



ULSTER
ARCHÆOLOGICAL
SOCIETY

Survey Report

Reference: Geophysical Survey No.6

Author: David Craig

Location:

**Aerial and Geophysical Survey
Gordonall Hilltop Enclosure
County Down**

In association with:
HeritageNI



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Cover illustration: view of enclosure looking North with Mount Stewart in the background – HeritageNI/Irishsights

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1. Summary

1.1 Location

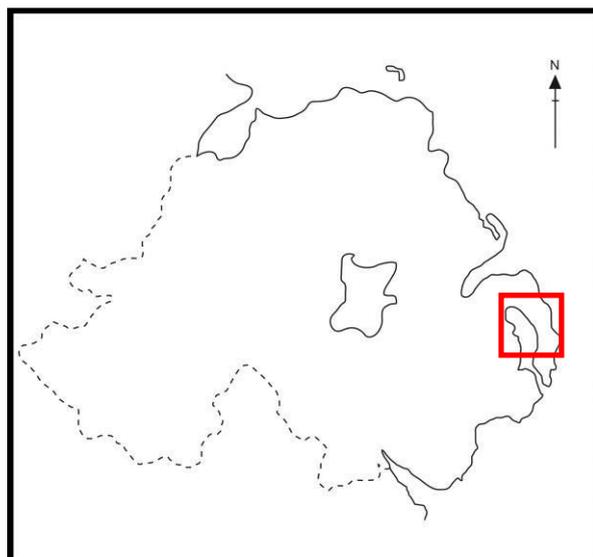


Figure 1: Location map for the Gordonall enclosure

1.2 Aims

The Ulster Archaeological Society's survey team undertook a geophysical survey of an area of archaeological interest in the townland of Gordonall in the barony of Ards Lower, just south of Mount Stewart. The area of interest is an oval shaped crop mark first located on the very edge of an unrelated aerial oblique photograph taken over the southern extent of the mount Stewart Estate in 2018. The target is on a farm owned by John Martin which extends from Mount Stewart to Greyabbey. The UAS wish to thank the Martin family for their enthusiastic interest in allowing the survey to take place.

1.3 Summary of Results

The geophysical survey undertaken at Gordonall located a number of high/low resistance anomalies that may relate to structural remains. A low oval shape resistance anomaly has been interpreted as being a ditch 70.3m from north-west to south-east and 54.4m at its widest north-east to south-west. The oval feature's internal area is 2365.5m² with an internal perimeter of 176.4m. Several small high resistance areas inside the feature are possibly post holes of a structure or pits. An entrance has been identified at the North East edge of the feature. Several radiating low resistance linear feature are visible on the outside of the enclosure which has been interpreted as being the ditches associated with field boundaries contemporary with the main feature.

2. Introduction

2.1 Description of site

The site is located at Irish Grid J 57001 68847 with an elevation of approximately 19m OD. The site sites slightly down slope on the eastern side of a drumlin ridge aligned north-west to south-east with the ditch feature running fairly parallel to the contour of the hill. The survey area consists of 0.64 ha. A line of electric poles was used as baseline with an offset to the actual survey baseline. Strangford Lough is 1.7m to the south-west

but would have been approximately 660m away prior to the building of a sea wall. The actual previous shore may have even been further inland from this line when seen on the ground.

The feature was reported to the Historic Environment Division. At the time of identification the feature was not recorded on the Historic Environment Sites and Monuments Register (HERoNI)

PlacenamesNI.org records the following regarding the townland name:

“The absence of historical forms prior to the first half of the 19th century makes it difficult to postulate the origin of this name and it may well be that it was coined by English speakers. O’Donovan’s suggestion that the name has its origin in Irish Garrdha Domhnaill ‘Donnell’s garden’ necessitates the stress to be on the initial syllable of his proposed second element, but this does not accord well with the current local pronunciation which shows elision of this syllable. A form such as Gort Donn an Fháil ‘the brown field of the fence’ could be defended but with no great conviction”



Figure 2: Approximate line of the sea shore prior to the building of the sea wall.

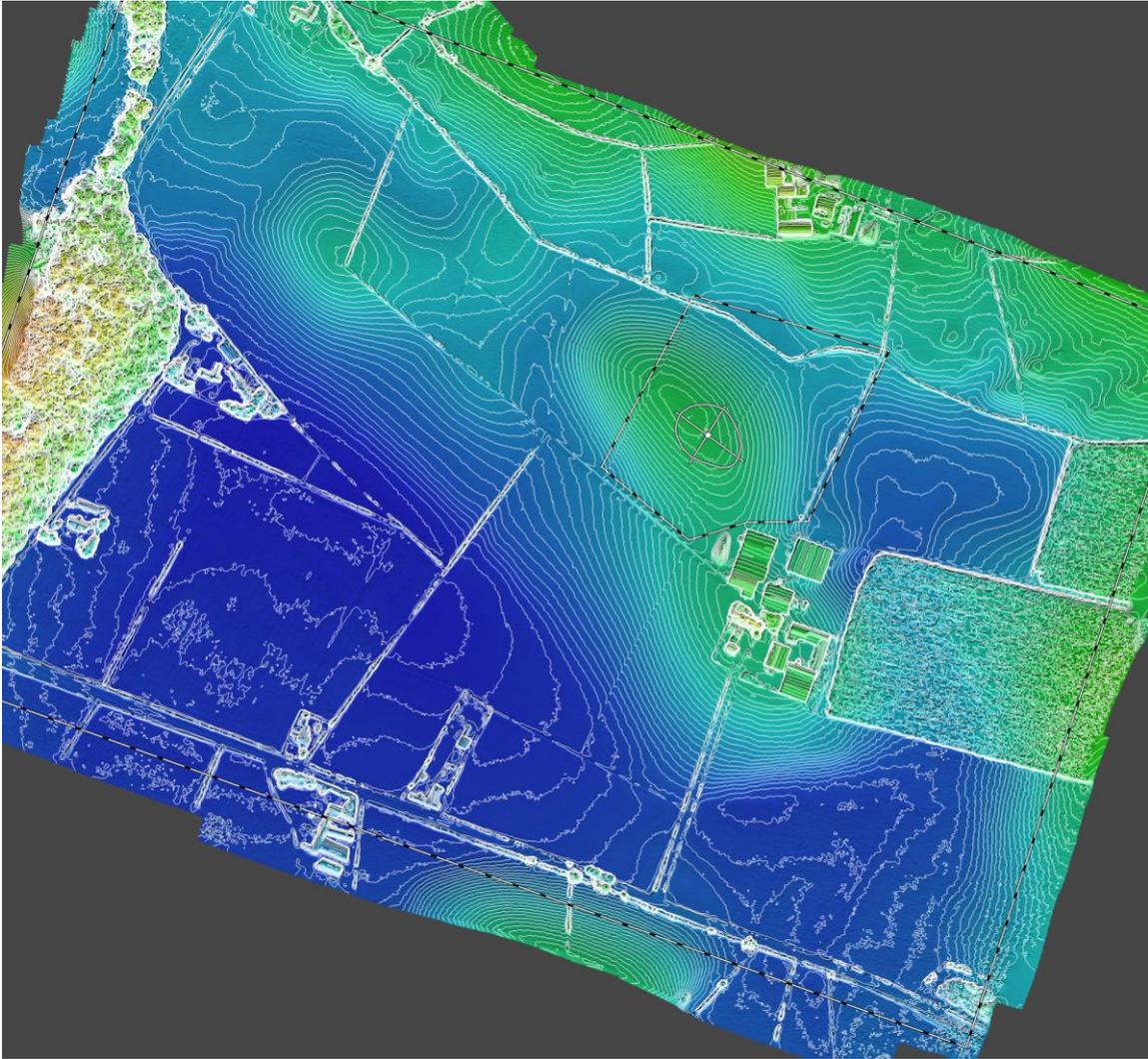


Figure 3: 0.5m contours over the Digital Elevation Model derived Hillshade. Blue is low elevation, green is high.

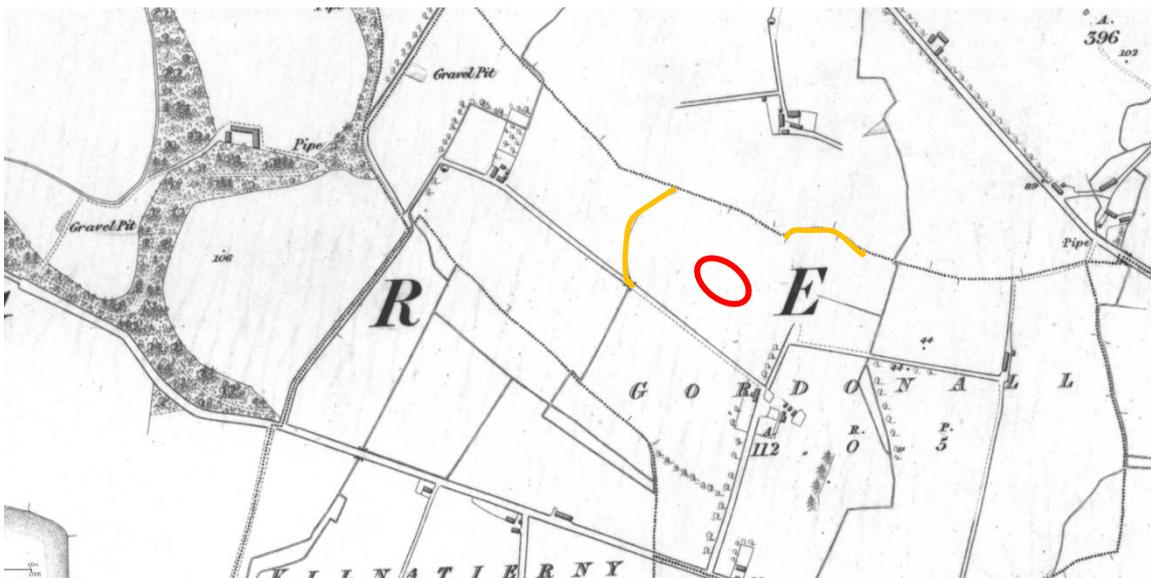


Figure 4: OS 1st Series 6" map showing 2 isolated curved field boundaries

2.2 Archiving

Copies of this report have been deposited with HED and the Ulster Archaeological Society. All site records have been archived by the Ulster Archaeological Society.

2.3 Credits and Acknowledgements

The survey was led by David Craig and included members of the Ulster Archaeological Society's Geophysics survey team. Team members were Ian Gillespie, Lee Gordon, Chris Stevenson, Helen Yohanis, Paula Sandford, David Irvine and George Rutherford. The Ulster Archaeological Society is particularly grateful to the landowner John Martin and his family for allowing access to the survey site.

2.4 Aerial survey

An aerial survey was carried out by David Craig of HeritageNI to assess the local landscape context of the target. The equipment used was a DJI Inspire 1 with a 12MP camera and simultaneously with a 12MP Gopro Hero 8 Black converted with an anamorphic Near Infrared lens. Multiple overlapping images were acquired using automated capture software and flown autonomously. 333 photographs were taken nadir to create the georeferenced photogrammetry dataset that is 22,335 x 24,428 pixels. The ground sample distance (GSD) is 5.26 pixels/cm. The flights were carried out on 3rd August 2018. This exceptionally dry summer was ideal for recording crop marks that otherwise would not be noticed. The images were processed through photogrammetry software Photoscan Pro (now known as Agisoft Metashape Pro). The resulting geoTIFF image was further processed through the Camera Raw plugin in Adobe Photoshop and the colours adjusted using a custom filter to create the enhanced black and white image.



Figure 5: Aerial Photogrammetry survey of surrounding area processed colorimetrically as a Black and White image.

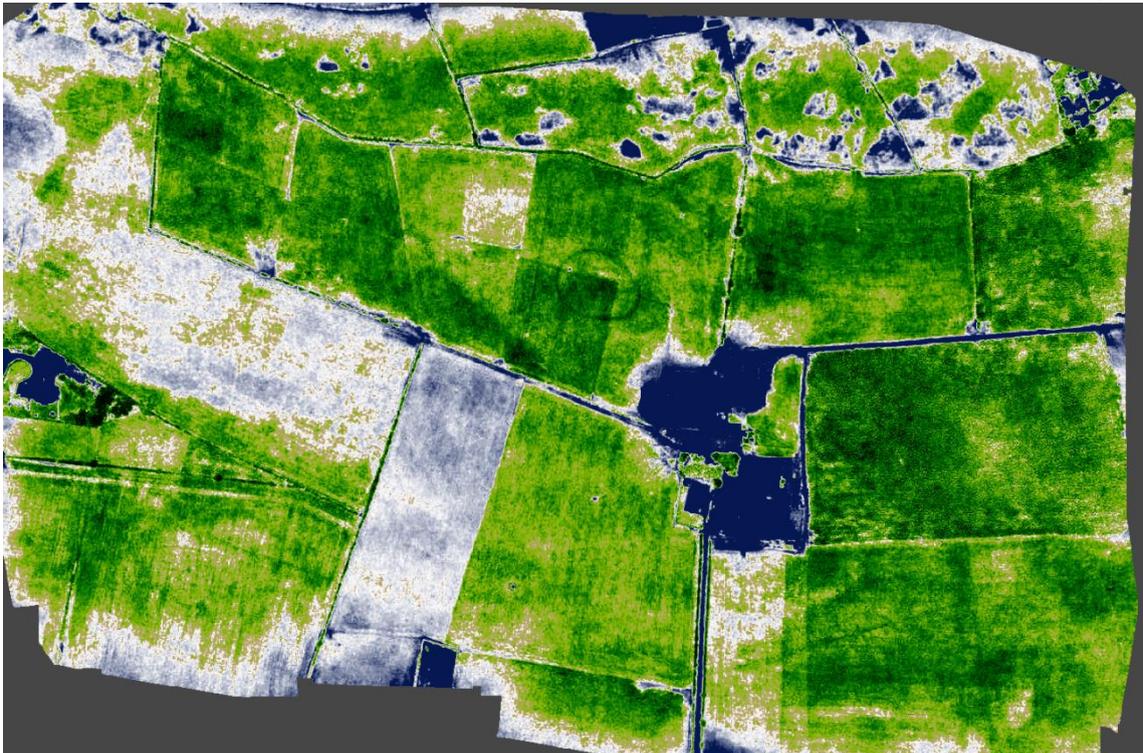


Figure 6: Near Infrared false colour representation of landscape context

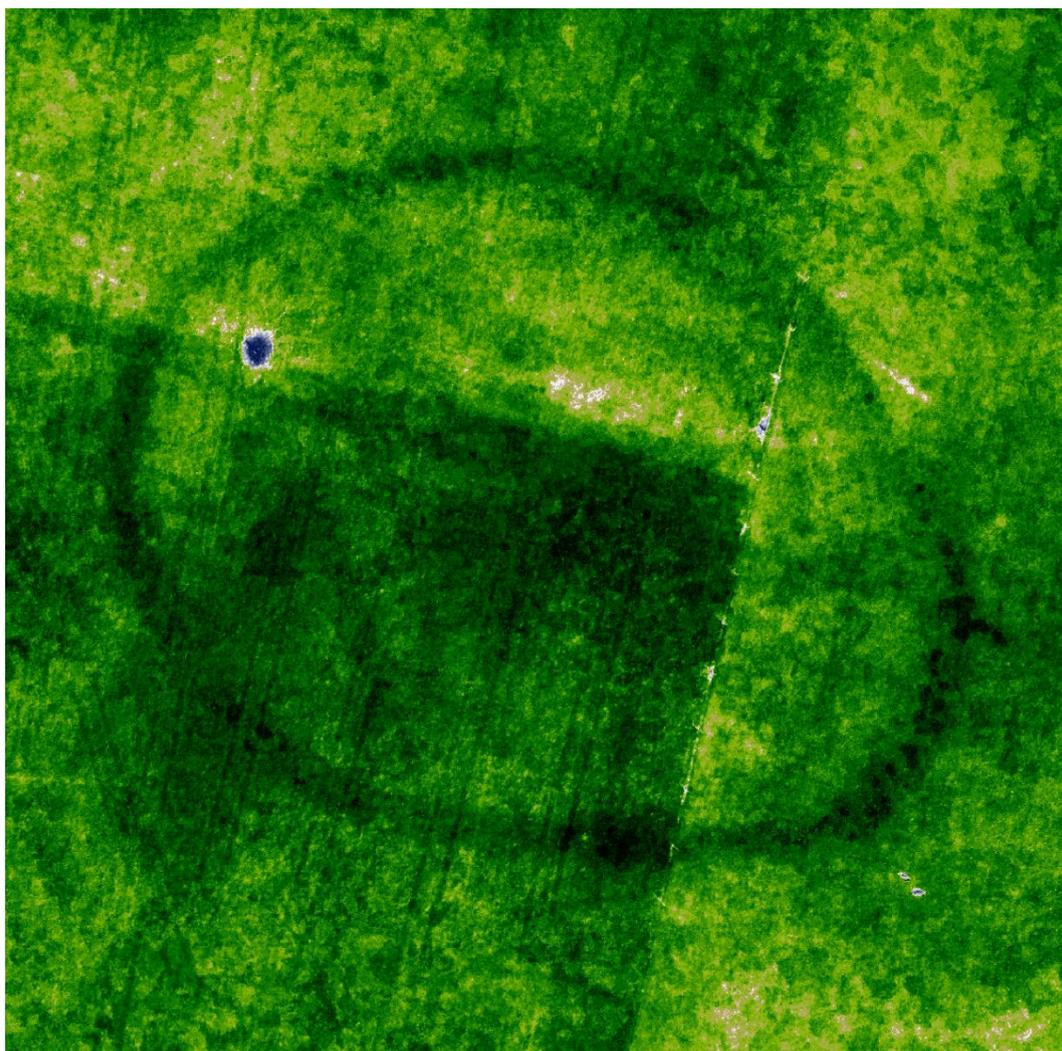


Figure 7: Close-up of the target feature in near-infrared

When the full colour image mosaic is processed to black and white using specific adjustments in separate colour bands as in Figure 4 features show as differentiated crop marks. The target feature is clearly visible along with ploughed out laneways, some of which could be the old road along the coast heading to Greyabbey. No other distinguishing features were apparent in the immediate vicinity of the feature. There are 2 possible targets for the entrance, one at the North West and the other at the East side of the feature. The ploughed out field boundary running diagonally through the feature can be identified on the OS 2nd Edition 6" maps.

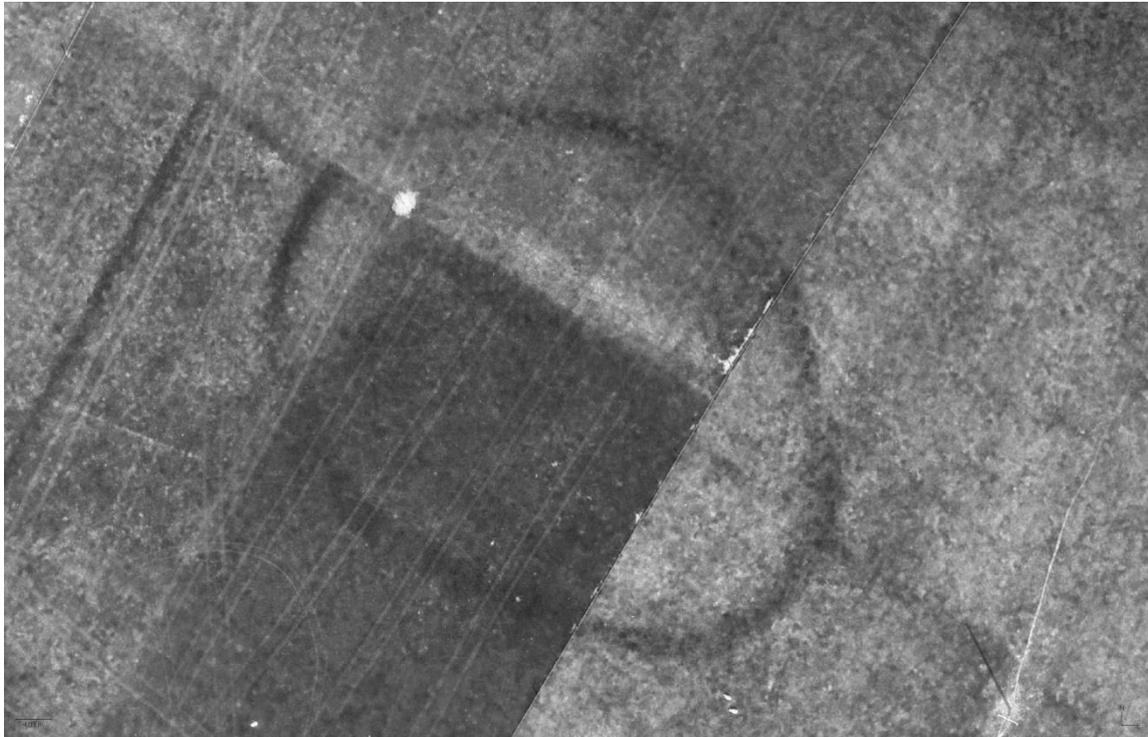


Figure 8: Cropped aerial image of the target feature 70.3m x 54.4m (outside)

Two sections/profiles were taken across the feature as illustrated in Figure 9

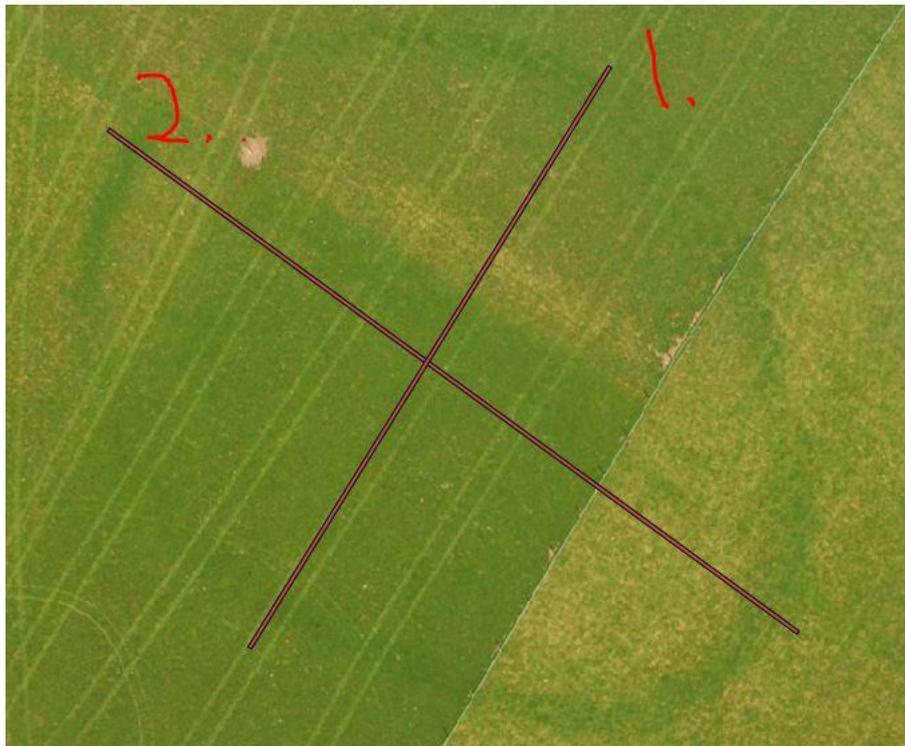


Figure 9: Two section/profiles. 1. North-east to south-west and 2. North-west to south-east

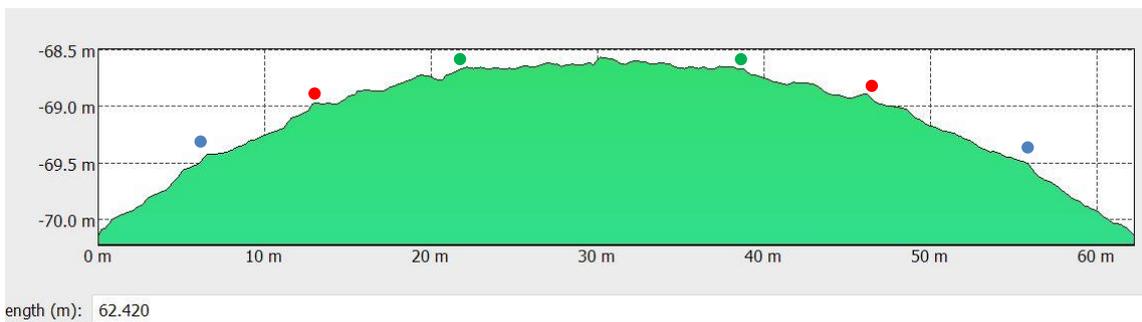


Figure 10: Section/Profile 1. North-east to south-west

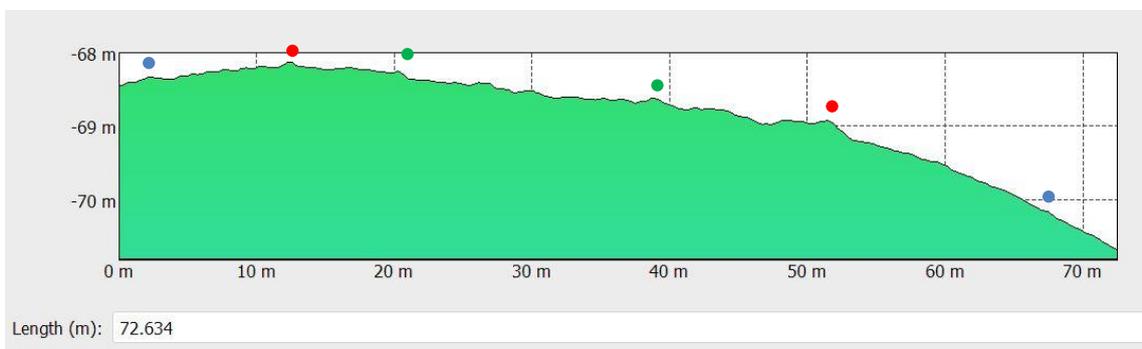


Figure 11: Section/Profile 2. North-west to south-east

Although changes in slope indicating banks and ditches were impossible to identify on the ground they do show up in the sections generated from the photogrammetry with a vertical exaggeration of x20 (approx.). As can be seen from the section/profiles above there is a prominent internal bank on both sides of the feature approximately 15m-20m

from the edge of the main ditch that defines the target feature and possibly two other banks within that again illustrated by the symmetrically placed matching coloured dots. These features may represent earlier enclosures. The right hand red dot in Figure 11 may be a rise either side of the fence line.

2.5 Geophysical Survey Method

Earth Resistivity was the method employed for this project. More information regarding this technique is included in the methodology section below.

3. Methodology

3.1 Date of Fieldwork

The fieldwork was carried out over three days from 7th – 9th March 2019 when the weather was fairly stormy. On the second day there was more surface water that showed lower average resistivity readings.

3.2 Grid Locations

The location of the survey grids has been plotted in Figure 2 together with the referencing information. Grids were set out using 50m measuring tapes and referenced the line of electric poles that ran to the south west of the target area.

3.3 Description of Techniques and Equipment Configurations

This method relies on the relative inability of soils (and objects within the soil) to conduct an electrical current which is passed through them. As resistivity is linked to moisture content, and therefore porosity, hard dense features such as rock will give a relatively high resistivity response (light coloured in the resistivity plot), while features such as a ditch which retains moisture give a relatively low response (dark coloured in the resistivity plot.)

The resistance meter used was an TAR-3 manufactured by RM Frobisher incorporating a twin probe array. The twin probes are separated by 0.5m and the associated remote probes were positioned approximately 15m outside the grid. The instrument uses an automatic data logger which permits the data to be recorded as the survey progresses for later downloading to a computer for processing and presentation.

Though the values being logged are actually resistances in ohms they are directly proportional to resistivity (ohm-metres) as the same probe configuration was used through-out.

3.4 Sampling Interval

Readings were taken at 1.0m centres along traverses 1.0m apart. This equates to 400 sampling points in a full 20m x 20 grid. All traverses were surveyed in a “zig-zag” mode.

3.5 Depth of Scan and Resolution

The 0.5m probe spacing of a twin probe array has a typical depth of penetration of 0.5m to 1.0m. The collection of data at 1m centres with 0.5m probe spacing provides an optimum resolution for the task.

3.6 Data Capture

The readings are logged consecutively into the TAR-3 on an SD card. The data is transferred to the office for processing and presentation.

3.7 Processing

The processing was carried out using specialist software known as *Snuffler* and involved the 'despiking' of high contact resistance readings and the passing of the data through a 'Remove Geology' filter. This has the effect of removing the larger variations in the data often associated with geological features. Data was further enhanced by interpolating the data points and the application of a sharpening filter. The net effect is aimed at enhancing the archaeological or man-made anomalies contained in the data.

3.8 Presentation of Results and Interpretation

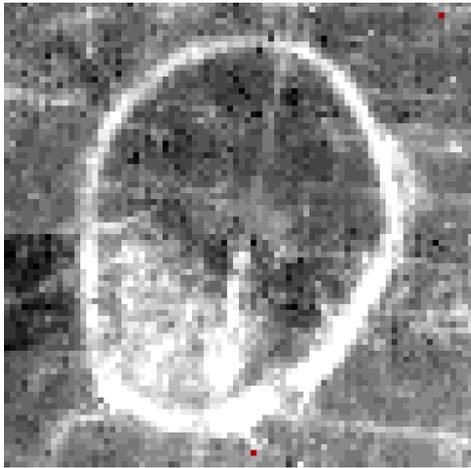
The presentation of the data for the site involves a print-out of the raw data as a grey scale plot (Figure 3), together with Figures for various filters and routines applied. Anomalies have been identified and shown in Figure 16.

4. Discussion

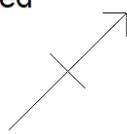


Figure 12: Location of Survey Grids

The following figures show the named filters and routines applied accumulatively



Document: ClipboardViewdespiked
 Grid Width: 80 (80 m)
 Grid Height: 80 (80 m)
 Sample Size: 1.00 x 1.00m



50.48 81.52

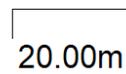
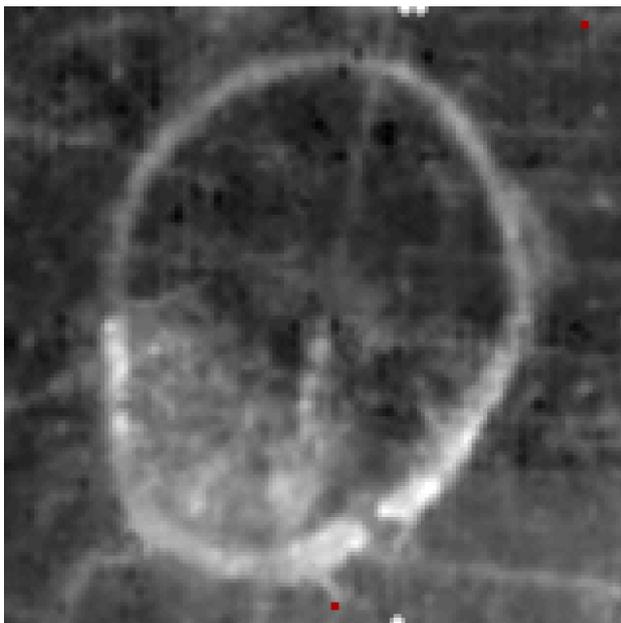


Figure 13: Despiked raw Plot Data



Document: Interpolated
 Grid Width: 160 (80 m)
 Grid Height: 160 (80 m)
 Orig. Sample Size: 1.00 x 1.00m
 New Sample Size: 0.50 x 0.50m



36.80 72.60

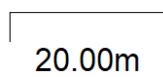


Figure 14: Interpolated routine and tone stretch applied to previous figure

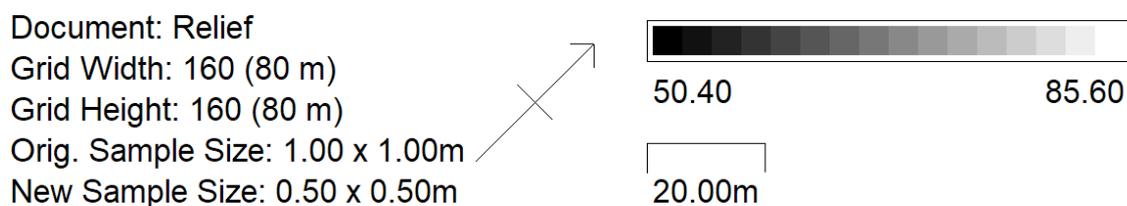
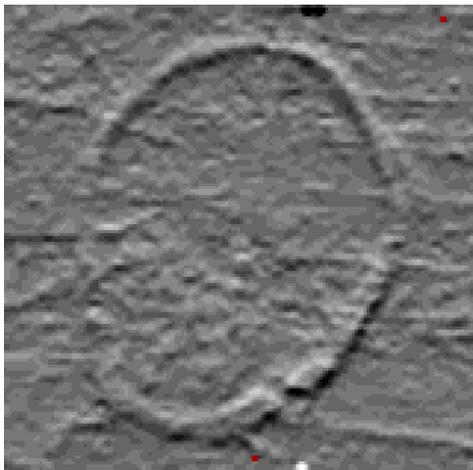


Figure 15; Reverse relief routine applied to previous figure

5. Interpretation

The lighter area in the bottom half of the image in figure 15 reflects the wetter ground on the steeper slopes surveyed on day one. There is little evidence of an inner bank, however the site has been ploughed out completely and there is no topography of the feature visible.

The feature seems to be a substantial one with a shape uncommon with other County Down hill top enclosures which are more circular and smaller in size. The size of the enclosure would suggest that the occupants would have been of high status (MacNeill, 'Ancient Irish Law', p.305). The enclosure may have been more circular in its earlier life but there is no indication of such in the aerial or resistivity datasets.

There several clusters of high resistance 'pits' and a low resistance possible drainage ditch leading out of the enclosure through what appears to be a gap in the main fosse (left-hand side). On the right of the image above the main fosse seems to have a smaller divergent ditch which curves back into the main alignment.

The entrance is to the east of the feature and is narrower on the inside of the enclosure with a small ditch extending from the right-hand ditch. It is suggested that this may be an aid to herding animals towards the narrowing entrance.

The red lines in Figure 15 may indicate the corresponding ditch of contemporary field boundaries that butt up against the fosse.

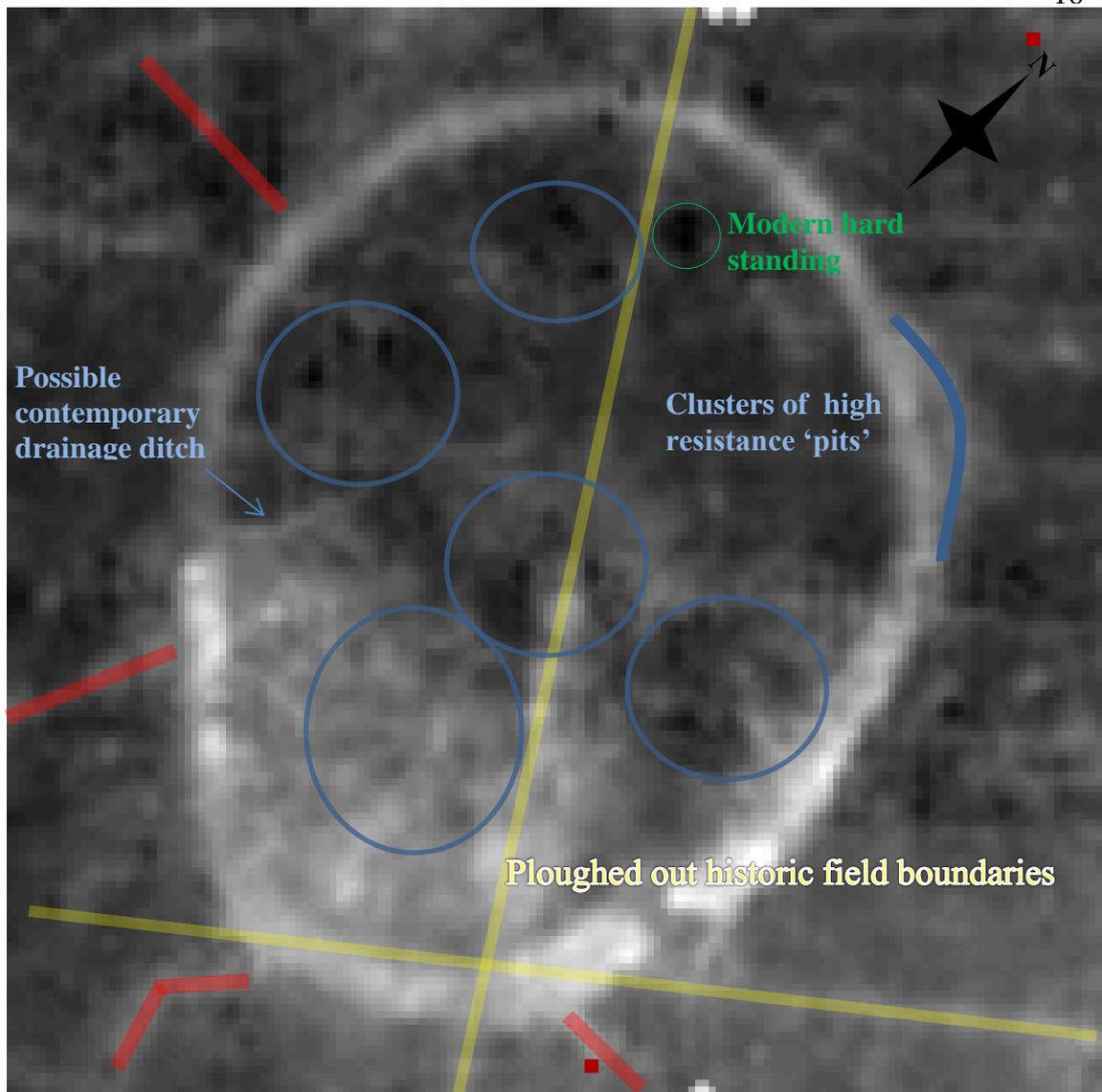


Figure 16: The red lines of low resistance appear not to cut the feature, which are probably contemporary, unlike others that do which are probably modern field drains

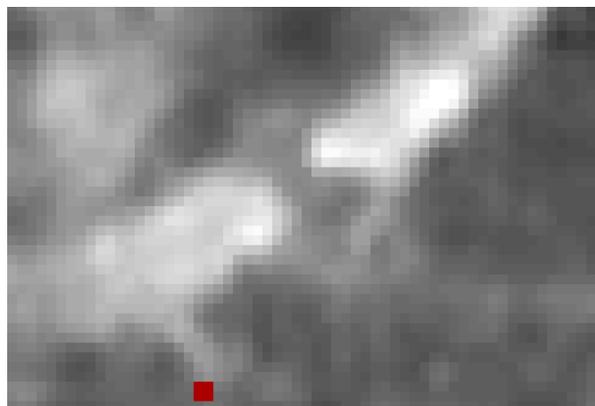


Figure 17: Close-up of the entrance

6. Recommendations for further work

It is the aim of the survey group to return and use the line mode of the resistivity meter across the ditch to establish its morphology and depth. Two test pit excavations into the ditch either side of the entrance may yield artefacts that have been discarded which can be dated.

7. Bibliography

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8. Appendix

Photographs of the Survey group on site.



