

# **Tintern Abbey, Tintern, NP16 6SE**

## **Photogrammetric (Terrestrial and Aerial) Survey Metadata Report**

**Prepared  
for**

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## Photogrammetric Survey Metadata Report

### 1 Introduction

- 1.1.1 Black Mountains Archaeology Ltd were commissioned by Cadw (Llywodraeth Cymru/Welsh Government) to undertake a photogrammetric survey at Tintern Abbey SAMMm102 (Figure 1). The aim of the survey is to produce accurate, measured 3D photogrammetric modelling of the east wall of the Chapter House and east facing elevation of the Monk's Dortor/Day Room utilising both terrestrial and aerial (drone) digital cameras.
- 1.1.2 The programme of photogrammetric building recording was implemented according to the standards set out in *Historic England's Photogrammetric Applications for Cultural Heritage Guidance for Good Practice* (Published 2017). The aerial (drone) survey was undertaken in accordance with the rules and regulations contained within *Air Navigation Order 2016* and its 2018 and 2019 amendments.

### 2 Location and Topography

- 2.1.1 The photogrammetric survey areas were situated adjacent (east) to the mid-12<sup>th</sup> century cloister at Tintern Abbey. Area A was located on the east wall of the Chapter House, centred on coordinates NGR: SO 353325.270,200031.684. Area B was located on the south western corner of the Monks' Dortor/Day room and entrance to the day stairs, centred on coordinates NGR: SO 353313.090,200050.154. The abbey is located on a level river terrace to the south of the River Wye.

### 3 Methodology

- 3.1.1 The survey was carried out by UAV (drone) equipped with a Hasselblad 35mm equivalent 20mp, 1" sensor, 4k UHD camera and a terrestrial Canon EOS 2000D camera with a 24.7mp, 22.3mm x 14.9mm CMOS sensor. The terrestrial and aerial survey was tied into the Ordnance Survey National Grid and Datum using an EMLID Reach GN55/ Glonass (GPS) Receiver and data logger with a <20mm tolerance. All 3D models were produced using proprietary photogrammetry software and aligned using known ground control points (GCPs). Dimensional control was then be applied to each model and then reprocessed using the new parameters and optimised cameras to create dense point clouds and high face count meshes exported to OBJ format. All high-resolution orthographic renders (orthoplanes and orthomosaics) were exported and scaled in raster (JPEG) format.
- 3.1.2 The survey was undertaken on the 31<sup>st</sup> March 2021. The weather was clear and fine with strong but low winter sunlight that cast shadows over the survey area during the course of the day.

### 4 Results

- 4.1.1 The Monk's Day Room survey created a dense point cloud of over 18 million points and high face count meshes exported to OBJ format with a mean RMS error of 0.8cm. The Ground Sampling Distance (GSD) achieved was a great 0.43cm/pixel. Five GCPs were used with a sub-20mm error margin to OSGB36 (National Grid). The 3D model (high face count mesh) is hosted by us and can be viewed here <https://p3d.in/Bplth>.
  - 4.1.2 The Chapter House survey created a dense point cloud of over 36 million points and high face count meshes exported to OBJ format with a mean RMS error of 0.8cm. The Ground Sampling Distance (GSD) achieved was a great 0.38cm/pixel. Five GCPs were
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used with a sub-20mm error margin to OSGB36 (National Grid). The 3D model (high face count mesh) is hosted by us and can be viewed here <https://p3d.in/5Ho5G>.

- 4.1.3 The deliverables for this project, in addition to the high face count 3D meshes noted above, include four high resolution photogrammetric orthographic drawings in PDF format accompanying this report:
- 4.1.4 Drawing Number 1076/12/04/21/01 – Monks’ Day Room, Tintern Abbey. East Facing Photogrammetric Elevation.
- 4.1.5 Drawing Number 1076/12/04/21/02 – Chapter House, Tintern Abbey. East Facing Photogrammetric Elevation.
- 4.1.6 Drawing Number 1076/12/04/21/03 – Chapter House, Tintern Abbey. West Facing Photogrammetric Elevation.
- 4.1.7 Drawing Number 1076/12/04/21/04 – Monks Day Room and Chapter House Photogrammetric Plan.

## **5 Copyright and Arbitration**

- 5.1.1 Black Mountains Archaeology Ltd shall retain full copyright of any commissioned reports, 3D models, metadata, tender documents or other project documents, under the *Copyright, Designs and Patents Act 1988* (chapter IV) with all rights reserved; excepting that it hereby provides an exclusive licence to the client for the use of such documents by the client in all matters directly relating to the project.
- 5.1.2 Any dispute or difference arising out of a contract in relation to this work shall be referred for a decision in accordance with the Rules of the *Chartered Institute of Arbitrators* applying at the date of the agreement.

## **6 Acknowledgements and Copyright**

- 6.1.1 The project was managed, surveyed, and reported by Richard Lewis BA MCIfA. The copyright of this report is held by Black Mountains Archaeology Ltd. Ordnance Survey maps are reproduced under licence 100058761. Black Mountains Archaeology Ltd retains copyright of any annotations.
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7 Appendix I – Figures

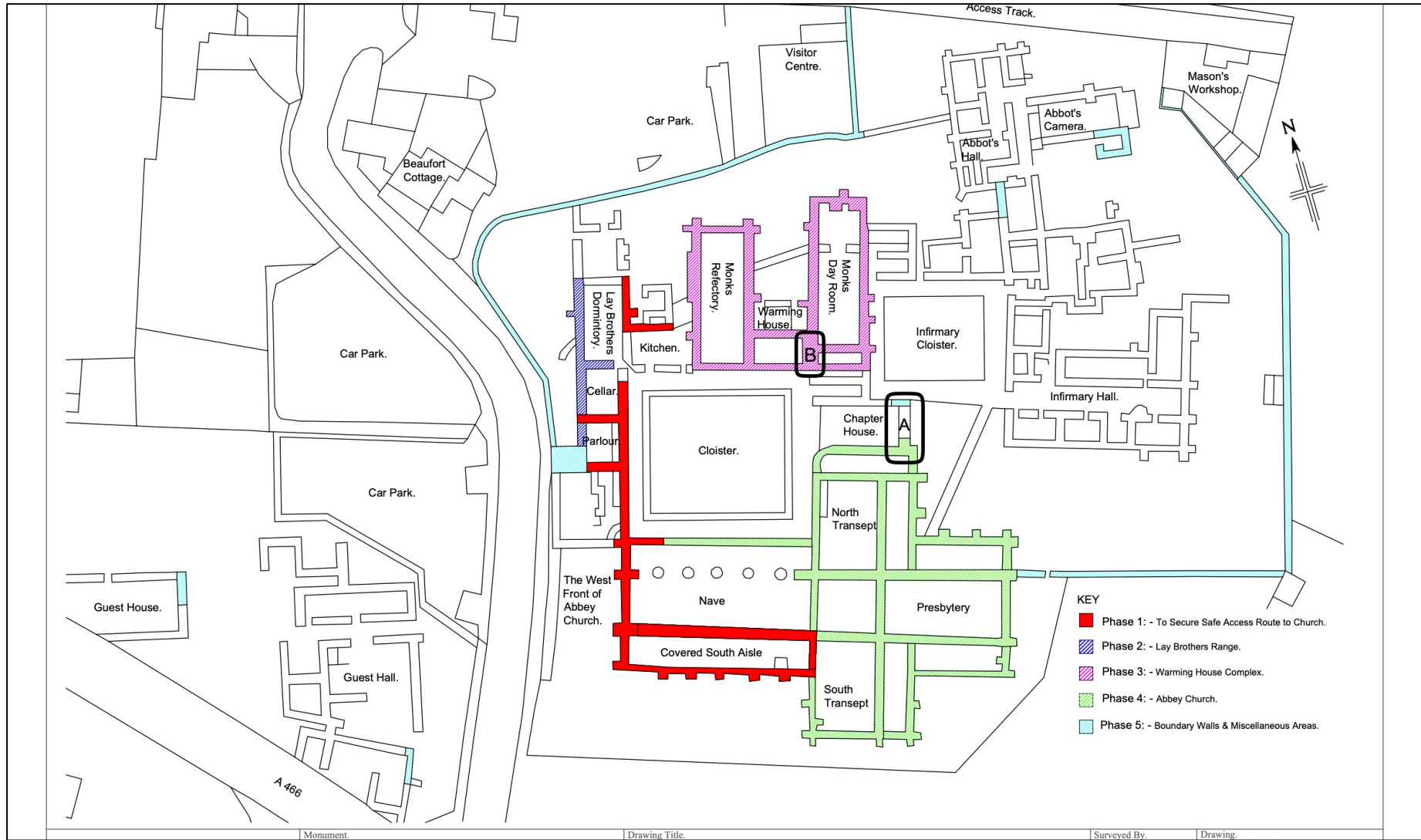


Figure 1. Plan of aerial survey area (black). © Cadw. Reproduced with kind permission.



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Yn rhan o'n hawydd i wella ansawdd ein gwasanaeth, rydym yn croesawu unrhyw adborth y gallwch ei ddarparu.

As part of our desire to improve our quality of service we welcome any feedback you are able to provide.

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