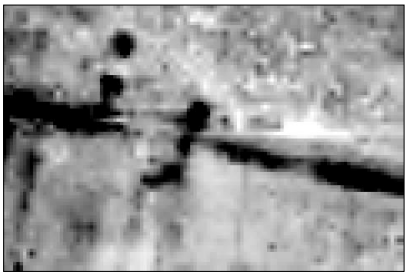
The mobile electrodes (one current and one potential, usually 1m apart) are mounted on a survey frame and connected to a Geoscan RM15 resistance meter, which records the specific resistance of the soil (measured in ohms).

The resistance meter is connected to the pair of remote probes (one current and one potential), which remain in a fixed location. Data are collected as the survey frame and mobile probes reach each designated sample interval. Survey was undertaken at 0.5 m sample intervals along 1 m traverses (i.e., 800 readings per 20m x 20m grid. The adaptability of the instrument enables increased sampling intervals, as well as a range of probe separations and arrays to operate at varying depth penetration.

Data Display & Presentation

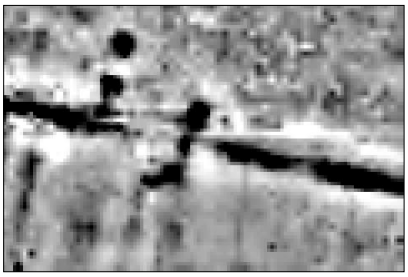
Greyscale

The greyscale format assigns a cell to each datum according to its location on the grid. The display of each data point is conducted at very fine increments, allowing the selected range of values to be displayed within the given data set. This display method also enables the identification of discrete responses that may be at the limits of instrument detection.



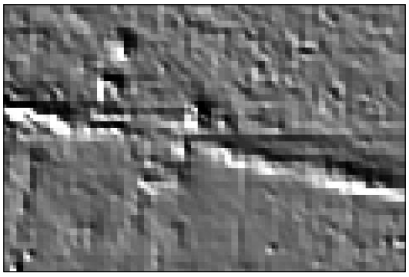
High Pass Filter

The data can be processed to enhance readings of interest. A High Pass Filter is commonly applied to increase the contrast of the responses with the natural background readings. The High Pass Filter can often emphasize responses of particular archaeological interest.



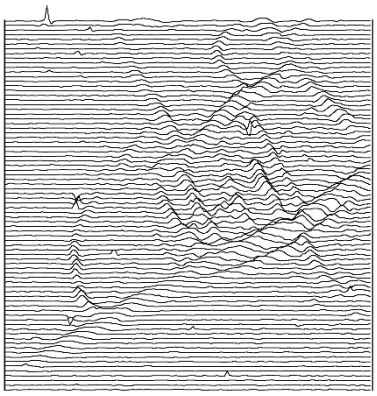
Relief Plot

The Relief Plot provides an aesthetic image of the data, giving the illusion of a 3-D data set. The illusion of height can provide a better visualisation of the resistance results and can be useful for interpretation and presentation.



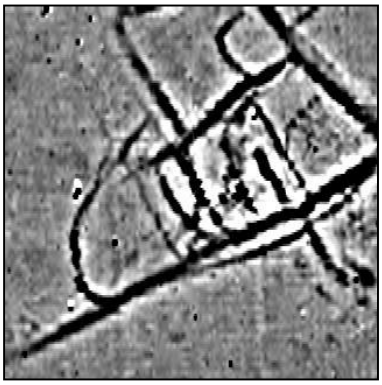
Gradiometer Data Display & Presentation

XY Trace



The data are presented as a series of linear traces, enabling a semi-profile display of the respective anomalies along the X and Y-axes. This display option is essential for distinguishing between modern ferrous materials (buried metal debris) and potential archaeological responses. The XY trace plot provides a linear display of the magnitude of the response within a given data set.

*Greyscale**



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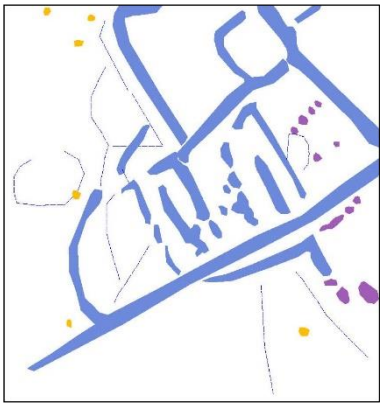
Interpretation



An interpretation of the data is made using many of the plots presented in the final report, in addition to examination of the raw and processed data. The project managers' knowledge and experience allows a detailed interpretation of the survey results with respect to archaeological potential.

**XY Trace and raw greyscale plots are presented in archive form for display of the raw survey data. Summary greyscale images of the interpolated data are included for presentation purposes and to assist interpretation.*

Glossary of Interpretation Terms

Archaeology

This category refers to responses which are interpreted as of clear archaeological potential, and are supported by further archaeological evidence such as aerial photography or excavation. The term is generally associated with significant concentrations of former settlement, such as ditched enclosures, storage pits and associated features.

? Archaeology

This term corresponds to anomalies that display typical archaeological patterns where no record of comparative archaeological evidence is available. In some cases, it may prove difficult to distinguish between these and evidence of more recent activity also visible in the data.

? Industrial

Such anomalies generally possess a strong magnetic response and may equate with archaeological features such as kilns, furnaces, concentrations of fired debris and associated industrial material.

Area of Increased Magnetic Response

These responses often lack any distinctive archaeological form, and it is therefore difficult to assign any specific interpretation. The resulting responses are site specific, possibly associated with concentrations of archaeological debris or more recent disturbance to underlying archaeological features.

Trend

This category refers to low-level magnetic responses barely visible above the magnetic background of the soil. Interpretation is tentative, as these anomalies are often at the limits of instrument detection.

Ploughing/Ridge & Furrow

Visible as a series of linear responses, these anomalies equate with recent or archaeological cultivation activity.

? Natural

A broad response resulting from localised natural variations in the magnetic background of the subsoil; presenting as broad amorphous responses most likely resulting from geological features.

Ferrous Response

These anomalies exhibit a typically strong magnetic response, often referred to as ‘iron spikes,’ and are the result of modern metal debris located within the topsoil.

Area of Magnetic Disturbance

This term refers to large-scale magnetic interference from existing services or structures. The extent of this interference may in some cases obscure anomalies of potential archaeological interest.

Bibliography

European Archaeological Council (EAC) (2015) '*Guidelines for the use of Geophysics in Archaeology*' by Armin Schmidt, Paul Linford, Neil Linford, Andrew David, Chris Gaffney, Apostolos Sarris and Jörg Fassbinder.

English Heritage (2008) '*Geophysical guidelines: Geophysical Survey in Archaeological Field Evaluation*.' Second Edition.

Gaffney, C. Gater, J. & Ovenden, S. (2006) '*The use of Geophysical Techniques in Archaeological Evaluations.*' IFA Paper No. 6.

Gaffney, C & Gater, J (2003). '*Revealing the buried past: Geophysics for Archaeologists*.' Tempus Publishing Limited.

National Soil Survey of Ireland (1980) *General soil map second edition (1:575,000)*. An Foras Taluntais.

List of Figures

Figure	Description	Paper Size	Scale
Figure 1	Site & Survey Location Diagram	A4	1:1,500
Figure 2	Gradiometer Survey: Summary greyscale image	A4	1:1,000
Figure 3	Gradiometer Survey: Summary interpretation	A4	1:1,000
Figure 4	Resistance survey: Summary greyscale image	A4	1:750
Figure 5	Resistance survey: Summary interpretation	A4	1:750
Figure 6	Combined interpretation diagram	A4	1:1,000

Archive Data Supplied as a PDF Upon Request

A1.01	Area A: Raw data XY-Trace Plot & Greyscale	A3	1:500
A1.02	Area B: Raw data XY-Trace Plot & Greyscale	A3	1:500
A1.03	Area C: Raw data XY-Trace Plot & Greyscale	A3	1:500
A1.04	Area 1: Raw and processed data Greyscale	A3	1:500
A1.05	Area 2: Raw and processed data Greyscale	A3	1:500

Photographic Plates

Plate 1	Sigginstown Castle.
Plate 2	Tower House.
Plate 3	Area A, looking north.
Plate 4	Area B, Looking north.
Plate 5	Area C, looking east.

Plate 1. View from Area C looking west at Sigginstown Castle

Plate 2. View of Tower House

Plate 3. View of Area A, looking north

Plate 4. View of Area B, looking north

Plate 5. View of Area C, looking east

Application Area

Detailed gradiometer Survey

Detailed resistance Survey

0 metres 60

Client:	Project:	Title:		
Elizabeth Jones	Sigginstown Castle, County Wexford	Geophysical Survey: Site & Survey Location	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:1,500 Figure: 1 Licence No.: 17R0125 Issue Date: 09.08.2017

-2.5 nT 3.5

0 metres 40

Client:	Project:	Title:		
Elizabeth Jones	Sigginstown Castle, County Wexford	Gradiometer Survey: Summary greyscale image	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:1,000 Figure: 2 Licence No.: 17R0125 Issue Date: 09.08.2017

?Archaeology

Negative Response- ?Archaeology

Trend

Not suitable for survey - Pile of cleared vegetation

Modern Ferrous response

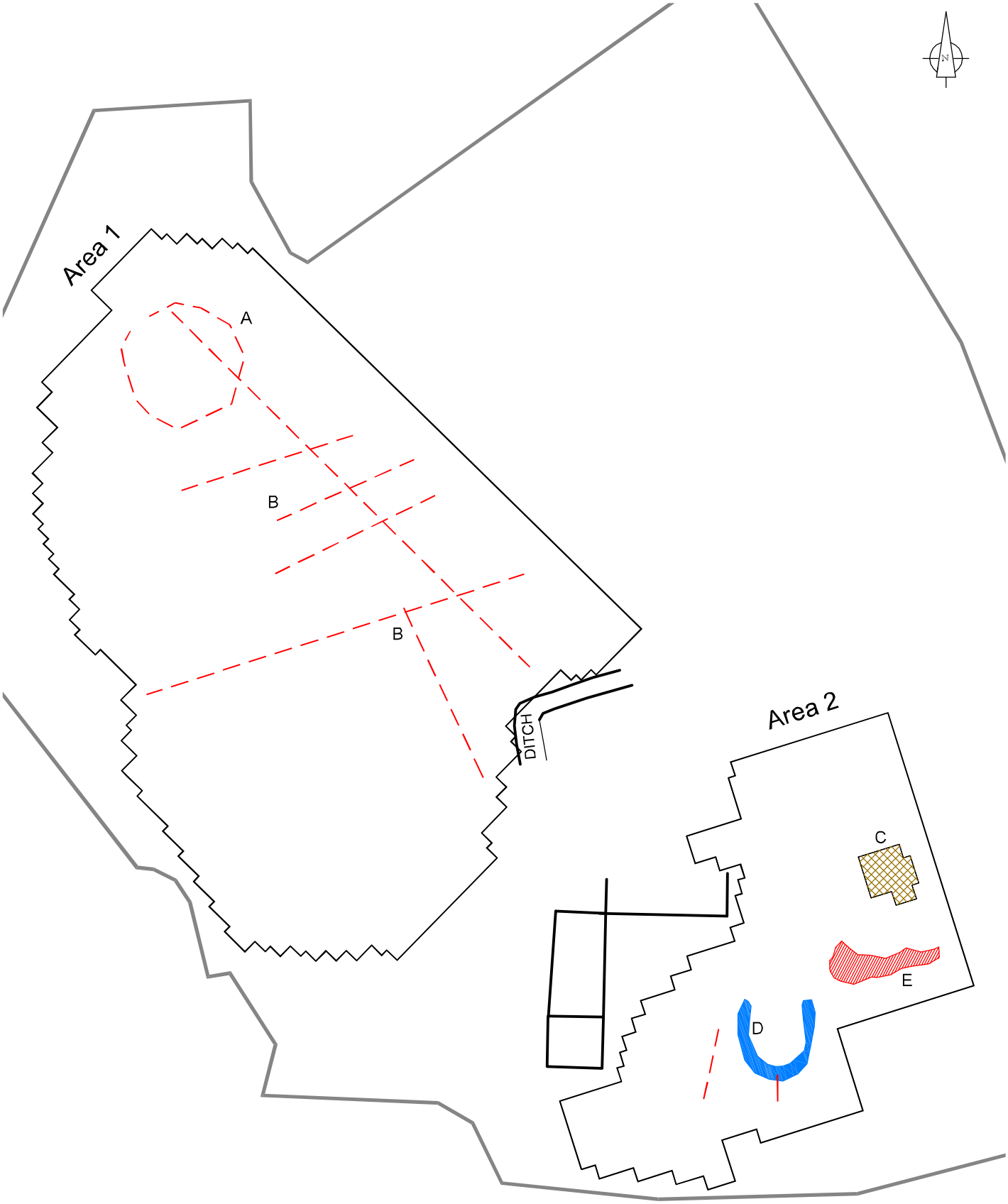
0 metres 40

Client:	Project:	Title:		
Elizabeth Jones	Sigginstown Castle, County Wexford	Gradiometer Survey: Summary interpretation	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:1,000 Figure: 3 Licence No.: 17R0125 Issue Date: 09.08.2017

-1.5 S.D. 1.5

0 metres 30

Client:	Project:	Title:		
Elizabeth Jones	Sigginstown Castle, County Wexford	Resistance Survey: Summary greyscale image	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:750 Figure: 4 Licence No.: 17R0125 Issue Date: 09.08.2017



High Resistance

? Archaeology

Trend

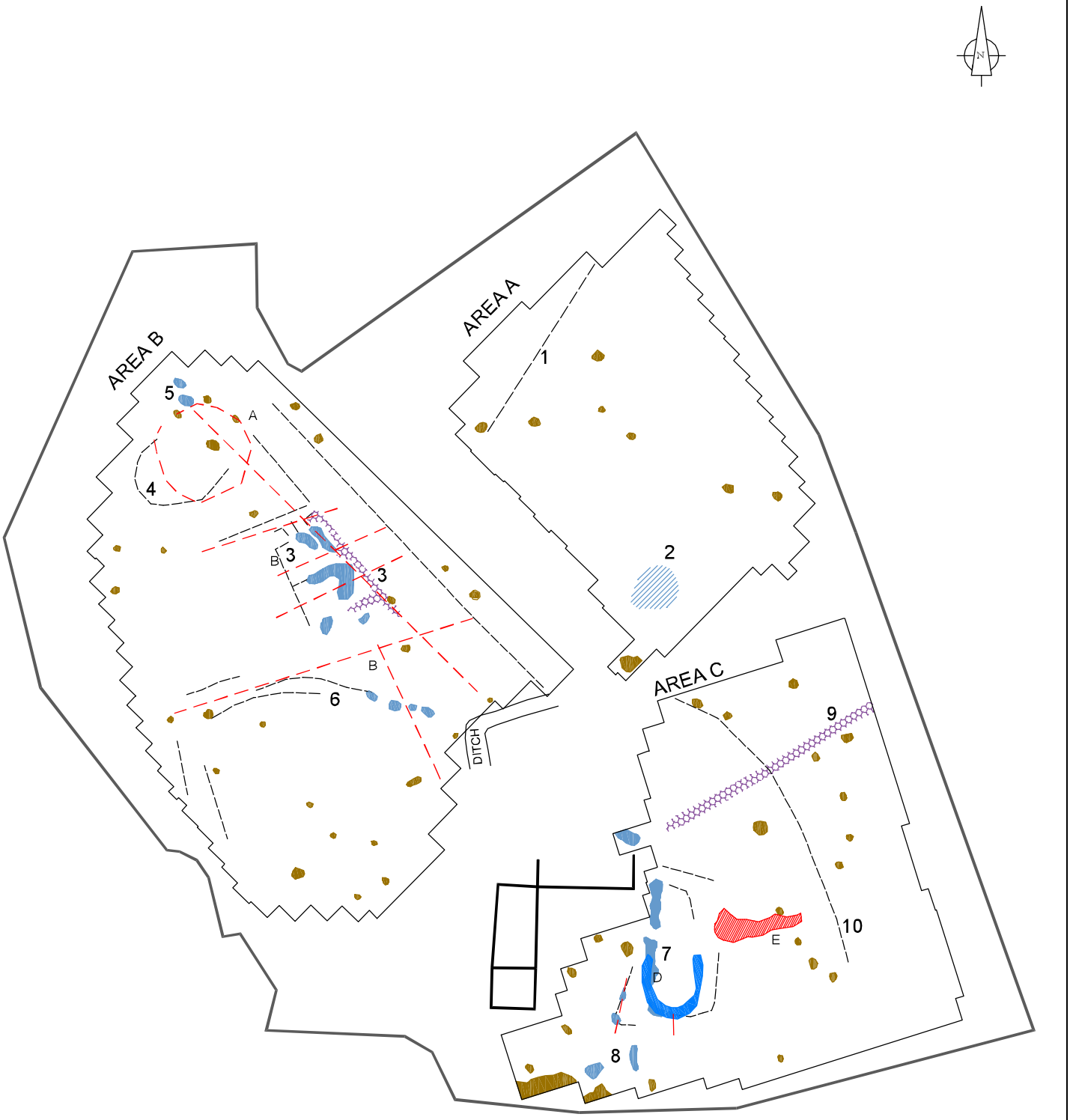
Low Resistance

? Archaeology

Not suitable for survey - Pile of cleared vegetation

0 metres 30

Client:	Project:	Title:		
Elizabeth Jones	Sigginstown Castle, County Wexford	Resistance Survey: Summary interpretation	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:750 Figure: 5 Licence No.: 17R0125 Issue Date: 09.08.2017



High Resistance

? Archaeology

Trend

Low Resistance

? Archaeology

Gradiometer Survey

?Archaeology

Negative Response- ?Archaeology

Trend

Magnetic disturbance

Modern Ferrous response

0 metres 40

Client:	Project:	Title:		
Elizabeth Jones	Signninstown Castle, County Wexford	Gradiometer Survey: Combined interpretation	J.M.Leigh surveys www.jmlsurveys.com	Scale @ A4: 1:1,000 Figure: 6 Licence No.: 17R0125 Issue Date: 09.08.2017