

# **ESGAIR FRAITH MINE, CEULANAMAESMAWR, CEREDIGION: HISTORIC ENVIRONMENT DESK-BASED ASSESSMENT**



Prepared by Heneb – Dyfed Archaeology  
For: Coal Authority



**Heneb**

## **HENEB – DYFED ARCHAEOLOGY**

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by

**Philip Poucher MCIfA**



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**ESGAIR FRAITH MINE, CEULANAMAESMAWR, CEREDIGION:**

**HISTORIC ENVIRONMENT DESK BASED ASSESSMENT**

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# **ESGAIR FRAITH MINE, CEULANAMAESMAWR, CEREDIGION: HISTORIC ENVIRONMENT DESK-BASED ASSESSMENT**

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## **ESGAIR FRAITH MINE, CEULANAMAESMAWR, CEREDIGION**

### **HISTORIC ENVIRONMENT DESK-BASED ASSESSMENT**

#### **EXECUTIVE SUMMARY**

*Heneb – Dyfed Archaeology were commissioned by the Coal Authority (CA) on behalf of the joint Metal (Non-Coal) Mine Programme between Natural Resources Wales (NRW) and the CA to provide an historic environment desk-based assessment to inform proposed environmental remediation works, initially comprising the installation of monitoring structures, at Esgair Fraith mine, Ceredigion.*

*The assessment has identified and mapped known and visible archaeological remains within the study area, assessed their significance and highlighted the potential for further remains to exist. Outline mitigation measures to protect the historic environment are also suggested.*

#### **CRYNODEB GWEITHREDOL**

*Comisiynwyd Heneb – Archaeoleg Dyfed gan yr Awdurdod Glo ar ran y Rhaglen Mwyngloddiau Metel (Heb Glo) ar y cyd rhwng Cyfoeth Naturiol Cymru (CNC) a'r Awdurdod Cymwys i ddarparu Asesiad Desg Amgylchedd Hanesyddol i hysbysu gwaith adfer amgylcheddol arfaethedig, yn cynnwys gosod strwythurau monitro i ddechrau, ym Mwynglawdd Esgair Fraith, Ceredigion.*

*Mae'r asesiad wedi nodi a mapio olion archeolegol hysbys a gweladwy o fewn ardal yr astudiaeth, wedi asesu eu harwyddocâd, ac wedi amlygu'r potensial i olion pellach fodoli. Awgrymir hefyd fesurau lliniaru amlinellol i warchod yr amgylchedd hanesyddol.*

## **1. INTRODUCTION**

### **1.1 Project Proposals and Commission**

- 1.1.1 Heneb – Dyfed Archaeology (formerly Dyfed Archaeological Trust - Archaeological Services) were commissioned by the Coal Authority (CA) on behalf of the joint Metal (Non-Coal) Mine Programme between Natural Resources Wales (NRW) and the CA, to prepare a historic environment desk-based assessment on the former Esgair Fraith mine, Ceulanamaesmawr, Ceredigion (Figs 1 and 2, SN 7404 9115), ahead of proposed remediation works at the site.
- 1.1.2 Esgair Fraith mine (PRN 5626) was often worked alongside Esgair Hir mine which lies a short distance to the west. Both mines were worked in the late 17<sup>th</sup> century and represent important sites in the challenge to, and eventual breaking of, the royal monopoly on precious metal mining, which opened up Ceredigion to private investment and a great expansion in metal mining through the 18<sup>th</sup> and 19<sup>th</sup> centuries. Some surface structural remains survive, wheel pits in particular, along with mine shafts, levels, tramways, leats and buried remains, spread across a remote area now dominated by forestry plantation.
- 1.1.3 The CA is investigating potential remediation works to reduce metals entering local rivers, in the first instance through the installation of flow monitoring structures and scour protection works.
- 1.1.4 Further sites of interest lie within the vicinity of the mine and the area lies close to a registered historic landscape. As a result, the CA has requested that an archaeological desk-based assessment of the sites be undertaken so as to better assess the potential impact upon the historic environment and inform potential future works.
- 1.1.5 The assessment has been a primarily desk-based study of the proposed work areas and their environs, identifying the following:
- any known archaeological or historical sites within the localities
  - potential setting impacts on designated archaeological assets in the vicinity
  - any historic landscape areas that might be affected by the proposals

The report also assesses the potential for hitherto unknown archaeological remains to be present within the project areas.

### **1.2 Scope of the Project and Methodology**

- 1.2.1 The scope of the assessment follows the Standard And Guidance For Historic Environment Desk-Based Assessment as laid down by the Chartered Institute for Archaeologists (CIfA 2014). The standard is stated by CIfA as:

*Desk-based assessment will determine, as far as is reasonably possible from existing records, the nature, extent and significance of the historic environment within a specified area. Desk-based assessment will be undertaken using appropriate methods and practices which satisfy the stated aims of the project, and which comply with the Code of Conduct and other relevant regulations of CIfA. In a development context desk-based assessment will establish the impact of the proposed development on the significance of the historic environment (or will identify the need for further evaluation to do so), and will enable reasoned proposals and decisions to be made whether to mitigate, offset or accept without further intervention that impact.*

- 1.2.2 A desk-based assessment is defined by CIfA as:

*..... a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely historic assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of historic assets and, in England, the nature, extent and quality of the known or potential archaeological, historic, architectural and artistic interest. Significance is to be judged in a local, regional, national or international context as appropriate.*

- 1.2.3 The desk-based study of the area identifies known archaeological sites within the project areas and their environs, and assesses the potential for hitherto unknown remains to be present within the proposed project areas. This will help inform future decision making, and design solutions and potential mitigation strategies, including the potential for further archaeological works.
- 1.2.4 The report also includes a brief assessment of the impact on the settings of surrounding designated historic assets, including scheduled monuments, listed buildings, historic landscape character areas and undesignated archaeological sites. This utilises the best practice guidance in *Setting of Historic Assets in Wales* (Cadw 2017).
- 1.2.5 The report presents relevant information from a number of sources including:
- Historic Environment Record (HER) data from the regional Archaeological Trust;
  - Map regression exercise using earlier cartographic sources;
  - Available and relevant reports on any archaeological work undertaken in the area that affects the site or its setting;
  - Archive records held at the County Archive, the National Library of Wales (NLW) and the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW);
  - Aerial photography, satellite imagery and LiDAR data;
  - Relevant records held by the project team;
  - Identification of any scheduled monuments, listed buildings, registered parks and gardens, registered historic landscapes, historic landscape character areas or conservation areas within or in the vicinity of the site area (Cadw, Heneb-Dyfed Archaeology, Natural Resources Wales);
  - Assessment of the archaeological potential of the area; and
  - Assessment of potential impacts on any identified remains within the project sites (or possible remains) and likely requirements, if any, for further stages of archaeological work.
- 1.2.6 The assessment focusses on the mine remains but also includes an initial search area of 1km from the centre of the site to identify sites recorded on the HER and other sources, including the potential impact on the setting of high status, designated historic assets in the surrounding landscape.
- 1.2.7 For the purposes of planning policy in Wales, the historic environment is defined as:

*all the surviving physical elements of previous human activity and illustrates how past generations have shaped the world around us. It is central to Wales's culture and its character, whilst contributing to our sense*

*of place and identity. It enhances our quality of life, adds to regional and local distinctiveness and is an important economic and social asset (Welsh Government 2024)*

Examples of what can constitute an historic asset include (ibid):

- *Listed buildings;*
- *Conservation areas;*
- *Historic assets of special local interest;*
- *Historic parks and gardens;*
- *Townscapes;*
- *Historic landscapes;*
- *World Heritage Sites; and*
- *Archaeological remains (including scheduled monuments).*

### **1.3 Abbreviations**

- All sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Reference 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 Reference Number (NPRN).
- Altitude is expressed to a height above Ordnance Datum (aOD).
- References to cartographic, documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

### **1.4 Illustrations**

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

### **1.5 Timeline**

- 1.5.1 The following timeline in Table 1 gives date ranges for the various archaeological periods that may be mentioned within this report.

**Table 1:** *Archaeological and historical timeline for Wales*

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 1086	
Medieval Period	1086 – 1536	
Post-Medieval Period*	1536 – 1750	
Modern	20th century onwards	

\* Note: The post-medieval and Industrial periods are combined as the post-medieval period on the regional HER, as held by Heneb



## **2. POLICIES AND GUIDANCE**

### **2.1 The Historic Environment (Wales) Act**

2.1.1 The *Ancient Monuments and Archaeological Areas Act 1979* was previously the primary legislation for protecting archaeological remains and scheduled monuments. This has more recently been amended by *The Historic Environment (Wales) Act 2016* which has three main aims as defined by Cadw:

- to give more effective protection to listed buildings and scheduled monuments;
- to improve the sustainable management of the historic environment; and
- to introduce greater transparency and accountability into decisions taken on the historic environment.

2.1.2 The new Act also amends the *Planning (Listed Buildings and Conservation Areas) Act 1990* and is supported by a number of planning guidance documents. The Act most specifically provides better safeguards for the protection of scheduled monuments, listed buildings and historic parks and gardens. It also includes further guidance on place names.

### **2.2 Planning Policy Wales**

2.2.1 Planning Policy Wales (Ed.12, 2024) sets out the Welsh Government's land use planning policies. Its primary objective is to ensure that the planning system contributes to the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation.

2.2.2 Chapter 6, 'Distinctive and Natural Places', explains how planning systems must take into account the Welsh Government's objectives to protect, conserve, promote and enhance the historic environment as a resource for the general well-being of present and future generations. It also sets out the planning policies for the sustainable management of specific categories of historic environment assets.

### **2.3 Technical Advice Note 24: The Historic Environment**

2.3.1 This technical advice note provides guidance on how the planning system considers the historic environment during development plan preparation and decision making on planning and Listed Building Consent applications. It also provides specific guidance on how the following historic environment assets should be considered:

- Scheduled monuments
- Archaeological remains
- Listed buildings
- Conservation areas
- Historic parks and gardens
- Historic landscapes
- Historic assets of special local interest
- World Heritage Sites

2.3.2 The technical advice note usefully gathers together the selection criteria employed in the designation of scheduled monuments and listed buildings, and the registration of historic parks and gardens and historic landscapes.

- 2.3.3 Advice and decisions on planning applications affecting nationally significant historic environment features (or designated historic environment assets) is provided by Cadw acting on behalf of the Welsh Government.
- 2.3.4 This report will also make reference to other guidance documents published by Cadw, namely:
- Conservation Principles (March 2011);
  - Heritage Impact Assessment in Wales (May 2017);
  - Managing Historic Character in Wales (May 2017); and
  - Setting of Historic Assets in Wales (May 2017).

## **2.4 Local Development Plan**

- 2.4.1 The historic environment is subject to the relevant policies and procedures as laid out in the Ceredigion County Council (CCC) Local Development Plan (LDP) 2007 – 2022. It is referenced throughout the document in numerous policies, emphasising its significance to the county. The main policy references to the Historic Environment are outlined in the strategic policy DM19:

### ***DM19: Historic and Cultural Landscape***

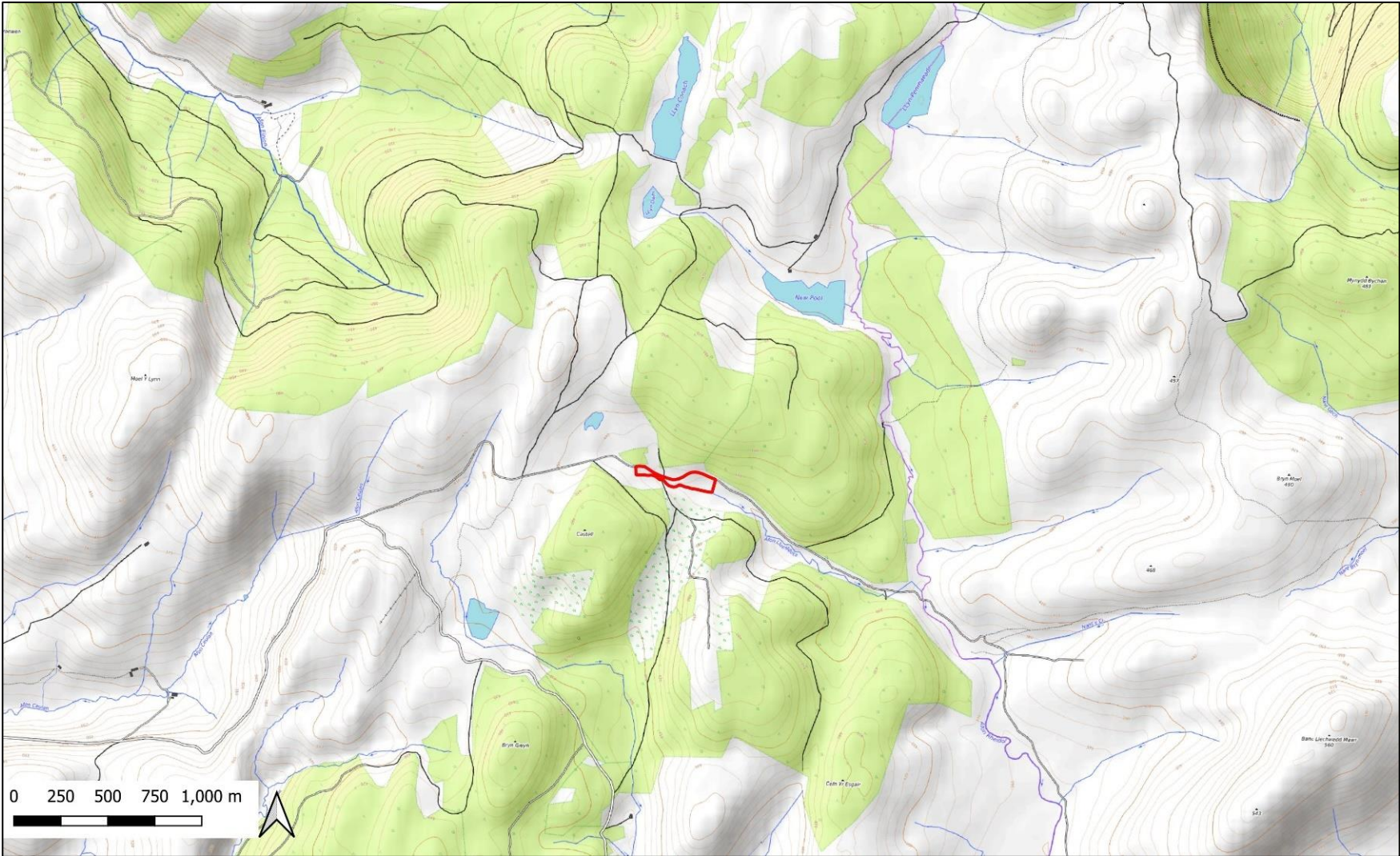
*Development affecting landscapes or buildings which are of historical or cultural importance and make an important contribution to the character and interest of the local area, will be permitted where the distinctive appearance, architectural integrity or their settings will not be significantly adversely affected. Where possible development should enhance these qualities and special character.*

*8.167 Policy DM19 recognises that although conserving and enhancing the landscape in general (Policy DM17) is important, certain historic and cultural elements need specific mention because the Ceredigion landscape is rich in evidence from the past. Many of these features are protected as Scheduled Ancient Monuments or included on the Sites and Monuments record [HER] maintained by Dyfed Archaeological Trust and the Royal Commission for Sites and Monuments Wales.*

*8.168 The Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales highlights what are considered to be the best examples of different types of historic landscape and gardens in Wales. Upland Ceredigion has been identified as a landscape of outstanding historic interest. A good practice guide explains how the Register should be used in assessing the effect of major developments on the historic landscape. Applicants should consult CADW, CCW or one of Wales' archaeological trusts to view this Register.*

### **3 LOCATION, TOPOGRAPHY AND GEOLOGY**

- 3.1 Esgair Fraith mine (SN 7404 9115) lies in a remote location in northern Ceredigion (Figs 1 and 2). The mine site is spread across the southern slopes of Esgair Fraith, an area of high ground that reaches 485mOD in an area of undulating upland. The study area itself lies between 400mOD and 425mOD close to the head of the Afon Llustgota. The river runs down to the southeast, in a shallow valley between Esgair Fraith to the north and Castell and Banc yr Wyn to the south, eventually feeding Nant y Moch reservoir 3.5km to the southeast.
- 3.2 The site is approached via a former mine track, now an open forestry pathway, from the local Talybont to Nant y Moch road to the west. The area is dominated by extensive coniferous forestry plantation surrounded by open areas of upland, with local peaks reaching to around 500mOD and more, and cut by stream and upland river valleys.
- 3.3 Some dispersed farmsteads and cottages lie in more sheltered valleys, otherwise the settlement pattern is sparse. The nearest nucleated settlement is the village of Talybont, 8.5km to the west. Machynlleth lies 9.5km to the north and Aberystwyth 18km to the southwest.
- 3.4 The bedrock geology of this area comprises interbedded mudstones and sandstones of the Devil's Bridge Formation, the Derwenlas Formation, the Cwmere Formation and the Rhayader Mudstone Formation, all lying in roughly north – south aligned bands throughout the area. Deposits of overlying peat are also noted on some higher ground to the north and further down the watercourse to the east (BGS viewer).



**Figure 1:** Location map, showing the Esgair Fraith mine study area in red and the regional topography.

Map data from OpenStreetMap (OSM) <https://www.openstreetmap.org/copyright> 19/03/24





**Figure 2:** Location map in greater detail, showing the Esgair Fraith mine study area in red. © Google 2024.

## **4 DESIGNATED HISTORIC ASSETS (Fig 3)**

### **4.1 General**

- 4.1.1 A review of several databases was made of historic assets within a 1km radius search area around the main Esgair Fraith study area. Designated assets beyond 1km were also considered for potential wider-ranging impacts and these are described first, as they largely comprise assets with some form of statutory protection.

### **4.2 Scheduled Monuments**

- 4.2.1 Scheduled monuments are historic and archaeological sites considered to be of national importance. They are given legal protection, and consideration of the impact of development upon these sites and their settings are requirements of the planning process.
- 4.2.2 There are no scheduled monuments within 1km of Esgair Fraith mine.
- 4.2.3 The closest scheduled site is that of CD239 Moel y Llyn Cairn Cemetery, a collection of six Bronze Age cairns on the summit and upper slopes of Moel y Llyn, 2.3km to 2.8km west of Esgair Fraith. This site lies out of sight, over the brow of the hill to the west of the mine and at the given distance is unlikely to be affected by proposed works in the study area. Many of the other scheduled sites in the wider landscape also represent Bronze Age funerary monuments in upland locations but in general these all lie in excess of 3km from the study area. Deserted rural settlements are another scheduled site typical of the surrounding landscape but the closest such site is CD277 Nanc y Baracs Deserted Rural Settlement, which lies within a stream valley 2.4km to the southeast with no visual or other links between the sites.

### **4.3 Registered Historic Landscapes**

- 4.3.1 Registered historic landscapes are landscapes of historic interest included on the Register of Landscapes of Historic Interest in Wales (Cadw 1998). The landscape boundaries and associated details have been created as non-statutory advice to assist decision makers and landscape managers ensure that the historic character of the landscape is sustained, and that where change is contemplated, it is well-informed.
- 4.3.2 The Esgair Fraith study area does not lie within the boundaries of any registered historic landscape. It does however lie within 2.5km of the Upland Ceredigion Landscape of Outstanding Historic Interest (HLW (D) 2). This area is important for its prehistoric archaeology and mining features. The area includes the rocky summits of Plynlimon and is a remote, wild, expansive area of rugged moorland and blanket bog with dramatic scarp slopes along western fringes. It extends from Nant-y-moch reservoir in the north to the Tywi Forest in the south, and from the head of the Ystwyth and Teifi rivers in the east to Trawscoed and Penrhyn-coch in the west. The whole area is rich in diverse and often visually dramatic evidence of land use and the exploitation of natural resources, from the prehistoric period to the present, and it also includes several sites with important historic artistic associations. The Ystwyth valley provides one major east – west route, with mountain scenery, open upland moors, rivers and waterfalls that inspired many 18th century travellers and artists. The post-medieval metal mining industry forms one of the major historic components of this landscape.
- 4.3.3 In order to better characterise the historic environment of the Historic Landscape it has been sub-divided into a number of Historic Landscape Character Areas (HLCA). These areas are not necessarily confined to the limits of the registered



historic landscape, and one such area extends to the north of the historic landscape to include the Esgair Fraith study area. **HLCA 12 Esgair Fraith Plantation** is a very extensive tract of upland 20<sup>th</sup> century coniferous plantation which was established over unenclosed moorland.

- 4.3.4 This upland area formerly lay within the Cwmwd Gene u'r glyn, which was probably considered Crown land until relatively recently. The area includes some important former metal mine sites, including Esgair Hir and Esgair Fraith. These two mines, known as the Welsh Potosi, are of considerable antiquity and richness. It was at Esgair Hir that Sir Carberry Pryse challenged the Crown monopoly on mining precious metals in 1689, which subsequently opened up the area to new capital leading to the expansion of metal mining in the area. Aside from the metal mining the area remained remote and little used until acquisition by the Forestry Commission and the establishment of extensive conifer plantations in the 1960s. It is the forestry plantations and their associated features, and the historic metal mining sites, that form the main historic components of this landscape area. Other archaeological remains comprise evidence of abandoned long huts and other settlements, and some agricultural remains, indicating a sparsely populated landscape prior to the 19<sup>th</sup> century, along with some evidence of Bronze Age activity.

#### **4.4 Listed Buildings**

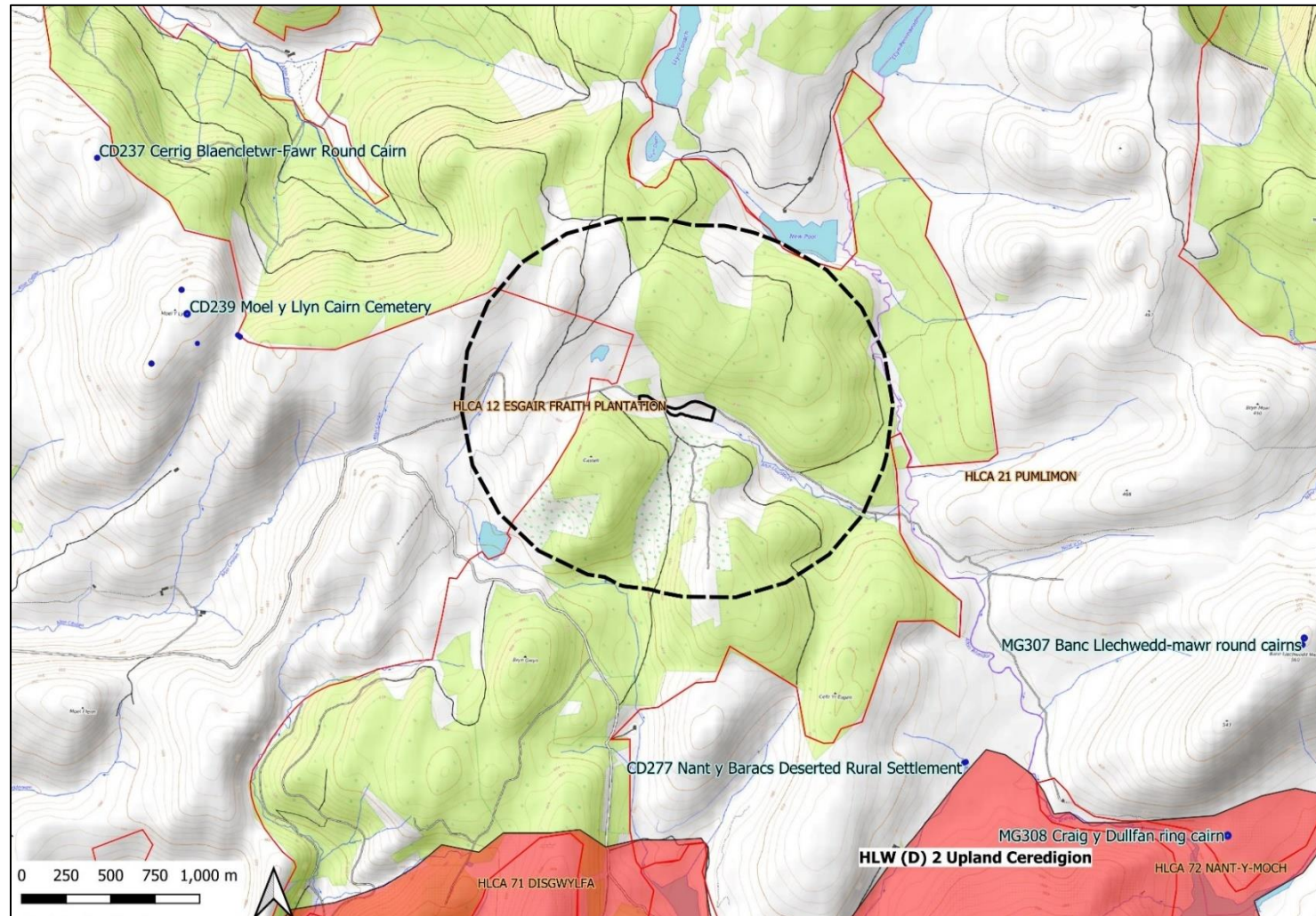
- 4.4.1 Listed buildings are buildings and structures of national importance given legal protection by being placed on a 'List' of Buildings of Special Architectural or Historic Interest. Buildings on the list are given one of three grades which denote their level of importance (Grade I, II\* and II), Grade I being the highest. A listed building may not be demolished, extended or altered without special permission from the local planning authority.
- 4.4.2 There are no listed buildings with the Esgair Fraith study site and no listed buildings within the surrounding landscape that may be affected. The closest listed building is an 18<sup>th</sup> century farmhouse (ref.83269) lying over 3.5km to the northwest.

#### **4.5 Conservation Areas**

- 4.5.1 Conservation areas are designated to preserve and enhance the special character of areas of architectural or historic interest. The purpose of designating a conservation area is to provide the local planning authority with an additional measure of control over an area that they consider to be of special historic and/or architectural value.
- 4.5.2 There are no conservation areas within the 1km radius search area, the nearest being over 9km to the north.

#### **4.6 Registered Historic Parks and Gardens**

- 4.6.1 Parks and gardens that are of special historic interest in Wales are included on a Register of Historic Parks and Gardens, designed to provide comprehensive information to assist decision makers protect and preserve essential features of these parks and gardens, and enable their significance and character to be protected through the planning system.
- 4.6.2 There are no registered parks and gardens within the 1km radius search area, nor are there any in the wider landscape surrounding the site. The nearest is Lodge Park, lying over 7.5km to the west.



**Figure 3:** Location map with the mine site and 1km study areas represented by the dotted lines. The map shows the designated assets mentioned above. Scheduled monuments are illustrated in blue with historic landscapes in red.

Map data from OpenStreetMap (OSM) <https://www.openstreetmap.org/copyright> 19/03/24

## **5 NON-DESIGNATED HISTORIC ASSETS (Table 2, Fig 4)**

### **5.1 General**

- 5.1.1 A search of the regional HER and other databases was made for the 1km radius search area around the Esgair Fraith study area.
- 5.1.2 The HER records 133 assets within the 1km radius search area. The vast majority of these records relate to individual features of the post-medieval metal mining landscape and include the Esgair Fraith mine site. These sites serve to highlight the importance of their archaeological remains.
- 5.1.3 The following information is laid out chronologically to provide a brief archaeological and historical background for the area for each period, along with the relevant HER entries pertaining to that period. The historical development of the mines are included and a detailed description of individual features is outlined in Section 7 of the report.

### **5.2 Palaeolithic, Mesolithic and Neolithic**

- 5.2.1 There are no sites of these periods recorded within the 1km search area. In the wider landscape evidence of activity during the Palaeolithic and Mesolithic periods remains scarce.
- 5.2.2 During the Neolithic period there is some evidence of growing activity in the wider landscape. Several kilometres to the north there is a record of a Neolithic burial chamber on the slopes of Bwlch Carog, whilst to the west some stone circles are recorded at the head of a stream valley near Moel y Garn and several flint working sites have been recorded from the Nant y Moch reservoir area. There is little to indicate an increased potential within the Esgair Fraith study area however.

### **5.3 Bronze Age**

- 5.3.1 There are two records of Bronze Age date within the 1km search area. To the west a standing stone (PRN 5628) lies close to Esgair Hir mine, whilst 350m to the north of Esgair Fraith lies a possible round barrow (PRN 5631) of which little is known. It was recorded as a 'tump' on early Ordnance Survey maps but the area is now covered in dense forestry and no description of the site exists. The 'tump' reference, and its apparent location on a local high point, would suggest this represents the remains of a Bronze Age burial mound. Such monuments were often constructed in prominent locations in these upland landscapes and it is thought that visibility often played an important role in their siting, with visibility between sites a key factor in the determination of site location. This can be seen in the wider landscape, with several of the prominent hilltops in the surrounding landscape surmounted by similar cairns, such as the collection at Moel y Llyn to the west (see CD239, Fig 3).
- 5.3.2 What is less clear is the form and extent of contemporary activity in these upland regions. Standing stones, cup-marked stones, burnt mounds and further smaller cairn sites are known on lower slopes, particularly around the Nant-y-Moch reservoir area, suggesting a more complex ritual landscape, however the location and distribution of associated settlement sites in the area is not clear. Therefore, although there is only one Bronze Age site recorded in the study area, this likely represents a fragment of the active landscape and the potential for Bronze Age archaeological remains in the area exists.
- 5.3.3 Gerrard (2014) suggests the presence of hammer stones recorded in the Esgair Hir area (Browne and Hughes 2003; 44) indicate the potential for Bronze Age mining at the site. Hammer stones have been found at other Bronze Age mine

sites but this reference has not been checked and the discovery of hammer stones has not been reported in any of the examined databases.

#### **5.4 Iron Age and Roman**

- 5.4.1 There are no recorded sites of Iron Age or Roman date within the 1km search area. Such sites in the wider landscape are also remarkably sparse for this area. Although this is likely due to a lack of identified sites rather than a total absence of activity, there still appears to be a relatively low potential for such sites within the site area.

#### **5.5 Early Medieval and Medieval Periods**

- 5.5.1 During the medieval period this area lay within the Commote of Geneu'r Glyn, within the Cantref of Penweddig. The administrative centre was located at Llandre, around 13km to the southwest. The 1km search area appears to have been sparsely populated during this period and there are no records of early medieval activity in the area; the single medieval site recorded is that of a dairy (PRN 126464). This dairy forms part of a collection of earthworks along the Ceulan Valley to the west which represent a spread of pastoral agricultural buildings that have not been closely dated but are thought to be medieval or early post-medieval in origin. Similar remains are also recorded in a small stream valley just over 1km to the east along the Lluestgota valley. The remains suggest these upland areas may have been used as grazing, with agricultural buildings in the more sheltered valleys, possibly used only on a seasonal basis. These are little to indicate any significant activity in the Esgair Fraith study area during this period.

#### **5.6 Post-medieval and Modern Periods**

- 5.6.1 It is likely that this style of pastoral farming persisted into the post-medieval period. The earthwork remains of a building (PRN 28192) and a sheepfold (PRN 28191) lie further down the Lluestgota valley, together with a sheepfold to the north (PRN 28193) and a farmstead to the east (PRN 28186). Clearly however the vast majority of post-medieval archaeological remains are related to the metal mining industry of the late 18<sup>th</sup> to early 20<sup>th</sup> centuries.
- 5.6.2 Throughout much of the post-medieval period this area lay within the extensive Gogerddan Estates, owned by the Pryse family since the 15<sup>th</sup> century. The main seat of the family was at Plas Gogerddan around 16km to the southwest. In the late 1560s Queen Elizabeth I established the Society of Mines Royal, one of two mining monopolies in England and Wales. By the early 17<sup>th</sup> century Ceredigion was becoming one of its main centres of operation, including mines within and around the Gogerddan Estate, with the company laying claim to any mineral deposits yielding silver or gold. In 1690 a rich vein of lead and silver ore was discovered on the Gogerddan Estate at Esgair Hir (PRN 5628), just to the west of Esgair Fraith. The head of the Gogerddan Estate, Carberry Pryse, together with other family members, set about establishing mine workings to exploit this vein, hiring William Waller as the mine manager. They soon ran up against a counter claim from the Society of Mines Royal however who also began to remove the ore, claiming the silver content meant it could only be mined by them. Pryse objected, claiming the silver content was too low, and pursued his claim against the Society to Parliament and the Courts. In order to fund his case Pryse entered into a joint stock undertaking with several other investors, including the Earl of Danby (Peregrine Osborne), Philip Bickerstaffe, Sir Stephen Evance and Sir William Scawen. After several retrials, Pryse eventually won with the passing of a royal mines bill in Parliament in 1693 which restricted the rights enjoyed by

the Society of Mines Royal and opened up the metal mines of Ceredigion to private investment, greatly expanding mining activity in the region.

- 5.6.3 Despite this success, disputes between the various partners hindered investment in the mines. To attract investors, a prospectus had been privately published, optimistically stating that with a workforce of 600 men, the mines could be expected to yield £70,000 clear profit a year. However, weaknesses in management and persistent quarrelling among the partners resulted in debts, not least to the employees, and a failure to clear enough water from the workings to begin full production. Carberry Pryse died in 1694 with the mining company in debt, passing his mining interest on to Edward Pryse who inherited the estate. In 1698 the Esgair Hir mine manager, William Waller, published an appeal to convince investors of the value of the mines. He compared Esgair Hir to the Potosi Mine in Bolivia, which sat on one of the world's largest silver deposits. From this point on Esgair Hir and the soon-to-be exploited Esgair Fraith became known as the 'Welsh Potosi'. Waller persuaded Sir Humphrey Mackworth, an industrialist who had recently moved to The Gnoll, Neath, to purchase the mine interests in 1698 for £16,000 and the Company of Mines Adventurers was formed to exploit Esgair Hir and other veins of ore in the locality (Palmer 1983, Bick 2004).
- 5.6.4 There is circumstantial evidence that Esgair Fraith was being worked in the early 18<sup>th</sup> century. This mine lay on the same vein as Esgair Hir and the two mines would often be worked in conjunction but copper ore was also discovered and exploited at Esgair Fraith. The extraction of copper was mentioned in Waller's accounts of these early years (Bick 2004). Descriptions, stylised plans and profiles of the site reference an 'East Level' which has been associated with a mine level at the western end of the Esgair Fraith area (PRN 38079). It is also thought that 'Bog Shaft' to the north (PRN 38071) may also have been started by Waller (Palmer 1983). The Company of Mines Adventurers worked several mines in Ceredigion but Esgair Hir, and by extension Esgair Fraith, remained the most profitable in the first decade of the 18<sup>th</sup> century. The ability to get sufficient labour to work these mines remained an issue and in 1700 Waller resorted to using condemned criminals to work the mines in exchange for their eventual freedom, although many did not prove reliable workers (Bick 2004). The mines did not return the profits first advertised by Waller and he himself was accused of mismanagement and eventually dismissed in 1709, after which it would appear work at the mines ceased (Palmer 1983), although Jones (1922) suggests they continued to be worked intermittently until around 1744 when records for the mines stop.
- 5.6.5 Meyrick (1810) states that a new company was formed in 1760 to work the mine, driving a new, deeper drainage level to the Esgair Hir workings but this enterprise failed. Esgair Fraith was being worked towards the end of the 18<sup>th</sup> century as Meyrick states the company working the mine was ousted by the new lord of the manor, who then went on to sell copper ore himself for a short while around 1791. Subsequently a new company took over the mine, driving in another new level, but that too abandoned the site in 1794.
- 5.6.6 In the 1840s the mining lease was taken up by the Flintshire smelting company of Williamson and Eyton. Until this point the development of the mine had been hampered by its remote location. Williamson and Eyton tried to remedy this by constructing the road to the site between 1839 and 1840. Other works included the installation of a large pumping wheel at Esgair Fraith (PRN 38054) with flat rods running up the hill towards Esgair Hir, as well as up to five reservoir ponds and a long leat to the pumping wheel which carried the water in a wooden launder. A house (PRN 95623) was built by the waterwheel. Miners' cottages (PRNs 95504-95509) to the west, which may have been started in the late 18<sup>th</sup> century, were rebuilt and expanded, and by the mid-19<sup>th</sup> century there was said

to be accommodation for 200 miners (Palmer 1983). The mine was worked from the mid 1840s until 1849, with at least one new shaft sunk, probably to the north of the study area (PRNs 38057, 38072, 95615) but returns were relatively low and Williamson and Eyton may have lost money on the venture.

- 5.6.7 In the 1850s Absalom and Matthew Francis, who would be heavily involved in mining in Ceredigion for many years, became interested in the mine. They may have prepared the mine, invested in a replacement waterwheel and crushing mill, (PRNs 38065 and 95611) and relaid the flat rods (PRN 38068) but do not appear to have worked it as a lease was drawn up for the Welsh Potosi Company, under the directorship of T.W.Wilkinson, in 1853. This company however soon took on Matthew Francis as the mine manager. The company extended the surface workings considerably (Palmer 1983), building a new reservoir (Llyn Conach) and leat and possibly the second crushing mill (PRNs 38065 and 95611) at Esgair Fraith. In 1855 it employed 51 miners, nine trammers and six landers and fillers across its mines, and sank a new shaft or possibly expanded Bog Shaft (PRN 38071) to the north. In the summer of 1856 an inclined tramway (PRN 95609) was built to Esgair Hir and then extended to the new crushing mill at Esgair Fraith and connecting to Bog Shaft to the north. Despite the heavy investment in water management to provide power, works were often held up by both floods and drought. The Welsh Potosi Company decided to invest in a steam-powered engine at Esgair Hir for both pumping water and raising ore, powered by coal brought in from Aberystwyth and supplemented by peat cut locally. However, despite raising more ore than any other company during the 19<sup>th</sup> century the workings once again did not prove profitable and the company was declared bankrupt in 1857 and wound up in 1858.
- 5.6.8 The Cardiganshire Consolidated Mining Company carried on operations at the site from 1858, under the management of Captain Sanders. The return from the Esgair Hir mine proved poor so the company turned its attention to the copper workings at Esgair Fraith, opening up much new ground at this mine. Quarry PRN 38072) and Bog Shaft (PRN 38071) to the north were both worked further and Copper Shaft (PRN 95615) was sunk to the east, with new pumps, pulleys and rods installed. An air shaft ('Pumping Shaft' PRN 38057) was also sunk to the east of Copper Shaft, which was turned into a pumping and drawing shaft due to the quantity of water that came out of it. In 1863 records indicate 22 men were employed underground, along with one kibble filler, one lander, one pitman and machine man, one waterman, one extra odd-job man, one smith, one carpenter, one dresser, five boys, two girls and a woman tending the barracks. In 1864 Sanders began driving a new adit westward from an outcrop at the eastern end of the site near the river (location uncertain) and in 1867 a tramway was built connecting Copper Shaft to the crushing mill. Mining ceased once again in 1868 however.
- 5.6.9 In 1872 a lease was granted to the Esgair Hir Mining Company, but it appears to have concentrated efforts on raising lead ore from the Esgair Hir mine which it worked until 1875. The mine then passed between local concerns in 1876-7, with some working suggested, before Esgair Hir Silver Lead mine and Esgair Fraith Copper mine was bought by the Cambrian Mining Company in 1877 for £70,000. The Cambrian Mining Company worked the mines until the early 1880s, under the management of Captain Glanville. Work recommenced at the Copper and Pumping Shafts, with new flat rods laid to the shafts. In 1878-9 work on the 'Eastern Shaft' (possibly PRN 38057) was aided by a new drainage adit to the south and a portable steam engine, powered by locally cut peat.
- 5.6.10 After this the mines were worked sporadically through the 1880s and 1890s by a number of short-lived companies. The final lease was made in 1900 to Vavasour Earl and the Welsh Copper Mining Syndicate. In 1902 they are recorded as



employing 38 men underground at Esgair Fraith, with 27 surface workers (Palmer 1983). The last returns recorded for Esgair Fraith come in 1904, and in 1908 the surface plant was sold off. No further workings are recorded at the mine during the 20<sup>th</sup> century.

- 5.6.11 Following the decline of the metal mining industry the area appears to have reverted to a rural upland pasture until the 1960s when the Forestry Commission acquired the land and began a programme of extensive conifer plantation.

**Table 2:** All sites recorded on the HER in the study area

PRN	Name	Type	Period	NGR
5626	Esgair Hir Mine; Esgair Fraith Mine; Cambria; Welsh Potosi; Cardigan Consolidated; Kylon Potosi; New Cambrian; Esgairffraith; Cardigan Consols	Copper Mine; Lead Mine; Silver Mine	Post Medieval	SN735912
5628	Esgair Hir Mine	Standing Stone	Bronze Age	SN72929089
5631	Esgair Fraith	Round Barrow	Bronze Age	SN74269154
19915		Quarry	Post Medieval	SN73789132
19916	Esgair Fraith	Aqueduct	Post Medieval	SN7487191581
19919	Bryn Melyn	Quarry	Post Medieval	SN7401092188
25814	Lluest-grafia	Lead Mine	Post Medieval	SN7515991342
27097	New Pool	Boundary Stone	Post Medieval	SN7451392135
28186	Lluest-grafia	Farmstead	Post Medieval	SN7513291370
28190	Lluest-gotta	Boundary Stone	Post Medieval	SN74919063
28191	Tirion-mawr	Sheep Fold	Post Medieval	SN7470490781
28192	Tirion-bach	Long Hut	Post Medieval	SN7457690844
28193		Sheep Fold	Post Medieval	SN73589165
38048	Esgair Fraith	Footbridge	Post Medieval	SN7450491115
38049	Esgair Fraith	Shaft	Post Medieval	SN7443791145
38050	Esgair Fraith	Level	Post Medieval	SN7448891181
38051	Esgair Fraith	Shaft	Post Medieval	SN7443491262
38052	Esgair Fraith	Tramway	Post Medieval	SN7442091105
38053	Esgair Fraith	Shaft	Post Medieval	SN7432491271
38054	Esgair Fraith	Wheel Pit	Post Medieval	SN7425191082
38055	Esgair Fraith	Building	Post Medieval	SN7423691167
38056	Esgair Fraith	Wheel Pit	Post Medieval	SN7423891189
38057	Esgair Fraith	Shaft	Post Medieval	SN7424791265
38058	Esgair Fraith	Tramway	Post Medieval	SN7421491258
38059	Esgair Fraith	Structure	Post Medieval	SN7419091237
38060	Esgair Fraith	Shaft	Post Medieval	SN7411491351
38061	Esgair Fraith	Level	Post Medieval	SN7448991122
38062	Esgair Fraith	Level	Post Medieval	SN7420991146

PRN	Name	Type	Period	NGR
38063	Esgair Fraith	Tramway	Post Medieval	SN7412991215
38064	Esgair Fraith	Structure	Post Medieval	SN7408991147
38065	Esgair Fraith	Wheel Pit	Post Medieval	SN7403191172
38066	Esgair Fraith	Aqueduct	Post Medieval	SN7394691224
38067	Esgair Fraith	Reservoir	Post Medieval	SN7390291239
38068	Esgair Fraith	Flat Rods	Post Medieval	SN7379191201
38069	Esgair Fraith	Structure	Post Medieval	SN7401791159
38070	Esgair Fraith	Tramway	Post Medieval	SN7374691217
38071	Esgair Fraith	Shaft	Post Medieval	SN7393791333
38072	Esgair Fraith	Shaft	Post Medieval	SN7381591335
38074	Esgair Fraith	Spoil Heap	Post Medieval	SN7362791304
38075	Esgair Fraith	Reservoir	Post Medieval	SN7373091458
38076	Esgair Fraith	Leat	Post Medieval	SN7379691396
38077	Esgair Fraith	Leat	Post Medieval	SN7369391342
38078	Esgair Ffraith	Level	Post Medieval	SN7399591170
38079	Esgair Ffraith	Level	Post Medieval	SN7388391191
38080	Esgair Ffraith	Shaft	Post Medieval	SN7387191188
38081	Esgair Ffraith	Shaft	Post Medieval	SN7428091073
38082	Esgair Ffraith	Leat	Post Medieval	SN7458291037
38083	Esgair Ffraith	Leat	Post Medieval	SN7453991005
38096	Fainc Fach	Triangulation Point	Modern	SN7418690146
38097	Castell	Triangulation Point	Modern	SN7365990880
38101	Esgair Ffraith	Footbridge	Post Medieval	SN7498191309
38102	Lluest-gotta	Stone	Post Medieval	SN7498390624
38104	Banc Yr Wyn	Stone	Post Medieval	SN7472290485
38105	Foel Cerig-gwynion	Footbridge	Post Medieval	SN7514091454
38148	Esgair Fraith	Triangulation Point	Modern	SN7475191378
38546	Lluest Grafia Well	Well	Post Medieval	SN7510191249
47572	Esgair-hir	Mine Workings	Post Medieval	SN72999112
47574	Esgair-hir	Engine House	Post Medieval	SN73359125
47576	Esgair-hir	Metal Mine	Post Medieval	SN73439120
47577	Esgair-fraith	Reservoir	Post Medieval	SN73599149
47578	Esgair-hir	Reservoir	Post Medieval	SN73329136
47579	Esgair-hir	Pond	Post Medieval	SN73099158
95299	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Leat	Post Medieval	SN72849107
95300	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Spoil Heap	Post Medieval	SN72929116
95301	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Gulley	Post Medieval	SN72929118

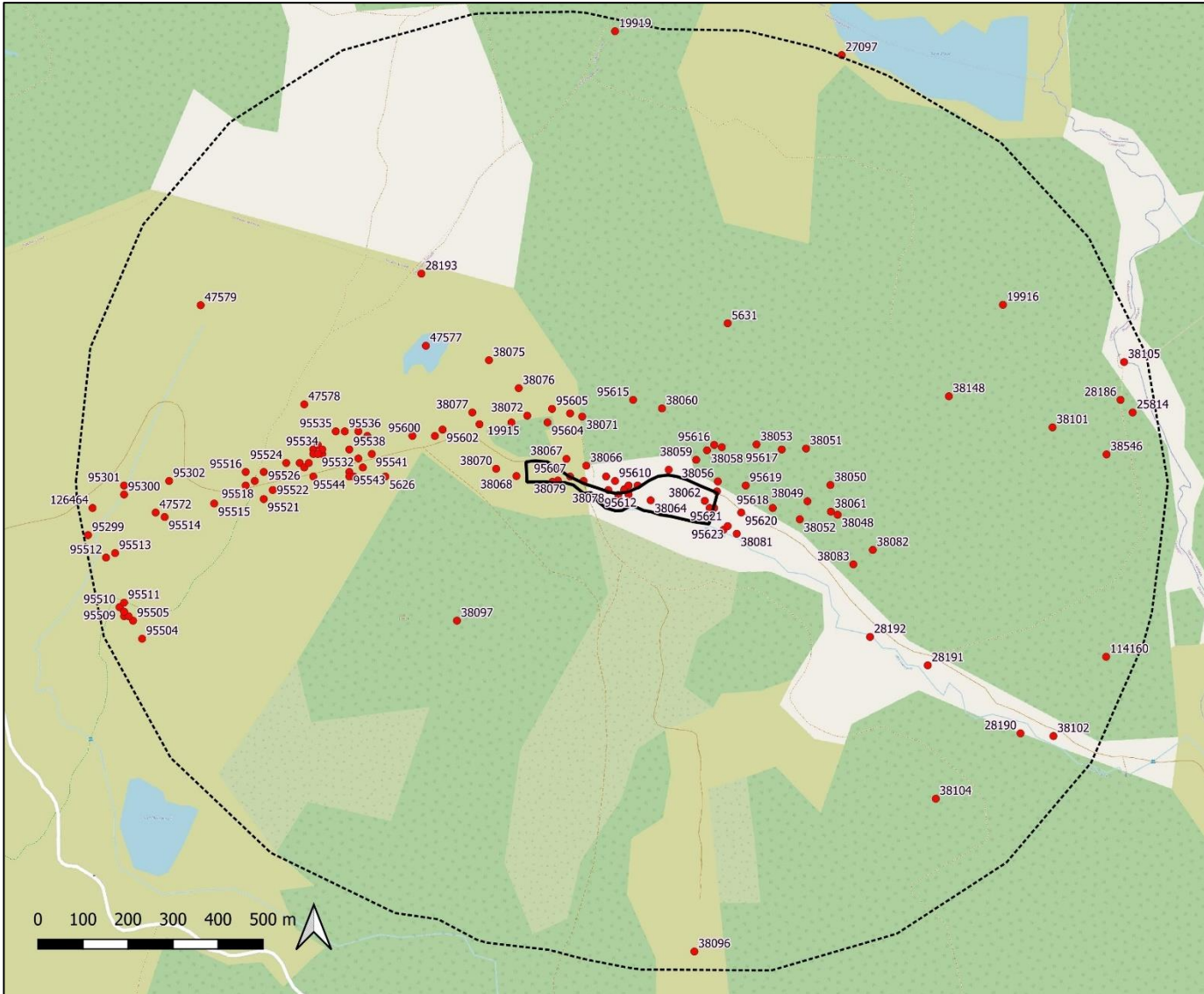
PRN	Name	Type	Period	NGR
95302	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Shaft	Post Medieval	SN73029119
95504	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Cottage	Post Medieval	SN72969084
95505	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72949088
95506	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72939089
95507	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72929090
95508	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72929090
95509	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72919091
95510	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Terraced Cottage	Post Medieval	SN72919091
95511	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Building	Post Medieval	SN72929092
95512	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Gulley	Post Medieval	SN72889102
95513	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Shaft	Post Medieval	SN72909103
95514	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Shaft	Post Medieval	SN73019111
95515	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Trench	Post Medieval	SN73129114
95516	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Leat	Post Medieval	SN73199121
95517	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Workings	Post Medieval	SN73179116
95518	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Working	Post Medieval	SN73199118
95519	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Working	Post Medieval	SN73219119

PRN	Name	Type	Period	NGR
95520	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Shaft	Post Medieval	SN73239121
95521	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Working	Post Medieval	SN73239115
95522	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Trench	Post Medieval	SN73259117
95523	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Spoil Heap	Post Medieval	SN73269120
95524	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Working	Post Medieval	SN73289123
95525	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Balance Pit	Post Medieval	SN73319123
95526	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Shaft (Lead)	Post Medieval	SN73329122
95527	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Spoil Heap	Post Medieval	SN73349120
95528	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Ore Bin	Post Medieval	SN73339123
95529	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Boiler House	Post Medieval	SN73349126
95530	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Building	Post Medieval	SN73359127
95531	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Balance Pit	Post Medieval	SN73349125
95532	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Building	Post Medieval	SN73359125
95533	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Building	Post Medieval	SN73369125
95534	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Balance Pit	Post Medieval	SN73369126
95535	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Shaft	Post Medieval	SN73399130
95536	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mining Feature	Post Medieval	SN73419130

PRN	Name	Type	Period	NGR
95537	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Spoil Heap	Post Medieval	SN73449130
95538	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Gulley	Post Medieval	SN73429126
95539	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Balance Pit	Post Medieval	SN73469129
95540	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Embankment	Post Medieval	SN73449124
95541	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Shaft	Post Medieval	SN73479125
95542	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Shaft	Post Medieval	SN73459122
95543	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Building	Post Medieval	SN7342091210
95544	Esgair Hir Mine; Esgair Fraith Mine; Cambria	Mine Office	Post Medieval	SN73429120
95600	Esgair Hir Mine etc (see PRN 5626)	Mine Shaft	Post Medieval	SN73569129
95601	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN73619129
95602	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN7362791304
95603	Esgair Hir Mine etc (see PRN 5626)	Spoil Heap	Post Medieval	SN7370991316
95604	Esgair Hir Mine etc (see PRN 5626)	Gulley	Post Medieval	SN73869132
95605	Esgair Hir Mine etc (see PRN 5626)	Trackway	Post Medieval	SN73879135
95606	Esgair Hir Mine etc (see PRN 5626)	Mine Shaft	Post Medieval	SN73919134
95607	Esgair Hir Mine etc (see PRN 5626)	Mine Building	Post Medieval	SN73919120
95608	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN73949119
95609	Esgair Hir Mine etc (see PRN 5626)	Tramway Embankment	Post Medieval	SN73999120
95610	Esgair Hir Mine etc (see PRN 5626)	Tramway Structure	Post Medieval	SN74019119
95611	Esgair Hir Mine etc (see PRN 5626)	Crushing Mill	Post Medieval	SN74039117
95612	Esgair Hir Mine etc (see PRN 5626)	Mine Building	Post Medieval	SN74049116

PRN	Name	Type	Period	NGR
95613	Esgair Hir Mine etc (see PRN 5626)	Tramway Structure	Post Medieval	SN74049118
95614	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN74069118
95615	Esgair Hir Mine etc (see PRN 5626)	Mine Shaft	Post Medieval	SN74059137
95616	Esgair Hir Mine etc (see PRN 5626)	Platform	Post Medieval	SN74239127
95617	Esgair Hir Mine etc (see PRN 5626)	Mine Shaft	Post Medieval	SN74389126
95618	Esgair Hir Mine etc (see PRN 5626)	Level	Post Medieval	SN74369113
95619	Esgair Hir Mine etc (see PRN 5626)	Leat	Post Medieval	SN74309118
95620	Esgair Hir Mine etc (see PRN 5626)	Leat	Post Medieval	SN74299112
95621	Esgair Hir Mine etc (see PRN 5626)	Balance Pit	Post Medieval	SN74239113
95622	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN74229113
95623	Esgair Hir Mine etc (see PRN 5626)	Mine Structure	Post Medieval	SN7426091090
114160	Esgair Fraith Plantation	Historic Landscape Area	Multi	SN751908
126464	Bwlch-y-garreg Sheepwalk V	Dairy	Medieval	SN72859113





**Figure 4:** Map showing the assets recorded on the regional HER within 1km (dotted line), labelled by PRN. Not all PRN labels are visible at this scale, more detailed site-specific maps are included in Section 7.

Map data from OpenStreetMap (OSM) <https://www.openstreetmap.org/copyright> 29/04/24

## **6 ASSESSMENT OF EVIDENCE**

### **6.1 General**

- 6.1.1 Sections 4 and 5 have laid out the known archaeological resource for the area, recorded on the regional databases of historic assets. The following section examines some of the main sources of information that could expand our current understanding of that resource and highlight previously unrecorded historic assets.

### **6.2 Previous Archaeological Work**

- 6.2.1 The National Library of Wales houses a large number of photographs from local mine sites, including Esgair Fraith, taken in the 1970s and 1980s by Mr D.L.Thomas. These photographs are extensively annotated with maps, well-researched histories and physical descriptions, and together provide an early and detailed survey of the mining remains.
- 6.2.2 Between 1978 and 1981 a team from Leicester University carried out a programme of surveying and limited excavations at Esgair Hir and Esgair Fraith which was reported on in *British Mining* (Palmer 1983). This work included an examination of the history and development of the mine, including clearance and excavation work around the crushing mill (PRN 95611) and wheel pit (PRN 38065), a dressing floor adjacent (EF07), an area of slime pits to the southeast (PRN 38064) and a wheel pit (PRN 38054) just beyond the site area to the east. This has been used as a source for the archaeological background discussed in Section 5 but not all detail from these works has been included in the HER.
- 6.2.3 In 1993 a survey of the mine site was undertaken by Protheroe-Jones, the current Principal Curator of Industry at the National Museum of Wales, as part of a survey of Ceredigion Metal Mines. This included a site visit along with the production of annotated maps. Much, but not all, of this detail has been included in the HER.
- 6.2.4 In 1999 work by the Forest Enterprise to manage the water flow through parts of the Esgair Fraith site was undertaken under an archaeological watching brief (Frost 2000, ERN 42688). Unfortunately, a copy of this report was not available for consultation; it is unclear therefore where these works were undertaken and what was recorded.
- 6.2.5 In 2014/5 the Cambrian Mountain Society submitted an application requesting the remains of Esgair Hir and Esgair Fraith be scheduled. As part of this process a site survey was undertaken by Dr Sandy Gerrard and a report produced to accompany the scheduling application (Gerrard 2014). This report includes descriptions of many of the visible remains of the mine at that time.
- 6.2.6 Other studies of the general area include a survey of deserted rural settlements (Sambrook and Ramsey 1999), the results of which have already been incorporated into the HER.

### **6.3 Historic Mapping**

'Mapp of the great Lead Mines of Sir Carbery Prise,' Waller. W. 1693

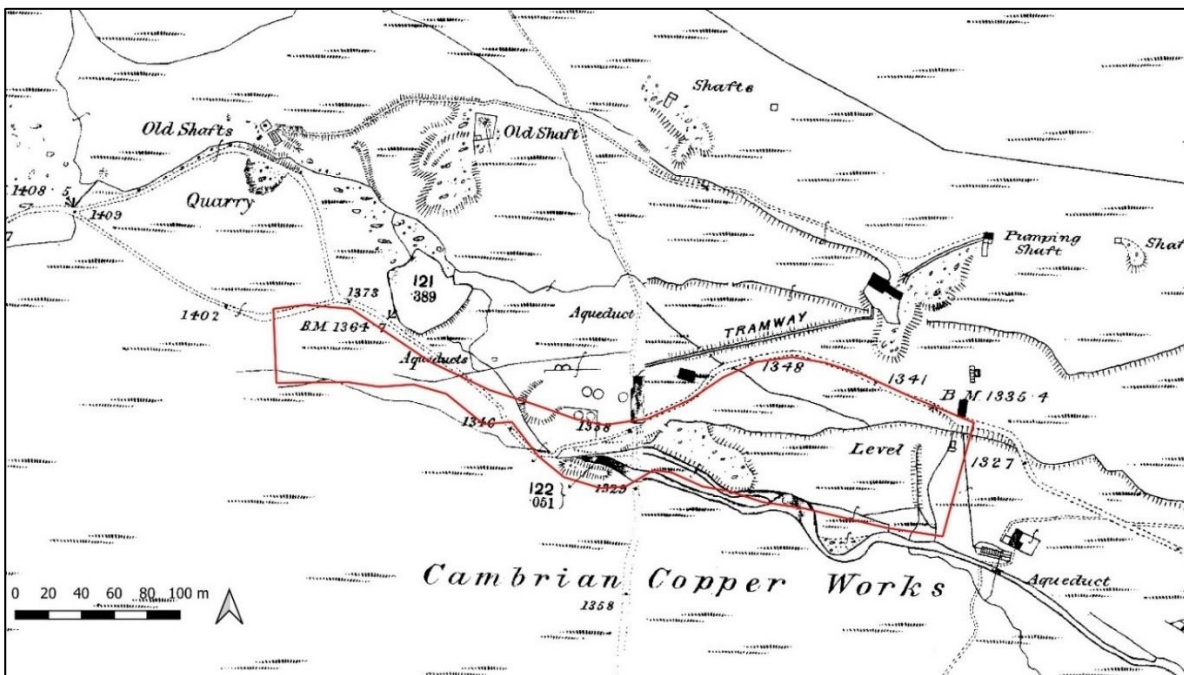
- 6.3.1 Waller produced an early annotated map of the mines which is a valuable source of information related to the early stages of metal mining in Ceredigion. The map provides little further detail however, focussing on Esgair Hir and stylised in its portrayal. The levels of the underground workings are shown but the location of any surface features in and around Esgair Fraith are indeterminate.

Mid-19<sup>th</sup> century mine plans

- 6.3.2 Maps from the 1850s are available in the county archives and reproduced in Palmer (1983). Once again however these maps tend to focus on Esgair Hir and show little of detail within the proposed development area. A series of shafts are noted but these appear to be the Quarry (PRN 38072), Bog (PRN 38071) and Copper (PRN 95615) shafts to the north. The East Level (PRN 38079) is also marked but otherwise there is little of use to the development area. Interpretative maps are produced by Palmer (1983) using these sources that do show detail within the study area from the mid-19<sup>th</sup> century workings, including wheel pits, leats and tramways.

Ordnance Survey 1:2500 map 1887 (Fig 5)

- 6.3.3 The most detailed record of mine features comes from the Ordnance Survey map of 1887. At the time the mine was in active use by the Cambrian Copper Works Co. and a series of shafts, levels, buildings, dressing floors and leats are marked. A number of 'old shafts' are also marked from earlier works, some of which may date back to the initial workings at the end of the 17<sup>th</sup> century, but not all known sites are shown. This map provides the basis for many of the features identified on the site.

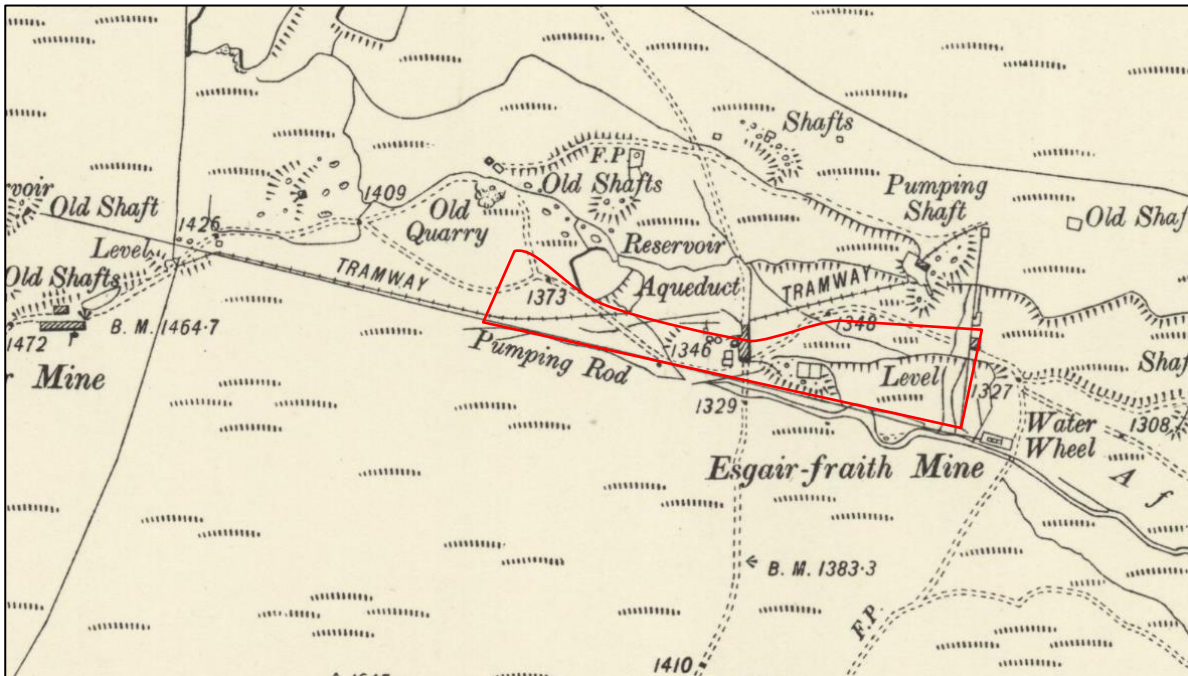


**Figure 5:** Extract from the Ordnance Survey map of 1887 showing the Esgair Fraith mine site. Study area outlined in red.

Ordnance Survey 6 inch map 1903, 1953 (Fig 6)

- 6.3.4 The subsequent Ordnance Survey map of 1903 (Fig 6) captures the mine in the final years of its use. Generally the features depicted on the previous, more detailed Ordnance Survey map of 1887 are reproduced, with some abandonment of shafts and buildings. New features include slime pits (PRN 38064) to the southeast of the crushing mill (PRN 95611) and extensive pumping rods (PRN 38068) connecting a shaft at Esgair Hir to the water wheel (PRN 38054) at the

eastern end of Esgair Fraith. This layout is reproduced on the subsequent Ordnance Survey map published in 1953, although by this time there is no record of the site being worked.



**Figure 6:** Extract from the Ordnance Survey map of 1903 showing the Esgair Fraith mine. Approximate study area outlined in red.

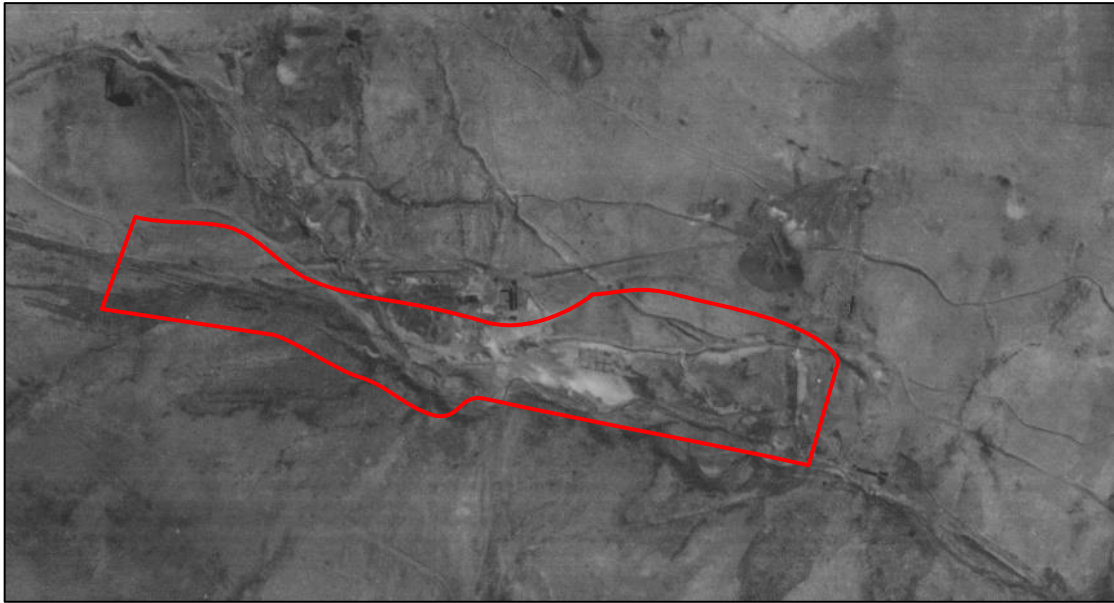
(Reproduced with the permission of the National Library of Scotland).

## 6.4 Aerial and Historic Photography

- 6.4.1 A search was made of available historic and modern aerial photographs, although due to the isolated locations few such photographs were available. The area was covered by some RAF images from the late 1940s and modern satellite imagery.
- 6.4.2 Although the images from 1946 (Photo 1) and 1948 capture the area prior to large scale afforestation, the scale makes specific features difficult to distinguish. Despite being produced at a similar time to the Ordnance Survey map of 1953 the aerial images suggest much of the site had long been abandoned with few structures visible and potentially more extensive areas of spoil, which may even indicate previous spoil tips had been reworked in the earlier 20<sup>th</sup> century. The wheel pit (PRN 38065) is visible, along with the north wall of the crushing mill (PRN 95611). This would appear to be the condition of the site when it was investigated by Leicester University students in the late 1970s (Palmer 1983), which indicates the site had been cleared prior to afforestation. The tramways to the north, slime pits (PRN 38064) to the southeast and level (PRN 38062) at the eastern end of the site are also visible.
- 6.4.3 The extent of the forestry cover and new forestry tracks is visible on the satellite imagery of the site from 2006 onwards. The current track running west to east around the northern edge of the study area roughly follows the line of the original mid-19<sup>th</sup> century track but is clearly a new construction, taking a slightly different line in places. New tracks also run south, north towards Bog Shaft (PRN 38071) and past the wheel pit (PRN 38065) and through the site of the crushing mill (PRN 95611). There are gaps in the forestry to the north around various mine features. To the south planting comes close to the site of East Level (PRN 38079). The slime



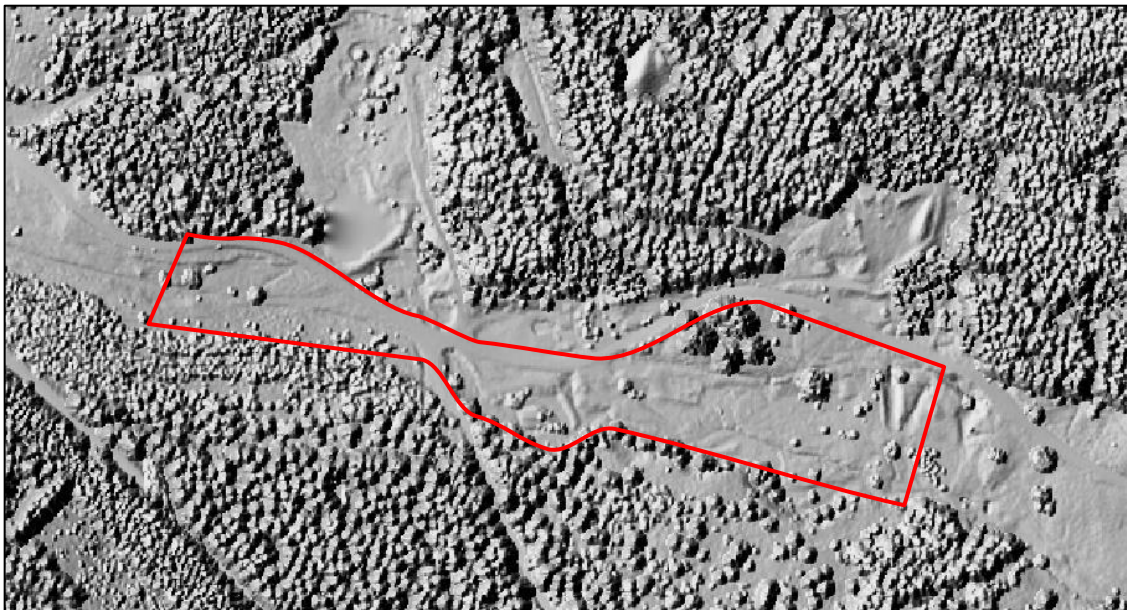
pits PRN 38064 are still visible in 2006, as is level PRN 38062 and leat PRN 95620, becoming slightly less visible over the subsequent years but still identifiable on the latest satellite images.



**Photo 1:** Extract from the 1946 RAF aerial photograph, showing the Esgair Fraith mine study area marked in red.

## 6.5 LiDAR

6.5.1 LiDAR data at 1mDSM is available for the area (Fig 7). Earthworks are visible across the site, which include features such as the slime pits PRN 38064, leat PRN 95620 and level PRN 38062. Also apparent is a trench adjacent to, and similar in appearance, to the level but it is not clear if this represents an archaeological feature or a more recent drainage feature. Also apparent on the LiDAR results is a long trench that represents the line of the flat rods PRN 38068.



**Figure 7:** LiDAR data at 1mDSM. The approximate study area is marked in red.  
Contains public sector information licensed under the Open Government Licence v3.0.

## **6.6 Site Visit**

- 6.6.1 A site visit was undertaken on the 29<sup>th</sup> February 2024. The weather conditions were generally dry with low cloud and the occasional shower, and all round views were possible and relatively extensive. Access to the entire site was possible, although mine openings were not entered and surrounding forestry was not extensively surveyed.
- 6.6.2 The visit allowed all known sites to be re-examined, updating descriptions, conditions and interpretations. Some recorded sites no longer appear visible but potential new sites were noted. Records were made in note form, photographs were taken of each identified feature with a high-definition digital camera and locations were recorded using a hand-held Garmin GPS Map unit.
- 6.6.3 Full descriptions, photos and a plan of all identified features are laid out in Section 7.

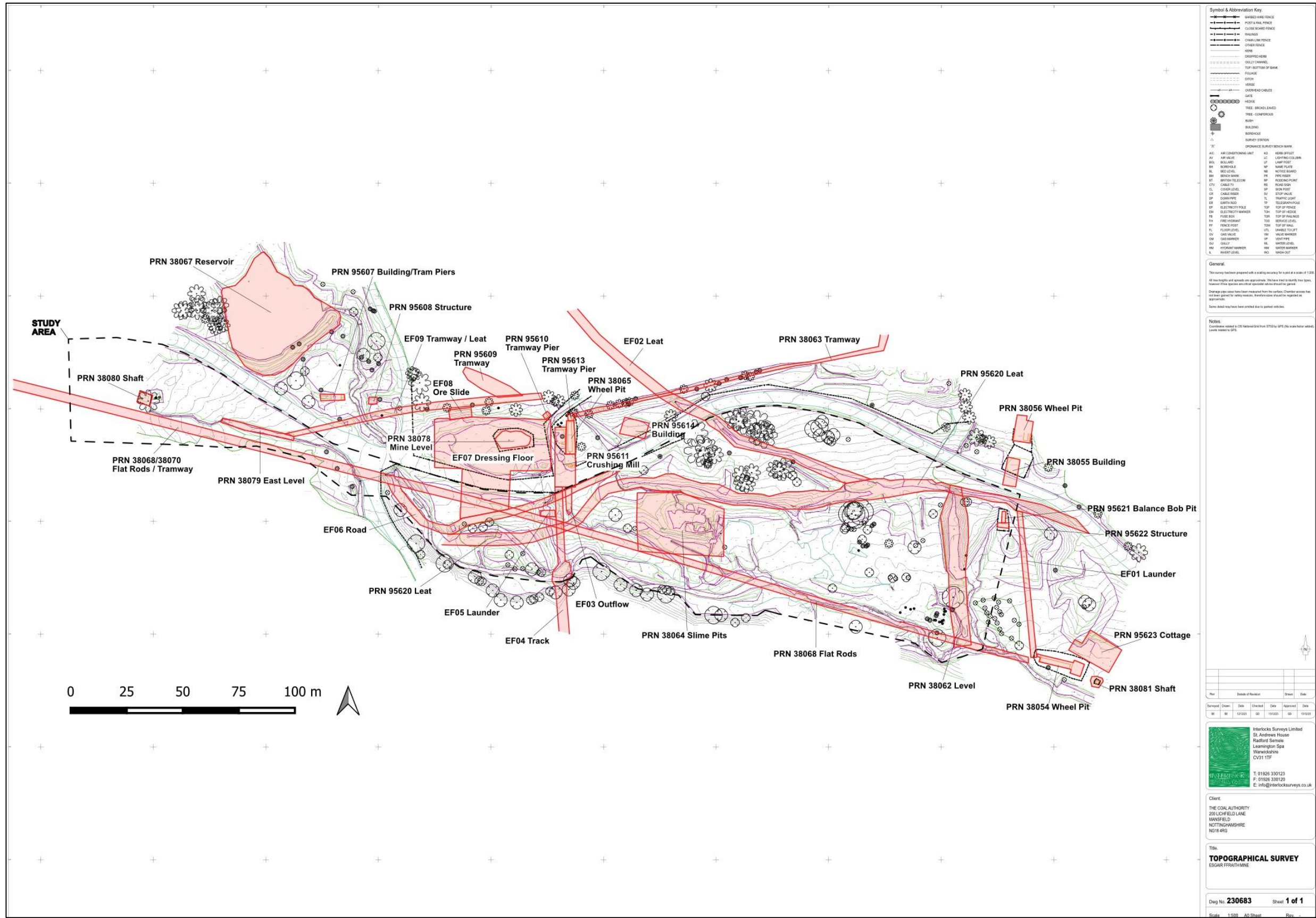
## **7 MINE FEATURES**

- 7.1 The following section details features within the study area around the Esgair Fraith mine. It does not include all related mining features that lie outside the study area.
- 7.2 A written description of these sites is included in Table 3 which is laid out in numerical order according to the PRN. Additional sites are included at the end of the table, given the prefix EF (to identify it as a site from Esgair Fraith) and then numbered sequentially.
- 7.3 Pictures of the sites are shown in Photos 2 - 32. A plan of the mine features is provided in Figure 8. These locations can also be provided in GIS file formats to accompany this report.
- 7.4 The main track to the site passes through the Esgair Hir mine site to the west before dropping down the hill slightly towards the study area where it widens at a crossroads; here one forestry track runs south and another runs north whilst the main track continues eastward. Although following the line of the original mine track of the 1840s to this point, the track has clearly been re-laid to allow the passage of modern vehicles.
- 7.5 To the north of the track on this approach, outside the study area, lies the mine reservoir PRN 38067 (Photo 2), which remains intact and provides the main source of water at the head of the Afon Lliestgota. The water drains from the reservoir and towards the track crossroads, passing the remains of PRN 95607 (Photo 3), as well as PRN 95608 and EF09, although there is no clear evidence of the latter two. The water course then passes under the crossroads via a modern metal culvert, where it is met by a smaller watercourse, also channelled under the forestry track via a modern culvert (Photo 4).
- 7.6 This smaller second watercourse drains from the west, through an area of tussocky undergrowth within the western end of the study area. The watercourse drains through the undergrowth, past the remains of the rock cut mine shaft PRN 38080, visible as a fenced off shaft with a tree growing out of it (Photo 5). The watercourse then drains into the channel formed by level PRN 38079. The level is largely infilled with vegetation, the opening is not visible and only the flow of water along a straightened route marks the location of the level cutting. There is no clear evidence of the line of the flat rods or tramway (PRNs 38068 and 38070) at ground level amongst the tussocky undergrowth.
- 7.7 To the east of the crossroads and north of the study area lies a largely fenced off zone of mining remains, including the main visible structural elements in the immediate vicinity. The dressing floor EF07 is visible as a levelled stony area, with the further fenced remains of the flooded collapsed mine level PRN 38078 within (Photo 7). To the east lies the wheel pit PRN 38065 (Photo 8), the most visible part of the former crushing mill PRN 95611 which is otherwise noted as tumbled and potentially deteriorating masonry to the northwest and south (Photo 9). A track runs past the remains and into the woodland to the north. It is crossed by the line of leat EF02, visible as a well-constructed channel within the woodland (Photo 10). Earthworks and piles of masonry also mark the lines of various tramways (PRN 38063, 95609 and EF09) accessing the former crushing mill and processing site.
- 7.8 The dressing floor EF07 would have extended beyond the modern forestry track and into the study area. This now comprises a levelled area of broken stone, possibly originating from a mix of coarse mining spoil and demolished buildings (Photos 11 and 12). The occasional fragment of timber and ironwork is visible amongst the stone but there is nothing clearly structural with the exception of part of the line of leat PRN 95620. This leat is visible as a circa 3m wide channel with

a low 0.9m wide stone wall along the southern edge and suggestions of a similar wall to the north, all set at a lower level than the levelled ground surrounding it, highlighting the potential for buried remains at a similar working level (Photos 12 and 13).

- 7.9 As the modern track runs around the northern edge of the study area it cuts across the line of leat EF02. The water draining from this leat is then channelled west along the northern edge of the modern track to a point just to the south of the wheel pit PRN 38065, where it passes under the track via a culvert and cuts a channel south to the Afon Lluestgota (Photo 14). This channel may partially cut along trackway EF04 but no clear remains of the track are visible. Within the sides of the water channel, timberwork EF05 is exposed (Photo 15). To the west lies a worked timber, aligned north – south, with a possible buried timber launder to the west (Photo 16). To the east lies a timber chute or launder, approximately 0.25m square, buried beneath a 1.5m high bank of finer mine tailings (Photo 17). This may have conveyed water or materials from the processing floor EF07 to the west to the slime pits PRN 38064 to the east. Other fragments of timber within and on the mine tailings in this area indicate further buried timber structures (Photo 18).
- 7.10 East of this water channel lies an area of mine tailings, including some very fine deposits over the site of the slime pits PRN 38064 (Photo 19). The outline of some of the slime pits is still identifiable, as is some buried timberwork (Photo 20) which indicates structures still survive, although they appear less prominent than in previous images, suggesting continued erosion across this area. Water channels cut across the finer tailings; one particular channel emerges from beneath the modern trackway to the northwest (Photos 22 and 23) whilst another emerges from between blocks of buried masonry that may represent a buried structure (Photos 24 and 25), potentially associated with the outflow EF03 from the waterwheel pit PRN 38065 to the north. Embanked material along the northern edge of the slime pit area would appear to represent part of the line of leat PRN 95620 (Photo 26) which is otherwise lost to the west until reemerging as the built structure described above (Section 7.8).
- 7.11 To the east of the slime pits lies a low-lying area of vegetation which may obscure further surface or buried remains but no obvious archaeological traces were identified. The line of the flat rods PRN 38068 passes along the southern edge of this area but no clear evidence of this structure was identified. To the north the land rises onto a slight ledge which appears to mark the line of leat PRN 95620. This is joined by leat EF02, which is still visible as a narrow channel amongst the undergrowth (Photo 27) although it no longer appears to actively channel water beyond the modern trackway to the northwest. The point where the two meet appears to have caused an area of erosion, removing a section of PRN 95620. The line of the leat is then visible to the east as pooled areas of water (Photo 28) before it once again becomes visible as an earthwork channel (Photo 29). Towards the eastern end of the study area this channel appears in part to have been diverted into the cutting for mine level PRN 38062. The mine opening itself is no longer visible but the cutting can be seen as a prominent linear channel, along which water flows (Photo 30). The eastern end of leat PRN 95620 also appears to be diverted south into a linear channel that may represent the line of launder EF01 running towards the wheel pit PRN 38054 to the southeast. The fenced remains of the balance bob pit PRN 95621 (Photo 31) are also visible in this area but were not closely examined.
- 7.12 Lying just outside the study area to the east are the relatively well-preserved remains of wheel pit PRN 38054 (Photo 32). This site was visited briefly but remains of shaft PRN 38081 and Cottage PRN 95623 were not recorded.





**Figure 8:** Mine features (in red) identified within and around the study area, overlaid on a recent topographical survey. Not reproduced to scale.

**Table 3: Esgair Fraith Mine Features**

PRN/ Ref No	NGR	Type	Description	Photo
38054	SN74259109	Wheel Pit	Pumping wheel, built in 1839. Well-preserved as a masonry structure with bob pit to the east and intact iron work.	32
38055	SN74239117	Building	Mine building marked on the 1887 OS map. Lewis (1983) appears to suggest this may have been an engine house built in 1880 to house the portable Robey steam engine. Two walls were identified in 1983 but the site appears to have been removed with the construction of the forestry trackway.	
38056	SN74249119	Wheel Pit	Stone-built wheel pit and adjoining structure, marked on the 1887 OS map. Plan produced by Lewis (1983) who suggests it was built in 1866. Still standing, though ruinous, in a fenced off area.	
38062	SN74219115	Mine Level	A mine level, marked on the 1859 plan and 1887 OS map. The initial plan appears to suggest it continued underneath leat PRN 95620 to the north. Still visible as a clear wide, water-filled channel, but the level entrance itself appears collapsed or infilled.	30
38063	SN74109121	Tramway	Tramway marked on the 1887 OS map, carrying ore to the crushing mill. Described as largely intact, particularly towards its western end, in 1999. Not examined during current survey.	
38064	SN74099115	Slime Pits	Only marked on the 2 <sup>nd</sup> edition OS map of 1903 as a pair of square structures, assumed to be slime pits and fine processing, but Palmer (1983) suggests they were built in c.1856. Partially excavated by Leicester University, revealing three rows of four timber chambers, partly eroded by the water. Still partially visible on aerial photographs (APs), with outlines of square chambers visible at ground level, covered in very fine tailings and clay.	19, 20, 21, 24
38065	SN74049119	Wheel Pit	Stone built water wheel pit for powering the crushing mill PRN 95611. Built in the 1850s, the masonry remains survive intact.	8, 9
38067	SN73909124	Reservoir	A mine pond, marked on the 1887 OS. Still holding water.	2, 3
38068	SN73869119	Flat Rods	Line of flat rods, dating from the late 19 <sup>th</sup> /early 20 <sup>th</sup> century. Runs from the water wheel PRN 38054 all the way to Shaft Isaf at Esgair Hir. Earthwork platform and cutting visible on APs and LiDAR but at ground level it is covered in vegetation.	
38070	SN73869119	Tramway	Recorded as a late 19 <sup>th</sup> /early 20 <sup>th</sup> century tramway along the lines of the flat rods PRN 38068 (Palmer 1983), although unclear what the evidence for the tramway is.	

PRN/ Ref No	NGR	Type	Description	Photo
38078	SN74019184	Mine Level	A collapsed mine level, unmarked on any maps, but identified by Lewis (1975) as being opened in 1855 by the Welsh Potosi Company, with an associated adit likely to lie on the river's edge to the south, now unidentifiable. This level is visible as a flooded hollow within the dressing floor EF07.	7
38079	SN73899119	Mine Level	'East Level', one of the earliest workings on site, first mentioned by Waller in the late 17 <sup>th</sup> century. Still visible as a water-filled channel although the level entrance is lost in vegetation.	6
38080	SN73849121	Mine Shaft	A rock cut mine shaft, on the line of the East Level PRN 38079. Still open, though with trees growing out of it and fenced off.	5
38081	SN74279108	Mine Shaft	Not marked on any known map but noted during survey work in 1993 (Protheroe-Jones), noted as a drystone-lined shaft, 5ft in diameter, flooded at 10ft. Not visited during current survey.	
95607	SN73939121	Building/ Tramway Piers	Tumbled stone walls, not marked on historic maps but identified during a survey in 1993 (Protheroe-Jones 1993). These walls have been identified by Gerrard (2014) and Lewis (1975) as piers for a tramway over the adjacent stream, possibly for transporting ore from East Level to the dressing floor EF07, of unknown date as no tramway is marked in this location.	3
95608	SN73959120	Building/ Shaft	A small sub-rectangular feature marked on the 1887 OS map. Recorded as a possible structure during a survey in 1993 (Protheroe-Jones 1993) although there were no visible remains identified. The map depiction is also similar to mine shafts, although it is unlabelled. Lewis (1975) identified a foundation bolt casing on the stream edge adjacent, possibly from an unrecorded wheel-pit, raising the possibility that this may be an associated bob pit. No surface trace identified.	
95609	SN74009121	Tramway Embank- ment	Tramway embankment formed by a stone mound running into the trees. Perhaps took a straighter route to the west to meet up with PRN 95607. Was very prominent when photographed by Lewis (1975), since then trees have been planted on the line and trackway improvements have removed part of it.	
95610	SN74029220	Tramway Pier	A stone pier for carrying the tramway to the crushing mill. Survives as a rough stone mound, reduced from a prominent built stone wall visible in the 1970s.	
95611	SN74039118	Crushing Mill	A crushing mill, possibly established by the Francis brothers in the 1850s. Largely demolished prior to the establishment of forestry in the 1950s. Part of the northern wall survives, along with the associated water wheel pit PRN 38065 and a smith's hearth on the south side of it.	9

PRN/ Ref No	NGR	Type	Description	Photo
95613	SN74039120	Tramway Pier	Part of a tramway pier, attached to the northern side of the wheel pit PRN 38065.	
95614	SN74069119	Building	A building marked on the 1887 OS map, but no longer visible by the time of the 1993 survey (Protheroe-Jones 1993). Function unknown.	
95620	SN74119116	Leat	A long leat running east – west, marked on the 1887 OS map but at a lower level potentially draining the site off to the east. The west end is gone, the east end is visible as an earthwork, but possibly adapted to drain into features to the south.	12, 13, 26, 28, 29
95621	SN74229115	Balance Bob Pit	An intact balance bob pit, marked on the 1887 OS map, stone-built and currently fenced off. According to Lewis (1983) is associated with wheel pit PRN 38056, built in 1866.	31
95622	SN74229114	Structure	Mine structure marked on the 1887 OS map, adjacent to the bob pit. Not visible in 1993 and not noted in the tussocky grass during current assessment.	
95623	SN74279109	Cottage	Cottage and garden enclosure marked on a mine plan of 1859, with an L-shaped building shown on the 1887 OS map. Built as a cottage for the operator of the adjacent water wheel. No trace when surveyed in 1993, and not noted during current survey.	
EF01	SN74249112	Launder	A water channel marked and labelled as a launder on a plan of 1859, and marked on the 1887 OS map. Takes water from leat PRN 95620 to waterwheel PRN 38054. Earthwork remains visible, most prominent to the north.	
EF02	SN74109119	Leat/ Drain	A roughly east – west leat or drainage channel, marked on the 1887 OS map, connecting leats PRNs 95619 and 95620, as well as drainage from the hillside to the northwest beyond PRN 95619. Still visible as a slight earthwork below the forestry track.	10, 27
EF03	SN74049115	Outflow	A buried outflow from the waterwheel PRN 38065 to the river, the start of which was identified in excavations by Leicester University (Palmer 1983). Towards the north end a watercourse emerges from underground and flows across the tailings, possibly from this outflow.	24, 25
EF04	SN74039114	Trackway	A trackway running south from the crushing mill PRN 95611, crossing the river presumably via a ford, and continuing south. May originally have been the main route from Ponterwyd to Machynlleth prior to the mid-19 <sup>th</sup> century (Lewis 1975). Currently no surface evidence.	

PRN/ Ref No	NGR	Type	Description	Photo
EF05	SN74039115	Launder	Timberwork running east-west, exposed by a modern watercourse and otherwise buried beneath tailings. To the east is a timber launder, to the west it appears wider and may be the remains of a chamber.	15, 16, 17
EF06	SN74029116	Road	The line of the road built in the 1840s to access the site (Palmer 1983). Largely destroyed as it passes through Esgair Fraith, with some elements underneath the current modern track, and those sections that don't follow the modern track removed by forestry operations.	
EF07	SN74009118	Dressing Floor	A dressing floor and processing area adjacent to the crushing mill, dating to the mid-19 <sup>th</sup> century. Partially excavated in 1978-80 revealing well-preserved timber launders, chamber, buddles, grilles and grates. Levelled by the Forestry Commission in c.1980, prior to the completion of excavation.	7, 11, 12
EF08	SN73999120	Ore Slide	A pair of ore slides/bins, marked on the 1887 OS map. Partially excavated in 1978-79 revealing curved stone built slides and boundary with a large intact timber at the base (Palmer 1983). The remains were apparently demolished a few years later (Lewis 1979).	
EF09	SN73979120	Tramway/ Leat	A linear feature marked on the 1887 OS map but unlabelled. It runs to the East Level PRN 38079 and is therefore assumed to be a tramway, but it also runs by the top of the ore bins EF08 and a leat was recorded at this point during excavations of the ore bins (Palmer 1983). Lewis (1975) suggests tramway piers existed, but were largely demolished in the early 1980s. No visible surface remains.	





**Photo 2:** View southwest, showing reservoir PRN 38067 with water overflow and start of the Afon Llestgota in the foreground.



**Photo 3:** View northwest showing the remains of Building/Tramway Pier PRN 95607, with the embanked edge of reservoir PRN 38067 to the rear.





**Photo 4:** View west showing the water channels emerging and conjoining from beneath the forestry tracks.



**Photo 5:** View ESE from the western end of the study area, with mine shaft PRN 38080 visible right of centre.





**Photo 6:** View west along the line of East Level PRN 38079.



**Photo 7:** View southeast across dressing floor EF07, with the fenced remains of mine level PRN 38078 to the top left.





**Photo 8:** View south of the  
wheel pit PRN 38065.



**Photo 9:** View northeast of remains of the wheel pit PRN 38065 and crushing mill PRN 95611. 1m scale on the corner of the wheel pit.





**Photo 10:** View northwest along the line of leat EF02 within the forestry to the north of the study area. 1m scale.



**Photo 11:** View east across the lower end of the dressing floor EF07.





**Photo 12:** View north showing the built remains of leat PRN 95620 with the levelled area of material around dressing floor EF07 behind.



**Photo 13:** View west along the built remains of leat PRN 95620 towards the western end of its run. 1m scale.





**Photo 14:** View north along the water channel to the south of the crushing mill and dressing floor.



**Photo 15:** View north showing the timber remains EF05 exposed within the water channel. 1m scale





**Photo 16:** View north showing the timber remains of EF05 on the west side of the watercourse.



**Photo 17:** View east showing the timber remains of EF05 on the east side of the watercourse.





**Photo 18:** View north, fragments of timber amongst the mine tailings to the south of the crushing mill and processing floor. 1m scale.



**Photo 19:** View southeast across the area of slime pits PRN 38064, visible as square pools on the left.





**Photo 20:** Buried timber amongst the fine tailings in the area of the slime pits PRN 38064. 1m scale.



**Photo 21:** Fine deposits in and around the slime pits PRN 38064. 1m scale.





**Photo 22:** View northwest, showing the course of water flow from the modern trackway across the slime pits PRN 38064.



**Photo 23:** View north, showing the emergence of the watercourse from the modern trackway before it flows across the slime pits PRN 38064.





**Photo 24:** View east showing a second watercourse across the area of slime pits PRN 38064, potentially originating from outflow EF03. 1m scale.



**Photo 25:** View north showing the emergence of the watercourse from between a possible built stone structure (outflow EF03). 1m scale.





**Photo 26:** View west, showing the course of leat PRN 95620 on the right.



**Photo 27:** View northwest showing the course of leat EF02 as it runs southeast from the modern trackway.





**Photo 28:** View east showing water pooling along the length of leat PRN 95620.



**Photo 29:** View east of the earthwork remains of leat PRN 95620 towards the eastern end of the study area.





**Photo 30:** View south down the line of mine level PRN 38062.



**Photo 31:** View southwest across the fenced remains of the balance bob pit PRN 95621.





**Photo 32:** View west across the remains of wheel pit PRN 38054.

## **8 CONCLUSIONS**

### **8.1 Development Details**

- 8.1.1 Planned remediation works at the mine sites are currently in the early stages of development, therefore current outline proposals comprise the initial installation of flow monitoring structures and possible scour protection works.
- 8.1.2 At present flow monitoring structures are proposed on the water course exiting the East Level PRN 38079, roughly located around SN 7390 9119, with a second at a point where two watercourses converge at around SN 7397 9114 and a third around the entrance to Level PRN 38062 at around SN 7423 9115. These initial proposed locations are illustrated in Figure 9 but final locations may differ. Water will flow over a V-shaped channel which will be secured in place with gabion baskets or sandbags, or potentially with a built concrete structure (example structure illustrated in Figure 10). Clearance and levelling works may be required prior to installation and a monitoring device will be set up nearby. It is anticipated that these structures will be in place for between 18 months to five years and will therefore have some degree of durability about them.
- 8.1.3 Scour protection works are likely to comprise modified or new channels, or rock-rolls along existing water channels to prevent the water getting out. A general area for potential scour protection works is suggested from the emergence of the main water flow from the modern culvert at SN 7396 9117 for approximately 70m to the east, illustrated on Figure 9.
- 8.1.4 Subsequent to the site visit however it is clear that water is emerging from a modern roadside drain and culvert, and a possible outflow for the water wheel (at EF03), washing over mine tailings and other deposits in and around the area of slime pits PRN 38064 which may also require monitoring or remediation at some point.
- 8.1.5 Future works may require more extensive excavations to control the flow of water, along with enabling works such as the construction of access routes, parking and storage areas. The design, location and extent of these works has not yet been discussed but are likely to require ground-disturbing activities that could have a physical impact upon historic assets by potentially exposing, damaging or destroying archaeological remains.





**Figure 9:** Initial proposed locations for flow monitoring structures (blue) and scour protection works (orange) within the study area. © Google 2024



**Figure 10:** Example of the flume to be used in the flow monitoring structure.



## **8.2 Archaeological Constraints**

- 8.2.1 This assessment has examined and detailed the historical and archaeological background to the site, identified the archaeological potential and detailed specific features and areas of archaeological interest to allow a greater understanding of the archaeological importance and sensitivity of the site. This in turn can help inform appropriate remediation work proposals.

### *Pre-mining archaeology*

- 8.2.2 The archaeological potential of the study area clearly rests largely in the metal mining activity of the post-medieval period. Some degree of Bronze Age activity in the locality is suggested by the presence of a possible Bronze Age barrow to the north and Gerrard (2014) suggests mining activity may have started in the area during this period, although at present evidence of such activity is at best uncertain. Gerrard goes on to suggest that mining activity during the Roman and medieval periods is also a possibility but there is currently a lack of any activity in the area during these periods.
- 8.2.3 Possible medieval deserted rural settlements are a feature of the wider landscape but these sites are located in more sheltered valleys and there is little indication of any such site within the study area. The potential for pre and post-medieval mining remains to survive at surface level within the study area therefore appears minimal.

### *Esgair Fraith Mine*

- 8.2.4 The Esgair Fraith mine has its origins in the late 17<sup>th</sup> century and was reworked at various points throughout the 18<sup>th</sup> and early 19<sup>th</sup> centuries. East Level PRN 38079 is related to this early period of activity on the site but contemporary mining features at Esgair Fraith have been difficult to positively identify on the ground. It is possible the mine shafts that follow the main lode around 150m north of the site represent the main areas of activity at this time but the presence of East Level within the study area highlights the possibility for contemporary remains further south which may subsequently have been buried by later workings and remains unrecorded.
- 8.2.5 In the mid-19<sup>th</sup> century the establishment of the crushing mill PRN 95611 and dressing floor EF07 brought much of the study area into active use and a wide complex of mining remains related to both the extraction and processing of the ore has been identified from historical sources alongside excavated and physical remains, as illustrated in Figure 8. Remains are not always visible at surface level and excavations carried out by Leicester University between 1978 and 1981 clearly demonstrated that well-preserved remains survive below ground, buried by later mine waste and vegetation. Known features have been plotted, but the occurrence of buried remains such as launder EF05 and the suggestion (Lewis 1975) that mine level PRN 38078 is likely to have an associated adit on the riverside somewhere, are clear indications that even the better documented later 19<sup>th</sup> century mine features are not fully understood and located.
- 8.2.6 Clearly therefore there is a good potential for surviving buried archaeological remains associated with the post-medieval mining operations throughout much of the study area. The potential may be higher for the mid to late 19<sup>th</sup> century mining activity but the possibility for early 17<sup>th</sup> and 18<sup>th</sup> century remains cannot be discounted and are arguably of greater archaeological significance given their relative rarity and the significance that Esgair Hir and Esgair Fraith had in the opening up of metal mining across the region.

- 8.2.7 In many cases water is flowing within archaeological features, notably the East Level PRN 38079 and Level PRN 38062, therefore proposed flow monitoring structures are located in archaeologically sensitive areas. The general area of potential scour protection works is also located in an archaeologically sensitive area given the identified remains of Leat PRN 95620 in this area and the potential for further buried remains.

Designated historic assets

- 8.2.8 Although the mine is a site of some archaeological significance (an application has been made to schedule the remains) they are not currently designated as scheduled monuments, listed buildings or conservation areas and no such site lies within the study area.
- 8.2.9 Designated sites in the wider landscape have been examined but no potential impact on the setting of any scheduled monument, listed building, conservation area of historic park and garden has been identified.
- 8.2.10 The mine lies within the Historic Landscape Character Area of Esgair Fraith Plantation (HLCA 12). The study area itself lies some distance beyond the boundary of the actual registered Historic Landscape of Upland Ceredigion (HLW (D) 2) but as part of an associated HLCA it could be considered to lie within the setting of the landscape. The surrounding forestry plantation is the main characteristic of this HLCA, with the mine site itself being one of the main significant archaeological and historic elements in the area. However, it is unlikely that the scale of works proposed will be significant enough to alter these character elements and will therefore have a negligible impact upon the Historic Landscape.

### **8.3 Mitigation**

- 8.3.1 Due to the archaeological sensitivity of the site there is likely to be some form of archaeological mitigation required, both during the initial installation of monitoring structures and for any future remediation works.
- 8.3.2 For the initial monitoring structure installation it would be beneficial to alter the proposed location of the structure close to East Level PRN 38079. As one of the earliest mining features on the site this is a particularly significant and sensitive area and therefore a location on the watercourse further to the east is preferable.
- 8.3.3 Visible archaeological remains have been mapped and should different locations for the monitoring structures be sought then it would be advisable to avoid these known features.
- 8.3.4 A proposed monitoring structure along the line of Level PRN 38062 is also in an archaeologically sensitive area and whilst this level is perhaps of reduced archaeological significance in comparison to PRN 38079, the archaeological monitoring of any ground breaking activity associated with installation works would be beneficial given the archaeological potential within the level cutting, and indeed across much of the study area. Archaeological monitoring would require the presence of an archaeologist as groundworks are undertaken, with the opportunity and resources included within the development programme to allow any archaeological remains identified during this process to be sufficiently investigated and recorded. Provision should also be made in the possible event that significant archaeological remains are uncovered requiring additional mitigation, such as additional time and resources.
- 8.3.5 Scour protection works should similarly be sensitively located where possible, with some archaeological features identified in areas where water currently flows, such as launder EF05 and around the areas of slime pits PRN 38064 that could

easily be damaged in any associated ground-disturbing works. Even where archaeological features have not been positively identified, ground-disturbing works would benefit from archaeological monitoring.

- 8.3.6 Any future remediation works requiring ground-breaking activity within the study area may need to be preceded by an intrusive archaeological evaluation to determine the nature of the buried archaeological resource and areas where archaeological remains may not be disturbed by subsequent works. As a minimum it is likely archaeological monitoring would be required for any future ground-breaking activity in these areas.

## 9 SOURCES

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