



Drakewalls Mine (east), St Ann's Chapel, Cornwall

Report on building conservation works



Historic Environment Projects

Drakewalls (east) Mine, St Ann's Chapel, Cornwall

Report on building conservation works (2008)

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The 2007 measured building survey for all of the mine buildings affected by building conservation works was undertaken by Team Surveys of St Austell. The 'as built' conservation works drawings were produced by Andrew White of Knevitts (Cons. Eng.). The East Cornwall Regeneration Project was managed by Chris Hariades.

Within Historic Environment Projects the Project Manager was Colin Buck, Jacky Nowakowski edited this report.

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

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Cover illustrations

Front cover images of Drakewalls Mine rotary/winding engine house, before (2007) and after (2008) works. Rear cover image of the Rotary engine house at Drakewalls Mine (foreground) taken by Ordish (1929).

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Abbreviations

CCC	Cornwall County Council (now CC - Cornwall Council)
ECRP	East Cornwall Regeneration Project
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment
NGR	National Grid Reference
NHL	Natural Hydraulic Lime
SWRDA	South West Regional Development Agency
TVC	Tamar Valley Centre
WHS	World Heritage Site

1 Summary

A mine site conservation scheme and village improvement works, named the East Cornwall Regeneration Project (ECRP) took place from 1991 to 2001. This was followed by a second phase of conservation works to other Tamar Valley mine sites including their access links (2006–2009). This report describes building conservation works to Drakewalls Mine, St Ann's Chapel. The site is owned by the Duchy of Cornwall, although Cornwall Council has agreed to purchase part of the site.

In 1994 an archaeological assessment report was produced for the western side of the mine following its purchase by Cornwall County Council from the Duchy of Cornwall (Buck, 1994). Two phased site conservation works were undertaken in 1995 (shaft safety works - Buck 1996) and from 1996 to 1997 (building conservation works - Buck 1999), to the surviving pumping engine house and related site components, all on the western side of the road bisecting the site.

Surviving components within the eastern side of the Drakewalls Mine project area include: one extant engine house, one boiler house, one chimney, three mine shafts (one of which recently subsided; two others in the past decade), early 20th century arsenic dressing floor remnants and mine spoil and dressing floor dumps. The conservation project site relevant to this report lies to the east of the main site and is wooded, although Japanese Knotweed has recently covered parts of it, obscuring the engine house (see Figures 1 and 2).

The East Cornwall Regeneration Project (ECRP 2006-2009) only funded the conservation of the significant remaining buildings on the eastern side of the site namely: the engine house, the chimney and the boiler house. There were a few structural remediation works to undertake which included removal and rebuilding of masonry. However, mechanisms were put in place to ensure that there was a high degree of historic buildings consultancy and archaeological recording.

Contractors were tendered and AD Williams of Landulph were successful. Work started on the rotary engine house in late April 2008 after scaffolding. Repointing, building conservation and timber lintel replacement for the engine house followed by the loadings finished (after some delay) in mid November 2008. Finalisation of this project enabled this former 19th century site of intensive mining to be safely used for public access dedicated to historical, leisure and educational activities as part of a wider scheme of similar co-ordinated land reclamation and regeneration works in east Cornwall.

The Tamar Valley Centre (TVC - to site the TVAONB offices, Calstock Parish offices and Calstock Parish Archive), was a focal point of the East Cornwall Regeneration Project (ECRP), a £2.1million project managed by Cornwall County Council and funded primarily by European Regional Development Fund (Objective 1) and South West Regional Development Agency. An archaeological record during site excavation and construction (May 2008 to March 2009), was a planning condition to site this new building on Drakewalls mine, part of Cornwall and West Devon's World Heritage Site. In addition, construction of a nearby car park on the east side of the road opposite the TVC and associated landscape work was also recorded for any archaeological impacts.

2 Introduction

2.1 Project background

Drakewalls (East) Mine is one of a number of mine sites (Hingston Down Mine, Holmbush Mine, Prince of Wales Mine and Wheal Brothers), which all formed part of the overall East Cornwall Regeneration Project (ECRP: 2006-2009). The ECRP is the second phase of building conservation works following the first phase from 1999-2001 (mine sites at Gunnislake Clitters, Okel Tor and Wheal Brothers). It had been formulated with the co-operation of local community groups and each of the site's landowner. The conservation and management of features relating to the site's mining heritage and enablement of safe public access forms the basis for this conservation scheme.

The site (SX 42681 70731, PRN 42143, see Figures 1 and 2 for site location and conservation works project area), is part of the Cornwall and West Devon World Heritage Site. The ECRP project aims comply with the overall strategy for the Tamar Valley (see CCC Strategy document 1998). Funding for the project had been secured from a variety of sources: primarily the South West Regional Development Agency (SWRDA), Objective One funds, Cornwall Council (CC), and the Tamar Valley Service.

The Historic Environment Projects team, Cornwall Council (previously Historic Environment Service Projects, Cornwall County Council), had previously produced an archaeological assessment of the Drakewalls (East) mine site (Buck 2006, Report No. 2007R012), in which each site was identified and management recommendations produced. An Ecological assessment report was compiled in May 2007 (Michael Davies, Cornwall Environmental Consultants). Sherrell Ltd of Tavistock (Geotechnical Mining Consultants) had previously produced a series of geotechnical mining assessments (Report No. 1448 from 1989), for the entire Drakewalls mine site (east and west). In January 2007, Team Surveys of St Austell carried out EDM surveys of all the extant mine buildings relating to the building conservation project (before works). A structural buildings assessment survey on each of the buildings, including on-site supervision of the contractors and the production of 'as-built' drawings, was commissioned from Knevitts Cons. Eng. of Wadebridge (Andrew White – B6148.2 November 2007). A subsequent detailed specifications report and tender document report was also produced by Knevitts (B6148.2 February 2008).

The HE Projects team was commissioned in January 2008 by Cornwall Council Landscape and Urban Design Unit (Chris Hariades), to undertake an impact assessment survey of the site (Buck 2008, Report No. 2008R030). The report assessed the impact of the proposed works on the site's significant assets, giving mitigation recommendations for their impacts and described the proposed site management.

HE Projects (Colin Buck) was employed as the archaeological consultant and recording archaeologist for the 2008 building conservation project for the boiler house, the rotary engine house and the attached chimney. In addition, planning permission was given for a 'new build' Tamar Valley Centre (funded in part by the ECRP) sited in the south east corner of Drakewalls Mine (see Figure 2), at SX 42566 70660, and a new car park (SX 42598 70666). A condition of the planning permission was archaeological recording of the building's excavation footprint. This was undertaken at a similar time as the building conservation project.

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, the ECRP Project Manager, structural engineers and contractors, and to agree 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.
- Carry out regular site inspections whilst the building and remediation works were being carried out, to ensure compliance with the detailed agreed work specification.
- Ensure that there was an adequate level of archaeological recording (features exposed or affected by the Tamar Valley Centre construction works).
- Include a photographic record of all building and archaeological landscape features affected by the scheme (before, during and after works).
- Produce a descriptive and survey record at an appropriate level of detail of those structures, features and sites that were affected by both the building conservation scheme and the Tamar Valley Centre construction works.
- Produce a report outlining the findings of the archaeological consultancy and archaeological recording of the Tamar Valley Centre footprint excavation to provide the ECRP and landowners with copies of the same.
- Provide archaeological field and archive data for inclusion in Cornwall and the Isles of Scilly Historic Environment Record.

2.3 Project methodology

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.

For the buildings consolidation part of the works, it was decided at an early stage to hold bi-weekly progress meetings on site with the Cornwall Council project funding manager (Chris Hariades), the site archaeologist (Colin Buck of Historic Environment Projects), the Structural Engineer (Andrew White of Knevitt Cons. Engineers) and the site foreman for the contractors (Darren Stewart). 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 short term future problems that may occur during the works.

The project methodology for archaeological recording of the Tamar Valley Centre excavation footprint necessitated frequent site visits in the early construction stages of the project. The site gazetteer (Mitigation recording results - Section 4), contains a detailed description of how consolidation and preservation works affected each archaeological feature within the project area and details results of the archaeological recording.

2.3.1 Site 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:

- Derelict Land at Drakewalls Mine, Cornwall: Volumes 1-2B (Desk studies and Site Investigations), Frederick Sherrell Ltd, Report No. 1448, 1989

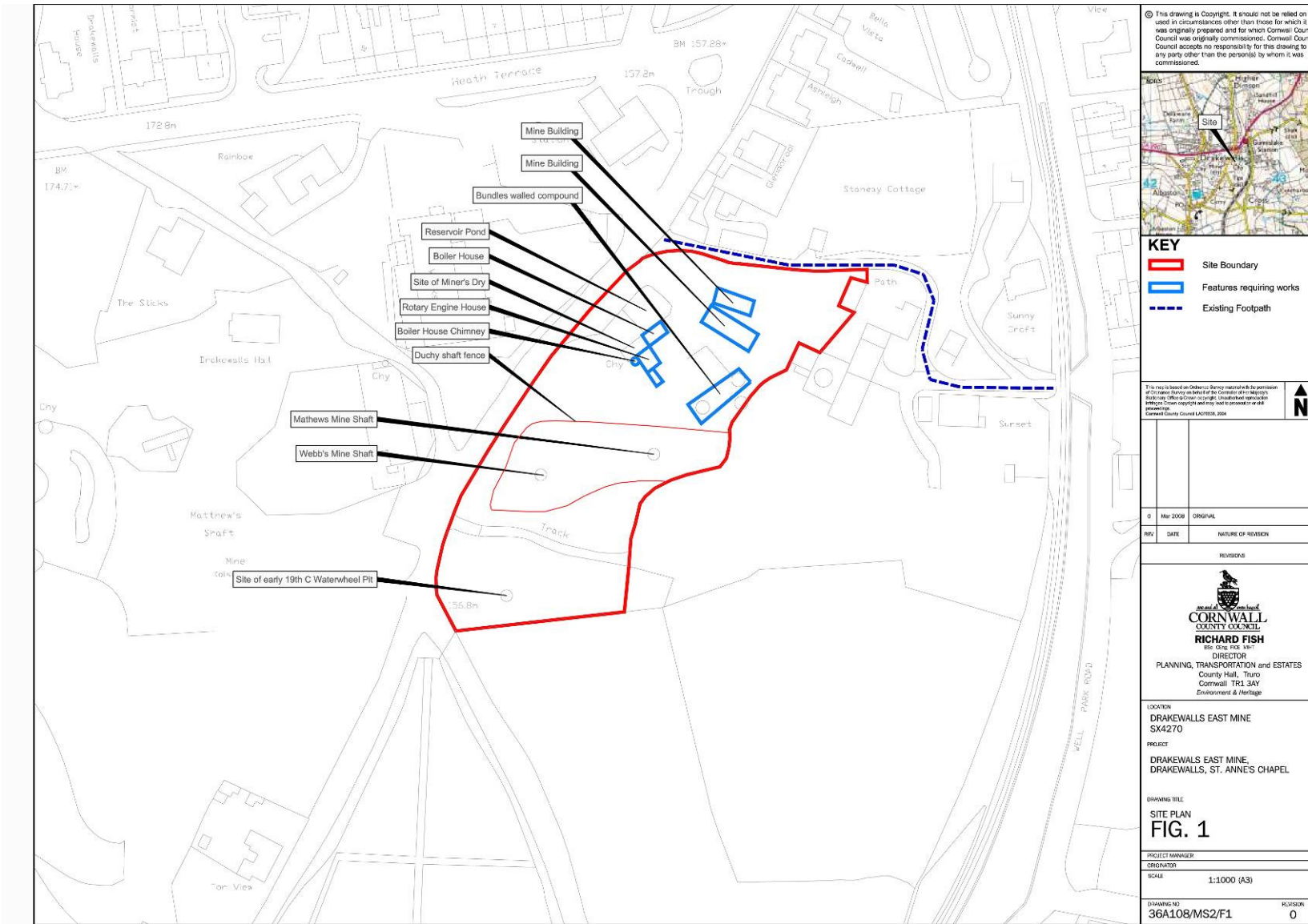


Figure 1 Site location plan

- The proposed Visitor centre and car park at Drakewalls mine, Gunnislake, variety of reports relating to Geotechnical contamination and monitoring requirements, Frederick Sherrell Ltd, Report No. 1448B/1448B2, 2004-2006
- Drakewalls (East) Mine, St Anne's Chapel, Cornwall: Archaeological assessment report, (HES Projects CC (C Buck) Report No 2007R012, February 2007
- Drakewalls (East) Mine, nr Gunnislake Extended Phase 1 Habitat Survey, Cornwall Environmental Associates Ltd. May 2007 Ref CEC1131
- Structural Appraisal Report: East Cornwall Regeneration Project, Engine House, Drakewalls, Gunnislake, Knevitt Consulting Engineers, November 2007 B6148.2
- Drakewalls Mine, St Anne's Chapel, Cornwall: Impact assessment report, HES Projects (C Buck) Report No. 2008R030, February 2008
- European Protected Species License method Statement to cover conservation works at Drakewalls East Mines, A McCarthy Assoc. February 2008 Ref 689
- Structural Safety Works, Contract Documents, Form of Tender, Conditions of Contract, Schedule of Works, Specifications, etc – Drakewalls Mine, Gunnislake, Knevitts Consulting Engineers, February 2008 B6148.2
- Pre-Tender information Pack (CDM Regs. 2007) for Drakewalls Mine, Gunnislake, Knevitts Consulting Engineers, February 2008 B6148.2
- Drakewalls Mine, Gunnislake: Phase 4 Soil Remediation Verification Report, (Frederick Sherrell Ltd, Report No. 1448B, May 2010)

2.3.2 Survey and recording techniques

Measured building surveys were undertaken by Team Surveys of St Austell in January 2007, in order to have a detailed record of the buildings before any consolidation works were carried out (and before scaffolding had been erected). These were used throughout the project for a number of reasons:

- To provide essential dimensions and detail for rebuilding where removal of unsafe sections of masonry walls occurred.
- To provide survey drawings for calculating/assessing detailed structural engineering solutions for building instability problems and liaison with the Historic Buildings Consultant and English Heritage.
- 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.
- These EDM surveys are reproduced in the archaeological watching brief report (as 'As built' annotated survey drawings), and are an effective and cost efficient method of graphically showing the extent and nature of the consolidation works.

Archaeological recording for both the engine house building conservation works (including fencing), and the Tamar Valley Centre 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 were carried out, during works and after they had finished. Survey and recording techniques followed basic IfA protocols, which included quick hand measurements of exposed archaeological sections whilst site contractors were working.

The results of the watching brief for both the building conservation scheme and the archaeological recording of the Tamar Valley footprint excavation are summarised below in the mitigation recording results inventory (Section 4). 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 historic buildings consultancy and archaeological 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 and Safety Risk Assessment Record). Safe working practices were observed at all times, especially where recording work was undertaken on features near or within shafts, and when in close proximity with working machinery. For the building conservation project, the project archaeologist liaised closely with the building conservation site contractors (AD Williams of Landulph); the site works supervisor (Darren Stewart), and the Structural Engineer was Andrew White of Knevitt Structural Eng. Ltd. For the TVC project the contractors were Midas Construction Ltd., and the architect was ZedFactory Ltd.

2.3.3 Pre-works consultations

Pre-works consultations, an important part of the historic buildings consultancy, with the structural building engineer; the landowner (Duchy of Cornwall), and ECRP Project Officer (Chris Hariades), 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). Recommendations from sites identified in the archaeological assessment (Buck 2007), were brought to the attention of the project manager (Chris Hariades).

Regular on-site consultations between the structural engineer, the site contractors, 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.

2.3.4 Building conservation works summary

The archaeological assessment survey (Buck 2007), described in detail the remnants of buildings and related masonry features at Drakewalls Mine; those affected by the conservation works are described below. Figure 2, a conservation scheme site plan, shows each structure. Tanalised Douglas fir timber was used, the new specifications matching the original sizes.

List of consolidation works (April-November 2008)

- Rotary Engine House (Buck 2007, Site 1)
- Flywheel loadings (Buck 2007, Site 1.1)
- Boiler House chimney (Buck 2007, Site 2)
- Boiler House (Buck 2007, Site 3)

2008 Fencing works:

- Additional site fencing (by Bob Truscott for Duchy of Cornwall) was constructed in front of the buddles dressing floor vertical retaining wall (Buck 2008, Site 9), and in front of the Boiler house (Site 3 - see Figure 2 for site locations).

In the first phase of the building conservation scheme, the structural engineer carried out a preliminary structural survey of the main buildings included in the project. Structural problems were identified in both the Rotary Engine House south and west walls (Figures 7 and 10). In addition, once vegetation and rubble was removed from the remains of the boiler house, it was found that part of the east wall needed to be rebuilt. There were a small number of additional structural stability problems to the Engine House (Site 1).

Following the production by the structural engineer of a single document which detailed Contract documents, Tender forms, works specifications (agreed after consultation), and Bills of Quantities, the works were put to tender after consent for the works was given by the Objective 1, Cornwall Council fund providers, and the landowner (Duchy of Cornwall).

AD Williams, a locally based East Cornwall (Landulph) company, with previous experience of undertaking building consolidation works to historic buildings, was successful in gaining the Drakewalls Mine works contract. Following ongoing site discussions with respect to the building specifications during site works, the mine buildings were consolidated using sympathetic remediation and consolidation techniques, retaining the historic character of the site.

An important aspect of the historic buildings consultancy and archaeological watching brief records were the weekly site consultations with the project structural engineer and contractors with regard to solving structural issues, and the extent of repointing and style of finish for all consolidation works (and where appropriate by phone/email). The Cornish Lime Company supplied a pre-washed aggregate Cornish Lime Sand (CLS 26), which was mixed with NHL 5.0 strength for wall tops and 3.5 for the remainder. 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. For deeper pointing, CLS 24 was occasionally used in the heart of the wall. Following scaffold erection and removal of dangerous parts of the walls (part of the overhanging south engine house wall) 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 repointing 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 re-bedded 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. Following the completion of the building conservation element of the project, the site was fenced in some places (as described above).

2.3.5 Tamar Valley Centre works summary

An archaeological assessment survey (Buck 1994), described in detail the remnants of buildings and the potential for below ground archaeological features at Drakewalls Mine (east and west). Figure 16, a project site plan, shows the location of the new Tamar Valley Centre and its related car park.

List of works (May 2008-March 2009)

- Excavation of the Tamar Valley Centre foundations (close to Site 21a, Buck 2004)
- Excavation of the New Car park (Site 8, Buck 2007)
- Site investigation of a small depression collapse (see Figure 16)

The planning condition for this project related to the undertaking of an archaeological watching brief and site recording during the excavation for the Tamar Valley Centre's footprint and foundations (Section 4.6), as well as an archaeological watching brief and site recording of the excavation and building up of the site of the new car park (see Figure 16, Section 4.7), due to the possibility of archaeological features being uncovered.

During the excavation works a small site depression opened up, which was later investigated by Sherrell Ltd. An archaeological watching brief and site recording was undertaken during this small site investigation (Section 4.8).

Table of sites and summary of conservation/archaeological recording works undertaken (2008)

Section No.	Feature	NGR (SX)	Works summary
	Drakewalls Mine		PRN 42143
4.1	Rotary engine House (Site 1)	42647 70729	After ivy was removed – general building conservation works to the extant building. 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. Small-scale rubble clearance internally at the cataract pit and ground revealed around the newly revealed cylinder bedstone.
4.2	Flywheel loadings (Site 1.1)	42650 70728	After rubble removal from walls and flywheel pit, focussed conservation works (and wall capping), to masonry loadings.
4.3	Boiler House chimney (Site 2)	42644 70728	Erection of scaffolding (extension of engine house). Repointing of masonry with lime mortar where appropriate. Installation of a lightning conductor and earth rods/mats at base.
4.4	Boiler House (Site 3)	42650 70737	Wall ‘capping’, repointing and partial rebuilding with lime mortar was undertaken where appropriate.
4.5	Site safety fencing (Sites 3, 9)	(see Figure 2)	Following the building conservation scheme, the hazardous areas (steep drops), were fenced (with timber post and rail/wire) by the Duchy of Cornwall.
4.6	Tamar Valley Centre	42566 70660	Archaeological recording during excavation of site footprint.
4.7	New car park (Site 8)	42598 70666	Archaeological recording during excavation of car park footprint.
4.8	Collapse depression	42546 70675	Archaeological recording during site investigation.

3 Site description

3.1 Location and setting

Drakewalls Mine (centred SX 426 707) is located on the southern side of the A390 (from Tavistock to Callington), 100m south of the eastern end of St Ann’s Chapel, on the southern flank of the granite ridge extending from Kit Hill to the Tamar Valley.

The east-west topography of the mine (as shown on Figure 1) is truncated in two places; firstly by a north/south link road from Albaston to Gunnislake, and secondly further eastwards by the East Cornwall Mineral Railway. The western (main) part of the mine (containing the sites of two engine houses, a water wheel pit and shafts in the medieval gunnis), is outside the project area and subject of a previous archaeological assessment (Buck 1994), and a subsequent site and building conservation scheme (Buck 1995 and 1999). The central part of the mine (between the truncating road and railway), is the subject of this assessment (see Figure 1 for site location).

Within the project area, the site slopes from west to east with the winding engine house sited just north of the main lode (and gunnis) in the western part of the project area. There is tree cover virtually all over the site, which appears to be the result of a complete lack of any site vegetation management. Gorse, bramble and Japanese Knotweed (treated by CCC in 2005-7), have previously taken hold across the entire site over wide areas. However, the landowners, the Duchy of Cornwall, in the past few years securely fenced gunnies and mine shaft subsidence (Stamps Shaft/gunnis collapse eight years ago), as well as the rotary engine house building due to its instability. Recently (early 2008), Webbs Shaft and an adjacent shaft has been fenced by the landowners due to its partial collapse.

This report essentially focuses on (and brings to a higher prominence), the important historical heritage that can still be found a century after these mines folded, a result of which has been its inclusion in the World Heritage Site for the Cornwall and West Devon mining landscape.

3.2 Designations

3.2.1 International

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 (non-statutory) 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). *'Area A10 is the most easterly and the second largest of the WHS Areas, this mining district A10 (i) lies in the Tamar Valley Area of Outstanding Natural Beauty and comprises both valley and upland settings for tin, copper, silver-lead and arsenic mining, ore-processing and smelting'*.

3.2.2 National

The entire project area is within the Tamar Valley Area of Outstanding Natural Beauty (AONB) – UID 1319.

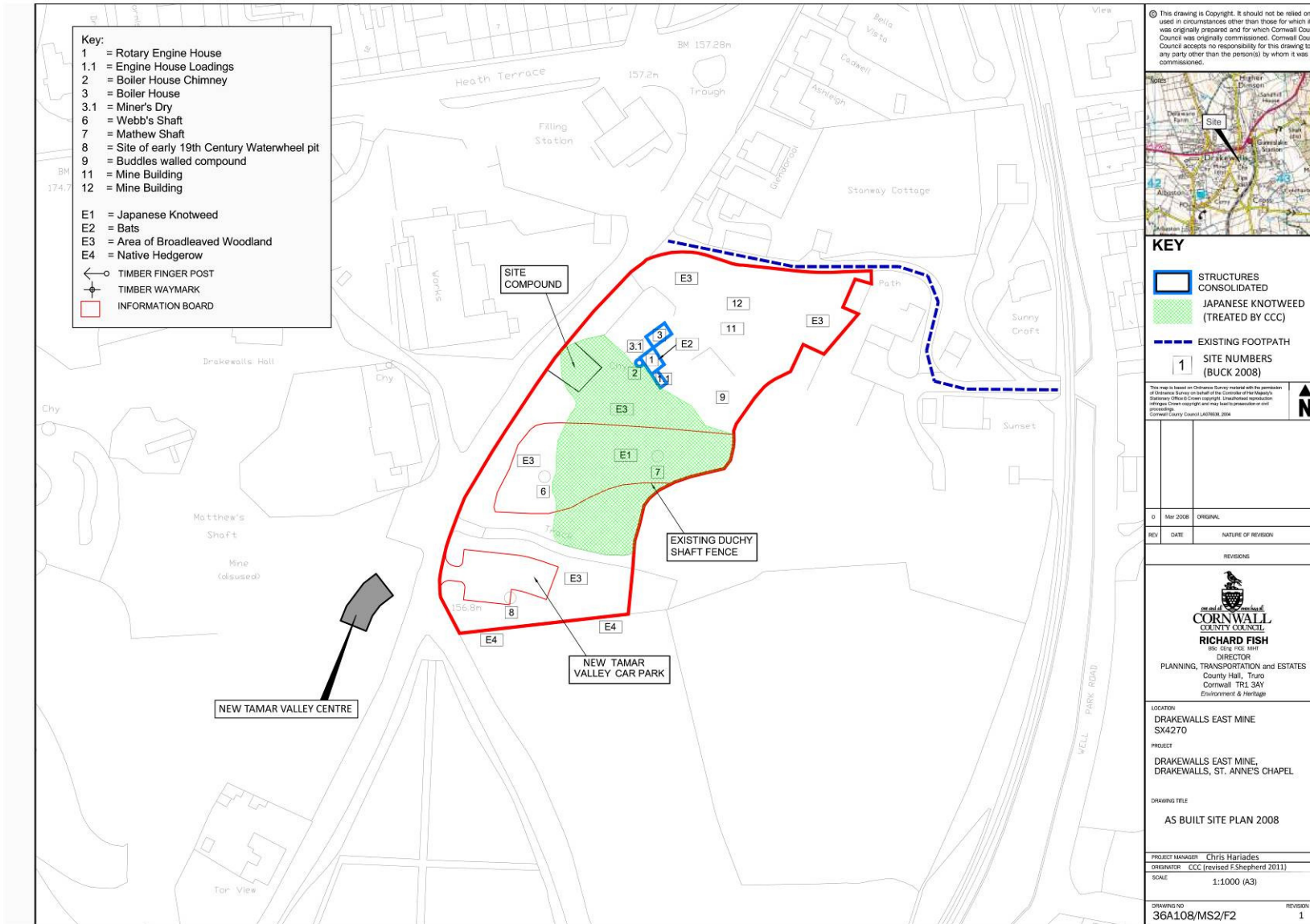


Figure 2 Site plan of building conservation works and the new Tamar Valley Centre

3.3 Brief site history of Drakewalls Mine

(Summarised excerpt: For a more detailed history of the site see Buck, 2007, Section 3.2)

The first specific documentary reference for this copper, tin and arsenic mine, was in 1793 when it only mined tin, using waterwheels as its power source, with water brought by leats from Kit Hill. Frequent summer drought and deepening shafts meant that steam engines were necessary by 1843, when a pumping engine was purchased. By the 1860s a new 40" stamping engine and 26" winding engine worked the mine, which by now mined copper. Its rich returns by 1875 (£350,000 from Main Lode) earned it the title '*Dolcoath of East Cornwall*'. By 1895 Drakewalls was abandoned as the ore market price had dropped far below the economical cost of operating the mine. By 1901 the mine was re-started and the levels pumped out (which took two years) '*so much ground has been taken away (by mining) that great underground caverns exist which can be traversed only by boat*'. By 1905 no returns had been made from pumping out the mine and it ceased working for the final time. The stamps were maintained at work until 1909.

The medieval gunnis was progressively infilled after 1957 from its west end with refuse (and presumably at a similar time the openwork within the project area), by the local Borough Council (Buck 1994, Site 14 and Buck 2007, Site 10). Since that date, the engine houses have either been taken down (the Stamps engine house, boiler house, buddles and chimney were demolished in the late 1970s - SX 42559 70764, as was the top part of the pumping engine house; Buck 1994 Site 1), or have progressively collapsed as the timber lintels rotted. Within the last decade the three mine shafts within (and close to) the project area (Matthews Shaft, Webbs Shaft and Stamps Shaft), have collapsed as the 19th century gunnis infill has become increasingly unstable. The latter two shafts have subsequently been fenced by the Duchy of Cornwall (see Figure 2).

4 Archaeological recording results

General recording methodology is detailed in Section 2.3.2 above, whilst Figures 2 and 16 show the sites on plan:

Engine House conservation:

- EDM plan and elevation surveys of the engine house (with ivy covering), and plans of other buildings were produced by Team Surveys of St Austell in January 2007. These primary surveys were then checked by the Historic Buildings Consultant (C Buck), and after approval given to the Structural Engineer for use in the project specifications tender documents.
- The structural engineering consultancy (including contract management), for this and other ECRP sites was tendered and won by Knevitt Consulting Engineers of Wadebridge (Andrew White). A structural report (B6148.2) with building conservation recommendations (annotating the survey elevations/plans) for each engine house building was produced by Knevitts in November 2007.
- A set of tender and then working survey drawings detailing the nature and extent of the works were produced in February 2008 by the structural engineer (Andrew White) which accompanied the Contract documents, works specification and Bills of Quantity. Again, the nature and extent of the works was approved by the Historic Buildings Consultant.
- Given the importance of this mine site and its location within the World Heritage Site, the Historic Environment projects team, Cornwall Council, was requested to produce an Impact Assessment Report (Buck 2008, Report No. 2008R030),

detailing the impacts and mitigation measures in advance of the building conservation scheme.

- Contractors were tendered for the high priority consolidation works to the main mine buildings in March 2008. AD Williams won the tender for these works.
- Site clearance of dense vegetation, trees and fly-tipped debris were undertaken in March 2008 prior to groundworks starting. Any small tree stumps that had been affecting the buildings were cut down and the stumps treated with 'Round-up'.
- For the buildings consolidation part of the works, it was decided at an early stage to hold bi-weekly progress meetings on site with the CC project funding manager (Chris Hariades), the site archaeologist (Colin Buck), the Structural Engineer (Andrew White of Knevitt Cons. Engineers) and the site foreman for the contractors (Darren Stewart). 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 occurred during the works.
- The archaeological watching brief record and historic building consolidation consultancy for all of the safety works at the site took place from April to November 2008, although consultancy time had been spent prior to groundworks starting to ensure the detailed project specifications followed English Heritage guidance for the conservation of historic buildings. 'As-built' external and internal surveys (based on the original 2007 surveys) are reproduced as part of this report for each elevation of the rotary engine house, boiler house and loadings (see Figures 3-4, 7, 10-11).

Tamar Valley Centre and Car Park:

- In parallel with the building conservation project, the Tamar Valley Centre was being built (May 2008 to March 2009). The planning permission for this project included an archaeological planning condition, recommending the archaeological recording of any visual and disturbed archaeology; both to the site of the new building and its associated new car park (see Figure 2).
- The site of an early 19th century water course leat (supplying water to a number of water wheels) was recorded as it crossed the new building construction site, as shown in Figures 17 – 19).

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 location plan of sites within the project area, and the summary table of remediation works (Section 2.3.4). Site investigation and 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:

- Cornwall's Historic Environment Record (HER) is only given if different from the preceding site.
- The Archaeological assessment report (Buck, February 2007), describes the historical and functional background for each of the sites and a descriptive survey. Site numbers given below refer to the 2007 assessment report.
- The mitigation recommendations given in the impact assessment report (for the 2007 works only), for each site are reproduced below and precede the mitigation results.

- The conservation works needed an Impact Assessment Report. The latter was produced by HE Projects, CC (Buck, 2008, Report No. 2008R030). Site impact descriptions for the 2008 works are also given below.
- The Pre-Contract meeting was held on 18th April 2008 with the site works planned to start on 21st April 2008 (scaffolding partially erected the week before). The main contractors compound was subsequently sited west of the Engine House (see Figure 2).
- The inventory list is given in order of completion.

Building conservation works (2008)

4.1 Rotary Engine House

Civil Parish: Calstock

Site name: Drakewalls Mine

PRN: 42143

NGR : SX 42647 70729

Site No: 1

Recommendations (Buck 2007, 40):

Emergency remedial works to the large section of missing masonry to the undercut bob wall should be undertaken. Removal of the dense ivy and old ivy branches would permit a detailed survey by a structural engineer of the entire building to assess the need for further remediation work to restrict further movement of the walls. The engine house will need to be fully scaffolded and parts of the side walls and all the tops of the walls repointed. All of the timbers will need to be replaced and masonry reconstruction to a number of locations around the building – especially the exterior face of the west wall (Figure 14). It is likely that consolidation works will take the form of rebuilding parts of the collapsed masonry (to support the standing masonry), repointing the upper sections of wall and replacement of the remaining timber structural components.

Expected site impact (Buck 2008, 14):

The impact of the proposed scheme on the building is simply to replace the rotting timber lintels, to rebuild small scale localised masonry collapse (above the lintel collapses), and to repoint the walls where necessary.

The south (bob) wall elevation shows that the eastern half of the wall has collapsed and is suffering structurally as a result of its missing large timber lintels at the base of the wall but more importantly across the top of the plug door. Although the western part of the wall is extant it is rather unstable and the undercut collapsed section will need to be partly rebuilt after the lintel has been replaced. The north gable wall will require replacement of all of the timber lintels with new tanalised timber equivalents for the three openings, whilst the east wall (which has partly collapsed) now appears to be structurally sound and will need to be partially repointed. The exterior face of the west wall is showing signs of structural weakness as masonry above rotted lintels are moving downwards, pulling masonry away from the quoin stones.

The overall impact of the conservation scheme on the fabric of the building will be to remove old and crumbling mortar and replace with new lime mortar. This may well entail repointing parts of the outside and a variable percentage of the upper inside and surface of the four walls to retain structural strength to the building which lost its roof many years ago. It is the intention of the project to make the building structurally safe by consolidating the four main walls. In order to access the outside walls and chimney,

scaffolding will be erected. Access for both scaffolders and site contractors is likely to be from the west side of the building. It should be noted that there will be a physical survey of the existing ivy growing on the walls to assess whether there are any roosting bats, prior to removal of the ivy.

The overall impact of the proposed works on this feature can be defined as '*Minor positive*'. The works will provide more structural stability and a higher degree of Health and Safety for at least another generation, for what is an iconic 19th century former industrial site in the St. Ann's Chapel area.

Conservation works (2008):

Three lime mortar aggregate test panels were used to demonstrate a variety of aggregates and sands. Following a site meeting the combination described below was agreed: Natural Hydraulic Lime (NHL) 3.5 was used for repointing walls whilst the more exposed sections of the site used NHL 5. Both were mixed in the ratio of 1:2.5 (Lime : Aggregate). Cornish Lime Sand (CLS) No 26 was used at the exterior face with CLS 24 used inside the wall.

Following erection of the scaffolding, ivy and other vegetation was removed. The north, south and west elevations were all in need of structural repair. The 'As built' survey drawing (Figure 4) shows the details of the replacement of all the timber lintels above the window and door openings. The extent of the rebuild above the upper window opening can be seen (to provide more structural reinforcement), and replacement of missing masonry to the sides of the ground floor cylinder doorway. Photographs of this elevation shows the site before (Figure 5), and after works (Figure 6), visually shows the nature and extent of these works.

The south elevation was structurally in a poor condition. The extent of collapse can be seen by comparing Figure 8 with Figures 7 and 9. The original profile of this wall can also be compared to the rear cover image. The overhang part of the south wall was slightly reduced and additional masonry built underneath to support as much overhang as possible. In addition, the plug doorway opening lintel was reinstated (to support the masonry above), and additional masonry built over the lintel to provide additional support.

The west elevation consisted of a window opening and a blocked window opening – with structural instability of the wall leaning inwards (away from the supporting chimney), creating cracks extending down the wall. The wall was repointed and the cracks stitched with stone where necessary (see Figure 10 'as built' surveys). Building conservation to the east elevation was relatively simple, this mainly consisted of repointing – although new timber stumps were used to replicate the original positions of timber lintels for window openings in this wall (see Figure 11 'as built' surveys).

The masonry over the top of all the rotted timber lintels was carefully replaced with fallen stone from the building after new sections of tanalised Douglas Fir inserted to mimic the original timber specification. The top of the remaining walls were 'capped' and repointed. The walls were only repointed where there was a structural need to do so (mainly in the upper sections).

Figures 4, 7, 10 and 11 are 'as-built' internal and external measured survey elevations of the engine house and a site plan (Figure 3). Each drawing has detailed annotations relating to the works that have been undertaken on each wall. Relevant representative photographs of the works are also reproduced in the text (Figures 5-6, 8-9, and 12-15). By mid November 2008 all the major and minor conservation works to the engine house and adjacent loadings as an additional project (see Section 4.2), had been completed with the scaffolding removed in mid July 2008. During this period, the inside of the engine house had been cleared of rubble to allow safe public access, revealing an intact granite cylinder bedstone (1.0m X 1.1m and 0.3m thick), with four intact holes (near each corner) for the cylinder bolt tensioners. The cataract pit was not excavated; its rubble/earth infill was spread to allow safe public access through the engine house.

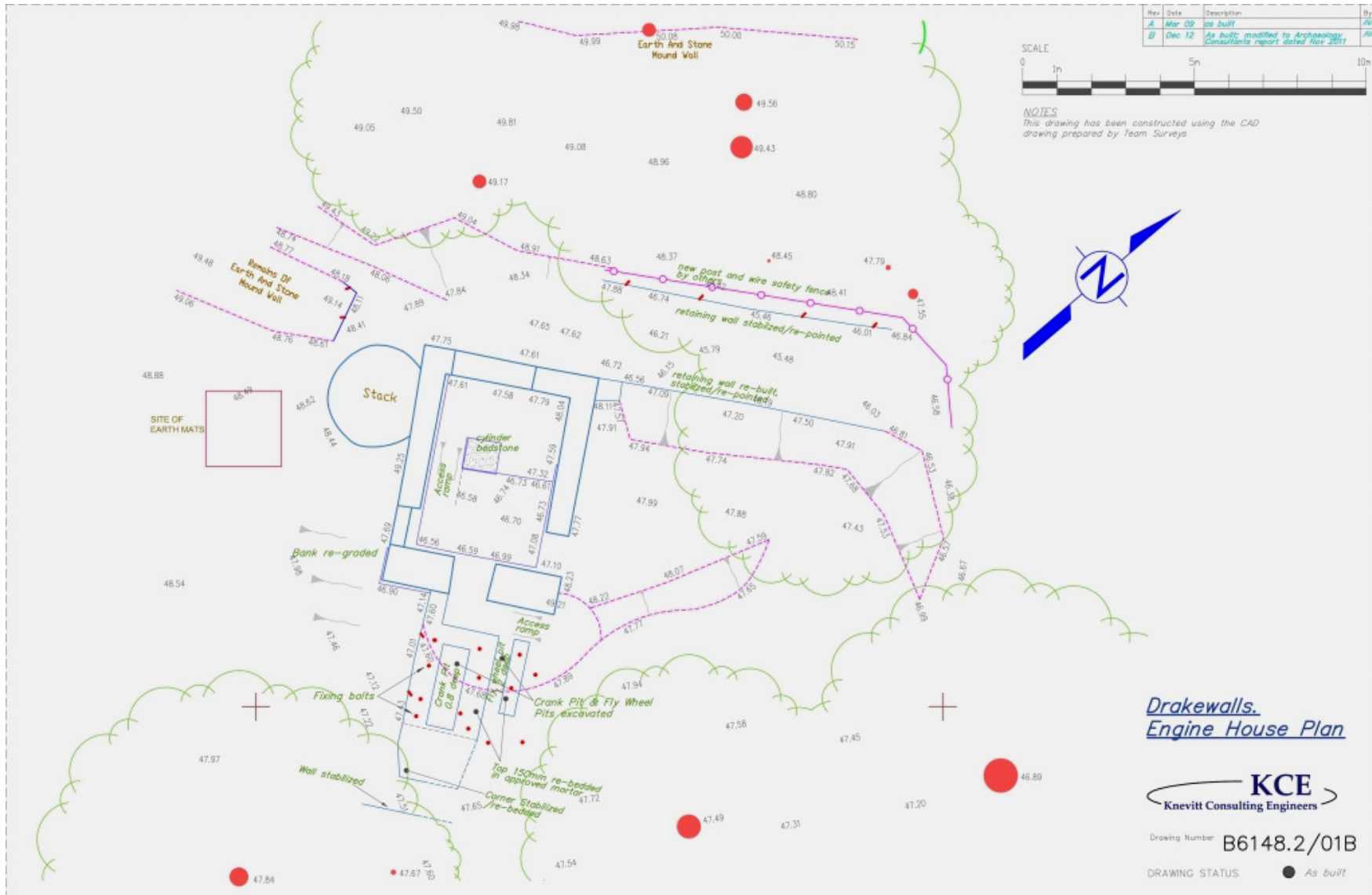


Figure 3 'As built' survey plan of the rotary engine (and boiler) house, flywheel loadings/crank pit after works (Knevvit Cons. Eng. 2008)

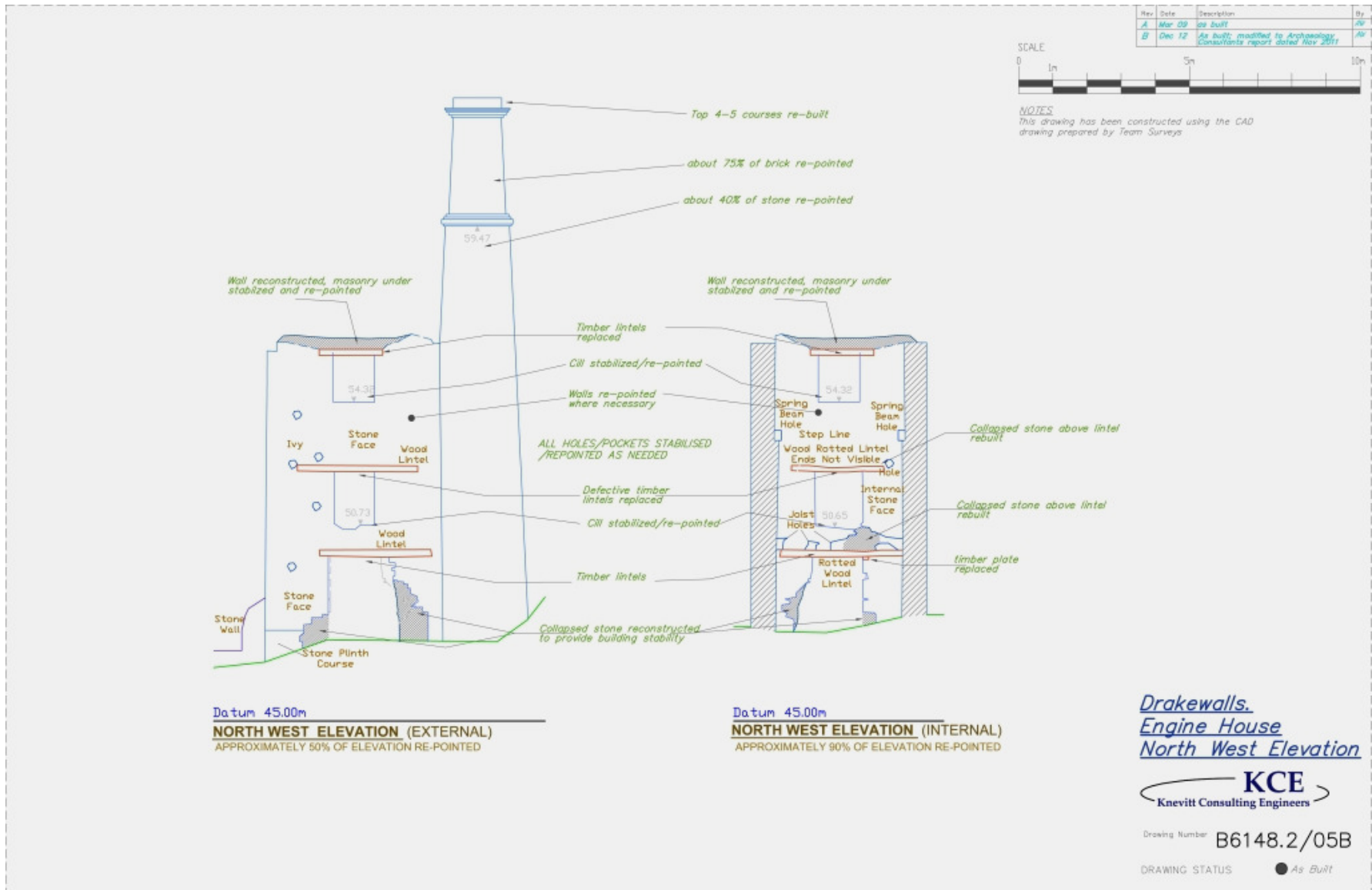


Figure 4 'As built' annotated North elevation survey of the rotary engine house after works (Kneivt Cons. Eng. 2008)



Figure 5 External north view of the rotary engine house before works © CC HE Projects 2008

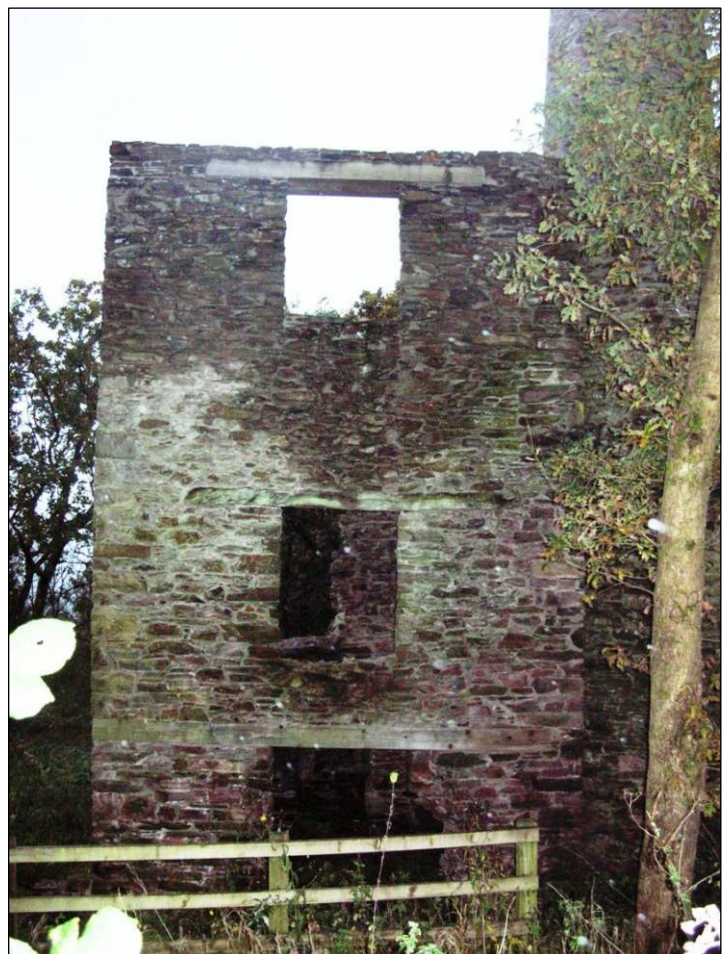


Figure 6 External north view of the rotary engine house after works © CC HE Projects 2011

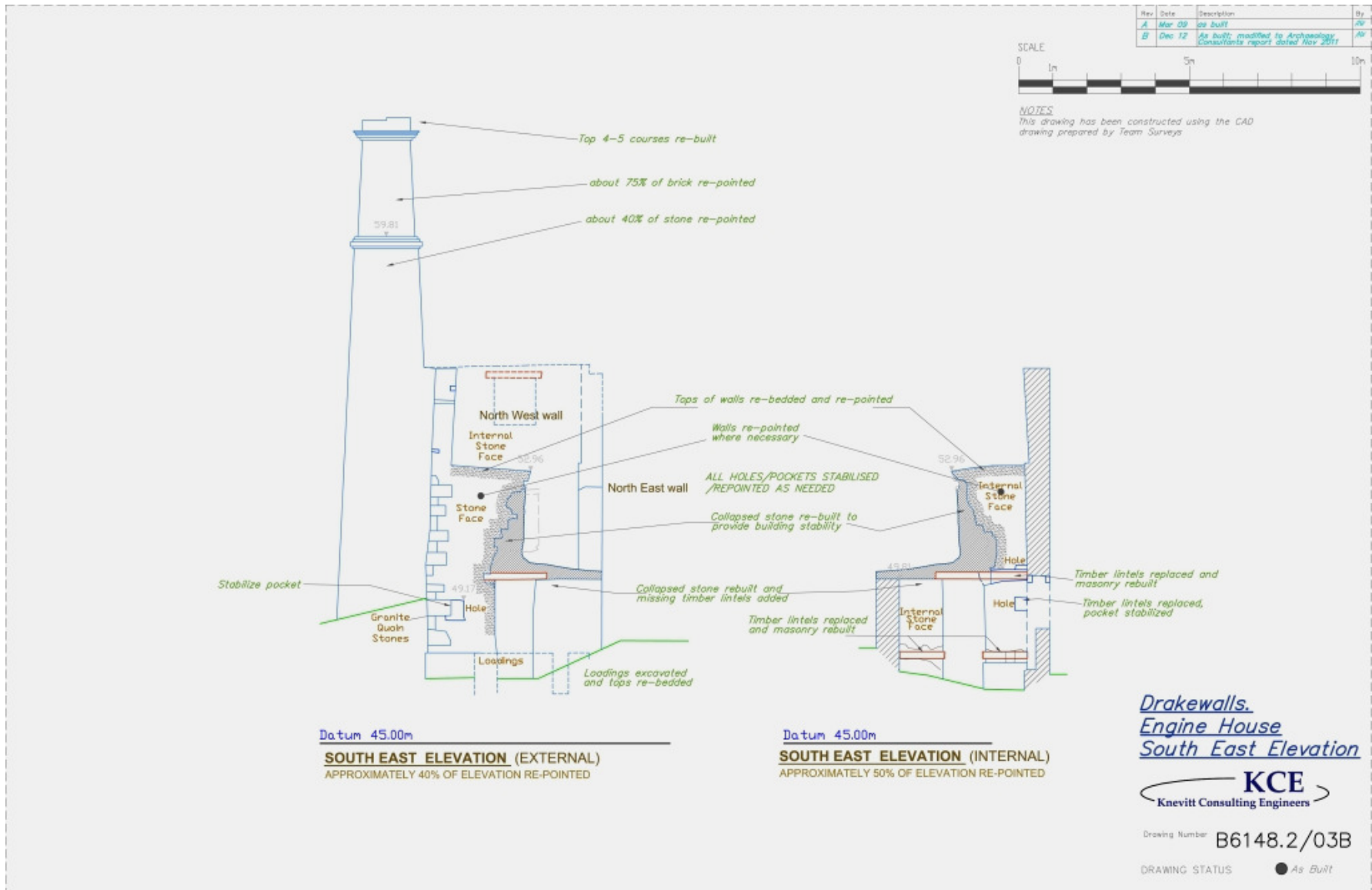


Figure 7 'As built' annotated South elevation survey of the rotary engine house after works (Knevvit Cons. Eng. 2008)



Figure 8 External south view of the rotary engine house before works © CC HE Projects 2008



Figure 9 External south view of the rotary engine house after works © CC HE Projects 2008

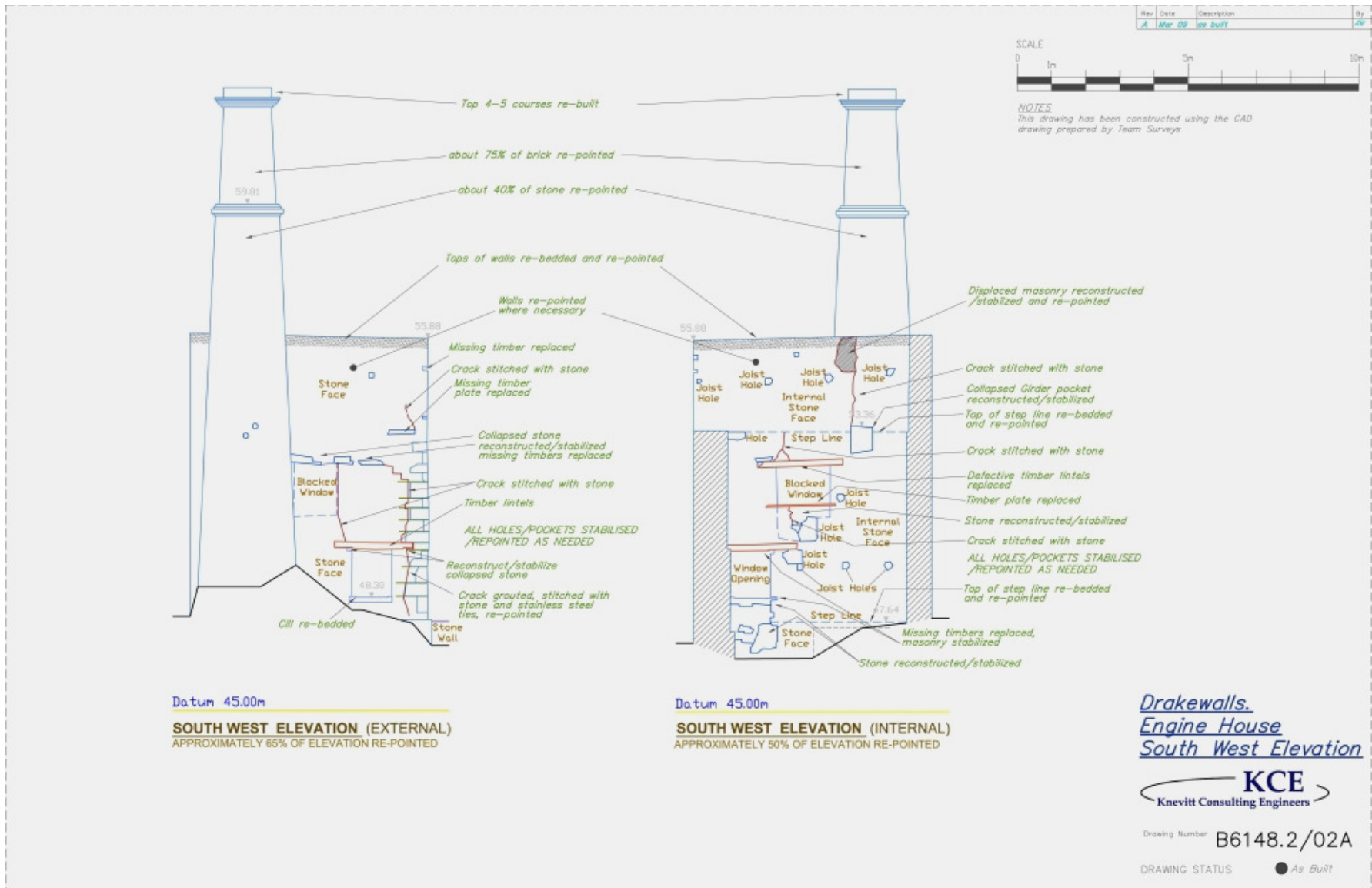


Figure 10 'As built' annotated West elevation survey of the rotary engine house after works (Kneivtt Cons. Eng. 2008)

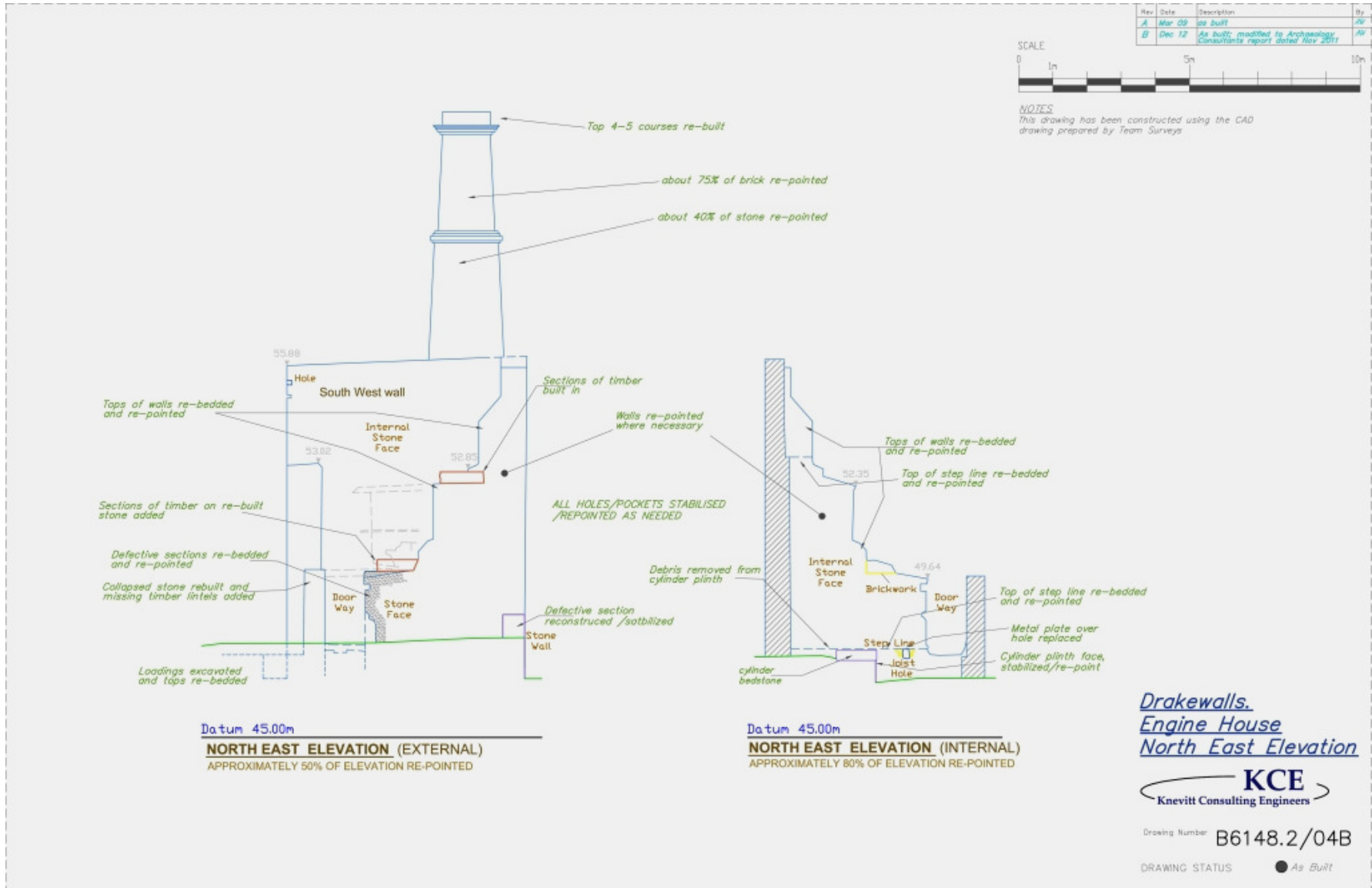


Figure 11 'As built' annotated East elevation survey of the rotary engine house after works (Knevvit Cons. Eng. 2008)

4.2 Flywheel loadings/crank pit

NGR : SX 42650 70728

Site No: 1.1

Recommendations (Buck 2007, 40):

Removal of the rubble from the engine house outside south (bob) wall would aid presentation of the loadings as part of the public interpretation of the building.

Expected site impact (Buck 2008, 14):

At present the flywheel loadings south of the mostly collapsed bob wall (Site 1.1), are almost buried by fallen bob wall masonry and earth/vegetation. It is proposed that this material will be removed to reveal the top and sides of the rotary engine crank pit loading and perhaps part of the flywheel pit, in order to reveal the site to the public, and the provision of site interpretation to promote its relationship to the building.

The overall impact of the proposed works on this feature can be defined as '*Minor positive*'. The works will provide more structural stability and a higher degree of Health and Safety for at least another generation, for what is an iconic 19th century former industrial site in the St. Ann's Chapel area.

Conservation works (2008):

Additional funds were found after the main conservation works to the engine house had finished to expend on the excavation and conservation of the (partly visible) loadings south of the engine house. Work on this started on 22/09/08, using a mini-digger to carefully excavate the earth and masonry rubble (from the collapsed south bob wall), over the loadings and from the flywheel and crank pits. Following excavation, the plan of the loadings is shown on Figure 3. The long masonry wall (west side) is 0.6m deep, whilst the crank pit is 0.8m deep and 2.65m long. The flywheel pit is on its eastern side and is 1.25m deep, 0.33m wide and 1.9m long – although this was partially infilled after excavation to its floor for safety reasons. The long masonry wall was revealed and conserved, as well as its associated loadings wall return. The position of a number of protruding wrought iron bolts from the masonry walls are shown on Figure 3 (an 'as-built' measured survey plan of the winder drum loadings, with annotations detailing the extent of the conservation works). Photographs of the site after excavation are shown on Figures 12 and 13.

The agreed mortar specifications for the engine house were also used for the adjacent crank and flywheel pit with loadings masonry. The top of the remaining loadings and walls were 'capped' and repointed. The walls were only repointed where there was a structural need to do so (mainly in their upper parts). It is probable that the winder drum was located on the east side of this feature – marked by a solitary protruding wrought iron bolt. Unfortunately there was insufficient funding to excavate and conserve this feature – although little is visible of its former masonry sides. By 24/09/2008, all the major lime repointing works to winder drum loadings had been completed, the surrounding area landscaped to permit safe public access.



Figure 12 External south view of the flywheel loadings/crank pit after works © CC HE Projects 2008



Figure 13 External east view of the flywheel loadings/crank pit after works © CC HE Projects 2008

4.3 Boiler house chimney

NGR : SX 42644 70728

Site No: 2

Recommendations (Buck 2007, 41):

Following removal of the ivy and a structural assessment, it is recommended that the chimney is repointed with a lime mortar where necessary and a lightning conductor attached. If the flue opening is visible it may need to be grilled.

Expected site impact (Buck 2008, 15):

The main impact on the fabric of the building is likely to focus at the top of the chimney where weather erosion is more likely to have affected the stability of the masonry, but more particularly the lime mortar. 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. This may entail renewing the top 'capping' of the chimney (approximately 12m high) – which has not been closely surveyed due to the dense ivy.

Given that the chimney is part of the engine house structure, it is likely that it will be scaffolded with the engine house. Following ivy removal, discussion with the site archaeologist and structural engineer concerning the nature and extent of the conservation works will be undertaken. In addition the site contractors (or another company), will install copper lightning conductors and earth rods/plates to achieve the appropriate conductivity earthing. The copper conductor will be attached down the inside of the chimney (in masonry joints) to exit through a small hole drilled at the base of the south side and then be attached to either earthing rods or an earthing mat (depending on the localised earth impedance level), sited nearby (away from archaeological features – at the direction of the archaeological consultant). Earthing plates will require excavation of the ground to a depth of approximately 0.4m depth, for an area of approximately 1.0m x 5.0m. If this form of earthing needs to be undertaken, then an archaeologist will be present to record any visible or disturbed archaeological features. There are not likely to be any other impacts. 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.

The overall impact of the proposed works on this feature can be defined as '*Minor positive*'. The works will provide more structural stability and enhance the site's visual authenticity for at least another generation. A photograph of the chimney is reproduced on the front cover.

Conservation works (2008):

Ivy and vegetation covered and obscured part of this chimney (see front cover and Figure 8). Once scaffolding was erected the ivy was removed. The sides of the chimney were repointed with mortar, and rebuilt (especially at the brick top) where necessary, although some small openings were left for bat roosting and bird nests. Figures 14 and 15 show the top of the brick cornice both before and after works. Given the state of the brickwork, the top four brick courses needed to be entirely rebuilt.

Before the scaffolding was removed in mid July 2008, a copper lightning conductor was fixed around the top brick course (see Figure 15) by contractors (Dawson Ltd), and connected to a copper tape that was fixed vertically into the internal side of the chimney, exiting through a small hole that had to be cut/drilled through the south-west side of the chimney.



Figure 14 External view of the chimney top before works © CC HE Projects 2008



Figure 15 External view of the chimney top after works © CC HE Projects 2008

Excavation for the lightning conductor earth plates took place on 17/09/08, after the scaffolding had been removed. A small digger excavated a trench 0.9m deep, 0.4m wide and 2.0m long, extending from the south west side of the chimney. Two galvanised steel plates, each 0.4m wide and 1.0m long, and each interconnected with copper tape, were placed in the bottom of the trench. The excavated soil profile was approximately 0.15m of topsoil/grass/earth, 0.4m of roots and sandy light brown shillet and tailings with earth/stone inclusions. Buried stone/brick/lime mortar formed the lowest layer profile 0.35m deep. There were no substantive archaeological finds apart from breaking a 6" diameter storm water drain that crossed the site, and across the conductor plate trench. This pipe was not shown on any services site plans. The broken pipe section was replaced by the site contractors, and the trench backfilled.

4.4 Boiler house

NGR: 42650 70737

Site No: 3

Recommendations (Buck 2007, 43):

It is likely that there will be public access within this building and so it is recommended that the fly-tipping is removed as well as some of the rubble masonry at the west end of the building. The structural condition of the tall section of the northern wall should be assessed after the dense ivy has been removed. It is important that the small trees growing from both walls are cut at their base and the stumps treated. The remaining walls should be repaired and repointed to achieve structural competency where necessary, and the tops of the walls capped and repointed with lime mortar.

Expected site impact (Buck 2008, 16):

The main impact on the fabric of the building is likely to focus on rebuilding the collapsed sections of masonry at both the north and south sides of the building where a combination of tree roots and general structural deterioration have combined to affect the stability of the masonry, causing localised collapse of part of both remaining walls. The tree root in the south wall will need to be removed (as far as possible and any remnants treated with Amcide (a tree stump killer). The collapsed section of wall on the south side will need to be partly rebuilt using stone from the mounds of adjacent rubble in order to ensure that the rest of the wall stays structurally sound. Both sides of the boiler house walls act to retain higher ground on the north and south sides. The fly-tipping and loose rubble will be removed from the floor of the building to leave a surface that is accessible to the public. The tops and sides of the walls will be repointed and capped to permit water run-off.

There are very few visible remnants of the Miner's Dry. It is not the intention of the building conservation project to excavate and reveal more of this feature; however those that are visible will be repointed and if necessary re-bedded. The overall impact of the proposed works on this feature can be defined as '*Minor positive*'. The works will provide more structural stability and enhance the site's visual authenticity for at least another generation.

Conservation works (2008)

Once the ivy and vegetation covering the remains of the former Miners Dry building and extension was removed (and the thick ivy stems treated with a root killer), the instability of both wall remnants could be seen. The northern wall was stabilised by adding stone and complete repointing, whilst the southern wall was substantially rebuilt with the existing fallen stone (up to the junction with the engine house), and the tops of the walls were re-bedded with mortar, and the sides of the walls completely repointed. Figure 3 is a plan survey of the site with annotations describing the extent of the conservation works. A number of photographs were taken before, during and after works. These conservation works were finished by mid June 2008.

4.5 Site safety fencing

NGR: SX 40069 70627 and SX 42650 70737

Site No's: 3 and 9 (respectively)

Conservation works (2008)

Figure 3 shows the extent of site fencing at a single location on the higher north side of the boiler house (Site 3), although fencing of Site 9 (see Figure 2) along its north western masonry boundary also occurred (not shown on Figure 3). This consisted of timber posts and straight wire. All tanalised posts are 1.3m high above ground level. In addition, for fencing other steep drops within the site (for example Site 9, the Buddles compound), on the west side of the feature), tanalised posts and barbed wire were used.

It should be noted that prior to the start of the buildings conservation project, the Duchy of Cornwall (landowners who undertook all the site fencing), fenced both Webb and Matthews Shafts (with a single encompassing fence), due to the recent collapse of Webbs Shaft (Buck 2007, Site 6, 44).

4.6 Tamar Valley Centre

NGR: 42566 70660

Site No: North of 21b

Recommendations (Buck 2004, 26):

This site is on the main part of the mine site (see Figure 2). An archaeological assessment of this site was undertaken in 1994 (Buck 1994). Although these sites do not in themselves merit much archaeological interest, the aesthetic relationship of the dumps to the engine house and other areas of the site is still preserved. There may be archaeological information buried under the dumps (this area may have been the site of earlier dressing floors), and an archaeological watching brief during dump removal would be necessary if these features are to be removed from the site.

Expected site impact:

An archaeological impact assessment was not requested for this site – which followed standard planning application protocol. However, historical/archaeological consultancy was sought by CC Planning Advice Team, from which the planning condition of archaeological recording was based. The archaeological consultancy information related to the site's proximity to a large spoil mound (Buck 1994, Site 21b), and the site of an 1830s water wheel leat (as shown in Buck 2007, 11, Figure 6).

Archaeological recording (2008)

The site's topography is gently sloping from south to north and steeper from west to east (see Figure 22 for landscape survey plan). In 1997, this area of the former Drakewalls Mine dressing floors was purchased by Cornwall County Council from the Duchy of Cornwall (Buck 1997). Due to high levels of metalliferous toxicity, and the desire of the County Council to have the site as a public amenity area, the former dressing floor area was landscaped and covered down with a less toxic earth material, then grass and wild flowers grown. The adjacent pumping engine house was also conserved (Buck 1997, Section 4.8), which provides an impressive World Heritage Site reference point and view from the new Tamar Valley Centre.

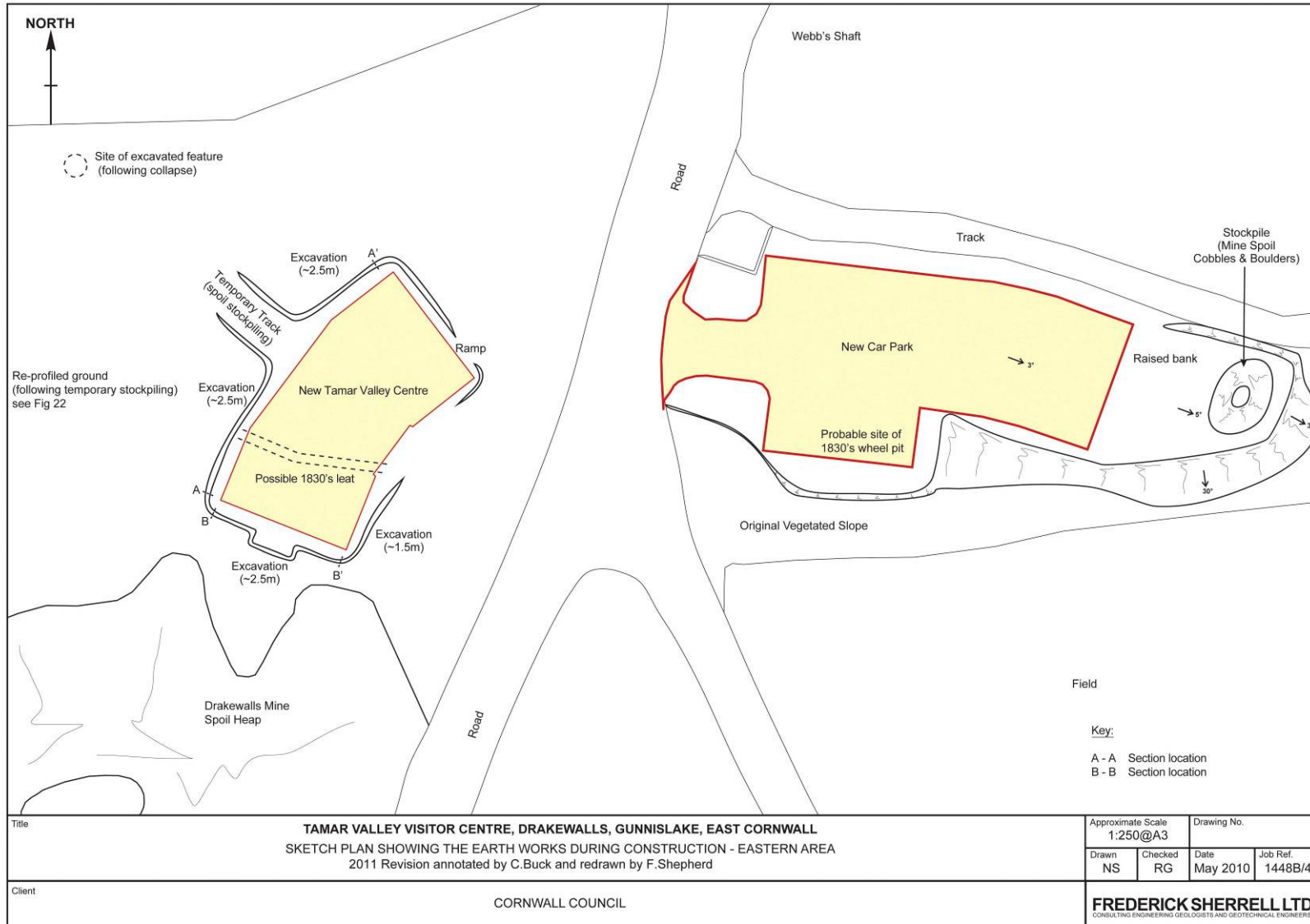
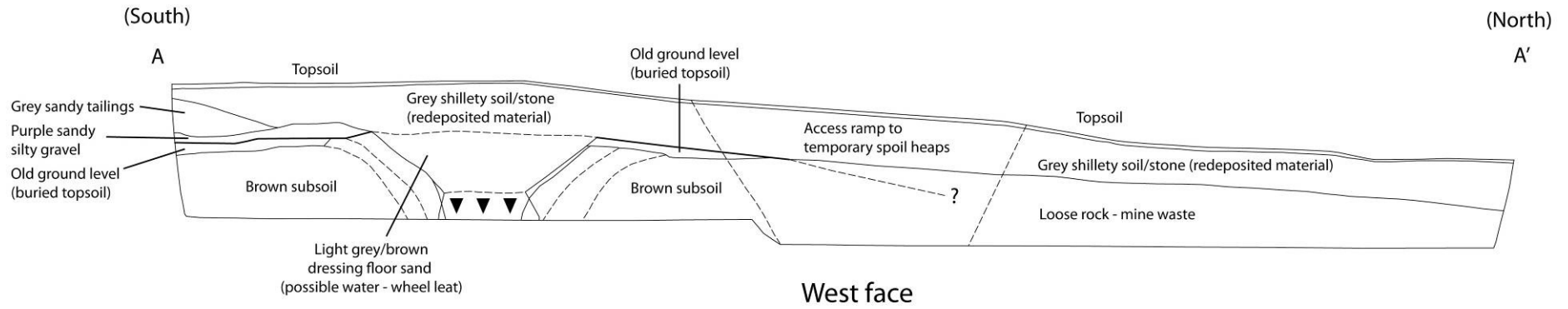


Figure 16 Survey Plan of the Tamar Valley Centre site and car park (Original by Sherrell 2011, revised by C Buck)

Section A - A'



Section B - B'

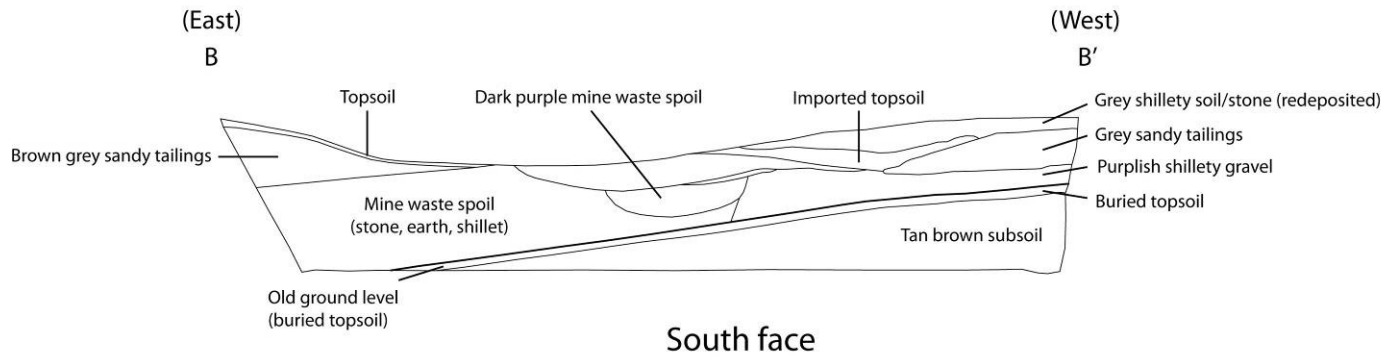


Figure 17 Section drawings A - A' and B - B'



Figure 18 A view (south end) of Section A-A' from the east © CC HE Projects 2008



Figure 19 A view of Section B-B' from the north © CC HE Projects 2008



*Figure 20 A view of the Tamar Valley Centre building site (from the northeast)
© CC HE Projects 2008*



*Figure 21 A view of the finished Tamar Valley Centre building (from the north)
© CC HE Projects 2008*

Site excavation started in early May 2008 (see Figure 20), with the final depth of footprint excavated by 21/05/2008. The site, as shown in detail on Figure 16, consisted of a rhomboid excavation, leaving a deeper section at the south west corner (Junction of Sections B' and A), to a depth of 2.3m, whilst the opposite corner was only excavated to a depth of 1.0m. Sections A-A' (south face) and B-B' (west face), are only shown in this report (as being representative of the soil profile and revealed archaeology). The illustrated sections are shown in Figure 17, with a photograph of each section reproduced as Figure 18 for Section A-A' (south half), and Figure 19 (Section B-B').

In both sections, an old ground level can be seen part way through the centre of each soil profile. The fill material (spread layers of mine waste material and shillet overburden), over the old ground level, may have been relatively recent (i.e. 1997), or perhaps the result of landscape clearance works post dating the end of the mine's operation (turn of the 20th century). Underneath the old ground level line, the earth profile reflects natural tan coloured subsoil overburden, or as natural as one can get adjacent to a large mine waste dump on an old mine site.

The main significant archaeological feature is plainly visible in both Section A-A' and Figure 18. The light grey dressing floor sand material appears to have been deposited into a wide profile water leat which fed a water wheel sited in the area of the new car park (Section 4.7). An 1834 Tithe map showing the course of this leat is reproduced in Buck 2006, 11, Figure 6). The top of the leat cut is approximately 4.0m wide across its top, 2.0m deep and 1.5m wide across its excavation base. The remainder of the section show a variety of mine waste and sandy dressing floor tailings; visual below ground archaeological features for this part of the Drakewalls mine site, which in the mid 19th century once sited its dressing floors. Section B-B' is also a relatively standard profile for this part of the mine site, reflecting the site's topography and proximity to a large mine waste tip.

Given the depth and loose infilled leat material at the base of the foundation excavation, a decision was taken to further reduce (by an additional 0.8m), the depth of the building's footprint in order to entirely remove the leat's infill from the floor of the site. An access ramp had previously been excavated through the west side of Section A-A', in order to remove the surplus material to temporary dumps (see Figure 22), from which it was redistributed on site and then covered down with imported cleaner additional earth/stone, as the excavated material from both the building's footprint and the new car park excavations contained a degree of mine waste and metallic ore contamination.

To summarise, the total depth of ground removed on the west side was approximately 2.8 to 3.0m below ground level, reducing from 0.3 to 1.5m on the east side. The north side was only 0.3 to 0.5m, and the south side only 1.5 to 3.0m below ground level. The excavation area was then levelled with a layer of '803'. The building was erected after the excavation footprint was deemed to be acceptable by the site building engineer (Mark Lovell Design Eng.) at the end of May 2008. Photographs were taken of this process, although the final stage is only shown in this report (Figure 21).

4.7 New car park

NGR: 42598 70666

Site No: 8

Recommendations (Buck 2007, 49):

The water wheel site is likely to be buried under a few metres of mine waste debris. The proposed car park is to be sited on top of the existing mine waste tip. It is recommended that apart from removal of the tree trunk roots, the site is not excavated to any depth below 1.0m below the existing ground level – in order to ensure burial preservation of any remains of the 1830 water wheel pit.

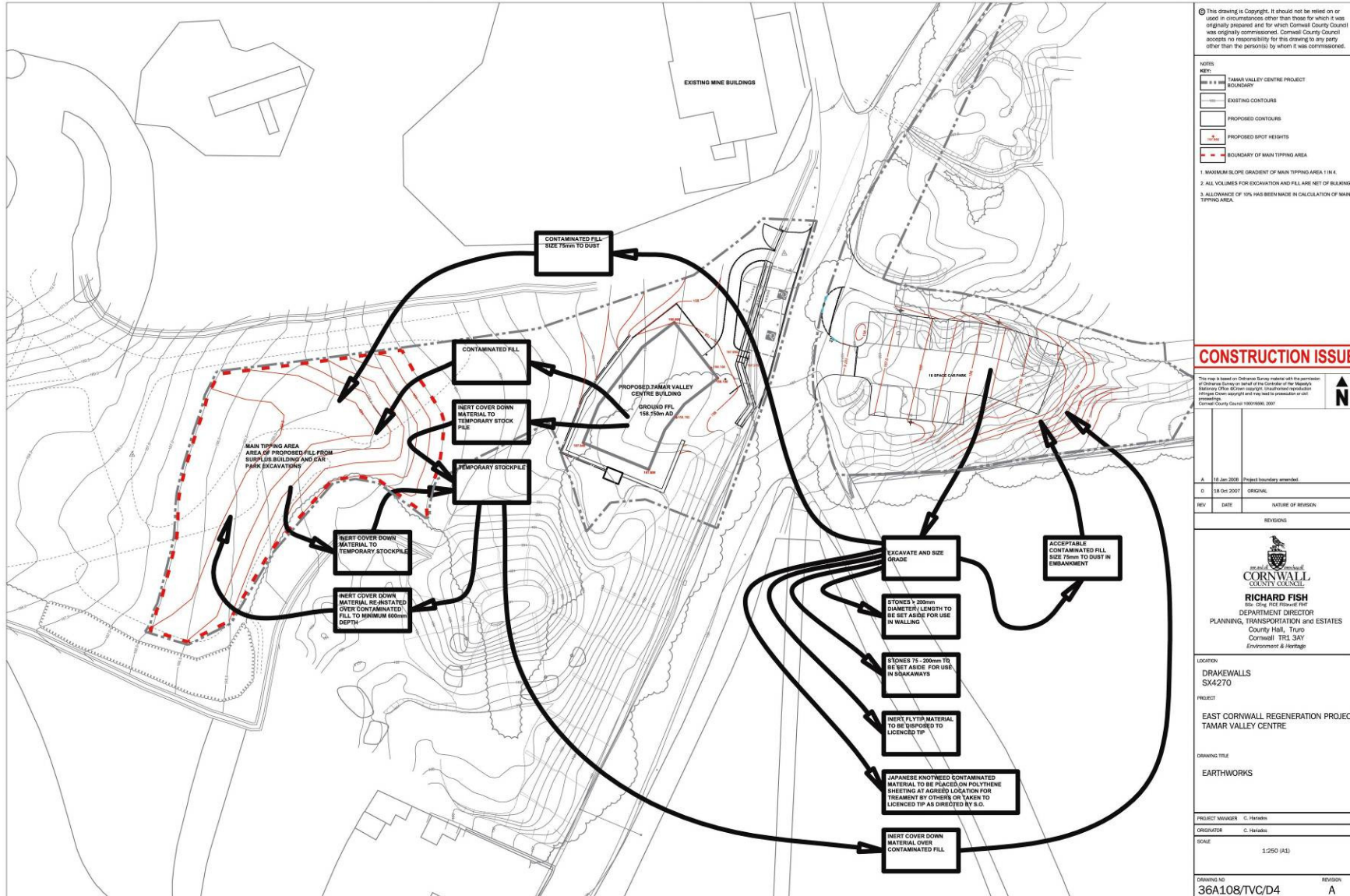


Figure 22 Tamar Valley Centre earthworks site plan (CCC 36A108/TVC/D4 Rev A)

Expected site impact (Buck 2008, 17):

The height of the original ground surface can be surmised from the adjacent track to the north. The highest point of the late 19th century spoil dump is approximately 3.0m above ground level, close to the approximate site of the wheelpit (Buck 2007, Figure 6, page 11). It is hoped therefore that there will be no archaeological impact arising from the proposed Tamar Valley Countryside Service Discovery Centre car park (on top of the spoil mound), to the possible remains of the wheelpit walls (at a much lower level).

Archaeological recording (2008)

The site's topography is sloping from west to east and from north to south (see Figure 22 for landscape survey plan). In late 2008, this eastern area of the former Drakewalls Mine was purchased by Cornwall County Council from the Duchy of Cornwall, as well as the site containing the rotary engine house (Buck 2007, Site 1). This is a woodland site, which has grown on top of and around the sides of a former mine waste tip (probably from Webbs Shaft – (Buck 2007, Site 6 - to the north of the car park).

The trees covering the site of the new car park (see Figure 16), were removed in late 2007, and the stumps with some fly-tipping by 20/05/2008, to form a flattish area. In order to create a gradual link into the car park from the adjacent road, approximately 1.6m to 1.8m of material was removed across the site, to achieve appropriate levels for access and water run-off.

As described above, the southern part of the site appears once to have sited an early 19th century water wheel pit, which may have been impacted by reducing the ground levels of the site to accommodate the new car park. Accordingly, a trial site investigation trench was excavated across the probable site (north-south), down to the finished car park level (which was built back up from its excavation level). No evidence of the site of the wheelpit was forthcoming. All of the excavated material consisted of mine waste rock and earth. Presumably, if there are remains of the wheelpit, it is located deeper underground. By 28/05/2008, the car park was rolled with '803' ready for the final tarmac surface finish.

4.8 Depression site investigation

NGR: 42546 70675

Site No: South of Sites 10 and 12 (Buck 1994)

Archaeological recording (2009)

The site's topography is sloping from north to south and slightly from west to east (see Figure 22 for landscape survey plan and Figure 16 for the site plan). In the mid 1990s, the main part of Drakewalls Mine was purchased by Cornwall County Council from the Duchy of Cornwall. Shaft treatment and large scale landscaping works soon followed (Buck 1995). In a second phase, conservation works to the pumping engine house and other site fencing and gunnis hedging occurred from 1996-1997 (Buck 1999).

During the excavation phase of the Tamar Valley Centre and the creation of temporary waste dumps (see Figure 22), a slight depression was observed. The site was temporarily fenced off during the site works. Sherrells Ltd (geotechnical mining engineers of Tavistock) were asked to undertake a small site investigation with a mini-digger. This took place on 13/01/2009. The small collapse was approximately 1.3m x 1.1m and 0.7m deep. It is sited 2.7m from the adjacent hedge encircling the south side of the gunnis (as shown on Figure 23). The feature was excavated to a depth of 1.5m and a length of 3.0m, with two trenches cut across the feature (see Figure 24). No definite conclusions were reached, except that it was probably a shallow pit or trench that had collapsed – possibly as a result of the previous landscaping works in 1995 that had covered a shallow void – which subsequently collapsed in late 2008. The site was backfilled.



Figure 23 A view of the surface depression before site investigation (from the south east) © CC HE Projects 2009



Figure 24 A view of excavated surface depression (from the north) © CC HE Projects 2009

5 References

5.1 Primary sources

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6 Project archive

The HE project number is **2008038**.

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. The contents of this archive are as listed below:

1. A project file (2008038) contains site records and notes, project correspondence and administration.
2. **Site recording (Photographic):**

Photographs (Black/White: **GBP**,) and Digital images are archived under the following index numbers:

Black/White photographs:

Site before consolidation works: GBP 1890/0-36; 1904/21-36

Site during consolidation works: GBP 2034/1-5; 2036/1-9, 29-36; 2038/31-36; 2039/25-27; 2041/2.

Site after consolidation works: GBP 2073/1 – 4;

TVC (WB): GBP 2035/1-7, 16-19; 2036/10-14

Digital images:

(R:/HE Images/Sites A-D-P/Drakewalls Mine WB 2008038)

3. **Site recording (Surveys):**
CAD surveys: .pdf copies of the original (2007) Team Surveys CAD survey and 'as built' survey files (created by Knevitts Cons. Eng.) are in the project file.
4. This report text is held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Sites D\Drakewalls (East) Mine HBC-WB 2008038\Report & Figs\ Drakewalls (East) Mine report 2008038.doc
5. EH OASIS No. cornwall2-115742