

# Devon Great Consols Incline Winder Devon

## Archaeological site investigations



**Historic Environment Projects**  
Cornwall Council



A Report for Mr and Mrs Hoskins

**Devon Great Consols steam incline winder site  
Morwell, Devon**

**Archaeological site investigations**

<b>Client</b>	<b>Mr and Mrs Hoskins</b>
<b>Report Number</b>	<b>2009R081</b>
<b>Date</b>	<b>October 2009</b>
<b>Status</b>	<b>Final</b>
<b>Report author(s)</b>	<b>Colin Buck Dip. Arch MIFA</b>
<b>Checked by</b>	<b>PGR</b>
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### **Acknowledgements**

This site investigation report was commissioned by Mr and Mrs Hoskins. It was carried out by the Historic Environment Projects team, Cornwall Council.

Within Historic Environment, the project manager was Colin Buck and Figures 1 and 4 reproduced in this report were compiled by Emma Trevarthen and Jane Powning. The report was edited by Pete Rose, Projects Manager.

The views and recommendations expressed in this report are those of the Historic Environment Service 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.



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### **Cover illustration**

A view from the north of the base of the boiler house chimney and soot opening (Site TT5, Buck 2009)

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Report No <b>2009R081</b>	Report Name <b>Devon Great Consols steam incline winder site - archaeological site investigations</b>	Report Author <b>Colin Buck</b>
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Event Type Archaeological site investigations and recording			
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Client Organisation Mr and Mrs Hoskins	Client Contact Mr and Mrs Hoskins
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Monuments (MonUID) Devon (3881)					
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Fieldwork dates (From) 14/10/ 2009	(To) 14/10/ 2009	(Created By) Colin Buck	(Create Date) 15/10/2009
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Location (postal address; or general location and parish)

The Incline winder complex is sited at the top of the Morwellham Incline and the southern end of the Devon Great Consols railway, near Morwell, Devon

(Town – for urban sites)	(Postcode)

(Easting) X co-ord SX 44274	(Northing) Y co-ord 70359		
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**List of Figures** (at end of report Appendix 1)

Fig No.	Description
1	Location and site plan
2	Proposed Incline winder trial trench sites
3	Excavated Incline winder trial trench sites (14/10/09)
4	Detailed site plan of excavated archaeological features
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6	General view looking south
7	Photo of TT3
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**Appendix 1**

Project Design for site trenching and archaeological recording of former buildings at the Morwellham steam Incline Winder, Devon (Buck 24/4/2009)

**Appendix 2**

Reproduction of archaeological assessment of Incline winder sites (Wheal Russell Mine, Sites 47 to 56: Buck 2005, 41-44)

## **Project background**

The landowners (Mr and Mrs Hoskins), are interested in a project to investigate the possibility of conserving any low walled building remnants of former cottages, a steam engine house, a boiler house and chimney, and two other buildings within a small complex that functioned from the mid 19<sup>th</sup> century to lower/wind materials up/down the Morwellham Incline for Devon Great Consols Mine (4.5 miles to the north west), as described in an assessment report (Buck 2005).

The landowners hope that the existing remnants of these buildings (some oblong mounds of stone/earth on the same site as the original buildings), hide the lower sections of each wall, which when revealed (and conserved), will provide an informative, interesting and educational function for all visitors walking through the site from a nearby public footpath. The site is also very accessible from the recently opened Devon Great Consols Mine to Morwellham (4.5 miles) public access trail.

The site has the statutory designation of being within the Tamar Valley AONB, and the non statutory designation of being within the Cornwall and West Devon World Heritage Site (WHS). In addition Natural England (NE), are interested in the possibility of funding related follow-up projects (if there is sufficient walling to preserve the original outlines of some buildings), including the conservation of extant walling, fencing of a shaft, track drainage and site interpretation etc.

A project design (24/04/09), was produced by Historic Environment Projects, Cornwall Council, describing in detail (and mapping) the nature and extent of proposed site investigation trenches at the corners of the site's buildings, as shown on archive survey plans (see Fig 2). The project design was accepted by Mr and Mrs Hoskins and Devon County Council (Bill Horner/Steph Knight). The site investigation project was funded by Mr and Mrs Hoskins.

## **Aims and objectives**

The purpose of this industrial archaeological feasibility project and archaeological recording as set out in the project design:

- To investigate the relatively high potential for the existence of lower wall sections (at the proposed trial trench locations given in Fig 2), of a number of buildings that functioned to provide the power source for winding and lowering mine materials up and down the Morwellham Incline.
- To ensure that all site excavation works are supervised by the site archaeologist; machine clearance will carefully reveal any surviving low sections of extant walls (the vertical face and tops of exterior walls), from obscuring rubble only at the trench locations shown in Fig 2, in order to minimise adverse impact upon the archaeological resource. Given the degree of rubble/earth overlying these buildings, it was not intended that internal walls be excavated for building conservation.
- To ensure that rubble clearance was carefully undertaken in such a way as to allow adequate archaeological recording of revealed walls which included photography (before works, after walls revealed, and after each trench site was to be backfilled to its original site topography and levels).
- Following site clearance fieldwork (minimal excavation to original ground level), to produce a short archaeological record report describing not only the nature and extent of the trench excavations, but also (depending on the results of the feasibility trenching), specific recommendations for a further more focussed clearance operation to reveal the lower walls of a number of buildings. It is thought that this second stage project, to conserve the revealed walls, will be eligible for funding from NE.
- To ensure that there is an agreed appropriate communication strategy for progress and any other issues etc with NE (Archaeology - Joy Ede) and Devon County Council (Archaeology - Bill Horner/Stephanie Knight), throughout the duration of the archaeological fieldwork element of the project.

- To record sites, features, deposits and artefacts affected by or uncovered by the works for Devon's Historic Environment Record.
- To disseminate the results of the project appropriately by production of an archaeological report and arrange for the deposition of the project archive.
- If, following fieldwork and production of the WB report, NE and DHES agree that conservation of buried/obscured walling is appropriate, a project design/WSI will be produced as part of a Stage 2 project for this site.

### **Working methods (summary)**

The detailed working methodology for both excavation and archaeological recording is described in detail in the project design (Appendix 1, Buck 24/4/09). The following is a summary of the main working methods:

1. The priority sites for archaeological investigation which may lead to building conservation and thereby increased public interpretation, are the steam engine house (Site 53), the boiler house (Site 52), its chimney (Site 52.1), the cottages (Site 49) and the winder buildings (Site 55). The proposed sites are shown on Fig 2, whilst the actual sites that were excavated are shown on Fig 3. The shaft water supply and reservoir pond are still visible on site, but the remainder of the sites are obscured by grassed rubble/earth.
2. Archaeological recording in the form of measured surveys (tape measured as appropriate and where possible given Health & Safety constraints), was undertaken at all features that were excavated as part of the Trial trenching.
3. Archaeological recording in the form of photography (as appropriate), was undertaken before any archaeological sites were revealed, during works (with scales), and if appropriate, after works were finished. This involved only the trench evaluation sites (see Fig 3).
4. A comparison of the proposed site investigation trenches (Fig 2), with the actual site investigation trenches (Fig 3), should be made – reasons for these differences are described in the Results text below.
5. An overall Monitoring Brief (liaison with site owner/contractors), ensured that the site works, vehicle movements etc. did not cause unintentional damage, nor result in any unforeseen impacts upon known archaeology.

### **Results**

The site investigation works was undertaken on 14<sup>th</sup> October 2009, using a one ton mini digger with a toothed bucket 0.8m wide, organised by the site owners (Mr and Mrs Hoskins). Two additional people employed by the site owner assisted the excavation; the digger driver and an assistant. The digger driver has worked for the present and previous owners of Morwell House for over fifteen years, and (once we were on site) recounted specific instances when the Engine and boiler house site (Sites 52 and 53) had been over-dumped especially within the last decade, when the main reservoir pond was cleared of debris, the earth residue being dumped on this site. This information was not known to the present owners (nor site archaeologist). Thus it had been presumed that the oblong mound over these two sites, was in fact rubble debris from the demolished engine and boiler house, when the site was reduced in c1903, following a request by the landowner (Duke of Bedford).

The following summary table describes the results of the site excavation works per TT (Trial trench) and site number. The location of Sites TT1 to TT10 can be seen by referring to the original proposed site plan (Fig 2). The two additional sites (TT11 and TT12) can be seen by referring to Fig 3, which also shows all the sites that were excavated, and those that were not.

Trial trench No.	Site Number (Buck 2005)	Site investigation results summary (14/10/09)
TT1	51 (Building)	No masonry features found at or below ground level
TT2	51 (Building)	No masonry features found at or below ground level
TT3	49 (Cottages)	Front wall of north cottage located and stone flooring just below ground level
TT4	49 (Cottages)	No evidence of south cottage front wall, site consists of deep deposits of re-deposited slate and stone rubble
TT5	52.1 (Chimney)	Chimney base located to original ground level and revealed soot access opening
TT6	53 (Engine house)	Site not excavated due to c2.0m deep over dumping
TT7	52 (Boiler house)	Site located, excavated and revealed boiler house wall return and flue to chimney
TT8	52 (Boiler house)	Site not excavated due to c2.0m deep over dumping
TT9	55 (Winder building)	Site not excavated as similar site excavated at TT12
TT10	55 (Winder building)	Site not excavated due to presence of large tree
TT11	52 (Boiler house)	Site located, excavated and revealed boiler house wall return and possible water drain sump soakaway
TT12	55 (Winder building)	Alternative location for both TT9 and TT10. Revealed masonry remnants (as shown on maps), and round profiled brick structure that may have housed the horizontal winder mechanisms.

The following eight trial trench excavation sites are described below, TT1-5, TT7, TT11-12:

#### TT1 and TT2 (Site 51 Building)

This building would have been sited on top of the scarp above the railway line. Its function has never been identified. Excavation of TT1, TT2 and along the western scarp edge failed to find any evidence of any masonry walling. Compacted light grey shillet forms the subsoil which was found 0.46m below ground level. Figure 3 shows the extent of the excavation areas.

#### TT3 (Site 49 Northern Cottage)

This site is characterised by linear mounds (0.4 to 0.6m high), in a predominantly flat area, which appeared to be the outline of sub-surface masonry walling of the northern cottage, covered by earth and vegetation. Excavation of TT3, just below surface level, soon revealed firstly, an area of flat stone/tiles bounded on the north side by vertical sections of stone 0.05m wide, in front of the cottage, near the remains of a porch wall. This was revealed to an area of 2.2m x 3.0m. Presumably this was formed as a stone walkway in front of the cottage, perhaps leading to a front porch, as shown on the 1883 OS map. A section of low front wall (0.3m thick), was then located for a length of 3.0m, possibly from its north face corner return, as well as possible remains of the north wall porch footings. The low wall (0.26m at its north end and 0.36m at its south end), was found below masonry rubble and earth 0.23m below surface mound level. The wall can be seen in Figs 4 and 7. This is an interesting site, which if the earth and rubble stone covering is carefully removed, has the potential to reveal the four walls of the northern cottage, and any outside stone/tile flooring.

#### TT4 (Site 49 Southern Cottage)

This site has a very different characterisation which, although predominantly flat, contains no surface evidence of linear mounds that may indicate the presence of sub-surface extant walls. The site of TT4 was located by measurement, but unfortunately, there was no distinct evidence of any walling. The ground was quite soft, and consisted of rubble masonry, some glass bottles and sections of flooring slate. An area of 4.0m x 4.0m was excavated to a depth of 1.0m in places, without finding any significant features



worthy of preservation. The ground appears to have been excavated or turned over in the past.

#### TT5 (Site 52.1 Chimney stack)

This site was located by offset measurements from the site of the north wall of the adjacent boiler house. The top of the chimney masonry remains are only 0.15m below ground level (see front cover photo). The sides of the masonry were revealed to a depth of 0.73m below masonry level for a circumference of 1.9m. Of additional archaeological interest was revealing the intact stone/brick arched soot opening (0.4m high and wide, 0.7m deep) on its north side. The base of the opening would have been at ground level and was used to remove the soot build up from the base of the chimney (see Fig 6). Again, this is an interesting site, which if the shallow covering of earth and rubble stone covering is carefully removed, has the potential to reveal not only the entire chimney stack base, but also the remains of the flue from the adjacent boiler house (Site 52, TT7).

#### Note:

Due to substantial overdumping of Sites 52 (Boiler house) and 53 (Incline winder engine), to a depth of approximately 2.0m (of mainly earth) above ground level, by previous occupants of Morwell House within the past twenty years, both the proposed sites of TT6 and TT8 were not uncovered, simply marked on site. The north, south and east walls of both sites are covered by dumping, but the west wall has not been overdumped (see Fig 4 for extent).

#### TT7 (Site 52 Boiler house)

The north west corner return of the boiler house wall (0.5m thick) was revealed 0.5m below existing field level, for a length of 0.6m from north-south and 1.3m from east-west. The masonry wall was excavated to a depth of 0.7m where it was seen to be founded on earth. It therefore represents the lower wall footings of the boiler house. At a distance of 0.55m from the corner return on the north wall face (see Figs 4 and 8), masonry rubble (0.3m below ground level), was found to overlie the remains of the western masonry flue wall which housed the exhaust flue from the boiler house to the south side of the chimney stack (Site 52.1).

#### TT11 (Site 52 Boiler house)

The south west corner return of the boiler house wall (0.5m thick) was revealed at or just below existing field level, for a length of 1.2m from north-south and 2.2m from east-west (see Figs 4 and 9). The south masonry wall was only excavated to a depth of 0.57m (this is likely to be shallow), but the west wall corner foundations (at the corner return), were not located either after excavation to a depth of 1.6m. However, a deep earth cut 0.95m wide from east – west from the wall masonry corner return was discovered. This deep site has been interpreted as a possible excess water sump outlet for the boiler house. It is located at the lowest corner of the boiler house site, and would have allowed water to drain away below ground level. However, the northern corresponding edge of the possible sump feature was not found.

It is acknowledged that the western boiler house wall is at or up to 0.5m below ground level; however, careful removal of the shallow covering of earth (now both ends of the wall has been revealed), on top and adjacent to its western (field) side for a maximum depth of 0.5m has the potential to reveal the entire west wall for a length of 17.0m, to allow re-pointing and capping of the upper two layers of masonry.

#### TT12 (Site 55 Maintenance buildings)

Excavation of TT10 was not possible due to the presence of a rather large tree. An alternative site to both TT10 and TT9 was chosen at the new site of TT12 (see Fig 3). This site has not been understood in detail in terms of its function, set within a yard with a mostly intact perimeter wall 1.8m to 2.0m high. However, the brief excavation of TT12 may shed some light on the mechanism of lowering and raising the ore wagons down and up the incline to Morwellham.; 'Gilson Martin of the Bedford Estates Office, Tavistock, wrote a report to the Duke of Bedford on 31 December 1868, and described the Incline railway: '*The trucks are lowered down this incline by a wire rope attached to powerful brakes, a fixed steam engine is used to for drawing the trucks up the incline*.' ... the last

*half-mile down to the quays being a steep incline, up and down which the wagons are drawn and lowered by a 22"stationary engine and a 4"wire rope. The gauge is 4ft. 8½" (the ordinary narrow gauge), but the rails are, like those of the Great Western lines, laid on longitudinal sleepers, their weight being 39 lbs. to the yard. The ore wagons weigh 2 tons 5cwt each and carry 3½tons of dry ore... A train generally consists of eight or ten wagons' (Hall 2000, 110 quoting an 1860 newspaper account of the mine). A flat rod (possibly via an underground channel), would have been connected from the crank pit loadings (the rectangular feature on the south side of the rotary engine house), to possibly Site 55, which may have (via large horizontally below ground large round wheels), drawn the wagons up the incline via the 4" wire rope. Alternatively, this site may have been the 'powerful brakes' that is mentioned in the historical text.*

The excavation of TT12 shows a wide horizontally round profiled brick feature (possibly up to 3.0m diameter), within a rectangular masonry feature (0.4m thick, up to 0.9m high and only 0.25m below ground level), as shown in plan on all archive maps, and in detail in Fig 4. There was insufficient time to investigate the feature in detail, but the site's potential is high. Although there is some degree of rubble on the site, it has not been affected by over-dumping, is close to existing ground level, and appears to retain its original shape and form (albeit at a lower level than its original form – see Fig 10), which included structural iron components to minimise structural weakness in each of the two buildings through vibration and movement of the inner wheels. It is likely that the large iron wheels were horizontally set within the inner rounded brick masonry chambers. It is likely that the upper sections of these buildings were demolished to remove the two large wheels for scrap value when the mine closed in 1903. However, the lower footings of the original brick lined chambers appear to remain. It was felt that excavation of TT9 would not provide any more archaeological information than that provided by TT12.

This is possibly the most interesting and significant feature of all the sites that have been excavated. If the shallow covering of earth, roots and rubble stone covering is carefully removed, these two features have the potential to reveal a rare form of incline plane winder/brake mechanism for public and industrial archaeological interpretation.

### **Finds**

All of the finds were not significant and appear to relate to general demolition debris belonging to the cottages and uses of the site (ie glass bottles, 19<sup>th</sup> century pottery, flooring slate, some obscure pieces of wrought iron etc). The land owners would like to keep the glass bottle items.

### **Backfilling of site investigation trenches**

There was insufficient time at the end of the excavation day (14/10/09) to immediately backfill the site excavation trenches. The site owners rented the mini-digger from an acquaintance, who needed it on the following day. The site owners have requested that the excavation trenches remain open until a decision has been made as to whether the project will extend to include further excavation and removal of the over-dump material, a pre-condition of revealing the buried boiler and engine house walls.

### **Site investigation recommendations**

- 1.** There is archaeological building conservation potential and public access interpretation potential following clearance of demolition debris from the covered walls of the northern pair of cottages (Site 49).
- 2.** There is archaeological building conservation potential and public access interpretation potential following clearance of some over-dumping debris from the south side and top of the former chimney stack base (Site 52.1). In addition there are the remains of the important contextual link of the boiler house flue with the chimney stack.
- 3.** There is archaeological building conservation potential and public access interpretation potential following clearance of earth from the buried west side of the west boiler house wall. This wall however, is at or below existing field level. There is unlikely to be archaeological features outside the wall, and clearance of earth should be no more

than 0.5m depth (on both sides of the wall), to allow building conservation by re-bedding the top two layers of stone (Site 52).

4. Unfortunately, in order to reveal in a similar fashion as (3) above, the remainder of the boiler house (and even the engine house walls – Site 53), approximately 2.0m depth of dumped earth overburden (an area of approximately 20m length x 14m width), will need to be removed from the site, to revert it back to its post demolition (1903) ground level (see Fig 4). It is highly likely that the north, east and south walls of the engine and boiler house are as well preserved as the west side boiler house walls (TT7 and TT11). The land owners have already intimated that they would cover the cost of removing the overburden, to a level from which the boundary walls can be carefully exposed and then conserved.
5. If there is increased public access through the site via a circular permissive path from the new Trail from Devon Great Consols to Morwellham, then the Water sump Shaft (Site 48) should be adequately fenced and hazard warning signs attached.
6. Site 55, the possible winder/brake buildings have a high archaeological building conservation potential and public access interpretation potential following clearance of earth/roots/demolition rubble from the buried lower footings. This site will require careful archaeological excavation and site interpretation.

### **Summary recommendations**

1. There is a high potential for revealing archaeological features (walls etc) at a number of locations across this site. There is no doubt that once the project is completed, this site would be of high significance, in terms of steam engine and transport technology, and an interesting site for the public walking to/from Morwellham along the newly created mine trail. Appropriate site interpretation would enhance the visitor experience.
2. These features are close to, or just below the original ground surface. In the last century, progressive vegetation growth and leaf/branch build up has obscured many of these features. Unfortunately, within the past decade, a large amount of material has been dumped on the former site of the engine house and boiler house. This is unlikely to have damaged the buried masonry walls, which on the west side consist of the lower footings. The extent of above ground walls on the north, south and east sides are not known, but as a minimum are likely to be at, or just below, ground level.
3. It is recognised that excavation of specific areas of the site would incur a high cost; both for removal of the latest phase of dumping, and to reveal the walls that are at or just below ground level. The site owners recognise this and have intimated that they would fund removal of the main overdump site, as well as any other non-archaeologically sensitive sites. The methodology for earth removal and area excavations could be specified in detail, with minimal supervision.
4. However, there will come a point for each site where archaeological site supervision, recording and historic buildings consultancy will be necessary. This detailed stage of final excavation will require the presence of a full time archaeologist, possibly supervising volunteers, if appropriate. At this moment in time it is not possible to estimate this cost.
5. Following careful site excavation, site quantities could be prepared for an estimate of the likely cost of a building conservation project.
6. There is no doubt that this site is both important and significant from a World Heritage perspective, and is easily accessible both from an adjacent public footpath and a newly created footpath from Devon Great Consols Mine to Morwellham. This site and the Incline Plane represents another part of the jig saw of the history of Devon Great Consols, Morwellham and the industrial archaeology of the Tamar Valley.
7. The landowners have made a commitment to maintain the site after the excavation works and building conservation scheme is completed.

## **References**

Buck, C., 2002, *Devon Great Consols Mine, Devon – Archaeological Assessment*, CAU report

Buck, C., 2005, *Wheal Russell Mine, Devon – Archaeological Assessment*, HES report

Hall, G.W., 2000, *Mines of the Sixties*, Griffin Publications

## **Project Archive**

The HE project number is **2009082**

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. A copy of the Project administration and black and white images will be archived with Plymouth Museum (following the agreed guidelines produced in the WSI).

1. A project file containing site records and notes, project correspondence and administration (2009082).
2. Black and white photographs archived under the following index numbers: GBP 2108/28-36
3. Digital photographs stored in the directory (R:/Images/HES Images/Devon/DGC Incline Winder SI 2009082).
4. This report text is held in digital form as: G:\Historic Environment (Documents)\HE Projects\Sites\Devon\Devon Great Consols/DGC Incline Winder SI 2009082
5. EH Oasis No. cornwall2-66796

# Appendix 1

## Historic Environment (Projects), Cornwall Council

### Project Design for site trenching and archaeological recording of former buildings at the Morwellham steam Incline Winder, Devon

**Client:** Peter Hoskins  
**Client contact:** Peter Hoskins  
**Client tel:** 01822 832733  
**Client email:** peterHoskins@billam.org

#### 1 Project Background

The landowners (Mr and Mrs Hoskins), are interested in a project to investigate the possibility of conserving any low walled building remnants of former cottages, a steam engine house, a boiler house and chimney, and two other buildings within a small complex that functioned from the mid 19<sup>th</sup> century to lower/wind materials up/down the Morwellham Incline for Devon Great Consols Mine (4.5 miles to the north west).

HE(Projects), CC has been asked by the client (email request sent on 24/4/09), and Natural England (NE) (email request sent on 6/4/09), to produce a Project Design/Written Scheme of Investigation (WSI), for a programme of evaluation trenches to assess the degree of survival of these historic buildings, and to provide a site plan showing the locations of the proposed trenching. It is a necessary pre-requisite for both NE (for reasons of derogating an archaeological site within a HLS/agri-environment scheme), and Devon County Historic Environment that an appropriate PD/WSI is approved. NE have stated they will not fund this feasibility clearance project. There has been no project brief produced by NE (Joy Ede) nor Devon Historic Environment Service (DHES - Bill Horner).

Following closure of Devon Great Consols Mine in 1903 (see brief site history summary in Section 1.3 below), the railway lines were removed and all iron sold for scrap value. The Earl of Bedford ordered that the labour force be employed for a short time to reduce all main buildings to approximate ground level (Buck 2002, 15). The landowners hope that the existing remnants of these buildings (oblong shaped mounds of stone/earth on the same site as the original buildings), hide the lower sections of each wall, which when revealed (and conserved), will provide an informative, interesting and educational function for all visitors walking through the site from a nearby public footpath. The site is also very accessible from the recently opened Devon Great Consols Mine to Morwellham (4.5 miles) public access trail.

The site has the statutory designation of being within the Tamar Valley AONB, and the non statutory designation of being within the Cornwall and West Devon World Heritage Site (WHS). In addition Natural England (NE), are interested in the possibility of funding related follow-up projects (if there is sufficient walling to preserve the original outlines of some buildings), including the conservation of extant walling, fencing of a shaft, track drainage and site interpretation etc.

#### 1.1 Project extent

The Incline winder complex is sited at the top of the Morwellham Incline and the southern end of the Devon Great Consols railway at SX 44274 70359 (see Fig 1).

#### 1.2 Previous archaeological work

A detailed archaeological assessment of the site (part of a larger study area including Wheal Russell Mine to the west) has been undertaken by CCC (HES) (Buck 2005, Sites 47 to 56). These sites are described in detail in the archaeological assessment report, and have been reproduced in full in this project design Appendix.

#### 1.3 Brief history of the Devon Great Consols railway and Incline winder site (Buck 2005, 41)

*'The railway system at Devon Great Consols was a direct reflection of the productivity and wealth of these mines. Consols claimed the only standard gauge railway line to be entirely owned and worked by a specific mining concern within the West Country. It was built to connect the various parts of the Consols Sett with the Tamar and the port of Morwellham. Construction over the 4½ mile route began early in 1857, work being completed in November 1858. Transport costs by road had been considerable and when the new line opened it was found that expenditure (transporting the copper ore to the ore quay), could be cut from 5 shillings a ton to 1 shilling a ton by rail'* (Bennett 1992, 22).

*'The line of the railway from the mines to the Morwellham Quays, where the ores are sampled and all the goods for the mines imported, runs along the high ground on the east bank of the Tamar, .... the last half-mile down to the quays being a steep incline, up and down which the wagons are drawn and lowered by a 22" stationary engine and a 4" wire rope. The gauge is 4ft. 8½" (the ordinary narrow gauge), but the rails are, like those of the Great Western lines, laid on longitudinal sleepers, their weight being 39 lbs. to the yard. The ore wagons weigh 2 tons 5cwt each and carry 3½ tons of dry ore... A train generally consists of eight or ten wagons'* (Hall 2000, 110 quoting an 1860 newspaper account of the mine).

Gilson Martin of the Bedford Estates Office, Tavistock, wrote a report to the Duke of Bedford on 31 December 1868 concerning mining and quarry within his land held in the Tamar Valley, and described the Incline railway: *'The trucks are lowered down this incline (to Morwellham) by a wire rope attached to powerful brakes, a fixed steam engine is used to for drawing the trucks up the incline. The other portion of the railway is worked by locomotives. Morwellham is situated upon the River Tamar where there are Quays, Docks, and floors for properly mixing and sampling ores and every convenience for carrying on the extensive business of the mines as well as the other general trade. Vessels from 100 to 200 tons burden come up and convey the ores into Wales where they are smelted'*.

## **2 Project aims and objectives**

The purpose of this industrial archaeological feasibility project and archaeological recording is:

- To investigate the relatively high potential for the existence of lower wall sections (at the trial trench locations given in Fig 2), of a number of buildings that functioned to provide the power source for winding and lowering mine materials up and down the Morwellham Incline.
- To ensure that all site excavation works are supervised by the site archaeologist; machine clearance will carefully reveal any surviving low sections of extant walls (the vertical face and tops of exterior walls), from obscuring rubble only at the trench locations shown in Fig 2, in order to minimise adverse impact upon the archaeological resource. Given the degree of rubble/earth overlying these buildings, it is not intended that internal walls are excavated for building conservation.
- To ensure that rubble clearance will be carefully undertaken in such a way as to allow adequate archaeological recording of revealed walls which will include photography (before works, after walls revealed, and after each trench site is backfilled to its original site topography and levels).
- Following site clearance fieldwork (minimal excavation to original ground level), to produce a short archaeological record report describing not only the nature and extent of the trench excavations, but also (depending on the results of the feasibility trenching), specific recommendations for a further more focussed clearance operation to reveal the lower walls of a number of buildings. It is thought that this second stage project, to conserve the revealed walls, will be eligible for funding from NE.
- To ensure that there is an agreed appropriate communication strategy for progress and any other issues etc with NE (Archaeology - Joy Ede) and Devon County Council (Archaeology – Bill Horner/Stephanie Knight), throughout the duration of the archaeological fieldwork element of the project.
- To record sites, features, deposits and artefacts affected by or uncovered by the works for Devon's Historic Environment Record.
- To disseminate the results of the project appropriately by production of an archaeological report and arrange for the deposition of the project archive.
- If, following fieldwork and production of the WB report, NE and DHES agree that conservation of buried/obscured walling is appropriate, a project design/WSI will be produced as part of a Stage 2 project for this site.

## **3 Working methods**

All archaeological recording work will be undertaken according to the Institute of Field Archaeologists *Standards and Guidance for Archaeological Investigation and Recording*. Staff will follow the IFA *Code of Conduct and Code of Approved Practice for the Regulation of Contractual Arrangements in Archaeology*.

The principal factor in effective project delivery will be the employment of key project staff who are expert in the management and recording of the industrial heritage. Cornwall Historic Environment Service project staff are able to draw upon a substantial track record in undertaking similar work throughout Cornwall, as well as a detailed knowledge of the project area and adjacent sites.

### **3.1 Fieldwork: archaeological supervision/recording before/after site works** (Buck 2005, Sites 48–56, Fig 2)

1. Figure 2 is a site plan showing the location and extent of the ten trial trenches, all of which have been designed to only reveal the corner returns of each building as shown on the 1867 Bedford estates map. Although most of the buildings are shown as unroofed on the later 1906 OS map (Buck 2005, Fig 9), the Cottages (Site 49), are shown as being roofed, presumably still habited. If there is sufficient masonry walling to conserve, a further stage of works are likely to be funded by NE. Thus areas of walling can be calculated to provide a cost estimate of the proposed conservation works (from existing quantities and rates) for the Stage 2 conservation scheme.
2. The priority sites for public interpretation are the steam engine house (Site 53), the boiler house (Site 52), its chimney (Site 52.1), and the cottages (Site 49). The shaft water supply and reservoir pond are still visible on site, the remainder of the sites are obscured by grassed rubble/earth.
3. Archaeological recording in the form of measured surveys (tape measured as appropriate and where possible given Health & Safety constraints), will be undertaken at all features that are excavated as part of the Trial trenching.
4. Archaeological recording in the form of photography (as appropriate), will be undertaken before any (previously unknown) archaeological sites are revealed and after works are finished. This will involve only the trench evaluation sites and any other site impacts (see Fig 2).
5. An overall Monitoring Brief (liaison with site owner/contractors), will ensure that the site works, vehicle movements etc. do not cause unintentional damage, and to record any unforeseen impacts upon known archaeology.
6. The chosen site archaeologist will adhere to Health and Safety Policies (see below), under the direction of the designated Site Safety Officer.
7. This project design will be altered following receipt of any additional DHES or NE recommendations.

### **3.2 Method statement for site excavation**

1. The site owners will be providing a small mini-digger with a narrow rear bucket and driver.
2. The mini digger will be supervised by the site archaeologist to excavate ten evaluation trenches, each measuring approximately 1.0m width and approximately 2.0m length, in order to adequately reveal the two faces of each corner building (from original ground level to its highest point) - (see Fig 2 for trench locations).
3. The positions of the trenches will be surveyed onto the report site plan (OS Landline map) by using the mine shaft as the site reference point.
4. The focus of each trial trench is to locate any intact lower wall footings for the 19<sup>th</sup> century buildings identified in Fig 2. It is not intended to excavate below original ground level, nor to excavate the interior of the buildings – simply to reveal the nature and extent of the corners and faces of some of the outer walls (enough to formulate quantities for a Stage 2 clearance and building conservation scheme).
5. Once walling is revealed and the loose material carefully cleared away, measurements and photos will be taken for each evaluation trench.
6. Following site recording each trial trench excavation will be carefully backfilled.
7. An archaeological watching brief report will be produced detailing the fieldwork results and recommendations (if appropriate) for an additional stage of site clearance works (from obscured/buried walls), followed by building conservation of the revealed walls.
8. If funding from NE is advanced for a Stage 2 project, the extent of walling and vertical measurements will inform quantities for production of a tender document for the site contractors.

### **3.3 Site liaison**

The site archaeologist will regularly liaise with Bill Horner (DHES), and CC World Heritage Advice (Archaeology), during the appropriate monitoring points as described below.

### **3.4 Site recording (general)**

- Site drawings (plans, sections, locations of finds) will be made by pencil (4H) on drafting film; all plans will be linked to the Ordnance Survey landline map; all drawings will include standard information: site details, personnel, date, scale, north-point.
- The site archaeologist will undertake recording in line with recommendations given by IFA. Sections and plans will be drawn on site at appropriate scales which will adequately record structures or features at appropriate

### *Incline Winder trenching*

levels of detail, and appropriate sections reproduced in the archive report at either 1:50 or 1:100 to adequately demonstrate revealed archaeological features.

- All features and finds will be accurately located by means of a National Grid reference.
- All archaeological contexts will be described using a standard format and linked to a continuous numbering sequence.
- A location plan will be made which will allow site detail to be accurately placed within the context of the Ordnance Survey Landline mapping.
- The archaeological watching brief report will detail (and if appropriate summarise) all forms of archaeological recording that has been undertaken at the mine site.

### **3.5 Treatment of finds**

- It is recognised that fieldwork may produce artefactual material.
- It will be important to agree the arrangements for deposition of any finds prior to the start of the project, and ensure that transfer agreements are arranged and signed.
- An allowance has been made for discussions with landowners for the deposition of archaeological finds in an appropriate museum have been included in the cost tender.
- All significant finds in stratified contexts will be plotted on a scaled base plan and described.
- All finds will be collected in sealable plastic bags which will be labelled immediately with the context number or other identifier.
- Plymouth City Museum is the designated museum. Their guidelines should be followed and accession numbers for finds and archives for each project should be obtained at the start of the project. Unless otherwise agreed, mining-related artefacts and small finds to be removed from site will be deposited at the Plymouth City Museum, pending detailed discussions over their final place of deposition or loan to other local smaller museums and interpretation centres (for example Morwellham and Tavistock) etc.

### **3.6 Photographic recording**

To include:

- Black and white scaled photography using either a 35mm camera or medium format camera using fine grain archive quality film (400ASA).
- Provision will be made for a range of lighting conditions and the photographic equipment will be available to the historic building recording personnel listed in the WSI.
- Each shot will be carefully composed, focused and lit appropriately with a flash gun if necessary.

The photo record will comprise:

- general views
- examples of structural and architectural detail.

Methodology for the archive standard photography is set out as follows:

- Photographs of details should be taken with lenses of appropriate focal length.
- Difficulties of back-lighting should be dealt with where necessary by balancing the lighting by the use of flash.
- A range of appropriate photographic scales should be used and a metric scale included in all archive recording photographs, except where health and safety considerations make this impractical.
- Selected prints will be scanned into the archive reports.
- Black and white photographs will be archived to HER standards and incorporated into the HES photo database.
- Supporting colour photographs will be taken with a high resolution digital camera (3MP or higher), to illustrate the report and for possible presentation purposes. This will be archived electronically onto each report CD.
- Care will be taken that each shot is focused and that with delayed shutter action that camera shake does not occur. Each shot will be of appropriate quality and used for reports and/or power-point presentation.
- Digital colour photographs will be stored according to the Historic Environment Service's guidelines. Copies of the images will be provided to the client.



- The archaeological record will include a plan showing the location of the photographs reproduced in the report.

#### **4.0 Post Fieldwork**

Following completion of the fieldwork stage the results of the archaeological recording will be combined into a single concise report:

##### **4.1 Archaeological recording report**

The site report will summarise the results of the archaeological monitoring and watching brief, photographic recording and any archaeological recording treated as part of this project, and will include the following components:

- Summary
- Project background
- Aims and objectives
- Recording Methodology
- Results of archaeological recording
- Conclusions
- References
- Project archive index
- Supporting illustrations (Appendices): location map, historic maps, site excavation plans, elevations/sections, - photographs (incl Project brief/Project Design).

A draft archaeological report containing the project results, as outlined above, will be produced and circulated to the DHES Advice Team for comment within three months of completion of the fieldwork.

##### **4.2 Final report format**

- A paper copy and a digital (PDF) copy of the report, illustrations and any other files will be held in the Cornwall HER.
- One paper copy of the report, and a CD containing an electronic copy of the report and the digital photographic archive will be produced for the client. Two paper copies of the report will be sent to Bill Horner (DHES) and a digital (PDF) copy.
- Two paper copies of the report will be distributed to local Devon archives (Westcountry Studies Library – Exeter and Plymouth), one to Cornwall and national archaeological record centres.

#### **5.0 Finds archiving**

Following review with the HES Project Manager the results from the fieldwork will be collated into an archive following the Society of Museum Archaeologists Guidelines. This will involve washing and cataloguing relevant finds, the indexing and cross-referencing of photographs, drawings and relevant context records.

- All finds and samples, etc will be stored in a proper manner (being clearly labelled and marked and stored according to Plymouth Museum guidelines).
- Following any necessary cleaning, stabilisation and recording, artefacts or small finds will be deposited at an appropriate location.
- All paper and photographic records will be ordered, catalogued and stored in an appropriate manner (according to HES guidelines). It is expected that the depository site for these records will be the Devon County Record Office, Exeter or Plymouth Museum (as preferred by DHES).
- An EH OASIS entry (on-line) will be prepared at this stage of the project summarising the site impacts for this site and referring to the archaeological watching brief reports (Stages 1 and 2).

##### **5.1 Cornwall HE (Projects) archive deposition**

An index to the site archive will be created and the archive contents prepared for long term storage, in accordance with HES standards (which will follow Society of Museum Archaeologists Guidelines). Archiving will comprise the following:

- All correspondence relating to the project, the WSI, a single paper copy of the report together with an electronic copy on CD will be stored in an archive standard (acid-free) documentation box.
- The drawn archive will be stored in A2 plastic wallets.

### *Incline Winder trenching*

- Photographic material will be stored in archive standard negative holders and archive print holders within an archive standard box.
- All black and white photographs are to be archived using captioned labels, appropriate record forms and location plans. Other photographic records to be supplied with written captions and subject to appropriate batch archiving to be held in safe archival storage.
- All paper and photographic records will be ordered, catalogued and stored in an appropriate manner (according to HES guidelines). It is expected that the ultimate repository site for the records will be the Cornwall Record Office, and in the interim they will be held at Cornwall's Historic Environment Service and in archival storage at Pound and Co, Penryn. Relevant project records will be held at DRO (Plymouth Museums).

## **6 Project staff**

The Historic Environment (Projects) has accumulated extensive experience in industrial archaeology, having been involved in this aspect of archaeology for the last twenty years (see the HES CV) and the specific personnel CV summary below). The project will be managed and carried out by an HE Senior Archaeologist with proven experience in industrial archaeology; this staff member will also carry out the historic buildings consultancy and historic buildings recording. The project manager will:

- Undertake the archaeological site recording project.
- Discuss and agree the detailed objectives and programme of each stage of the project with DHES and the clients, including arrangements for health and safety.
- Monitor progress and results for each stage.
- Edit the project report.

Key personnel within the project will be:

**Colin Buck, DipCert, Senior Archaeologist.** [cbuck@cornwall.gov.uk](mailto:cbuck@cornwall.gov.uk)

Specialist in conservation works to Cornish mining landscapes, archaeological assessments and watching brief recording since 1993. Involved in numerous projects including conservation works to many engine houses and other structural conservation works, shaft safety works and mine site access improvements, particularly in the east of Cornwall. Other projects include archaeological Impact Assessments, Conservation Management Plans and Historic Building Consultancies for the Mineral Tramways Project, East Cornwall Regeneration Project, Tamar Valley Mining Heritage Project and Caradon Hill Area Heritage Project. Involved in the preparation of policies for the Cornish Mining World Heritage Site Bid's Management Plan. Produced over 80 archaeological assessments and watching brief reports over the last fourteen years for Cornwall Archaeological Unit (now Historic Environment (Projects)).

A fuller CV for Colin Buck (Senior Archaeologist/HBC) can be provided upon request.

## **7 General arrangements**

### **Timetable**

It is expected that, following approval of the project from Devon County Historic Environment Service, and funding from the site owner, work will proceed as soon as possible, this summer (notwithstanding other work commitments by the site owner and site archaeologist).

### **Monitoring and Signing Off Condition**

- Monitoring of the project will be carried out by Bill Horner (DCC) and the CC World Heritage Advice (Archaeology), who should be informed 1 week in advance of the intention to start the field recording.
- The site archaeologist will liaise with Bill Horner (DCC) and the CC World Heritage Advice (Archaeology) to discuss the programme, progress of work, and agree site meetings as required.

Monitoring points during the project will include:

- Approval of the WSI by Bill Horner (DHES) and NE (Joy Ede)
- Completion of fieldwork
- Completion and distribution of archive report
- Deposition of the archive

### **Professional standards**

### *Incline Winder trenching*

The historic building and archaeological recording will be carried out to the standards of the Institute of Field Archaeologists and all work and advice will be carried out in line with the IFA Code of Conduct and Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology.

The Historic Environment Service is a Registered as an Archaeological Organisation with the Institute of Field Archaeologists.

As part of Planning, Transportation and Estates, Cornwall County Council, the HES has certification in BS9001 (Quality Management), BS14001 (Environmental Management), OHSAS18001 (Health, Safety and Welfare), Investors in People and Charter Mark.

### **Professional publications**

The consultancy and archaeological recording work will be informed by the practice and philosophy contained in the following publications (copies of which are held in the HES library and regularly used for Reference):

Buck, C., 1998, *Preliminary assessment of industrial sites of archaeological importance*, CAU report

Buck, C., 2005, *Wheal Russell Mine, Devon – Archaeological Assessment*, HES report

Thorpe, S. (2005), *World Heritage Site Management Plan*, HES/CCC Truro

### **Websites** (2nd Stage work)

<http://www.stastier.co.uk> A particularly useful website by the manufacturers of St. Astier brand lime products detailing methodologies for their application.

<http://www.cornishlime.com> The website of the Cornish Lime Company

<http://www.matchingbrick.co.uk> A useful website for those seeking matching brick for the repair of historic structures

### **Copyright**

Copyright of all material gathered as a result of the project will be reserved to Cornwall County Council. Existing copyrights of external sources will be acknowledged where appropriate.

### **Compliance and Variations**

Minor variations to this WSI will be discussed in liaison with the client, Bill Horner (DHES) and the WHS Planning Advice Officer (Phil Copleston).

### **Contract**

The HES projects team is part of the Historic Environment (Projects), within Environment and Heritage, Cornwall Council. If accepted, the contract for this work will be between the client and Cornwall Council.

The views and recommendations expressed will be those of the Historic Environment (Projects) team and will be presented in good faith on the basis of professional judgement and on information currently available.

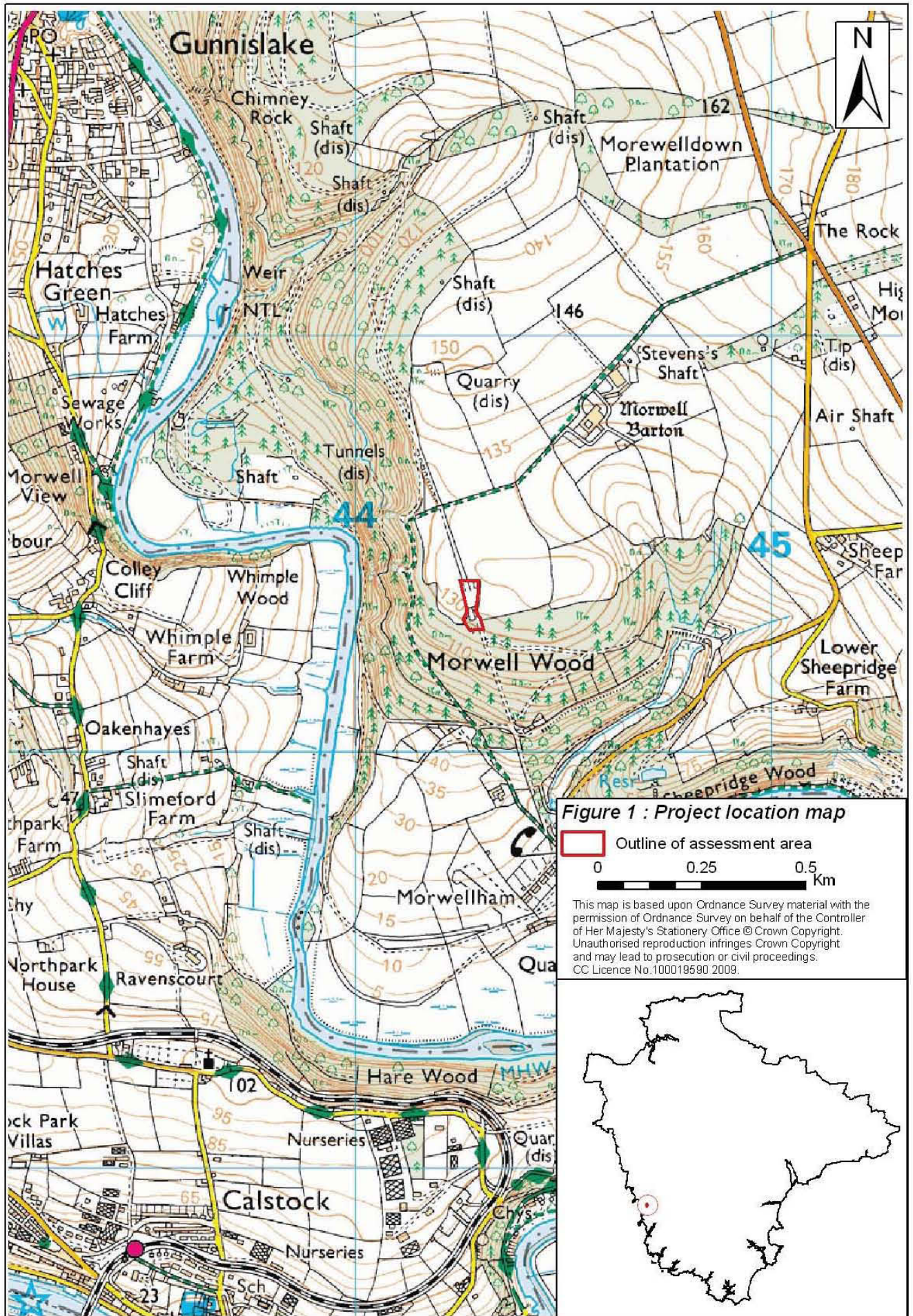
### **Health and safety**

- The Service follows the County Council's *Statement of Safety Policy*. For more specific policy and guidelines the Unit uses the manual *Health and Safety in Field Archaeology* (2002) endorsed by the Standing Conference of Archaeological Unit Managers and also the Council for British Archaeology's Handbook No. 6 *Safety in Archaeological Field Work* (1989).
- The archaeological consultant will adhere to the Health and Safety Statement of the Principal Contractors.
- Prior to carrying out on-site work HES will carry out a Risk Assessment.

### **Insurance**

As part of Cornwall Council, HES is covered by Public Liability and Employers Liability Insurance.

This project design has been prepared by Colin Buck, Senior Archaeologist, CCC HES (Projects), 24/4/2009.



**Figure 1 : Project location map**  
 [Red rectangle symbol] Outline of assessment area  
 0 0.25 0.5 Km  
 This map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. CC Licence No.100019590 2009.

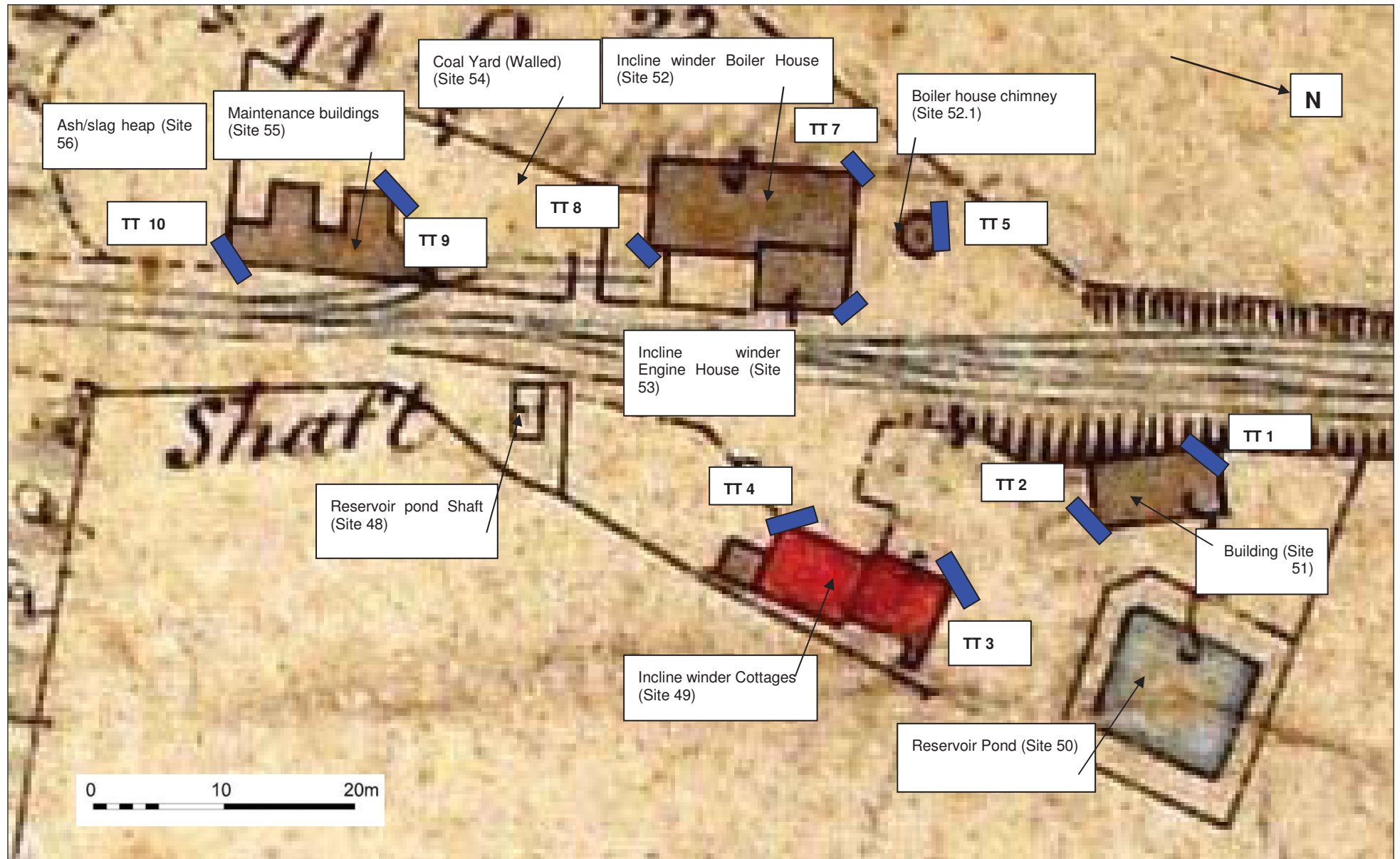


Figure 2 Proposed Incline winder excavation areas (NE Project) shown in blue. Site plan based on 1867 Bedford Estates map. Sites in Buck (2003)

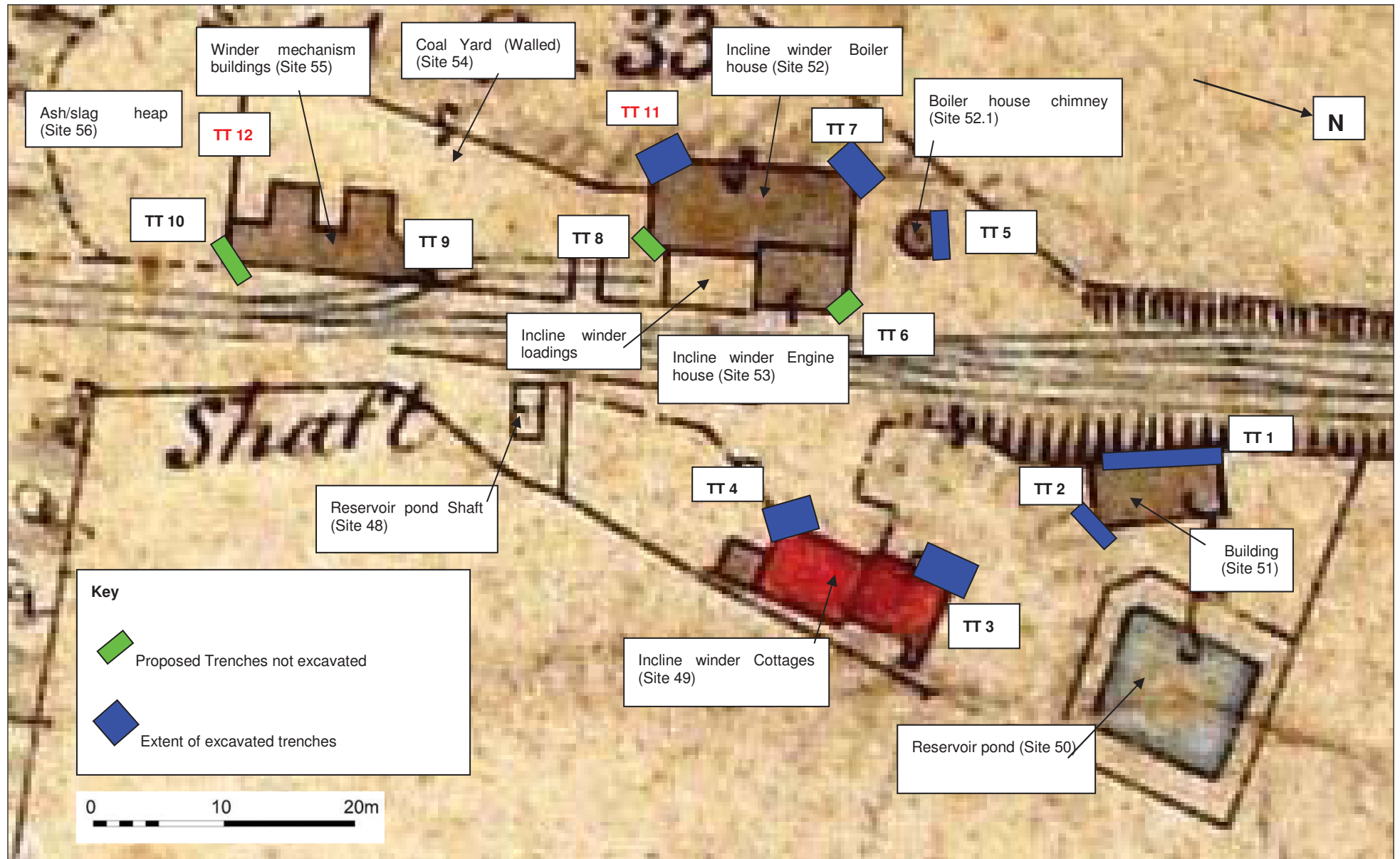
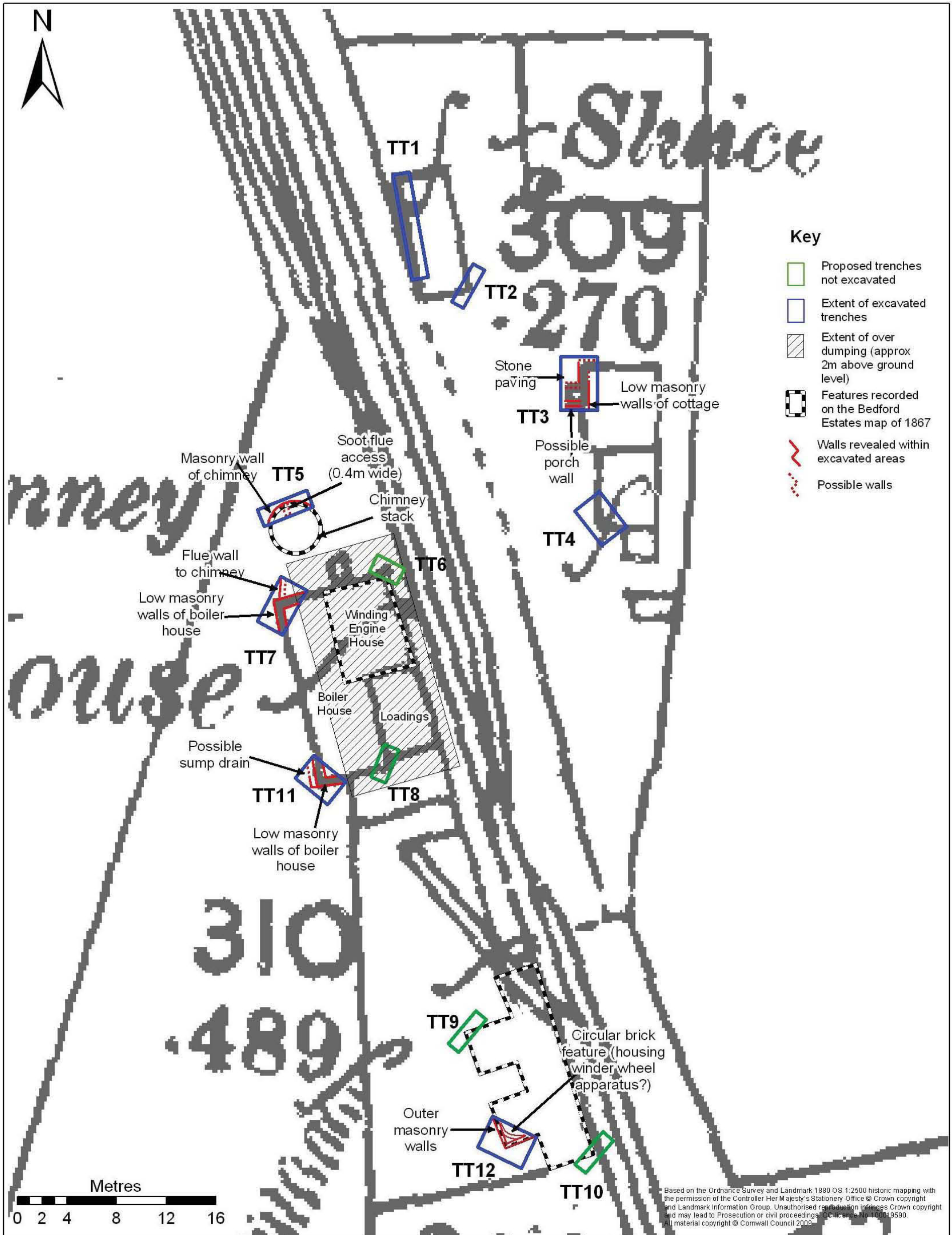


Figure 3 Incline winder excavation areas (shown in blue, red text for new trenches). Site plan based on 1867 Bedford Estates map. Sites in Buck (2003)




<p><b>Devon Great Consols Incline Winder - Site plan of investigation trenches</b> Based upon Landmarks 1883 OS map</p>	<p><b>Cornwall &amp; Scilly Historic Environment Record</b> Kennall Building, Old County Hall, Station Road, Truro, Cornwall, TR1 3AY tel: 01872 323603 fax: 01872 323811 email: hes@cornwall.gov.uk</p>	 <p><b>CORNWALL COUNCIL</b></p>
	<p>Originator <b>Jane Powning</b></p> <p>Date <b>21/10/2009</b></p>	<p><small>© This document is Copyright. It should not be relied on or used in circumstances other than those for which it was originally prepared and for which Cornwall County Council was originally commissioned. Cornwall County Council accepts no responsibility for this drawing to any other party other than the person(s) by whom it was commissioned.</small></p>

Figure 4 Detailed site plan of excavated archaeological features within each trial trench. Site plan based on Landmark 1883 OS map



*Fig 5 General view of the site (looking south) C Buck 2009 © HES*



*Fig 6 General view of the site (looking north) C Buck 2009 © HES*





*Fig 7 View of the cottage front wall (looking east) (Site 49, TT3) C Buck 2009 © HES*



*Fig 8 View of the north western boiler house wall (looking east) (Site 52, TT7) C Buck 2009 © HES*



*Fig 9 View of the south western boiler house wall (looking east) (Site 52, TT11) C Buck 2009 © HES*



*Fig 10 View of the possible winder mechanism chambers (looking east) (Site 55, TT12) C Buck 2009 © HES*

## Appendix 2

Reproduction of archaeological assessment of Incline winder sites (Wheal Russell Mine Sites 47 to 56: Buck 2005, 41-44)

### Site 47 Devon Great Consols Incline

SX 44281 70353 to SX 44527 69571

#### *Background*

*'The railway system at Devon Great Consols was a direct reflection of the productivity and wealth of these mines. Consols claimed the only standard gauge railway line to be entirely owned and worked by a specific mining concern within the West Country. It was built to connect the various parts of the Consols Sett with the Tamar and the port of Morwellham. Construction over the 4½ mile route began early in 1857, work being completed in November 1858. Transport costs by road had been considerable and when the new line opened it was found that expenditure (transporting the copper ore to the ore quay), could be cut from 5 shillings a ton to 1 shilling a ton by rail' (Bennett 1992, 22).*

*'The line of the railway from the mines to the Morwellham Quays, where the ores are sampled and all the goods for the mines imported, runs along the high ground on the east bank of the Tamar, .... the last half-mile down to the quays being a steep incline, up and down which the wagons are drawn and lowered by a 22" stationary engine and a 4" wire rope. The gauge is 4ft. 8½" (the ordinary narrow gauge), but the rails are, like those of the Great Western lines, laid on longitudinal sleepers, their weight being 39 lbs. to the yard. The ore wagons weigh 2 tons 5cwt each and carry 3½ tons of dry ore... A train generally consists of eight or ten wagons'. (Hall 2000, 110 quoting an 1860 newspaper account of the mine).*

Gilson Martin of the Bedford Estates Office, Tavistock, wrote a report to the Duke of Bedford on 31 December 1868 concerning mining and quarry within his land held in the Tamar Valley, and described the Incline railway: *'The trucks are lowered down this incline (to Morwellham) by a wire rope attached to powerful brakes, a fixed steam engine is used to for drawing the trucks up the incline. The other portion of the railway is worked by locomotives. Morwellham is situated upon the River Tamar where there are Quays, Docks, and floors for properly mixing and sampling ores and every convenience for carrying on the extensive business of the mines as well as the other general trade. Vessels from 100 to 200 tons burden come up and convey the ores into Wales where they are smelted'.*

The 1867 maps (Figs 5-7) show the Devon Great Consols Incline Winder complex during its heyday of copper ore production, whilst the OS 1884 map (Fig 8) shows its operation during the arsenic refining phase. Both maps appear to show a passing loop of tracks just north of the main site, whilst the incline section of track is shown as a single track. The site appears to have changed little during the intervening period. The 1904 OS map (Fig 9) however, shows the engine house was unroofed (presumably a consequence of scrap metal removal of the steam engine), but the cottages still in use.

#### *Survey*

The incline route of the railway went straight down the side of the hill. The track bed route of the railway has not been planted with conifer trees (or if it had they have now been cut down), and so can be clearly seen from above and below the hill slope. Out of the project area, the line went through a tunnel and under a row of houses down to the quays. Sites 48 to 56 individually describe each site component and have their separate survey details and management recommendations.

#### *Recommendations*

Refer to standard recommendations given for long term preservation of archaeological features in a working woodland environment (See Section 10.1). There may be some timber railway setts still buried *in-situ*.

### Site 48 Reservoir pond shaft SX 44293 70367

#### *Background*

This shaft is shown and labelled on the 1867 map. Presumably it functioned to access and pump water up to the reservoir pond (Site 50). It is likely that there was an underground pump powered by the nearby steam engine connecting to a rising main pipe that fed into the pond. Depending on the water source this may also have supplied domestic needs for the adjacent cottages.

### *Survey*

The shaft is protected by a timber post and rail fence with additional barbed wire to a height of 1.0m above ground level. The shaft opening measures 1.0m x 0.7m and is choked with vegetation and rubble at a depth of approximately 5.0m below ground level. A new Cornish hedge has been built and gate erected across the incline railway route just north of this shaft.

### *Recommendations*

None – although it may be prudent to raise the height of the protective fence around the shaft to 1.2 to 1.5 above ground level.

## **Site 49 Site of Incline winder cottages SX 44292 70380**

### *Background*

The 1867 maps show that two cottages were built on site to house the Engine House captain and boiler house men. It is likely that their families also helped with general duties to ensure that co-ordination between lowering trucks down the hill and winding trucks up the hill, together with the management of the trucks and engines that needed to go back to Devon Great Consols could be carried out efficiently. Presumably this site operated during daylight hours only.

### *Survey*

There is no visual evidence of the cottages; however their site can be seen as an overgrown mound measuring 7.0m in width, 12.0m in length and 1.0m above ground level. There may be remnants of the lower walls or foundations within the mound

### *Recommendations*

None.

## **Site 50 Reservoir pond SX 44291 70407**

### *Background*

This rectangular feature can be seen on the archive maps from 1867 onwards. The pond (approximately 17.0m x 17.0m), is likely to have been lined with clay to restrict water seepage. It is likely that there are still underground tunnels that housed pipes to take water from the pond to the steam engine and boiler house (underneath the railway track). In addition there would have been a pipe to fill the pond from the 'water' shaft.

### *Survey*

The sides of the reservoir pond are approximately 1.0m above ground level along the south side, with a gap in the west end of the bank which may have sited the sluice gate. The west side of the pond has lower sides that are not so well defined, although the quality of the remains is generally good. Small trees are growing from the interior of the feature.

### *Recommendations*

None.

## **Site 51 Site of building SX 44277 70398**

### *Background*

The 1867 and later maps show that a building was sited at this location next to the railway line. Its function could be a number of activities relating to the function of this complex.

### *Survey*

There is no visual evidence of the building; however the site can be seen as an overgrown mound measuring 5.0m in width, 10.0m in length and 0.5m above ground level. There may be remnants of the lower walls or foundations within the mound.

### *Recommendations*

None.

## **Site 52 Site of boiler house SX 44270 70367**

### **52.1 Site of chimney SX 44266 70375**

#### *Background*

The 1867 maps appear to show that the boiler house was located on the western side of the engine house. From map evidence it appears to have measured 17.0m in length and 7.0m in width. It would have housed only a single boiler, with a separate section for coal storage.

#### *Survey*

There is no visual evidence of remnants of the boiler house or chimney (Site 52.1). The boiler house site can be seen as an overgrown mound measuring 10.0m in width, 18.0m in length and 1.5m above ground level. The detached chimney site (a few metres north of the boiler house), appears to be located where there is a circular mound 0.7m high and 4.0m diameter. There may be remnants of the lower walls or foundations within either site.

#### *Recommendations*

None.

## **Site 53 Site of winder engine house SX 44274 70359**

#### *Background*

The 1867 maps appear to show that the engine house was located on the eastern side of the boiler house. From map evidence it appears to have measured 7.0m in length and 6.0m in width. The engine house would have supplied the power to both apply brakes (possibly by a geared winding drum) for trucks going down the incline, and to 'draw' trucks back up the incline.

#### *Survey*

There is no visual evidence for remnants of the engine house or chimney (Site 52.1), it is within the same overgrown earth/rubble mound as the boiler house described in Site 52 above. However, there may well be remnants of the lower walls or foundations of the building within the site.

#### *Recommendations*

None.

## **Site 54 Coal Yard SX 44275 70343**

#### *Background*

This feature has been interpreted as a walled yard. The 1867 map shows railway lines going up to the boiler/engine house in the northern section of the track, with some buildings in the south eastern part of the yard next to the track.

#### *Survey*

The west boundary wall of the yard is extant for approximately 20.0m. It is 2.8m high and 0.45m thick. It is the only visible surviving extant masonry in the entire Incline winder complex. A small section of the east boundary wall is also extant, built to retain the higher level of the track bed from the lower surface of the yard.

#### *Recommendations*

The wall could be repointed and the top capped.

## **Site 55 Site of storage/maintenance buildings SX 44282 70328**

#### *Background*

This feature has been interpreted as storage/engine house - winder maintenance buildings. However, the exact nature of the site layout of the winder and brake mechanism is not entirely known, and therefore the function of these buildings cannot be stated with any great accuracy, especially given their proximity to the side of the track at the lowest point of the complex.

*Incline Winder trenching*

*Survey*

There is no site evidence for these buildings.

*Recommendations*

None.

**Site 56 Ash/boiler slag dump SX 44276 70312**

*Background*

The 1867 and later maps show that a spoil heap was located at this location (approximately 5.0m high from its down slope (west) side.

*Survey*

Upon inspection the heap was found to consist of stone, ash and boiler house slag.

*Recommendations*

None.