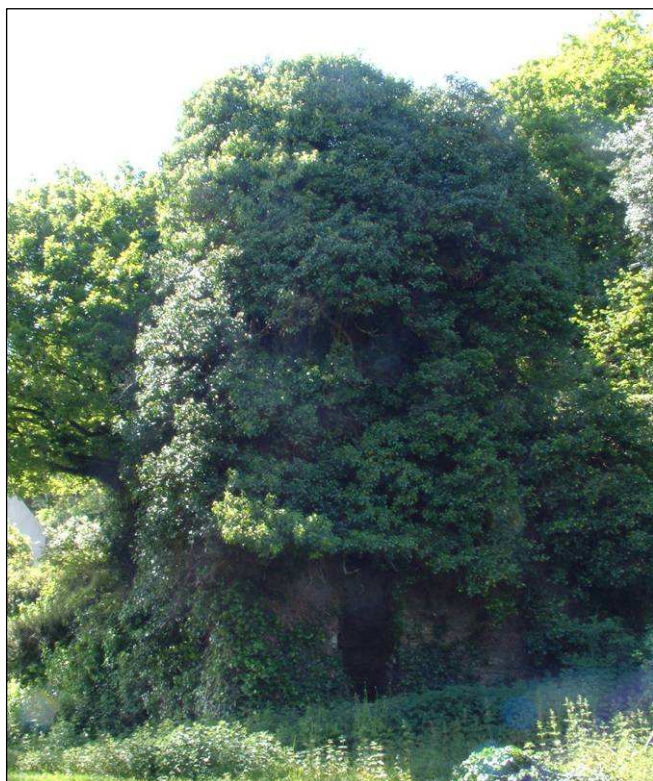


South Hooe Mine, Bere Alston, Devon

Report on building conservation works



Historic Environment Projects

**South Hooe Mine,
Bere Alston, Devon**

**Report on building
conservation works**

Client	Trish Dugmore
Report Number	2010R0124
Date	September 2010
Status	Final
Report author	Colin Buck MIFA
Checked by	Peter Rose
Approved by	Peter Rose

Historic Environment Projects

Cornwall Council

Kennall Building, Old County Hall, Station Road, Truro, Cornwall, TR1 3AY

tel (01872) 323603 fax (01872) 323811 E-mail HES@cornwall.gov.uk

www.cornwall.gov.uk

Acknowledgements

This mitigation report was commissioned by Trish Dugmore as part of a Natural England Higher Level Scheme: Environmental Stewardship Agreement. Within Historic Environment Projects, the project manager was Colin Buck.

The images reproduced in this report were compiled by the author, and other plans by Knevitt Cons. Eng. The report was edited by Pete Rose.

The views and recommendations expressed in this report are those of the Historic Environment projects team and are presented in good faith on the basis of professional judgement and on information currently available.

Freedom of Information Act

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.



Historic Environment, Cornwall Council is a Registered Organisation with the
Institute for Archaeologists

Cover illustrations

A view of South Hooe pumping engine house in 2003 (before works) and a comparison view of the engine house after conservation works had finished (C. Buck HE 2003 and 2010).

© Cornwall Council 2010

No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the prior permission of the publisher.

Contents

1	Summary	7
2	Introduction	8
2.1	Project background	8
2.2	Aims	9
2.3	Methods	9
2.3.1	Previous reports	9
2.3.2	Project management	11
2.3.3	Survey and recording techniques	11
2.3.4	Pre-works consultations	12
2.3.5	Conservation works summary	12
3	Site description	15
3.1	Location and setting	15
3.2	Statutory Designations	15
3.2.1	Statutory	15
3.2.2	Non - statutory	15
3.3	Brief history of South Hooe Mine	16
4	Results	16
4.1	Pumping Engine House	18
4.2	Boiler House	24
4.3	Pumping engine mine shaft	25
4.4	Boiler House chimney	27
4.5	Winding engine buildings	29
5	References	30
5.1	Primary sources (Site reports)	30
5.2	Secondary sources (Publications)	30
6	Project archive	31

List of Figures

Fig 1 Location map of the project area (with inset location map)

Fig 2 General site layout plan of the South Hooe Mine remediation works

Fig 3 Table of site numbering and remediation works

BUILDING CONSERVATION WORKS

Fig 4 Survey plan of the Pumping Engine House

Fig 5 South elevation surveys of the Pumping Engine House

Fig 6 South side view of the Pumping Engine house (before works)

Fig 7 South side view of the Pumping Engine house (after works)

Fig 8 East elevation surveys of the Pumping Engine House

Fig 9 East side view of the Pumping Engine house (before works)

Fig 10 East side view of the Pumping Engine house (after works)

Fig 11 West elevation surveys of the Pumping Engine House

Fig 12 West (internal) side view of the Pumping Engine house (before works)

Fig 13 West (internal) side view of the Pumping Engine house (after works)

Fig 14 North (internal) elevation survey of the Pumping Engine House

Fig 15 North (internal) view of the Pumping Engine house (before works)

Fig 16 North (internal) view of the Pumping Engine house (after works)

Fig 17 Survey plan of Pumping engine house fence and new steps layout

Fig 18 Survey plan of Platform over pumping engine shaft

Fig 19 Sectional details of Platform over pumping engine shaft

Fig 20 View of the Pumping Engine shaft (before works)

Fig 21 View of the Pumping Engine shaft (after works)

Fig 22 Elevation survey of the Winding engine boiler house chimney and buildings

Fig 23 View of the chimney (before works)

Fig 24 View of the chimney and buildings (after works)

Abbreviations

CC	Cornwall Council
DCC	Devon County Council
DMER	Devon Historic Environment Record
HE	Historic Environment
HLS	Higher Level Stewardship
NE	Natural England
NHL	Natural Hydraulic Lime
NGR	National Grid Reference
SMR	Sites and Monuments Record
SSSI	Special Site of Scientific Interest
TVAONB	Tamar Valley Area of Outstanding Natural Beauty
WHS	World Heritage Site

1 Summary

This report describes building consolidation and limited fencing safety works to South Hooe Mine, sited on the south side of the Hooe promontory within the landholding owned by Trish Dugmore, near Bere Alston, Devon in the Tamar Valley. The entire project was funded by Natural England (NE) as part of a capital works project within a Higher Level Stewardship (HLS) scheme.

Following an archaeological assessment in September 2009 (Buck 2009), during which each site was identified, its significance discussed and management recommendations produced, the extant mine buildings were surveyed in detail (EH Level 3). A Bat Survey Report (November 2009 by Spalding Assoc.) was also commissioned by NE (via the landowner), and a Structural survey report was also commissioned from Knevtitt's (Structural Engineers, Wadebridge) in August 2009 (B6880). The second stage (site implementation of the building conservation works recommended by both Buck and Knevtitt), was subsequently agreed by NE for HLS funding.

Remediation recommendations (for detailed building conservation works), from the project engineer (Andrew White of Knevtitt's) were discussed with Devon's Historic Environment Service (Steph Knight), and the Historic Building Consultant (Colin Buck), approved by NE (Simon Tame and Joy Ede), and incorporated into the Tender document (Knevtitt's: January 2010), following general principles of building conservation practice. CC HE Projects (Colin Buck) were commissioned to undertake historic buildings consultancy, archaeological recording and production of a report detailing the nature and extent of the works undertaken on site.

Contractors started work on 14th April 2010 (scaffold erection), followed by building conservation works to the three main sites from 19th April 2010: (Site 1: the extant remains of the pumping engine house, Site 2 a very small part of the boiler house, Site 5 surface works to the closed mine shaft, Site 12b the remnants of the winding engine boiler house chimney and Site 13, limited works to winding engine buildings). It was agreed during the contract, to excavate the earth/stone fill at the rear of the engine house to reveal the interior of this impressive building. This was achieved, but it had the knock on effect of the necessity to structurally retain the inside of two openings that had been revealed. As a result (including the engine shaft surface remediation scheme), the conservation works finally finished on 25th June 2010.

2 Introduction

2.1 Project background

Cornwall Council Historic Environment Projects was commissioned in July 2009 by Trish Dugmore, on behalf of Natural England as part of the farm's Higher Level Scheme – Environmental Stewardship Agreement, to undertake an archaeological assessment survey of South Hooe Mine (SX 42467 65592, DHER No's 5441 and 61684), within the land holding of Trish Dugmore, the Tamar Valley AONB and World Heritage Site: Area 10). The assessment report (Buck 2009), outlined the mining history, identified archaeologically sensitive areas and recommended the provision of an historic buildings consultancy and archaeological recording, during any proposed building conservation scheme. In addition the report contained impact assessments and mitigation recommendations for proposed conservation works on the historic structures within the project area, to follow guiding principles for future management and maintenance of the sites.

The study area includes the property ownership boundary of the landowner (Trish Dugmore), who lives in one of the former mine houses. The core of the mine (an extant engine house and mine shafts etc at SX 42467 65592), are sited within the garden area. The former site of the Stamps Dressing Floors is to the west of the core area.

Funding for all stages of these works was provided by Natural England (NE), as the landholding is part of a Higher Level Scheme within an Environmental Stewardship Agreement, through the landowner. The project has enabled this important site of silver-lead mining to be safely used for permitted occasional public access dedicated to historical, leisure and educational activities.

Additional site assessments included ecological and structural building reports which were commissioned in 2009. The Structural Report (including a detailed building survey produced in July 2009 by Team Surveys, St Austell), was produced by Knevitt Cons. Eng (B6880 in August 2009). This report, combined with the recommendations and impact assessment within the archaeological report (Buck 2009), provided the basis of the second stage of building conservation works, which included the preparation of Tender Documents by Knevitts for tendering the site contractors. A Bat/bird survey and dawn emergence survey assessment report (No. 08-T/TD/S.Hooe1) was produced in November 2009 by Spaldings Assoc, Truro. The Tender documents for the building conservation works were sent out in January 2010. Darrock and Brown of Bodmin, specialists in building conservation work, were subsequently asked to undertake the site works, following receipt of all the tenders.

In November 2009, NE (via Trish Dugmore), requested a project design and cost estimate for an historic buildings consultancy and archaeological recording during the engine house building consolidation works. This was subsequently approved by NE (Joy Ede and Simon Tame), and Devon Historic Environment Service (DHES). The site works at South Hooe started with ivy clearance early in 2009 from the wing walls of the engine house, and subsequent to the building conservation stage, tree clearance around the engine house and above other mine buildings in January 2010.

It was the long term intention of this project following the building consolidation and site safety works to permit this small mine to be used for permitted occasional access for leisure and educational activities. At present, there is a public footpath within the building conservation site. The historic buildings and archaeological recording consultancy of the works are described in detail within this report.

2.2 Aims

The main historic buildings consultancy and archaeological recording objectives of this project were to:

- Participate in the consultation process with the landowner and NE Project Manager, structural engineers and contractors, to set out the appropriate specification for the remediation works in terms of building consolidation works, shaft treatment and site fencing.
- Ensure that there was an adequate level of recording of upstanding masonry features affected by the conservation works (as identified and described in the archaeological assessment of the site), during the consolidation works.
- Include a photographic record of all building and landscape features affected by the scheme (before, during and after works).
- Carry out appropriate supervision of the contractors whilst the remediation works were being carried out, to ensure compliance with the detailed agreed work specification.
- Produce a descriptive and survey record at an appropriate level of detail of those structures, features, and sites etc that were affected by the land reclamation scheme.
- Produce a report outlining the findings of the archaeological consultancy and to provide NE and Trish Dugmore with copies of the same.
- Provide archaeological field and archive data for inclusion in both Cornwall and the Isles of Scilly Historic Environment Record, and Devon County Council's equivalent.

2.3 Methods

A building conservation scheme (especially within the World Heritage Site), necessitates the intervention of a field archaeologist/historic buildings consultant at two main stages; the archaeological assessment, and the resulting site works (results contained within this report). Historic buildings consultancy and archaeological recording during these projects are to ensure that there is a record of archaeological features that are affected, disturbed or destroyed by the conservation works. Furthermore, ongoing consultation with the site contractors and engineers is of paramount importance to ensure that appropriate building conservation techniques and standards are consistently applied, and to promote the survival and protection of important surface and sub-surface archaeological features, and to mitigate or limit damage wherever possible.

The site gazetteer (Mitigation recording results - Section 4.0), contains a detailed description of how consolidation and preservation works affected each archaeological feature within the project area.

2.3.1 Previous reports

The results of desk and field based surveys and reports (archaeological, ecological, geotechnical and structural), used and referred to during the course of the scheme are:

- South Hooe Mine, Bere Alston, Devon: Archaeological Assessment, (HES Report No 2009R077, September 2009)
- Structural Appraisal Report: South Hooe Mine, Bere Alston, Devon, Knevitts Consulting Engineers, August 2009 B6880

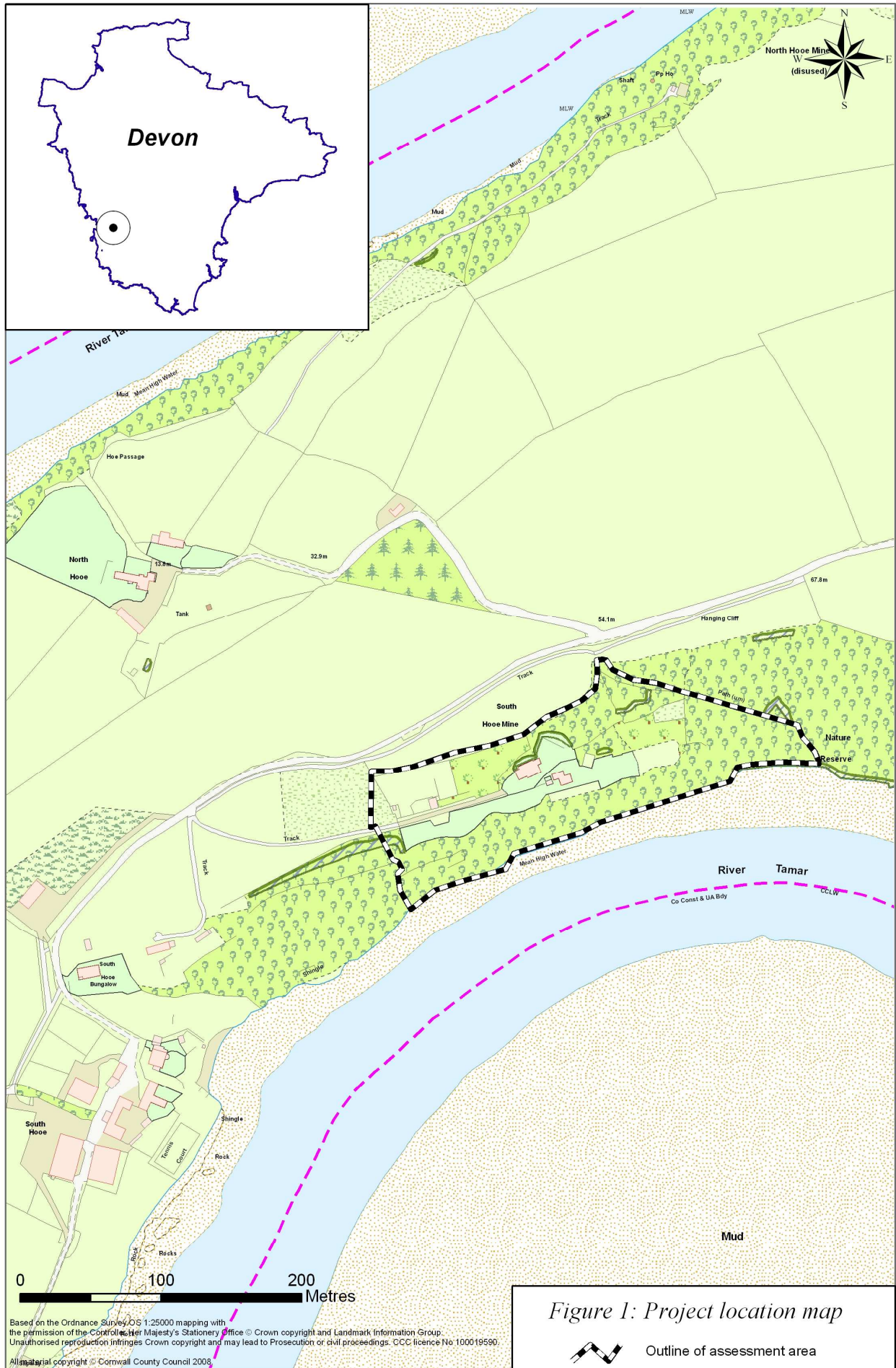


Figure 1: Project location map



Outline of assessment area

Based on the Ordnance Survey OS 1:25000 mapping with the permission of the Copyright Licensing Agency. Crown copyright and Landmark Information Group. Unauthorised reproduction infringes Crown copyright and may lead to Prosecution or civil proceedings. CGC licence No 100019590. All material copyright © Cornwall County Council 2008.

- Structural Safety Works, Contract Documents, Form of Tender, Conditions of Contract, Schedule of Works, Specifications etc – South Hooe Mine, Bere Alston, Devon, Knevitts Consulting Engineers, January 2010 B6880
- Pre-Tender information Pack (CDM Regs. 2007) for South Hooe Mine Bere Alston, Devon, Knevitts Consulting Engineers, January 2010 B6880
- Geotechnical mining report by Sherrells Ltd at South Hooe Mine, Bere Alston, West Devon, Report No. 3403, October 2009
- Visual Bat and Bird Survey of Mine Structures at South Hooe Mine, Devon by Spaldings Assoc. November 2009 Proj. No. 08-T/TD/S.Hooe1

2.3.2 Project management

HE Projects (C. Buck), provided project management on behalf of Natural England (NE) for the overall site conservation works. This included general project management and co-ordination, liaison with DCC WHS Planning Advice (Steph Knight), tendering for site consultants and co-ordinating the site contractors with the structural engineer and NE.

2.3.3 Survey and recording techniques

The measured building surveys that had been undertaken by the building survey company (Team Surveys), prior to any consolidation works being carried out (before scaffolding had been erected), were used throughout the scheme for a number of reasons:

- Production of a survey of masonry structures before consolidation works were undertaken. This provided essential dimensions and detail for rebuilding where removal of unsafe sections of masonry walls occurred.
- Provision of detailed structural engineering solutions to building instability problems and liaison with the Historic Buildings Consultant.
- Calculation of accurate Bills of Quantity for production of the Contract documents and Tenders.
- Accurate medium upon which the archaeological watching brief results can be measured and recorded on-site.
- Reproduction of these surveys (produced by Knevitt's Structural Eng.) in the archaeological watching brief report, is an effective and cost efficient method of graphically showing the extent and nature of the consolidation works.

Archaeological recording for general landscaping works, hedging and fencing consisted of a mixture of photography and annotated notes detailing their location and specification. On-site preparatory works by HE Projects included a photographic survey of all visible buildings that were to be affected by the land reclamation scheme before tree/ivy and rubble clearance was carried out, during works and after they had finished.

The results of the watching brief are summarised below in the mitigation recording results inventory (Section 4.0). All plans, maps, photographs etc generated during the project have been appropriately archived in the Cornwall and Isles of Scilly Sites and Monuments Record, correspondence and other material related to the project has been archived into the project file (Section 6).

The recording was undertaken by a single member of staff (Colin Buck) who followed HE Projects Health and Safety guidelines outlined in the project specifications (which included the completion of a Health & Safety Risk Assessment Record). Safe working practices were observed at all times, especially where recording work was undertaken on features near or within

shafts. The project archaeologist (who also managed some aspects of the project), liaised closely with the site contractors (Darrock and Brown of Bodmin); site works manager (Arthur Britton), the site supervisor (Pete West), the Structural Engineer (Andrew White of Knevitt's Structural Eng. Ltd), the NE Project Officer (Simon Tame) and NE archaeologist (Joy Ede).

2.3.4 Pre-works consultations

Pre-works consultations, an important part of the historic buildings consultancy, with the structural building engineer (Andrew White of Knevitt's) and the landowner (Trish Dugmore), and NE Project Officer were undertaken informally with HE Projects (Colin Buck) to ensure that the proposals did not undermine the historic character of the extant mine buildings and their setting within an industrial landscape in the World Heritage Site (WHS).

Regular on-site consultations throughout the term of the project between the structural engineer, the site contractors (Darrock and Brown), and site historic buildings consultant, ensured that the agreed specifications were adhered to and that the techniques and quality of work were consistent throughout the contract term of the site.

2.3.5 Conservation works summary

The archaeological assessment survey (Buck 2009) described in detail the remnants of buildings and related masonry features on South Hooe Mine, those affected by the conservation works described below. In addition, clearance of the rubble/earth build up inside the building revealed another doorway on the west elevation (see Fig 11), which, due to the build up of the ground (and rubble) needed to be retained in front of the engine house exterior west wall. In addition, in front of the exterior north wall, a concrete sewage sump had been built, whose south side wall also needed to be retained. The use of second hand timber railway sleepers for both openings to perform a retaining function, was felt to be appropriate and characteristic.

Building consolidation works (April – June 2010):

- Pumping Engine House (Buck 2009, Site 1)
- Pumping Engine Boiler House – limited works (Buck 2009, Site 2)
- Pumping Engine Shaft (Buck 2009, Site 5)
- Winding Engine Chimney (Buck 2009, Site 12b)
- Winding Engine buildings – limited works (Buck 2009, Site 13)

Fencing and stone steps remediation works (June 2010):

- Fencing around the north and part west side of the engine house
- Replacement of timber steps with granite steps near the north side of the engine house

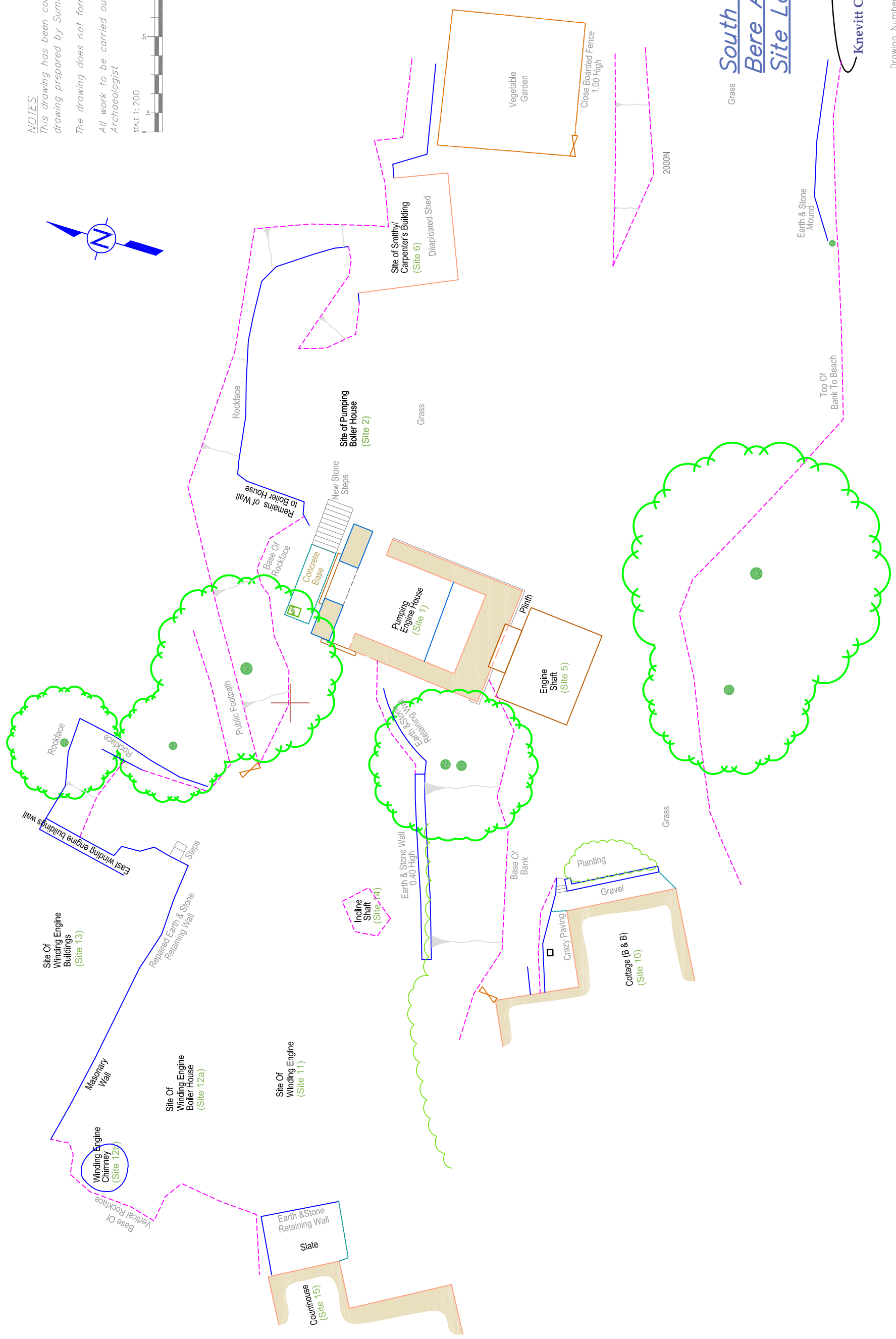
In the first phase of site assessments, the structural engineers (Andrew White of Knevitts Cons. Eng.), were instructed to carry out a preliminary structural survey of the main buildings (Report No.B6880 August 2009). Few structural problems were identified – the most visible and obvious being the state of the north end of each of the engine house wing walls (Site 1). The east wall was the worst structurally – necessitating partial demolition before any works to the interior could be permitted.

Following the production by Andrew White (Knevitt Consulting Engineers), of a single document which detailed Contract documents, Tender forms, works specifications (agreed after consultation), and Bills of Quantities (for the main building conservation contract referred above), the works were put to tender after consent for the works was given by NE (fund

Rev	Date	Description	By
A	12.07.10	As built	AW

NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys
 The drawing does not form part of a Schedule of Works.
 All work to be carried out under the direction of the Archaeologist



**South Hooe Mine
 Bere Alston, Devon
 Site Layout**



Drawing Number **B6880/02A**

DRAWING STATUS ● As Built

FIG 2

providers), the landowner (Trish Dugmore) and the Devon WHS (Planning Advice – Countryside – Steph Knight).

Darrock and Brown, a Bodmin based company (working with the Cornish Lime Company), with much experience of undertaking building consolidation works to historic buildings were successful in gaining the South Hooe Mine works contract. The building consolidation works were divided into a single phase. Following ongoing site discussions with respect to the building specifications with the structural engineer and site contractors during site works, the mine buildings were consolidated using sympathetic remediation and consolidation techniques.

An important aspect of the historic buildings consultancy and archaeological watching brief record were the weekly site consultations with the project structural engineer and contractors with regard to the extent of repointing and style of finish for all consolidation works (and where appropriate by phone/email). The Cornish Lime Company supplied pre-washed aggregate (two parts CLS 26 and three parts CLS 32), which was mixed with Natural Hydraulic Lime (5.0 strength). The aggregate was chosen (using the medium of agreed mortar panels), as being the most similar to that used during the original construction of all the mine buildings. Following scaffold erection (and removal of dangerous parts of the walls), the masonry was cleared of ivy and other vegetation growth, and where necessary wire brushed to remove mould in damp areas. Both the depth of ‘raking out’ and style of re-pointing was agreed and a standard style adopted:

- The aggregate : lime mix (2.5:1) was applied to walls after joints were raked back to sound mortar and pointed with a rebate depth of 2mm.
- After the mortar had taken on an initial ‘set’, the joints were struck off with a wire brush to expose the aggregate texture.
- The finished surface was regularly dampened to stop the lime from drying out too quickly and subsequently cracking.
- Loose wall tops were reduced to sound jointing material after earth and roots etc, had been removed. The wall tops were rebbed and rebuilt with flush joints, but these were brushed off after the initial set. This applied mainly to the tops of the remnant boiler house walls.

Figure 3 Table of sites and summary of conservation works undertaken (2009)

Site No.	Feature	NGR (SX)	Conservation works summary
	South Hooe Mine		DHER No. 5441/61684
1	Pumping Engine House	42468 65592	After ivy and unstable sections of upper wing walls removed – general building conservation works to the extant building. Removal of a large build up of earth/rubble from the rear of the interior. This revealed another doorway into the engine house on the west side, and the concrete block side of a sewage sump in the cylinder door opening. Horizontal second hand timber sleepers were used to structurally retain the higher ground/features in front of each opening. Removal and replacement of rotted lintel timbers on three sides of the building (with tanalised wood). Wall ‘capping’ and repointing with lime mortar was undertaken where appropriate to masonry.

Site No.	Feature	NGR (SX)	Conservation works summary
2	Boiler house	42476 65596	After ivy/vegetation removal – general building conservation works (patch repointing and wall capping), to a small section of boiler house west wall.
5	Pumping engine mine shaft	42466 65586	Removal of surface iron grille over shaft site. Shallow excavation of shaft to site concrete pads for RSJ installation, to support timber frame for timber platform over shaft site for historic/educational plays etc and to create a charismatic feature.
12B	Chimney	42435 65606	After ivy/vegetation removal and debris from the base of the chimney remnants, the tops of the walls were partially rebuilt, rebbed and side walls repointed (and where necessary stone added).
13	Winding engine buildings	42448 65607	After ivy/vegetation removal from the top of the long wall, it was capped and repointed where necessary. The east winding engine building wall was repointed and walls capped with lime mortar, to ensure structural stability. A small section of masonry near ground level was rebuilt, as it had collapsed where timber lintels had collapsed. These were re-instated with new lintels and the masonry built over.
	Fencing/granite steps	42470 65596	Following removal of the interior earth/rubble fill from the inside of the rear of the engine house, given the existing ground levels outside the north side of the engine house, a steep drop into the engine house was a severe safety hazard, necessitating a timber post and rail fence. In addition, second hand granite steps were installed to replace steep timber steps in order to form safe passage around the north side of the engine house.

3 Site description

3.1 Location and setting

The study area includes the property ownership boundary of the landowner (Trish Dugmore), who lives in one of the former mine houses. The core of the mine (an extant engine house and mine shafts etc at SX 42467 65592), are sited within the garden area. The landholding does not include the former site of the Stamps Dressing Floors to the west of the core area.

The general topography of the site (as shown on Fig 1) is sloping from the north down to the River Tamar. The site is on the south side of a relatively narrow promontory, south west of Bere Alston, Devon, bounded to the south, north and west by the River Tamar. The landscape is predominantly open with large fields and stone hedges, the lower steeper reaches of the promontory near the river often occupied by strips of mature woodland. The south facing setting of the site provides a wonderful opportunity to view the vista of the wide expanse of the tidal River Tamar as it proceeds to the south towards Plymouth.

3.2 Statutory Designations

3.2.1 Statutory

- The entire project area and to the north and south of the site is within the Tamar Valley Area of Outstanding Natural Beauty (AONB).
- There is a Site of Special Scientific Interest (SSSI) designation for nationally important sites along the River Tamar banks, for the nature conservation of Estuary birds and Waders.
- There is a Special Area of Conservation (SAC) designation as an important European site within the tidal limit of the River Tamar for wading birds and other similar habitats (non – statutory)

3.2.2 Non - statutory

The Cornish Mining World Heritage Site (WHS) seeks to demonstrate the international importance of the developments within mining and allied technologies which took place within Cornwall and West Devon during the last half of the 18th century and into the 19th century, establishing beyond doubt the contribution of this region to the development of the modern, industrialised world.

The World Heritage Site Management Plan 2005-2010 (2005, 12), statement of Outstanding Universal Value states that: *'The Cornwall and West Devon Mining Landscape was transformed during the period 1700-1914 by early industrial development that made a key contribution to the evolution of an industrialised economy and society in the United Kingdom, and throughout the world. Its outstanding survival, in a coherent series of highly distinctive cultural landscapes, is testimony to this achievement'*.

The formal WHS bid to UNESCO for World Heritage Site status was submitted to UNESCO in February 2005 by the Cornish Mining World Heritage Site Bid Partnership and has now been approved. This demonstrates the far reaching effects of the technological changes on the society, economy and landscape of the area, and identified a number of areas within Cornwall and West Devon where the results of these processes are still well-preserved.

The WHS areas, representative of the period of Cornish dominance of the mining world (c.1700-1860), includes the project site within the Tamar Valley Area and Tavistock (Area 10). World Heritage Site status will increase the likelihood of a further round of statutory designations of mining related sites (i.e. mine sites with significant buildings, harbours, foundries, mine settlements etc).

3.3 Brief history of South Hooe Mine

(Summarised excerpt reproduced from Buck, September 2009, Section 3.2.2)

Both North and South Hooe Mine worked the southern half of the western north-south silver/lead lode (Ward Mine working the northern end of the lode). These lodes were worked at surface from the late 13th to the late 15th centuries. In 1784/5 South Hooe mine was recorded as producing 6500oz silver. The richest lodes lay south of the mine under the Tamar. Although South Hooe Mine was far more prosperous than its northern namesake, both were operating by 1809 and both purchased by the Tamar Silver Lead Co. in 1835, for which Percival Norton Johnson was manager, engineer, innovator and local philanthropist. The mine's acquisition was to ensure ore production until 1876, producing 326,300 oz of silver and over 9000 tons of lead, from its maximum depth of 260 fathoms (466 m). In addition, between 1879 and 1882 nearly 800 tons of fluorspar was produced. This mine is one of the few which had an underground steam engine sited at the bottom of a long 25° incline (115 fathoms down), to aid winding of the ore up the 1680 ft long incline. By 1842 there were seven steam engines (three pumping and three steam whims). A year later a 14" engine had been erected to haul the ore up the incline. By 1852 over 200 people were employed at the mine, and nearly £44,000 had been paid out in dividends. In 1861 the mine was described as the deepest lead mine in England. The Tamar Lead Smelting Works at Weir Quay was built by the mine (as a separate company), to smelt the (and other mine's) ore. Operations finally ceased in 1885.

The conservation works focussed on the extant remains of the pumping engine house (its shaft being closed to surface), the winding engine boiler house chimney and associated incline shaft winder building. The remains of the pumping engine boiler house, the winding engine house and boiler house have all gone.

4 Results

Archaeological recording methodology is detailed in Section 2.3 above and Fig 2 shows the sites on plan:

- Knevvitt Consulting Engineers were awarded both the Stage 1 structural assessment and Stage 2 preparation of tendering documents, site specifications, site supervision and financial administration.
- A bat/bird assessment and dawn emergence survey was tendered from a project brief produced by HE Projects (Colin Buck). Spaldings Assoc. of Truro was successful in winning the tender, and the recommendations incorporated into the site specifications prepared by the structural engineer (Andrew White of Knevvitts).
- Site clearance of some trees were undertaken in January 2010, by a specialist company employed by the site owner (Trish Dugmore). Any small trees that had been (or were likely to in the near future), affecting the building were cut down and the stumps treated with 'Round-up'.
- The Level 3 measured building survey (elevations and plans) was produced by Team Surveys of St Austell in November 2009. A set of tender and then working survey drawings detailing the nature and extent of the works were produced in January 2010 by the structural engineer (agreed with the historic buildings consultant at an early stage), accompanied the Contract documents, works specification and Bills of Quantity. A stage of detailed specification consultation with Devon County WHS (Bill Horner/Steph Knight), resulted in agreement of the project spec which will be included in the project archive. 'As-built' surveys are reproduced as part of this report for most elevations of each building conserved (external and internal), most of which are reproduced in this report.

- Specialist building conservation contractors were tendered for the high priority consolidation works to the main South Hooe Mine buildings, in January 2010. Darrock and Brown of Bodmin won the tender for these works.
- For the buildings consolidation part of the works, the historic buildings consultant/site archaeologist (Colin Buck) decided at an early stage to hold weekly progress meetings on site with the site owner (Trish Dugmore), the Structural Engineer (Andrew White) and NE (Simon Tame/Joy Ede – when appropriate), and the site manager for the contractors (Arthur Britton). These site meetings were also held throughout the scheme to view and comment on the works that had been carried out and to iron out any problems that might occur during future works. The structural engineer produced written instructions when necessary to the site contractors, and the site archaeologist/historic buildings consultant produced project update emails when appropriate, following the site review meetings. When deviations from the agreed project specification occurred (where there might be budgetary implications), these were separately costed by the contractors and agreement obtained for the extra works from NE (Simon Tame). It should be noted that although the contract period was virtually doubled in length from its original estimate, the overall cost was less than had been anticipated.
- The archaeological watching brief record and historic building consolidation consultancy for all of the building conservation and safety works at South Hooe Mine took place from 19th April 2010 to 25th June 2010 (excluding an additional site visit to be held in late June 2010 for the final site retention meeting), although much time had been spent prior to groundworks starting in an advisory/consultancy role to ensure the detailed project specifications followed English Heritage guidance for the conservation of historic buildings. The Pre-Contract meeting was held on 17th March 2010 at South Hooe Mine.

This section of the report details and selectively illustrates the archaeological information uncovered during the watching brief stage for building consolidation or other groundworks. See Figure 2 for the general location plan of sites within the project area, and Figs 4, 5, 8, 11, 14, 17 - 19, and 22 for site specific elevations and plans showing the extent of building conservation works. Figure 3 is a summary table of remediation works. Watching brief details were sketch surveyed and photos taken at all sites before, during and after works had taken place.

Inventory of archaeological mitigation recording

Note:

- The Devon Historic Environment Record Number (DHER) for the site is given below.
- The archaeological assessment report (Buck, September 2009), gives the historical and functional background for each of the sites, a descriptive survey and the likely impact of the proposed works on each site. Site numbers given below refer to the assessment report.
- The recommendations given in the assessment report for each site are reproduced below (and site impact statement if relevant). These precede the 2010 recording results.

Main building consolidation works (2010)

4.1 Pumping Engine House

District: West Devon

Civil Parish: Bere Alston

Site name: Pumping Engine House

DHER: 5441

NGR: SX 42468 65592

Site No: 1

Recommendations (Buck 2009, 31):

The engine house will need to be fully scaffolded to permit the lime mortar repointing of the sides and re-bedding of the tops of the walls. A small amount of masonry stitching will be necessary and removal of small sections of overhanging masonry at the rear of the wing walls. Timber lintels will need to be replaced where they have rotted, or have already gone, and where appropriate, localised collapses of masonry above the missing lintels, replaced.

Removal of fallen masonry rubble from the interior of the engine house, and excavation for the possible buried remnants of the cylinder, would aid public interpretation of the building. Soft and crumbling mortar will be removed (to a maximum depth of 40mm), from the masonry walls following a detailed site assessment of the feature by the site contractors. Following approval of an appropriate mix of lime mortar and an aggregate to match the existing, the site contractors will repair any defective stone or mortar. The style and extent of re-pointing (slightly recessed from the masonry face), will mimic that of the original (this will be decided when the test mortar panel is agreed), by the site engineer and Historic Buildings Consultant. Any loose crumbly mortar (old and new) that has accumulated on the ground as a result of the works will be carefully cleared from the site.

Future management recommendations relate to reducing any increase of vegetation growing out of the side walls (particularly brambles, cotoneaster and possibly ivy – if it cannot be managed). Removal of earth/grass/brambles etc on top of the bob wall and wing walls should be undertaken once every five years – again to reduce cumulative build up. Patch repointing of the weather side (west) of the building and possibly the wall tops may need to be undertaken after a decade. If these recommendations are not acted upon brambles/cotoneaster etc will grow out of the walls, making the building unsightly and ultimately causing structural damage due to excessive root growth. Water ingress through deterioration of the wall capping (due to neglect) would also cause structural deterioration at a lower level.

Site impact (Buck 2009, 32):

The overall impact of the conservation scheme on the fabric of the building remnants will be to remove old and crumbling mortar and replace with new lime mortar. This may well entail repointing some surfaces of the building to retain structural strength. It is the intention of the project to make the building structurally safe by replacing rotted timber lintels. It should be noted that there may be the necessity for a physical survey of the walls to assess whether there are any roosting bats, prior to contractors starting work.

Clearance of rubble, vegetation and earth inside the walls of the former engine house will reveal the lower section of the north wall, and possibly the buried steam cylinder bedstones, that when conserved will enable a far better interpretation of the site. The impact on the site for this is highly beneficial.

Description of works (2010):

The Pumping Engine House was cleared of obscuring ivy, brambles etc (as can be seen on the front left cover photograph), early in 2009, by a local contractor. This enabled the building to be viewed and assessed for its structural competency and viability for a NE funded building conservation project. Following the archaeological and structural assessments in late summer 2009, trees that were dangerously overhanging the engine house and other structures (Sites 12 and 13), were carefully cut down in early 2010.

However, following removal of the dense ivy, it was apparent that the northern end of the upper east wing wall and to less of an extent, the west wing wall, were both unsafe, as a section of masonry from each wall could be seen to be falling away (see Buck 2009, Fig 12). It was therefore decided in the pre-contract meeting (17/3/2010), that the scaffolding would initially be erected around the outside of the building. This would allow further and more detailed site inspection by the buildings consultant, structural engineer and contractor. A decision was taken that the unsafe section of masonry would be removed from each wing wall before any further works were allowed to proceed inside the building. In addition, scaffolding could not be erected internally until the floor was cleared of earth and stone etc (to an agreed floor level). Thus, the building conservation works were undertaken in two stages, firstly the works to the exterior of the building (wall capping/wall repointing where necessary/replacement of structural items), and secondly (following clearance of earth/rubble etc), conservation works to the inside of the building.

The original lime mortar was compared to an aggregate test panel, resulting at a site meeting on 21st April 2010 in an agreement to use three parts of CLS 32 aggregate, and two parts of CLS 26 with a Natural Hydraulic lime strength of 5.0 for both the upper wall capping and repointing. Both were mixed in the ratio of 1 : 2.5 (Lime : Aggregate).

To summarise, the masonry over the top of the rotted timber lintels was carefully replaced with fallen stone from the building after the new sections of tanalised Douglas Fir had been inserted to mimic the original timber specification. The top of the wing walls and bob wall were ‘capped’ and repointed. The walls were only repointed where there was a structural need to do so (mainly in the upper parts of all walls), in fact, the dense ivy had mainly grown against the walls, protecting the masonry and lime mortar pointing. It was evident that there were areas of original internal plastering still visible – a rarity amongst buildings of this age.

Clearance of the earth/stone rubble build up against (and over) the north (rear) wall, down to what was taken as the original internal ground level (the building would have had a timber tongue and grooved floor on joists), revealed the sides of the cylinder door and just outside this opening, the vertical concrete block side of the landowner’s sewage septic tank. In addition, on the west side of the northern internal end of the engine house another doorway was found (with original plastered walls) – which was completely unexpected (see Fig 11). The existing ground level is now 3.0m higher on the west and north sides of the engine house, than the original engine house ground floor level. This 3.0m high build up of ground appears to be mainly rubble, earth and mortar from what would have been the collapsed rear gable wall of the engine house and parts of each of the wing walls. After a variety of options, it was decided to use old railway sleepers laid horizontally which spanned both sides of each of the two openings. This solution was deemed to be cost effective, structurally sound, and to retain the character of the building (see Fig 16).

Figs 5, 8, 11, and 14 are ‘as-built’ internal and external measured survey elevations of the engine house. Each drawing has detailed annotations relating to the works that have been undertaken on each wall. Relevant photographs of each elevation are also reproduced in the text following each survey plan.

Rev	Date	Description	By
B	12.07.10	As built	AW
A	11.05.10	Information about the North end of the building obtained 5.05.10 added and ref to Dig B6880/10 added	AW

NOTES
 This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys
 The drawing does not form part of a Schedule of Works.
 All work to be carried out under the direction of the Archaeologist

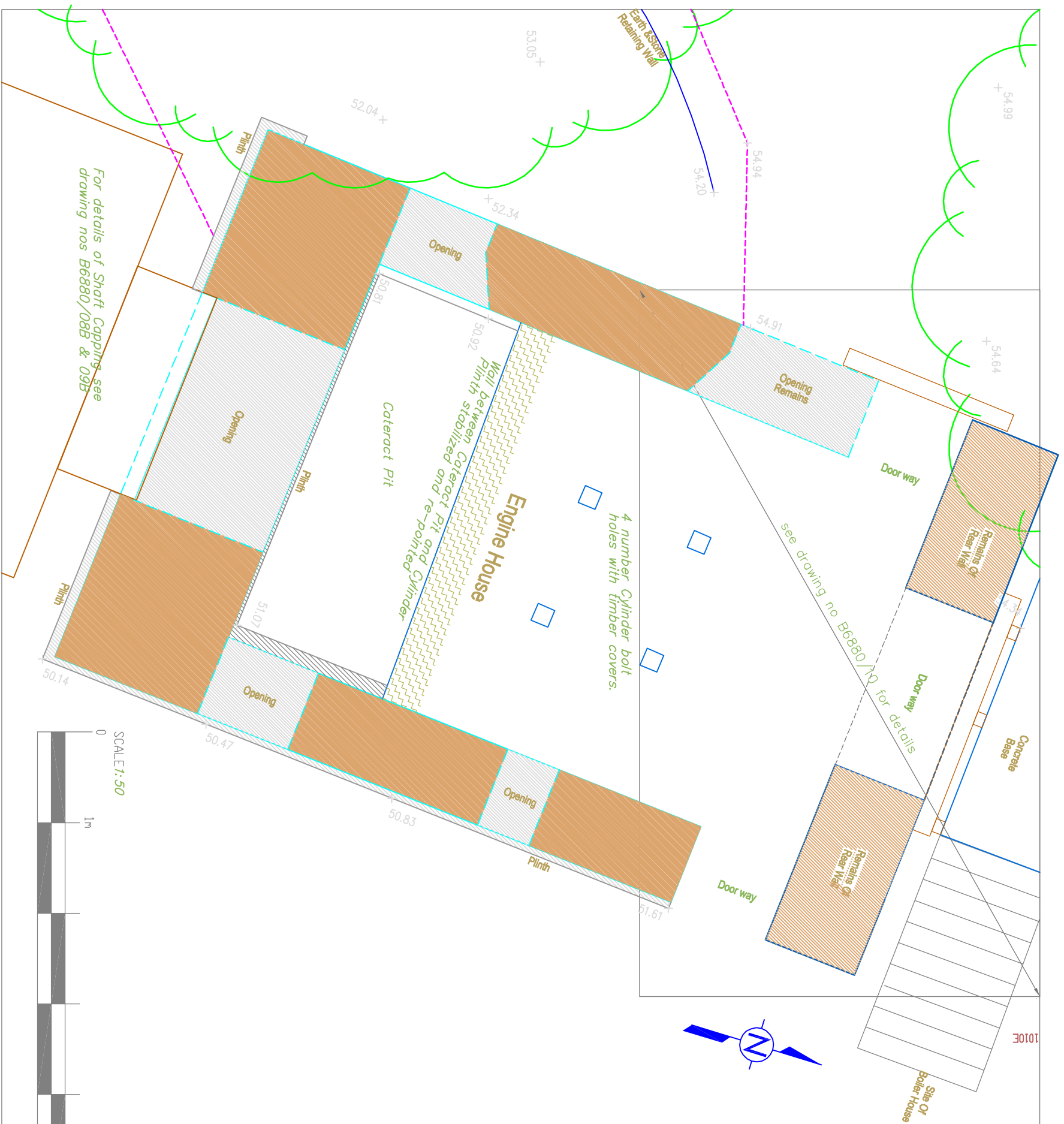
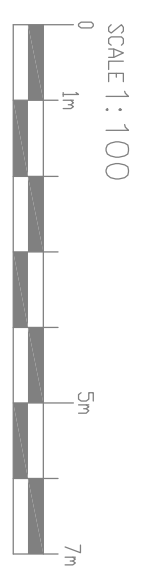
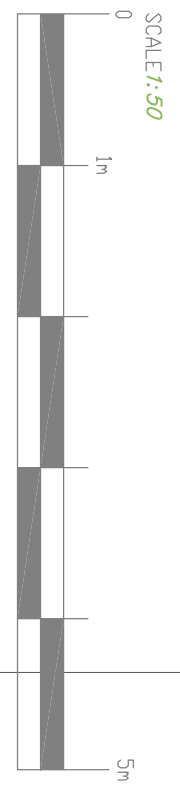


FIG 4 (Site no. 1)

For details of Shaft Capping see drawing nos B6880/08B & 09B



**South Hooe Mine
 Bere Alston, Devon
 Pumping Engine House
 Plan**



Drawing Number **B6880/03B**
 DRAWING STATUS ● As Built

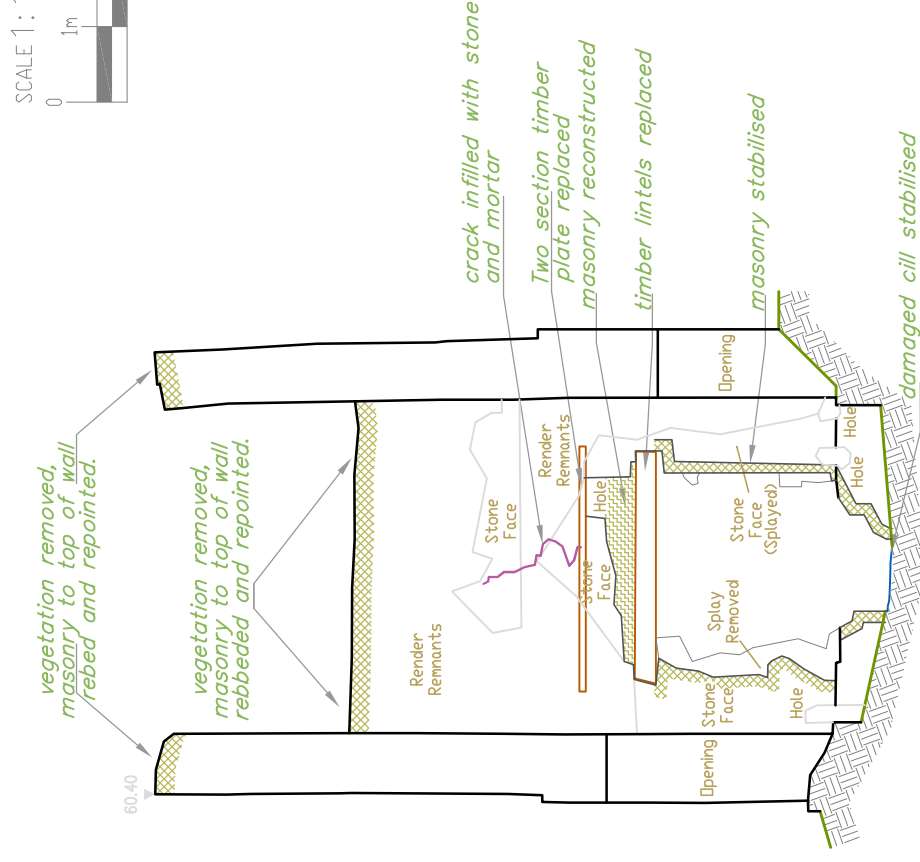
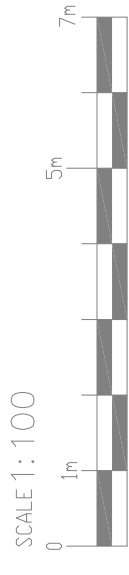
Rev	Date	Description	By
A	12.07.10	As built	AW

NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys

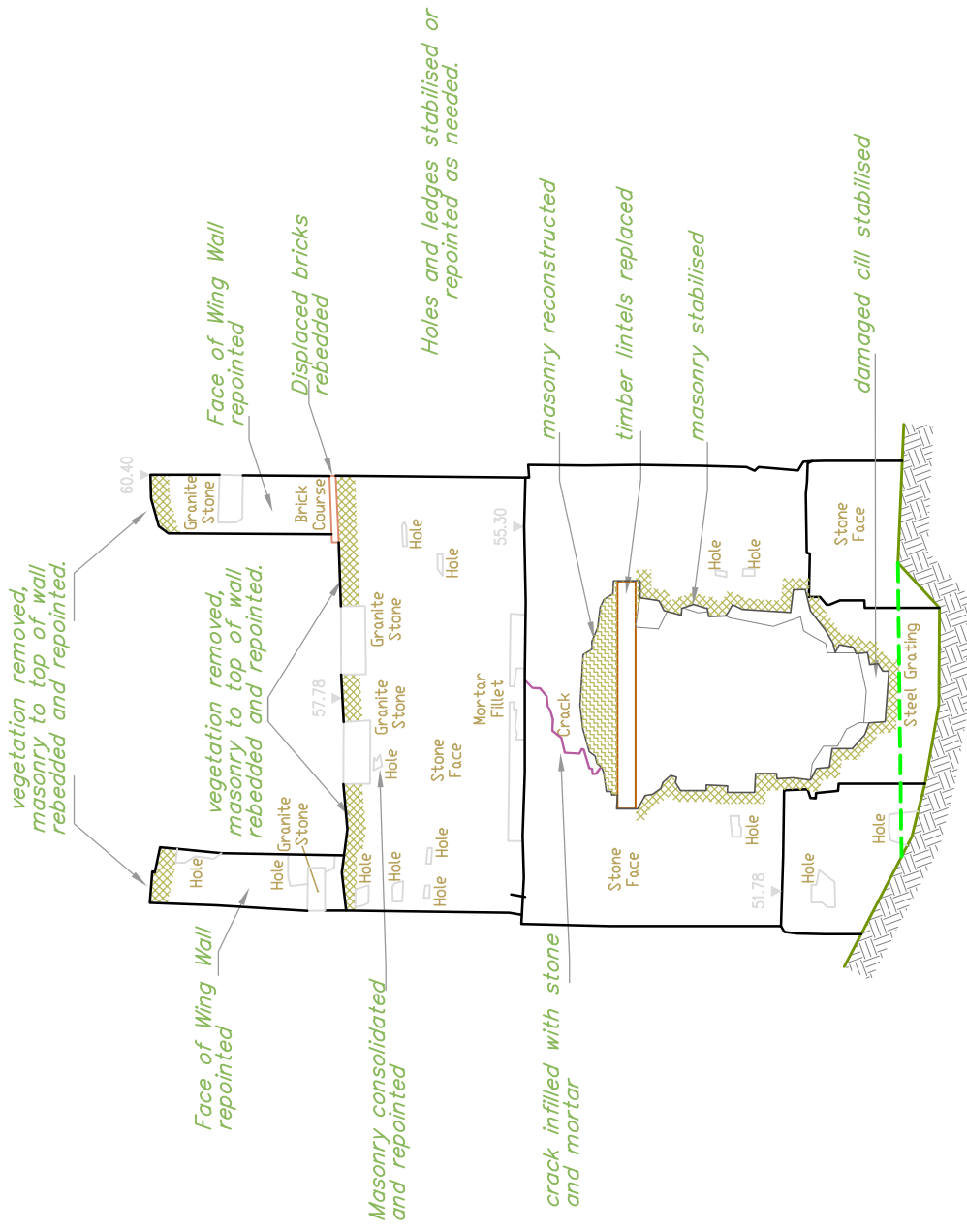
The drawing does not form part of a Schedule of Works.

All work to be carried out under the direction of the Archaeologist



Datum 48.00m

ENGINE HOUSE
SOUTH ELEVATION (INTERNAL)
3m² OF ELEVATION REPOINTED



Datum 48.00m

ENGINE HOUSE
SOUTH ELEVATION (EXTERNAL)
3m² OF ELEVATION REPOINTED

South Hooe Mine
Bere Alston, Devon
Pumping Engine House
South Elevations



Drawing Number **B6880/04A**

DRAWING STATUS ● As Built

FIG 5 (Site no. 1)

*Fig 6 South side view of the Pumping Engine House before works:
(Site 1) C. Buck 2010© CC HE*



*Fig 7 South side view of the
pumping Engine
House after works:
(Site 1) C. Buck
2010© CC HE*

Rev	Date	Description	By
A	12.07.10	As built	AW

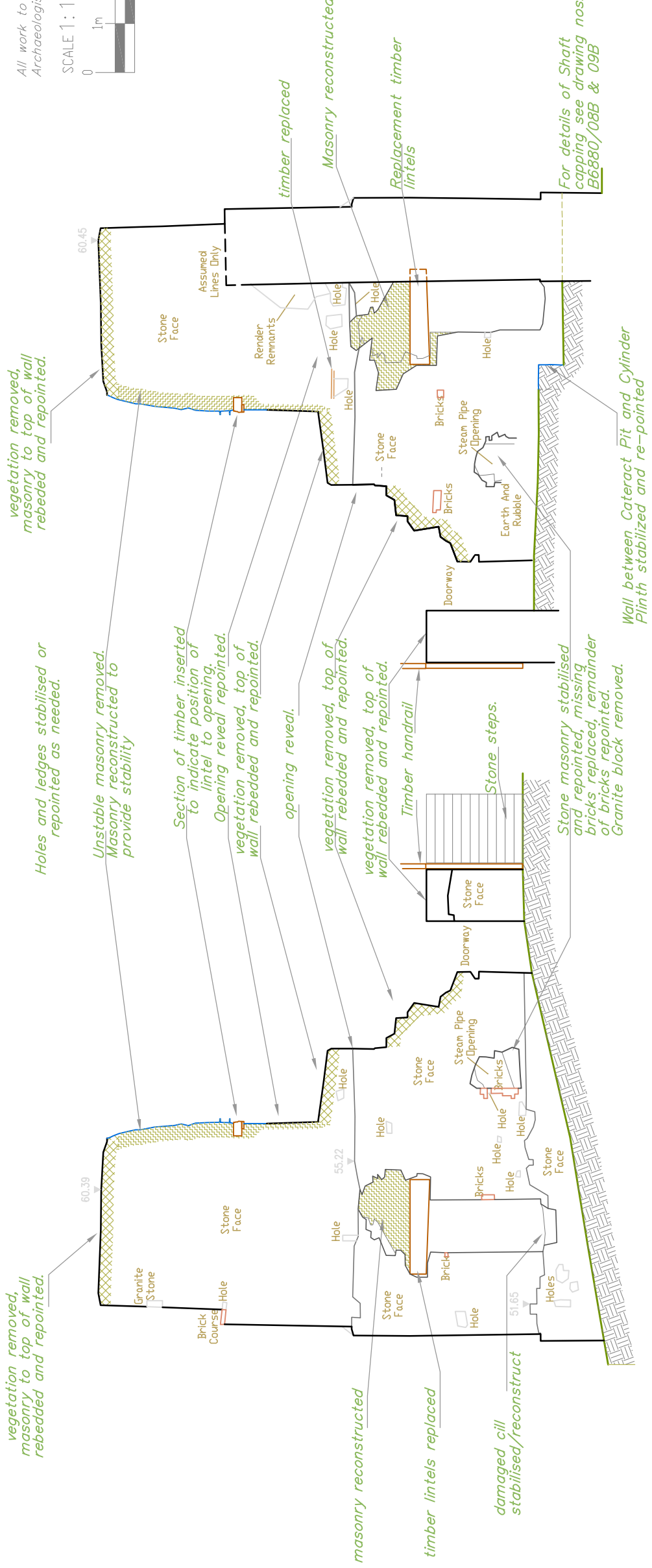
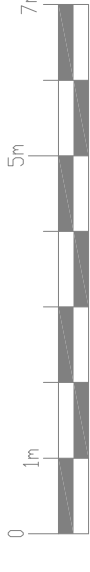
NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys

The drawing does not form part of a Schedule of Works.

All work to be carried out under the direction of the Archaeologist

SCALE 1:100



Datum 48.00m

**ENGINE HOUSE
EAST ELEVATION (EXTERNAL)**
10m² OF ELEVATION REPOINTED

Datum 48.00m

**ENGINE HOUSE
EAST ELEVATION (INTERNAL)**
12m² OF ELEVATION REPOINTED

South Hooe Mine
Bere Alston, Devon
Pumping Engine House
East Elevations



Drawing Number **B6880/05A**

DRAWING STATUS ● As Built

FIG 8 (Site no. 1)



Fig 9 East side view of the Pumping Engine House before works C Buck 2010© CC HE



Fig 10 East side view of the Pumping Engine House after works C Buck 2010© CC HE

Rev	Date	Description	By
A	12.07.10	As built	AW

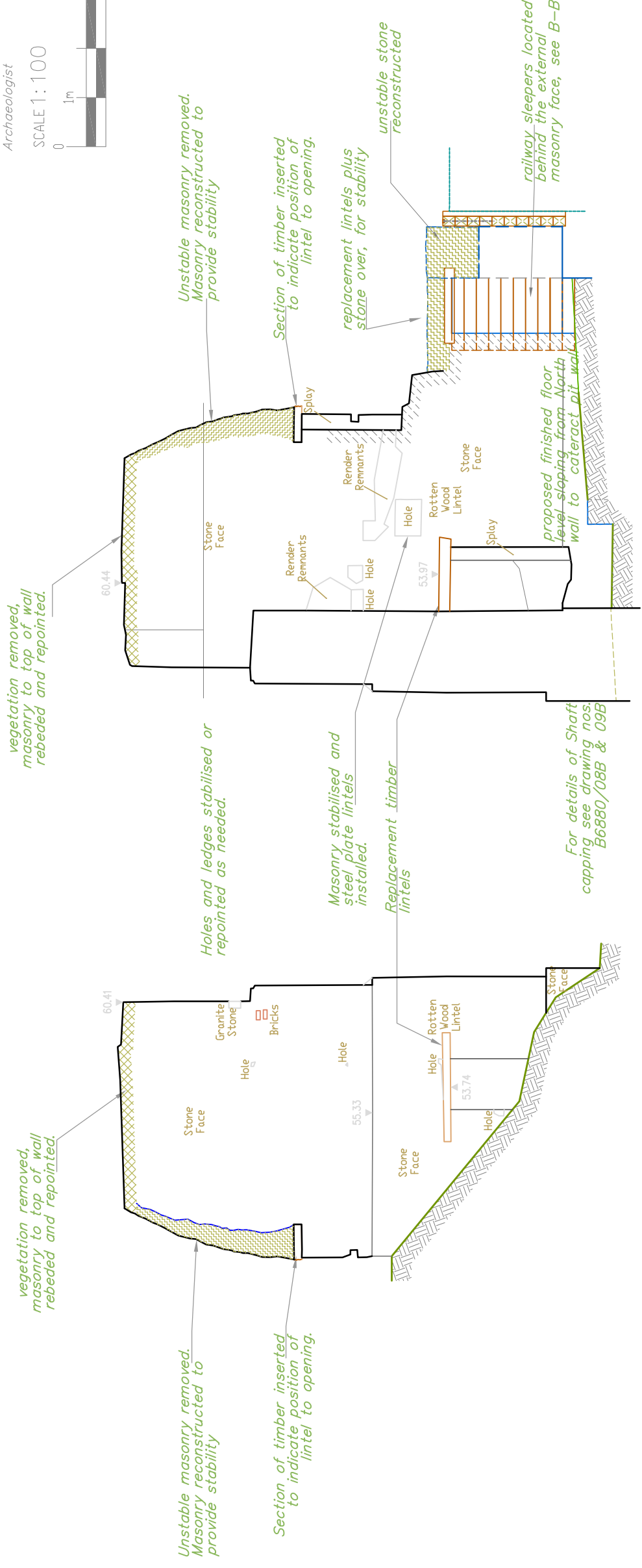
NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys

The drawing does not form part of a Schedule of Works.

All work to be carried out under the direction of the Archaeologist

SCALE 1:100



Datum 48.00m

**ENGINE HOUSE
WEST ELEVATION (EXTERNAL)**
11m² OF ELEVATION REPOINTED

Datum 48.00m

**ENGINE HOUSE
WEST ELEVATION (INTERNAL)**
12m² OF ELEVATION REPOINTED

South Hooe Mine
Bere Alston, Devon
Pumping Engine House
West Elevations



Drawing Number **B6880/06A**

DRAWING STATUS ● As Built

FIG 11 (Site no. 1)

Fig 12 West (internal) view of the Pumping engine house before works (Site 1) C. Buck 2010© CCHE

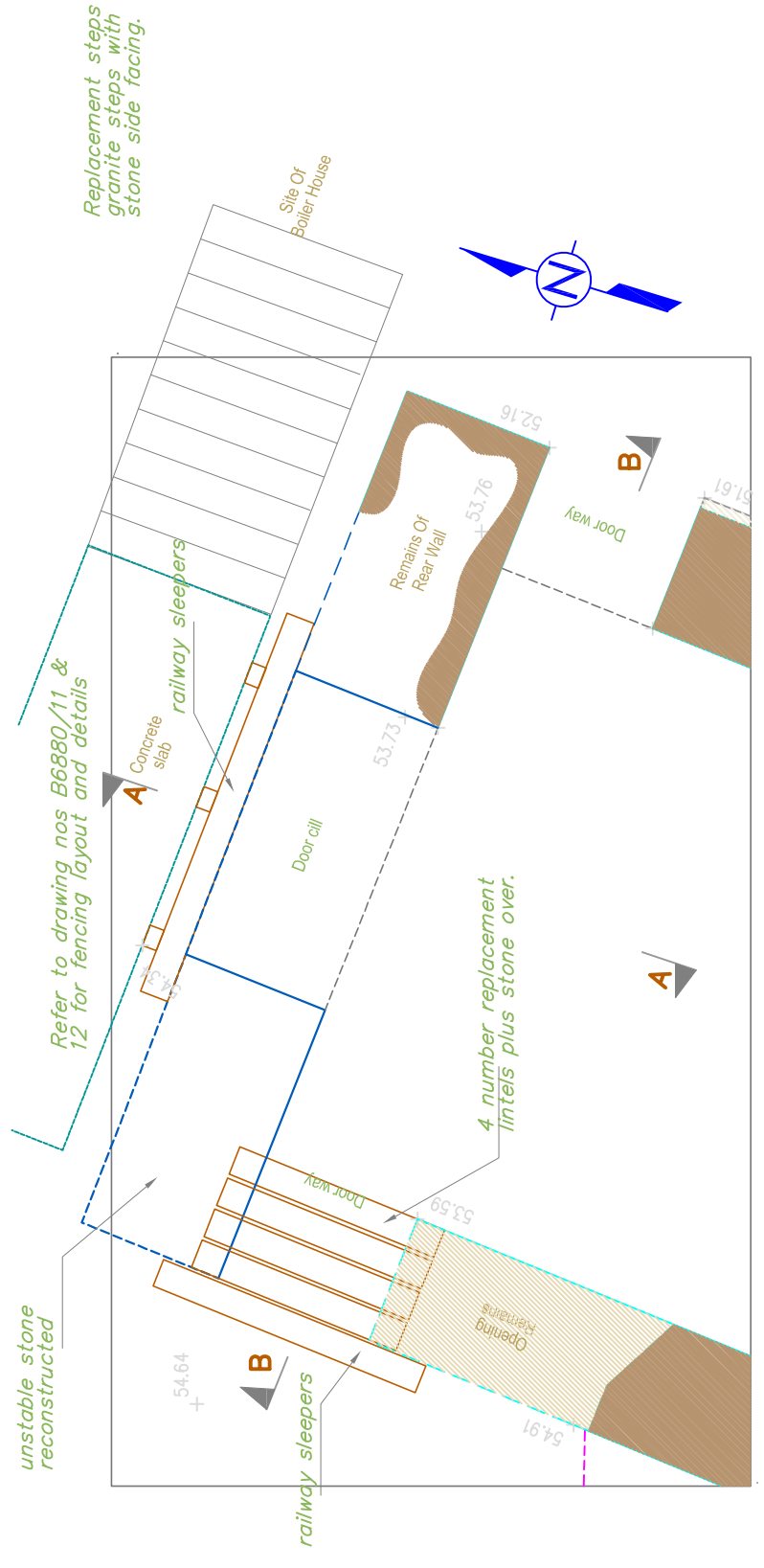


Fig 13 West (internal) view of the Pumping engine house after works (Site 1) C. Buck 2010© CCHE

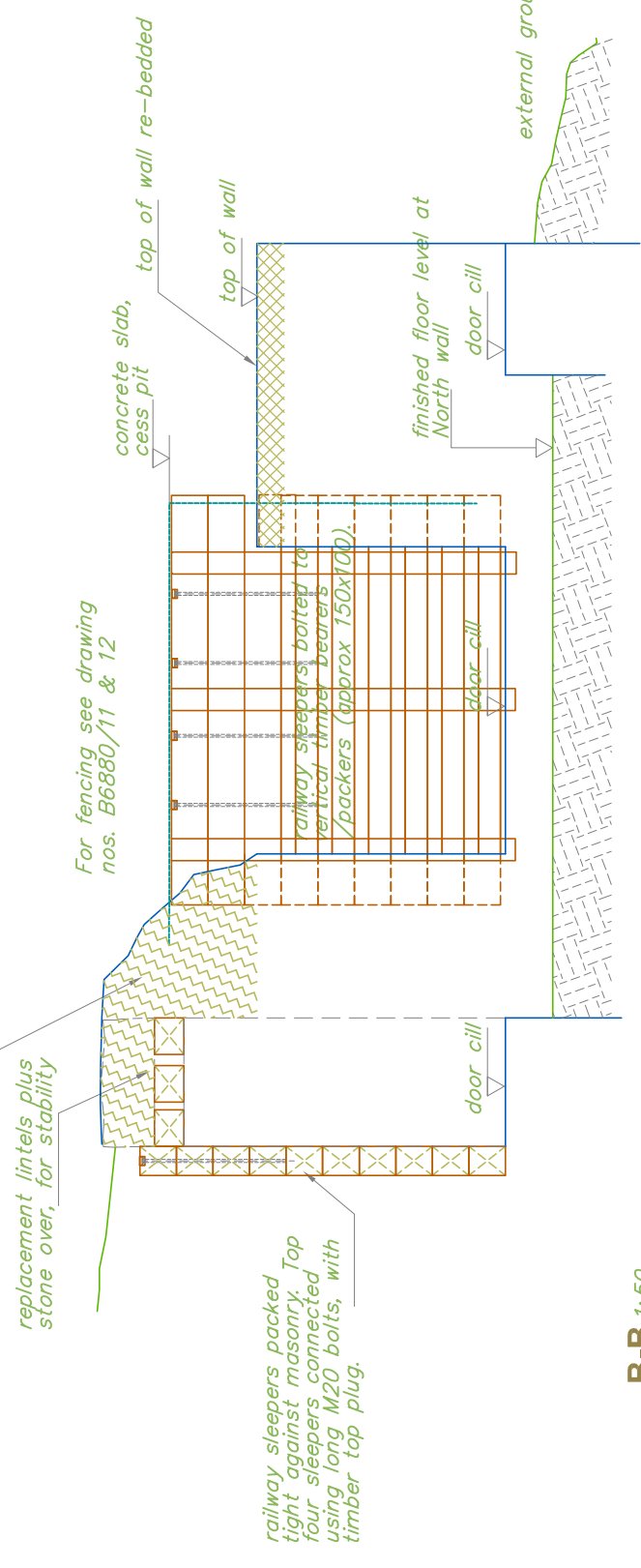
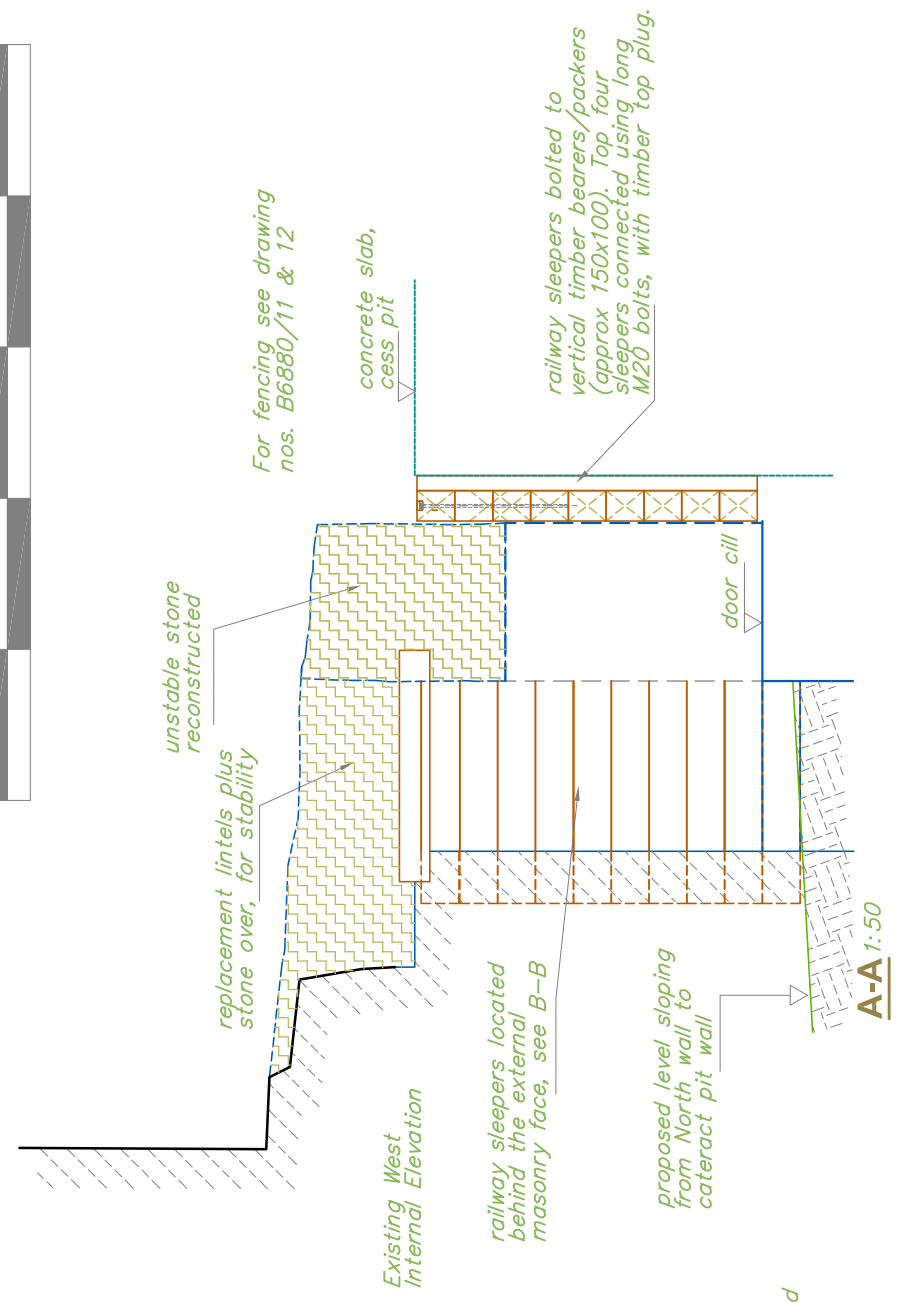
Rev	Date	Description	By
B	29.06.10	As built.	AW
A	28.05.10	Width of steps & length of concrete slab adjusted. Section B-B adjusted to suit revised fencing as agreed during the site visit on 27.05.10.	AW

NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys
 The drawing does not form part of a Schedule of Works.
 All work to be carried out under the direction of the Archaeologist



PART PLAN OF NORTH SECTION OF BUILDING 1:50



B-B 1:50

South Hooe Mine
Bere Alston, Devon
Pumping Engine House
North, Remedial Works



Drawing Number **B6880/10B**
 DRAWING STATUS ● As built

FIG 14 (Site no. 1)



Fig 15 North (internal) view of the Pumping Engine House before works C Buck 2010© CC HE



Fig 16 North (internal) view of the Pumping Engine House after works C Buck 2010© CC HE

From an ecological perspective, the bat survey had not confirmed the presence of bats originating from the engine house (rather adjacent trees etc). In addition, an endoscope survey of the exterior of the building had also failed to identify any bat roosts. Small openings were left in the masonry for bat/bird nests etc. However, when the internal scaffolding was erected (by 19/5/2010), it was soon discovered that a pair of young Tawny Owls were nesting inside one of the lintelled openings in the upper east wall. After consultation with the Devon Owl Trust, it appears the mother was roosting in nearby trees and feeding the owls during the night. The baby owls however, were nearing the time when they could fly, and within two weeks of discovery (using the scaffolding platforms for take off), had flown away.

Internally, the earth floor level had been left approximately at its original height. Unfortunately, there had been no sign of the (often granite) cylinder bedstone. This appears to have been removed long ago, as well as part of the front of the bedstone cataract wall. The ground level to this feature had not been reduced – which would allow easy access through the building via the bob wall plug opening and boiler house side doorway. The low visible cataract wall was partially rebuilt and the remainder repointed. The four cylinder tensioner bolt holes were located and timber caps placed in each, as an aid for public interpretation.

By early June 2010 all the major conservation works to the engine house bob wall had been completed. However, the excavation of the engine house internally had resulted in a 3.0m drop in ground level into the engine house, which (given occasional pre-arranged public access and the close proximity of a public right of way), was an obvious health and safety hazard. After discussion, a fencing specification of round profile timber post and rail was agreed which would span the northern end of the engine house and run out to the west side of the building. A small gate was also added for the landowner's use. In addition, the landowner had used some old timber steps to go around the north side of the engine house to go down to the garden on the east side. It was not thought that these steps were safe for public access, therefore it was agreed that more permanent steps (with a fence hand rail) would be built to replace the old timber steps. Wide second hand granite steps were purchased and constructed with a masonry side wall (see Figs 10 and 17).

On June 13th, a public open day was advertised for an event to view the finished building and to hold a variety of musical and drama/play events for Millfield School. The school utilised the engine house and shaft stage (Site 5) as a set to perform a play which was also filmed for GCSE drama exams. The event was very successful, and it is the hope of the landowner that the engine house and site could be used again for similar events, which would publicise both the history of the mine and of the Cornwall and West Devon World Heritage Site.

4.2 Boiler House

NGR: SX 42476 65596

Site No: 2

Recommendations (Buck 2009, 33):

The remaining wall remnants should be repaired and repointed to achieve structural competency where necessary, and trees on the tops of the rock face removed for long term safety.

Future management recommendations relate to reducing any increase of vegetation growing out of the remaining small section of side wall. Removal of earth/grass/brambles etc on top of the small wall segment should be undertaken once every five years – again to reduce cumulative build up. If these recommendations are not acted upon vegetation may grow out of the wall, making the building unsightly and ultimately causing structural damage due to excessive root

growth. Water ingress through deterioration of the wall capping (due to neglect) would also cause structural deterioration at a lower level.

Site impact (Buck 2009, 33)

The overall impact of the conservation scheme on the fabric of the building remnants will be to remove old and crumbling mortar and replace with new lime mortar. Removal of trees that appear to be precarious will have a short term impact. The impact on the site for this is highly beneficial.

Description of works (2010)

The boiler house wall remnant is only visible as a small section of vertical masonry remnant on the west side of the rock cut which was excavated to site the boiler house. Overhanging trees had been removed before the work, which simply entailed rebedding the top surface masonry and repairing some sections of the wall (only 2.4m high and 2.1 m long), with fallen stone and patch repointing where necessary.

During the contract period, a large timber mono-pitched roofed timber structure was built at the northern end of the boiler house site – infilling the rock cut space formerly occupied by the northern end of the boiler house. It is approximately 2.5m wide, 2.5m high and approximately 7.0m long, with four posts to the front and rear supporting the roof. It is designed as a shelter and possible stage for educational/drama productions. It has been tastefully designed and constructed.

4.3 Pumping engine mine shaft

NGR: SX 42466 65586

Site No: 5

Recommendations (Buck 2009, 35):

The mine and shaft site is likely to be viewed by members of the public who visit the site, as part of limited pre-arranged guided tours by Trish Dugmore, the landowner. The specification, design and form of any shaft surface treatment has not yet been agreed with the structural engineer, landowner and project funders (NE). It is recommended that the landowner is aware of the Health and Safety implications of an un-capped mine shaft and the possible instability of the shaft surface choke/blockage, by the commissioning of a ‘desk based’ geotechnical investigation of the project area, in particular the two mine shafts; this site and Incline Shaft (Site 14).

There is a high likelihood that there are sub-surface masonry remains of the balance bob box. It is likely to be located on the east side of the shaft. A ‘Balance bob box’ is a masonry structure which housed a 10 ton weight within a timber box frame. This is connected to the main shaft pump rod (in order to counteract the weight of the pump rod i.e. tree trunks bolted together with a pump at the bottom).

Site impact (Buck 2009, 35)

Given that the landowner has expressed a preference for the shaft not to be excavated as part of a shaft capping scheme, it is hoped that the main impact of the works to this site is perhaps only a visual one, namely a shaft fence or housing. The specification will be decided at a later date, when the impacts will be agreed and mitigated with DCC (Steph Knight).

Rev	Date	Description	By
B	29.06.10	As Built	AW
A	28.05.10	Posts PH5 and PH7 omitted, during site meeting on 27.5.10. Posts PH11 to PH13, plus rails added. Width of steps & length of concrete slab adjusted.	AW

NOTES

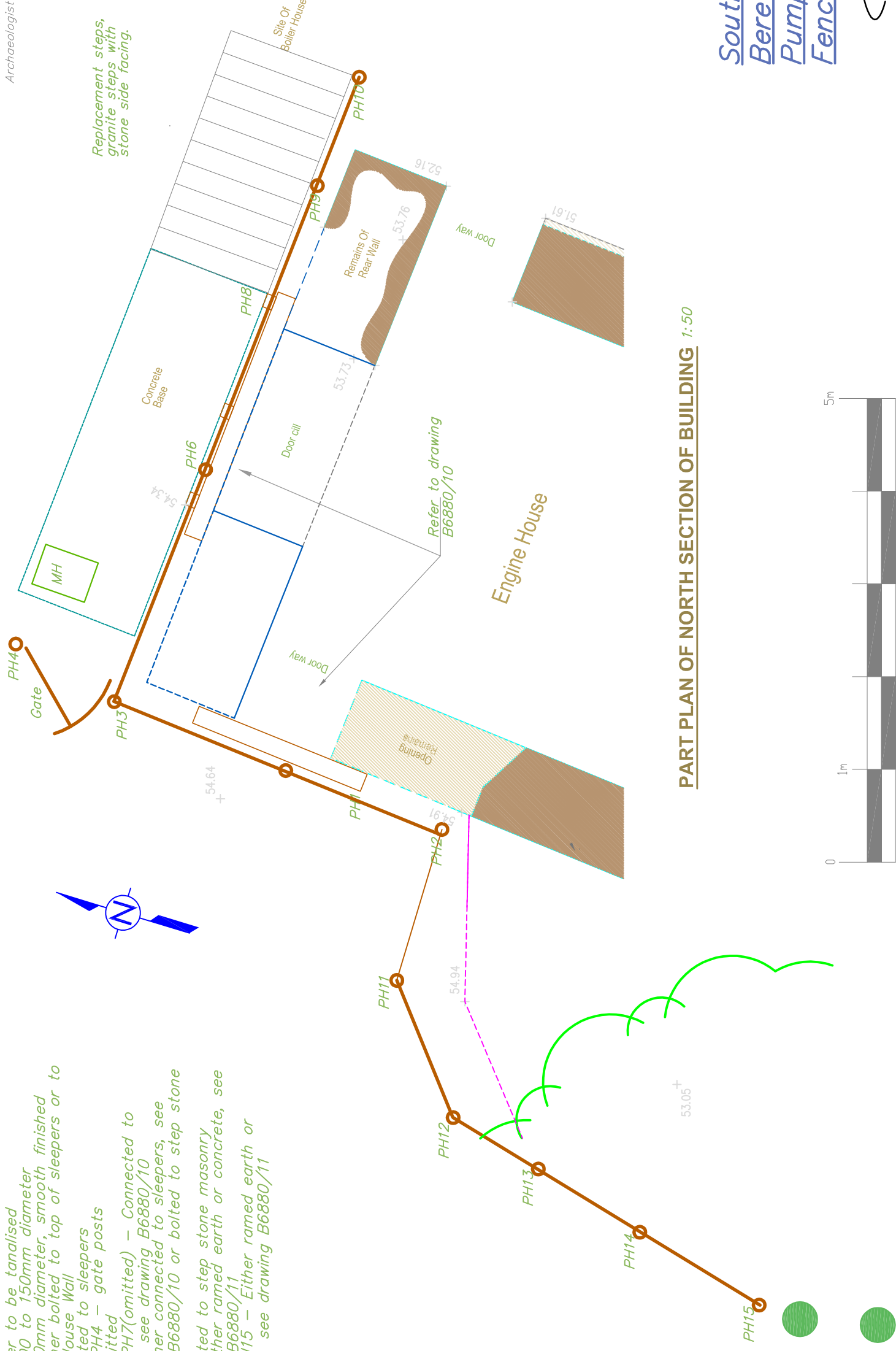
This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys

The drawing does not form part of a Schedule of Works.

All work to be carried out under the direction of the Archaeologist

Fence Specification
Refer to drawing B6880/11 for fencing and gate details.
All connections to masonry to be 12mm diameter chemical fixings

- All timber to be tanalised
- Posts 100 to 150mm diameter
- Rails 100mm diameter, smooth finished
- PH1-Either bolted to top of sleepers or to Engine House Wall
- PH2-Bolted to sleepers
- PH3 & PH4 - gate posts
- PH5-omitted
- PH6 & PH7(omitted) - Connected to sleepers, see drawing B6880/10
- PH8-Either connected to sleepers, see drawing B6880/10 or bolted to step stone masonry
- PH9-Bolted to step stone masonry
- PH10-Either ramed earth or concrete, see drawing B6880/11
- PH11-PH15 - Either ramed earth or concrete, see drawing B6880/11



PART PLAN OF NORTH SECTION OF BUILDING 1:50

**South Hooe Mine
Bere Alston, Devon
Pumping Engine House
Fence Layout**



Drawing Number **B6880/12B**

DRAWING STATUS ● As built

FIG 17 (Site no. 1)

Rev	Date	Description	By
B	12.07.10	As built	AW
A	05.07.10	Assumed revised construction.	AW

NOTES

All work to be carried out under the direction of the Archaeologist

1. STEEL

All structural steelwork to comply with the 'National Steelwork Specification for Building Construction', latest edition.

All steelwork design, details, specification and workmanship to be in accordance with BS5950. Steel to be grade 275, to BS4360, BS4:Part 1 or BS4848:Part 2, as appropriate. Bolts to be grade 4.6 in accordance with BS3692 and BS4190. Welds to be in accordance with BS5153 or BS4570 as appropriate.

The Contractor to be wholly responsible for the accurate setting out, fabrication, positioning and temporary stability (bracing to be designed and installed by the Contractor:

CORROSION PROTECTION – taken from Corus information:

External steel – High risk

Shop Applied: Blast clean to minimum SA3 to BS7079:Part A1.

140 micron DFT Hot dip galvanize to EN ISO 1461

One coat 50 micron DFT zinc phosphate epoxy sealer

One coat 100 micron DFT high build epoxy MIO

SITE APPLIED: One coat 60 micron DFT recoatable polyurethane finish

All corrosion protection should be compatible.

Any damaged areas are to be fully repaired.

2. TIMBER

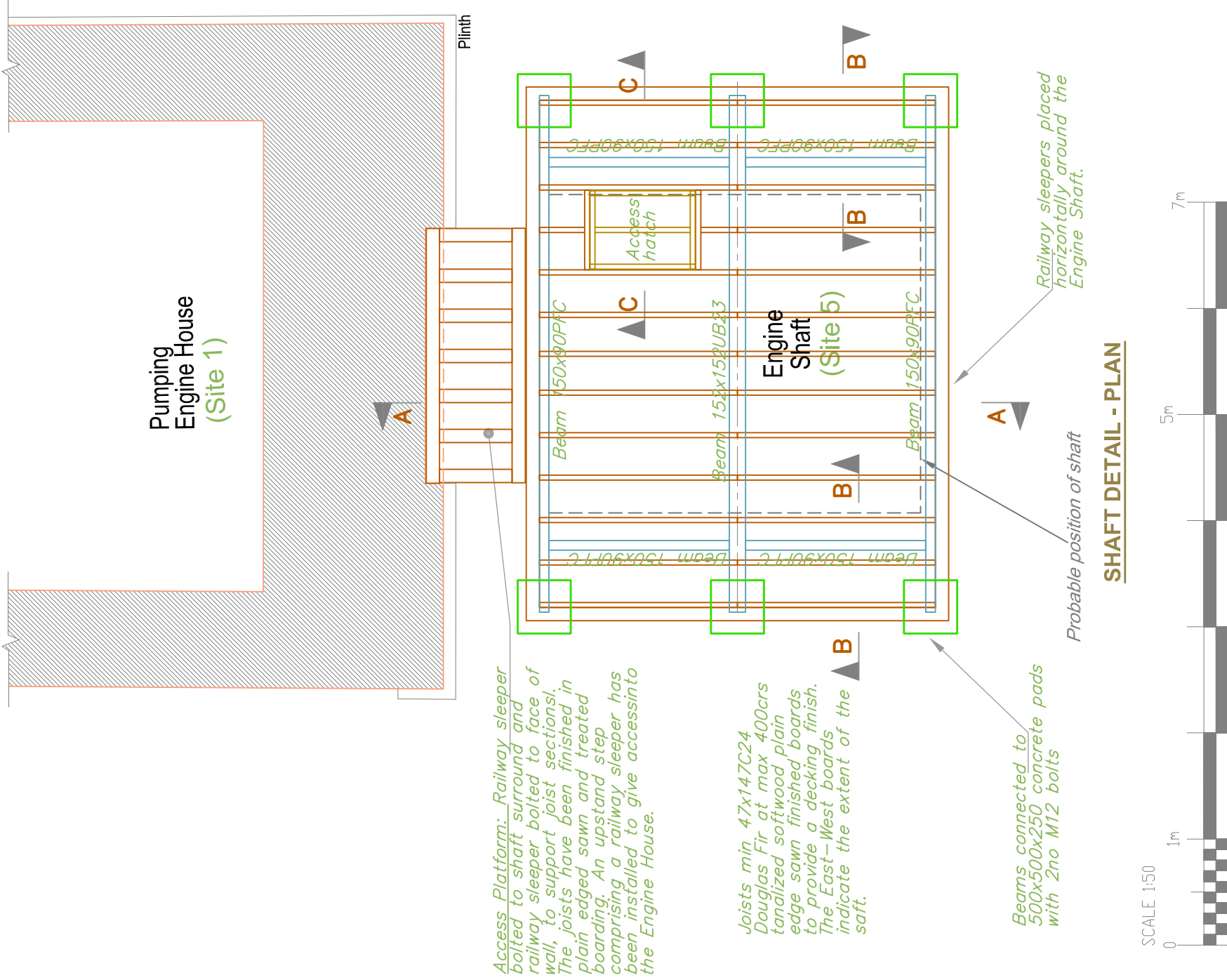
All timber and workmanship to comply with BS5268.

Timber to be minimum Douglas Fir C24 grade as specified. All timber connectors to be pre-galvanized and fixed in accordance with the manufacturer's specification.

3. FOUNDATIONS

To bear on to firm dry undisturbed ground having a minimum bearing capacity of 50kN/m2, minimum depth below proposed or existing ground level 450mm.

Excavations to be undertaken under the direction of the Archaeological Consultant.



**South Hooe Mine
Bere Alston, Devon
Platform Over Pumping
Engine Shaft – Layout**



Drawing Number **B6880/08B**

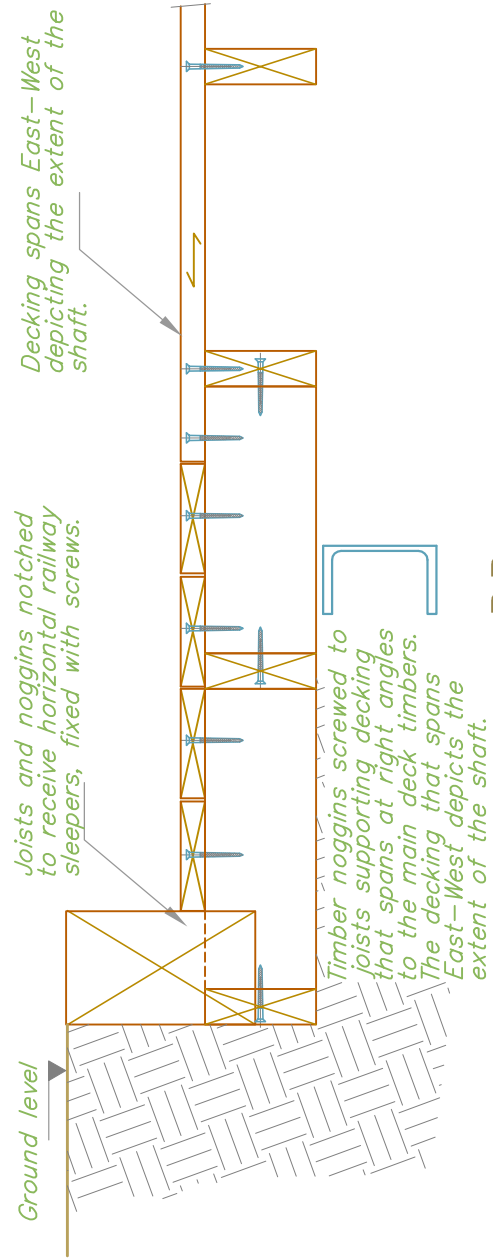
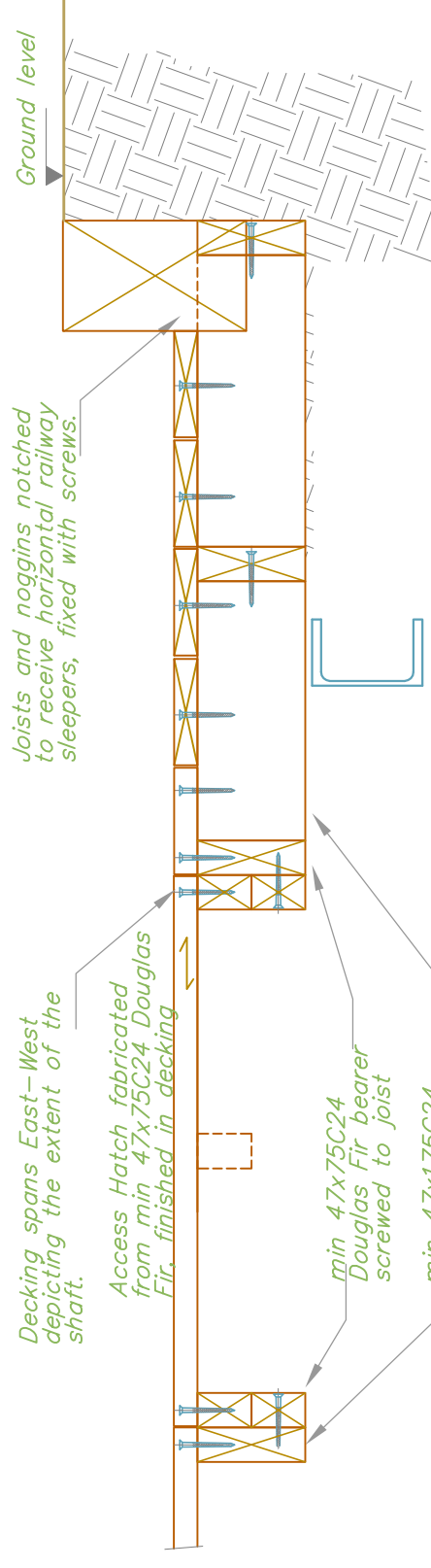
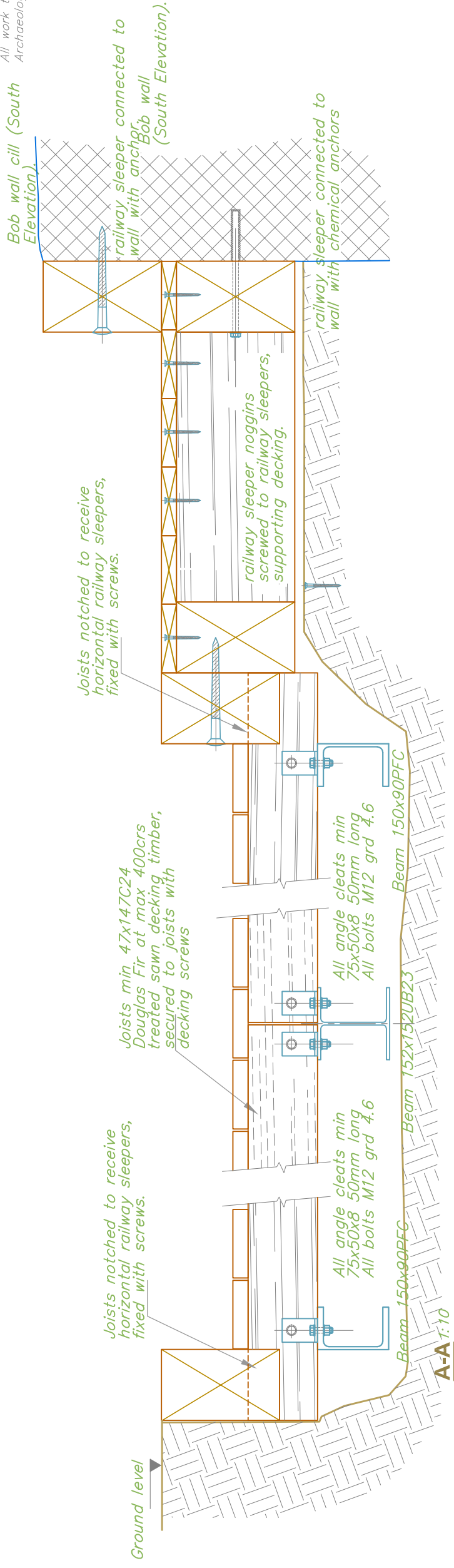
DRAWING STATUS **As Built**

FIG 18 (Site no.5)

Rev	Date	Description	By
B	12.07.10	As built	AW
A	05.07.10	Assumed revised construction.	AW

NOTES

All work to be carried out under the direction of the Archaeologist



**South Hooe Mine
Bere Alston, Devon
Platform Over Pumping
Engine Shaft – Details**



Drawing Number **B6880/09B**

DRAWING STATUS ● As Built

FIG 19 (Site no.5)



Fig 20 View of the Pumping Engine Shaft before works C Buck 2010© CC HE



Fig 21 View of the Pumping Engine Shaft after works C Buck 2010© CC HE

Description of works (2010)

Following receipt of the 'desk based' geotechnical mining investigation of the project area, and the likely use of the site for educational site visits, it was decided by the landowner and all consultants that an appropriate shaft capping scheme was necessary. However, this could not be an expensive permanent scheme which would necessitate a high degree of excavation and loss of archaeological features. A compromise was therefore agreed (with full NE funding), to have a design that would be located at a shallow depth and whose structure would span over the interpolated shaft's sides in case the shaft cap failed. The design (shown in detail in Figs 18 and 19), can be summarised as consisting of a box frame of connecting galvanised RSJ's founded on six concrete pads, at a shallow depth just below ground level. A timber frame was then connected to the steel frame which included an outer frame of railway sleepers (showing the size of the shaft), within which timber planking was laid – primarily to act as a floor stage for drama productions. This design therefore was a relatively cost effective and low archaeological impact form of shaft capping which also provided excellent facilities for drama use (directly in front of the engine house), and showed the extent of the shaft at ground level for site interpretation.

The shaft was excavated on 19/5/2010 by a JCB digger, after the iron grille had been removed (see Fig 20). A depth of only 0.5m (maximum) was excavated over the area of the shaft (from the sides !), for an extent of 5.0m x 5.0m. At the site of each of the six concrete pads the ground was removed to a further depth of 0.25m (each pad was 0.5 x 0.5 x 0.25m depth). This would then allow the RSJ's to be bolted into the hardened pads, and the timber frame to be made up on site, surmounted by the outer timber sleepers and timber boarding (see Fig 21).

Given the shallow depth of the excavation, the ground consisted of mixed redeposited material – presumably by previous owners to fill up the shaft. This consisted of earth, stone, small parts of a car, glass bottles (from the 1970s and earlier), and other waste products (including an intact teapot and stove/rayburn hand iron – which the owner has kept). The expected site of the upper masonry walls of the balance bob box and mountings on the east side of the shaft was not encountered – possibly as the shaft excavation was so shallow. Following construction of the surface timber shaft platform, the removed topsoil (which had been stockpiled), was reformed around the railway sleeper sides of the shaft outline.

4.4 Boiler House chimney

NGR: SX 42435 65606

Site No: 12B

Recommendations (Buck 2009, 41):

Following removal of the ivy and if necessary a structural assessment, it is recommended that the chimney is repointed where necessary with a lime mortar. Given the low height of the chimney it does not appear necessary to attach a lightning conductor.

Future management recommendations relate to reducing any increase of vegetation growing out of the chimney sides (particularly brambles, cotoneaster and possibly ivy – if it cannot be managed). Removal of earth/grass/brambles etc on top of the chimney should be undertaken once every five years – again to reduce cumulative build up which could cause further structural instability. Patch repointing to the top capping of the chimney may need to be undertaken after a decade to reduce water ingress.

Site impact (Buck 2009, 41)

Soft and crumbling mortar should be removed (to a maximum depth of 40mm), from the masonry walls following a detailed site assessment of the feature by the site contractors.

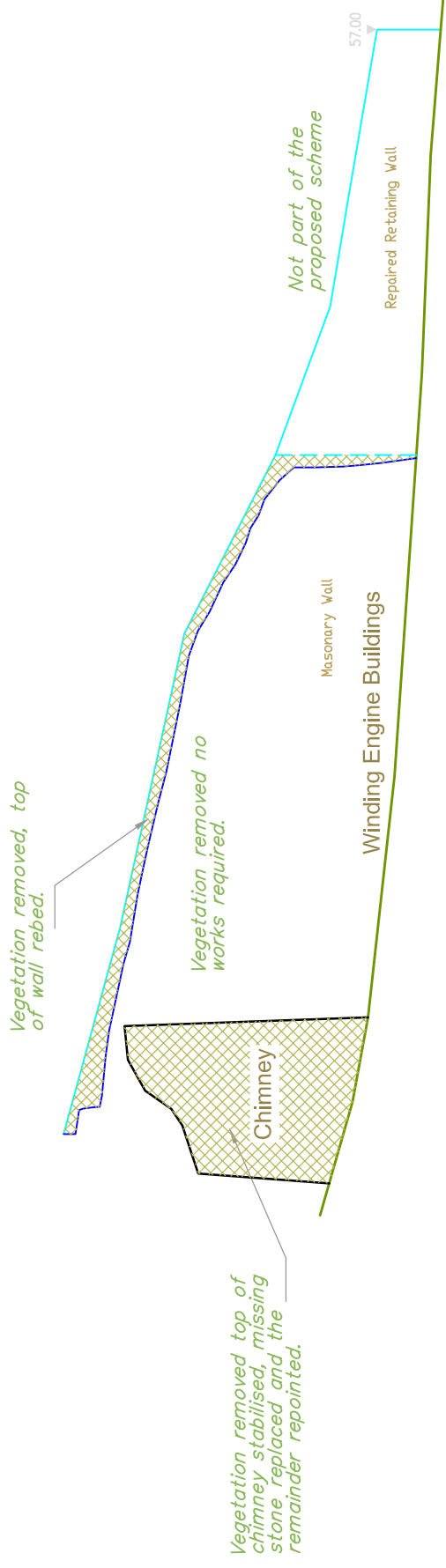
Rev	Date	Description	By
A	12.07.10	As built	AW

NOTES

This drawing has been constructed using the CAD drawing prepared by Sumo (Team) Surveys

The drawing does not form part of a Schedule of Works.

All work to be carried out under the direction of the Archaeologist



Datum 48.00m

WINDING BOILER HOUSE CHIMNEY
and Winding Engine Buildings
100% OF CHIMNEY REPOINTED

South Hooe Mine
Bere Alston, Devon
Winding Engine Boiler
House Chimney &
Winding Engine Buildings



Drawing Number **B6880/07A**

DRAWING STATUS ● *As Built*

FIG 22 (Site nos. 12b/13)



Fig 23 View of the winding engine boiler house chimney before works C Buck 2010© CC HE



Fig 24 View of the winding engine boiler house chimney/buildings after works C Buck 2010© CC HE

Following approval of an appropriate mix of lime mortar and an aggregate to match the existing, the site contractors will repair any defective stone or mortar. This should entail creating a top 'capping' for the chimney walls that have been so reduced in height. The style and extent of re-pointing (slightly recessed from the masonry face), will mimic that of the original (this will be decided when the test mortar panel is agreed with the site engineer and site Historic Buildings Consultant).

Description of works (2010)

Figure 23 shows the degree of ivy and vegetation covering the remains of this chimney. Once this was removed (and the thick ivy stems treated with a root killer), the tops of the walls were rebbed with mortar, and the sides of the chimney repointed and rebuilt where necessary. Figure 22 is an elevation survey with annotations describing the extent of the conservation works, and Fig 24 is a photograph of the chimney after works had finished.

4.5 Winding engine buildings

NGR: SX 42448 65607

Site No: 13

Recommendations (Buck 2009, 42):

If finances permit the remnants of the south masonry wall could be cleared of obscuring vegetation, and repointed where appropriate in lime mortar. The specification for this section of masonry cannot be detailed until the vegetation has been removed. This would aid site interpretation for members of the public. The section of east and west walls of the eastern building should be repointed where necessary, and steel lintels inserted to replace the rotted iron originals over the small flues. The site should be retained.

Future management recommendations relate to reducing any increase of vegetation growing along the outside face of the building, and its east side return (particularly ivy and brambles – if it cannot be managed), as it is a site of archaeological interest.

Site impact (Buck 2009, 42)

Soft and crumbling mortar will be removed (to a maximum depth of 40mm), from the masonry walls following a detailed site assessment of the feature by the site contractors. Following approval of an appropriate mix of lime mortar and an aggregate to match the existing, the site contractors will repair any defective stone or mortar. The style and extent of re-pointing (slightly recessed from the masonry face), will mimic that of the original (this will be decided when the test mortar panel is agreed), by the site engineer and site archaeologist. Any loose crumbly mortar (old and new) that has accumulated on the ground as a result of the works will be carefully cleared from the site.

Description of works (2008)

The top of the long south wall of the winding engine building, after a great deal of ivy and vegetation removal, was rebbed with mortar, whilst the side of the building did not need to be repointed (see Fig 24). However, the east side of this range of buildings had, after vegetation and rubble removal, needed to have a small amount of additional masonry conservation. It is likely that this end of the winding engine building complex housed the large winding drum which would have wound materials up Incline Shaft, located 10.0m to the south. Remnants of the masonry structure and holding down tensioner bolt holes were visible following the vegetation/rubble removal. Some masonry collapse had occurred above where short timber lintels had rotted. The timber lintels had provided space below for the holding down bolts (presumably part of the structure to support the winding drum in a cradle support) to be

tightened. Three complete slot holes were visible in the masonry, with a further two more evidenced on one side only. The slot measurements were 0.45m wide, 0.4m in height for a length of 0.97m, sited at a depth of 0.5m below existing ground level. It was agreed on site that the four missing timber lintels would be replaced with new equivalents, and the masonry rebuilt over the feature, leaving evidence of the small square holes through the masonry. Photographs were taken before and after works.

Works to this building had finished on 25/6/2010, the final stage of the building conservation project.

5 References

5.1 Primary sources (Site reports)

Knevitts Consulting Engineers, August 2009 B6880, *Structural Appraisal Report: South Hooe Mine, Bere Alston, nr Yelverton, Devon, PL20 7BW*

Knevitts Consulting Engineers, January 2010 B6880, *Structural Safety Works, Contract Documents, Form of Tender, Conditions of Contract, Schedule of Works, Specifications etc – South Hooe Mine, Bere Alston, nr Yelverton, Devon, PL20 7BW*

Spaldings Assoc, November 2009 Proj. No. 08-T/TD/S.Hooe1, *Visual Bat and Bird Survey of Mine Structures at South Hooe Mine, Devon*

Sherrells Ltd, Report No. 3403, October 2009 Geotechnical mining report at South Hooe Mine, Bere Alston, West Devon,

5.2 Secondary sources (Publications)

Ashurst, J., and N., 1989, *Practical building conservation, Vols 1 (Stone masonry) and 3 (Plasters, mortar and render)*, English Heritage

Barton, D.B., 1964, *Historical Survey of the mines and mineral railways of East Cornwall and West Devon*, Truro

Bereton, C., 1991, *The repair of historic buildings – advice on principles and methods*, EH

Booker, F., 1971, *The Industrial Archaeology of the Tamar Valley*, Newton Abbot

Buck, C., 2009, *South Hooe Mine - Archaeological Assessment*, Bere Alston, Devon HEP

Johnson N., Payton P., & Spalding, A., 1996, *The Conservation Value of Metalliferous Mine Sites in Cornwall CAU/ICS*, Truro

Schofield, J. undated, *Lime in buildings – a practical guide*, English Heritage

Sharpe, A., Johnson, N., and Lewis, R., 1996, *A Guide to Conserving Historic Mine Buildings in Cornwall*

6 Project archive

The HE project number is **2009112**

The project's documentary and photographic archive is housed at the offices of Historic Environment, Cornwall Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. A copy of the report will be deposited in Devon's Sites and Monuments Archive as well as a copy of all digital images.

The contents of this archive are as listed below:

1. A project file (2009112) containing site records and notes, project correspondence and administration.
2. **Site assessment (2009):**
Digital images (R:/Images/HE Images/Devon/South Hooe Mine Assess 2009062)
3. Black and white photographs (**GBP**) are archived under the following index numbers:
Site recording (2010):
GBP 2154/17-32 (site before consolidation works); 2154/1-16, 2155/10, 21-36, 2156/18-36 (site during consolidation works); 2157/13-36 (site after consolidation works)
4. Digital images archived in the images project file (R:/Images/HE Images/Devon/South Hooe Mine WB 2009112)
5. A .pdf copy of the original and 'as built' survey files (created by Knevitts Cons. Eng.) is in the project file.
6. This report text is held in digital form as: G:\Historic Environment (Documents)\HE Projects\Sites\Devon\South Hooe Mine (WB report) 2009112
7. EH OASIS No. cornwall2-66789