

## 1EW03 - Enabling Works Central

# AWHi Survey Report for Archaeological Recording at Railway Cottages, Doddershall Embankment, Buckinghamshire. AC250/32 Site Code: 1C19RWCAR

Document no.: 1EW03-FUS\_COP-EV-REP-CS04\_CL20-000008

Revision	Author	Checked by	Approved by	Date approved	Reason for revision
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# 1 Summary

- 1.1.1 This Survey Report details the survey methodology for setting out and surveying during the Archaeological Recording (AR) at Railway Cottages, Doddershall Embankment, Buckinghamshire (Figure 1, NGR 472670, 219998). The AR encompassed two fields (C25087) measuring c. 3.21ha in total. The site code for these works is 1C19RWCAR.
- 1.1.2 The Site is situated within CFA 12: Waddesdon and Quainton in Archaeological Character Sub-zone (ASZ) 7 (Doddershall Outer Estate). A Project Plan was prepared for the works (Document No. 1EW03-FUS-EV-REP-CS05-007815). The Project Plan for the preceding trial trench evaluation summarised the results of previous surveys of the Site, including LiDAR, hyperspectral imagery, aerial photographic analysis and geophysical surveys. (Document No. 1EW03-FUS-EV-REP-CS05-000645 Revision 3).

# 2 Introduction

- 2.1.1 COPA (the Archaeological Contractor) was commissioned by The Contractor to undertake a programme of archaeological works at Doddershall Embankment, Buckinghamshire.
- 2.1.2 The project background, methodology, standards and document references are contained in the Project Plan (Document No. 1EW03-FUS-EV-REP-CS05-007815).
- 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 (1EW03-FUS\_COP-EV-REP-CS05-000003).
- 2.1.5 The Archaeological Recording (AR) comprised the investigation of one area (C25087) across two fields. The location of this area was specified in the Project Plan (Figure 2).
- 2.1.6 The following strategy change was approved during the archaeological investigations:
- The stripping of the overburden in the northern part of the southern field was halted as the area did not contain significant archaeological remains, resulting in the reduction of 12560 m<sup>2</sup> to the originally designed area. (Document No. 1EW03-FUS-EV-FRM-CS05-000046).

# 3 Survey Methodology

## 3.1 Set Out and Survey

- 3.1.1 For the AR 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 AR areas in accordance with the location specified in the Project Plan 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 6 Permanent Ground Markers (PGMs) were installed to mark the AR areas. 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	472681.979	220033.890	83.233
PGM2	472752.604	219931.489	83.397
PGM3	472868.859	219797.880	81.416
PGM4	472627.370	220008.572	82.070
PGM5	472699.377	219940.277	83.638
PGM6	472836.131	219778.424	80.952

- 3.1.4 Setting out of the AR areas 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 AR 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-excitation. All post-excitation 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-excitation, 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 drawing (Figure 1) 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 AR, 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.

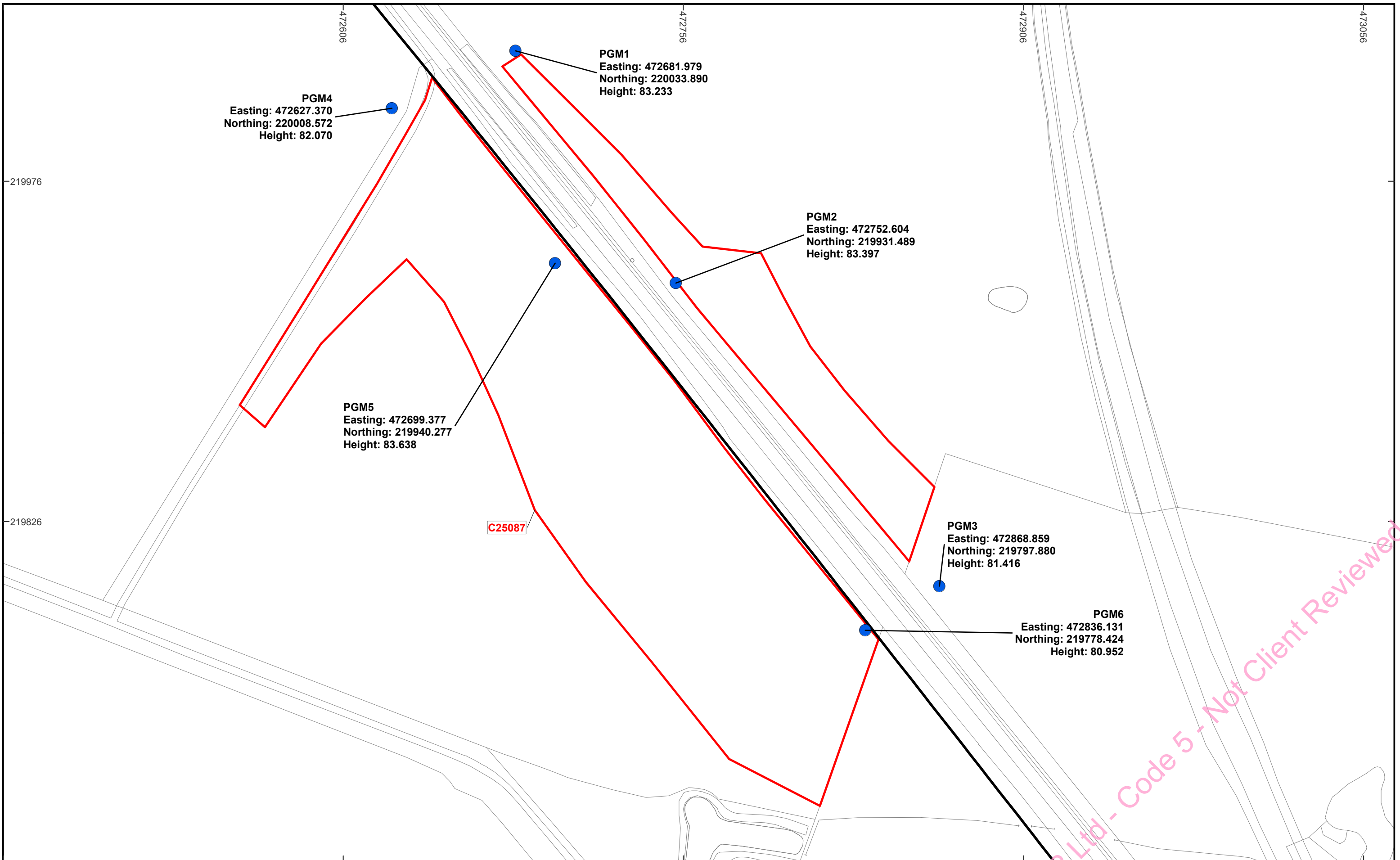
## 4.2 References

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
HS2 Phase 1 Central Section, Archaeological Works, Railway Cottages, Doddershall Embankment, Buckinghamshire, Site Code 1C17RWCTT Trial Trench Report	1EW03-FUS-EV-REP-CS05-007783
HS2 Project Plan for Trial Trench Evaluation at Doddershall Embankment, Buckinghamshire	1EW03-FUS-EV-REP-CS05-000645 Revision 3
AWHe - Project Plan for Archaeological Recording at Railway Cottages, Doddershall Embankment, Buckinghamshire, Site Code 1C19RWCAR	1EW03-FUS-EV-REP-CS05-007815
AWhi C2b Location Specific Written Scheme of Investigation for Archaeological Recording at Railway Cottages, Doddershall Embankment, Buckinghamshire. AC250/32	1EW03-FUS_COP-EV-REP-CS05-000003
1EW03 - Enabling Works Central- AWhi Historic Environment Fieldwork Change Control Acceptance Sheet for Archaeological Recording at Railway Cottages,	Document No. 1EW03-FUS-EV-FRM-CS05-000046

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Doddershall, Buckinghamshire, AC250/32 (Change No. FCCF190)	
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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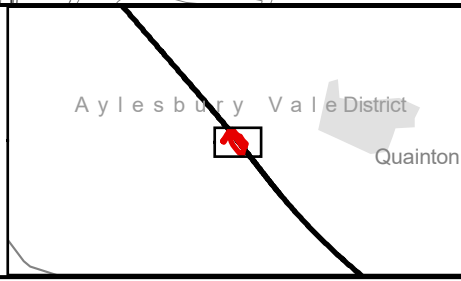
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**Legend**

- Control point
- HS2 route
- Site boundary



High Speed Two,  
Railway Cottages North and South (C25087)  
Control point locations

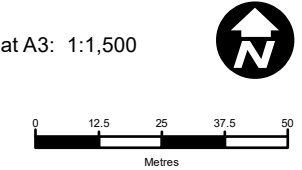
Fig. 1

Internal

# HS2

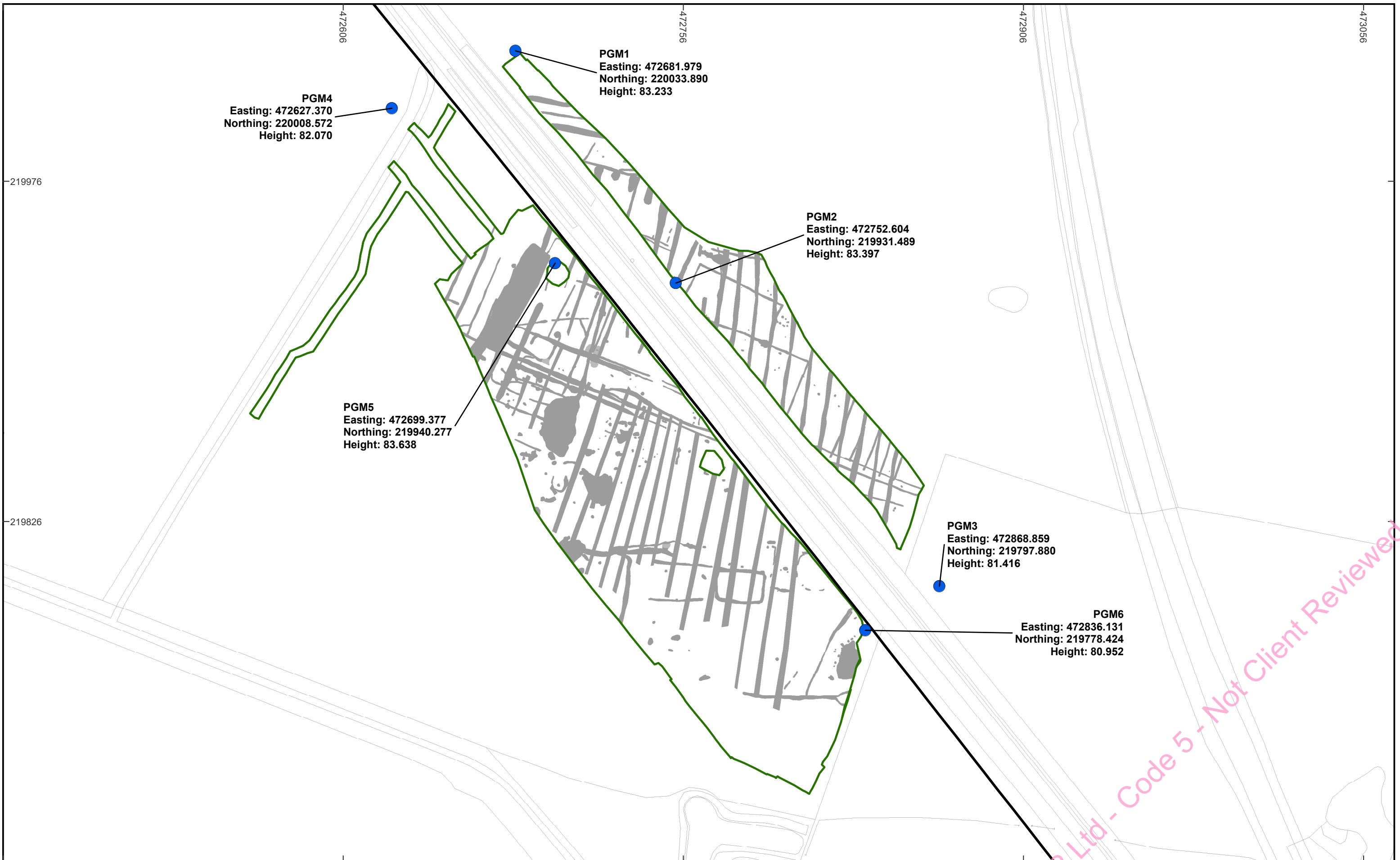
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**PGM4**  
 Easting: 472627.370  
 Northing: 220008.572  
 Height: 82.070

**PGM1**  
 Easting: 472681.979  
 Northing: 220033.890  
 Height: 83.233

**PGM2**  
 Easting: 472752.604  
 Northing: 219931.489  
 Height: 83.397

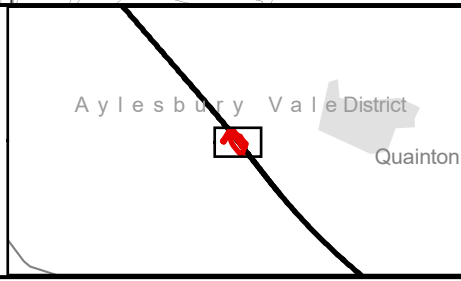
**PGM5**  
 Easting: 472699.377  
 Northing: 219940.277  
 Height: 83.638

**PGM3**  
 Easting: 472868.859  
 Northing: 219797.880  
 Height: 81.416


**PGM6**  
 Easting: 472836.131  
 Northing: 219778.424  
 Height: 80.952

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- Legend**
- Control point
  - HS2 route
  - Limit of excavation
  - Archaeological feature


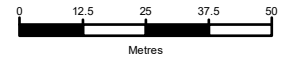


High Speed Two,  
 Railway Cottages North and South (C25087)  
 Limit of excavation as dug  
 Fig. 2  
 Internal



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