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**ZIPWORLD PROPOSED SWING AT PENRHYN QUARRY  
ARCHAEOLOGICAL AND SETTING ASSESSMENT**

for

**Zip World**

**PRN: 15840**

**NGR: SH 6223 6516**

**March 2024**

**Govannon Report GC468**

## ZIPWORLD PROPOSED SWING AT PENRHYN QUARRY

### ARCHAEOLOGICAL ASSESSMENT

*Non-technical summary: the present document constitutes an archaeological assessment for two discreet sites at Penrhyn Quarry in Gwynedd to inform a development proposal for the site sought by Zip World. It has been carried out by Dr David Gwyn OBE MCIfA FSA of Govannon Consultancy and Jon Knowles BSC. 4 sites of archaeological/heritage were identified of which 1 is multi-period, and 3 were ascribed to the Industrial/Modern period. Of the total of 4 sites, 3 were ascribed to category A and 1 to category D.*

*It also includes an evaluation of the setting issues posed by the planning application for the site sought by Zip World which concludes that the impact of the development would be fairly severe.*

*Crynodeb: mae'r ddogfen bresennol yn cynnwys asesiad archeolegol ar droed Chwarel y Penrhyn i lywio cais cynllunio arfaethedig ar gyfer y safle gan Zip World. Paratowyd yr asesiad gan Dr David Gwyn OBE MCIfA FSA o Ymgynhoriaeth Govannon a Jon Knowles BEng. Nodwyd 4 o safleoedd o ddiddordeb archeolegol/etifeddol yr oedd 1 yn aml-, a 3 wedi'u priodoli i'r cyfnod Ôl-Ganoloesol/Modern, O'r cyfanswm o 4 safle, priodolwyd 3 i gategori A, ac 4.*

*Mae'r ddogfen hefyd yn cynnwys gwerthusiad o'r achosion gosodiad a godwyd gan y datblygiad arfaethedig ar gyfer y safle a geisiwyd gan Zip World sydd yn dod i'r casgliad y byddai effaith y datblygiad yn weddol ddifrifol.*

#### Abbreviations

The following abbreviations are used in this report:

CRO: Caernarfon Record Office

GAT: Gwynedd Archaeological Trust

HER: Historic Environment Record

NMR: National Monuments Record

RCAHMW: Royal Commission on the Ancient and Historic Monuments of Wales

NGR: SH 6223 6516 is the centre point of the proposed development.

Front cover: a late 19<sup>th</sup> century view of Penrhyn Slate Quarry, showing the 'left side' galleries.

## 1 INTRODUCTION

Govannon Consultancy has been commissioned by Zip World to carry out an archaeological assessment of for two discreet sites at Penrhyn Quarry in Gwynedd which form part of one proposal, and additionally a setting assessment for the same proposal, in order to inform a planning application for the site sought by Zip World (the present document),

## 2 AIMS AND PURPOSE OF ASSESSMENT

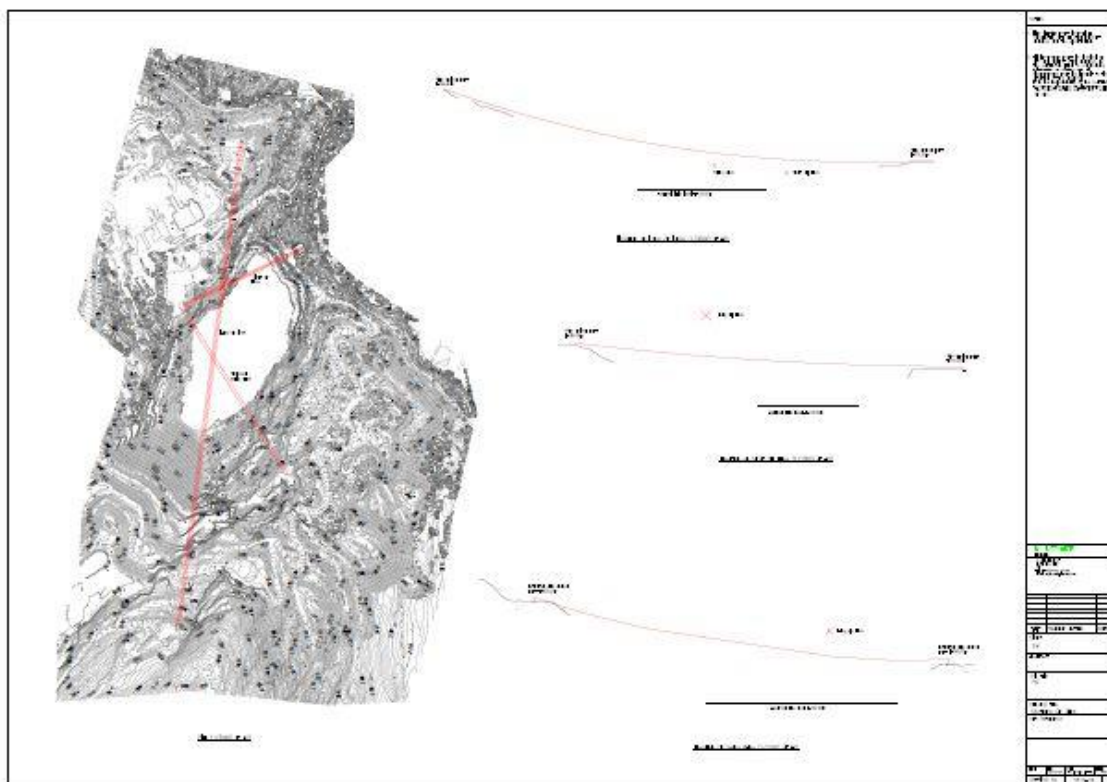
The purpose of this document is twofold. It assesses the impact of the **development** of a proposed adventure tourism facility, made up of a swing and associated structures, on the archaeology of the area of Penrhyn Slate Quarry within which it would be located. This appears as **sections 3-7** of this document. It accompanies a setting assessment for the same proposal which appears as **section 8** of this document. **Figure 1** is a depiction of this proposal.



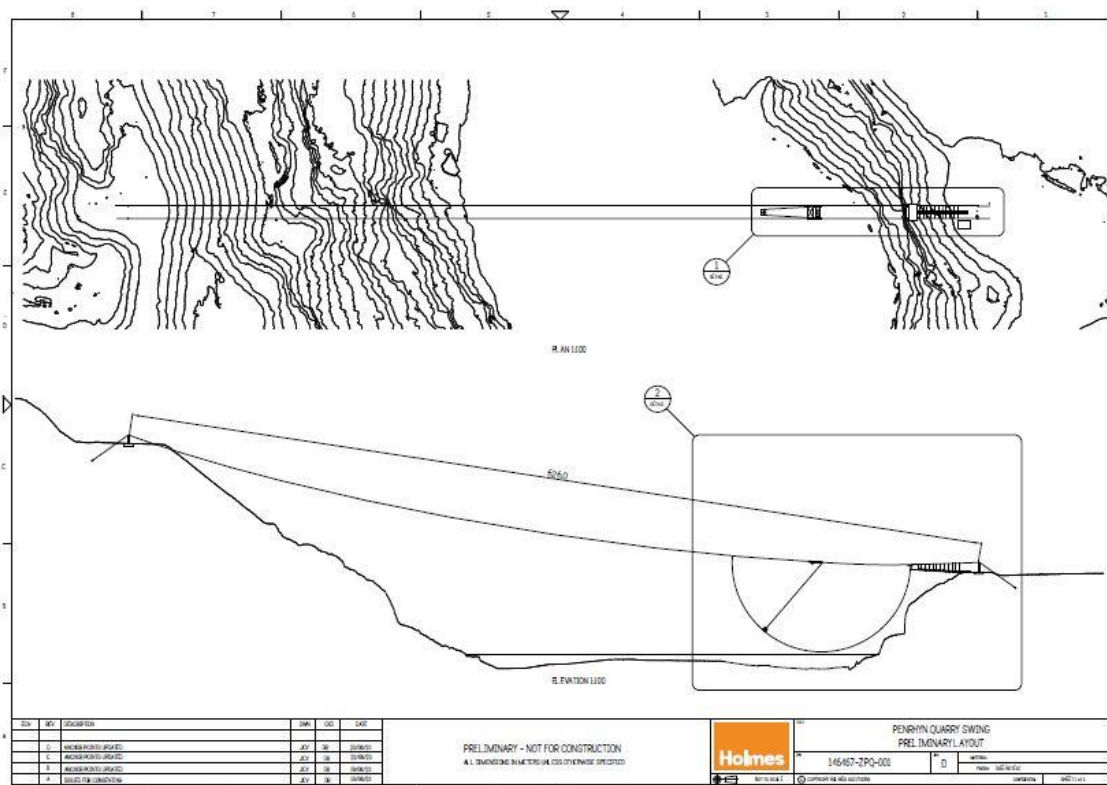
**Figure 1:** *A depiction of the proposed swing provided by the developers.*

The proposed swing and its associated structures would be additional to existing zipline adventure tourism facilities currently operational within the relict parts of Penrhyn Slate Quarry. These are indicated in plan in **Map 1**. A more detailed plan and elevation of the proposal is shown in **Figure 2**. **Figure 3** is an artist's impression of the ancillary buildings associated with the proposed swing, which also shows the suspension cable and hangars which do not appear in **Figure 2**. These have all been provided to the authors of the present document by the developers.

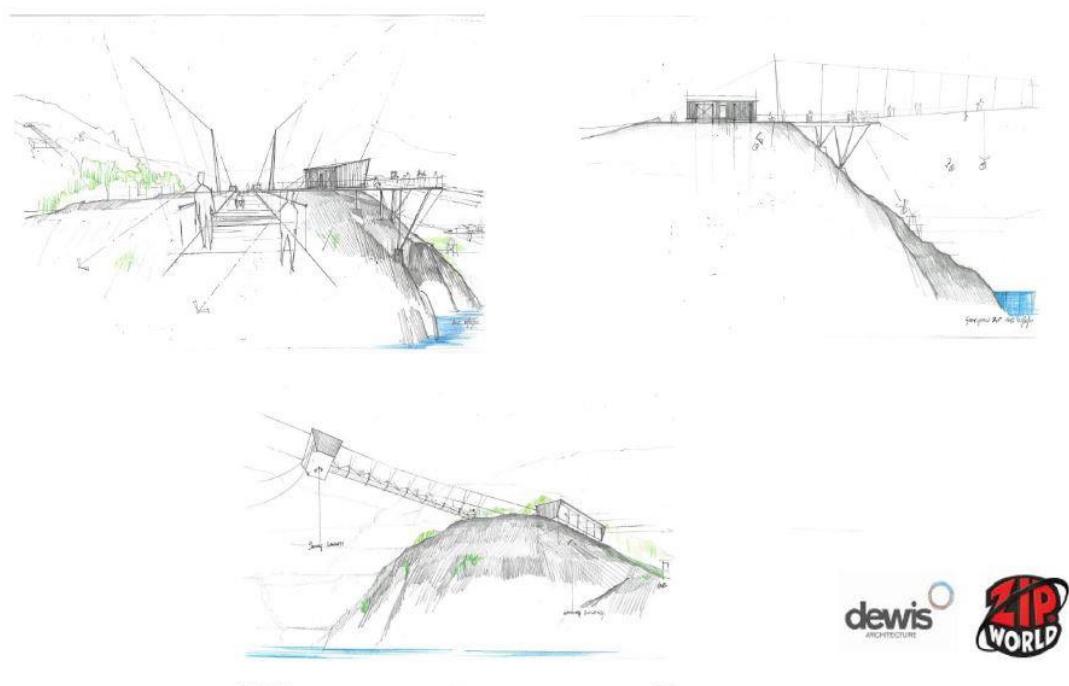




**Map 1:** A map of the proposed swing and its relationship in plan with existing ziplines, provided by the developers.



**Figure 2:** An elevation and plan of the proposed swing, provided by the developers.



**Figure 3:** An *artist's impression of a draft design* for the proposed swing and ancillary structures, provided by the developers.

### 3 METHODOLOGY

#### 3.1 Outline approach

The methodology followed in the archaeological assessment was the standard methodology set out by the Institute of Field Archaeologists. The methodology for the setting assessment is set out in section 8.

All work was carried out by Dr David Gwyn MA (Cantab.), PhD, MCIfA, FSA and Jon Knowles BSc. Known archival sources in the major research holdings were consulted, as was the HER and aerial photography curated by the GAT and the NMR curated by the RCAHMW, Aberystwyth. The advice of Jenny Emmett, Development Control Officer at Gwynedd Archaeological Planning Services was sought and obtained. It was confirmed that HER point data within the area represented by **Map 9** should be considered. From these data and from fieldwork, archaeological sites and features likely to be affected by the proposed development have been considered below.

By arrangement with zip-world, the site was visited on 4 September 2023. Sites and features were assessed in terms of their archaeological significance, and mitigatory recommendations made.

#### 3.2 Constraints on the project.

The closure of the CRO at the desk-top stage of the present project is not considered a constraint on the project as historic map coverage had been identified and archival sources previously identified.

#### 3.3 Definition of archaeological significance

The following categories were used to define the significance of the archaeological resource:

#### *Category A – sites of national importance*

Scheduled Ancient Monuments, Listed Buildings and sites worthy of scheduling or listing *ie* those which would meet the criteria for scheduling or listing or both.

Sites which are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

#### *Category B – sites of regional or county importance*

Sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region

Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

#### *Category C – sites of district or local importance*

Category C sites nevertheless merit adequate recording in advance of damage or destruction

#### *Category D – minor or damaged sites*

Sites which are of minor importance or so badly damaged that too little remains to justify their inclusion in a higher category

For Category D sites, rapid recording, either in advance of, or during, destruction should be sufficient

#### *Category E – sites needing further investigation*

Sites whose importance is as yet undetermined and which will require further work before they can be allocated to categories A-D are temporarily placed in this category, with specific recommendations for further evaluation.

### **3.4 Definition of field evaluation techniques**

Field evaluation is necessary to allow the reclassification of category E sites, and to allow the evaluation of areas of land where there are no visible features but where there is potential for sites to exist. Two principal techniques can be used for carrying out the evaluation; *geophysical survey* and *trial trenching*.

#### *Geophysical survey*

This technique involves the use of a magnetometer, which detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides, which tend to be concentrated in the topsoil. Features cut into the subsoil and back-filled or silted with topsoil contain greater amounts of iron and can therefore be detected with this gradiometer. Strong readings can be produced by the presence of iron objects, hearths and kilns.

Other forms of geophysical survey are available, of which *resistivity survey* is the other most commonly used. However, for rapid coverage of large areas, the magnetometer is usually considered the most cost-effective method. It is also possible to scan a large area very rapidly by walking with the

magnetometer, and marking the location of any high or low readings but not logging the readings for processing.

#### *Trial trenching*

Buried archaeological features cannot always be detected from the surface, even with geophysics, and trial trenching allows a representative sample of the development area to be investigated. Trenches of the appropriate size can also be excavated to evaluate category E sites. These trenches typically measure between 20m and 30m long by 2m wide. The turf and topsoil is removed by mechanical excavator, and the resulting surface cleaned by hand and examined for features. Anything noted is further examined so that the nature of any remains can be understood, and *mitigatory recommendations* recommended.

### **3.5 Definition of mitigatory recommendations**

Where a feature of archaeological significance is affected, mitigation measures should be instituted in accordance with current policies. The various levels of recording are listed below, and appear in the Mitigation field for each of the sites below.

The mitigation proposals are divided into various levels of recording as set out below:

#### *None*

No impact, so no requirement for mitigation

#### *Recording*

Recording Level 1 is essentially a basic visual record, typically consisting of drawings, photography and written account.

Recording Level 2 is a descriptive record, made in circumstances similar to those of Level 1 but when more information is needed.

Recording Level 3 is an analytical record, and will comprise an introductory description followed by a systematic account of the building's origins, development and use. The record will include an account of the evidence on which the analysis has been based, allowing the validity of the record to be re-examined in detail. It will also include all drawn and photographic records that may be required to illustrate the building's appearance and structure and to support an historical analysis.

Recording Level 4 provides a comprehensive analytical record. Whereas Level 3 analysis and interpretation will clarify the site's history in so far as it may be deduced from the site itself, the record at Level 4 will draw on the full range of available resources and discuss its significance in terms of architectural, social, regional or economic history.

#### *Strip, map and sample*

This technique involves the examination of machine-stripped surfaces to identify archaeological remains. The stripping is undertaken under the supervision of an archaeologist, Stripping and removal of the overburden is undertaken in such a manner as to ensure damage does not occur to surfaces that have already been stripped, nor to archaeological surfaces that have not yet been revealed.

Stripping is undertaken in as careful a manner as possible, to allow for good identification of archaeological features. A small team of archaeologists will be responsible for cleaning defined areas where necessary. Complex sites which cannot be avoided will need to be fully excavated.

#### *Watching brief*

A watching brief may be recommended whilst below-ground intervention is carried out as part of a development.

#### *Avoidance*

Features which may be directly affected by the scheme, or during the construction, should be voided. Occasionally a minor change to the proposed plan is recommended, but it is more usual to indicate the need for care during construction to avoid accidental damage to a feature. This is often best achieved by marking features prior to the start of work.

#### *Reinstatement*

The feature should be re-instated with archaeological advice and supervision.

## **4 FINDINGS OF THE DESK-TOP ASSESSMENT**

### **4.1 Location, topography and geology**

The study area is located within the Community of Tregarth and Mynydd Llandygai, and the historic parish of Llandygai in Gwynedd, formerly Caernarvonshire, on the east-facing slopes of y Fronllwyd on the western side of the Ogwen valley, a classic glaciated valley with a flat floor and steep sides, together with hanging valleys formed by smaller valley glaciers. North of the quarry, this valley opens onto the Arfon coastal plain, bordering the Menai Strait.

The two discreet areas form part of Penrhyn Quarry, an area extensively worked for slate since at least the eighteenth century. The Cambrian slate bed here runs south-west to north-east, and is made up of different veins. The northern anchorage would be located in an area where the underlying geology is 'bastard' (unworkable) slate, the southern on a gallery floor in the main vein.

### **4.2 Sources for the history and archaeology of the study area**

#### *Bibliographic records*

Whilst Penrhyn Quarry holds an important place in Welsh, and in industrial history, there are few publications which deal in any detail with the development of the quarry. Lindsay 1974 lists its history in outline and Gwyn 2000 and 2015 refers to some of its features. Boyd 1985 contains maps and photographs.

#### *Archival holdings*

The Penrhyn Quarry archive is held at the CRO, which in September 2023 was closed for refurbishment. Its contents are known, have been thoroughly investigated, and shed little light on the present proposal.

#### *Map evidence*



There is little reliable map evidence for the site. An estate map of 1769 (**Map 2**) and a detailed quarry map of 1826 (**Map 3**) show an industrial landscape that can barely be recognised in the early twenty-first century, and there has been considerable change since the ordnance survey of 1899. A map of the quarry, undated but apparently from the 1950s, in private possession, makes it clear that there has been much subsequent change to both the locations where a direct physical impact can be expected.

#### *Other existing archaeological records*

The following were consulted:

RCAHMW NMR Site file Caernarfonshire/Ind/SH 66 NW, which contains photographs of the area around the lower anchorage points taken in 1963.

Rees and Jones 2019 is an archaeological assessment of the cart-track installed at Penrhyn Slate Quarry as part of the adventure tourism offer, and considers an area of the site adjacent to, but not overlapping with, the upper anchorage point.

An aerial view of Penrhyn quarry in 1947 was analysed (Crown Copyright CUCAP BQ-2, 20-07-1948).

## **5 STATEMENT OF RESULTS OF THE DESK-TOP ASSESSMENT**

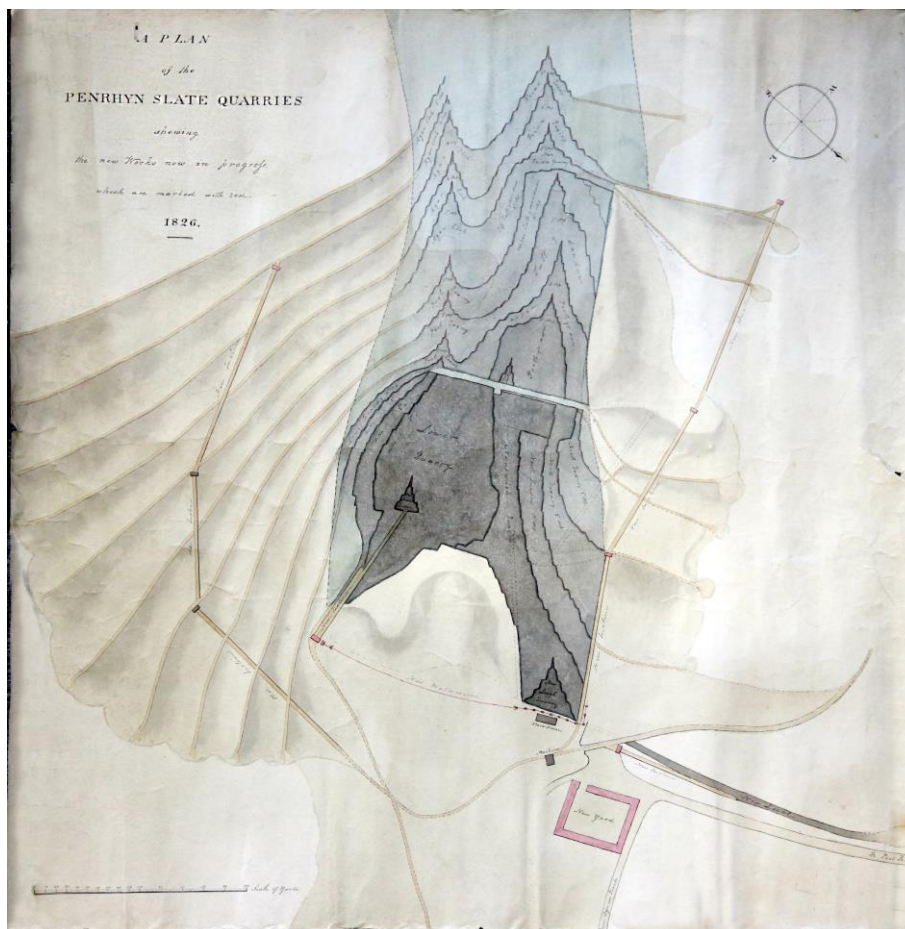
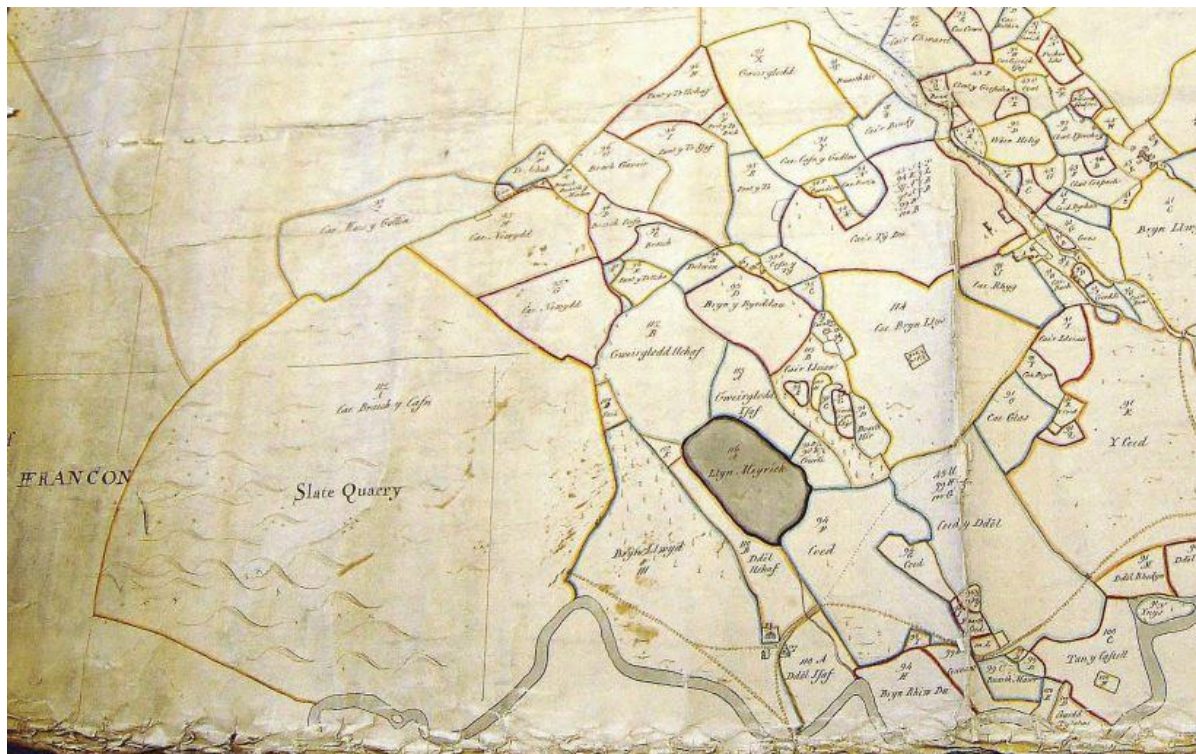
### **5.1 Prehistoric, Romano-British period, Medieval**

No pre-Modern sites are recorded within or immediately adjacent to the study area, which has been subject to intense industrial quarrying since the mid-eighteenth century. The HER identifies a possible Roman road along the western side of the Ogwen valley and suggests that it may have run in a straight line across the present site of the quarry (PRN: 17819) but it is unlikely to have crossed the spur of y Fronllwyd directly and more probably followed the course of the river, like the later turnpike.

### **5.2 Post-Medieval and Modern (1750-present day)**

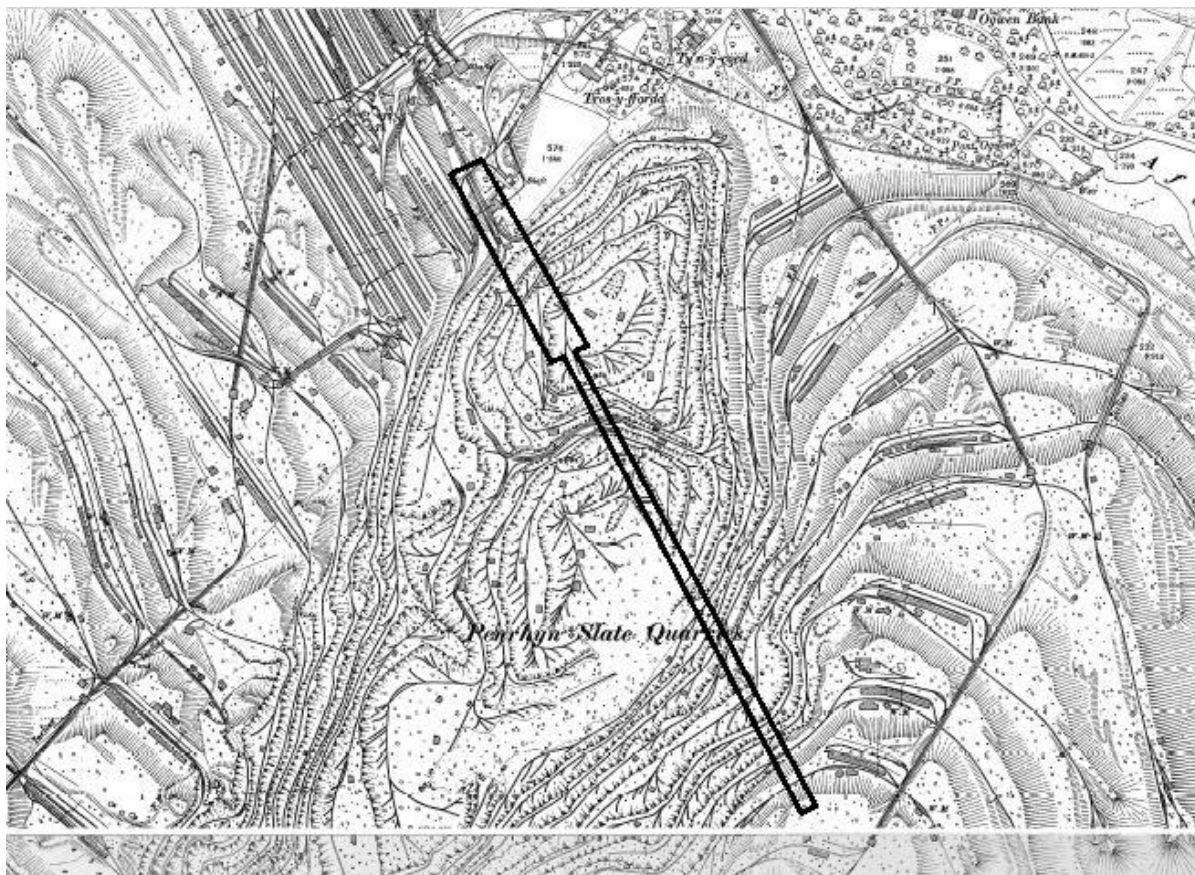
Since the mid-eighteenth century, the east-facing slopes of y Fronllwyd have been subject to intense industrial quarrying which has profoundly and continuously altered the immediate environment of the study-area. Whilst quarrying remains active, it is now carried out to the south-west of the area where it is proposed to carry out the development. The historic environment of quarrying has also been altered by tourism and the development of the 'Zip-world' facilities since 2013.

Penrhyn Quarry has remained in continuous production since before the capitalisation of the workings by the first Lord Penrhyn from 1782 and the subsequent global expansion of the market. An estate map of 1769 (BU: Penrhyn mss 2205) shows 'Slate Quarry' on the field Cae Braich y Cafn on the slope of y Fronllwyd. This is the earliest cartographic representation of the site.



By the 1790s operations had been systematised, and galleried working had been introduced. Sale of Penrhyn slate was encouraged by its use by the architect and merchant Samuel Wyatt, and it became the largest slate workings in the world. The quarry came to be operated as a multi-benched wedge in the hillside, the workings to the south being known as the 'left side' and those to the north as the 'right side'. The 'left side' workings have always been less stable than the 'right side', and were less intensively worked.

Particularly relevant to the present assessment are the introduction of the stepped galleries to work the slate, each one feeding a tip where its waste rock was dumped. Internal handling systems which included railways to a nominal gauge of approximately 0.6m followed in 1800, both level sections and inclined planes, water-balance shafts, from 1852, and powered steel ropeways ('Jerry Ms') from 1911, to overcome differences in levels. By the early nineteenth century, workings already formed a continuous series of quarry faces from the bottom of a series of pits to the upper slopes of the mountain.



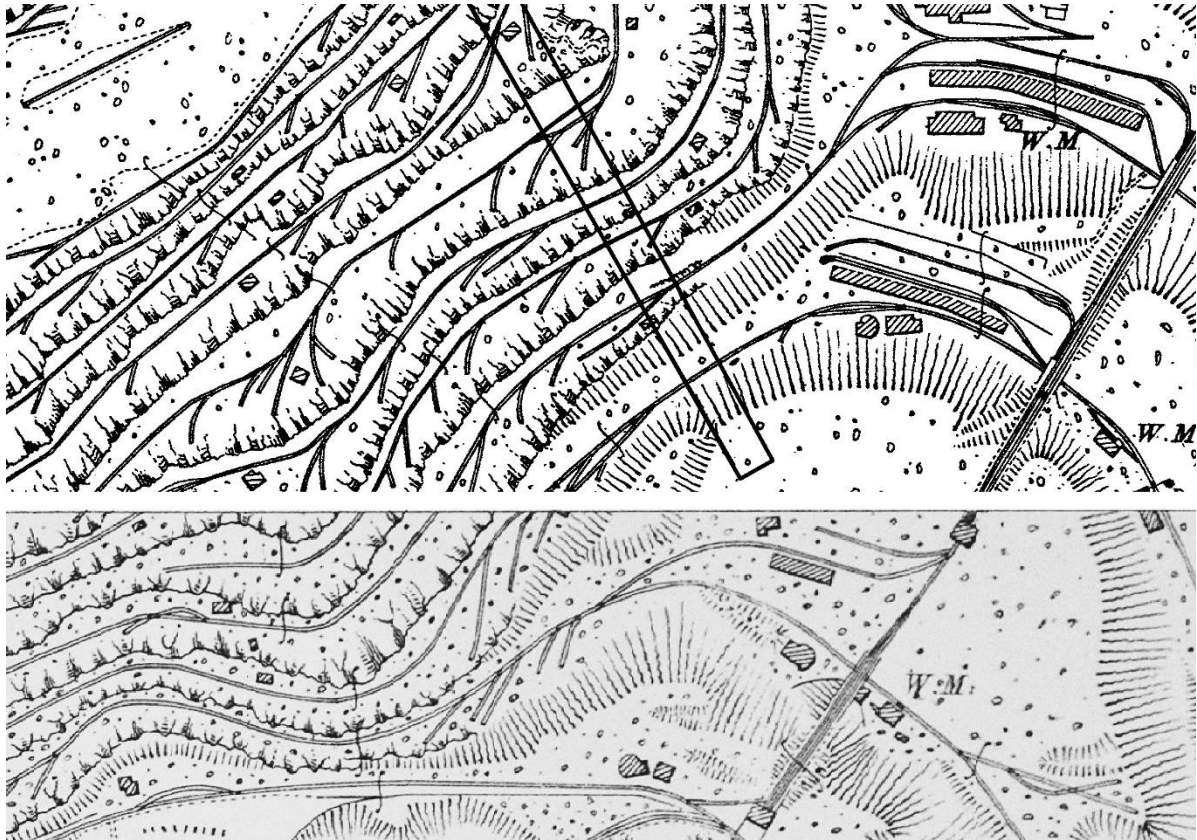
**Map 4:** A detail of the 1899 25" Ordnance survey map with the proposed development superimposed.





**Map 5:** The Sinc Bach area, the site of proposed lower anchorage point, superimposed on the 1899 25" Ordnance Survey map.

The 1899 25" ordnance survey (**Map 4**) shows the quarry at its most productive. Processing of the quarried rock was still at this stage depended on rows of open-fronted slate-makers' shelters on each main level rather than on mechanised mills, of which the first were introduced a few years later. The location of the system of inclined planes on both the 'left side' and the 'right side' has been altered. The proposed lower anchorage point would be located immediately to the west of the 'Princess May' water-balance headframe (SH 6215 6537) built in 1895 by Radcliffe's of Hawarden, and lies above a length of railway from the Sinc Bach gallery which carried blocks and rubble from to the foot of a shallow water-balance to the main processing area on Red Lion level (**Map 5**). Other structures here include a bridge over this length of railway which enabled blocks raised on the 'Princess May' water-balance to reach splitters' shelters shown to the west of the railway, on 'Right Sling'.



**Map 6:** *Ponc Ddwbl, the site of proposed upper anchorage point, superimposed on the 1899 25" Ordnance Survey map.*

The 1899 25" ordnance survey also shows arrangements on the 'left side' where the proposed upper anchorage point would be located (**Map 6**). This would be on 'Ponc Ddwbl', a working gallery where blocks were split in shelters adjacent to the inclined plane, one of a series which connected these workings with the railway from the quarry to the port. Other structures shown here include a weighing machine to the east of the inclined plane and what may be a *caban* (eating hut) and a blast shelter to the west.

An aerial photograph looking south taken in 1947 (**Figure 4**) (Crown Copyright CUCAP BQ-2, 20-07-1948) shows quarrying going on both the left side and (on a more intensive scale) the right side. Ponc Sling is operating much as it did in 1899 with both incline planes and the 'Princess May' water-balance in evidence, and Ponc Ddwbl is still in production. A ropeway system appears to have been installed on Tangarret, the level above Ponc Ddwbl, spanning the pit.



**Figure 4:** *An aerial view of Penrhyn quarry in 1947 (Crown Copyright CUCAP BQ-2, 20-07-1948).*



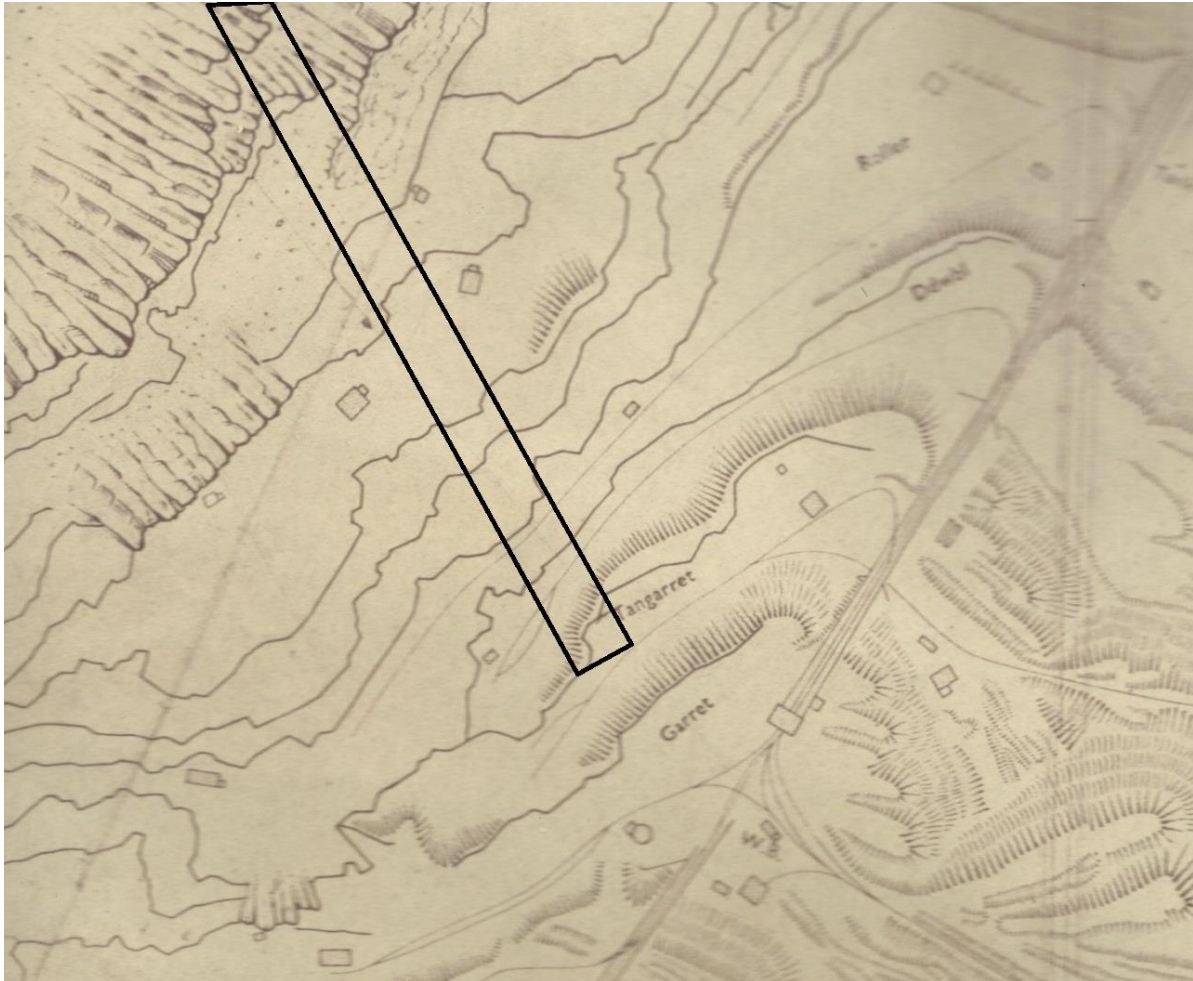


**Map 7:** *The location of the proposed lower anchorage point superimposed on a map of the 1950s.*

The 1950s plan of the quarry (**Map 7**) shows that arrangements where the lower end of the proposed swing would be located have changed little since 1899.

The same **document** (**Map 8**) shows that 'Ponc Ddwbl' is still in production, in that it is equipped with a length of railway, but processing does not appear to be taking place here any longer, and has doubtless moved to a powered mechanical saw mill located two levels down on 'Ponc Twrch'. This map confirms that quarrying in the intervening period at this location has altered the configuration of working faces and tips.

Photographs in RCAHMW NMR site file Caernarfonshire/Ind/SH 66 NW taken in 1963 show the area around the lower anchorage point still functioning much as in the 1950s.



**Map 8:** *The location of the proposed upper anchorage point superimposed on a map of the 1950s.*

In the late twentieth century, operations moved to higher galleries towards the south-west, and the pit and the left side were abandoned. This followed purchase of the site by Alfred McAlpine/Marchwiel Holdings, a major British construction company, which led to extensive modernisation, and the replacement of earlier handling systems by lorries. The quarry is now owned by Welsh Slate Ltd, part of the Breedon Group, a construction materials concern based in Leicestershire.

The relict workings retain characteristic benched galleries on the hillside and in a pit, as well as tips to the north and south. Underground features connecting with the pit reflect the technology of the Victorian period, when a large working and tipping area known as 'Red Lion' was created immediately to the north-west of the pit where the main quarry offices and mills are located.

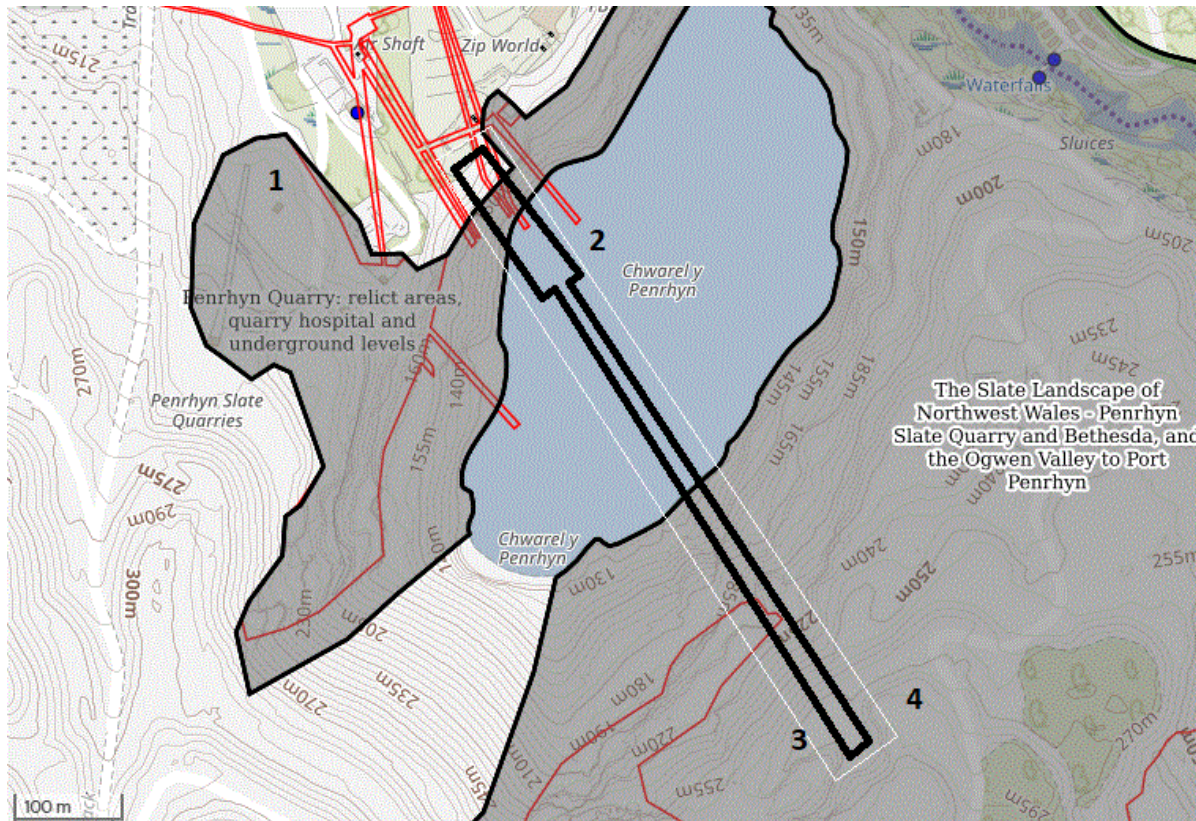
Since 2013, 'Zip-world' have constructed facilities which include a reception building and restaurant, a roadway from here through the 'left side' to the upper part of the historic quarry, an adventure zip line from this point to the northerly point of the historic site and a shorter zip line across the pit, as well as other attractions.

## **6 STATEMENT OF RESULTS OF FIELD-WORK**

The site was visited on 4 September 2023. Conditions were good for field-work. Features where it was considered that there was a prospect of a direct physical impact from the proposed development were identified and located on a map (below), and were photographed using a digital camera. It was



considered that there was little prospect of direct physical impact on any previously-identified HER sites provided to the authors of the present report within the boundaries indicated in **Map 9** below, other than PRN: 15840 Penrhyn Quarry landscape, and this is accordingly included, and **that the proposed development has no physical impact on the Scheduled Monument though it will be adjacent to it in plan and vertical section.**



**Map 9:** Site map of proposed development within the present-day landscape, showing swing (in black) and estimated area of possible physical impact (white outline); Scheduled Monuments shown in red, UNESCO World Heritage area shaded in grey, and assets identified during fieldwork numbered (see detailed description on pages 17-20). Note that the proposed development has no physical impact on the Scheduled Monument but will be adjacent to it in plan and vertical section.



**Figure 5:** A view looking westward over the 'right side' showing the quarry landscape, including tips of waste rock, stepped galleries and an inclined plane. To the right of the photograph, the 'Princess May' shaft headframe is visible.

### 1 Penrhyn Quarry, Landscape

<i>Location:</i>	SH 621 653	PRN: 15840
<i>Period:</i>	Multi period landscape	
<i>Description:</i>	Described by GAT HER as: A galleried slate quarry of great size, still in active production. Despite the scale of present quarrying operations, the quarry preserves the industrial landscape of the nineteenth century. Incline planes, galleries and ancillary structures survive as landscape features, and the quarry preserves a number of examples of quarry machinery from the 19th and 20th centuries. Operations are currently concentrated on the upper part of the quarry, and are likely to continue moving towards the south-west, but tipping continues to take place on the site of the 19th century workings.	
<i>Significance:</i>	A	
<i>Threat:</i>	Construction of foundations of proposed swing and buildings, and anchoring of tensioning ropes.	
<i>Mitigation:</i>	Watching brief	





**Figure 6:** The present hard standing on the site of Ponc Sling, showing the shelter adjacent to which it is proposed to erect the lower anchorage points and ancillary buildings. The 'Princess May' shaft headframe is visible to its left.

## **2 Ponc Sling (proposed lower anchorage point)**

**Location:** SH 62106 65334

PRN: 102467

**Period:** Modern

**Description:** A hard-standing of recent construction associated with 'Zip World' adventure tourism features, itself set out on recent bulldozing of slate rubble over historic quarry workings and internal handling features. It is located immediately adjacent to Scheduled Monument CN416 *Penrhyn Quarry: relict areas, quarry hospital and underground levels* in both plan and vertical alignment, and lies within the *Slate Landscape of Northwest Wales* World Heritage site. The present surface area does not correspond to any quarry horizon, but is located above the former *sinc bach* incline plane, which raised block and rubble from a gallery in the main pit to the foot of a water-balance shaft which lifted them to Red Lion level and other historic features as set out in **section 4** of this document. The developer's plan anticipates a cantilever from the hard-standing anchored into the vertical quarry rock-face immediately below.

**Significance:** A (assigned to this category in view of the need for the cantilever required to support the ancillary buildings having to be itself anchored into a vertical quarry face forming part of the World Heritage site).

**Threat:** Construction of foundations of proposed swing, and anchoring of tensioning ropes.

**Mitigation:** Watching brief





**Figure 7:** Ponc Ddwbl, showing recent reworking of the gallery system where it is proposed to install the upper anchorage point.

### 3 Ponc Ddwbl (proposed upper anchorage point)

**Location:** SH 62392 64746

PRN: 102468

**Period:** Modern/industrial

**Description:** A former working galleried quarry bench, 'ponc ddwbl', on the 'left side' of Penrhyn Slate Quarry, at 270.5M AOD, which has clearly seen some significant change since the end of industrial scale operations in the mid-20<sup>th</sup> century. It lies within Scheduled Monument CN416 *Penrhyn Quarry: relict areas, quarry hospital and underground levels* and within the *Slate Landscape of Northwest Wales* World Heritage site. Some secondary quarrying, perhaps for aggregates, has taken place at this location within recent years, and an extremely faulted part of the slate vein has been exposed. The 19<sup>th</sup> century gallery has been worked away to give road access to a lower gallery, 'ponc roller'.

**Significance:** A (assigned to this category in view of its inclusion in the World Heritage site).

**Threat:** Construction of foundations of proposed swing, and anchoring of tensioning ropes.

**Mitigation:** Recording Level 2; watching brief during construction phase





**Figure 8:** debris on Ponc Ddwbl, looking north-east.

#### **4 Debris on Ponc Ddwbl**

*Location:* SH 62430 64765

PRN: 102469

*Period:* Modern/industrial

*Description:* The remains of a concrete base and ironwork were observed on Ponc Ddwbl at a location where there is the potential for disturbance from construction traffic. It is possible that these reflect the remains of a ropeway base installed on the upper (Tangarret) level and which have fallen or been bulldozed into this location.

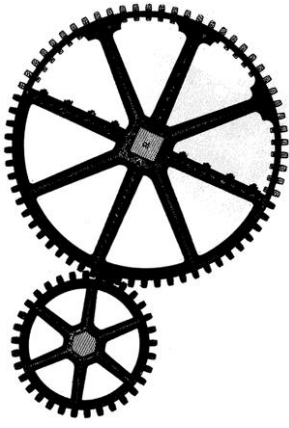
*Significance:* D

*Threat:* Construction traffic.

*Mitigation:* Recording Level 1

## **7 CONCLUSIONS OF THE ARCHAEOLOGICAL ASSESSMENT**

The proposed development would be located within an industrial environment of exceptional archaeological significance and historical importance but direct physical impact on heritage assets is likely to be limited, as these have seen considerable change since the end of industrial period activities within them in the 1960s. No direct physical impact on a Scheduled Monument is indicated. Any significant change in design for the proposed swing and buildings would require re-evaluation of the archaeological impact. **A watching brief is recommended for two sites and Level 1 recording for two sites.**



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*Mae'r ddogfen hefyd yn cynnwys gwerthusiad o'r achosion gosodiad a godwyd gan y datblygiad arfaethedig ar gyfer y safle a geisiwyd gan Zip World sydd yn dod i'r casgliad y byddai effaith y datblygiad yn ddifrifol.*

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RCAHMW: Royal Commission on the Ancient and Historic Monuments of Wales

NGR: SH 6223 6516 is the centre point of the proposed development.

Front cover: a late 19<sup>th</sup> century view of Penrhyn Slate Quarry, showing the 'left side' galleries.



## 1 INTRODUCTION

Govannon Consultancy has been commissioned by Zip World to carry out an archaeological assessment of for two discreet sites at Penrhyn Quarry in Gwynedd which form part of one proposal, and additionally a setting assessment for the same proposal, in order to inform a planning application for the site sought by Zip World (the present document),

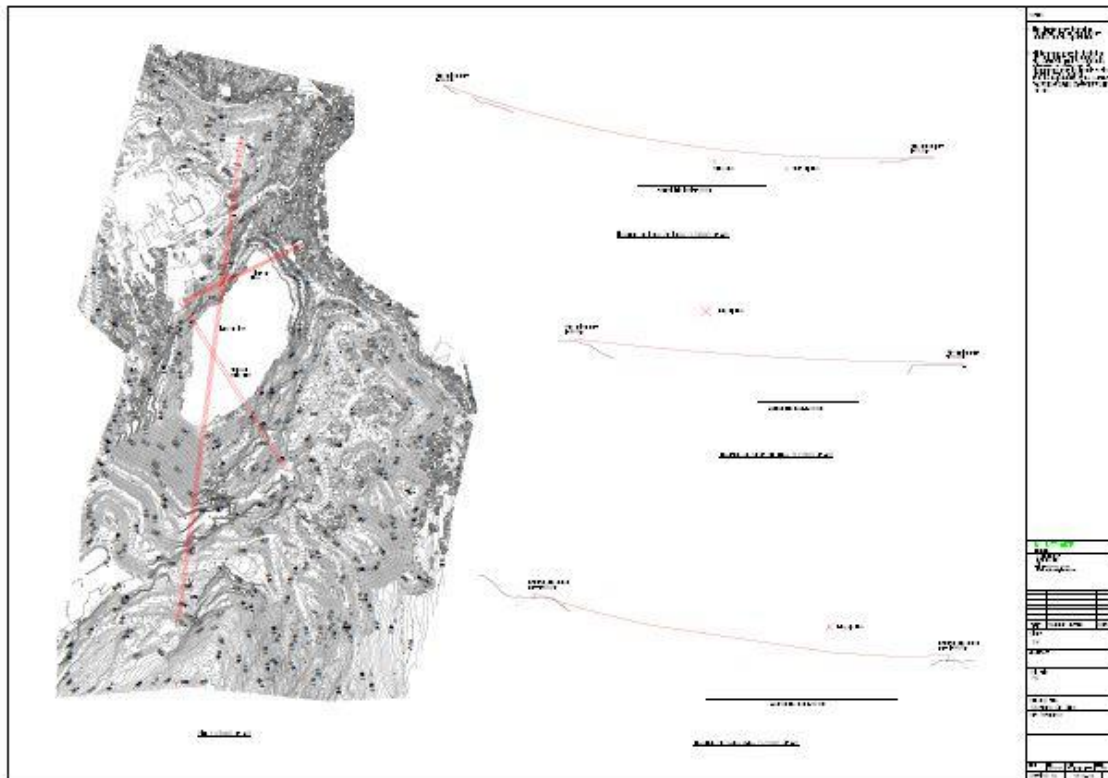
## 2 AIMS AND PURPOSE OF ASSESSMENT

The purpose of this document is twofold. It assesses the impact of the **development** of a proposed adventure tourism facility, made up of a swing and associated structures, on the archaeology of the area of Penrhyn Slate Quarry within which it would be located. This appears as **sections 3-7** of this document. It accompanies a setting assessment for the same proposal which appears as **section 8** of this document. **Figure 1** is a depiction of this proposal.

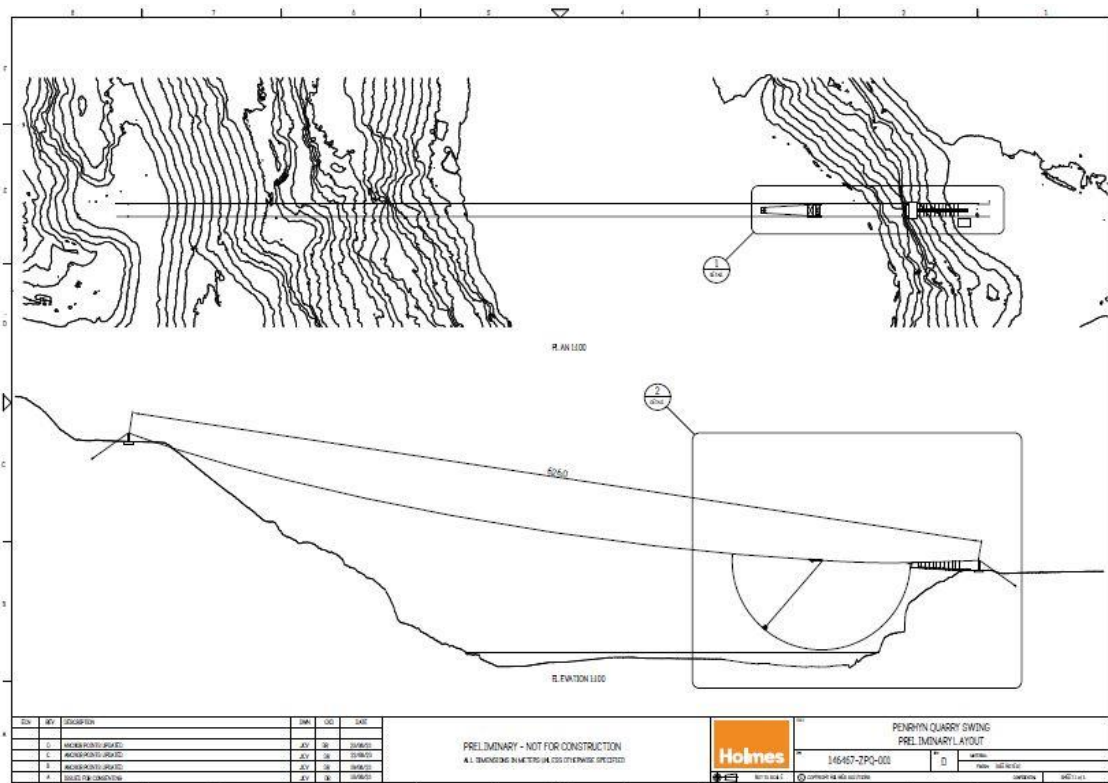


**Figure 1:** *A depiction of the proposed swing provided by the developers.*

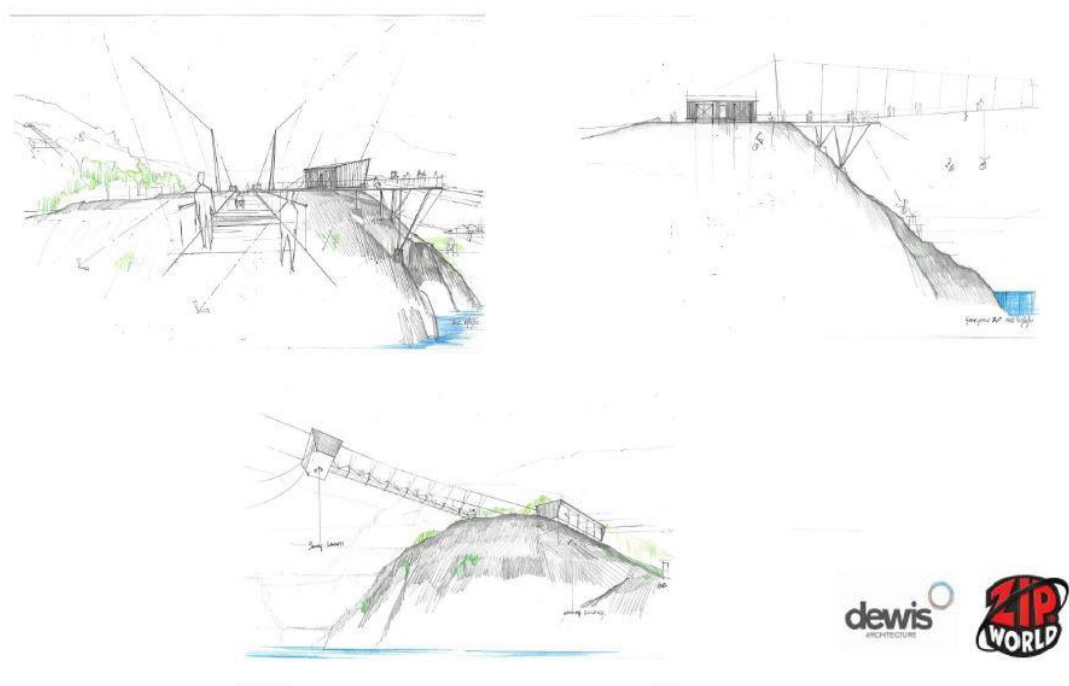
The proposed swing and its associated structures would be additional to existing zipline adventure tourism facilities currently operational within the relict parts of Penrhyn Slate Quarry. These are indicated in plan in **Map 1**. A more detailed plan and elevation of the proposal is shown in **Figure 2**. **Figure 3** is an artist's impression of the ancillary buildings associated with the proposed swing, which also shows the suspension cable and hangars which do not appear in **Figure 2**. These have all been provided to the authors of the present document by the developers.



**Map 1:** A map of the proposed swing and its relationship in plan with existing ziplines, provided by the developers.



**Figure 2:** An elevation and plan of the proposed swing, provided by the developers.



**Figure 3:** An *artist's impression of a draft design* for the proposed swing and ancillary structures, provided by the developers.

### 3 METHODOLOGY

#### 3.1 Outline approach

The methodology followed in the archaeological assessment was the standard methodology set out by the Institute of Field Archaeologists. The methodology for the setting assessment is set out in section 8.

All work was carried out by Dr David Gwyn MA (Cantab.), PhD, MCIfA, FSA and Jon Knowles BSc. Known archival sources in the major research holdings were consulted, as was the HER and aerial photography curated by the GAT and the NMR curated by the RCAHMW, Aberystwyth. The advice of Jenny Emmett, Development Control Officer at Gwynedd Archaeological Planning Services was sought and obtained. It was confirmed that HER point data within the area represented by **Map 9** should be considered. From these data and from fieldwork, archaeological sites and features likely to be affected by the proposed development have been considered below.

By arrangement with zip-world, the site was visited on 4 September 2023. Sites and features were assessed in terms of their archaeological significance, and mitigatory recommendations made.

#### 3.2 Constraints on the project.

The closure of the CRO at the desk-top stage of the present project is not considered a constraint on the project as historic map coverage had been identified and archival sources previously identified.

#### 3.3 Definition of archaeological significance

The following categories were used to define the significance of the archaeological resource:



#### *Category A – sites of national importance*

Scheduled Ancient Monuments, Listed Buildings and sites worthy of scheduling or listing *ie* those which would meet the criteria for scheduling or listing or both.

Sites which are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

#### *Category B – sites of regional or county importance*

Sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region

Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

#### *Category C – sites of district or local importance*

Category C sites nevertheless merit adequate recording in advance of damage or destruction

#### *Category D – minor or damaged sites*

Sites which are of minor importance or so badly damaged that too little remains to justify their inclusion in a higher category

For Category D sites, rapid recording, either in advance of, or during, destruction should be sufficient

#### *Category E – sites needing further investigation*

Sites whose importance is as yet undetermined and which will require further work before they can be allocated to categories A-D are temporarily placed in this category, with specific recommendations for further evaluation.

### **3.4 Definition of field evaluation techniques**

Field evaluation is necessary to allow the reclassification of category E sites, and to allow the evaluation of areas of land where there are no visible features but where there is potential for sites to exist. Two principal techniques can be used for carrying out the evaluation; *geophysical survey* and *trial trenching*.

#### *Geophysical survey*

This technique involves the use of a magnetometer, which detects variations in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides, which tend to be concentrated in the topsoil. Features cut into the subsoil and back-filled or silted with topsoil contain greater amounts of iron and can therefore be detected with this gradiometer. Strong readings can be produced by the presence of iron objects, hearths and kilns.

Other forms of geophysical survey are available, of which *resistivity survey* is the other most commonly used. However, for rapid coverage of large areas, the magnetometer is usually considered the most cost-effective method. It is also possible to scan a large area very rapidly by walking with the

magnetometer, and marking the location of any high or low readings but not logging the readings for processing.

#### *Trial trenching*

Buried archaeological features cannot always be detected from the surface, even with geophysics, and trial trenching allows a representative sample of the development area to be investigated. Trenches of the appropriate size can also be excavated to evaluate category E sites. These trenches typically measure between 20m and 30m long by 2m wide. The turf and topsoil is removed by mechanical excavator, and the resulting surface cleaned by hand and examined for features. Anything noted is further examined so that the nature of any remains can be understood, and *mitigatory recommendations* recommended.

### **3.5 Definition of mitigatory recommendations**

Where a feature of archaeological significance is affected, mitigation measures should be instituted in accordance with current policies. The various levels of recording are listed below, and appear in the Mitigation field for each of the sites below.

The mitigation proposals are divided into various levels of recording as set out below:

#### *None*

No impact, so no requirement for mitigation

#### *Recording*

Recording Level 1 is essentially a basic visual record, typically consisting of drawings, photography and written account.

Recording Level 2 is a descriptive record, made in circumstances similar to those of Level 1 but when more information is needed.

Recording Level 3 is an analytical record, and will comprise an introductory description followed by a systematic account of the building's origins, development and use. The record will include an account of the evidence on which the analysis has been based, allowing the validity of the record to be re-examined in detail. It will also include all drawn and photographic records that may be required to illustrate the building's appearance and structure and to support an historical analysis.

Recording Level 4 provides a comprehensive analytical record. Whereas Level 3 analysis and interpretation will clarify the site's history in so far as it may be deduced from the site itself, the record at Level 4 will draw on the full range of available resources and discuss its significance in terms of architectural, social, regional or economic history.

#### *Strip, map and sample*

This technique involves the examination of machine-stripped surfaces to identify archaeological remains. The stripping is undertaken under the supervision of an archaeologist, Stripping and removal of the overburden is undertaken in such a manner as to ensure damage does not occur to surfaces that have already been stripped, nor to archaeological surfaces that have not yet been revealed.

Stripping is undertaken in as careful a manner as possible, to allow for good identification of archaeological features. A small team of archaeologists will be responsible for cleaning defined areas where necessary. Complex sites which cannot be avoided will need to be fully excavated.

#### *Watching brief*

A watching brief may be recommended whilst below-ground intervention is carried out as part of a development.

#### *Avoidance*

Features which may be directly affected by the scheme, or during the construction, should be voided. Occasionally a minor change to the proposed plan is recommended, but it is more usual to indicate the need for care during construction to avoid accidental damage to a feature. This is often best achieved by marking features prior to the start of work.

#### *Reinstatement*

The feature should be re-instated with archaeological advice and supervision.

## **4 FINDINGS OF THE DESK-TOP ASSESSMENT**

### **4.1 Location, topography and geology**

The study area is located within the Community of Tregarth and Mynydd Llandygai, and the historic parish of Llandygai in Gwynedd, formerly Caernarvonshire, on the east-facing slopes of y Fronllwyd on the western side of the Ogwen valley, a classic glaciated valley with a flat floor and steep sides, together with hanging valleys formed by smaller valley glaciers. North of the quarry, this valley opens onto the Arfon coastal plain, bordering the Menai Strait.

The two discreet areas form part of Penrhyn Quarry, an area extensively worked for slate since at least the eighteenth century. The Cambrian slate bed here runs south-west to north-east, and is made up of different veins. The northern anchorage would be located in an area where the underlying geology is 'bastard' (unworkable) slate, the southern on a gallery floor in the main vein.

### **4.2 Sources for the history and archaeology of the study area**

#### *Bibliographic records*

Whilst Penrhyn Quarry holds an important place in Welsh, and in industrial history, there are few publications which deal in any detail with the development of the quarry. Lindsay 1974 lists its history in outline and Gwyn 2000 and 2015 refers to some of its features. Boyd 1985 contains maps and photographs.

#### *Archival holdings*

The Penrhyn Quarry archive is held at the CRO, which in September 2023 was closed for refurbishment. Its contents are known, have been thoroughly investigated, and shed little light on the present proposal.

#### *Map evidence*

There is little reliable map evidence for the site. An estate map of 1769 (**Map 2**) and a detailed quarry map of 1826 (**Map 3**) show an industrial landscape that can barely be recognised in the early twenty-first century, and there has been considerable change since the ordnance survey of 1899. A map of the quarry, undated but apparently from the 1950s, in private possession, makes it clear that there has been much subsequent change to both the locations where a direct physical impact can be expected.

#### *Other existing archaeological records*

The following were consulted:

RCAHMW NMR Site file Caernarfonshire/Ind/SH 66 NW, which contains photographs of the area around the lower anchorage points taken in 1963.

Rees and Jones 2019 is an archaeological assessment of the cart-track installed at Penrhyn Slate Quarry as part of the adventure tourism offer, and considers an area of the site adjacent to, but not overlapping with, the upper anchorage point.

An aerial view of Penrhyn quarry in 1947 was analysed (Crown Copyright CUCAP BQ-2, 20-07-1948).

## **5 STATEMENT OF RESULTS OF THE DESK-TOP ASSESSMENT**

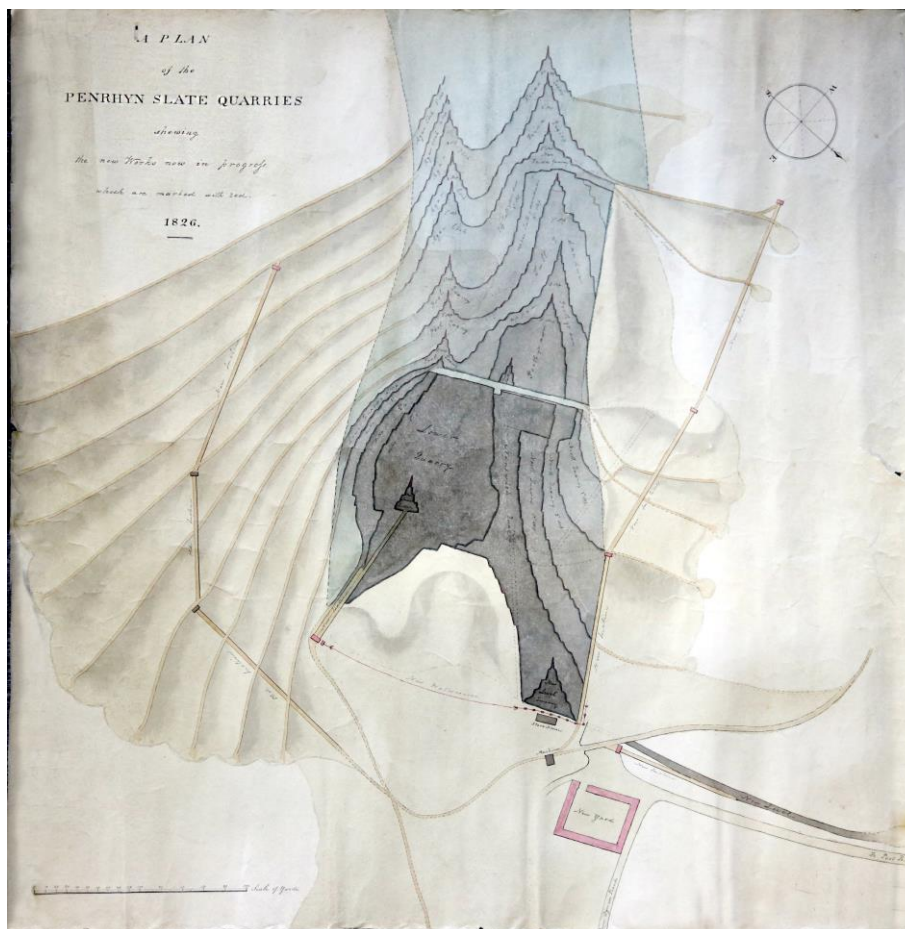
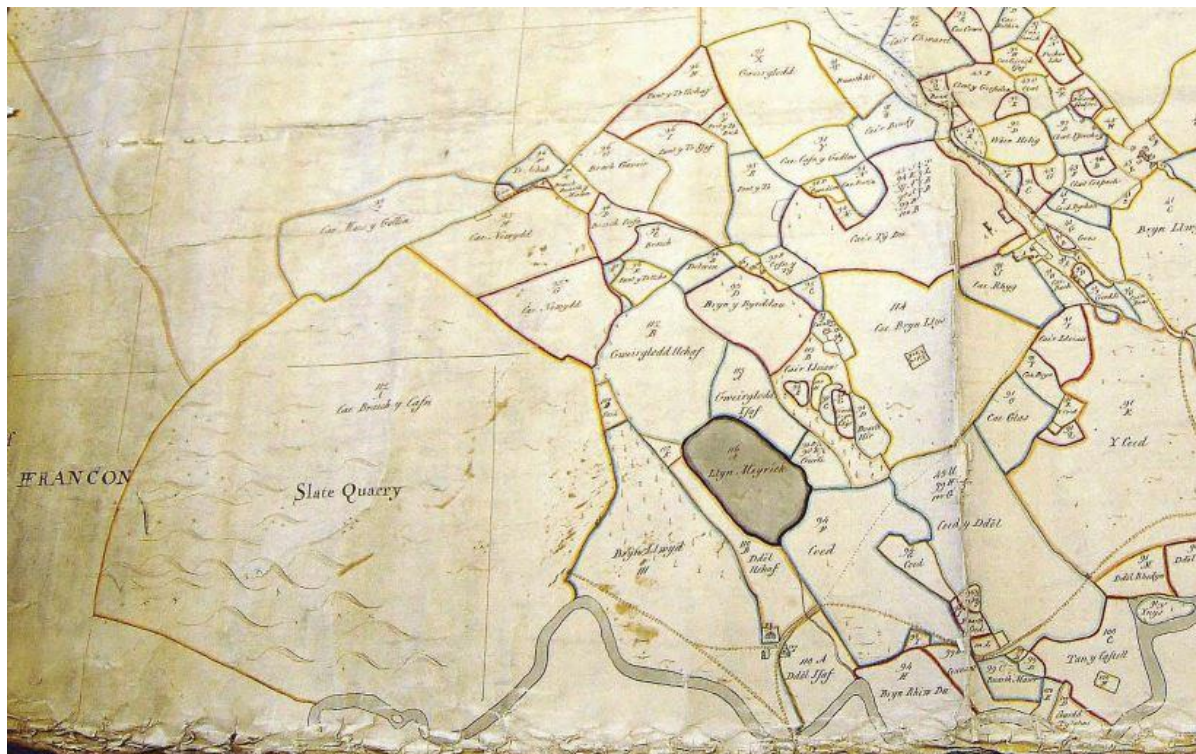
### **5.1 Prehistoric, Romano-British period, Medieval**

No pre-Modern sites are recorded within or immediately adjacent to the study area, which has been subject to intense industrial quarrying since the mid-eighteenth century. The HER identifies a possible Roman road along the western side of the Ogwen valley and suggests that it may have run in a straight line across the present site of the quarry (PRN: 17819) but it is unlikely to have crossed the spur of y Fronllwyd directly and more probably followed the course of the river, like the later turnpike.

### **5.2 Post-Medieval and Modern (1750-present day)**

Since the mid-eighteenth century, the east-facing slopes of y Fronllwyd have been subject to intense industrial quarrying which has profoundly and continuously altered the immediate environment of the study-area. Whilst quarrying remains active, it is now carried out to the south-west of the area where it is proposed to carry out the development. The historic environment of quarrying has also been altered by tourism and the development of the 'Zip-world' facilities since 2013.

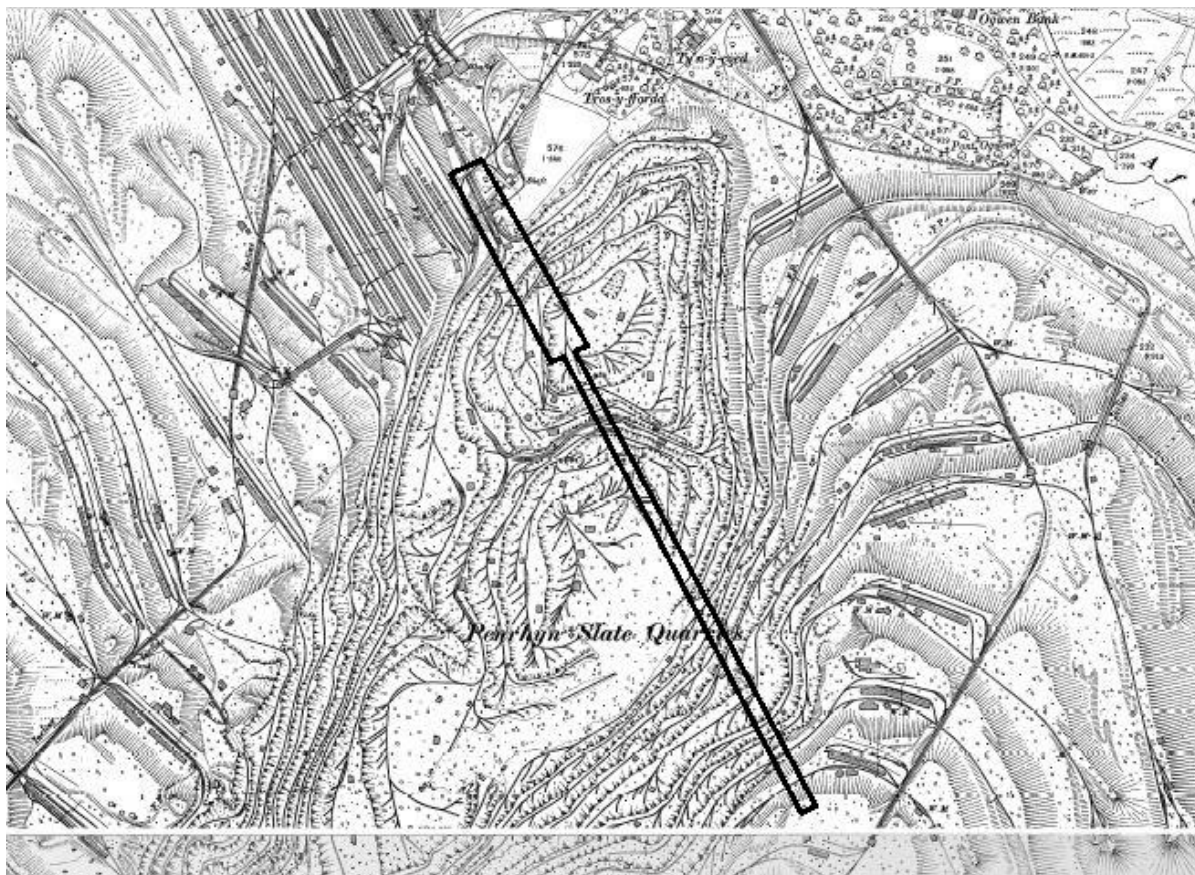
Penrhyn Quarry has remained in continuous production since before the capitalisation of the workings by the first Lord Penrhyn from 1782 and the subsequent global expansion of the market. An estate map of 1769 (BU: Penrhyn mss 2205) shows 'Slate Quarry' on the field Cae Braich y Cafn on the slope of y Fronllwyd. This is the earliest cartographic representation of the site.





By the 1790s operations had been systematised, and galleried working had been introduced. Sale of Penrhyn slate was encouraged by its use by the architect and merchant Samuel Wyatt, and it became the largest slate workings in the world. The quarry came to be operated as a multi-benched wedge in the hillside, the workings to the south being known as the 'left side' and those to the north as the 'right side'. The 'left side' workings have always been less stable than the 'right side', and were less intensively worked.

Particularly relevant to the present assessment are the introduction of the stepped galleries to work the slate, each one feeding a tip where its waste rock was dumped. Internal handling systems which included railways to a nominal gauge of approximately 0.6m followed in 1800, both level sections and inclined planes, water-balance shafts, from 1852, and powered steel ropeways ('Jerry Ms') from 1911, to overcome differences in levels. By the early nineteenth century, workings already formed a continuous series of quarry faces from the bottom of a series of pits to the upper slopes of the mountain.



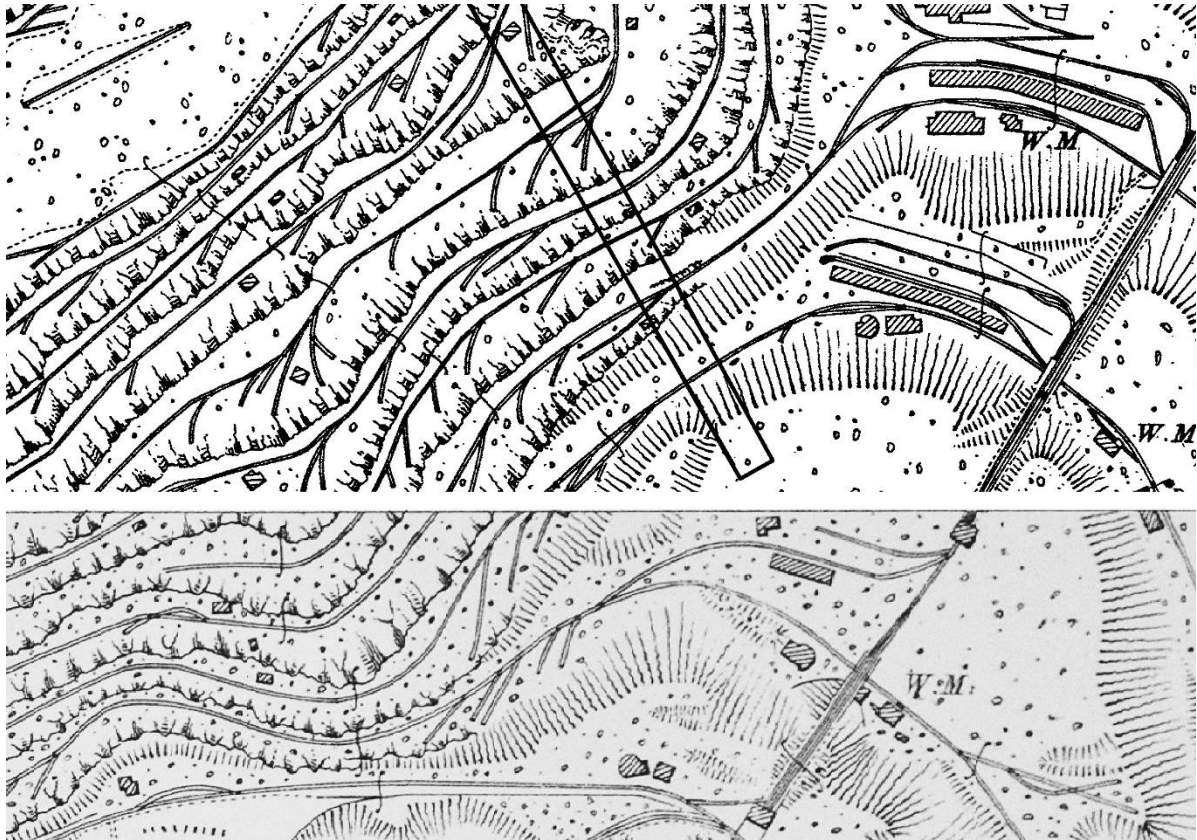
**Map 4:** A detail of the 1899 25" Ordnance survey map with the proposed development superimposed.





**Map 5:** The Sinc Bach area, the site of proposed lower anchorage point, superimposed on the 1899 25" Ordnance Survey map.

The 1899 25" ordnance survey (**Map 4**) shows the quarry at its most productive. Processing of the quarried rock was still at this stage depended on rows of open-fronted slate-makers' shelters on each main level rather than on mechanised mills, of which the first were introduced a few years later. The location of the system of inclined planes on both the 'left side' and the 'right side' has been altered. The proposed lower anchorage point would be located immediately to the west of the 'Princess May' water-balance headframe (SH 6215 6537) built in 1895 by Radcliffe's of Hawarden, and lies above a length of railway from the Sinc Bach gallery which carried blocks and rubble from to the foot of a shallow water-balance to the main processing area on Red Lion level (**Map 5**). Other structures here include a bridge over this length of railway which enabled blocks raised on the 'Princess May' water-balance to reach splitters' shelters shown to the west of the railway, on 'Right Sling'.



**Map 6:** *Ponc Ddwbl, the site of proposed upper anchorage point, superimposed on the 1899 25" Ordnance Survey map.*

The 1899 25" ordnance survey also shows arrangements on the 'left side' where the proposed upper anchorage point would be located (**Map 6**). This would be on 'Ponc Ddwbl', a working gallery where blocks were split in shelters adjacent to the inclined plane, one of a series which connected these workings with the railway from the quarry to the port. Other structures shown here include a weighing machine to the east of the inclined plane and what may be a *caban* (eating hut) and a blast shelter to the west.

An aerial photograph looking south taken in 1947 (**Figure 4**) (Crown Copyright CUCAP BQ-2, 20-07-1948) shows quarrying going on both the left side and (on a more intensive scale) the right side. Ponc Sling is operating much as it did in 1899 with both incline planes and the 'Princess May' water-balance in evidence, and Ponc Ddwbl is still in production. A ropeway system appears to have been installed on Tangarret, the level above Ponc Ddwbl, spanning the pit.



**Figure 4:** *An aerial view of Penrhyn quarry in 1947 (Crown Copyright CUCAP BQ-2, 20-07-1948).*





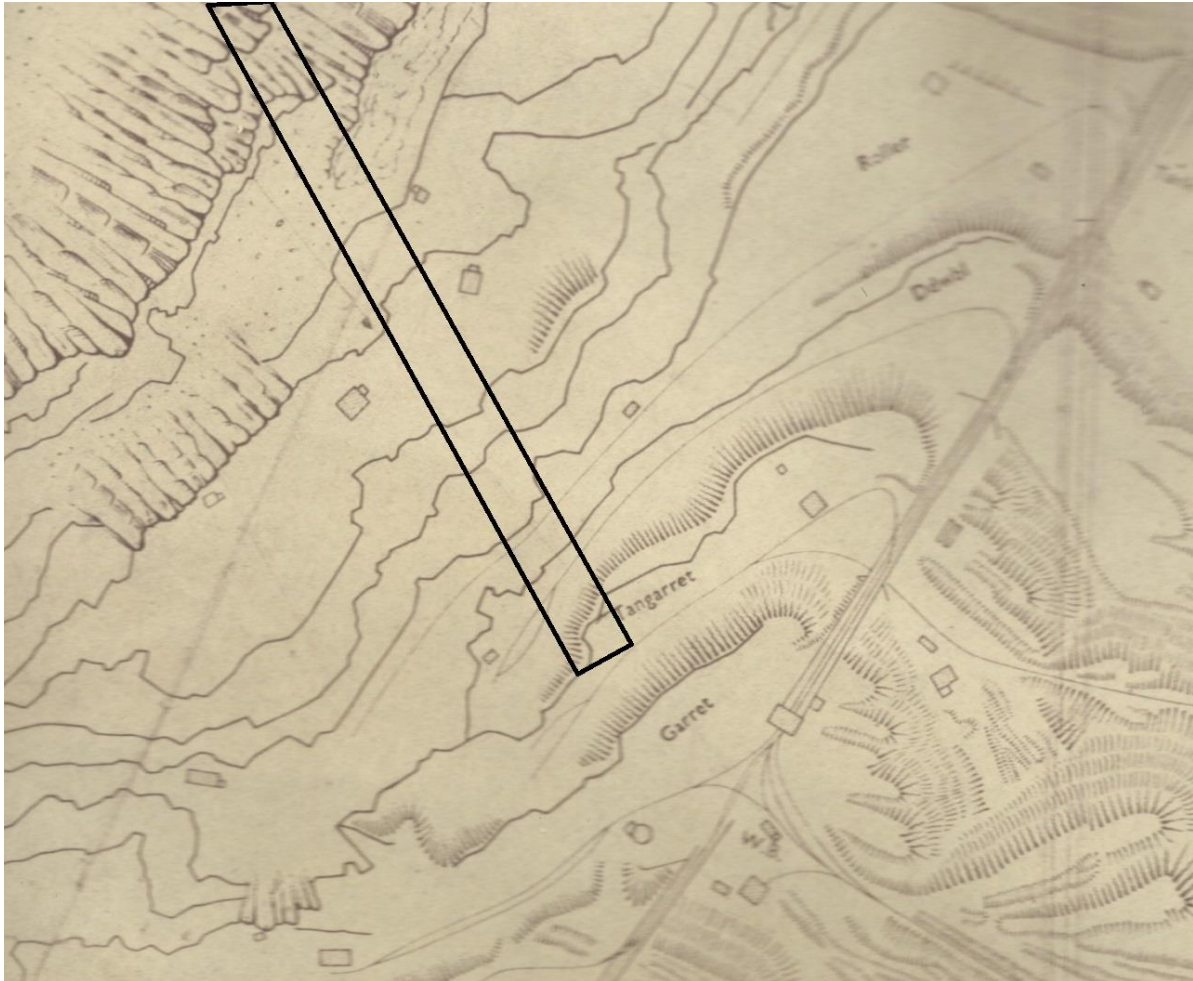
**Map 7:** *The location of the proposed lower anchorage point superimposed on a map of the 1950s.*

The 1950s plan of the quarry (**Map 7**) shows that arrangements where the lower end of the proposed swing would be located have changed little since 1899.

The same **document** (**Map 8**) shows that 'Ponc Ddwbl' is still in production, in that it is equipped with a length of railway, but processing does not appear to be taking place here any longer, and has doubtless moved to a powered mechanical saw mill located two levels down on 'Ponc Twrch'. This map confirms that quarrying in the intervening period at this location has altered the configuration of working faces and tips.

Photographs in RCAHMW NMR site file Caernarfonshire/Ind/SH 66 NW taken in 1963 show the area around the lower anchorage point still functioning much as in the 1950s.





**Map 8:** *The location of the proposed upper anchorage point superimposed on a map of the 1950s.*

In the late twentieth century, operations moved to higher galleries towards the south-west, and the pit and the left side were abandoned. This followed purchase of the site by Alfred McAlpine/Marchwiel Holdings, a major British construction company, which led to extensive modernisation, and the replacement of earlier handling systems by lorries. The quarry is now owned by Welsh Slate Ltd, part of the Breedon Group, a construction materials concern based in Leicestershire.

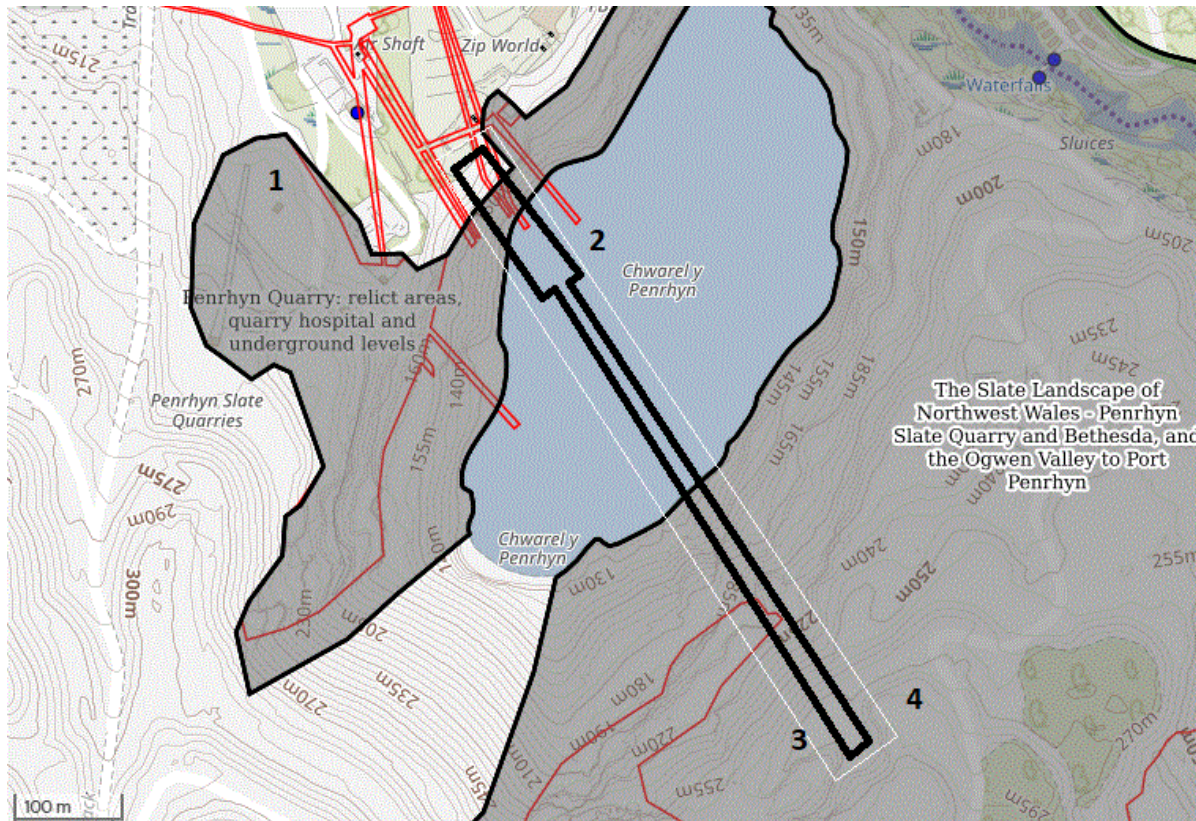
The relict workings retain characteristic benched galleries on the hillside and in a pit, as well as tips to the north and south. Underground features connecting with the pit reflect the technology of the Victorian period, when a large working and tipping area known as 'Red Lion' was created immediately to the north-west of the pit where the main quarry offices and mills are located.

Since 2013, 'Zip-world' have constructed facilities which include a reception building and restaurant, a roadway from here through the 'left side' to the upper part of the historic quarry, an adventure zip line from this point to the northerly point of the historic site and a shorter zip line across the pit, as well as other attractions.

## **6 STATEMENT OF RESULTS OF FIELD-WORK**

The site was visited on 4 September 2023. Conditions were good for field-work. Features where it was considered that there was a prospect of a direct physical impact from the proposed development were identified and located on a map (below), and were photographed using a digital camera. It was

considered that there was little prospect of direct physical impact on any previously-identified HER sites provided to the authors of the present report within the boundaries indicated in **Map 9** below, other than PRN: 15840 Penrhyn Quarry landscape, and this is accordingly included, and **that the proposed development has no physical impact on the Scheduled Monument though it will be adjacent to it in plan and vertical section.**



**Map 9:** Site map of proposed development within the present-day landscape, showing swing (in black) and estimated area of possible physical impact (white outline); Scheduled Monuments shown in red, UNESCO World Heritage area shaded in grey, and assets identified during fieldwork numbered (see detailed description on pages 17-20). Note that the proposed development has no physical impact on the Scheduled Monument but will be adjacent to it in plan and vertical section.





**Figure 5:** A view looking westward over the 'right side' showing the quarry landscape, including tips of waste rock, stepped galleries and an inclined plane. To the right of the photograph, the 'Princess May' shaft headframe is visible.

### 1 Penrhyn Quarry, Landscape

<i>Location:</i>	SH 621 653	PRN: 15840
<i>Period:</i>	Multi period landscape	
<i>Description:</i>	Described by GAT HER as: A galleried slate quarry of great size, still in active production. Despite the scale of present quarrying operations, the quarry preserves the industrial landscape of the nineteenth century. Incline planes, galleries and ancillary structures survive as landscape features, and the quarry preserves a number of examples of quarry machinery from the 19th and 20th centuries. Operations are currently concentrated on the upper part of the quarry, and are likely to continue moving towards the south-west, but tipping continues to take place on the site of the 19th century workings.	
<i>Significance:</i>	A	
<i>Threat:</i>	Construction of foundations of proposed swing and buildings, and anchoring of tensioning ropes.	
<i>Mitigation:</i>	Watching brief	



**Figure 6:** The present hard standing on the site of Ponc Sling, showing the shelter adjacent to which it is proposed to erect the lower anchorage points and ancillary buildings. The 'Princess May' shaft headframe is visible to its left.

## **2 Ponc Sling (proposed lower anchorage point)**

**Location:** SH 62106 65334

PRN: 102467

**Period:** Modern

**Description:** A hard-standing of recent construction associated with 'Zip World' adventure tourism features, itself set out on recent bulldozing of slate rubble over historic quarry workings and internal handling features. It is located immediately adjacent to Scheduled Monument CN416 *Penrhyn Quarry: relict areas, quarry hospital and underground levels* in both plan and vertical alignment, and lies within the *Slate Landscape of Northwest Wales* World Heritage site. The present surface area does not correspond to any quarry horizon, but is located above the former *sinc bach* incline plane, which raised block and rubble from a gallery in the main pit to the foot of a water-balance shaft which lifted them to Red Lion level and other historic features as set out in **section 4** of this document. The developer's plan anticipates a cantilever from the hard-standing anchored into the vertical quarry rock-face immediately below.

**Significance:** A (assigned to this category in view of the need for the cantilever required to support the ancillary buildings having to be itself anchored into a vertical quarry face forming part of the World Heritage site).

**Threat:** Construction of foundations of proposed swing, and anchoring of tensioning ropes.

**Mitigation:** Watching brief





**Figure 7:** Ponc Ddwbl, showing recent reworking of the gallery system where it is proposed to install the upper anchorage point.

### **3 Ponc Ddwbl (proposed upper anchorage point)**

**Location:** SH 62392 64746

PRN: 102468

**Period:** Modern/industrial

**Description:** A former working galleried quarry bench, 'ponc ddwbl', on the 'left side' of Penrhyn Slate Quarry, at 270.5M AOD, which has clearly seen some significant change since the end of industrial scale operations in the mid-20<sup>th</sup> century. It lies within Scheduled Monument CN416 *Penrhyn Quarry: relict areas, quarry hospital and underground levels* and within the *Slate Landscape of Northwest Wales* World Heritage site. Some secondary quarrying, perhaps for aggregates, has taken place at this location within recent years, and an extremely faulted part of the slate vein has been exposed. The 19<sup>th</sup> century gallery has been worked away to give road access to a lower gallery, 'ponc roller'.

**Significance:** A (assigned to this category in view of its inclusion in the World Heritage site).

**Threat:** Construction of foundations of proposed swing, and anchoring of tensioning ropes.

**Mitigation:** Recording Level 2; watching brief during construction phase





**Figure 8:** debris on Ponc Ddwbl, looking north-east.

#### **4 Debris on Ponc Ddwbl**

*Location:* SH 62430 64765

PRN: 102469

*Period:* Modern/industrial

*Description:* The remains of a concrete base and ironwork were observed on Ponc Ddwbl at a location where there is the potential for disturbance from construction traffic. It is possible that these reflect the remains of a ropeway base installed on the upper (Tangarret) level and which have fallen or been bulldozed into this location.

*Significance:* D

*Threat:* Construction traffic.

*Mitigation:* Recording Level 1

## **7 CONCLUSIONS OF THE ARCHAEOLOGICAL ASSESSMENT**

The proposed development would be located within an industrial environment of exceptional archaeological significance and historical importance but direct physical impact on heritage assets is likely to be limited, as these have seen considerable change since the end of industrial period activities within them in the 1960s. No direct physical impact on a Scheduled Monument is indicated. Any significant change in design for the proposed swing and buildings would require re-evaluation of the archaeological impact. **A watching brief is recommended for two sites and Level 1 recording for two sites.**

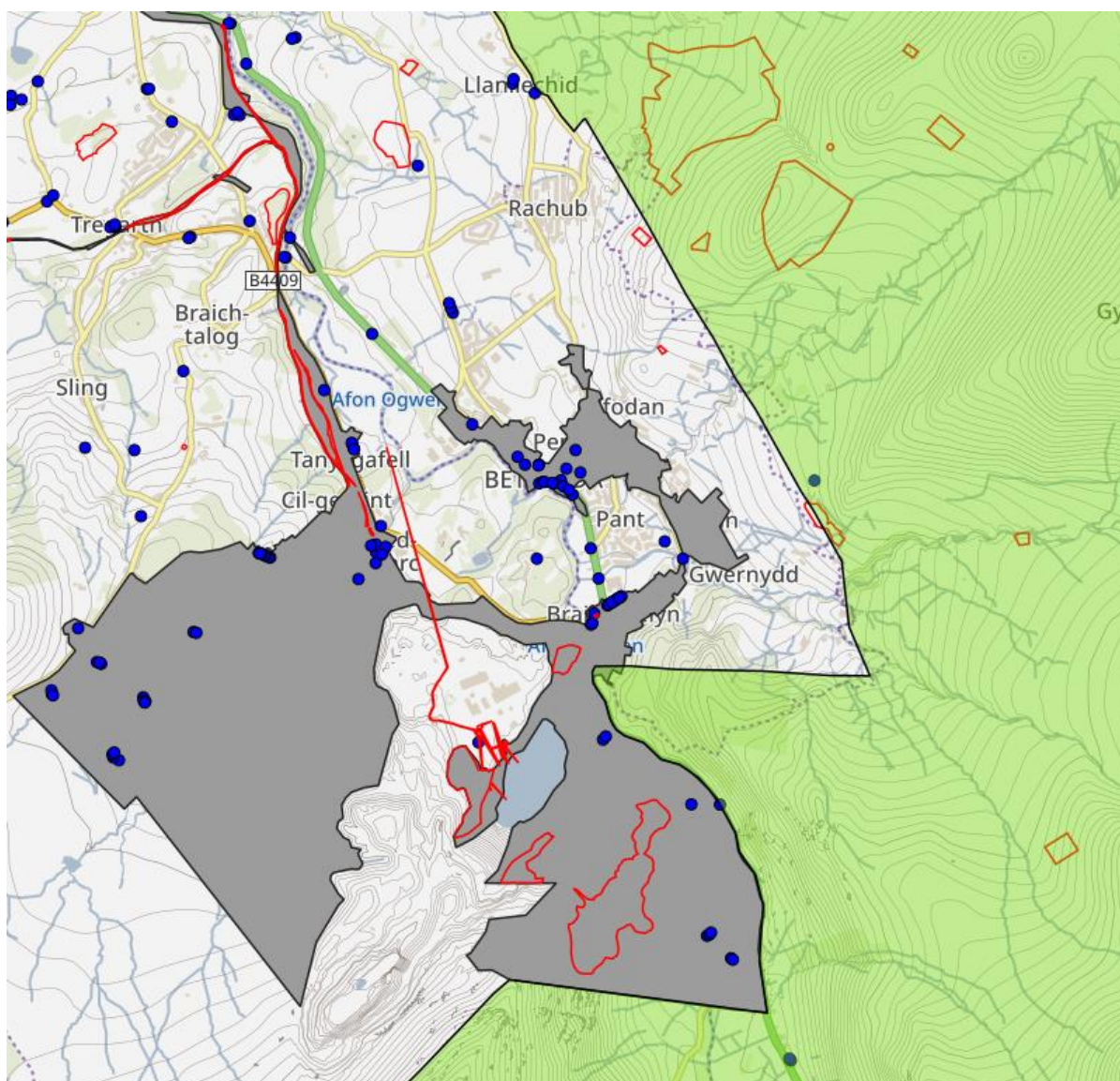
## 8 SETTING OF HISTORIC ASSETS

This section of the present document sets out to furnish the local planning authority with sufficient and proportionate information to allow the assessment of the likely impact of the development proposal described in **section 2** of this document on historic assets and their setting.

### 8.1 Context

The proposed development lies partly within a World Heritage site; entirely within a Registered Historic Landscape; within a zone of visibility which includes Parc Eryri (Snowdonia National Park); within a zone of visibility which includes Scheduled Monuments, listed buildings and other heritage assets.

These are shown on **Map 10**.



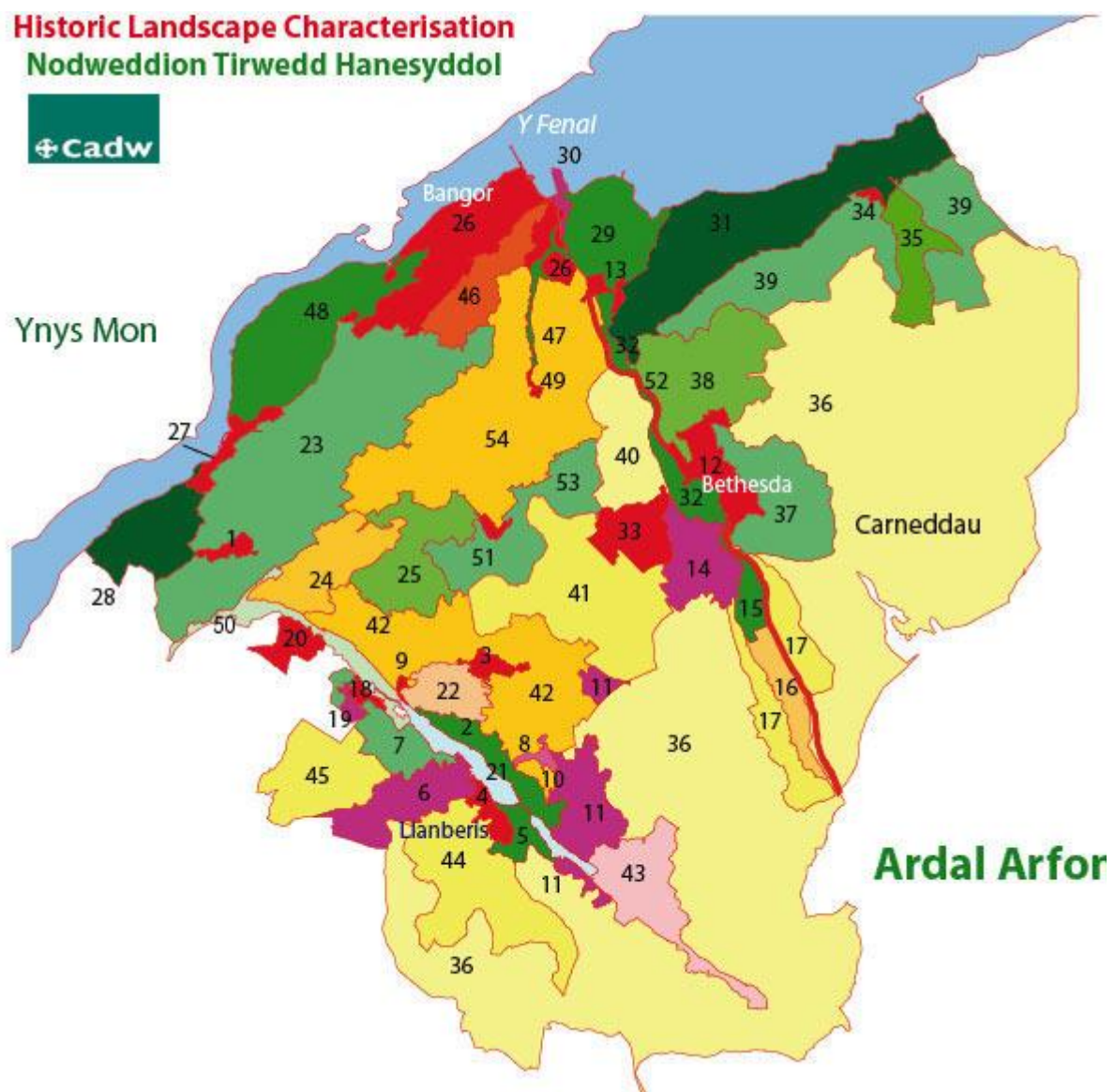
**Map 10:** Scheduled Monuments *are* shown in red, listed buildings in blue; Parc Eryri is shaded in green, *the* World Heritage site in grey. *The entire area shown here lies with the Arfon Historic Landscape.*



## World Heritage site

The proposed development lies partly within and partly without the *Slate Landscape of Northwest Wales* World Heritage site. Both the lower and upper anchorage points lie within it. Management of the historic environment of this World Heritage site is based entirely on existing means of landscape protection, referred to below, and is set out in *Property Management Plan 2020-2030* and in *The Slate Landscapes (sic) of Northwest Wales World Heritage Site – Supplementary Planning Guidance* (Gwynedd Council and Parc Eryri [Snowdonia National Park], June 2022).

The proposed development would be located entirely within the Arfon landscape in the Cadw-sponsored *Register of Historic Landscapes in Wales*, a non-statutory, advisory document, though it is a material consideration in the planning process. Its primary aim is to provide information and raise awareness of an initial selection of the most important and significant historic landscape areas in Wales in order to aid their protection and conservation. Characterisation exercises have been undertaken within each of the identified landscapes for smaller, discreet areas within each landscape, and recommendations made accordingly. **Map 11** indicates these areas. 14 is Penrhyn Slate Quarry itself.



**Map 11:** The Arfon historic landscape and the Historic Landscape Character Assessments within it.

The *Register of Landscapes of Outstanding Historic Interest in Wales* describes the Arfon landscapes as follows:

#### Contents and significance

This classic glaciated valley in north Snowdonia, containing contrasting evidence of prehistoric and later land use, superimposed by the extensive and visually dramatic remains of the recent and continuing industrial exploitation of slate. The area includes Neolithic and Bronze Age funerary and ritual monuments; Iron Age hillforts and concentrations of relict settlements and field systems; medieval settlements; large and extensive remains of 19<sup>th</sup> and 20<sup>th</sup> centuries slate quarries, tips, attendant settlements and transport systems; Penrhyn Castle and Park; Telford's Holyhead Road; historic literary and social associations.

Within the Arfon landscape, the following Historic Landscape characterisations are relevant: 14 (location); 36 (inter-visibility); 37 (intervisibility).

Arfon - 14 Penrhyn Quarry:

#### **Key historic landscape characteristics**

##### *Slate quarry landscape*

A galleried slate quarry of great size, still in active production. Despite the scale of present quarrying operations, the quarry preserves the industrial landscape of the nineteenth century. Incline planes, galleries and ancillary structures survive as landscape features, and the quarry preserves a number of examples of quarry machinery from the 19th and 20th centuries. Operations are currently concentrated on the upper part of the quarry, and are likely to continue moving towards the south-west, but tipping continues to take place on the site of the 19th century workings.

Arfon - Area 36 Unenclosed mountain (north Carneddau)

#### **Key historic landscape characteristics**

##### *Relict archaeology (settlements and fields), sheepfolds*

An area of relict stone-built remains of prehistoric, medieval and post medieval periods. No, or very few, modern intrusions.

Arfon - Area 37 Enclosed fields above Bethesda

#### **Key historic landscape characteristics**

##### *Palimpsest of field boundaries, relict archaeology, scattered farms, winding paths and tracks*

An intricate area made up of small details relating to many periods, within a framework of small, irregular fields, many of which date from the 18th century. The scattered settlement pattern reflects earlier occupation of the area, and there is considerable potential for researching and demonstrating landscape evolution in a restricted area.

*Parc Eryri (Snowdonia National Park)*

The proposed development would be apparent from Parc Eryri (Snowdonia National Park).

Not relevant to the present proposals are other designations considered in *Setting of Historic Assets*, namely conservation areas or registered historic parks and gardens.

#### *Scheduled Monuments, listed buildings and other heritage assets*

The significance of scheduled Monuments, listed buildings and other, non-designated, heritage assets is enhanced by their setting, defined as the surroundings in which they are understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Changes to the setting of these assets may be positive, negative or neutral.

## **8.2 Methodology**

The methodology followed in the setting assessment is the approach set out in Cadw/Welsh Government *Setting of Historic Assets in Wales* (May 2017), informed by the conclusions to the archaeological assessment set out in section 7 and by other documents noted below, which reflect the broader planning context. *Setting of Historic Assets in Wales* outlines the principles used to assess the potential impact of development or land-management proposals on scheduled monuments and listed buildings, whilst acknowledging that they are equally applicable to all individual historic assets, irrespective of whether or not they are statutorily protected. This is significant in that the location of this proposal, Dyffryn Ogwen, forms a remarkably interconnected landscape, in which all the assets form one another's settings, as well as to the fact that part forms a World Heritage site, that the proposal lies within a Registered Historic Landscape, within a zone of visibility which includes Parc Eryri (Snowdonia National Park), and within a zone of visibility which includes Scheduled Monuments and listed buildings.

Though *Setting of Historic Assets in Wales* does not make reference to other approaches to the management of heritage and landscape, other documents are germane to this assessment in view of this context. For World Heritage considerations, reference is made to Cadw's *Managing Change in World Heritage Sites in Wales*, to UNESCO's *Guidance and Toolkit for Impact Assessments in a World Heritage Context*, and to Gwynedd Council and Parc Eryri's *The Slate Landscapes of Northwest Wales World Heritage Site – Supplementary Planning Guidance*; for Registered Historic Landscape, to the *Register of Historic Landscapes in Wales*.

*Managing Change in World Heritage Sites in Wales* (Cadw, 2017) sets out general principles for understanding and managing World Heritage Sites in Wales, including how they are protected through the planning system.

*Guidance and Toolkit for Impact Assessments in a World Heritage Context* published by UNESCO in 2022 states (principle 4):

In many countries, proposed actions that may have an impact on World Heritage will be evaluated through national or other frameworks as part of an Environmental and Social Impact Assessment or Strategic Environmental Assessment. In these cases, World Heritage should be addressed specifically within the broader assessment. When a proposed action is not subject to this type of planning process, a stand-alone Heritage Impact Assessment should be carried out. In both cases, the assessment needs to clearly address potential impacts on the attributes of the property which convey Outstanding Universal Value, as well as other heritage/conservation values.



The approach followed here accordingly evaluates the present proposals through the existing national framework, whilst also having regard to the duty of all stakeholders within a World Heritage site to transmit the site's agreed and immutable Outstanding Universal Value to future generations, and the responsibility of the state party to protect Outstanding Universal Value to the utmost of its resources.

Outstanding Universal Value is embodied in attributes, which are summarised in *The Slate Landscapes (sic) of Northwest Wales World Heritage Site – Supplementary Planning Guidance* (Gwynedd Council and Parc Eryri [Snowdonia National Park], June 2022); particularly relevant attributes in the context of the present proposal are scale and significant landscape impact. The *Supplementary Planning Guidance* specifically references (2.16) adventure tourism as a growing market which is leading to an increased number of visitors to the area. Parts of the World Heritage site have benefitted from the introduction of adventure tourism facilities. Such activities have hitherto been considered to have had minimal impact on the Outstanding Universal Value of *The Slate Landscape of Northwest Wales World Heritage Site*, and the redevelopment and construction of new buildings to support these tourism facilities have been supported by policies in the local development plans. Further development to support new and existing tourism facilities will be supported where they conform to relevant policies within the Local Development Plans.

Inclusion on the *Register of Historic Landscapes in Wales* confers no special protection but is a material consideration in the planning process. The 2007 published *Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process Revised Edition* emphasises that it is non-statutory and advisory only. It is intended to assist local planning authorities to decide how much weight to give to information in the *Register* when determining planning applications. It is also intended to assist others involved in the planning and development process in Wales, particularly developers preparing Environmental Impact Assessment statements, to bring forward plans and proposals that are likely to have the least possible adverse impact on historic landscape areas on the *Register*.

### **8.3 Assessment**

*Setting of Historic Assets in Wales* sets out four stages to assessing the impact of a proposed change or development within the setting of historic assets. These are:

Stage 1: Identify the historic assets that might be affected by a proposed change or development.  
Stage 2: Define and analyse the settings to understand how they contribute to the significance of the historic assets and, in particular, the ways in which the assets are understood, appreciated and experienced.

Stage 3: Evaluate the potential impact of a proposed change or development on that significance.

Stage 4: If necessary, consider options to mitigate or improve the potential impact of a proposed change or development on that significance.

*Stage 1: identify the historic assets that might be affected by a proposed change or development.*

The Ogwen valley is not only an exceptionally rich historic environment but also one which has been extensively studied, with the result that many sites have been identified and added to archaeological records. Archaeological sites of the Bronze Age, the pre-Roman Iron Age and the Medieval period are evident, a number of which have been afforded statutory protection as nationally-important Scheduled Monuments. However, it is the Industrial and Modern period which has impacted most powerfully on this area, reflecting the transformative effect of the re-investment of capital from Jamaican sugar-plantations and the trade in enslaved Africans into the Penrhyn estate, as the major (though not the only) local landowner. This is evident in the opening up of Penrhyn slate quarry on an

industrial scale and in a systematic manner from the late eighteenth century onwards, the significance of which has also been recognised by the designation of some key assets within the quarry as Scheduled Monuments. It is also manifest in the creation of the quarry workers' settlement of Bethesda and in the smaller nucleations at Braichmelyn, Mynydd Llandygai, Rachub, Cilfodan and Tan y Foel, in the development of transport links, in the improved agriculture and woodlands of the lower valley slopes and in the siting of churches and chapels, as well as in less obvious ways such as the provision of explosives stores. Some, though not all, of these features have been included in Component Part 1 of the UNESCO World Heritage *Slate Landscape of Northwest Wales*, and all form part of the wider setting of the proposed development.

In light of the complexity and dense nature of this historic environment, assessment of setting was restricted to viewpoints from statutorily protected historic assets, in each case Scheduled Monuments, also ensuring that each relevant landscape character area was thereby represented and one location within Parc Eryri (Snowdonia National Park).

*Stage 2: define and analyse the settings to understand how they contribute to the significance of the historic assets and, in particular, the ways in which the assets are understood, appreciated and experienced.*



**Figure 9:** The proposed development would span the quarry pit, with the recent quarry tip of waste rock (in sunlight in this view) as a back-drop.

For the purpose of carrying out stage 2, a distinction may be drawn between the *immediate setting* of the quarry itself (HLCA14), within which there is considerable inter-visibility due to the nature of the workings, and a *wider setting* including HLCA 36 and 37 itself, as shown in **Map 11**). There is little significant inter-visibility between HLCA112 and 12 and 32.

Immediate setting



The immediate setting of the proposed development is the environment of Penrhyn Slate Quarry (HLCA 14, **Figures 9-12**). This is a coherent, striking and distinctive post-industrial landscape, and is on a very large scale. Within it, historic physical and functional relationships are clearly evident due to the strong inter-visibility between individual assets, and can be readily understood and appreciated even though internal arrangements have changed over time.



**Figure 10:** *This view from the upper part of the 'left side' looks north over the quarry pit towards Penmon on Anglesey, and takes in the main historic quarry-workers' settlements as well as the slopes of Moel Faban on the horizon to the right. The lower and upper anchorage points of the proposed development are arrowed.*

#### Wider setting

Within the wider setting, setting was assessed primarily from two Scheduled Monuments, from CN63 (Hut Circle Settlement at Ffôls Coetmor, **Figure 13**) and CN210 (Settlements & Enclosures on S & E sides of Moel Faban, **Figure 14**). Inter-visibility between the development proposal and any listed buildings is limited.

More generally, the multi-period landscape of the Ogwen valley was considered, in which evidence for historic route-ways, for landownership and exploitation of agricultural resources from before the industrial/modern period, and for later slate-quarrying are all clear.

*Stage 3: evaluate the potential impact of the proposed development on that significance.*

#### Immediate setting

Impact on the immediate setting has here been graded on the scale: very slight; slight; moderate; fairly severe; severe; very severe.





**Figure 11:** *This view from the Zip World road to the top of the 'left side' shows the extent of the span across the historic quarry environment, much of which is now a Scheduled Monument (CN416).*



**Fig 12:** *This view shows how the Zip World building is designed to blend in with its surroundings, whilst the red colour scheme of the 'aero explorer' attraction introduces a novel element into the historic environment.*



**Construction and operation** of the proposed swing will have a **fairly severe** impact on the immediate setting, by introducing an element substantial enough at this proximity to dominate it rather than be subsumed into it. The structural components include not only the framework of the swing itself but also the suspension cables and hangars depicted in **Figure 3**. The element of mobility is alien to the historic environment, more so than the existing zip-lines which recall the 'Jerry M' ropeways which were used here from 1911 to the 1960s. **Figure 1 and Maps 1 and 2** indicate the scale of the proposal, and show how it would be far from entirely swallowed even by the very large scale of the historic environment of quarrying (area 14). The small scale of proposed ancillary structures (see **Figure 3**) lessens the impact of the proposal on the historic industrial landscape.

#### Wider setting

Impact on the wider setting has here been graded on the scale: very slight; slight; moderate; fairly severe; severe; very severe.

**Construction and operation** of the proposed swing will have a **fairly severe** impact on the wider setting. It would be visible from the unenclosed mountain on the east side of the Ogwen valley, and from the Scheduled Monuments on Moel Faban but barely or not at all visible from Bethesda.



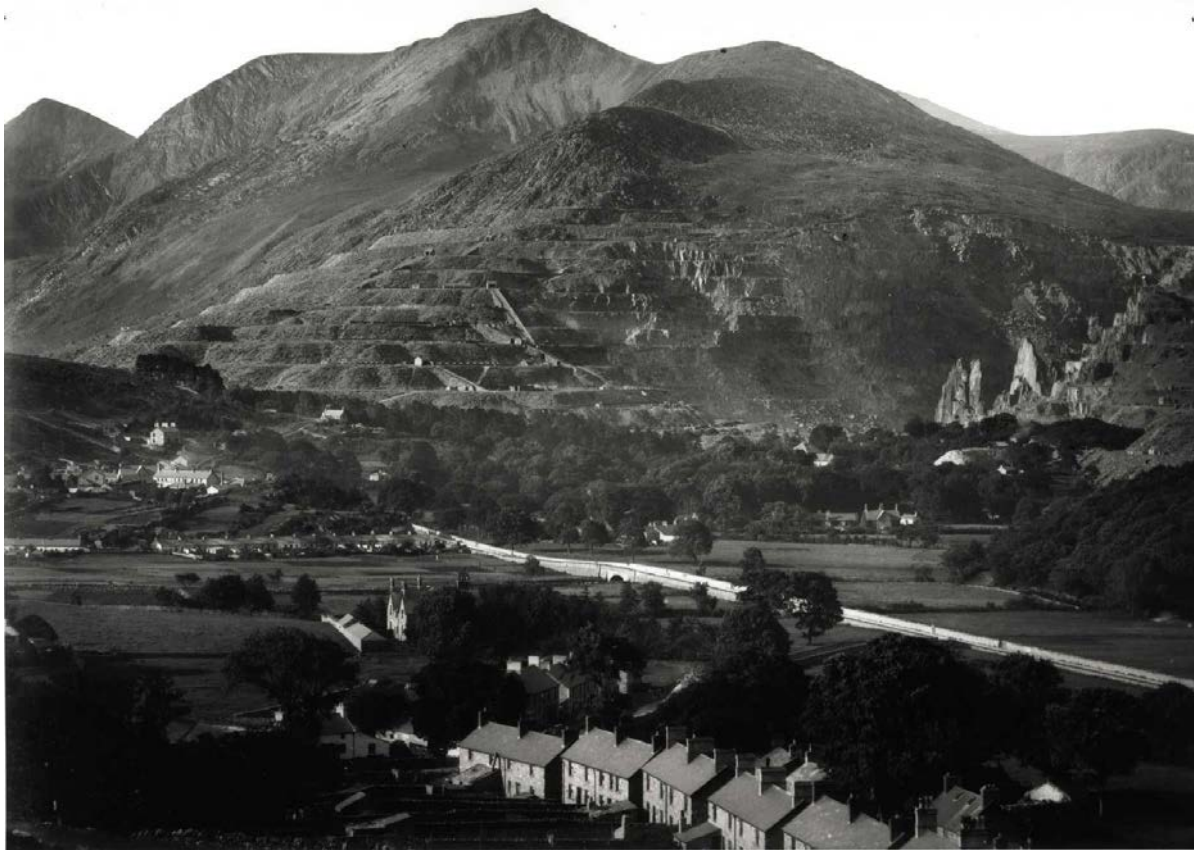
**Figure 13:** *This view from the Hut Circle Settlement at Ffôs Coetmor Scheduled Monument (CN263) and from HLCA 37 (enclosed fields above Bethesda) illustrates the limited visibility between this particular character area's historic assets and the proposed development. This location lies without Parc Eryri (Snowdonia National Park).*



**Figure 14:** *This view from the Moel Faban prehistoric settlements and enclosures Scheduled Monument (CN210) and from HLCA 36 (unenclosed mountain, North Carneddau) towards the south-west overlooks the improved fieldscape around Tyddyn Sabel and the two isolated cottage rows at Tan y Foel towards Braich Melyn, with the quarry cut into the slopes of y Fronllwyd in the distance. At a distance of over 2.5km, the quarry and Zip World roads are prominent. The proposed development would span the quarry pit with the large tip of waste rock shown in **Figure 5a** as a backdrop. This photographic location lies within Parc Eryri (Snowdonia National Park).*

This report considers that it will not be unambiguously **severe** (*ie that it will be at the lower end of the 'severe' category*) in the wider setting for several reasons. As **Figure 14** shows, from a distance, the quarry landscape of galleries and tips is on a large scale and is robust, with the capacity partially to subsume the proposed development. From the slopes of Moel Faban, the entire quarry landscape is apparent, and its features can be clearly discerned in anything other than misty or very wet weather. The eye is drawn, particularly in rainy or very sunny conditions, away from the centre to the roads from the lower quarry levels to the present workings on the 'right side' and to the visitor attractions on the 'left side', just as from the 19<sup>th</sup> century until the 1960s, the inclined planes on which the quarry relied for internal movement would have drawn the eye away from the main workings (**Figures 15 and 16**).





**Figure 15:** This late-19<sup>th</sup> century view shows the prominence of the inclined planes as visual features within the 'left side' of the quarry.



**Figure 16:** This view of Penrhyn quarry dated 1966 shows the transition period from railways to dumper trucks and fork-lifts, and shows how inclined planes were still the prominent features in the quarry landscape, as are roads now. © NMGW: 2018.6/38.

The view from Moel Faban towards the quarry is significant in several other respects. It takes in features from the Bronze Age to the present day. The precise nature and characteristics of the Prehistoric elements here are a matter of professional interest to archaeologists but it is evident to anyone with a feel for her or for his environment who explores this immediate area and looks to the south-west that the vista encompasses 'deep time' near at hand and the historical time of agricultural improvement and of the industrial revolution further away. The landscape of leisure, tourism and the 'white knuckle ride' is already present in this landscape, and will in time become an historic element in its own right.

It is in this connection that the cumulative impact of the proposed development and other existing but recent adventure tourism developments needs also to be considered. The introduction of these features at different stages since 2013, a period of ten years, has undoubtedly had a considerable impact on the historic environment, but there is currently little consensus as to how cumulative impact such as this can be assessed within the context of current Cadw advice.

*Stage 4: consider options to mitigate or improve the potential impact of a proposed change or development on that significance.*

Options to mitigate or improve the potential impact of the proposed development will be evolved following discussion between **Zipworld**, the site-owners, Cadw, the local authority and other interested parties. However, well-chosen colour schemes would enable the proposed development to blend in with its environment. Cumulative impact should be addressed by the evolution of a long-term plan for the tourism offer within the post-industrial parts of the Penrhyn Quarry landscape.

#### **8.4 Summary**

The proposed development will, on present evidence, have a **fairly severe** impact on the setting, **both the immediate and wider setting**.

#### **8.5 Recommendations**

The appearance of the proposed swing is subject to a design process that includes consideration of the conclusion of this report, the pre-application process and consultation with other stakeholders including the site-owners and Cadw. It is recommended that this design process determine appropriate colour schemes with the potential to reduce any potential adverse heritage impacts. Mitigation should be discussed between stakeholders, and concerns about cumulative impact should be addressed by an agreed long-term plan.

## **9 PROJECT ARCHIVE**

Copies of the present document have been provided to the client and lodged with the HER and with the NMR.

## **10 BIBLIOGRAPHY**

### **10.1 Published sources**

Lindsay J 1974. *A History of the North Wales Slate Industry*. Newton Abbot.

Boyd JIC 1985. *The Penrhyn Quarry Railway*. Oakwood.

Gwyn D 2000. 'Hoisting Machinery in the Gwynedd Slate Industry', *Transactions of the Newcomen Society* 71 (2). pp. 183-204.

Gwyn D 2015. *Welsh Slate: History and Archaeology of an Industry*. Aberystwyth.

Emmett J. *Building Capacity and Good Practice in Registered Historic Landscapes*. GAT Report No 338 for NRW.

### **10.2 Existing archaeological records**

GAT: *The Slate Landscape of Northwest Wales World Heritage Site Nomination Field Survey and Character Area Production 2018-19*: G1480

Archives of Plas Tan y Bwlch 'practical industrial archaeology' courses

RCAHMW NMR site file Caernarfonshire/Ind/SH 66 NW (Rex Wailes files)

GAT HER, Enquiry Report - Core Records: reference number: GATHER1934, prepared by Derby, S.

In view of the extent of the archaeological data, assessment of the setting of the proposed development has been carried out on the basis of inter-visibility with Scheduled Monuments, as further informed by key historic landscape characteristics as set out in section 7, and by the identified attributes of this component part of the World Heritage site. The volume of data is otherwise so overwhelming as to be impractical.

(end of document)



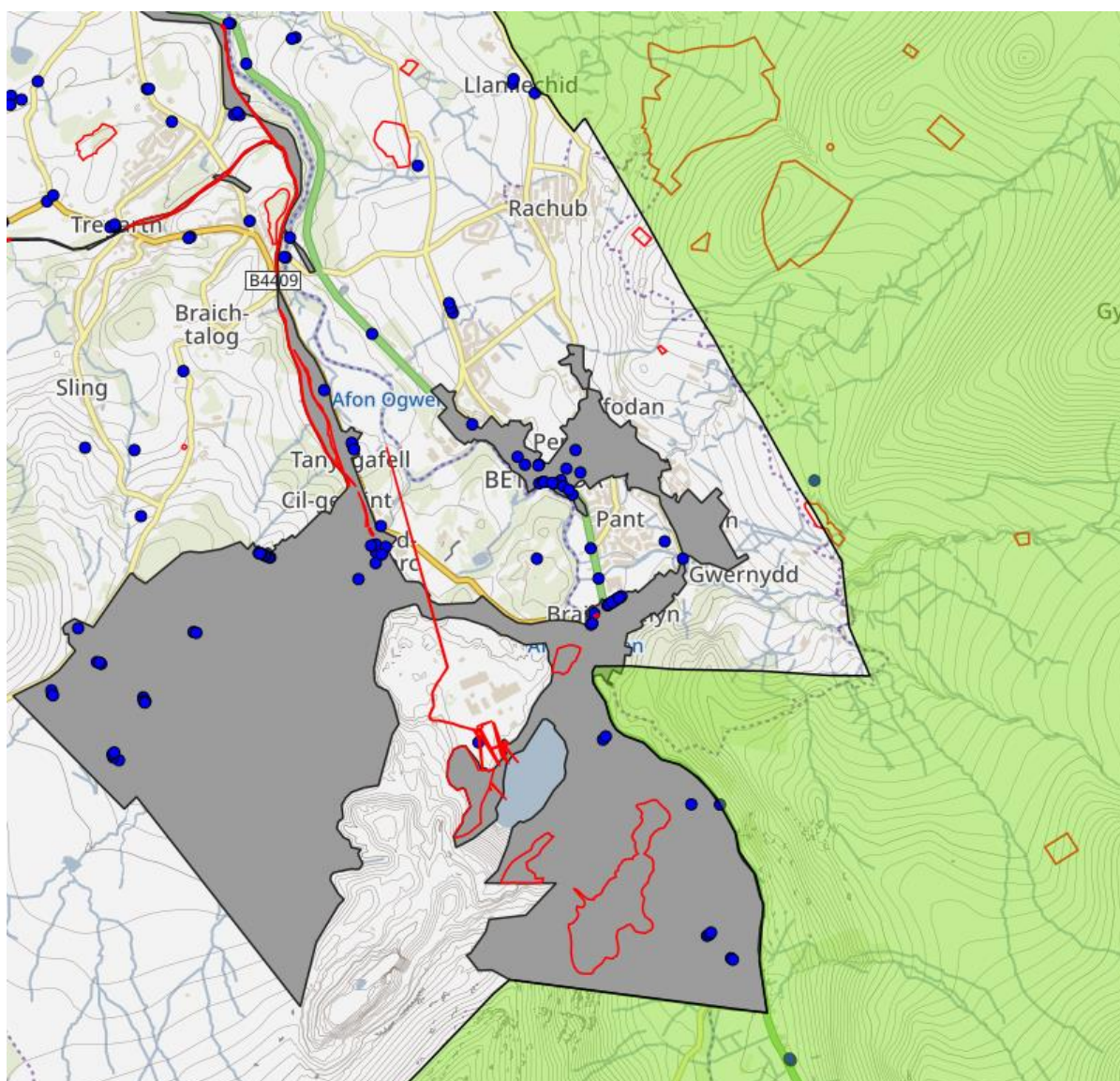
## 8 SETTING OF HISTORIC ASSETS

This section of the present document sets out to furnish the local planning authority with sufficient and proportionate information to allow the assessment of the likely impact of the development proposal described in **section 2** of this document on historic assets and their setting.

### 8.1 Context

The proposed development lies partly within a World Heritage site; entirely within a Registered Historic Landscape; within a zone of visibility which includes Parc Eryri (Snowdonia National Park); within a zone of visibility which includes Scheduled Monuments, listed buildings and other heritage assets.

These are shown on **Map 10**.

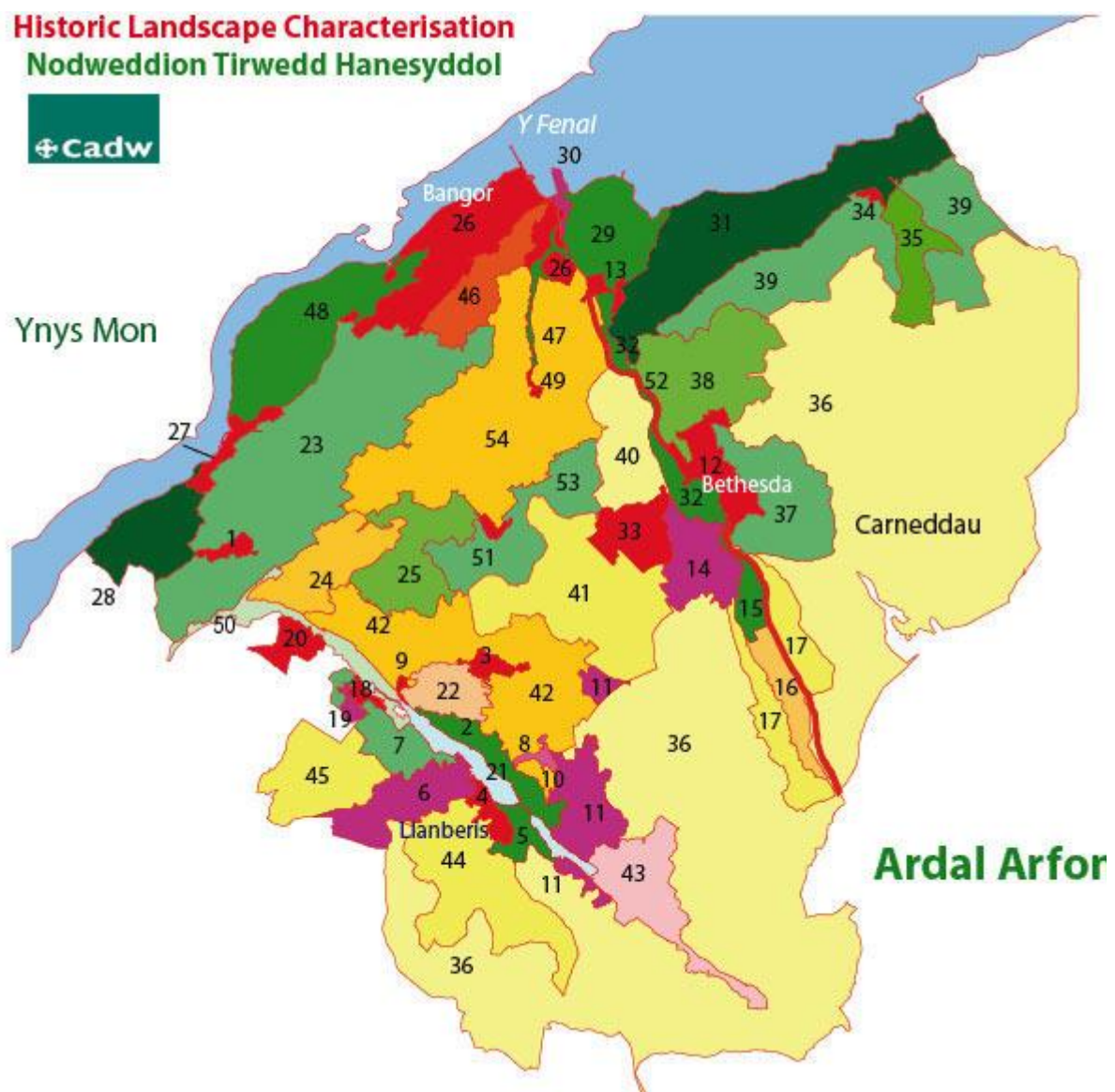


**Map 10:** Scheduled Monuments *are* shown in red, listed buildings in blue; Parc Eryri is shaded in green, the World Heritage site in grey. The entire area shown here lies with the Arfon Historic Landscape.

## World Heritage site

The proposed development lies partly within and partly without the *Slate Landscape of Northwest Wales* World Heritage site. Both the lower and upper anchorage points lie within it. Management of the historic environment of this World Heritage site is based entirely on existing means of landscape protection, referred to below, and is set out in *Property Management Plan 2020-2030* and in *The Slate Landscapes (sic) of Northwest Wales World Heritage Site – Supplementary Planning Guidance* (Gwynedd Council and Parc Eryri [Snowdonia National Park], June 2022).

The proposed development would be located entirely within the Arfon landscape in the Cadw-sponsored *Register of Historic Landscapes in Wales*, a non-statutory, advisory document, though it is a material consideration in the planning process. Its primary aim is to provide information and raise awareness of an initial selection of the most important and significant historic landscape areas in Wales in order to aid their protection and conservation. Characterisation exercises have been undertaken within each of the identified landscapes for smaller, discreet areas within each landscape, and recommendations made accordingly. **Map 11** indicates these areas. 14 is Penrhyn Slate Quarry itself.



**Map 11:** The Arfon historic landscape and the Historic Landscape Character Assessments within it.

The *Register of Landscapes of Outstanding Historic Interest in Wales* describes the Arfon landscapes as follows:

#### Contents and significance

This classic glaciated valley in north Snowdonia, containing contrasting evidence of prehistoric and later land use, superimposed by the extensive and visually dramatic remains of the recent and continuing industrial exploitation of slate. The area includes Neolithic and Bronze Age funerary and ritual monuments; Iron Age hillforts and concentrations of relict settlements and field systems; medieval settlements; large and extensive remains of 19<sup>th</sup> and 20<sup>th</sup> centuries slate quarries, tips, attendant settlements and transport systems; Penrhyn Castle and Park; Telford's Holyhead Road; historic literary and social associations.

Within the Arfon landscape, the following Historic Landscape characterisations are relevant: 14 (location); 36 (inter-visibility); 37 (intervisibility).

Arfon - 14 Penrhyn Quarry:

#### **Key historic landscape characteristics**

##### *Slate quarry landscape*

A galleried slate quarry of great size, still in active production. Despite the scale of present quarrying operations, the quarry preserves the industrial landscape of the nineteenth century. Incline planes, galleries and ancillary structures survive as landscape features, and the quarry preserves a number of examples of quarry machinery from the 19th and 20th centuries. Operations are currently concentrated on the upper part of the quarry, and are likely to continue moving towards the south-west, but tipping continues to take place on the site of the 19th century workings.

Arfon - Area 36 Unenclosed mountain (north Carneddau)

#### **Key historic landscape characteristics**

##### *Relict archaeology (settlements and fields), sheepfolds*

An area of relict stone-built remains of prehistoric, medieval and post medieval periods. No, or very few, modern intrusions.

Arfon - Area 37 Enclosed fields above Bethesda

#### **Key historic landscape characteristics**

##### *Palimpsest of field boundaries, relict archaeology, scattered farms, winding paths and tracks*

An intricate area made up of small details relating to many periods, within a framework of small, irregular fields, many of which date from the 18th century. The scattered settlement pattern reflects earlier occupation of the area, and there is considerable potential for researching and demonstrating landscape evolution in a restricted area.

*Parc Eryri (Snowdonia National Park)*



The proposed development would be apparent from Parc Eryri (Snowdonia National Park).

Not relevant to the present proposals are other designations considered in *Setting of Historic Assets*, namely conservation areas or registered historic parks and gardens.

#### *Scheduled Monuments, listed buildings and other heritage assets*

The significance of scheduled Monuments, listed buildings and other, non-designated, heritage assets is enhanced by their setting, defined as the surroundings in which they are understood, experienced and appreciated, embracing present and past relationships to the surrounding landscape. Changes to the setting of these assets may be positive, negative or neutral.

## **8.2 Methodology**

The methodology followed in the setting assessment is the approach set out in Cadw/Welsh Government *Setting of Historic Assets in Wales* (May 2017), informed by the conclusions to the archaeological assessment set out in section 7 and by other documents noted below, which reflect the broader planning context. *Setting of Historic Assets in Wales* outlines the principles used to assess the potential impact of development or land-management proposals on scheduled monuments and listed buildings, whilst acknowledging that they are equally applicable to all individual historic assets, irrespective of whether or not they are statutorily protected. This is significant in that the location of this proposal, Dyffryn Ogwen, forms a remarkably interconnected landscape, in which all the assets form one another's settings, as well as to the fact that part forms a World Heritage site, that the proposal lies within a Registered Historic Landscape, within a zone of visibility which includes Parc Eryri (Snowdonia National Park), and within a zone of visibility which includes Scheduled Monuments and listed buildings.

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In light of the complexity and dense nature of this historic environment, assessment of setting was restricted to viewpoints from statutorily protected historic assets, in each case Scheduled Monuments, also ensuring that each relevant landscape character area was thereby represented and one location within Parc Eryri (Snowdonia National Park).

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Within the wider setting, setting was assessed primarily from two Scheduled Monuments, from CN63 (Hut Circle Settlement at Ffôls Coetmor, **Figure 13**) and CN210 (Settlements & Enclosures on S & E sides of Moel Faban, **Figure 14**). Inter-visibility between the development proposal and any listed buildings is limited.

More generally, the multi-period landscape of the Ogwen valley was considered, in which evidence for historic route-ways, for landownership and exploitation of agricultural resources from before the industrial/modern period, and for later slate-quarrying are all clear.

*Stage 3: evaluate the potential impact of the proposed development on that significance.*

#### Immediate setting

Impact on the immediate setting has here been graded on the scale: very slight; slight; moderate; fairly severe; severe; very severe.





**Figure 11:** *This view from the Zip World road to the top of the 'left side' shows the extent of the span across the historic quarry environment, much of which is now a Scheduled Monument (CN416).*



**Fig 12:** *This view shows how the Zip World building is designed to blend in with its surroundings, whilst the red colour scheme of the 'aero explorer' attraction introduces a novel element into the historic environment.*



**Construction and operation** of the proposed swing will have a **fairly severe** impact on the immediate setting, by introducing an element substantial enough at this proximity to dominate it rather than be subsumed into it. The structural components include not only the framework of the swing itself but also the suspension cables and hangars depicted in **Figure 3**. The element of mobility is alien to the historic environment, more so than the existing zip-lines which recall the 'Jerry M' ropeways which were used here from 1911 to the 1960s. **Figure 1 and Maps 1 and 2** indicate the scale of the proposal, and show how it would be far from entirely swallowed even by the very large scale of the historic environment of quarrying (area 14). The small scale of proposed ancillary structures (see **Figure 3**) lessens the impact of the proposal on the historic industrial landscape.

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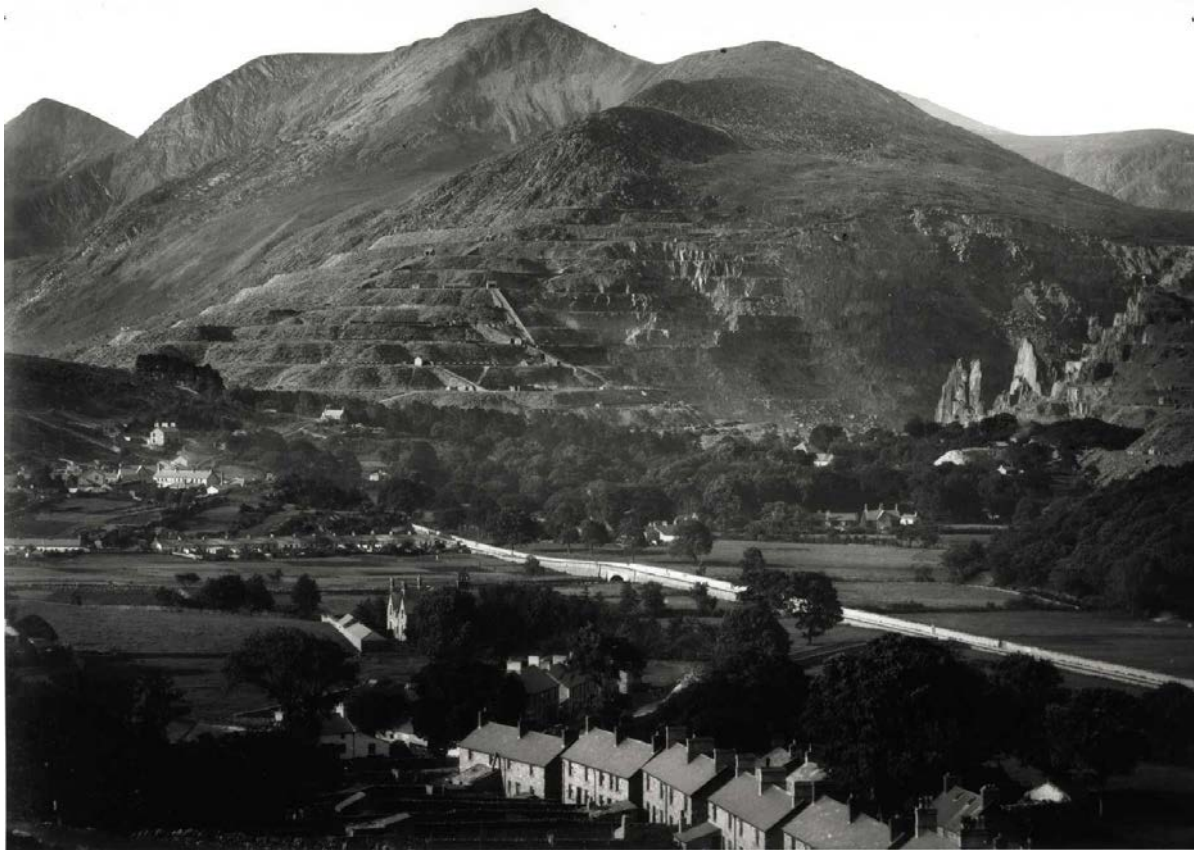
**Figure 13:** *This view from the Hut Circle Settlement at Ffô's Coetmor Scheduled Monument (CN263) and from HLCA 37 (enclosed fields above Bethesda) illustrates the limited visibility between this particular character area's historic assets and the proposed development. This location lies without Parc Eryri (Snowdonia National Park).*





**Figure 14:** *This view from the Moel Faban prehistoric settlements and enclosures Scheduled Monument (CN210) and from HLCA 36 (unenclosed mountain, North Carneddau) towards the south-west overlooks the improved fieldscape around Tyddyn Sabel and the two isolated cottage rows at Tan y Foel towards Braich Melyn, with the quarry cut into the slopes of y Fronllwyd in the distance. At a distance of over 2.5km, the quarry and Zip World roads are prominent. The proposed development would span the quarry pit with the large tip of waste rock shown in **Figure 5a** as a backdrop. This photographic location lies within Parc Eryri (Snowdonia National Park).*

This report considers that it will not be unambiguously **severe** (*ie that it will be at the lower end of the 'severe' category*) in the wider setting for several reasons. As **Figure 14** shows, from a distance, the quarry landscape of galleries and tips is on a large scale and is robust, with the capacity partially to subsume the proposed development. From the slopes of Moel Faban, the entire quarry landscape is apparent, and its features can be clearly discerned in anything other than misty or very wet weather. The eye is drawn, particularly in rainy or very sunny conditions, away from the centre to the roads from the lower quarry levels to the present workings on the 'right side' and to the visitor attractions on the 'left side', just as from the 19<sup>th</sup> century until the 1960s, the inclined planes on which the quarry relied for internal movement would have drawn the eye away from the main workings (**Figures 15** and **16**).



**Figure 15:** This late-19<sup>th</sup> century view shows the prominence of the inclined planes as visual features within the 'left side' of the quarry.



**Figure 16:** This view of Penrhyn quarry dated 1966 shows the transition period from railways to dumper trucks and fork-lifts, and shows how inclined planes were still the prominent features in the quarry landscape, as are roads now. © NMGW: 2018.6/38.

The view from Moel Faban towards the quarry is significant in several other respects. It takes in features from the Bronze Age to the present day. The precise nature and characteristics of the Prehistoric elements here are a matter of professional interest to archaeologists but it is evident to anyone with a feel for her or for his environment who explores this immediate area and looks to the south-west that the vista encompasses 'deep time' near at hand and the historical time of agricultural improvement and of the industrial revolution further away. The landscape of leisure, tourism and the 'white knuckle ride' is already present in this landscape, and will in time become an historic element in its own right.

It is in this connection that the cumulative impact of the proposed development and other existing but recent adventure tourism developments needs also to be considered. The introduction of these features at different stages since 2013, a period of ten years, has undoubtedly had a considerable impact on the historic environment, but there is currently little consensus as to how cumulative impact such as this can be assessed within the context of current Cadw advice.

*Stage 4: consider options to mitigate or improve the potential impact of a proposed change or development on that significance.*

Options to mitigate or improve the potential impact of the proposed development will be evolved following discussion between **Zipworld**, the site-owners, Cadw, the local authority and other interested parties. However, well-chosen colour schemes would enable the proposed development to blend in with its environment. Cumulative impact should be addressed by the evolution of a long-term plan for the tourism offer within the post-industrial parts of the Penrhyn Quarry landscape.

#### **8.4 Summary**

The proposed development will, on present evidence, have a **fairly severe** impact on the setting, **both the immediate and wider setting**.

#### **8.5 Recommendations**

The appearance of the proposed swing is subject to a design process that includes consideration of the conclusion of this report, the pre-application process and consultation with other stakeholders including the site-owners and Cadw. It is recommended that this design process determine appropriate colour schemes with the potential to reduce any potential adverse heritage impacts. Mitigation should be discussed between stakeholders, and concerns about cumulative impact should be addressed by an agreed long-term plan.



## **9 PROJECT ARCHIVE**

Copies of the present document have been provided to the client and lodged with the HER and with the NMR.

## **10 BIBLIOGRAPHY**

### **10.1 Published sources**

Lindsay J 1974. *A History of the North Wales Slate Industry*. Newton Abbot.

Boyd JIC 1985. *The Penrhyn Quarry Railway*. Oakwood.

Gwyn D 2000. 'Hoisting Machinery in the Gwynedd Slate Industry', *Transactions of the Newcomen Society* 71 (2). pp. 183-204.

Gwyn D 2015. *Welsh Slate: History and Archaeology of an Industry*. Aberystwyth.

Emmett J. *Building Capacity and Good Practice in Registered Historic Landscapes*. GAT Report No 338 for NRW.

### **10.2 Existing archaeological records**

GAT: *The Slate Landscape of Northwest Wales World Heritage Site Nomination Field Survey and Character Area Production 2018-19*: G1480

Archives of Plas Tan y Bwlch 'practical industrial archaeology' courses

RCAHMW NMR site file Caernarfonshire/Ind/SH 66 NW (Rex Wailes files)

GAT HER, Enquiry Report - Core Records: reference number: GATHER1934, prepared by Derby, S.

In view of the extent of the archaeological data, assessment of the setting of the proposed development has been carried out on the basis of inter-visibility with Scheduled Monuments, as further informed by key historic landscape characteristics as set out in section 7, and by the identified attributes of this component part of the World Heritage site. The volume of data is otherwise so overwhelming as to be impractical.

(end of document)