



ULSTER
ARCHÆOLOGICAL
SOCIETY

Survey Report

Reference: Geophysical Survey No. 4

Author: David Craig

Location:

Geophysical Survey
Cathedral Hill, Downpatrick
County Down

In association with:



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Cover illustration: Aerial view of Survey Area by *David Craig/Irishsights.com*

CONTENTS

CONTENTS	3
LIST OF FIGURES	4
1. Summary	5
1.1 Location	5
1.2 Aims	6
1.3 Summary of Results	6
2. Introduction	6
2.1 Description of site	6
2.2 Previous archaeological surveys	7
2.3 Archiving	7
2.4 Credits and Acknowledgements	7
2.5 Survey Methods	7
3. Methodology	7
3.1 Date of Fieldwork	7
3.2 Grid Locations	7
3.3 Description of Techniques and Equipment Configurations	7
3.4 Sampling Interval	8
3.5 Depth of Scan and Resolution	8
3.6 Data Capture	8
3.7 Processing	8
3.8 Presentation of Results and Interpretation	8
4. Discussion	8
5. Data Plots	8
6. Recommendations for further work	11
7. Bibliography	12

LIST OF FIGURES

Figure 1: Location map for Downpatrick	5
Figure 2: Location context. Local Dominance enhanced image from LiDAR	5
Figure 3: Location of survey NW of Down Cathedral	6
Figure 4: Location of Survey Grids	9
Figure 5: RAW Plot Data	9
Figure 6: Despiked Plot Data	10
Figure 7: Interpolated Routine Applied to Previous Figure	10
Figure 8; Sharpening Routine applied to Previous Figure	11
Figure 9: Abstraction and Interpretation of Anomalies	11

1. Summary

1.1 Location

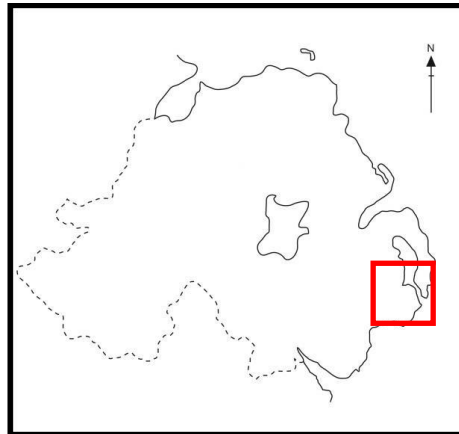


Figure 1: Location map for Downpatrick

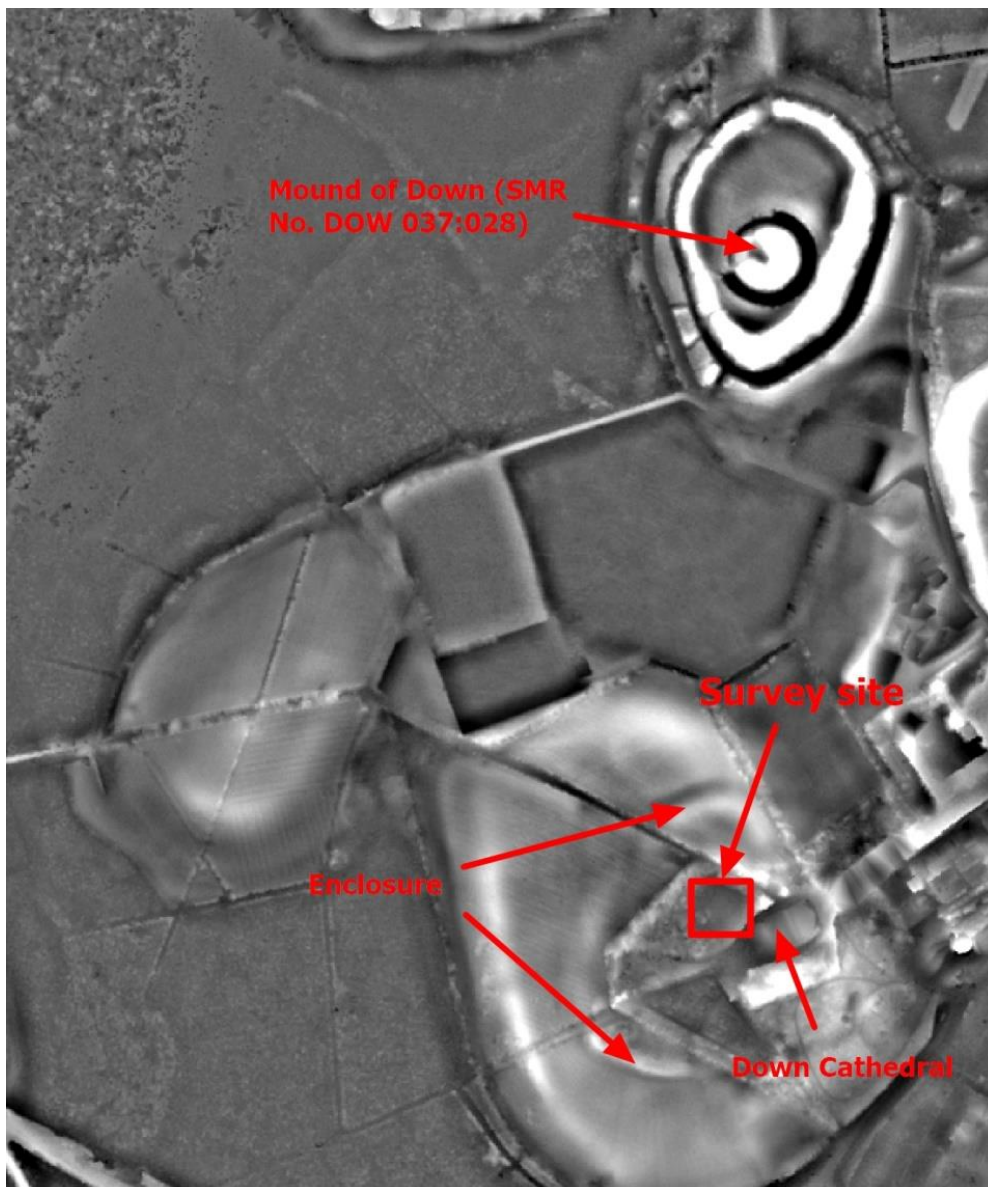


Figure 2: Location context. Local Dominance enhanced image from LiDAR



Figure 3: Location of survey north-west of Down Cathedral

1.2 Aims

The Ulster Archaeological Society's survey team were commissioned to undertake a geophysical survey of an area of archaeological interest at the Cathedral Hill in Downpatrick. This survey forms part of an archaeological investigation being undertaken by The Centre for Archaeological Fieldwork (CAF) on behalf of Down County Museum. This survey formed part of a community archaeology project undertaken in July 2018 by Down County Museum, the Ulster Archaeological Society and the Centre for Archaeological Fieldwork at Queens University, Belfast (CAF), funded by the European Union Peace IV Programme, managed by the Special European Union Programmes Body and the Northern Ireland Executive Office and Department for Rural and Community Development in Ireland.

1.3 Summary of Results

The geophysical survey was undertaken at what is known as the Tennis Courts 30m NW of the tower of Down Cathedral. The site formed part of a complex of historic monuments located at Cathedral Hill, centred around Irish Grid Reference J 48249 44503, in the Townland of Demesne of Down, Parish of Down and Barony of Lecale Upper. The monuments are scheduled and recorded on the Northern Ireland Sites and Monuments Record (SMR) as DOW 037:027 and include Downpatrick Town Cross, a Benedictine monastery, a multi-period church site, prehistoric settlement, earthworks and a graveyard. The survey located a number of high resistance anomalies which has been interpreted as being possible wall features associated with an earlier ecclesiastical building on the site.

2. Introduction

2.1 Description of site

The survey area consists of approximately 120m² of flat mown grass, with trees to the north-west and large bushes to the east and west. The site is bordered by a stone all on its south-east side.

2.2 Previous archaeological surveys

The area known as Cathedral Hill in Downpatrick has been the location of human activity for thousands of years and it is no surprise that it has attracted the attention of antiquarians and archaeologists for many years. The results of past investigations can be found in a variety of published documents as detailed in the bibliography below. Further information can also be found in the archives of the Historic Environment Division: Department for Communities (HED).

2.3 Archiving

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

2.4 Credits and Acknowledgements

The survey was led by David Craig and included Randal Scott, Lee Gordon, David Irvine, Anne McDermott, Pat O'Neill and Ian Gillespie.

The Ulster Archaeological Society is particularly grateful to Very Reverend Henry Hull, Dean of Down Cathedral and the Church of Ireland for allowing access to the survey site.

2.5 Survey Methods

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 15th August 2018 when the weather was dry with good well drained ground conditions.

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 to the base line with a Leica CS15 differential GNSS, with an accuracy of <3cm.

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 “zigzag” 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 version 1.21 and involved the 'despiking' of high contact resistance readings. Data was further enhanced by interpolating the data points and the application of a sharpening filter. The nett 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 plotted onto the 'Abstraction and Interpretation of Anomalies' drawing (Figure 8).

Part of the survey area was also subject to an archaeological excavation where 2 trenches were investigated by the Centre for Archaeological Fieldwork.

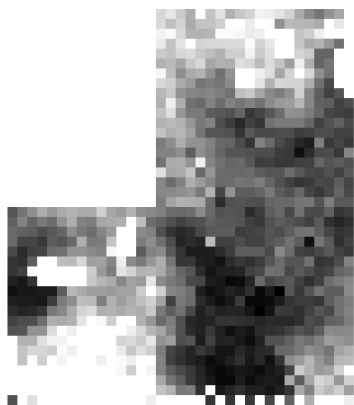
4. Discussion

Linear features of high resistance has been interpreted as walls of a previous ecclesiastical building that would have been part of a larger monastic settlement. The feature highlighted in yellow in Figure 9 are aligned with the walls uncovered by the Centre for Archaeological fieldwork in the 2 trenches within the survey area.

5. Data Plots



Figure 4: Location of Survey Grids



Document: DownpatrickRAW
Grid Width: 40 (40 m)
Grid Height: 40 (40 m)
Sample Size: 1.00 x 1.00m

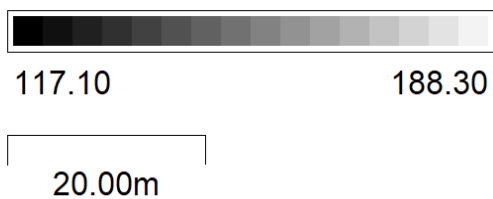
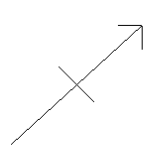
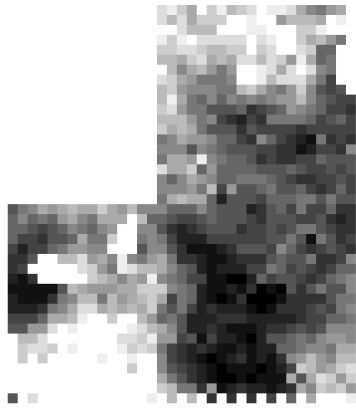


Figure 5: RAW Plot Data

The following figures show thee named filters and routines applied accumulatively



Document: DownpatrickDeSpike
Grid Width: 40 (40 m)
Grid Height: 40 (40 m)
Sample Size: 1.00 x 1.00m

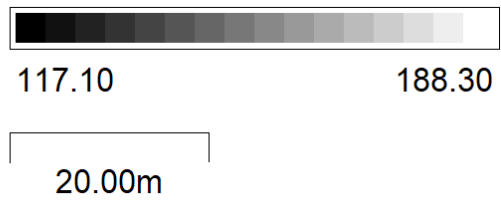
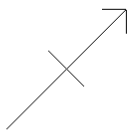
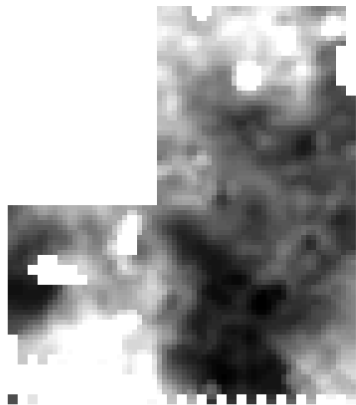


Figure 6: Despiked Plot Data



Document: DownpatrickInterpolated
Grid Width: 80 (40 m)
Grid Height: 80 (40 m)
Orig. Sample Size: 1.00 x 1.00m
New Sample Size: 0.50 x 0.50m

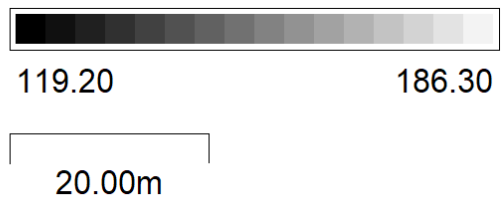
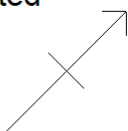


Figure 7: Interpolated Routine Applied to Previous Figure

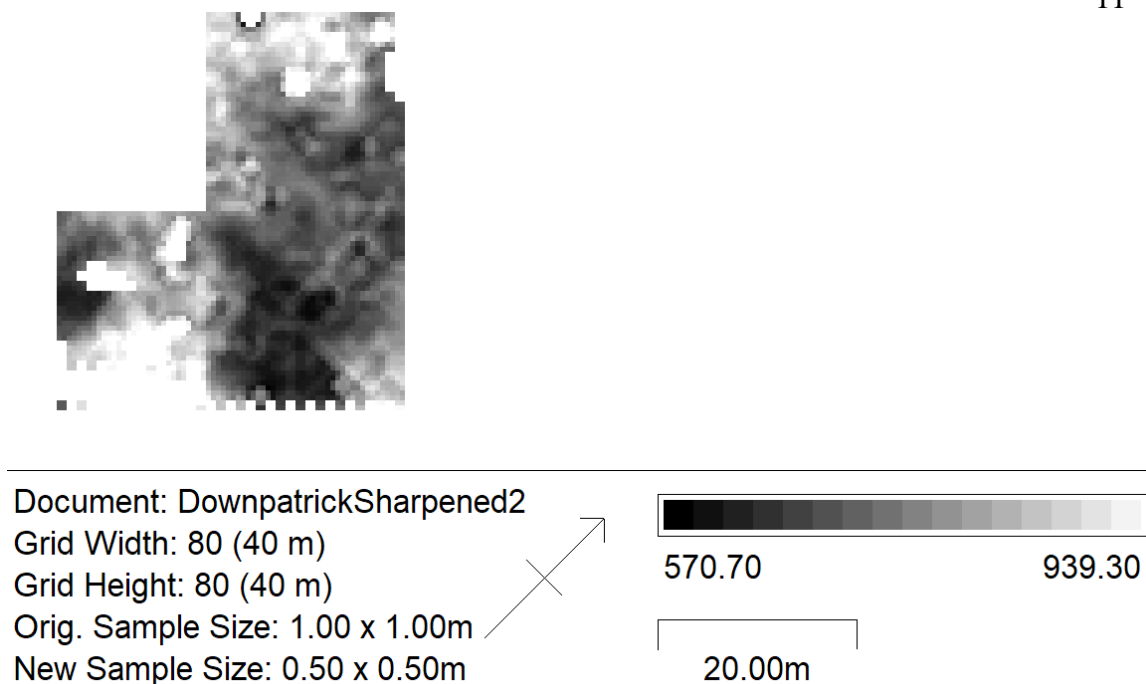


Figure 8; Sharpening Routine applied to Previous Figure

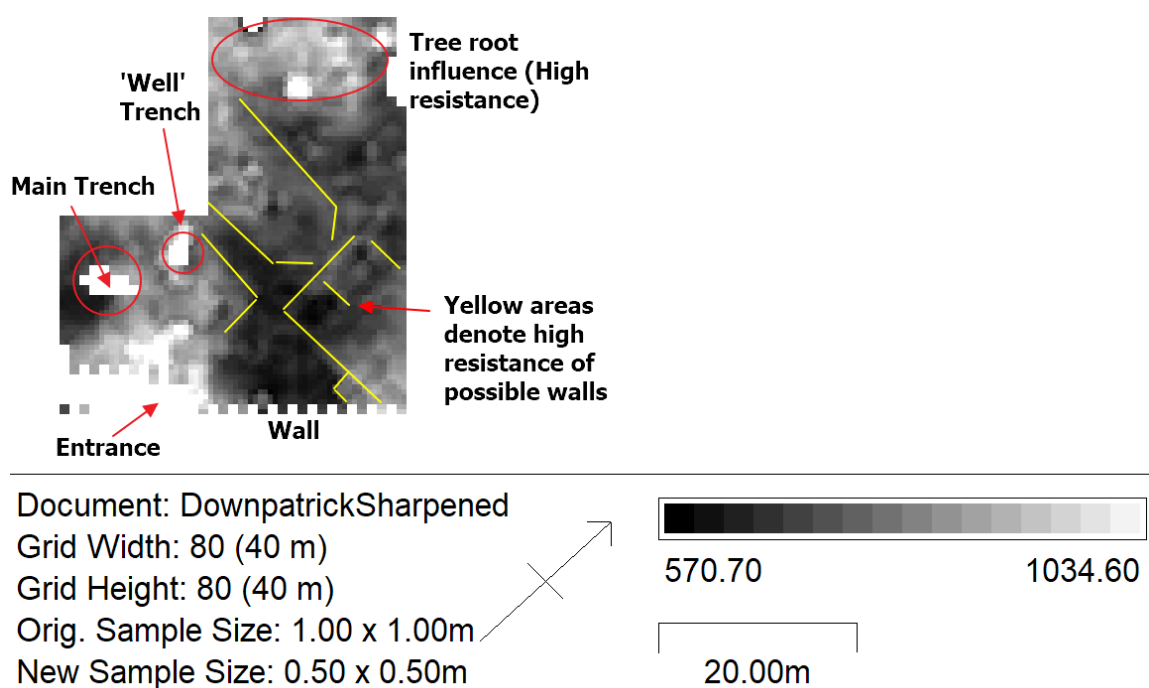


Figure 9: Abstraction and Interpretation of Anomalies

6. Recommendations for further work

It is recommended that the above results be the basis of further excavations of the areas highlighted in yellow in order to determine the represented buildings date and function.

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