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## Plan Overview

*A Data Management Plan created using DMPonline*

**Title:** Geophysical Survey at Wains Hill, Somerset.

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### Project abstract:

A magnetometry survey carried out at Wain's Hill, Clevedon, North Somerset (centred on ST 39085 70655) as part of an Undergraduate Dissertation. The aim of the survey was to improve the interpretability of the previous resistivity survey conducted in 2006. The magnetometry survey revealed new potentially significant archaeological anomalies that were not detected by the previous survey. The report also clears up some unanswered questions from the previous survey. However, the survey's limitations due to time and resource constraints suggest that the Site should be surveyed in its entirety to achieve a more comprehensive understanding of its archaeological background.

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# Geophysical Survey at Wains Hill, Somerset.

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## Project Summary

**Provide a brief description of the project and the research being carried out. State if the research is part of a larger project, if there are any funders involved, and how data fits in.**

A magnetometry survey carried out at Wain's Hill, Clevedon, North Somerset (centred on ST 39085 70655) as part of an Undergraduate Dissertation. The aim of the survey was to improve the interpretability of the previous resistivity survey conducted in 2006. The magnetometry survey revealed new potentially significant archaeological anomalies that were not detected by the previous survey. The report also clears up some unanswered questions from the previous survey. However, the survey's limitations due to time and resource constraints suggest that the Site should be surveyed in its entirety to achieve a more comprehensive understanding of its archaeological background.

## Data Types

**What types of data will be involved?**

<i>Geophysics data</i>	working files
	preservation files
	image files
<i>Project material</i>	project notes
	project report
<i>Project documentation</i>	geophysics metadata
	geophysics georeferencing
	project metadata
	file description

**What file formats will be used?**

<i>Geophysics data</i>	working files	.shp; .xyz; .tiff
	preservation files	.shp; .xyz; .tiff
	image files	.tiff
<i>Project material</i>	project notes	.PDF/A
	project report	.PDF/A
<i>Project documentation</i>	geophysics metadata	.csv
	geophysics georeferencing	.shp
	project metadata	.csv,
	file description	.txt

**What will be the approximate size of the files?**

- 0 - 50 GB

## Data Capture

**How will the data be generated and/or gathered?**

Geophysical Survey and Landscape Survey as defined by the Forum on Information Standards in Heritage (FISH) Archaeological Event Type Thesaurus (2021, v.26).

The survey was conducted using a Bartington Grad 601-2 dual sensor fluxgate gradiometer.

The sample interval was set to 0.25m intervals (four readings per metre).

The traverse interval was set to 1.00 metres, within 20.00 x 20.00 metre grids.

Grids 01 to 22 were conducted in a zig-zag pattern, starting westerly in the lowest left corner of the grid.

Grid 23 used linear traverses to account for the pillbox and ditch behind it. This was started facing east from its respective lowest left corner.

The instrument was balanced against the local magnetism on each day of the survey in an area of low noise measuring roughly 100m<sup>2</sup>.

The instrument was set to detect magnetic variation in the order of 0.01 nT.

This gradiometer consists of two magnetically sensitive sensors positioned vertically, with a 1-meter gap between them. Each sensor measures the strength of the Earth's magnetic field in nano Teslas (nT), and the instrument records the discrepancy between the readings obtained from each sensor. By comparing these readings are relative to the background magnetism as calibrated during the 'balancing' stage. As a result, the instrument is capable of detecting subtle variations or irregularities in the magnetic field caused by materials near the Earth's surface, particularly within the top meter.

Data was offloaded onto a laptop and opened in TerraSurveyor 3.0.37.

The grids were assembled into their relative position and orientation.

The GPS coordinates of the grids were offloaded into ArcGIS Pro 3.0.3.

So not to remove any anomalies of archaeological potential, or to create any spurious responses that could be considered anomalies with archaeological potential, the raw data from the magnetometry survey was minimally processed to both enhance the data's visuals and remove any defects (Gaffney and Gater 2010, pp.102-104). The following processing options (filters) were applied to the raw data:

1. Destripe
2. Destagger
3. Interpolate

The assembled and processed grids were exported as TIFF image files.

The assembled and processed grids TIFF were imported into ArcGIS Pro 3.0.3 and georeferenced using the grid coordinates.

The interpretation of the results was conducted within ArcGIS Pro, with the responses highlighted and outlined using georeferenced polygons and linear trends noted with georeferenced polylines.

These responses and linear trends were classified according to the following classifications:

<b>Classification</b>	<b>Definition</b>
<b><i>Natural</i></b>	Features likely of natural origin
<b><i>Modern</i></b>	Definite or known modern features
<b><i>?Modern</i></b>	Features likely of modern origin
<b><i>Archaeological</i></b>	Definite or known archaeological features
<b><i>?Archaeological</i></b>	Features likely of archaeological interest
<b><i>Magnetic response</i></b>	Features or areas of noticeably positive or negative magnetism, suggesting interest but of unclear origin
<b><i>Ferrous</i></b>	Dipole responses from ferrous objects
<b><i>Trend</i></b>	Linear features of noticeably positive or negative magnetism

## Data Storage and Preservation

### How will the data be backed up?

Data prior to processing will be stored on University of Bristol SharePoint servers with one off-site backup of all data.

All processed data will be stored in The University of Bristol Research Data Storage Facility (RDSF), which provides secure, long-term storage for research data. This major investment provides nightly backup of all data, with further resilience provided by three geographically distinct storage locations. A tape library is used for backup purposes and also for long-term, offline data storage. Only authorised users can access data stored within the RDSF. The RDSF is managed by Bristol's Advanced Computing Research Centre (ACRC) which has a dedicated steering group and a rigorous data storage policy ([https://www.acrc.bris.ac.uk/acrc/RDSF\\_policy.pdf](https://www.acrc.bris.ac.uk/acrc/RDSF_policy.pdf)). The RDSF upholds and reinforces Bristol's wider Information Security Policy ([www.bris.ac.uk/infosec/policies/docs/isp-01.pdf](http://www.bris.ac.uk/infosec/policies/docs/isp-01.pdf)).

### **Do you have security procedures in place for sensitive data?**

No personal data is captured.

### **What are your plans for long-term storage of the data?**

Data will be stored with the University of Bristol's Research Data Repository (data.bris) will preserve research data for a minimum of 20 years. The report will be submitted to the local HER via email and OASIS V record. Any additional report data will be made available upon request.

## **Data Organisation**

### **How will data be organised?**

Data will be stored, recorded, and organised according to the best practices outlined by the Archaeology Data Service (ADS) for the storage and archiving of Geophysical Survey data.

<i>Geophysics data</i>	working files
	preservation files
	image files
<i>Project material</i>	project notes
	project report
<i>Project documentation</i>	geophysics metadata
	geophysics georeferencing
	project metadata
	file description

## **Data Documentation and Description**

### **What documentation will you keep?**

Data will be stored, recorded, and organised according to the best practices outlined by the Archaeology Data Service (ADS) for the storage and archiving of Geophysical Survey data.

### **Will you be using any metadata standards?**

Data will be stored, recorded, and organised according to the best practices outlined by the Archaeology Data Service (ADS) for the storage and archiving of Geophysical Survey data.

## **Data Sharing and Publication**

### **What data do you plan to share?**

All processed and raw survey data will be made publicly available.

### **Are there any ethical, commercial, legal or IPR issues which might apply when publishing your data?**

There are no ethical, commercial, legal or IPR issues with publishing this data.

**How will your data be shared?**

Data will be published through the University of Bristol Research Data Repository (data.bris). The data.bris Repository offers a means for Bristol's researchers to openly share non-confidential research data, without the need for external data users to undergo any form of authentication. Each deposit is accompanied by appropriate metadata and is assigned a unique Digital Object Identifier (DOI) via the DataCite scheme. All data published by the Repository is available under a permissive re-use license.

**Will there need to be controlled access procedures in place for your data?**

There is no need for controlled access procedures to be in place for this data.

# Planned Research Outputs

## Dataset - "Working Files"

These are all the geophysics files created during the duration of the project, ranging from the raw data files downloaded from field instruments, to processed geophysical data files, their image representations, GIS files that integrate these files and interpretation diagrams. They will mostly be stored and managed in proprietary data formats that are best suited for the processing flow (e.g. ArchaeoSurveyor XML files, Geoplot composites, dxf or shp files). All these files should be included in the Archive as they can be useful for subsequent analysis and re-evaluation. They form the primary information and are equivalent to a collection of archaeological finds from an excavation.

## Dataset - "Preservation files"

XYZ text files both in their unprocessed ('raw') form and after final processing.

Interpretation diagrams created as overlays of the measured geophysical data. They are vector diagrams (lines and polygons) and standard preservation files can be used (e.g. dxf/dwg, shp).

## Image - "Image files"

Raster outputs of the raw and processed geophysical data, exported and georeferenced as a GeoTIFF file.

## Text - "Project report"

Report of survey with interpretation and undertaken procedures.

## Georeferenced point/line data - "Geophysics georeferencing"

- The geophysics coordinate system (procedure used to lay out the grid; where is the coordinate origin; estimates of accuracies for re-establishing the grid).
- Coregistration to site grid (coordinates of control points, both in the geophysics coordinate system and the site grid, together with their respective accuracies; geophysics or site coordinates of map-features, if coregistration with a map is required; geophysics or site coordinates of ground features used for georeferencing).
- Georeferencing (description and approximate location of ground features for reference; distance to ground features for key points along the baselines; compass bearings of baselines).

## Planned research output details

Title	Type	Anticipated release date	Initial access level	Intended repository(ies)	Anticipated file size	License	Metadata standard(s)	May contain sensitive data?	May contain PII?
Working Files	Dataset	2023-12-06	Open	data.bris Research Data Repository	6 MB	Creative Commons Zero v1.0 Universal	None specified	No	No
Preservation files	Dataset	2023-12-06	Open	data.bris Research Data Repository	10 MB	Creative Commons Zero v1.0 Universal	None specified	No	No
Image files	Image	2023-12-06	Open	data.bris Research Data Repository	10 MB	Creative Commons Zero v1.0 Universal	None specified	No	No
Project report	Text	2023-11-06	Open	data.bris Research Data Repository	10 MB	Creative Commons Zero v1.0 Universal	None specified	No	No
Geophysics georeferencing	Georeferenced point/line data	2023-12-06	Open	data.bris Research Data Repository		Creative Commons Zero v1.0 Universal	None specified	No	No