HEMERDON MINE
PLYMPTON
DEVON

ARCHAEOLOGICAL GROUNDTRUTHING SURVEY

For

GROUNDWORK ARCHAEOLOGY

on behalf of

WOLF MINERALS

CA PROJECT: 3000
CA REPORT: 10036

MARCH 2010

COTSWOLD ARCHAEOLOGY

HEMERDON MINE
PLYMPTON
DEVON

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CA PROJECT: 3000
CA REPORT: 10036

prepared by	Robin Latour & Laura Gadsby
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Building 11, Kemble Enterprise Park, Kemble, Cirencester, Gloucestershire, GL7 6BQ
Tel. 01285 771022 Fax. 01285 771033 E-mail: enquiries@cotswoldarch.org.uk

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LIST OF ILLUSTRATIONS

SUMMARY

Project Name:	Hemerdon Mine
Location:	Plympton, Devon
NGR:	SX 56600 59500
Type:	Groundtruthing Survey
Date:	December 2009; January and March 2010
Location of Archive:	To be deposited with Plymouth City Museum and Art Gallery

An archaeological groundtruthing survey was undertaken by Cotswold Archaeology to determine the measure of the confidence in earthwork features that had been identified as earthworks within the project area by previous surveys and to definitively locate those features.

A total of 560 features were identified for survey, of which 108 features were not visible on the ground and 106 were “non-archaeological”. 118 features were visible but poorly defined, as their clear boundaries had been eroded or had disappeared. 89 features were classed as subtly defined, having some measurable breadth/depth and 139 features in total were clearly observed and clearly identifiable.

1. INTRODUCTION

1.1 In December 2009, January and March 2010 Cotswold Archaeology (CA) carried out an or an archaeological field survey on Crownhill Down, Devon (centred on NGR: SX 56600 59500), commissioned by Groundwork Archaeology Ltd on behalf of Wolf Minerals Ltd.

1.2 The survey was carried out in accordance with a detailed *Written Scheme of Investigation* (WSI) produced by CA (2009) and approved by Stephen Reed, Devon County Council Archaeology Service. The fieldwork also followed the *Standard and Guidance for Archaeological Field Evaluation* issued by the Institute of Field Archaeologists (2008), *Recording Archaeological Field Monuments, a descriptive specification (RCHME 1999), Understanding the Archaeology of Landscapes, A good guide to recording practice (*EH 2007), Section 6 of *Metric Survey Specification for English Heritage,* and the *Management of Archaeological Projects* (English Heritage 1991). The work was monitored by Stephen Reed of Devon County Council.

The site

1.3 Hemerdon Mine has planning consent (ref 9/42/49/0542/85/3) for the extraction of tungsten, tin and china clay, and the associated tipping of waste on Crownhill Down, granted in 1986, with conditions attached requiring "a work programme for comprehensive archaeological investigation and recording…before and during the course of development" (Section 1: condition 10 (g) as well as determining "methods to be adopted for the safeguarding of archaeological sites within the permission area. but not directly affected by the development" (condition 10 (h).

1.4 A programme of work to fulfil these conditions, and also similar conditions applying to the China Clay processing plant lying within the site boundary (Section 2, conditions 4d and 4e) was subsequently prepared by Professor John Collis on behalf of AMAX Exploration of UK Inc (*The Hemerdon Project,* undated; document approved by Devon County Council in 1992). In 2008 the Archaeological Works Programme was updated through the production of an Archaeological Framework Document (AFD, last updated and approved version dated 02/02/09) produced by Groundwork Archaeology Ltd on behalf of Wolf Minerals Ltd (Groundwork

Archaeology 2008). This report contributes to *Stage 1: Ground Truthing*, as specified in Appendix B of the AFD.

1.5 A number of programmes of desk-based and field investigations were carried out prior to the compilation of *The Hemerdon Project*, including survey works by Professor Collis. These surveys were carried out between twenty and thirty years ago, and the archive comprises paper reports and plans of varying scope, format and accuracy. A later survey was also carried out by English Heritage in 2002. A large archive of information on the archaeology of the site was available, and to assess this, a review of the information was carried out (CA 2008). This *Archaeological Data Review*, to which reference should be made for an appraisal of the archaeological and historical background of the area, has identified that extensive archaeological remains survive as earthworks within the site Subsequently a LiDAR analysis was carried out which provided further information on some of the features recorded in previous surveys, and identified other features of archaeological potential (University of Birmingham 2008).

1.6 Together the previous studies identified a range of earthwork remains, located with varying degrees of accuracy and certainty, and with variable visibility according to changing ground conditions and survey methodologies. It was considered in first instance that the plethora of evidence required basic 'groundtruthing' against the baseline surveys, to clarify the actual location of previously observed features and to clarify any overlap or underlap between previous surveys.

1.7 The area of survey is shown on Figure 2. It does not include the area of intensive tinmining and tinworking lying west and east of the B3417 which is being surveyed in detail separately. It does include the area of Scheduled Monument DV1027 which has also been surveyed in detail and is the subject of a separate report (CA 2010). The groundtruthing survey has been fully integrated with the GIS system and database constructed for the Data Review. The results of the earthwork survey will be used to develop strategies for further survey and investigation if required and in the process of development of appropriate mitigation if the site is to be impacted upon by construction of the mine. Any such further surveys, investigations and mitigation will be the subject of specific detailed Written Schemes of Investigation for each element, which will be submitted for approval by local archaeological advisors in advance of works commencing on site in accordance with the AFD.

Objectives

1.8 The general aim of the survey was to:

- provide further data on the date, character, quality, survival and extent of the archaeological deposits within the site to determine the scope of further survey or mitigation measures which may be appropriate.

The objectives were to:

- provide a measure of the confidence in the features that have already been identified as earthworks within the project area by previous surveys
- definitively locate those features
- identify any new earthworks
- produce a definitive map of the archaeological earthworks

Methodology

1.9 For areas where LiDAR coverage and interpretation exists, this was used as the default baseline data for checking the nature of visible features on the ground. In areas beyond this coverage, the EH 2002 survey (Fletcher and Newman 2002) and the 1985 National Mapping Programme survey (RCHME 1985) were used as the default baseline data in the same way. The earlier surveys (Edwards 1979; Collis 1985) were checked against these data to determine whether any clear features existed which were not visible on later surveys, or which did not correspond with confidence to features identified on the later surveys. .

1.10 The co-ordinates of each earthwork feature were be uploaded into a Leica 1200 series "SmartRover" RTK (real-time kinematic) GPS with +/- 2cm in accuracy for all 3D observations and measurements. The location of each feature was then visited on site, using the GPS to locate it and the original unique identifier affixed to that feature in the GIS database. The visual presence or absence of the feature was recorded using a proforma earthwork recording sheet) and the general accuracy of the depiction in the previous surveys assessed. Each location was assigned a score in the field, based on the degree of confidence in its visibility and correspondence to the recorded resource using the following scale

0 - the feature is identified as non-archaeological

1 - the feature is not visible on the ground. This can refer to where a feature was noted on previous surveys but is not visible

2 - the feature is faintly visible – as a cropmark, parchmark, grassmark; clear earthen boundaries are eroded or gone but evidence remains of some feature having been present. Where massed earthworks cannot be untangled or surveyed separately, they may receive this score – "an area of unclear earthworks".

3 - the feature has some height, is visible as a subtle but defined earthwork; full extent may be unclear, but enough is visible to determine orientation, possible extent and approximate height.

4 - the earthwork is clearly defined on the ground, with measurable breadth and height, extents, and orientation

1.11 The earthwork records were entered into an Access database as part the over-arching GIS for the project currently held by Cotswold Archaeology (with a copy held by Groundwork Archaeology as the overall project consultant). Shapefiles created from this provide a direct link to the database via the unique feature identifiers. The database tables were joined to the GIS map and used to analyse the survey results, for example the total number of features observed on the ground compared to those originally included in the preliminary data set; the number of clear archaeological features compared to poorly defined ones; and to filter out any non-archaeological features from the EH and LiDAR mapping.

1.12 The database can be updated as and when observations are made on site at any later date (new features, amendments to existing ones) and the GIS mapping will update itself accordingly, via the link established.

2. RESULTS (FIGS 2-3)

2.1 A total of 865 features were contained in the original survey data set (ie the combined English Heritage and LiDAR surveys) across the entire site, including areas beyond the defined site boundaries (Fig. 2). These were reviewed and 560 were identified as relevant and useable for the ground-truth surveying, meaning a

total of 305 features were removed on the basis of them being either outside the survey area, duplicated in both EH and LiDAR surveys or lying within the areas of tinworking or the Scheduled Monument DV 1027, where detailed topographical surveys were undertaken as separate exercises.

2.2 Of these identified features, 452 were actually observed on the ground (and scored 0, 2, 3 or 4) (Figs 2 and 3). This figure is arrived at by taking the all the features in the cleaned data set (combined EH and LiDAR results) and subtracting from it features which were not observed at all during the ground walkover (i.e., outside the survey area) and any feature given a clarity score of 1 – not visible at the time of the ground-truth survey.

2.3 During the course of the walkover, 108 features were scored as not visible (a score of 1) and 106 were removed from the data set after being classed as "non-archaeological" (a score of 0). These include modern trackways, paths and low field boundary walls.

2.4 Of the total features, 118 features were given a score of 2, where the feature was faintly visible but clear boundaries had been eroded or had disappeared.

2.5 89 features were classed as subtle but definable, having some measurable breadth/depth (score of 3).

2.6 139 features in total were clearly observed and clearly identifiable as being of unequivocal archaeological origin and with good visibility (clarity score of 4). These are primarily leats, banks and ditches.

3. DISCUSSION

3.1 The groundtruthing survey has clearly identified those features from the previous surveys which were visible in the ground conditions prevailing in late 2009/early 2010. It does of course not mean that these features did not exist at ground level at some stage during previous surveys, but it is clear, from the multiple reviews of the data which have occurred, that the locational detail of the early surveys (Collis, Edwards etc) has led to double or triple-counting of earthwork features within the baseline data. It should also be noted that features visible on LiDAR analysis may

be too subtle and lacking in visible three-dimensional form for observation as earthwork features in the field. No previously unrecorded earthwork remains were identified during the survey.

4. CA PROJECT TEAM

Fieldwork was undertaken by Jonathan Bennett assisted by Sian Reynolds, Martin Harrington and Diarmuid O'Seaneachain. The report was written by Mark Collard, Robin Latour and Laura Gadsby. The illustrations were prepared by Laura Gadsby, Robin Latour, Peter Moore and Jonathan Bennett. The project was managed for CA by Mark Collard.

5. REFERENCES

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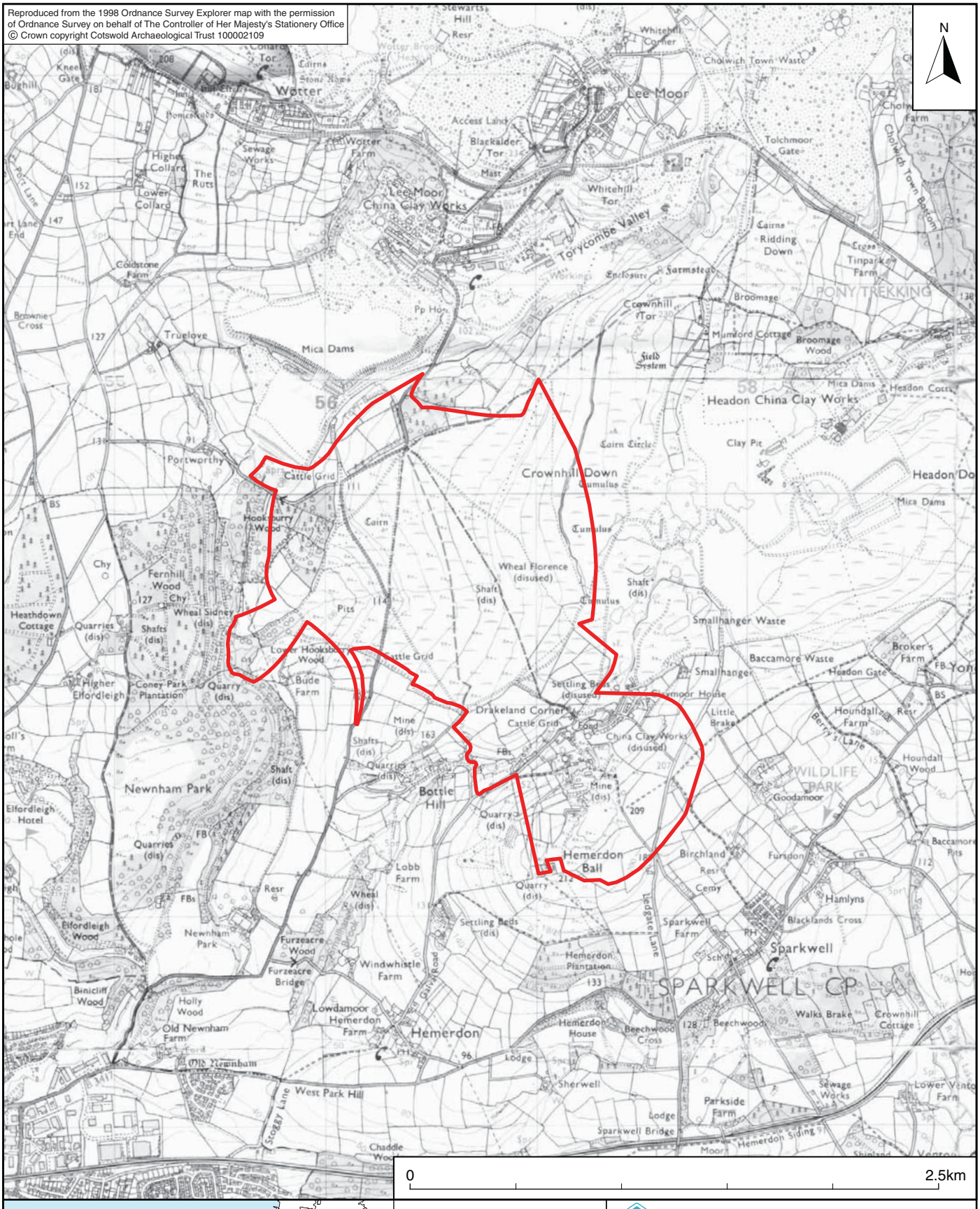

COTSWOLD ARCHAEOLOGY

PROJECT TITLE
Hemerdon Mine, Plympton, Devon

FIGURE TITLE
Site location plan

DRAWN BY	*SCALE*	*PROJECT NO.*	*FIGURE NO.*
PJM	1:25,000@A4	3000	**1**

256500
257000
60500
60000
59500
59000

N

SAM DV1027

Area of detailed topographical survey

0
460 m

Hemerdon

- observed on the ground (0, 2, 3, 4)
- not observed (1)
- Area of Detail
- survey boundary
- exclusion zone
- OS basemap

COTSWOLD ARCHAEOLOGY

PROJECT TITLE
Hemerdon Mine Devon:
Ground Truthing survey

FIGURE TITLE
Baseline data

DRAWN BY	SCALE	PROJECT NO.	FIGURE NO.
LRG	1:6,000@A3	3000	**2**

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256000
256500
257000
257500
60500
60000
59500
59000
N
SAM DV1027
Area of detailed topographical survey
survey boundary
exclusion zone
Area of Detail
OS basemap
Ground-truth survey results
clarity score
4 - well defined
3 - subtly defined
2 - poorly defined
0 - non-archaeological
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COTSWOLD ARCHAEOLOGY
PROJECT TITLE
Hemerdon Mine, Devon:
Ground Truthing survey
FIGURE TITLE
Features from ground-truth survey: by clarity score

DRAWN BY	SCALE	PROJECT NO.	FIGURE NO.
LRG	1:6,000@A3	3000	**3**