

1EW03 - Enabling Works Central

AWHi - Survey Report for Construction Integrated Recording at Chetwode Mill, Buckinghamshire (C25147), Site Code: 1C21CWMCI

Document no.: 1EW03-FUS_COP-EV-REP-CS06_CL10-000006

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1 Summary

- 1.1.1 This Survey Report details the survey methodology for setting out and surveying during Construction Integrated Recording (CIR) at Chetwode Mill, Buckinghamshire (Figure 1; NGR 464848, 228412). The CIR comprised one plot (C25147) measuring 0.99ha in total. The site code for this work is 1C21CWMCI.
- 1.1.2 The Site is situated within CFA13 Calvert, Steeple Claydon, Twyford and Chetwode in Archaeological Character Sub-zones (ASZ) 23, to the south of Chetwode, Buckinghamshire. The fieldwork was undertaken in accordance with the Fieldwork Change Control for Construction Integrated Recording at Chetwode Mill (Document No. 1EW03-FUS-EV-FRM-CS06_CL10-000011) and the Route-Wide Project Plan for Construction Integrated Recording (Document No. 1EW03-FUS-EV-REP-C000-009812).

2 Introduction

- 2.1.1 COPA (the Archaeological Contractor) was commissioned by The Contractor to undertake a programme of archaeological works at Chetwode Mill, Buckinghamshire.
- 2.1.2 The project background, methodology, standards, and document references are contained in the Fieldwork Change Control for Construction Integrated Recording at Chetwode Mill (Document No. 1EW03-FUS-EV-FRM-CS06_CL10-000011).
- 2.1.3 COPA Standard Operating Procedures (SOPs) are listed in *CA Technical Manual 2: Survey Manual*.
- 2.1.4 This survey report specifically sets out the survey methodology and locates the works as outlined in the LSWSI (Document No. 1EW03-FUS_COP-EV-REP-CS06_CL10-000004).
- 2.1.5 The Construction Integrated Recording (CIR) was required to establish the location, extent, survival, and significance of any archaeological remains that may be revealed during the planned ground reduction by the Main Works Contractor within Area C25147.
- 2.1.6 The following strategy changes were approved during the archaeological investigations:
- Following the removal of trees, a series of archaeological features were identified, extending outside the area of archaeological monitoring. The area was subsequently extended to the north-west, east, and south by a total of 108m² (FCCF418) (Document No. 1EW03-FUS_COP-EV-FRM-CS06_CL10-000006).
 - During this investigation, an area of CIR (approximately c.45m²) was unable to be completed due to an active Public Right of Way and farm track that needed to be maintained during the investigation works. This area will be undertaken at a later date by the Main Works Contractor (Document No. 1EW03-FUS-EV-FRM-CS06_CL10-000012).

3 Survey Methodology

3.1 Set Out and Survey

- 3.1.1 For the CIR results to be reliable, it is necessary to maintain an appropriate level of survey accuracy when setting out areas and mapping archaeological features. The purpose of setting out is to position the CIR area in accordance with the location specified in the Fieldwork Change Control and LSWSI. Any alterations to the areas were implemented in accordance with the fieldwork Change Control procedure (see 2.1.6).
- 3.1.2 Prior to commencement, all equipment was checked. Pre-survey information was downloaded onto the survey equipment from COPA's File Transfer Protocol (FTP) server. Field recording software for RTK GNSS equipment (Leica SmartWorx/Captivate) was verified as up to date prior to commencement.
- 3.1.3 A total of 5 Permanent Ground Markers (PGMs) were installed to mark the CIR area. These were located with RTK GNSS equipment (Figure 1). Coordinate values for each PGM were calculated in Leica Infinity from the average of two 180 epoch occupations taken an hour apart. PGMs were surveyed at the start and finish of each survey job (= data packet (leica .dbx file) containing site survey for a day - sent back and processed at the end of each day), giving an estimate of the absolute accuracy of each day's survey, in accordance with the LSWSI.

PGM No	Easting	Northing	m aOD
PGM1	464910.290	228418.462	87.247
PGM2	464857.775	228394.207	86.933
PGM3	464851.907	228394.970	87.008
PGM4	464811.368	228420.837	87.624
PGM5	464858.693	228422.160	86.927

- 3.1.4 Setting out of the CIR area was undertaken using Leica GSo8 Real Time Kinematic (RTK) Global Navigation Satellite System (GNSS) set in network RTK mode, accessing corrections data from Leica Smartnet. Leica manufacturers' certificates for RTK GNSS kits are held by the Employer. X,Y coordinates for points along the edges of each area were created in ArcGIS and uploaded to Leica GSo8 controllers for setting out. The edges of areas were set out on site using flags and bamboo canes, marked with the appropriate area number. All areas were located to a horizontal accuracy of +/- 50mm in relation to the GIS data supplied along with the Project Plan and LSWSI figures.

- 3.1.5 Surveying of area limits and archaeological features was conducted by trained and competent COPA staff using Leica GSo8 RTK GNSS equipment. All features were surveyed in accordance with *Fieldwork Manual 2: Survey Manual* (CA 2017) and was compliant with Historic England Metric Survey Specifications (EH 2015). Survey data was related to the Ordnance Survey National Grid (OSGB36/15), with heights given above Ordnance Datum Newlyn (ODN).
- 3.1.6 CIR area limits were recorded at the top and base of excavation. The limits of archaeological features were surveyed immediately following the machine-stripping of areas to provide a plan of all archaeological features prior to hand-excavation. All post-excavation survey was conducted with a horizontal accuracy of +/- 50mm and a vertical accuracy of +/-50mm. Points outside these accuracy benchmarks were automatically rejected by the survey controller software and re-surveyed when conditions allowed an appropriate level of accuracy. Following hand-excavation, the limits of each feature were re-surveyed, along with the limits of each hand-excavated intervention and the feature base. Sections were hand-drawn and located using RTK GNSS equipment with drawing points surveyed at each end of the section line. Levels were generated from GNSS data.

3.2 Standards and Guidance

- 3.2.1 All spatial data was recorded by Leica RTK GNSS on an appropriate memory card and transferred to the office using FTP. Non-spatial information such as context, sample or registered artefact numbers were recorded either directly into the controller or into a field notebook. Survey data was processed daily in Leica Infinity and exported in ESRI Shapefile format before being collated and stored in ESRI File Geodatabase (.gdb) format. The File Geodatabase provided scaled digital data of all required elements of the project and located them within the Ordnance Survey grid with heights given above Ordnance Datum Newlyn (ODN). These files were backed up with originals being stored on COPA's server in Kemble, near Cirencester, Gloucestershire.
- 3.2.2 COPA followed the relevant HS2 Standards, guidance and procedures in relation to the production of documents and digital materials. The following list outlines the key documents and is not exhaustive.
- HS2 Cultural Heritage GIS Specification (Document No. HS2-HS2-GI-SPE-000-000004)
 - The BIM documents set out in Document No. HS2-HS2-SA-SPE-000-000008 High Speed Two Phase One Project Requirements Specification (PRS) (section 2.1.4 Information Management)
 - Historic Environment Physical Archiving Strategy (Document No. HS2-HS2-EV-STR-000-000018)
 - Historic Environment Digital Data Management and Archiving Strategy (Document No. HS2-HS2-EV-STR-000-000019)

- Information Paper E8: Archaeology. (Document No. LWM-HS2-HY-PPR-000-000042)

3.2.3 All drawings are composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and COPA Geomatics protocols (CA 2017). In all instances, GIS work has, and will, follow the guidelines set out in the Employer's GIS Standards (Document No. HS2-HS2-GI-SPE-000-000004).

3.2.4 The GIS drawings (Figure 1 and 2) contains an information layout which included all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements will be made available as hard copy for archiving purposes.

3.3 Archive Deposition

3.3.1 Following the completion of the CIR, COPA will provide the Contractor with the required data, metadata and digital materials as specified in the Historic Environment Digital Data Management and Archiving Procedure (Document No. C262-ARP-EV-SPE-000-000003) and the Historic Environment Digital Data Management and Archiving Strategy (HS2 Ltd 2015).

3.3.2 The survey data will be edited to ensure that the archive is fit for purpose both as a record of the archaeology removed by excavation, and as a planning resource for future mitigation.

3.3.3 The digital data will be temporarily stored on the server at COPA Kemble (near Cirencester, Gloucestershire), which is backed up on a daily basis. The data will be transferred to HS2 in due course for long term archival storage.

4 References

4.1 Glossary of terms

4.1.1 The following terms have been used in this report (where applicable):

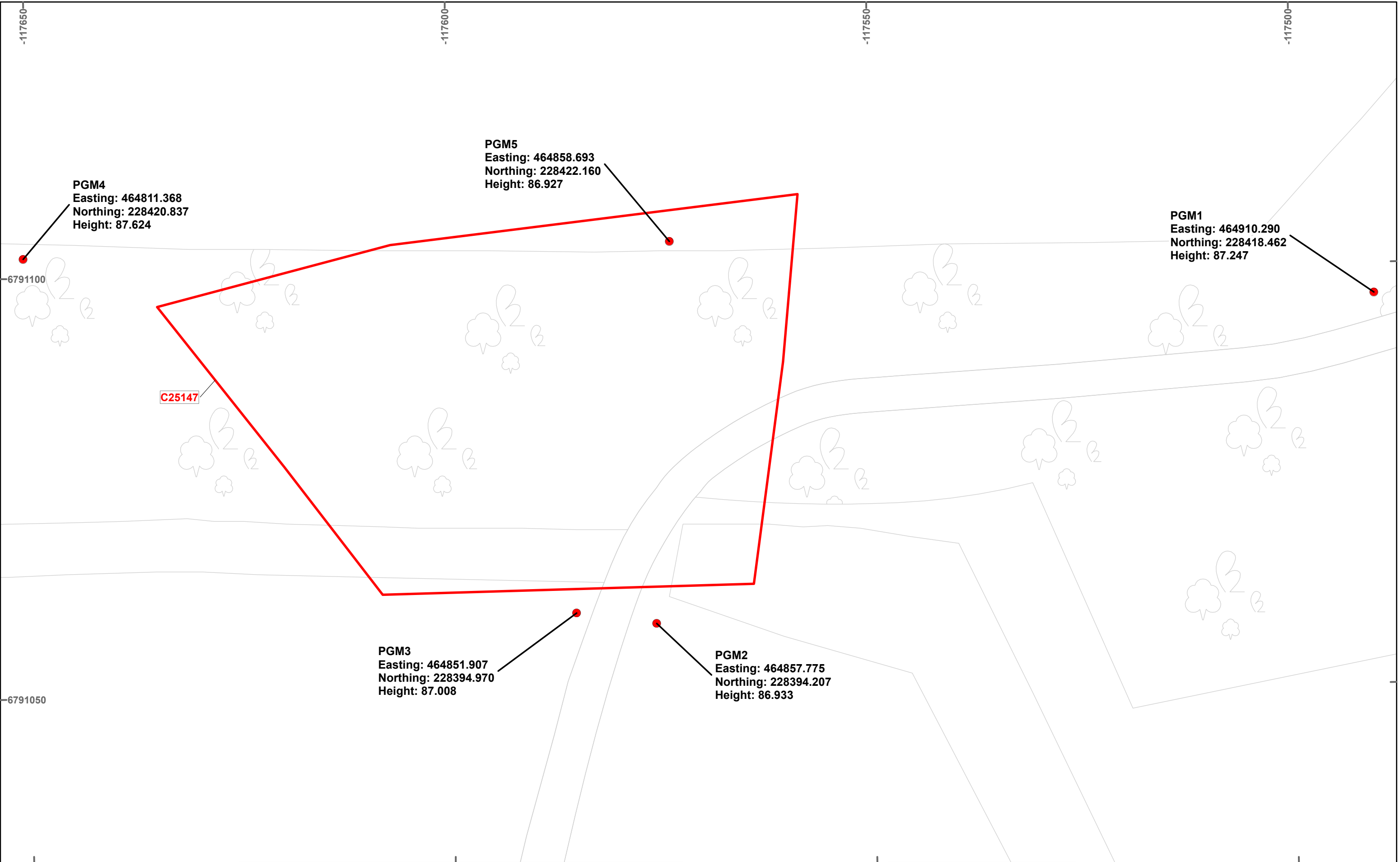
- **Archaeological Contractor** - the organisation undertaking the specific historic environment works for the Contractor.
- **Contractor** – Fusion; the organisation undertaking the Enabling Works for Area Central on behalf of the Employer.
- **Employer** – HS2 Ltd, the organisation responsible for delivery of HS2 Phase One Scheme and all terms and conditions, policies, procedures, and payments
- **Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS)** – the framework for delivering all historic environment investigations undertaken as part of the HS2 Phase 1 programme.
- **GNSS** (Global Navigation Satellite System) a generic term for satellite-based positioning systems e.g. GPS, GLONASS, BDS or Galileo

- **Location** – a specific HS2 worksite or group of worksites that are being addressed as a combine historic environment investigation programme of assessment, evaluation and investigation.
- **Location Specific Written Scheme of Investigation (LSWSI)** - specification document assembling one or more Project Plans within an area of land defined primarily for construction programme purposes. The LS-WSIs will be agreed with the Project Manager and would provide a costed and programmed approach to delivering outcomes.
- **Project Plans** – specification document for each specific package of activity (e.g. a survey, desk-based assessment, excavation, recoding project). The plans would respond to the Specific Objectives set out in the GWSI: HERDS and be delivered within an agreed budget.
- **RTK (Real-Time Kinematic)** real-time kinematic survey is a satellite navigation technique used to enhance the precision of position data derived from satellite-based positioning systems
- **Works** – the specific historic environment assessment, evaluation or investigation works at each location.

4.2 References

Title	Reference
HS2 Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
High Speed Two Phase One Project Requirements Specification (PRS)	HS2-HS2-SA-SPE-000-000008
Historic Environment Physical Archiving Strategy	HS2-HS2-EV-STR-000-000018
Historic Environment Digital Data Management and Archiving Strategy	HS2-HS2-EV-STR-000-000019
Information Paper E8: Archaeology	LWM-HS2-HY-PPR-000-000042
AWHi - Method Statement for Construction Integrated Recording at Chetwode Mill, Buckinghamshire	1EW03-FUS_COP-HS-MST-CS06_CL10-000001
AWHi Location Specific Written Scheme of Investigation for Construction Integrated Recording at Chetwode Mill, Buckinghamshire	1EW03-FUS_COP-EV-REP-CS06_CL10-000004
AWHi Project Plan Report for Archaeological Monitoring and Construction Integrated Recording – Central area-route wide	1EW03-FUS-EV-REP-C000-009812
AWHi – Fieldwork Change Control Form A (Spec C) for Construction Integrated Recording at Chetwode Mill, Buckinghamshire FCCFA038	1EW03-FUS-EV-FRM-CS06_CL10-000011

AWHi – Fieldwork Change Control Form A (Spec C) for Construction Integrated Recording at Chetwode Mill PRow, Buckinghamshire FCCFA058	1EW03-FUS-EV-FRM-CS06_CL10-000012
AWHi – Fieldwork Change Control Form for C25147 Construction Integrated Recording at Chetwode Mill, Buckinghamshire, FCCF418	1EW03-FUS_COP-EV-FRM-CS06_CL10-000006
Cotswold Archaeology, Technical Manual 2- Survey Manual	CA 2017
English Heritage: Where on Earth Are We? The Role of Global Navigation Satellite Systems (GNSS) in Archaeological Field Survey	EH 2015



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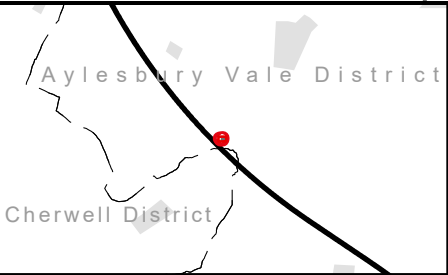
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Legend

- Control point
- Site Boundary



High Speed Two

1C21CWMCI
Chetwode Mill (C25147) ,
Buckinghamshire
Control point locations

Internal

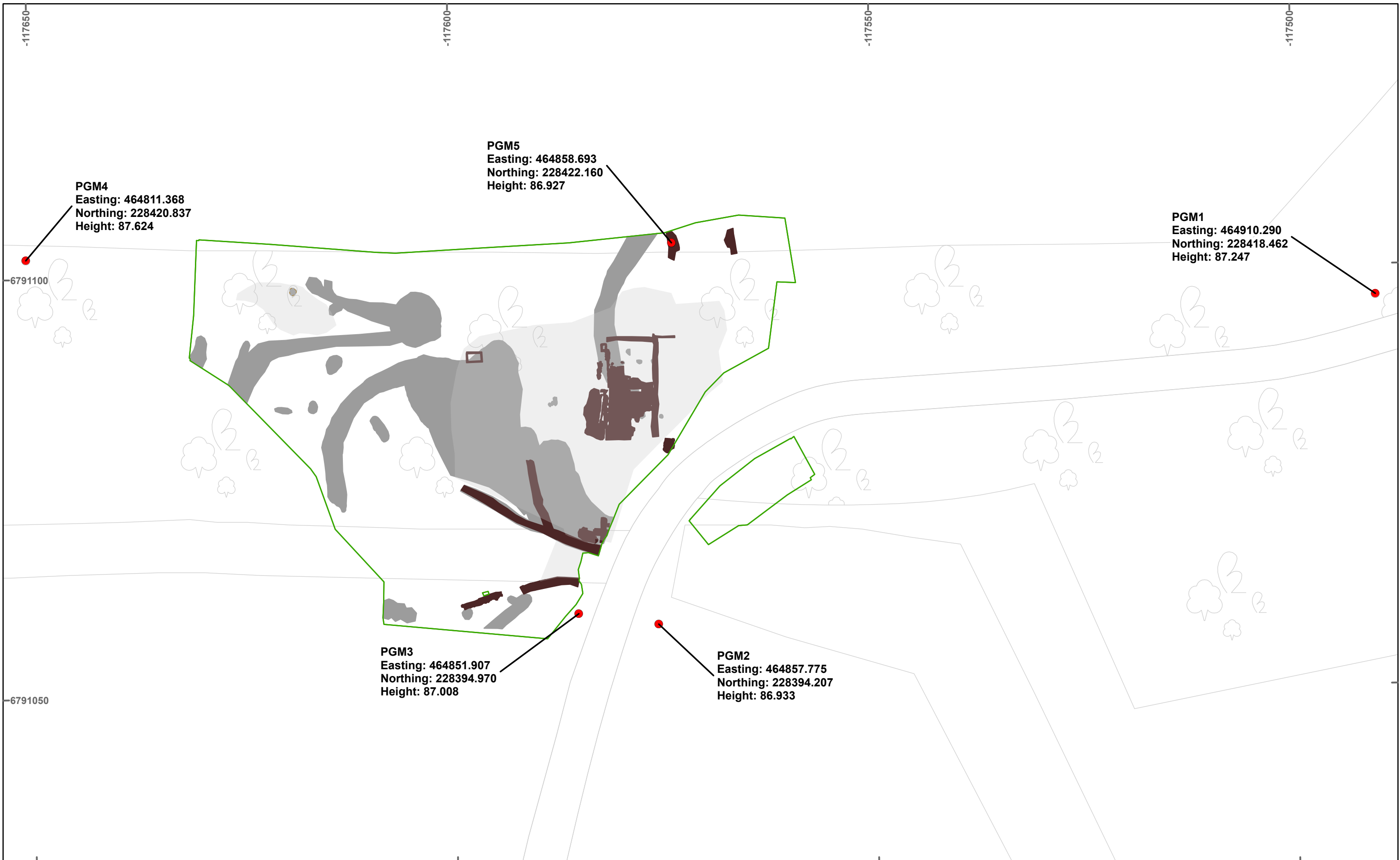
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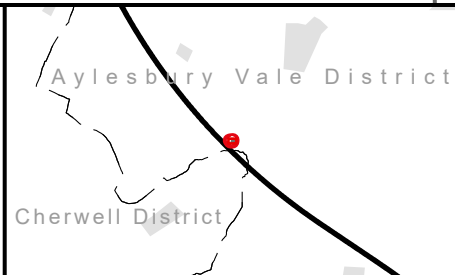
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Legend

- Control point
- Limit of excavation
- Deposit
- Structure
- Archaeological feature



High Speed Two

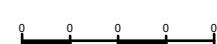
1C21CWMCI

Chetwode Mill (C25147) ,

Buckinghamshire

Limit of excavation as dug

Internal

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