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ESGAIR FRAITH MINE

ARCHAEOLOGICAL WATCHING BRIEF

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**REPORT COMMISSIONED BY
FOREST ENTERPRISE
CANOLBARTH DISTRICT**

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CONTENTS

1. Introduction
2. Location, Geology, and Topography
3. Historical and Archaeological Background
4. Watching Brief
5. Conclusions
6. Acknowledgements
7. Sources

LIST OF ILLUSTRATIONS:

- Fig. 1 Plan of Proposed Works
Reproduced with permission from Forest Enterprise
- Fig. 2 Location Plan
Reproduced from 1891 OS 1st edition Map
Cardiganshire Sheet IV NE
Enlarged from Scale 6": 1 mile
- Fig. 3 Enlargement from 1891 OS 1st edition Map
Cardiganshire Sheet IV NE
- Fig. 4 East facing section of Crusher House Tramway
- Fig. 5 West facing section of Crusher House Tramway
-
- Plate 1 Crusher house wheelpit, prior to works
- Plate 2 Crusher house wheelpit, prior to works
- Plate 3 Dressing floor; Location 4, prior to works
- Plate 4 Dressing floor; Location 4, during works
- Plate 5 Dressing floor; Location 4, during works
- Plate 6 Location 3, prior to works
- Plate 7 Location 3 during works
- Plate 8 Location 2 during works
- Plate 9 Crusher house tramway, prior to works
- Plate 10 Crusher house tramway, view from W, prior to works
- Plate 11 Crusher house tramway, view from W, after works
- Plate 12 Crusher house tramway, view from E, after works

APPENDIX 1:

Site Archive

1. Introduction

1.1 Esgair Fraith Metal Mine (*PRN 5626; SN 741912*) lies within Forest Enterprise compartment 5061, known as New Park. Extensive areas of spoil tips, 3 impressive water wheelpits and substantial earthwork features survive unplanted, while a considerable amount of mining features are located within the conifer crop planted in the 1950s.

1.2 The site has been designated an Unscheduled Conservation Area by Forest Enterprise for its high botanical interest and the mine site has been recorded as Category A, during the 1999 Welsh Heritage Assets Project for its Industrial Archaeological remains.

1.3 The constant flow of water that followed the line of a Forestry RUPP has endangered the botanical interest surrounding the Crusher House Wheelpit (*PRN 38065; SN 74031 91172*). The watercourse has formed a natural collection point for water, which in winter months has been particularly threatening to this sensitive area (*see Plates 1 & 2 overleaf*). Although, the area around the crusher house has been heavily disturbed by the forestry road and a considerable amount of stone has been removed from the spoil tips that lie to the south of the wheelpit and forestry road; the surviving structure of the wheelpit is of high archaeological and botanical interest and the dressing floors to the south may still contain buried archaeological features.

1.4 To avert further damage and ensure preservation of the archaeological and botanical interest on site, the programme of work outlined in Fig. 1 was planned following pre-commencement site meetings.

1.5 Following recommendations from Cambria Archaeology and in accordance with '*Forest and Archaeology guidelines for Forest Enterprise Wales*' (1998, pp 4-6), an archaeological watching brief was required during these repairs.

1.6 In December 1999, the author was contracted by Michelle Bromley, acting on behalf of Forest Enterprise, to undertake the watching brief in accordance with *Schedule and Agreement No. CSM101:12/99*. The schedule included a photographic survey to be undertaken prior to commencement of the works, and archaeological recording and supervision during the works to protect the botanical interest on site. The photographic survey was undertaken on December 5th 1999 and the watching brief from February 7th to 9th 2000. The results form the basis of this report.



Plate 1: Crusher house wheelpit (*PRN 38065*), prior to works. View from SE shows the flow of water running down-hill from the forestry RUPP. The water has followed the N side of the tramway which is visible on the right side of the photograph.



Plate 2: View from east, showing the natural collection point for run-off water, prior to works. 1m ranging pole identifies part of a damaged wooden launder box, N side of the forestry road.

2. Location, Topography, and Geology

2.1 Location

Esgair Fraith Mine (*Cambrian Copper Mine*) is located *c.8km* east of Talybont on a minor track leading east off the Ponterwyd to Tal-y-bont mountain road (*see Fig. 2*). The minor track leads through the western workings at Esgair Hir (*Cambrian Lead Works; SN 735912*) before entering Forest Enterprise land. The Tal-y-bont road had been constructed *c.1840s* by the mining company to facilitate movement of ore from the mountain mines to Aberystwyth for shipment to Flintshire for smelting.

2.2 Topography

The mine site is located at *c.400m* OD stretching along a broad valley created by the Afon Lluest-gotta. The forested ridge of Esgair Hir rises to the north and Castell and Banc-yr-Wyn form a ridge to the south. Prior to the development of the mineral interest, the area appears to have been undeveloped rough grassland in use as upland grazing.

2.3 Geology

Esgair Fraith and Esgair Hir are part of the North Cardiganshire Mining District, where the solid geology are the Silurian rocks of the Lower Frongoch Formation, on the edge of their boundary with the Ordovician Rocks of the Plynlimon Dome. The rocks are identified grey and greenish shales, flagstones and mudstones (*Jones 1922, 3*), which are clearly visible on spoil tips in the locality. The main vein followed a general east/west trend and produced large quantities of lead, silver, copper and zinc with quartz and calcite gangue minerals as identified on the tips.

3. Historical and Archaeological Background

3.1 The main east/west vein was discovered *c.1680*, presumably outcropping on the moorland pass. In 1690, the owner of the Gogerddan Estate, Sir Carberry Pryse established a company to work the mines himself. It is assumed that, at this time, mining operations were concentrated at Esgair Hir. However, a manuscript deposited in the British Museum (*444 a 29*) recording the '*Great Lead & Silver Mines at Bwlch-yr-eskir-hir*' in 1704, includes Bog Shaft and a Drift, which form part of the Esgair Fraith workings now on Forestry land.

3.2 The general history of Esgair Fraith and Esgair Hir, their development and numerous holding companies have been adequately recorded by Palmer (*1983*) and Bick (*1988*) and it is beyond the scope of the present brief to refer to features not affected by the current works. The area affected by the current work are the remains of the sett as recorded by the Ordnance Survey in 1891 (*Fig. 2*), when the mine was worked by the Cambrian Copper Company. Palmer (*1983, 18*) records this company becoming the owners of Esgair Hir Silver Lead Mine and Esgair Fraith Copper Mine in 1877, when the dressing floor area and other features involved in the current programme of work were already established.

3.3 Palmer (1983, 25-31) outlines the development at Esgair Fraith which suggests that the 40ft overshot Pumping Wheelpit (PRN 38054) alongside the Afon Lluest-gotta and the Crusher Wheelpit (PRN 38065) date c.1840s at the time when Williamson & Eyton (*Flintshire Smelters*) owned the sett. The earth bank of the leat cut at Location 3 presumably dates to the construction of the pumping waterwheel, since it appears to have powered the wheel by means of a launder (see details Fig. 3). The leat (PRN 28195), is the lower of 2 leats that can be traced from Llyn Dwfn running in a north/south direction along c.400m contour to enter the mine site from the eastern slopes of Esgair Ffraith ridge (see Fig. 2). Llyn Dwfn is marked as 'pond off the sett' on the 1853 map which accompanied the lease to the Welsh Potosi Company (Palmer 1983, 25).

3.4 The dressing facilities were improved by the Welsh Potosi Company in 1854, when a second crushing mill was built at Esgair Fraith. Cardigan Consols worked the mine from 1858 and deepened Bog Shaft and constructed a tramway to take ore to the dressing floor, which was presumably the upper dressing floor, now covered by farm sheds.

3.5 In 1867, the Company developed Eastern/Pumping Shaft (PRN 38057) and constructed a tramway (PRN 38063) to take ore from the shaft to the crushing mill (see Figs 1-3). This is clearly the tramway affected by the current works at Location 1. Eastern Shaft was the centre of activity for the mine site until closure c.1904.

3.6 The dressing floors at Esgair Fraith were partly excavated, as part of a larger programme of recording surface and some sub-surface remains at Esgair Fraith and Esgair Hir, intermittently from 1978-1980 by Leicester University students under the Directorship of Dr. Marilyn Palmer. The results were published as British Mining Memoirs No. 22 in 1983. During the excavation on the dressing floors, numerous wooden launders and wooden catch-pits were uncovered, broken examples of which are strewn over the fine waste tips today (Location 4; see Plate 3 overleaf).

4. The Watching Brief

4.1 The watching brief was conducted according to the Schedule CSM010:09/99), which required:

- i an archaeological presence during the proposed works
- ii guidance to contractors on site
- iii production of a report to include scaled drawings and photographic record, as necessary.

4.2 The programme of work centred at 4 locations, as identified in Fig. 1. Due to inclement weather and the constant heavy flow of water down-slope past Location 1, it was decided to insert the 3 new sections of drainage pipes at Locations 4, 2 and 3 respectively, prior to cutting through the tramway at Location 1. The removal of clearance on the area marked as Location 5 was also supervised during the programme of work.

4.3 Location 4

The removal of existent concrete pipe and the re-excavation and enlargement of the cut through the forestry road was monitored 07/02/2000. Plate 3 (*below*) shows the existent pipe in situ and the remains of damaged wooden catch boxes for slimes protruding from the eroding spoil tips. The box protrudes for c.1.9m x 1.2m max. width. Broken timbers can be seen to the right of Plate 3 also.

As the work continued, sections of a broken wooden launder became visible in the east and west sides on the enlarged cut. The launder may have already been cut through during the sinking of the first concrete pipe and removal of spoil to form a clear drainage channel. The launder was visible as a section c.0.1m wide x 0.05m high on the N side and protruded for c.0.5m on the east side of the cut. The enlarged re-cut revealed very fine spoil typical of buddle waste.

See Plates 4 & 5 overleaf.

The cut through the road was excavated to 1.5m below the present forestry road level. two 6m pipes of 0.5m diam. were laid and the trench was back-filled with the excavated material, made up with stone from Location 5.



Plate 3: Dressing floor area at Location 4, prior to works. View from south shows part of a damaged wooden collection box for slimes. 1m ranging pole in the background shows the concrete pipe to be replaced.



Plates 4 & 5: Dressing floor view from south. Left: the JCB has started to remove spoil and has revealed a section of damaged wooden launder c.0.5m x 0.1m wide x 0.05m deep, protruding through fine waste.



Right: the enlargement of the cut to take the wider plastic pipe has revealed the damaged section of launder, which has been cut through by the earlier drainage works, when the concrete pipe was laid.

4.4 Location 2

Work at Location 2 was monitored 07.02.2000 and the section through forestry road was excavated through loose shales to a depth of 1.3m to lay two 6m pipes x 0.6m diam. (*see Plate 8*). The pipes were back-filled with the excavated spoil.

It is assumed that the forestry road must have been laid on partly made-up or levelled ground since the course of the natural fall of the upland stream/embanked leat (*see Fig 1*) is interrupted by this road. The excavated section did not cut into a natural clay bed as revealed at Locations 1 & 3.

The dried-up earthwork continues south as recorded on Figs 1-3 to Location 3. See Plate 6 below.



Plate 6: View from east from Location 3, prior to works. 1m ranging poles show the embanked leat/watercourse of upland stream, which has dried up since the flow of water was cut off presumably during forestry work in the 1950s. The dry bed will be utilised as the run-off as outlined in Fig. 1. To the left of the photograph, south of the rough grass, is the line of leat PRN 28195, with its embankment covered in fine waste.



Plate 7: Location 3, view from S, shows cut through the embankment of leat PRN 28195.



Plate 8: Location 2, view from S, shows section cut through forestry road, south of the Crusher house tramway PRN 38063.

4.5 Location 3

The earthwork embankment photographed on Plate 6, forms the eastern part of PRN 28195, the lower of 2 leats that can be traced from Llyn Dwfn running in a north/south direction along c.400m contour to enter the mine site from the eastern slopes of Esgair Ffraith ridge.

The section through the leat bank and its covering of spoil was excavated to a max. depth of c.1.65m to facilitate the laying of two 6m x 0.6m diam pipes.

The section through revealed a max. of:

0.0 to 0.3m - pale yellow silty clay

0.3 to 0.35m - orange/yellow silty clay

0.35 to 0.75m - brownish/yellow silty clay

0.75 to 0.85m - orange silty clay

0.85 to 0.95m - dark brown/black silty clay

0.95 to 1.65m - fine spoil, which was un-vegetated on the surface.

The clay layers had no stone content and are similar to the clay layers recorded in the west facing section of the tramway – See Fig. 5. The spoil layer appears to have resulted from tipping along a natural ridge, which also formed the embankment of the leat PRN 28195.

See Plate. 7 overleaf.

4.6 Location 1

Works, as out-lined in Fig. 1 at Location 1 were monitored 08-09. 02.2000. A section was cut through the Crusher House Tramway, PRN 38063 along the line of the depression featured in Plate 9 below.



Plate 9: Crusher House Tramway, PRN 38063, prior to works. View from south across forestry road shows sunken section of tramway.

Crusher House Tramway

The section through the tramway was excavated to a max. depth of c.2.86m below the top of the tramway, as recorded in the east facing section (*see Fig. 4; Plate 12*). The cut revealed 2 different sections. The west facing section revealed a clean cut through natural clay layers (*Contexts 2-5*) as previously recorded at Location 3. (*see Fig. 5*). The tramway is presumed to have been constructed on top of a natural ridge, as the ground appears to rise naturally to the north and a layer of shale bed (*Context 6*) lies on top of the clay to a depth of c.1.38m. The bed of the tramway is constructed of stone to a max. depth of c.0.5m on the outer sides, and a bed of no more than 0.3m on top of the tramway. The stones used to construct the tramway bed have presumably come from the sinking of shafts. They contain small amounts of vein material and many are rusty brown in colour indicating a considerable amount of iron carbonate present.

The east facing section (*Fig. 4*) included part of a rubblestone wall. The wall appears to have been in a state of collapse under the structure of the tramway because loose rubblestones, showing no form, were removed during the excavation. On the north side of the cut, there was no evidence of the wall. Both sections on the north side of the tramway ended abruptly with the plantation. It is assumed that the land was ploughed right up to the tramway prior to forestry planting. (*Forestry ploughsoil = Context 8 in section*).

The rubblestone wall is presumed to have been constructed sometime prior to the construction of the tramway in 1867 (*3.5 previous*) to form a culvert over the 'watercourse' which is recorded on the 1891 map (*Figs 1 & 2*). The 1891 map records the 'watercourse' from a position north of Location 1, carrying a natural source of upland water south to be culverted below the tramway; the watercourse/stream then continues south along the embanked leat to Location 3 to meet Leat PRN 28195.

The wall was recorded, as in *Fig. 4*, to a max. height of c. 0.88m. The width/depth is unknown. At the north side of the tramway, the wall appears to curve to the west, disappearing into the section. There is no evidence of the wall in the forestry ploughsoil (*Context 8*). The wall has been constructed on the natural clay layers (*Context 2*) at c.0.18m above the base of the present trench. The culvert was presumably constructed prior to 19th century mining developments to the east. The rubblestones uncovered were river rubbles as opposed to those evident on the mine site that have come from the sinking of the shafts.

The shales in the east facing section were looser than in the west, suggesting disturbance from the collapse of the wall.

Two 6m x 0.6m diam. pipes were inserted into the excavated cut and the tramway was made-up again with the excavated material. The work at Location 1 was finalised by the excavation of forestry plough-soil on the north side of the tramway to create a new run-off. Following this the former run-off was blocked and the flow of water found its' way out of the pipe at Location 3 within an hour.



Plates 10 & 11: Crusher house tramway, PRN 38063, prior to and after works.
 Left: shows tramway as it extends east to the spoil created by Eastern Shaft.
 Right: cut through undisturbed shale embankment, showing max. of 0.5m made-up stoned surface for tramway. View from west.



Plate 12: East facing section of Crusher House Tramway, PRN 38063.

Section finally cut to a depth of 2.86m to reveal:

0 – 0.28m max. pale yellow/orange sticky clay natural with no stone, forming the base of the cut (*Context 2 in Sections 4 & 5*).

Max. of 0.88m of rubblestone wall (*Context 9*), which rises to north along the natural south facing slopes.

The wall included 4 pieces of timber (*Context 11*), which appear to have been used as part of the construction, although displaced.

The wall disappears into the section at the north and, where it is abutted by the rich brown forestry plough-soil with loose shale content (*Context 8*).

The bed of the tramway is constructed of vein material, seen in Plate 12 above as calcite and quartz. The difference between the river rubblestones in the buried wall and the stones used in the construction of the tramway can be seen above.

Conclusions

5.1 **Location 1:** Evidence to the north of the tramway suggests that the establishment of the conifer crop in the 1950s used the tramway as its boundary. The ploughsoil (*Context 8*) ends abruptly on the north side of the tramway.

5.2 It is assumed that the depression in the tramway as recorded on Plate 9, is due to the collapse of the culvert beneath.

5.3 The watercourse, which was presumably a natural stream gathering upland water, flowing naturally north to south was presumably culverted prior to 1867, when the tramway was built and mining operations centred at the eastern end of the site around Shaft PRN 38057. This natural stream was presumably controlled for mine use as the eastern site developed. The embankment guides the watercourse to meet leat PRN 28195, which also powered the lower wheel, PRN 38054.

5.4 **Location 3:** The embankment on the south side of leat PRN 28195 appears to have been constructed on the natural contours of the ridge rising north. It has later been used as a natural tipping platform for fine waste.

5.5 **Location 2:** The forestry road was presumably constructed on part made-up ground, since it interrupts the natural north to south flow of the watercourse.

5.6 **Location 4:** The launder revealed during the re-cut, and the depth of fine spoil revealed, suggests that there may still be a considerable amount of buried archaeology on the dressing floor tips, despite previous damage.

5.7 **Location 5:** The stone removed from this location on the north bank of the Afon Lluest-gotta confirmed the supposition that this area consists of previously bull-dozed waste relating to forestry work.

6. Acknowledgements

5.1 The author would like to extend thanks to Forest Enterprise, and in particular Michelle Bromley; Douglas Hughes, Foreman and the contractor on site, Adrian Rees, all of whom were extremely helpful.

7. Sources

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Palmer, Dr. Marilyn. 1983, *British Mining No. 22: The Richest in All Wales; The Welsh Potosi of Esgair Hir and Esgair Fraith Lead and Copper Mines of Cardiganshire*. Sheffield: Northern Mines Research Society

Cartographic Sources:

1891 1st edition Ordnance Survey map Cardiganshire sheets 4 NE

1906 2nd edition Ordnance Survey map Cardiganshire sheets 4 NE

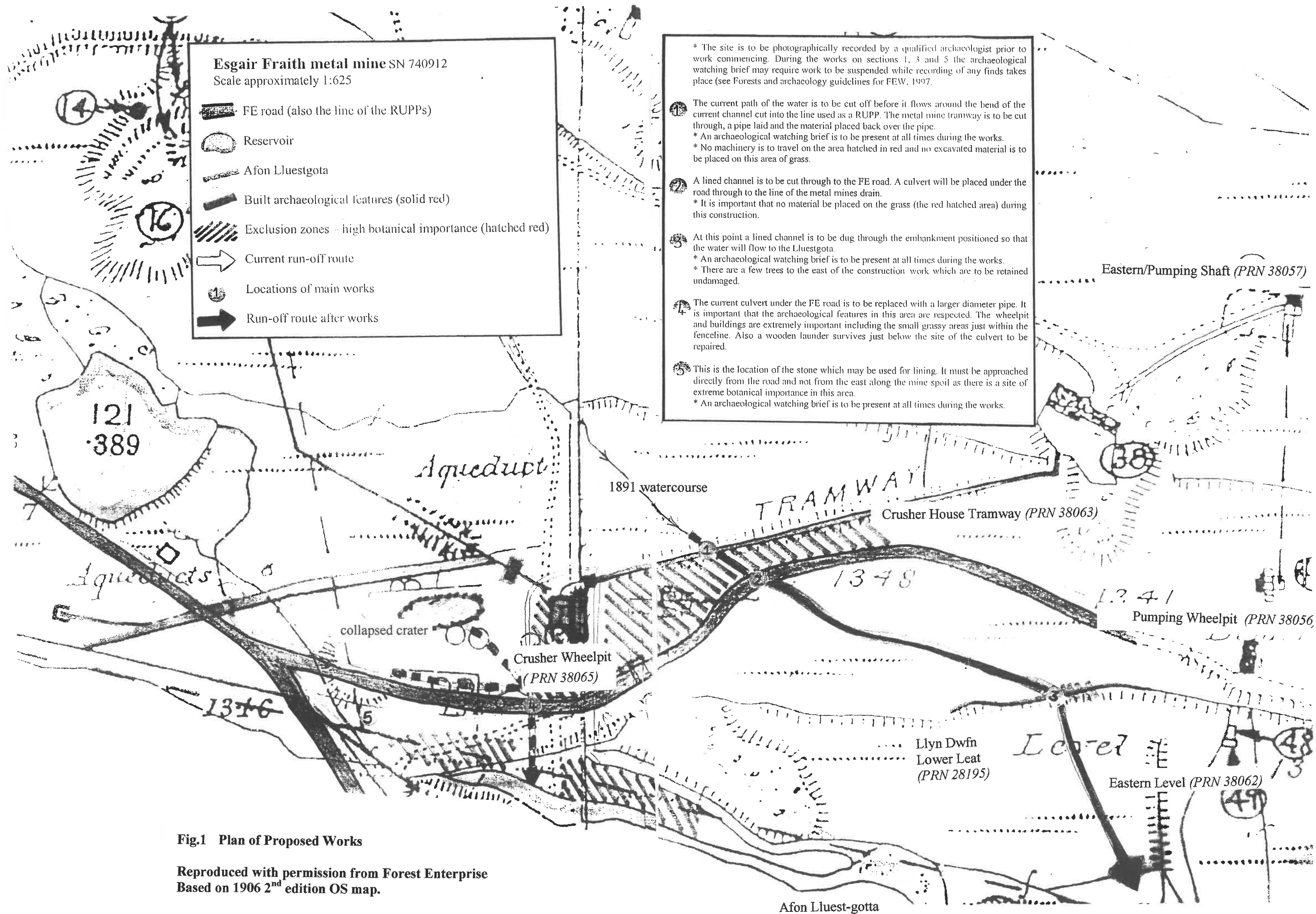


Fig.1 Plan of Proposed Works

Reproduced with permission from Forest Enterprise
Based on 1906 2nd edition OS map.

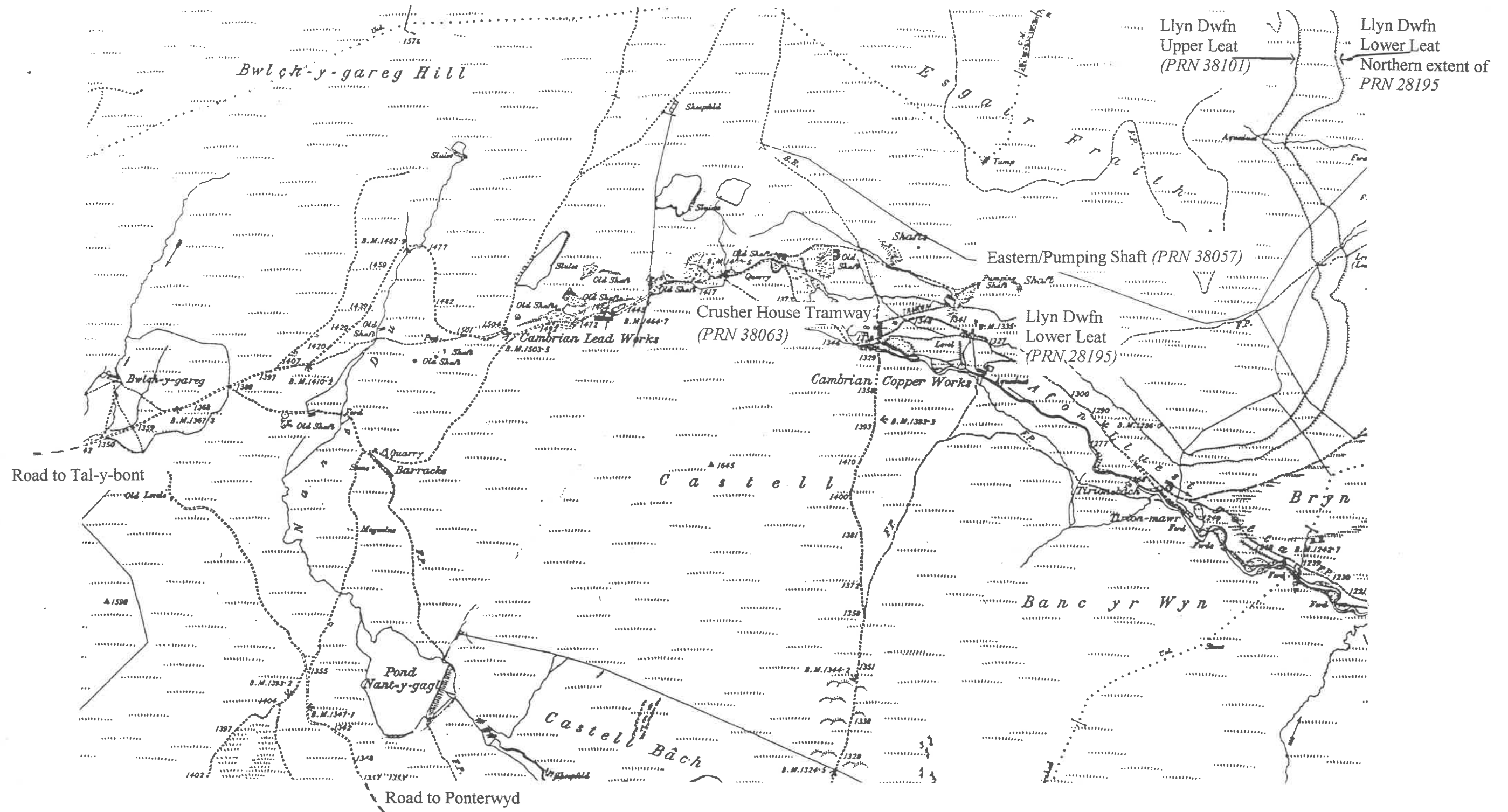


Fig. 2 Location Plan

Reproduced from 1891 OS 1st edition Map Cardiganshire Sheet IV NE
Enlarged from Scale 6": 1 mile

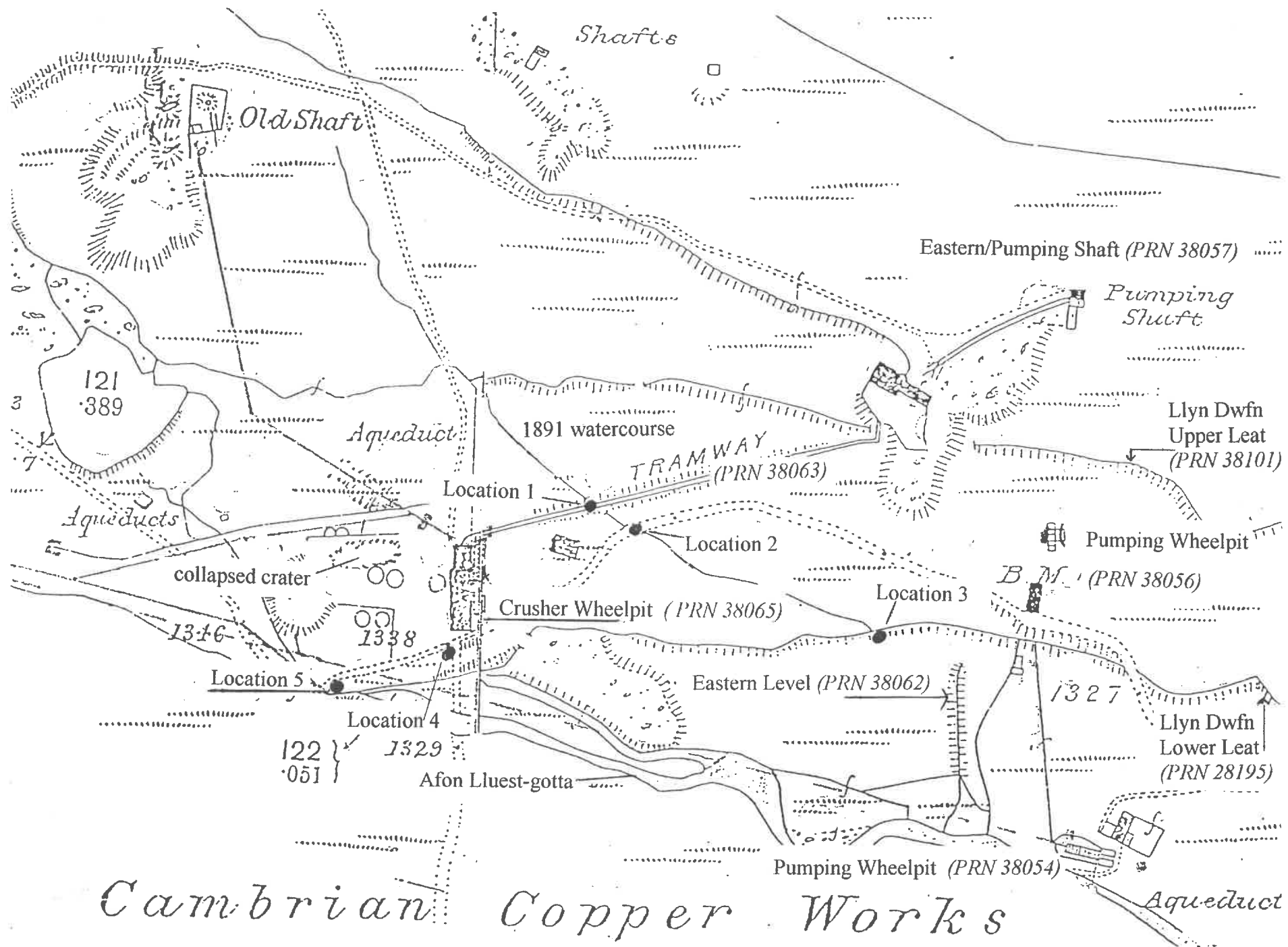


Fig. 3 Enlargement from 1891 OS 1st edition Map; Cardiganshire Sheet IV NE, showing location of major sites in association with location of works.

Contexts

1. Crusher House Tramway
2. Natural clean pale yellow/orange sandy sticky clay with no stone content.
3. Deeper yellow sandy sticky clay with no stone content.
4. i. mid-brown sticky clay
ii orange sticky clay
iii light grey sticky clay
5. Dark brown/black sticky clay – no stone
6. Light brown/yellow loose soil with Fragmentary shales.
7. Stone/shale bed of tramway
8. Rich brown forestry ploughsoil
9. Buried rubblestone wall
10. Thin layers of turf covered topsoil
11. Disturbed pieces of wood

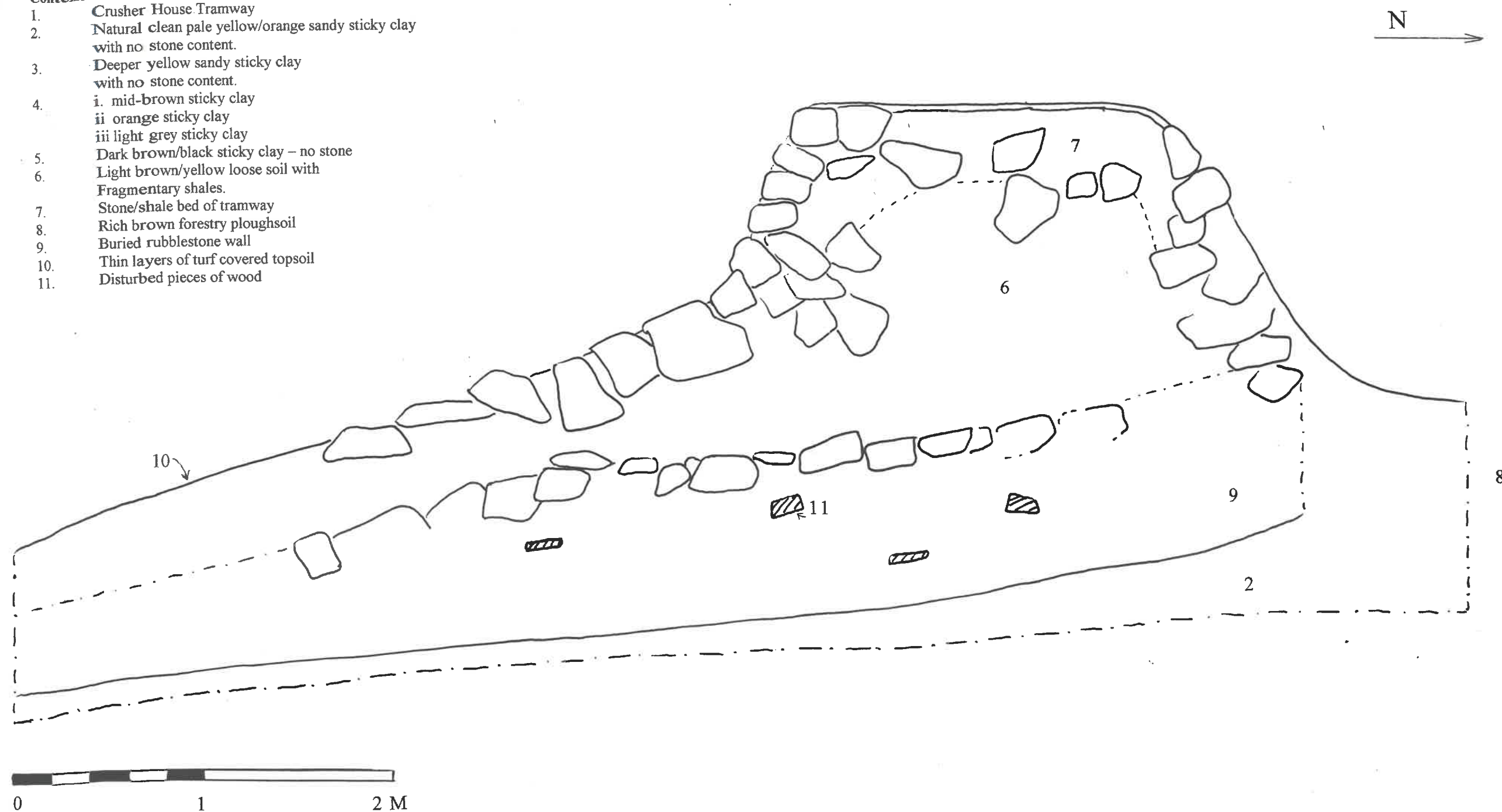


Fig. 4 East facing section of Crusher House Tramway

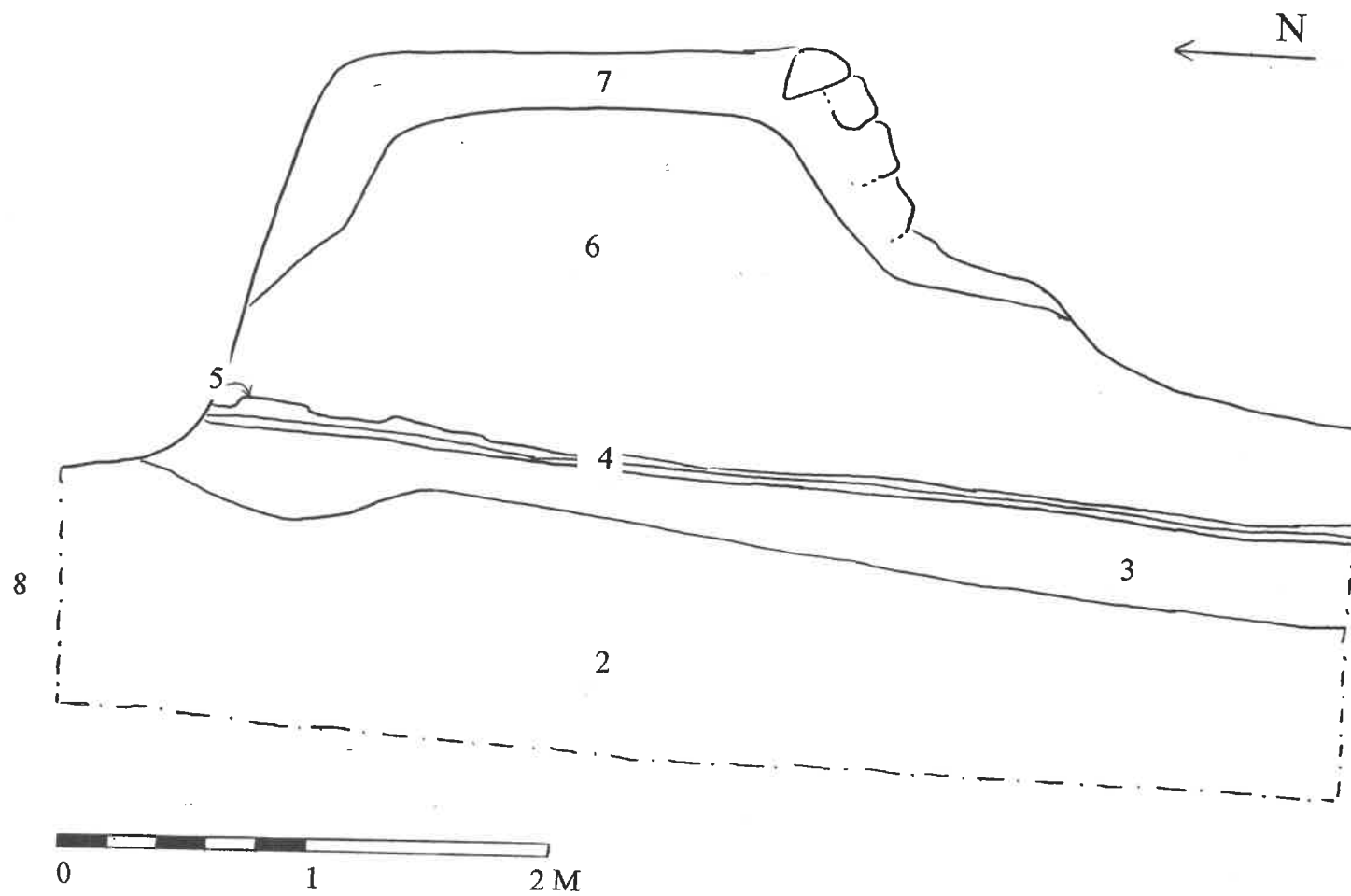


Fig. 5 West facing section of Crusher House Tramway

Appendix I: Archive Sheet

Site Name:	Esgair Fraith
Site Code:	Report No.103
PRN:	5626
NPRN:	105591
SAM:	N/A
Other Ref No:	N/A
NGR:	SN7397191137
Site Type:	Industrial
Project Type:	Watching Brief
Project Dates:	December 1999/January 2000
Categories Present:	Industrial
Location of Original Archive:	Dyfed Archaeological Trust
Location of duplicate Archives:	Forest Enterprise
Archive Contents:	Films: 1 B & W negs + contact sheet 1 CS; 1 CP prints + negs. Drawings: 1 sheet
Number of Finds Boxes:	0
Location of Finds:	N/A
Museum Reference:	N/A
Copyright :	Forest Enterprise
Restrictions to access:	None