

FRONGOCH METAL MINE REMEDIATION PROJECT

ARCHAEOLOGICAL TRIAL TRENCH EVALUATION

WRITTEN SCHEME OF INVESTIGATION

July 2013



Specification prepared by
Dyfed Archaeological Trust
for Cyfoeth Naturiol Cymru /
Natural Resources Wales



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Dyfed Archaeological Trust Field Services

FRONGOCH METAL MINE REMEDIATION PROJECT

FRONGOCH PHASE 2 REMEDIATION WORKS, CEREDIGION: ARCHAEOLOGICAL RECORDING AND WATCHING BRIEF WRITTEN SCHEME OF INVESTIGATION

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INTRODUCTION

This Written Scheme of Investigation (WSI or specification) has been prepared by Dyfed Archaeological Trust Field Services in response to a request from Natural Resources Wales to provide an archaeological written scheme of investigation for required archaeological recording and watching brief to be undertaken prior to and during the proposed Phase 2 remediation works at the former Frongoch lead mine, Ceredigion (SN 7213 7440). The Frongoch Mine has been discharging zinc and lead into the River Ystwyth catchment every year for the last century, making it one of the largest sources of heavy metal pollution in Wales. The Phase 1 remediation works constructed a new surface water drain around the perimeter of the former lead mine leading to a new settling pond, with a controlled outflow into the nearby water course. These works have already proved to be effective in channelling rain water runoff without it leaching through the areas of contaminated mine waste thereby reducing the amount of contaminants entering the watercourses.

The Phase 2 works will include re-profiling of slag heaps, lining and capping of certain areas of the site and further internal drainage within the area of the slag heaps to prevent contaminants leaving the site area. This written scheme of investigation deals with the proposed Phase 2 works.

This specification is in accordance with the *Standard and Guidance for Archaeological Watching Briefs* (IfA¹, 1994, revised 2001).

The site area has been subject to a number of previous archaeological studies, by Dyfed Archaeological Trust Field Services. These include an initial desk-based archaeological appraisal undertaken in January 2012 (Murphy 2012a), a watching brief during geotechnical investigations in February 2012 (Murphy 2012b), an archaeological trial trench evaluation in September 2012 (Poucher 2012) and a watching brief during the Phase 1 remediation works (Shobbrook 2013).

The archaeological appraisal summarised the site as follows: *'One of the largest mines in North Ceredigion, Frongoch is a lead and zinc mine situated near Pontrhydygroes in central Wales. Underground mining started at Frongoch in the mid 1700's and the mine was then worked almost continuously until 1903. It is estimated that with an estimated output of over 100,000 tons of lead and zinc ore, Frongoch was the most productive mine in Ceredigion. From 1924 to 1930 the huge dumps of waste material were reworked on a substantial scale and are now largely removed. The ruins of Cornish engine houses and other mine buildings now stand as a testament to a once thriving industry, whilst surrounding them is a near waste land pitted with the scars of the former mine workings.'*

'Part of the site is designated as a Scheduled Ancient Monument and will not be affected by the proposed test pitting. The following written scheme of investigation outlines the methodology through which Dyfed Archaeological Trust Field Services would undertake an archaeological watching brief during groundworks at the site, which have the potential to expose, damage or destroy archaeological remains.' (Murphy 2012a)

Frongoch Metal Mine is situated within an extensive upland area of moorland between 240 and 260m above sea level, to the north of the village of Pontrhydygroes, Ceredigion. Apart from conifer plantations and small stands of

¹ Institute for Archaeologists.

broadleaf woodland, it is virtually a treeless landscape. The field pattern is one of large, irregular enclosures. The earth banks that once divided the enclosures are now redundant or augmented with wire fences.

The Phase 2 remediation works will include re-profiling of the existing tailings / spoil heaps to create a more uniform hillslope at the northern end of the site (Figure 1). In the southeastern part of the site an area of ground reduction is proposed to create a new wetland area approximately 1.5m deeper than presently exists. Some further ground reduction will take place to the northeast of this wetland area, reducing the ground by around 1m. Further re-profiling works will be undertaken in localised areas. The majority of the re-profiling works will not cause disturbance to any archaeological remains, assuming the methodology for moving spoil around will ensure that below ground disturbance is kept to a minimum. In these areas it is anticipated that any surviving remains will be sealed and protected by increased depths of spoil. Disturbance to buried archaeological remains will occur where the ground reduction is to take place.

The trial trench evaluation undertaken in August 2012 was targeted within the central part of the former lead mine, where the bulk of the Phase 2 remediation works are proposed. The trench locations are shown overlaid on the Proposed Remedial Works plan (Figure 2).

The evaluation results were summarised as follows: *The evaluation comprised the excavation of six trenches across the site area, in locations determined by the Environment Agency. The trenches varied between 27m and 65m long, and 1.6m to 2m wide.*

Structural features and deposits of archaeological interest were recorded in five of the six evaluation trenches. These included the well-preserved remains of two buddle-pits, several wall-lines, in situ tram rails and tramway banks, a reservoir bank, ephemeral timber structures and other ditches and banks. The depth of these features varied significantly across the site from 0.2m to 1m below current ground levels. Numerous nearby features visible as either surface remains or standing structures were also partially recorded during the course of the works.

As well as identifying these specific features the evaluation demonstrated a remarkable survival of structural remains as depicted on historic map sources, but also indicated that many structures and features were not recorded on these map sources, and therefore an accurate plan of where these remains may be discovered cannot be ascertained from these maps alone. As archaeological features were discovered at varying depths the removal of any deposits has the potential to expose or damage archaeological features, but clearly some of the proposed works are likely to have a direct impact on several archaeological features identified during the course of this evaluation.

In order to mitigate the impact on the archaeological resource a program of archaeological recording prior to the works being undertaken, and an archaeological watching brief during the course of the works is recommended." (Poucher 2012).

Trench 1 from the evaluation was located to the northwest of the Phase 2 remediation works and is not shown on Figure 1. Trench 6 was located in an area where material has subsequently been dumped during the Phase 1 works, undertaken following consultation with archaeologists.

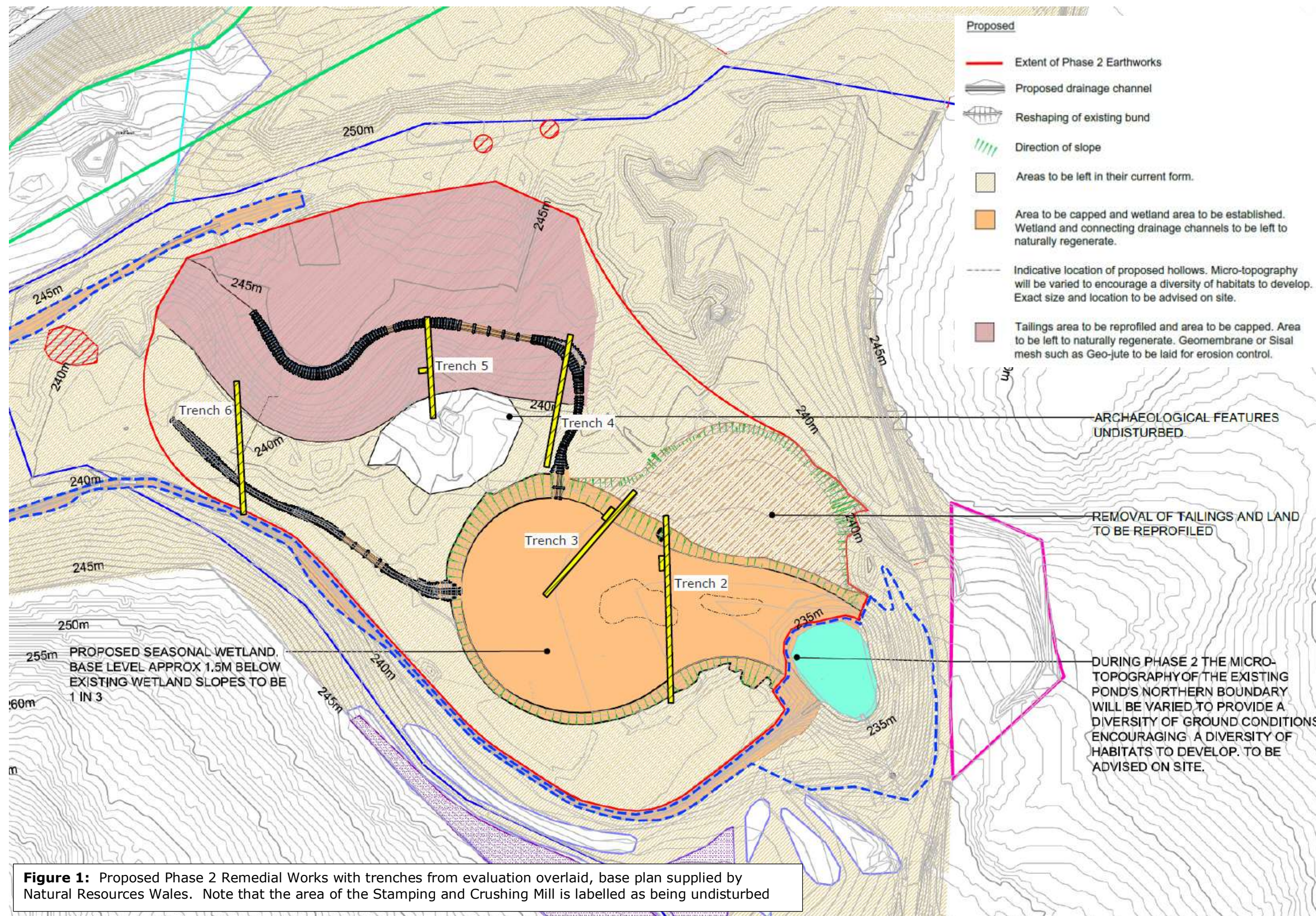


Figure 1: Proposed Phase 2 Remedial Works with trenches from evaluation overlaid, base plan supplied by Natural Resources Wales. Note that the area of the Stamping and Crushing Mill is labelled as being undisturbed

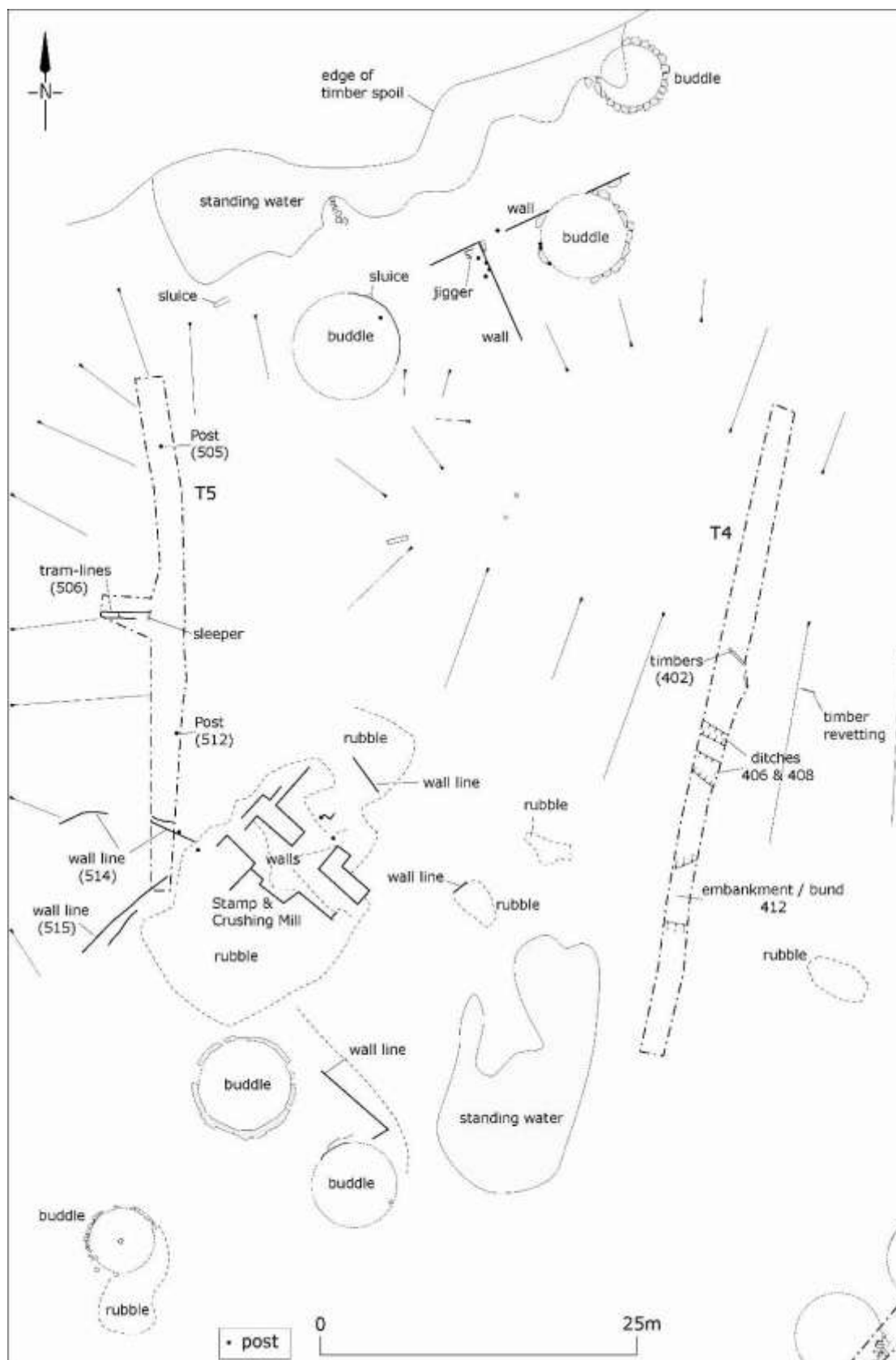


Figure 2: Plan of trenches 4 and 5 from the evaluation as well as visible archaeological remains in the vicinity of the trenches (Poucher 2012).

The location of trenches 4 and 5 mostly lies within areas where material is to be dumped during the re-profiling works. The results from these trenches included wall lines, ditches and tram lines (Figure 2). No further works associated with the archaeology revealed within these two trenches is anticipated as being necessary.

Whilst recording these trenches surrounding features visible at ground level were also surveyed, which included a series of walls and buddles to the north of the trenches; the Stamp and Crushing Mill ruins; and further buddles and walls to the south (Figure 2). The buddles and walls to the north of the trenches lie on higher ground, which will again be raised through spoil movement so the remains will be sealed and protected. It should be noted that during a recent site visit an additional buddle was seen exposed at ground level not recorded during the trial trench evaluation. Further surveying of these remains will be carried out prior to them being buried. At this point in time it is anticipated that the buddles exposed to the south of Trenches 4 and 5 will be left exposed as features in the landscape, although this has not been confirmed. Further surveying of this area will be needed if more remains have become visible since the 2012 survey.

The ruins of the Stamp and Crushing Mill survive in places to almost 2m in height. The stone walls of the building include timber supports and large timber beams built inside the walls which are presumed to have acted as shock absorbers/dampeners for the stamping and crushing that occurred within the structure. The area around and including the Stamp and Crushing Mill is to be left undisturbed during the Phase 2 works. The remains should be clearly demarcated through fencing and all on-site contractors made aware that the area is to be left untouched. It is suggested that a simple photographic record of the structure is made in its present condition.

Trenches 2 and 3 were located within the area in which it is proposed that ground reduction will take place (Figures 1 and 3). Trench 2 only revealed the edge of the former reservoir and a single wall line. A series of stone walls were visible at ground level to the west of Trench 2 adjacent to Trench 3. The northeastern end of Trench 3 revealed two buddles at a very shallow depth. The eastern of the two buddles had a very well preserved timber floor (Photo 1). The evaluation has clearly demonstrated that the area around this part of Trench 3 has very high archaeological potential and that any remains in this area will be destroyed by the remediation work proposals. An open area excavation of these remains will be undertaken to record the remains prior to any ground reduction taking place (preservation through record).

It is possible that further remains could be exposed in the vicinity of Trenches 2 and 3 during the ground reduction works, and an archaeological watching brief should be undertaken during these operations in order to record any archaeological remains that are exposed by the works. A contingency for salvage excavation in the event that significant remains are revealed would also be needed.

Earlier in 2013 information was provided from the evaluation to present a deposit model, indicating the depth of the archaeology seen within the trenches superimposed on the predicted levels of groundworks across the site for the Phase 2 works. This information is presented in Figure 4. The information confirmed that the proposed ground reduction levels for the new wetland area would be around 1m below the level at which archaeological remains were encountered within Trenches 2 and 3. For Trenches 4 and 5, the proposed ground level would be raised well above the level of recorded archaeology.

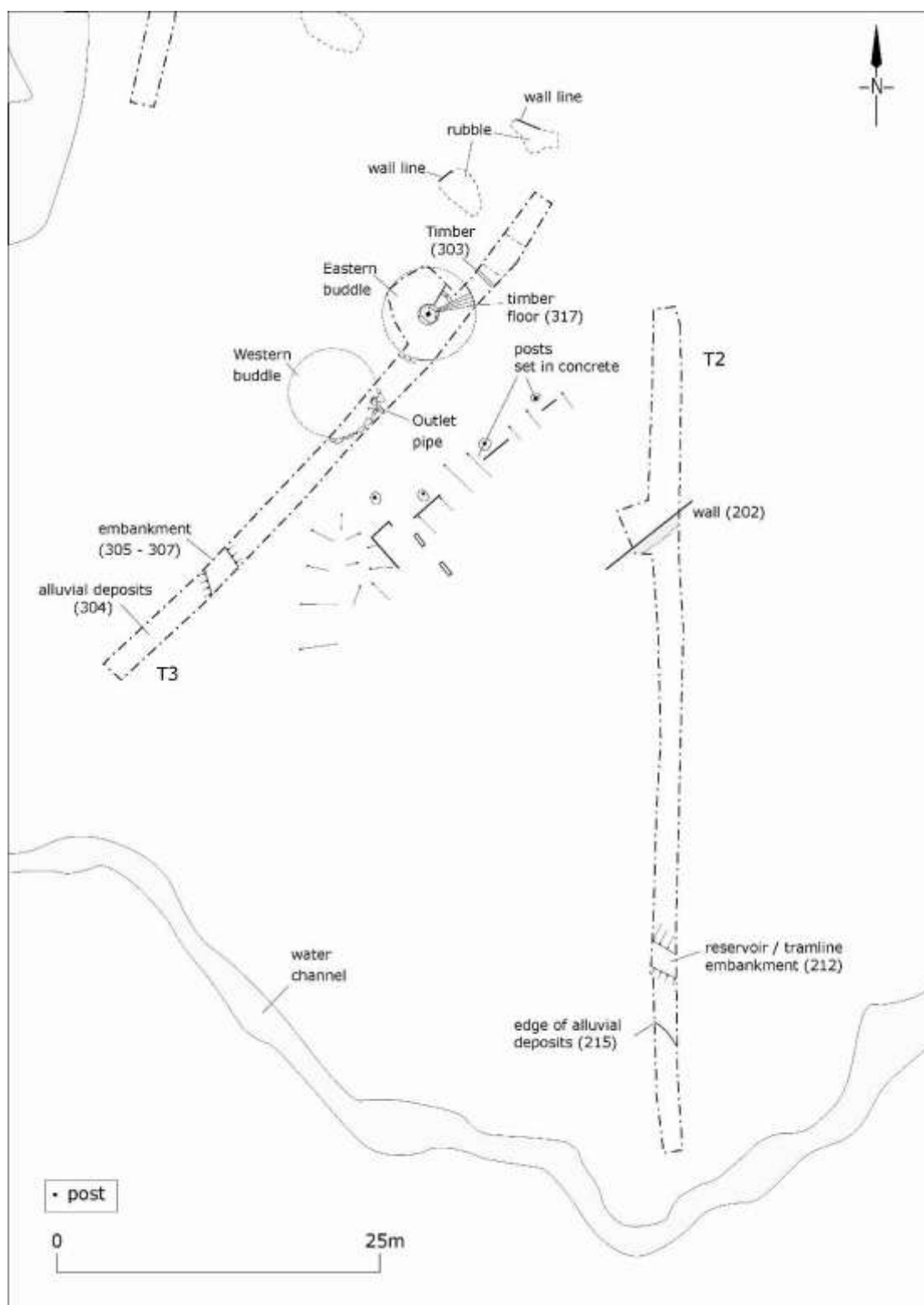


Figure 3: Plan of Trenches 2 and 3 from the evaluation (Poucher 2012)

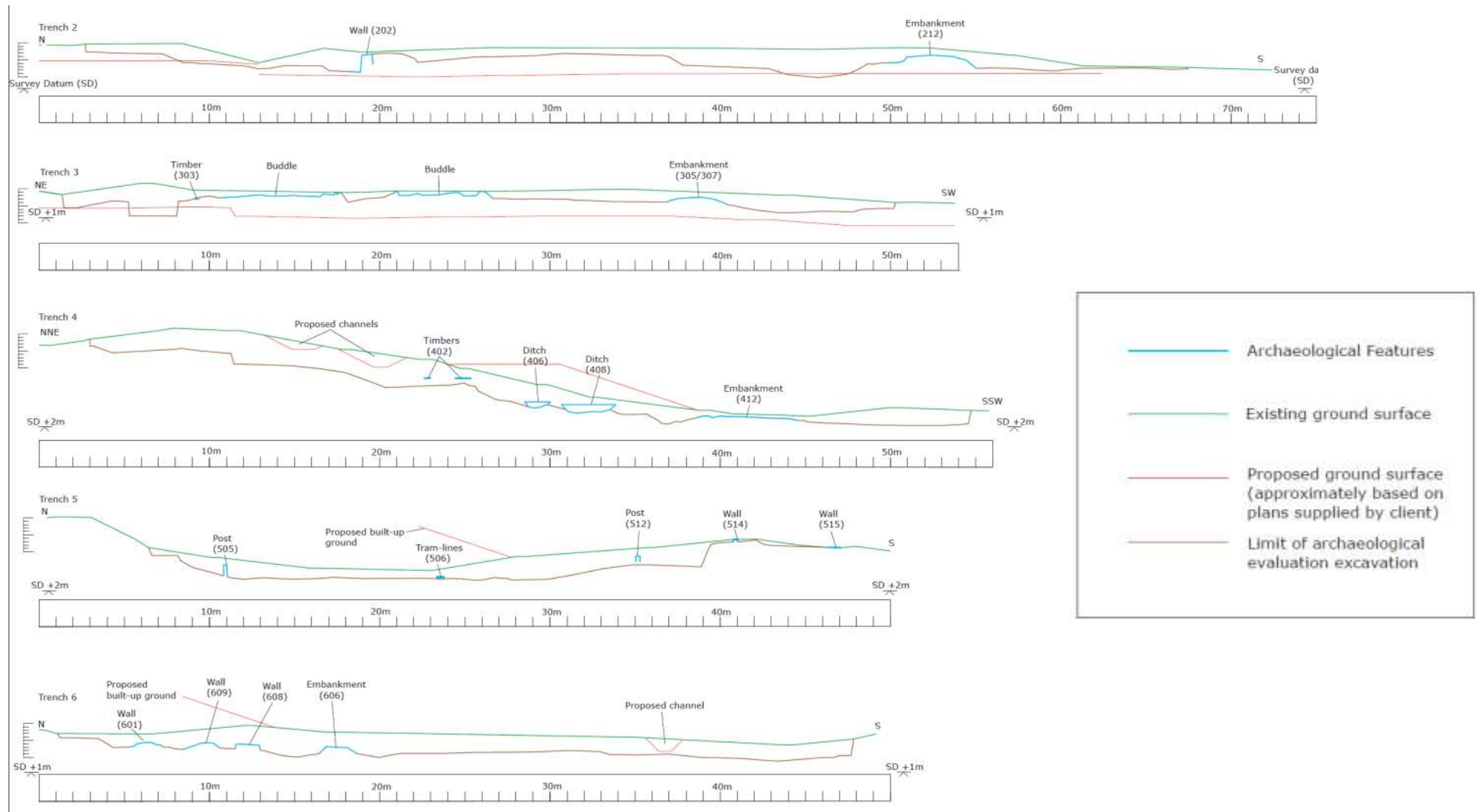


Figure 4: Information from deposit modelling, showing levels of existing archaeology and ground surface and proposed finished levels of remedial works



Photo 1: Buddle within Trench 3

Three main stages of archaeological mitigation are proposed for the site:

- Further survey of visible remains across the site area prior to re-profiling;
- A rapid photographic survey of the Stamp and Crushing Mill;
- Open area excavation of the known remains recorded in and around Trench 3 of the evaluation; and
- An archaeological watching brief during ground reduction for the new wetland areas in the southeastern part of the site, with contingency for salvage excavation in the event of significant archaeological remains being revealed.

Dyfed Archaeological Trust is an IfA Registered Archaeological Organisation.

All Dyfed Archaeological Trust Field Services staff are CSCS² certified to work on construction sites.

² Construction Skills Certification Scheme.

1 PROJECT OBJECTIVES

- 1.1 Provision of a written scheme of investigation to outline the methodology by which the watching brief should be undertaken.
- 1.2 To identify the presence/absence of any archaeological deposits.
- 1.3 To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works.
- 1.4 To appropriately investigate and record any archaeological deposits to be affected by the ground works.
- 1.6 To produce an archive and report of any results.

2. FIELDWORK METHODOLOGY

A generic methodology for an archaeological watching brief is included.

2.1 Watching Brief

- 2.1.1 The definition of archaeological watching brief, taken from the Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (IfA S&G: AWB) is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.
- 2.1.2 The purpose of a watching brief, as laid down in the IFA S&G AWB is:
 - to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;
 - to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment.
- 2.1.3 A 'watching brief' undertaken at the commencement of groundworks at the site which have the potential to expose, damage or destroy underlying archaeological remains. This will require the presence of at least one archaeologist during ground reduction works.
- 2.1.4 Any archaeological features or deposits revealed during the groundworks will be examined and recorded to an appropriate level. Recording of all archaeological features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual³ used by Dyfed Archaeological Trust Field Services. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.
- 2.1.5 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by Dyfed Archaeological Trust Field Services in stable conditions.

³ Dyfed Archaeological Trust Field Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

All finds, except those deemed to be Treasure Trove, will remain the property of the landowner.

- 2.1.6 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, Dyfed Archaeological Trust shall have the power to halt any ground works and shall inform the site agent/project manager and the curatorial officer, and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains by the curatorial officer, Dyfed Archaeological Trust Field Services shall, if required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features. In these instances it would be necessary to employ extra resources to record such features to an appropriate standard.
- 2.1.7 In the very unlikely event that human remains be encountered the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

2.2 Survey and Recording of visible areas of Buddles and walls

- 2.2.1 As noted above, there are two areas of visible remains exposed at ground surface to the north and south of Trenches 4 and 5. These include at least 6 buddles and numerous walls. Since the initial rapid survey undertaken during the trial trench evaluation in 2012, further remains have become exposed.
- 2.2.2 The visible remains will be surveyed using an Electronic Distance Measurer, supplemented with photographs and written records.
- 2.2.3 Recording of all archaeological features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual⁴ used by Dyfed Archaeological Trust Field Services. If hand drawing is needed of some of the significant archaeological features or deposits, these will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.

2.3 Photographic Survey of the Stamp and Crushing Mill

- 2.3.1 It is recommended that a photographic survey of the Stamp and Crushing Mill is undertaken. The area will be fenced off to prevent any disturbance occurring to the building. A simple photographic survey of the structure in its present state would provide information that could inform any future mitigation measures that could take place within this area of the site.
- 2.3.2 The photo survey will include general view or views of the building, its external appearance and views inside the building. Details of internal features may also be photographed.
- 2.3.3 Locations of the photographs can be added to pre-existing plans of the building.

⁴ Dyfed Archaeological Trust Field Services have adopted the new Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

2.4 Open Area Excavation of Archaeological remains in vicinity of Trench 3

- 2.4.1 The open area excavation is proposed to be approximately 40m² covering the buddles seen in Trench 3, the adjacent structures to the east and the wall within the northern part of Trench 2 (Figure 5). The size of this area will be dependent upon the exposed remains. Overburden will be initially removed by machine under full archaeological supervision.
- 2.4.2 The area will then be subject to cleaning using hand tools and brushes (where applicable) to expose the remains. These are thought to include: at least 2 buddles, adjacent walls and slime pits and timber structures.
- 2.4.3 Recording of all archaeological structures, features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual⁵ used by Dyfed Archaeological Trust Field Services. If hand drawing is needed of some of the significant archaeological features or deposits, these will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.
- 2.4.4 Some excavation and removal of these remains will be carried out to determine if any earlier remains survive beneath. The evaluation indicated that this was unlikely, but a contingency should be held back in case stratified remains exist below this level and within the depth of material proposed to be removed.
- 2.4.4 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by Dyfed Archaeological Trust Field Services in stable conditions. All finds, except those deemed to be Treasure Trove, will be donated by the landowner to Dyfed Archaeological Trust, who will ensure that they are stored in appropriate conditions as part of the site archive at a suitable repository (to be confirmed).
- 2.4.5 Should any human remains be encountered the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

⁵ Dyfed Archaeological Trust Field Services have adopted the new Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

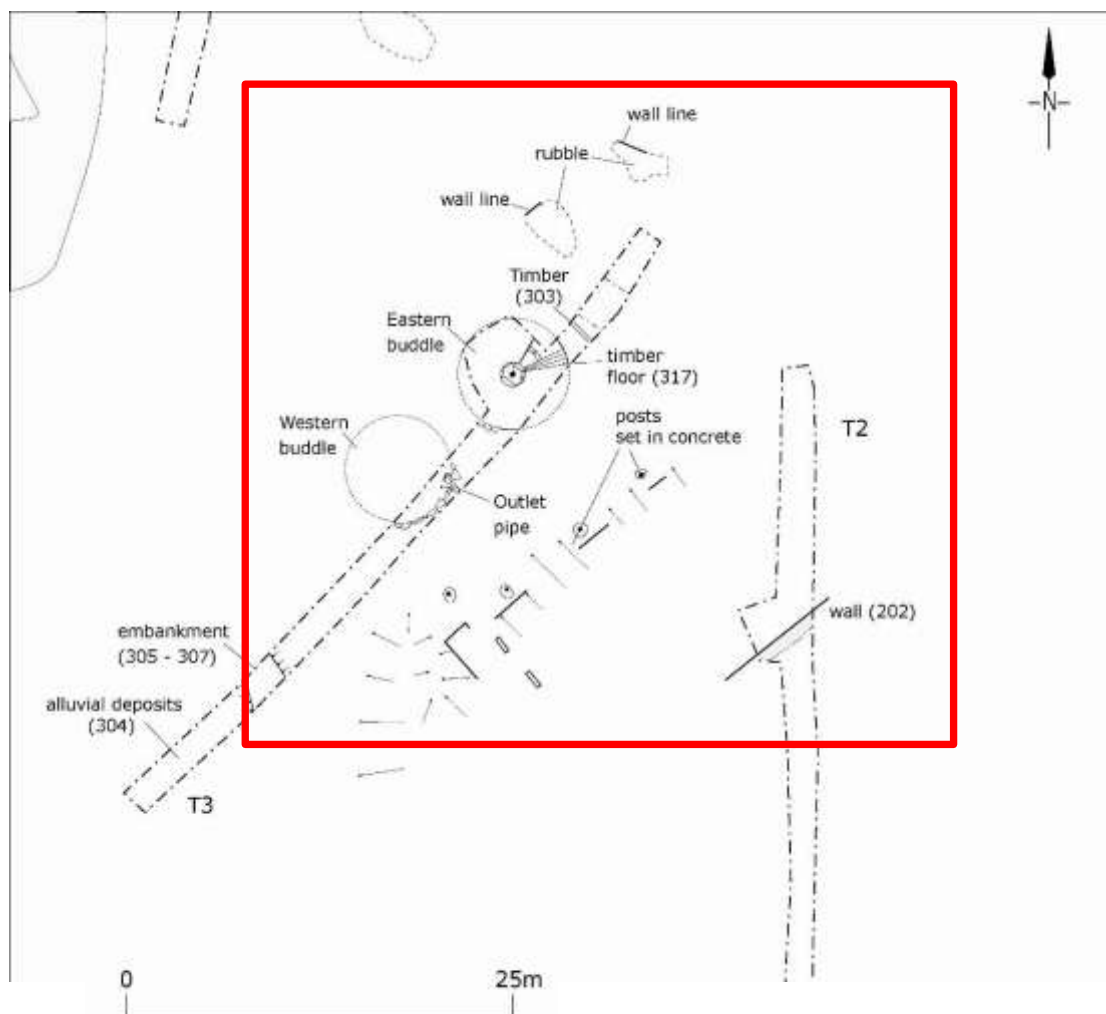


Figure 5: Approximate area of proposed open area excavation

3. POST-FIELDWORK REPORTING AND ARCHIVING

- 3.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with the specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2007), and the procedures recommended by the National Monuments Record, Aberystwyth.
- 3.2 The full extent of the level of the post-excavation analysis required and thereby the actual costs and timescales will be made following a brief assessment of the site results and through consultation with the client and the archaeological advisors to the planning authority.
- 3.3 Specialist advice will be sought from Robert Protheroe-Jones of the National Museum Wales, the Mines Preservation Trust and other mining experts in order that the best interpretation of the results can be made.
- 3.4 The results of the fieldwork will be assessed in local, regional and wider contexts.
- 3.5 A report that is fully representative of the results of the fieldwork will be prepared and four copies will be sent to the client for dissemination to all relevant parties.
- 3.6 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).
- 3.7 The project archive, including all artefacts and ecofacts (excepting those which may be deemed to be Treasure Trove) will be deposited with an appropriate body following agreement with the landowner (Ceredigion Museum will be approached for storage of the archive if finds are recovered, but if merely a paper archive this will be stored with the RCAHMW)..
- 3.8 A copy of the final report will be deposited with the regional HER within six months of the completion of the project.
- 3.9 Should the results of the investigations be of high significance then there is likely to be a requirement for more detailed publishing and analysis, although the scope of this work cannot be ascertained at this stage. The initial assessment following fieldwork should determine the need or otherwise for this requirement.

4. STAFF AND MONITORING

- 4.1 This project will be managed by James Meek, Head of Field Services and a Member of the Institute of Archaeologists (MIFA).
- 4.2 The archaeological fieldwork will be undertaken by staff of Field Services.
- 4.3 The fieldwork may need to be monitored by the Planning Services section of Dyfed Archaeological Trust, who should be provided access to the site at any time during the watching brief works. It is also possible that Cadw may want to visit the site and inspect the works due to the proximity of the Scheduled Area and the archaeological significance of the site. Any monitoring visits will need to be arranged and agreed with the Natural Resources Wales managers.
- 4.4 It is also possible that members of the Mines Preservation Trust may wish to visit the site during the works (and possibly assist in the recording), although this will need to be cleared with Natural Resources Wales before this is allowed.

5. HEALTH AND SAFETY

- 5.1 The archaeological contractor will carry out a health and safety risk assessment prior to the commencement of the works to ensure that all potential risks are minimised. This is a separate document.
- 5.2 All relevant health and safety regulations must be followed.
- 5.3 All site inductions, H&S procedures, H&S constraints and site rules of the site contractor will be made known to the archaeological contractor staff at the start of the works.
- 5.4 The required PPE on the site includes safety helmets, high visibility jackets, wet weather gear, warm clothing and steel toe-capped and steel mid-soled boots.
- 5.5 Large 21 tonne mechanical excavators will be used on the site. A minimum distance of 3m from the machine must be maintained by the attending archaeologist.
- 5.6 The site is known to be contaminated and staff will ensure that they wear gloves and any other appropriate PPE as deemed absolutely necessary by Natural Resources Wales.

6. BIBLIOGRAPHY

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