NRW TREE FELLING ON LAND AROUND DOLAUCOTHI GOLD MINES, CARMARTHENSHIRE: ARCHAEOLOGICAL WATCHING BRIEF

DAT Archaeological Services

Prepared by DAT Archaeological Services
For: Natural Resources Wales

REGISTERED ORGANISATION CIfA

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RHIF YR ADRODDIAD / REPORT NO. 2018-46
RHIF Y DIGWYDDIAD/ EVENT RECORD NO. 113514

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ARCHAEOLOGICAL WATCHING BRIEF

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ARCHAEOLOGICAL WATCHING BRIEF

SUMMARY

DAT Archaeological services were commissioned by Natural Resources Wales to undertake an archaeological watching brief during construction of infrastructure to enable the felling of two diseased larch plantations adjacent to the scheduled Dolaucothi Gold Mines and associated aqueducts in Carmarthenshire (centred on SN 66614 40479 and SN 66940 40625). The works involved the construction of new access roads, a log storage area and a skyline for transporting logs from the upper part of the site to the log store.

During construction of the access roads a yellow silty/sand layer was observed which directly overlay the natural bedrock geology. There were no archaeological deposits or remains observed during the course of the watching brief. No earthworks associated with hitherto unrecorded aqueducts or any other features were recorded in the felling areas. This could potentially be due to disturbance from the plantation itself, caused by the process of tree planting, tree growth and tree falls.

CRYNODEB

Comisiynwyd Gwasanaethau Archaeolegol YAD gan Cyfoeth Naturiol Cymru i ymgymryd â brîff gwylio archeolegol yn ystod adeiladu isadeiledd i ganiatáu cwympo dau planhigfa llarwydden afiach ger Pyllau Glo Dolaucothi a dyfrbontydd cysylltiedig yn Sir Gaerfyrddin (wedi'i ganoli ar SN 66614 40479 a SN 66940 40625). Roedd y gwaith yn cynnwys adeiladu ffyrdd mynediad newydd, ardal storio boncyff a skyline ar gyfer cludo boncyffion o ran uchaf y safle i'r storfa foncyffion.

Yn ystod adeiladu'r ffyrdd mynediad gwelwyd haen silt/tywod felen sy'n gorchuddio'n uniongyrchol â daeareg creigwely naturiol. Ni welwyd unrhyw ddyddodion archeolegol nac olion yn ystod y brîff gwylio. Ni chofnodwyd unrhyw wrthgloddiau sy'n gysylltiedig â dyfrbontydd heb eu cofnodi hyd yma nac unrhyw nodweddion eraill yn yr ardaloedd cwympo coed. Gallai hyn fod o ganlyniad i aflonyddwch o'r blanhigfa ei hun, a achosir gan y broses o blannu coed, tyfiant coed a chwympo coed.

1. INTRODUCTION

1.1 Project Commission

1.1.1 Natural Resources Wales (NRW) proposed to fell two areas of diseased larch plantation around the Dolaucothi Gold mines in Carmarthenshire (SN 66614 40479 and SN 66940 40625; Figures 1, 2 and 3) due. The works involved the creation of new access roads, one in the western part of the site to provide access to the main road and the second on the upper plantation area to the northeast, to provide access for tree felling vehicles. A log storage area was also constructed in the lower, western part of the site. A skyline was to be used to transport felled logs from the upper part of the site down to the log store near the road.

1.1.2 The Conservation and Heritage Manager of NRW requested that a programme of archaeological works be implemented due to the proximity of the scheduled features associated with the Dolaucothi Gold Mines, to ensure that if any archaeological deposits are present they can be appropriately investigated and recorded. The mines and the area of tree felling are owned by The National Trust who were also keen that archaeological works should be undertaken. Discussions had also been on-going with Cadw due to the proximity of the scheduled monuments and again programme of archaeological works where groundworks were proposed was requested. It was been agreed that an archaeological watching brief during the construction of the road lines, log storage area and sky line platforms would be undertaken.

1.1.3 Following the completion of tree felling it was also agreed to undertake a topographic survey of the northern, upper area to record any earthworks that might be revealed that could be associated with the Dolaucothi Gold Mines (including other possible Roman aqueducts). This survey would provide information regarding any subsequent replanting of the area with broad leaf trees in the future and whether certain features or areas should be avoided with tree planting.

1.1.4 DAT Archaeological services were commissioned by NRW to provide a programme of archaeological works during groundworks associated with the tree felling to ensure that if any archaeological deposits or remains were present they could be appropriately investigated and recorded. This programme comprised of an archaeological watching brief during the construction of the road lines, log storage area and sky line platforms.

1.1.5 A Written Scheme of Investigation (WSI) was prepared by DAT Archaeological Services (Appendix I) and approved prior to groundworks commencing. The WSI detailed the methodology for the watching brief and was prepared in accordance with the relevant Chartered Institute for Archaeologists (CIfA) standards and guidance (CIfA 2014).

1.2 Scope of the Project

1.2.1 The written scheme of investigation (WSI) prepared by DAT Archaeological Services stated the watching brief objectives:

- To monitor ground works in order to identify the presence/absence of any archaeological deposits;
- To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works;

- To appropriately investigate and record any archaeological deposits to be affected by the ground works;
- To undertake a topographic survey of the southern forestry area where earthwork remains of former Roman viaducts to the gold mines may be located;
- To produce an archive and report of any results.

1.2.2 The overall aim of the work was: Archaeological attendance during ground works associated the construction of roadways, access tracks, storage areas and sky line platforms within the larch felling areas at Dolaucothi Gold Mines on behalf of NRW which could potentially expose, damage or destroy archaeological remains. Appropriate investigation and recording of any such remains will be undertaken if revealed, including an earthwork survey following completion of tree felling. A report and archive of the results of the works will be prepared.

1.3 Report Outline

1.3.1 This report describes the location of the site along with its archaeological background, and provides a summary and discussion of the results of the watching brief. It has been prepared in accordance with the relevant CIfA standards and guidance (CIfA 2014).

1.4 Abbreviations

1.4.1 All sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded on the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Scheduled Monument (SM). Altitude is expressed to Ordnance Datum (OD). References to cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section towards the end of the report.

1.5 Illustrations

1.5.1 Printed map extracts are not necessarily reproduced to their original scale. North is towards the top of the page unless otherwise indicated.

1.6 Timeline

1.6.1 The following timeline is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text (Table 1).

Period	Approximate date	
Palaeolithic –	*c.*450,000 – 10,000 BC	Prehistoric
Mesolithic –	*c.* 10,000 – 4400 BC	
Neolithic –	*c.*4400 – 2300 BC	
Bronze Age –	*c.*2300 – 700 BC	
Iron Age –	*c.*700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – *c.* AD 410	Historic
Post-Roman / Early Medieval Period –	*c.* AD 410 – AD 1066	
Medieval Period –	1066 – 1536	
Post-Medieval Period[1] –	1536 – 1750	
Industrial Period –	1750 – 1899	
Modern –	20th century onwards	

Table 1: Archaeological and Historical Timeline for Wales

[1] The Post-Medieval and Industrial periods are combined as the Post-Medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust

Figure 1: Map showing the location of the NRW tree felling scheme area around Dolaucothi Gold Mines (red box)

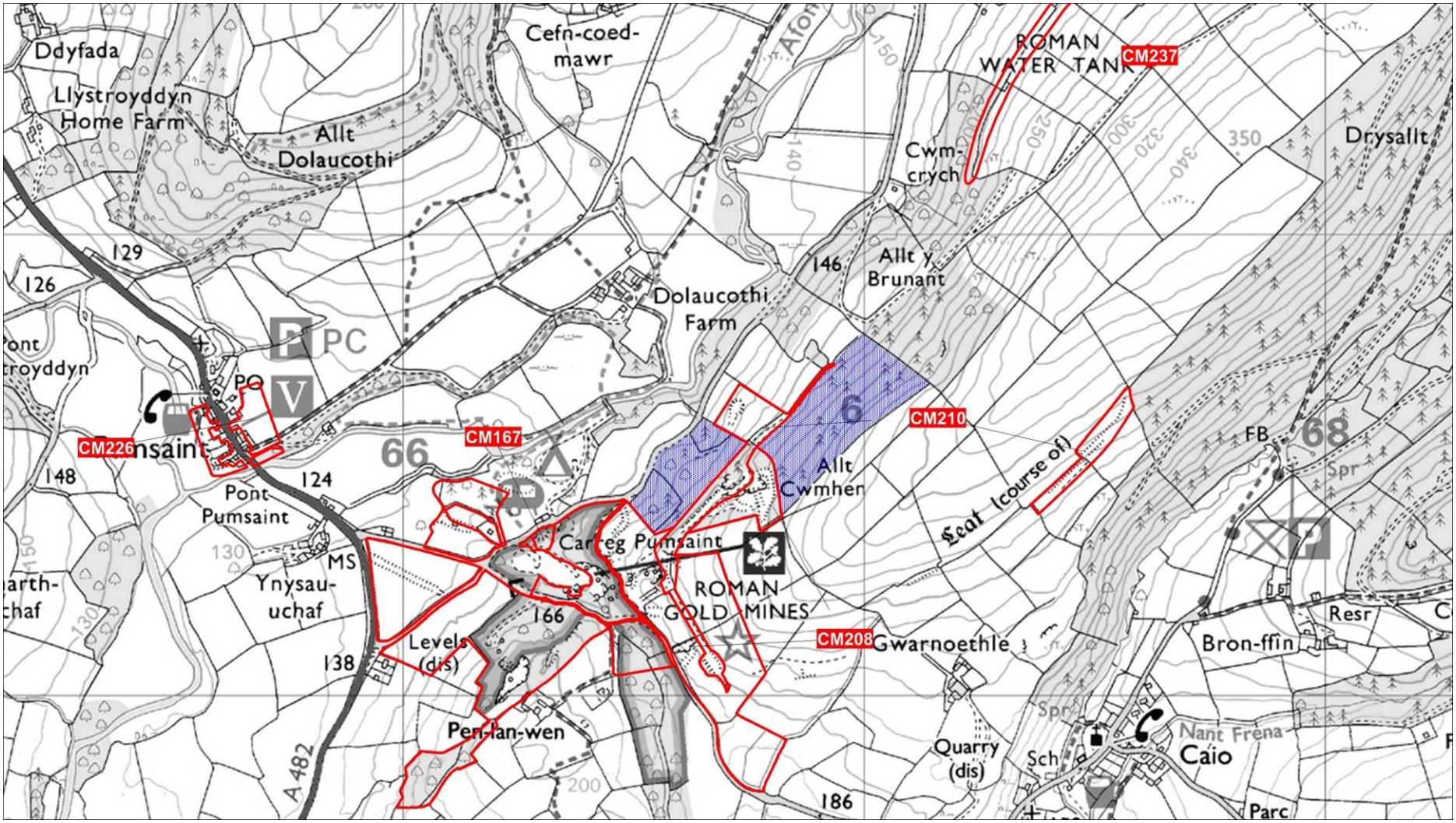

Figure 2: Map showing the location of the surrounding Scheduled Ancient Monuments in red around the tree felling areas (blue)

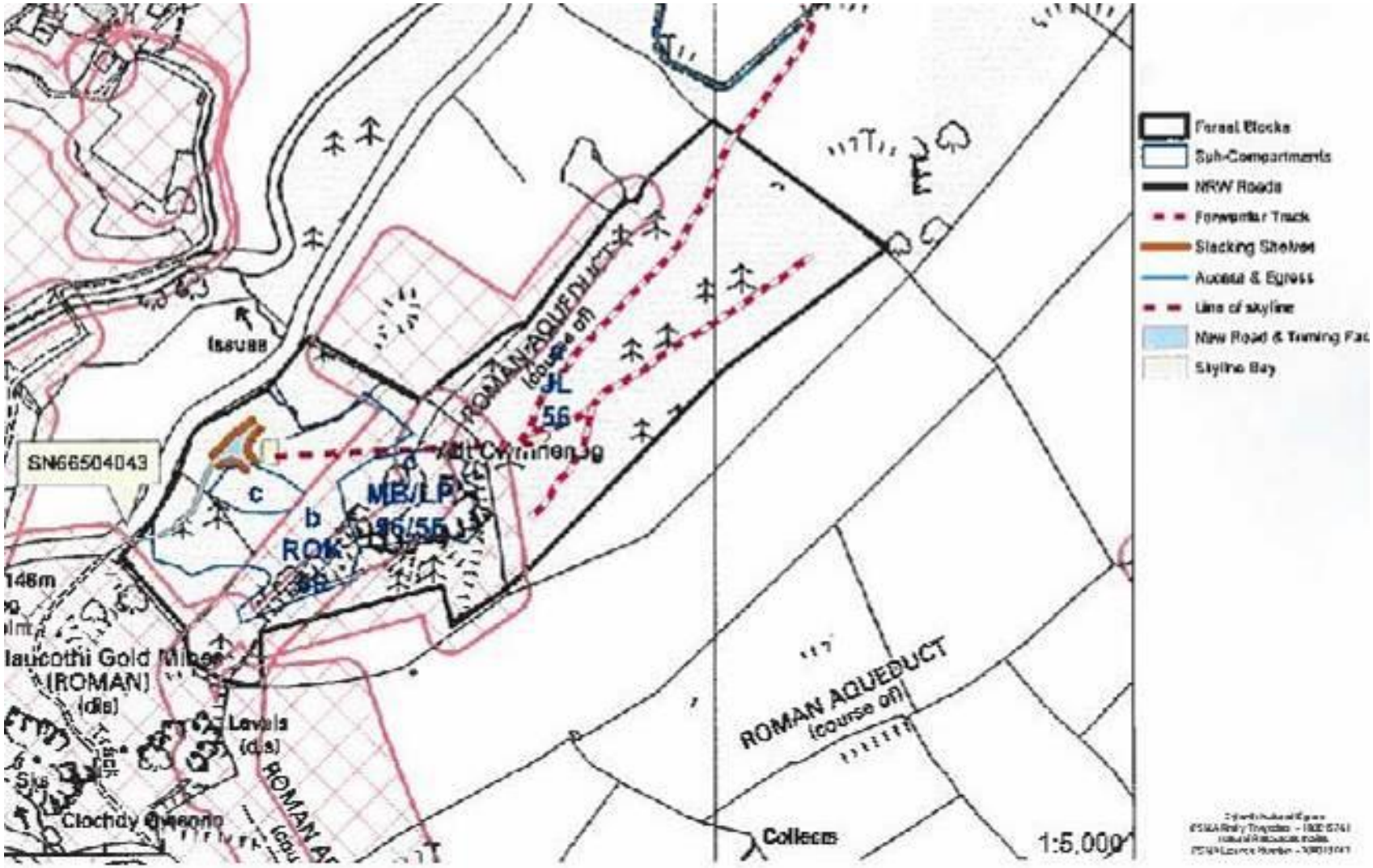

Figure 3: Extract of map provided by NRW showing tree felling areas, site of roadway, felling tracks, sky line route and bases, and log storage areas with surrounding scheduled areas in red

2. THE SITE

2.1 Location

2.1.1 The area of tree felling is located to the north of Dolaucothi Gold Mine, just outside of the site boundary. The site areas lie around 1km east of the village of Pumpsaint. Two areas of tree felling were proposed: the western area runs alongside a small road leading east from the A482; the second area lies on higher ground to the northeast of the first. The land is all owned by the National Trust.

2.1.2 The areas of the watching brief focussed on the construction of access roads to the west of the western tree felling area, connecting with the existing road. A second road way was located at the northern end of the northern felling area, linking an existing trackway running uphill from the western road, crossing part of a field to the woodland. The base for the northern (upper) skyline was located at the southern end of this access track. The third area observed was located at the northern end of the western access track, adjacent to the western road. Here a wider area was stripped of topsoil only for log storage and as a vehicle turning area. It also incorporated the location for the western (lower) skyline base.

2.1.3 The underlying solid geology of the site is mainly mudstone and laminated Hemipelagic Mudstone – sedimentary bedrock formed approximately 433 - 444 million years ago in the Silurian Period. The overlying superficial geological deposits recorded in this area consists of Glaciofluvial deposits and Devensian – sands and gravels, formed up to 2 million years ago in the Quaternary period (British Geological survey [online])

2.2 Archaeological and Historical Background

2.2.1 The proposed areas of larch tree felling lie adjacent to the Scheduled areas of the Dolaucothi Gold Mines (CM 208) and the Roman aqueduct (CM 200) (Figure 2). Relevant elements of the summary description of the Gold Mines are as follows:

The monument (CM 208) consists of the remains of a gold mine, dating initially to the Roman period (1st to 4th century AD), but with further phases of activity, of which those in the later 19th and early 20th century are best attested. The main focus of the mines lies in and around a saddle on the northern slopes of a range of hills running north-east to south-west, known as Allt Ogofau to the south-west of the mines and Allt Cwmhenog to the north-east. …. The early workings were fed with water by at least one and probably more aqueducts, the main one of which ran 11km down the Cothi valley from Pwll Uffern Cothi (scheduled as CM200). Various features around the mine area have been postulated as related to the use of this water for different mining and processing activities. … The monument is of national importance for its potential to enhance our knowledge of Roman mining practices. The more recent phases are also of historical interest. It retains significant archaeological potential, with a strong probability of the presence of associated archaeological features and deposits.

2.2.2 The scheduled Roman Aqueduct (CM 200) is described as follows and is of most relevance to the proposed tree felling area:

2.2.3 *The monument consists of the remains of a water channel, dating to the Roman period. It is believed to have been constructed in conjunction with the Roman exploitation of the gold mines at Dolaucothi, probably in the later 1st and early 2nd centuries AD. It runs for a total of about 10.7 kilometres from its source beside a waterfall in the gorge at Pwll Uffern Cothi, down the southern flank of the Cothi valley to the gold mines near*

the village of Pumpsaint, where it fed a number of tanks and was used for various purposes. It was very skilfully designed with a fall of about 1 in 750 throughout, partly as a result of the need to carry it over the saddle beside Allt Dinbeth, which limited the gradient above this point. The channel hugs the contour of the hillside for most of its route, running some way up side valleys at Cwm Dâr, Pen-twyn and Llwynceiliog as a result. Some parts of its course were probably carried on or supported by timber structures which do not survive. While occasional stretches of rock-cut inner face are visible, nowhere is it possible to calculate the original width and depth of the channel. This is the longest and best-preserved leat from the Roman period in Wales (one of only a handful known in Britain) and an important demonstration of the sophistication of water management by Roman engineers. Parts of the course have been lost over the years, so that only the better surviving portions have been deemed suitable for scheduling. …. The monument is of national importance for its potential to enhance our knowledge of Roman structural engineering and mining technology. The scheduled sections of the monument are generally well-preserved and an important relic both of their Roman construction and of the subsequent development of the local landscape, in which its line often became a key feature. It retains significant archaeological potential, with a strong probability of the presence of both structural evidence and intact associated deposits.

2.2.4 Three other scheduled monuments lie in the vicinity: Within the centre of the gold mines lies Dolaucothi mound formed of mine waste (CM 167); to the northwest of the gold mines lies Pumpsaint Roman Fort (CM 226); and to the northeast lies a further element of the Roman aqueduct (CM 237).

2.2.5 The area has the potential for remains of Roman activity associated with the gold mines, including additional aqueducts that formerly led to the mines.

3. WATCHING BRIEF METHODOLOGY

3.1 Fieldwork

3.1.1 This watching brief was undertaken in accordance with the relevant CIfA Standard and Guidance for an Archaeological Watching Brief (2014). The Written Scheme of Investigation (Appendix I), outlined the archaeological works proposed and provided a detailed methodology for the watching brief. This was approved prior to the commencement of the works.

3.1.2 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out in accordance with the Recording Manual[2] used by DAT Archaeological Services.

3.2 Post-Fieldwork Reporting and Archiving

3.2.1 All data recovered during the fieldwork has been 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 2011). *The National Standards for Wales for Collecting and Depositing Archaeological Archives* have also been adhered to (The Federation of Museums & Art Galleries of Wales 2017). A digital archive will be deposited with the Royal Commission on the Ancient and Historical Monuments Wales (RCAHMW), created to their requirements (ibid.).

3.2.2 The results of the fieldwork have been assessed in local, regional and wider contexts. The report includes a desk-based research element to ensure that the site is placed within its wider archaeological context.

3.2.3 This report is fully representative of the results of the fieldwork.

3.3 Timetable of the Works

3.3.1 The watching brief works were undertaken between 15th August and 4th December 2018. This involved visits to the site to observe stripping for the road access, a new access road leading to and through the northern area, the bases for the skylines and a topographic survey was undertaken at the end of the works.

[2] DAT Archaeological Services has adopted the Recording Manual developed by English Heritage Centre for Archaeology.

4. RESULTS

4.1 Access Roads – Southwestern Area

4.1.1 At the northern part of the site the watching brief was undertaken during construction of the access way to the main road and the log storage area (Photos 1 - 3).

4.1.2 Tree felling had occurred along the road line route prior to groundworks commencing. Tree felling was not observed by an archaeologist both for health and safety reasons and the fact that works involved felling trees at ground level and the root bowl removed afterwards during the site strip.

4.1.3 The area was machine stripped and for the majority of the area revealed a thin layer of silty topsoil. Beneath this was a deep deposit of yellow/brown silts, sand and shale stones (Photo 1 & 2). Large areas of disturbed ground were present in the areas where tree stumps had been removed.

4.1.4 It was clear that the underlying ground surface had been disturbed to some extent, potentially when the original larch trees were planted. The shallow depth of topsoil overlying the underlying natural geology was surprising and may indicate that the area had been topsoil stripped before planting, although this is by no means certain.

4.1.5 Where the access track met the road along the western side of the area the ground level was reduced quite significantly (Photos 2 & 3). It was clear that this cut into the underlying natural geology and no archaeological remains were observed.

4.1.6 Crushed stone mostly taken from the cutting for the road was spread across the access track surface (Photos 4 & 5).

Photo 1: Mechanical excavator removing the topsoil and exposing the underlying silts and sand.

Photo 2: Machine excavating the access road to the north of the site.

Photo 3: Representative section of access road showing topsoil and underlying sands and silts.

Photo 4: View from western road along access track after ground reduction

Photo 5: View along western access track towards log storage area and lower skyline base

4.2 Access Roads – Northern Area

4.2.1 The second access road in the upper plantation (Allt Cwmhen) was also monitored through a watching brief. In this area the road was cut from an existing trackway running uphill from the western road, across a field and towards the woodland area (Figure 3; Photo 6).

4.2.2 Where the topsoil strip crossed the field from the track to the woodland it revealed a yellow, sand silt, similar to that which had been seen in the previous area, directly overlying the natural bedrock geology (Photo 7 and 8). Due to the slope of the land in this area the trackway was terraced into the hill slope with stone cut from the ground upslope used to raise the side of the road on the downslope side (Photos 6 and 7). Within the field the topsoil was again quite shallow.

4.2.3 A similar method of construction was employed for the road lines within the plantation area (Photo 8). The topsoil here was again shallow and lay directly upon the bedrock. Disturbed areas were present where former trees had stood.

4.2.3 A few metres to the west of the proposed location for the upper end of the skyline, a sunken trackway was observed. This was visible on the very southern edge of the felling area and presumably lay within the scheduled area. It is uncertain if the feature was associated with the Roman goldmines or a more recent trackway. It is shown on the ordnance survey maps. The route of the sunken feature did not extend or project into the felling area as far as could be seen (Figure 4, Photo 9).

4.2.4 Following the completion of the access road and skyline base a survey was carried out to locate the line of the new access road and identify any features within the felling area (Figure 4). In the event no other archaeological features could be observed, other than the trackway lying just outside of the area.

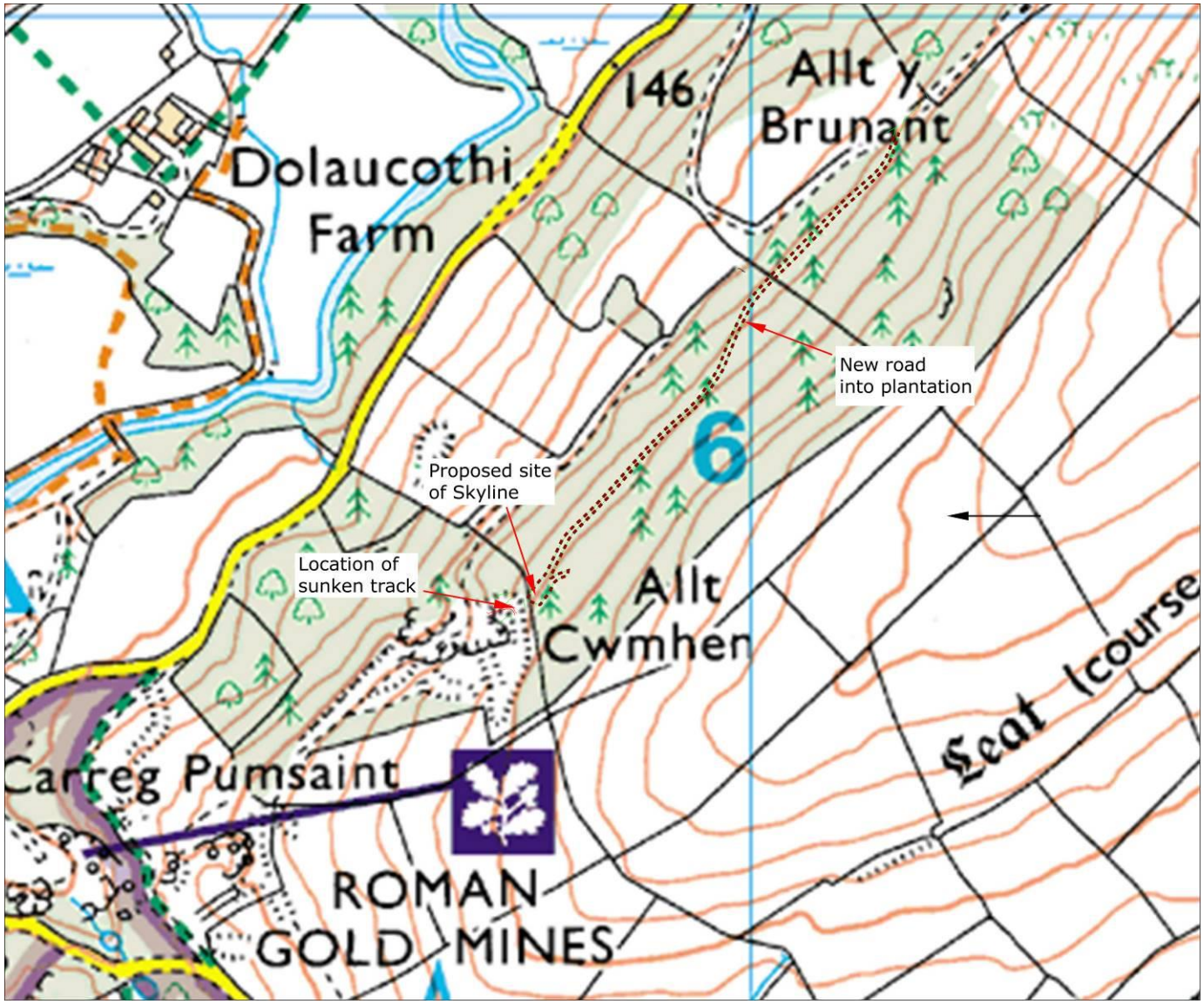

Figure 4: Location of new road into Allt Cwmhen, surveyed features

Photo 6: New road entering Allt Cwmhen

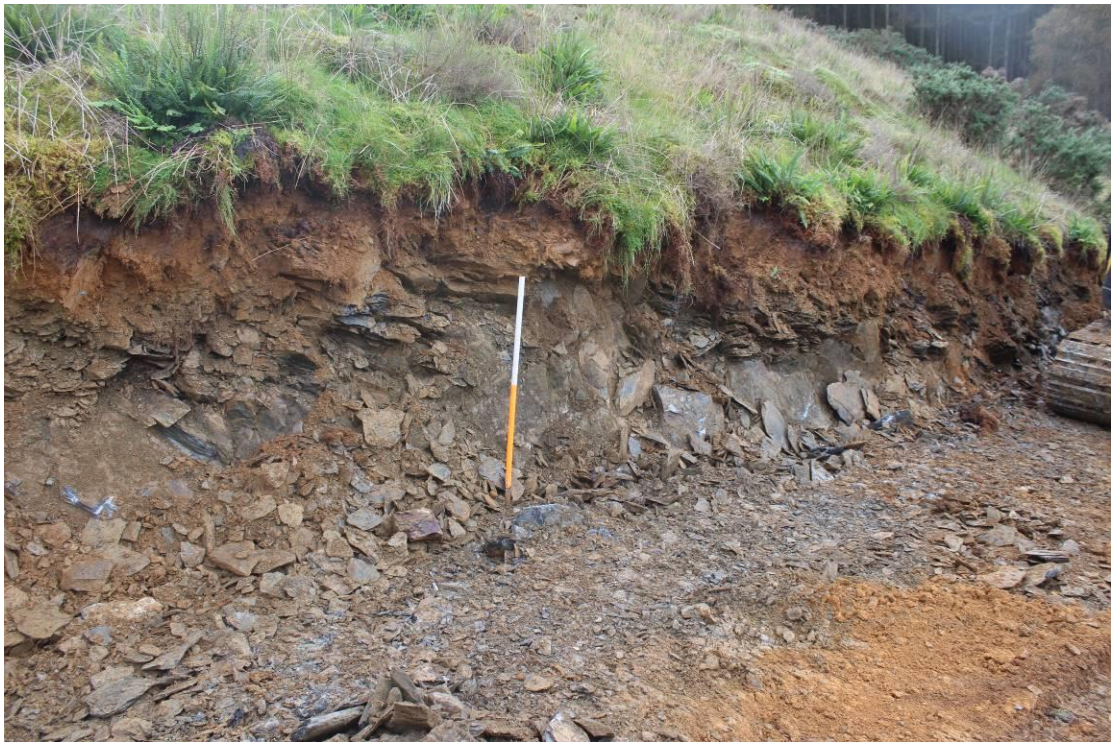

Photo 7: Bedrock geology revealed during road cut.

Photo 8: Road cut within plantation showing bedrock geology

Photo 9: Looking west at sunken track located below proposed site for skyline, outside of the proposed tree felling area observed

4.3 Log Storage Area

4.3.1 At the northern end of the access track leading from the western road in the lower part of the site a wider area was topsoil stripped to make room for the required log storage areas and in order to provide a turning area for vehicles.

4.3.2 This area was again stripped with a large 360 excavator with flat bladed bucket. The surface prior to stripping was quite disturbed from the earlier felling activity, but in general little deeper disturbance had occurred (Photo 10).

4.3.3 Thanks to the assistance of the site contractors a neat strip was possible to expose the entire part of this area. The topsoil was again thin overlying a orange yellow sand clay and stone natural geology layer (Photos 11, 12, 13 & 14).

4.3.3 Numerous hollows from former tree roots were noted across the stripped area, a number of tree roots were also removed during this part of the watching brief (Photos 13 and 14). Some were fairly small and self-contained (Photo 14) whereas others were far larger combining roots systems from several trees (Photo 13).

Photo 10: Log storage area prior to site stripping, but after felling showing ground conditions

Photo 11: View east across upper part of log storage area in the vicinity of the skyline base showing stripped surface

Photo 12: View northeast across upper part of log storage area in the vicinity of the skyline base showing stripped surface

Photo 13: View northwest across storage area showing large area of tree root disturbance in foreground.

Photo 14: Smaller area of tree root disturbance seen within log storage area during topsoil stripping.

5 CONCLUSIONS

5.1 Overall the archaeological watching brief undertaken during activities associated with large scale tree felling in two areas of woodland northeast of Dolaucothi Gold Mines revealed nothing of archaeological significance within the felling areas.

5.2 Part of a track or hollow way to the southwest of the northern felling area and upper skyline base was recorded. This lay beyond the boundary of the felling area lying within a scheduled area (CM 210). The earthwork was not disturbed by the works.

5.3 Across the entire site within areas of woodland and the field to the north, a thin topsoil was recorded directly overlying the underlying natural geology comprising yellow/orange silty sand and bedrock. No archaeological features were observed cutting into the natural.

5.4 The thin nature of the topsoil may be associated with the steep slopes on which the felling areas lie exacerbating water run-off and thus hill wash running down slope lowering the topsoil depth over centuries. It was also noted on the western area that potentially the thin topsoil may indicate removal or thing of it when the original larch plantation was established.

5.5 The exposed ground surface below the topsoil contained lots of evidence of root bowls for the former trees. These would have caused significant disturbance to the ground and any archaeology which may have been present.

5.6 Fairly large areas were stripped within the felling areas adjacent to the nationally significant Dolaucothi Gold Mines. No artefacts were recovered from anywhere within the site area of any period, including Roman material. Based on the abundance of roman activity in the area and the proximity of the fort at Pumpsaint the lack of any Roman artefacts is quite surprising and may indicate a lack of activity within the areas observed. It is possible that the steep slopes were not suitable for past activity and that any further aqueducts or other features associated with mining were located elsewhere.

5.7 Even though no archaeological remains were identified during this watching brief, it is clear that woodland plantations cause significant damage to archaeological remains. This occurs both from the original process of laying out and planting the trees, from tree root growth, tree falls and the eventual process of tree felling. It was not possible to identify any earthworks within the extent woodland before or during the activities on-site, due both to tree cover and the fact that the ground had been disturbed through the planting process, tree growth and tree falls.

5.8 This does not indicate that archaeology would not survive within tree plantation areas, but does demonstrate that such remains if present would have been disturbed. Whether it is possible to alter the process of woodland planting in the future to avoid or minimise disturbance to archaeology is something that could be considered in the future. The process of felling is also destructive (although in the log storage area it was more evident with disturbance from planting and growth than felling) and again mitigation measures should be considered to minimise disturbance through this process also.

6. SOURCES

Published

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Database

Dyfed Archaeological Trust Historic Environment Record, housed with Dyfed Archaeological Trust at Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AE.

Websites

British Geological Survey mapping portal. Available at: http://mapapps.bgs.ac.uk/geologyofbritain/home.html [Accessed 2/Feb/2018]

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APPENDIX I:

NRW TREE FELLING ON LAND AROUND DOLAUCOTHI GOLD MINES, CARMARTHENSHIRE: ARCHAEOLOGICAL WRITTEN SCHEME OF INVESTIGATION

1 INTRODUCTION

1.1 Natural Resources Wales are proposing to fell two areas of Larch plantation around Dolaucothi Gold Mines in Carmarthenshire (SN 66614 40479 and SN 66940 40625; Figures 1 & 2) due to diseased trees. The works will involve the creation of new access roads, one in the northern part of the site to provide access to the main road and the second on the upper plantation area, to provide access for felling vehicles. A log storage area will also be constructed in the lower, northern part of the site. A sky line will be used to transport felled logs from the upper part of the site down to the log store near the road.

1.2 The Conservation and Heritage Manager of NRW has requested a programme of archaeological works be implemented to ensure that if any archaeological deposits are present they can be appropriately investigated and recorded. Following discussions it has been agreed that an archaeological watching brief during the construction of the road lines, log storage area and sky line platforms will be undertaken. Following the completion of tree felling it is also proposed to undertake a topographic survey to record earthworks that could be associated with the Dolaucothi Gold Mines (including other possible Roman aqueducts) within the upper area to the south. This survey will provide information regarding any subsequent replanting of the area with broad leaf trees in the future. This document lays out the methodology by which DAT Archaeological Services will implement these works.

1.3 The proposed areas of larch tree felling lie adjacent to the Scheduled areas of the Dolaucothi Gold Mines (CM 208) and the Roman aqueduct (CM 200). Relevant elements of the summary description of the Gold Mines are as follows:

The monument consists of the remains of a gold mine, dating initially to the Roman period (1st to 4th century AD), but with further phases of activity, of which those in the later 19th and early 20th century are best attested. The main focus of the mines lies in and around a saddle on the northern slopes of a range of hills running north-east to south-west, known as Allt Ogofau to the south-west of the mines and Allt Cwmhenog to the north-east. …. The early workings were fed with water by at least one and probably more aqueducts, the main one of which ran 11km down the Cothi valley from Pwll Uffern Cothi (scheduled as CM200). Various features around the mine area have been postulated as related to the use of this water for different mining and processing activities. … The monument is of national importance for its potential to enhance our knowledge of Roman mining practices. The more recent phases are also of historical interest. It retains significant archaeological potential, with a strong probability of the presence of associated archaeological features and deposits.

1.4 The scheduled Roman Aqueduct (CM 200) is described as follows and is of most relevance to the proposed tree felling area:

The monument consists of the remains of a water channel, dating to the Roman period. It is believed to have been constructed in conjunction with the Roman exploitation of the gold mines at Dolaucothi, probably in the later 1st and early 2nd centuries AD. It runs for a total of about 10.7 kilometres from its source beside a waterfall in the gorge at Pwll Uffern Cothi, down the southern flank of the Cothi valley to the gold mines near

the village of Pumpsaint, where it fed a number of tanks and was used for various purposes. It was very skilfully designed with a fall of about 1 in 750 throughout, partly as a result of the need to carry it over the saddle beside Allt Dinbeth, which limited the gradient above this point. The channel hugs the contour of the hillside for most of its route, running some way up side valleys at Cwm Dâr, Pen-twyn and Llwynceiliog as a result. Some parts of its course were probably carried on or supported by timber structures which do not survive. While occasional stretches of rock-cut inner face are visible, nowhere is it possible to calculate the original width and depth of the channel. This is the longest and best-preserved leat from the Roman period in Wales (one of only a handful known in Britain) and an important demonstration of the sophistication of water management by Roman engineers. Parts of the course have been lost over the years, so that only the better surviving portions have been deemed suitable for scheduling. …. The monument is of national importance for its potential to enhance our knowledge of Roman structural engineering and mining technology. The scheduled sections of the monument are generally well-preserved and an important relic both of their Roman construction and of the subsequent development of the local landscape, in which its line often became a key feature. It retains significant archaeological potential, with a strong probability of the presence of both structural evidence and intact associated deposits.

1.5 Three other scheduled monuments lie in the vicinity: Within the centre of the gold mines lies Dolaucothi mound formed of mine waste (CM 167); to the northwest of the gold mines lies Pumpsaint Roman Fort (CM 226); and to the northeast lies a further element of the Roman aqueduct (CM 237).

1.6 The area has the potential for remains of Roman activity associated with the gold mines, including additional aqueducts that formerly led to the mines.

1.7 This WSI details the methodology of the evaluation which will be undertaken and has been prepared in accordance with the *Standard and Guidance for an Archaeological Watching Brief* (CIfA[3] 2014).

1.8 The Trust always operates to best professional practice. DAT Archaeological Services has its own Health and Safety Policy, and all works are covered by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.

1.9 ***Dyfed Archaeological Trust is a CIfA Registered Organisation.***

1.10 ***All permanent staff members of DAT Archaeological Services are CSCS[4] registered.***

[3] ***Chartered Institute for Archaeologists.***
[4] ***Construction Skills Certification Scheme (Health and Safety Tested)***

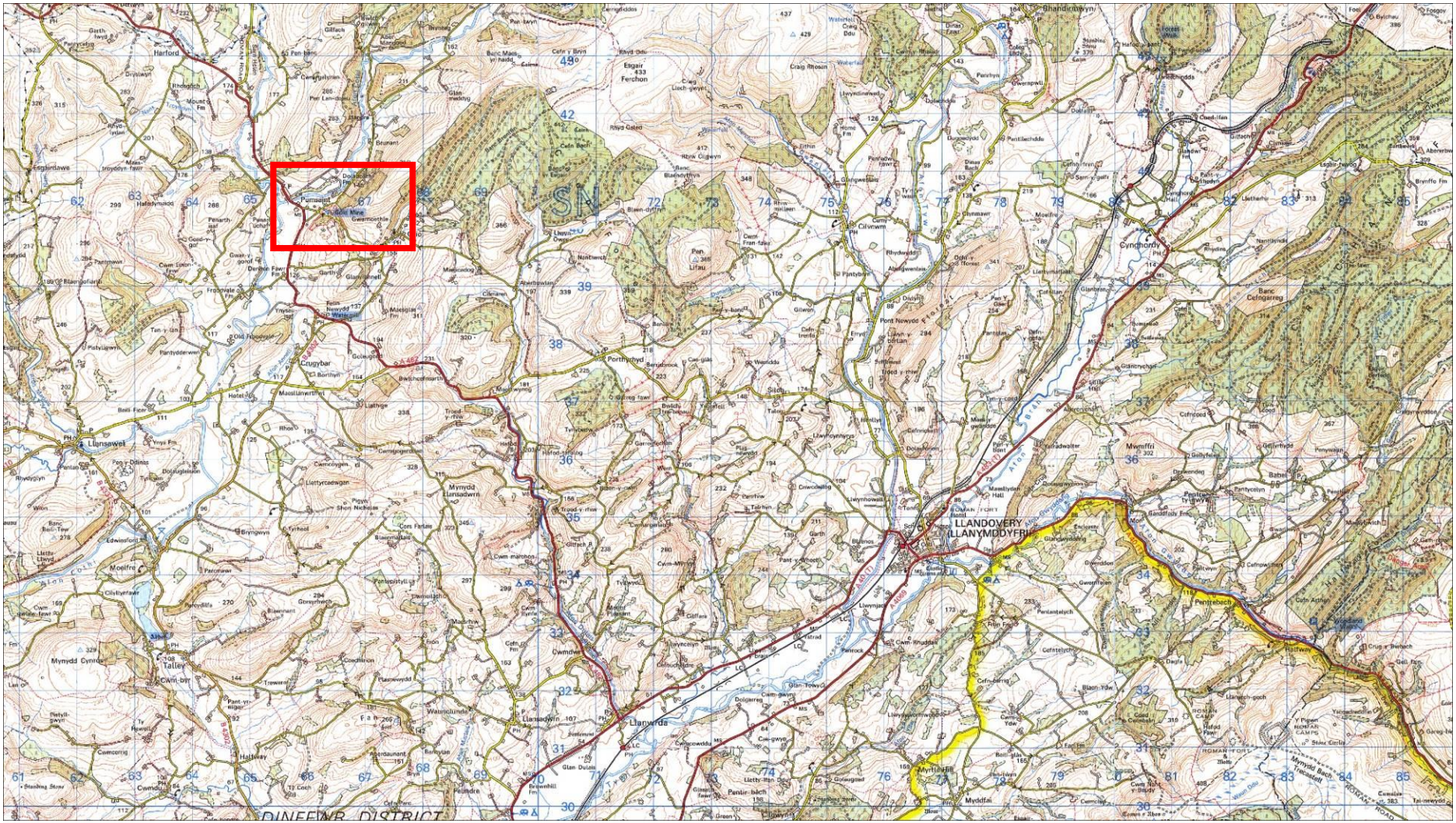

Figure 1: Map showing the location of the NRW tree felling scheme area around Dolaucothi Gold Mines (red box)

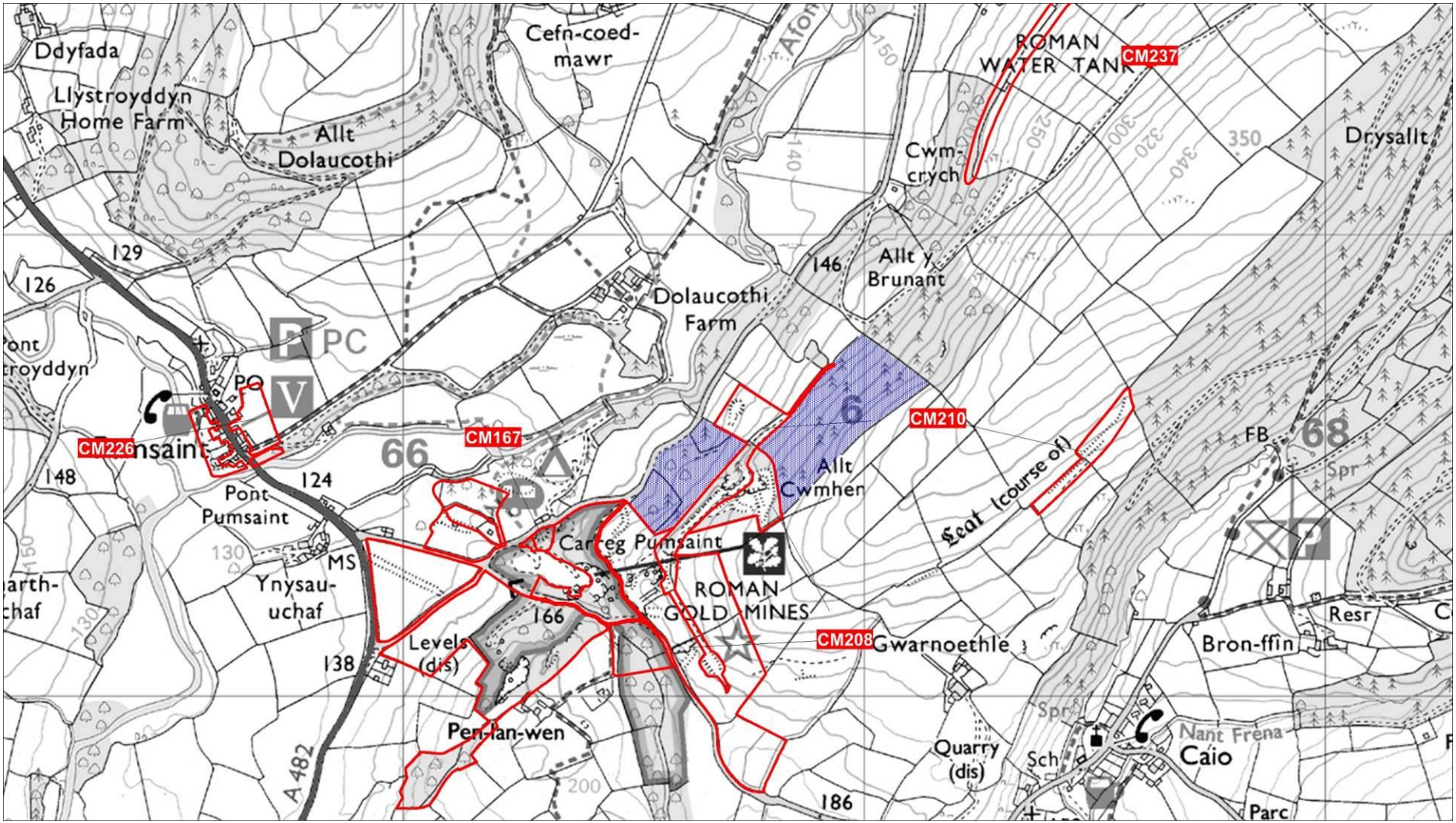

Figure 2: Map showing the location of the surrounding Scheduled Ancient Monuments in red around the tree felling areas (blue)

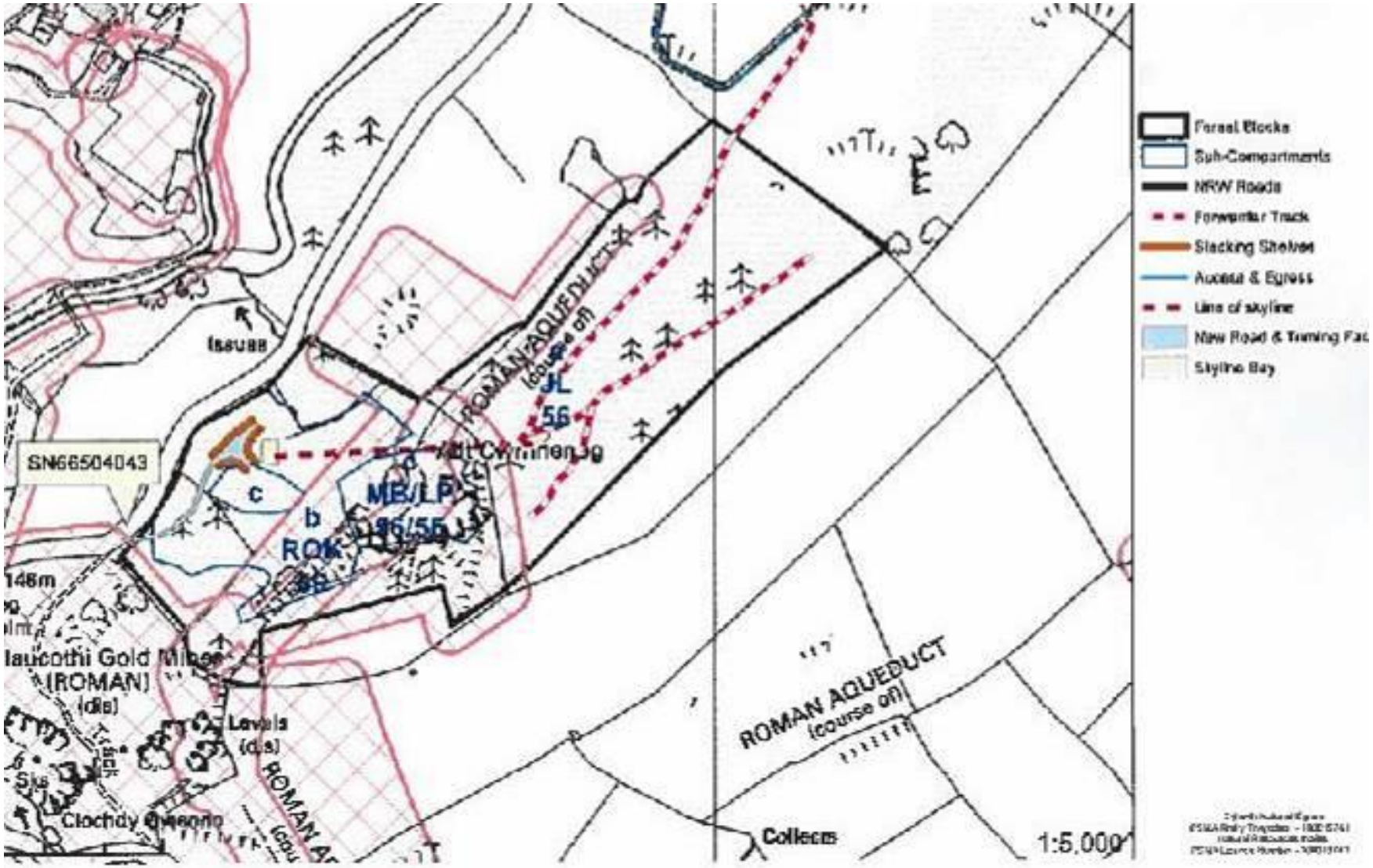

Figure 3: Extract of map provided by NRW showing tree felling areas, site of roadway, felling tracks, sky line route and bases, and log storage areas with surrounding scheduled areas in red

2. WATCHING BRIEF

2.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (CIfA S&G: AWB 2014) 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.

2.2 The purpose of a watching brief, as laid down in the CIfA 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.*

2.3 This document provides a scheme of works for: ***Archaeological attendance during ground works associated the construction of roadways, access tracks, storage areas and sky line platforms within the larch felling areas at Dolaucothi Gold Mines on behalf of NRW which could potentially expose, damage or destroy archaeological remains. Appropriate investigation and recording of any such remains will be undertaken if revealed, including an earthwork survey following completion of tree felling. A report and archive of the results of the works will be prepared.***

2.4 The following tasks will be completed:

- **Provision of a written scheme of investigation to outline the methodology for the archaeological watching brief which DAT Archaeological Services will undertake (this document);**
- To monitor ground works in order to identify the presence/absence of any archaeological deposits;
- To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works;
- To appropriately investigate and record any archaeological deposits to be affected by the ground works;
- To undertake a topographic survey of the southern forestry area where earthwork remains of former Roman viaducts to the gold mines may be located;
- To produce an archive and report of any results.

3 FIELDWORK

3.1 The watching brief would entail an archaeologist being present during all ground works where there is a potential for archaeological remains to be exposed, damaged or destroyed. This will be carried out during all site stripping for road ways, access tracks, log storage areas and skyline platforms.

3.2 All groundworks must be carried out using a mechanical excavator fitted with a flat bladed bucket (grading bucket) to enable easier identification and recording of any archaeological remains which may be present. It is not anticipated that any attendance would be needed during the process of felling trees, which will be cut down at ground level. Tree stumps will not be moved, other than where they lie within the route of the access road/roadways. Stump removal must be undertaken with an archaeologist present.

3.3 It is essential coordination between the site contractor's and archaeologist is established at the outset to avoid any potential disturbance to archaeology without an archaeologist being present, or unnecessary visits to the site when works are being carried out that do not require the presence of an archaeologist.

3.4 Adequate time must be made available to the visiting archaeologist to ensure that appropriate recording can be undertaken of any archaeological features or deposits exposed during ground works.

3.5 Recording of all archaeological features or deposits will conform to best current professional practice and be carried out in accordance with the Recording Manual[5] used by DAT Archaeological Services. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.

3.6 All archaeologically significant finds will be retained and, where possible, related to the contexts from which they derived. Finds will be temporarily stored by DAT Archaeological Services in stable conditions. All finds, except those deemed to be Treasure, will remain the property of the landowner.

3.8 Under the 1996 Treasure Act, "treasure" can be summarised as:

- Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
- Any prehistoric assemblage of base metal;
- Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
- Any object found associated with treasure except unworked natural objects; and
- Any object which would have been Treasure Trove before the 1996 Act but not covered above.

3.9 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed (which is a potential within this area of high archaeological significance), DAT Archaeological Services shall have the power to halt any

[5] ***DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.***

ground works and shall inform the site agent/project manager, NRW 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, DAT Archaeological 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.

3.10 In the unlikely event that human remains are 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.

3.11 Following the removal of tree stumps in the southern forestry area, a topographic survey will be undertaken to record the remains of any earthworks exposed following tree clearance. This could include former routes of Roman aqueducts. The resulting survey will be used to inform planting schemes for broad leaf trees in the future.

4 POST-FIELDWORK REPORTING AND ARCHIVING

4.1 An archive will be prepared if it meets the requirements of the Dyfed Archaeological Trust archive retention policy (2018). If it does, then data recovered during the watching brief 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 2011), and the procedures recommended by the National Monuments Record, Aberystwyth. The *National Standards for Wales for Collecting and Depositing Archaeological Archives* produced by the Federation of Museums and Art Galleries of Wales will also be adhered to. Digital archives will be collated using the Royal Commission on the Ancient and Historical Monuments of Wales systems (2015) and deposited with the RCAHMW.

4.2 The results of the fieldwork will be assessed in local, regional and wider contexts.

4.3 The results will be used to inform subsequent design considerations of the proposed development so that they will aim to avoid impacts upon any archaeological remains or that mitigation can be implemented before such remains are disturbed.

4.4 The report will include a desk-based assessment element to place the site into its wider context within the area and also more detail on and interpretation of the geophysical survey results.

4.5 The project archive, including all significant artefacts and ecofacts (excepting those which may be deemed to be Treasure) will be deposited with an appropriate body following agreement with the landowner.

4.6 DAT Archaeological Services will arrange for the deposition of finds, and ascertain the costs of storage and deposition, with an approved body before the project commences and inform the curator of the arrangement which has been made (it is anticipated that the archive will be deposited with the Carmarthen Museum or the NBGW themselves).

4.7 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).

4.8 The report will be prepared to follow the *Standard and Guidance for an Archaeological Watching Brief* (CIfA 2014).

4.9 A digital copy will be produced for NRW. Digital copies of the report will be supplied to Dyfed Archaeological Trust - Development Management and the regional Historic Environment Record.

5 STAFF

5.1 The project will be managed by J Meek MCIfA.

5.2 The on-site works will be undertaken by experienced archaeologists, from DAT Archaeological Services.

6 MONITORING

6.1 The Dyfed Archaeological Trust – Development Management / Heritage management teams should be told of the commencement of the works so that they can arrange a monitoring visit if needed. The fieldwork will also need to be monitored by the Head of DAT Archaeological Services.

6.2 Professor Barry Burnham and Helen Burnham have also requested access to the site during the works. Barry is a leading expert in Roman archaeology of this area, having undertaken much excavation and research at both Dolaucothi and Pumpsaint Roman fort. Helen Burnham was formerly the Cadw Ancient Monuments inspector for the area.

6.3 All parties should be provided with free access to the site at any time during the watching brief works.

7 HEALTH AND SAFETY

7.1 Service information should be obtained prior to the start of the works.

7.2 A health and safety risk assessment must be prepared prior to the works commencing to ensure that all potential risks are minimised.

7.3 All relevant health and safety regulations must be followed.

7.4 All site inductions, H&S procedures, H&S constraints and site rules of the client or any on-site contractor will be made known to the archaeological contractor at the start of the works.

7.5 Safety helmets, safety boots and high visibility vests are to be used by all site personnel as necessary. The site contractors will make all archaeological staff aware of any other PPE that may be required and provide them. Archaeological staff must not enter any area where there is a considered to be a health and safety risk that has not or is not being appropriately mitigated against.

7.6 DAT Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially machine operators.

NRW TREE FELLING ON LAND AROUND DOLAUCOTHI GOLD MINES, CARMARTHENSHIRE: ARCHAEOLOGICAL WATCHING BRIEF

RHIF YR ADRODDIAD / REPORT NO. 2018-46
RHIF Y PROSIECT / PROJECT RECORD NO. 113514

Aust 2019
August 2019

Paratowyd yr adroddiad hwn gan / This report has been prepared by

CHARLES ENRIGHT

Swydd / Position: **Archaeologist**

Llofnod / Signature ..... Date 03/08/2019

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith
This report has been checked and approved by

JAMES MEEK

ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.
on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: **Head of DAT Archaeological Services**

Llofnod / Signature ..... Date 22/08/2019

Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau sydd gennych ar gynnwys neu strwythur yr adroddiad hwn

As part of our desire to provide a quality service we would welcome any comments you may have on the content or presentation of this report

ymddiriedolaeth archaeolegol

DYFED

archaeological trust