PEN YR ORSEDD SLATE QUARRY

ARCHAEOLOGICAL ASSESSMENT

Report No. 275

Ymmddiriedolaeth Archaeolegol Gwynedd

Gwynedd Archaeological Trust

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ARCHAEOLOGICAL ASSESSMENT (G1508)

prepared for

Alfred McAlpine Slate Penrhyn Ltd

November 1997

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ARCHAEOLOGICAL ASSESSMENT

1. INTRODUCTION

Alfred McAlpine Slate Penrhyn Ltd at Penrhyn Quarries has commissioned Gwynedd Archaeological Trust (Contracts Section) to carry out an archaeological assessment of all land within the quarry permission at Pen yr Orsedd Quarry, Nantlle.

2. ASSESSMENT BRIEF

An initial report was requested from the Gwynedd Archaeological Trust assessing the importance of all the archaeological remains, ranging from the Prehistoric to the Industrial period.

The basic requirement was for a desk-top study and field-search of the quarry permission area. The importance and condition of known archaeological remains were to be assessed and new sites identified. Measures to mitigate possible damage to the archaeological resource were to be suggested.

Gwynedd Archaeological Trust's proposals for fulfilling these requirements were as follows:

a) to identify and record the cultural heritage of the area

b) to evaluate the importance of what was identified, both as a cultural landscape and as the individual items which make up that landscape

c) to recommend ways in which damage to the cultural heritage could be minimised.

3. METHODS AND TECHNIQUES

3.1 Desk-top study

Consultation of the quarry archive and other written records was carried out in the Caernarfon Record Office of the Gwynedd Archives Service. The Gwynedd Archaeological Trust's Sites and Monuments Record was also consulted, as were the relevant volume of the Royal Commission on Ancient and Historic Monuments (Wales) Inventory, Alun Richards *Gazetteer of the Welsh Slate Industry* and James Boyd's *Narrow Gauge Railways in North Caernarvonshire.*

3.2 Field Search

A field visit was undertaken by Trust staff. Features identified were marked on the current 1/10,000 ordnance survey map and on the 1915-16 25" County Series and on the map provided by Alfred McAlpine Ltd.

3.3 Consultation

Dr Michael Lewis of the University of Hull was consulted and permission given to make use the of the study carried out in connection with the Hull University/Snowdonia National Park Practical Industrial Archaeology courses carried out in 1996 and 1997. In addition the following report also derives in part from discussion with former Pen yr Orsedd quarrymen and staff, including the late Dafydd Lisa Anne, Nantlle, Bobi Humphries, Maes Llyfnwy, Tal y Sarn, Jac Tomos, Bro Silyn, Peredur Hughes, Porthmadog, and Brynley Jones, Carmel.

3.4 Statutory protection and description.

The blondin ropeways and associated structures at Pen yr Orsedd Quarry are a Scheduled Ancient Monument (C208). Six areas which include hut circle settlements and field systems have also been Scheduled as Ancient Monuments in the area 1km to the east of the quarry.

3.5 Report

The features on the site were assessed and allocated to the categories listed below. These are intended to give an idea of the importance of the site, and specific recommendations for further evaluation or mitigatory measures. The criteria used for allocating sites to categories are based on those used by the Secretary of State when considering ancient monuments for scheduling. These are set out in Welsh Office Circular 60/96 Planning and Environment: Archaeology.

3.6 Categories

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

Category A - Sites of national importance.
Scheduled Ancient Monuments, Listed Buildings and sites worthy of scheduling or listing *i.e.* those which would meet the criteria for scheduling (ancient monuments) or listing (buildings) 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.
Sites which are not of sufficient importance to justify a recommendation for preservation if threatened.

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

Category D - Minor and 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 or, 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. By the end of the assessment there should be no sites remaining in this category.

3.7 Definition of Mitigatory Recommendations

Where a feature of archaeological significance is affected, mitigation measures will be included in accordance with current policies as recommended in Circular 60/96 for rescue archaeology.

For the purposes of this report the mitigation and rescue archaeology proposals have been divided into various levels of recording, which can be summarised as:

Level 1: Minimal recording

a. A photographic record of principal external views. The photographs to be dated and indexed. Negatives should be indexed and suitably stored for archive.

b. A brief summary description, related to the photographic record as appropriate.

Level 2: Basic recording

a. A photographic record of all principal elevations and selected features of particular interest. Photographs to be taken, as much as is possible, at right angles to the face of the feature and should include a scale. There should also be a few general photographs to set the site in context.

The photographs to be indexed as for Level 1 and related to a basic site plan which might be taken from a published OS map as appropriate.

b. A simple description of the visible remains relating to the photographic record.

Level 3: Basic recording with survey

As Level 2 recording, but to include:

c. A measured survey of the ground plan of the site or structure at an appropriate scale (1:200 for buildings or 1:500 for larger areas where individual buildings are of no great significance).

Level 4: Full photographic record

a. A photographic record of all external and, if appropriate, internal elevations as well as any features of particular interest. The photographs should be taken, so far as is possible, at right angles to the face of the feature and should include a scale. They should be reproduced at a scale where, for example, individual stones may be identified. Steps should be taken to minimise distortion, (*eg* by use of a shift lens) and achieve a consistent scale. These photographs should be supplemented with general photographs showing the site in its setting and, if composite photographs are necessary to cover a large feature or elevation, then general shots of the feature should be included. The photographs to be indexed as for Level 1, and related to a site plan.

b. A general description and a description of all the principal features.

c. A measured survey of the ground plan of the building or site at an appropriate scale as for Level 3.

Level 5 Full record

This would normally include the full photographic record as described for Level 4, but would be supplemented by a measured survey surveyed to no more than a 1% error. The record may be supplemented by elevations and sections, where appropriate, drawn at a scale consistent with the plans. Individual features should also be surveyed and drawn to scale. The full record would include a detailed description, including measurements wherever necessary.

Preservation *in situ*: it is recommended that features considered to be of national importance be preserved *in situ*.

N.B. Recommendations within the gazetteer (4.4 below) would only take effect if the site referred to is to be disturbed.

4. ARCHAEOLOGICAL FINDINGS AND RECOMMENDATIONS

4.1 Location

Pen yr Orsedd quarry is situated on the northern slopes of Dyffryn Nantlle, in the community (formerly civil parish) of Llandwrog at grid ref: SH51005380 within the county of Gwynedd. It is one of the major sites of the Nantlle slate district, extracting the rock from pits on the hillside slopes. Its workings and tips dominate the northern side of the valley, and the village of Nantlle was built to house the quarry's workforce.

4.2 Historical background.

4.2.1 Pre-modern

Dyffryn Nantlle has seen human occupation since, in all probability, the Bronze Age, as there is a strong likelihood of the copper ores which outcropped at Drws y Coed having been exploited in Prehistory. Evidence of later Prehistoric occupation is to be found in the field systems on the western slopes of Mynydd Mawr, near Caeronwy, in hut circles and field systems identified between Pen yr Orsedd and Fron quarries, as well as at the hill-fort at Bryn Engan.

In the Medieval period it is known that the area of land known as Baladeulyn on the valley floor at the foot of the quarry formed one of the demesnes surrounding a *llys* of the Princes of Gwynedd, and became the property of the crown of England after the Conquest, being made over to Queen Eleanor of Castile. Edward I stayed there in 1284 for several weeks. Possibly the *llys* itself was situated near the sub-medieval house known as Ty Mawr at SH 5086 5333. The valley is mentioned several times in the fourth branch of the *Mabinogion*, not only Baladeulyn itself, where Gronw Pebyr transforms Lleu Llaw Gyffes back into the semblance of a man but also Dol Pebin, Maen Dylan and possibly Bryn Engan, which has been suggested as the site of Math fab Mathonwy's court of Caer Dathyl. However, in this time the valley appears to have been sparsely populated and comparatively remote, and it is thus that it is depicted in Richard Wilson's famous landscape, *Snowdon from Llyn Nantlle*, painted in the 1760s and preserved in the Walker art gallery.

4.2.2 Modern and Industrial period

Wilson's landscape shows no evidence of industrial activity, but it is known that the scale of local economic activity was beginning to intensify in the late eighteenth century, leading to the reopening of the copper mines at Drws y Coed, by this time part of Assheton Smith's Vaynol estate, and to the quickening pace of the local slate industry, which appears to have been in being since at least Pre-conquest times. Work had begun at Pen yr Orsedd by the end of the eighteenth century, and from 1816 onwards was prosecuted more vigorously by William Turner, a quarry entrepreneur from the lake district who had already had experience of slate and copper workings in Wicklow, Dyffryn Conwy and Blaenau Ffestiniog..

The construction of the Nantlle Railway, a 3' 6" gauge horse-worked public railway, to a terminus near the quarry in 1828 would have substantially reduced transport costs, even more so after a short extension was constructed to the quarry itself in perhaps 1832. This connected to an internal railway network, organised around a series of counter-balanced inclines, also to the 3' 6" gauge. There were also lines from the working faces to the *gwaliau* and the tips. There are hints that the first internal rails in the quarry was a cast-iron plateway, but by the 1860s movement of raw blocks and of rubble was being carried out on 2' gauge edge rails, such as were then commonplace throughout the Welsh slate industry.

There is little other evidence of technical development in the first half of the nineteenth century, however, and the quarry appears to have grown very little between the 1820s and the 1860s. At some stage, probably during the period when the manager was Miss Lydia Cane, a chain incline to raise wagons from the main working pit was installed, operated by a water-wheel; another water-wheel immediately adjacent may have pumped or may have offered augmented power to the chain incline. It is possibly that this was installed *c.* 1848 when an extensive water-powered system to serve Pen yr

Orsedd's neighbour, Pen y Bryn quarry, was installed, whose supply leat passed through Pen yr Orsedd and certainly came to be used by them to power machinery. Chain inclines are effectively aerial ropeways steeply inclined from a working bank to a quarry pit along which a traveller carriage runs from which a dependent rope lifts a wagon, and were originated at Delabole slate quarry in Cornwall in perhaps the 1830s. The technology reached Dyffryn Nantlle in the early 1840s when a Cornishman by the name of Gullet arrived from Delabole to run Pen y Bryn quarry, and the example was not lost on neighbouring quarries.

The first serious change in the quarry's existence however, came in 1862, when a partnership of which W.A. Darbishire was a leading light took over the quarry from John Lloyd Jones, a notorious speculator who had acquired the lease in 1848. Darbishire came from a family that had recently settled at Pendyffryn near Penmaenmawr in the wake of the construction of the Chester and Holyhead Railway, of which his father had been secretary, and may have been involved in land-speculation along the route. William Darbishire was to leave his mark on the quarry in several different ways; as a Unitarian in religion and a Liberal in politics, he regarded business enterprise as a mutually beneficial relationship between capital and labour, and firmly believed that the workforce deserved proper treatment and housing. Accommodation for the quarrymen was constructed which took the form of a purpose-built village, grafted onto an existing development along the Pen y Groes to Rhyd Ddu road and also of barracks in the village and in the quarry itself. The dwellings in the village are an excellent example of a planned nineteenth century slate-quarrying community, contrasting with the more *ad-hoc* development of other settlements in the valley.

As an engineer, Darbishire seems to have believed also in an intensive factory approach to quarry management. The purchase of a lease by this new partnership therefore led to substantial investment in the quarry, reflected in the provision of mills making use of both water and steam power.

A map of Pen yr Orsedd prepared for W.A. Darbishire in 1862 (CRO Pen yr Orsedd 375) shows a quarry that had barely begun the process of mechanisation, in which the raw blocks of slate were processed entirely by hand in the traditional open booths, known in Welsh as *gwaliau*. This was soon to change. Pen yr Orsedd's first mill, intended to produce mechanically-sawn slabs, was under discussion in November 1867, when it was proposed to construct a steam-powered mill for two small tables on level 4. When it came into being the following year, it was slightly more ambitious; a new steam engine had been bought for it instead of the second-hand one they originally proposed to use, a Hunter saw had been ordered for £200 and a 9' by 5' planer for £100. This is now the oldest surviving quarry mill in the Nantlle valley. Small independent slab mills may have existed from the early nineteenth century, and Melin Griffith at Dorothea was built *c.* 1840, but no trace survives of them.

In 1875 the DeWinton foundry in Caernarfon drew up plans for a two-gable mill to produce roofing slates on level 6, colloquially Bonc yr Offis, in which the blocks were to be mechanically sawn and dressed, though the process of splitting was to be carried out by hand. When it came into being, it was served by three longitudinal railways, and powered by a water-wheel set in its north-west gable end and an auxiliary steam engine. This complex was evidently in existence by 1877, when a further set of plans, once again from the DeWinton drawing office, shows an extension to the north-west, giving a large structure with a central power-source. The valuation of 1907 records a 30' water-wheel here, as well as a double cylinder 14" X 18" Robey steam engine, dating from 1903, and a boiler of 1899.

Very shortly afterwards, or contemporaneously with the Bonc yr Offis mill, a further roofing-slate mill on the level 4 was built next to the slab mill, and housed twenty-seven DeWinton hydraulic feed saw-tables and twenty-six dressers. It was initially powered by a wire rope transmission from the water-wheel and steam engine power-sources in the Bonc yr Offis mill, until after 1906, when electric motors were installed in the roof trusses. Its position downslope from the Bonc yr Offis mill would have made it ideally suited to the conventional water-power system whereby a sequence of water-wheels from the same flow could have operated them. However, Pen yr Orsedd suffered from a legal constraint, whereby water had to be delivered to the neighbouring Pen y Bryn quarry at a certain level; this lay above the level of the no. 4 mills, but below no. 6.

This building exemplifies the intensive factory approach to slate processing adopted at Pen yr Orsedd after the experimental mills of the period 1860 to 1874 elsewhere in the slate industry, in which the hand-processing work areas are not separated from the mechanical processing.

Other instances of mechanisation recorded in this period are the first members of what were to become a fleet of steam locomotives. *Starston* and *Baladeulyn* were experimental prototypes built by the Caernarfon firm of DeWinton, to whose products the quarry remained loyal for as long as they operated. Later steam locomotives came mostly from Hunslets of Leeds, and from 1945 the quarry also made use of diesels by Ruston Hornsby of Lincoln. Steam locomotives were used possibly as late as 1960, and all rail transport ceased in 1978-9.

By the end of the nineteenth century the focus of workings had shifted to the north, and the original pit worked in the 1860s was being tipped over to form a new working level known as Eureka or Bonc Brig, on which a mill was constructed in 1898. This remained in use until 1997. It was built to house thirty-three saw-tables and thirty-two dressers, and was powered by a compound condensing horizontal steam engine It was substantially rebuilt with modern equipment in the late 1960s and was further altered after the abandonment of rail transport in 1978-9. In order to reach the workable slate, chain inclines and blondin ropeways were installed from this level.

In 1904-6 Pen yr Orsedd quarry was working on an extensive scale with 161 men working inside, and 362 outside and was undergoing a second wave of investment in new technology, which was effectively to see it through to 1978. Henceforth three-phase electrical power supplied by the North Wales Power and Traction Company's Cwm Dyli power station was to power the ropeway systems, the level 6 mill and the larger of the level 4 mills. The internal railway system continued to be operated by steam locomotives, and the exit railway from the stackyards by the mills to the standard gauge railway at Tal y Sarn station by horses, as it had been since 1832, and as it was to remain until 1963.

Similarly, hydraulic power remained important. Not only did a pressure system continue to drive the saw-tables in the mills, but a water-wheel continued to pump out William quarry. The other pits were drained by an extensive underground system driven in the 1870s, but for reasons which are not clear, William quarry was not connected to this. The same water-wheel also operated the chain incline which hauled out of Wern Ifan quarry, until it was replaced by an electrically-driven blondin in 1926.

Pen yr Orsedd quarry continued to work along much the same lines for the next seventy years. Use of the level 4 mills ceased during the second world war and of Bonc yr Offis in 1946, apart from some small-scale working into the 1960s. The last run of slate went down the remaining stub of the Nantlle Railway to Tal y Sarn station in 1963, and thereafter the quarry relied on road transport to take away the finished product. The 3' 6" gauge rails were lifted below the foot of the level 6 to Eureka incline in 1970. But the 2' gauge system, a short length of the 3' 6" gauge to a lorry loading bay, and the blondins remained in use until closure came in 1979, after the same company had run the quarry for 126 years.

Plans were discussed in 1976 to open a narrow-gauge railway museum on the site, and a number of locomotives and other heritage items were delivered, but further counsels led to their removal to Gloddfa Ganol in Blaenau Ffestiniog.

The quarry was bought by the Ffestiniog Slate Quarries Company Ltd trading as the Nantlle Slate Quarry Company Ltd in March 1979, and reopened making use of road vehicles from the working face to the Eureka mill, now equipped with substantial diamond saws.

Accommodation for the quarrymen was provided after the Darbishires arrived on the scene, in the form of a purpose-built village, grafted onto an existing development along the Pen y Groes to Rhyd Ddu road and also of barracks in the village and in the quarry itself. The dwellings in the village are an excellent example of a planned nineteenth century slate-quarrying community, contrasting with the more *ad-hoc* development of other settlements in the valley. The social concerns of the family are evident also in the provision of a handsome chapel, now demolished and in the absence of a pub in the village of Nantlle.

4.3 Archaeology of the quarry area.

Existing surveys by Gwynedd Archaeological Trust have identified Pen yr Orsedd quarry as an outstanding industrial landscape, and courses pursued jointly by the University of Hull and the Snowdonia National Park Studies Centre at Plas Tan y Bwlch have established the significance and function of certain of the features at the quarry, and have carried out some measured surveys. The quarry forms part of an area defined as a Landscape of Exceptional Historic Interest in the recent report (Kelly 1994) commissioned by the Countryside Council for Wales, Cadw and Icomos UK (International Council on Monuments and Sites) for its "prehistoric settlements and field systems, slate quarries and settlements, Mabinogi and poetic landscapes, Richard Wilson's Snowdon."

4.3.1 Extraction points and tip runs.

Pen yr Orsedd was observed to be typical of slate-quarry practice in the Nantlle district in that slate was extracted from deep sheer-sided pits and hauled up to the working levels by means of ropeways. The pits which remained in operation until 1997 show evidence of modern roadways having been constructed to the working faces, and generally reflect modern quarry practice. A substantial fall on the northern face has obliterated a number of features which survived until recently.

4.3.2 Processing

The archaeological and documentary record makes it clear that Pen yr Orsedd pioneered an intensive factory-style approach to the processing of slates, constructing extensive mill-buildings on a factory-basis. without making use of separate areas for splitters. Whilst slab mills have been a feature of the industry since Penrhyn Quarry's Felin fawr opened its doors in 1803, and integrated mills for the production of roofing slates were introduced from the 1850s onwards, Pen yr Orsedd appears to have been a leader in the field and its approach contrasts with the much more conservative approach adopted at Penrhyn quarry in the last decades of the nineteenth century, where practically no attempt was made to mechanise the production of roofing slates. Its mill buildings therefore constitute an important component of the historic landscape of the quarry.

4.3.3 Power

As well as the intensively engineered approach implied by the extensive mill buildings at the quarry, the power systems used illustrate the progression from standard nineteenth century power sources to the state of the art technology brought in by the North Wales Power and Traction Company. North Wales has been recognised as a world-leader in the field of electricity generation in the years 1900 to 1925, and Pen yr Orsedd was one of the first two industrial sites (with Oakeley quarry at Blaenau Ffestiniog) to make use of remotely-generated alternating current. In this respect its surviving archaeology is of international importance. However, this new technology went to work alongside elderly steam locomotives, horses and water-wheels, and the quarry's ingenious use of hydraulic power also adds to the importance of this site.

4.3.4 Transport

Internal transport was carried out from the very early nineteenth century to 1979 by a variety of narrow-gauge railway systems, which certainly included 2' and 3' 6" gauge edge railways and quite possibly a plateway system in the early days as well. Motive power was variously horse, hand, steam and petrol, and the quarry made extensive use of the DeWinton vertical boiler locomotives.

Transport of the raw blocks from the pit to the processing areas was also observed to be carried out by a variety of aerial ropeway systems, including the chain incline, introduced to the area from Cornwall in the 1840s, and the blondin ropeway, devised in the freestone quarries of Aberdeen from the 1870s onwards and introduced at Pen yr Orsedd from 1898. The survival of the three of these systems on level 8 adds very considerably to the importance of the site as a whole, and their significance has been recognised by their designation as Scheduled Ancient Monuments.

4.3.5 Ancillary structures

Pen yr Orsedd quarry was observed to contain a number of ancillary buildings, some in a good state of preservation. These included offices, carpenters' shops, a smithy and weighbridge houses. Pride of place, however, must go to the workshop complex on Bonc yr Offis, which contained until recently a remarkably fine array of early twentieth century machine tools, and remains a well-designed structure, a tribute to the skill and ingenuity of the craftsmen who worked in it.

4.3.6. Domestic structures

The few domestic structures constructed within the quarry itself are of a pleasing design, and the cottages on level 6 in particular are of national importance for their ornateness and their survival within the quarry landscape as a whole. The hospital is witness to the social concerns of the Unitarian management, also reflected in the buildings of Nantlle itself and Baladeulyn chapel.

4.4 Gazetteer of Archaeological Sites

Pen yr Orsedd Quarry has been worked from six major pits, known as Wern Ifan (SH 507 537 C), Green Quarry (SH 507 537 C, now buried), Arthur (SH 506 538 C), William (SH 505 539 C), Ellen (SH 506 541 C), Eureka (SH 507 542 C) and Twll Mawr or New Quarry (SH 509 543 C), as well as earlier workings, now buried such as at SH 509 541 C or long-disused, such as Ceunant y Glaw (SH 511 543 C). The processing and tipping levels were numbered in the quarry sequence from the bottom upwards, and this is used here; the main levels were 3 (the level of the Nantlle Railway), 4 (Bonc Isa'), 6 (Bonc yr Offis) and 8 (Bonc Brig).

1. Shaft-head *Category C*
NGR: SH 5084 5349
A shaft on the west side of the access road on the quarry's western drainage system; this leads from an opening south of the house known as Ty Mawr and which served Wern Ifan, Green Quarry, Arthur, William and Ellen. This was driven from the late 1870s, and it is believed that it can be followed for most of its length by suitably equipped personnel. The shaft head consists of a low slate wall retained by iron rails, with slate slabs laid across the opening.

Recommendations: level 1 recording.

2. Shaft-head *Category E*
NGR: SH 5079 5362
A depression in the ground at this point may correspond to a further shaft in the western drainage system; recent underground exploration by members of the Hull University/Plas Tan y Bwlch Practical Industrial Archaeology course suggests that there may be a danger of collapse here.

Recommendations: level 1 recording.

3. Marshalling yard *Category B*
NGR: SH 5078 5360
The site of the former level 3 marshalling yard at the foot of the lower incline to level 4 of Pen yr Orsedd quarry. The railway access is believed to have been constructed in 1832 and remained in use until 1963. The site of the yard is now heavily overgrown.

Recommendations: level 2 recording.

4. Structure *Category B*
NGR: SH 5076 5359
Situated to the north of the marshalling yard, orientated east to west, including a weighbridge house at its western end and a *caban* on the eastern. It is built of sawn and unsawn slate blocks. The roof timbers and some slates survive over the weighbridge site.

Recommendations: level 3 recording.

5. Stable block *Category B*
NGR: SH 5079 5359
A substantial stable block, orientated east to west alongside (3), built out of unsawn slate slabs, now roofless and badly dilapidated, overgrown by deciduous woodland. The walls survive up to 2m high in places but the collapse of the south longitudinal wall seems imminent. A water-course passes the western gable end, which may have powered a wheel, possibly for a chaff-cutter.

Recommendations: level 3 recording.

6. Incline and drumhouse *Category B*
NGR: SH 5087 5365
The trace of a counterbalanced incline from level 3 to level 4 (Bonc Isa'); a roadway has been driven through the incline course, destroying the lower part, but the drumhouse survives in excellent condition, with its brake mechanism, drum and some rails *in situ* and its roof largely intact.

Recommendations: level 4 recording.

7. Locomotive shed *Category B*
NGR: SH 5085 5365
Constructed in 1878 for the locomotive *Kelso*, and subsequently extended to hold a second locomotive. It is built out of slate blocks. Some of the roof timbers survive, but the slates have been removed. It is believed latterly to have been used as a garage for the manager's car.

Recommendations: level 4 recording.

8. Structure *Category C*
NGR: SH 5089 5366
Built in two phases, perhaps in the 1920s, possibly a weighbridge house to record wagons coming down the incline from the higher level grafted on to a *caban*. Now roofless.

Recommendations: level 3 recording.

9. Weighbridge house *Category D*
NGR: SH 5087 5367
A post-war structure, built out of breeze blocks with a monopitch roof. Part of an Avery weighbridge mechanism survives damaged by the door, and the weighbridge itself survives intact. This feature is believed to have been installed when lorries came to be used for transport of the finished slates.

Recommendations: level 2 recording.

10. Slab mill *Category A*
NGR: SH 5088 5369
The floor 4 slab mill, roofed and substantially complete, containing a smithing hearth and the base of what may have been a crusher. It is the oldest surviving mill in Dyffryn Nantlle, and was built to house the planer which now survives in a lean-to on the large Bonc yr Offis mill as well as a Hunter patent saw. The mill exemplifies the experimental stage of mechanical slab processing in Nantlle.

The building is intact and in good condition. There are some slipped slates on the roof, and part of the crusher base is becoming dilapidated. It was recorded by students on a Plas Tan y Bwlch/Hull University course in August 1996.

Recommendations: preservation in situ.

11. Slate mill *Category A*
NGR: SH 5087 5373
The floor 4 integrated slate mill, with a dual pitch roof, from which the slates have very recently been removed. A substantial structure; though the DeWinton hydraulic feed saw tables with which it was

formerly equipped have been removed, the line shafting survives. It was recorded by students on a Plas Tan y Bwlch/Hull University course in August 1996.

The substantial king-post trusses are listing badly to the north-west, and the north-west gable wall in particular is in danger of collapse above eaves height. There is a crack in the longitudinal wall near this point. Some of the purlins have snapped.

Recommendations: preservation in situ.

12. Rope support *Category A*
NGR: SH 5089 5376
A slate and brick-built structure which formerly carried a sheave to transfer a wire-rope drive to (**11**) from (**32**) by means of (**13**). Though this feature still stands to its full height of 4m. there has been considerable dilapidation on the north corner. It was recorded by students on a Plas Tan y Bwlch/Hull University course in August 1996.

Recommendations: preservation in situ.

13. Sheave support *Category A*
NGR: SH 5094 5380
A slab-built sheave base to transfer power from (**32**) to (**11**) by means of (**12**). This feature stands up to its original height of 4m+ and appears stable.

Recommendations: preservation in situ.

14. Structure *Category B*
NGR: SH 5090 5376
A slate-built structure which has suffered some dilapidation and whose roof has suffered further recent collapse. Possibly a stable; not marked in 1862 but the use of heavy slates from the old pit suggests a construction date not long afterwards.

Recommendations: level 3 recording.

15. Privy *Category B*
NGR: SH 5091 5379
A slate-built privy, substantially intact. A number of *englynion* have been scratched on the whitewash of the slab stalls.

Recommendations: level 2 recording.

16. Adit mouth *Category A*
NGR: SH 5091 5379
A corbelled adit mouth; an excellent example of a type of construction extensively used in the slate industry. This feature appears to be in good condition and to be under no apparent threat.

Recommendations: preservation in situ.

17. Ropeway winding house. *Category A*
NGR: SH 5076 5370
This structure survives intact and roofed; it formerly housed a stationary steam engine for winding a chain incline ropeway into Wern Ifan quarry, immediately to its west. It exemplifies one method of uphaulage commonly used in the Nantlle quarries, and one particular type of prime mover. The survival of the slab and concrete base for the engine illustrates the internal arrangements that prevailed here. The catslide extension on the north of this feature is built very near the edge of the pit, and the walls have cracked. The main engine house appears to be stable at the moment, but problems may arise if the made-up ground underneath crumbles any further.

Recommendations: preservation in situ.

18. Ropeway winding house *Category A*
NGR: SH 5083 5374
A slab-built structure dating from 1929, intact apart from a few slipped slates on the roof and a crack in the southern longitudinal wall. The concrete base for the electric motor that it housed, which wound the blondin ropeway from Wern Ifan quarry, survives intact, and makes clear how these features were installed. On the internal wall are three murals, each enclosed in a painted disc, one of a dog's head and a potted plant, one of a bird on a branch, one of a horse's head. This feature appears to be stable.

Recommendations: preservation in situ.

19. Water-wheel pit. *Category A*
NGR: SH 5070 5380
A slab-built pit dating from 1889 for a backshot water-wheel which formerly operated both a flat-rod system through cranks whose marks are visible on the exterior walls of the pit and a chain incline ropeway into Wern Ifan quarry by means of a winding drum whose housing survives integral with the pit. The stonework is substantially complete, though there is some cracking in the winding-drum housing, which appears to be later than the wheel pit itself, perhaps dating from 1897. The timber supports and the holding-down bolts for the machinery remain. It was recorded by students on a Plas Tan y Bwlch/Hull University course in August 1996.

Recommendations: preservation in situ.

20. Launder pillars *Category A*
NGR: SH 5070 5380 to SH 5070 5381
A row of six slab-built launder pillars to carry water to (**19**). These appear to be stable.

Recommendations: level 3 recording.

21. Flatrod supports *Category A*
NGR: SH 5070 5380 to SH 5070 5381
A row of flatrod supports from (**19**), standing 1m+ high, thought to have been used at one time to operate a pump at Ellen quarry. These exemplify the variety of power-transmission methods used in this site. The condition of the surviving supports appears to be stable; the higher supports and the bellcrank base no longer survive.

Recommendations: level 3 recording.

22. Water-wheel pit *Category B*
NGR: SH 5060 5389
The upper water-wheel pit, constructed in 1878 to pump William quarry, later used to pump Ellen, Eureka and New quarry. The wheel was sold *c.* 1915-16. It is a three-sided wheelpit excavated into sloping ground, built out of slate slab.

Recommendations: level 3 recording.

23. Structure *Category B*
NGR: SH 5062 5390
A substantial slate-built structure, dilapidated and roofless, whose walls survive up to 5m high. A concrete machine base is evident.

Recommendations: level 3 recording.

24. Structure *Category C*
NGR: SH 5064 5392
A small, severely dilapidated structure, roofless, and which has suffered complete collapse of the western half.

Recommendations: level 1 recording.

25. Structure *Category D*
NGR: SH 5066 5391
A small structure whose slate-built walls survive up to 2m high, of uncertain function.

Recommendations: level 1 recording.

26. Structure *Category D*
NGR: SH 5071 5392
A small structure, roofless and dilapidated, possibly a *caban*. There are traces of rendering on the walls.

Recommendations: level 1 recording.

27. Ropeway anchorages *Category D*
NGR: SH 5066 5394
Anchorages for a blondin ropeway spanning Ellen quarry.

Recommendations: level 1 recording.

28. Locomotive shed *Category C*
NGR: SH 5075 5391
A shed capable of accommodating two Hunslet saddle-tanks. An inspection pit was noted. The walls survive up to eaves height and the roof timbers and some slates remain.

Recommendations: level 3 recording.

29. Incline and drumhouse *Category C*
NGR: SH 5075 5390
The drumhouse and trace of a counterbalance incline. The drumhouse has suffered severe dilapidation, and the collapse of the south-west facing gable seems imminent. Part of the brake mechanism survives *in situ*.

Recommendations: level 3 recording.

30. Compressor house *Category C*
NGR: SH 5081 5384
A compressor house dating from the 1920s, formerly used to supply air to William and Ellen, in good condition, with an intact roof. The concrete bases for a prime mover and the compressor itself survive, but the only ironwork to survive is the air receiving cylinder.

Recommendations: level 3 recording.

31. Privy *Category C*
NGR: 5093 5388
A six-stall privy, substantially complete, with an automatic flushing device *in situ*. Built after 1913.

Recommendations: level 3 recording.

32. Slate mill *Category A*
NGR: SH 5100 5383
An integrated slate mill built in stages from 1874, roofless and partly dilapidated, containing a water-wheel-pit, a mounting for a succession of steam engines and an electric motor, the remains of a hydraulic accumulator, a Caernarfon-made slate planer of 1867 in a lean-to, and a number of dressing-machine frames. Two of the mill's original hydraulic feed tables constructed by DeWinton

of Caernarfon in the 1870s have been removed very recently. These were left *in situ* when the mill equipment was scrapped in the 1970s.

The north-western part of the mill has been demolished above foundation level. The south-eastern part stands partly up to eaves height, but there has been substantial collapse in the gable wall and in the north-east longitudinal wall, with the possibility of further deterioration. The lean-to which houses the planer has lost most of its roofing slates but otherwise the condition of the planer and of the other machinery appears stable. The trusses have been stacked against the longitudinal wall. A measured survey was carried out by students on a Snowdonia National Park/Hull University course in August 1996.

Recommendations: preservation in situ.

33. Launder pillars *Category A*
NGR: SH 5102 5385
A series of launder pillars emerging from under a tip to supply water to the hydraulic saws and to the wheel in (**32**); by 1915 a branch had been built to serve (**19**). These structures appear to stand to their full original height and to be in a stable condition. A measured survey has been carried out by students on a Snowdonia National Park/Hull University course in August 1996.

Recommendations: level 3 recording.

34. Carpenter's shop *Category A*
NGR: SH 510 15387
A group of buildings which may have seen more than one phase of use but which is described as "carpenter's shop" in 1867. At one stage it may have been a dwelling. Built of unsawn slate slab, dilapidated and roofless. The structure appears to be stable apart from one gable wall which is leaning over.

Recommendations: preservation in situ.

35. Smithy *Category B*
NGR: SH 5098 5388
A structure is marked "smithy" here in 1862, and the present extremely dilapidated and roofless structures may date in part from this period or earlier. It may have included a dwelling.

Recommendations: level 4 recording.

36. Gwaliau *Category B*
NGR: SH 5104 5381
Traces of the *gwaliau* which preceded (**32**), and which existed by 1862 were noted at this point.

Recommendations: level 1 recording.

37. Workshops *Category A*
NGR: SH 5100 5376
An exceptionally fine example of a well-equipped quarry workshops, containing tuyere hearths, woodworking equipment, an overhead gantry crane and a locomotive turntable. The slate rubble ranges date from 1937-8, though there were clearly buildings on the site before this date. The corrugated iron building of 1900 is a fine example of a barrel-roofed corrugated iron structure, but is becoming progressively more derelict. A measured survey has been carried out by students on a Snowdonia National Park/Hull University course in August 1996.

Recommendations: preservation in situ.

38. Hospital *Category A*
NGR: SH 5098 5375

The late-nineteenth century quarry hospital, built on the main processing level. Constructed out of country rock with a brick chimney stack. This building is substantially complete but is losing its window frames and doors, and slates are slipping off the roof. Much of the internal plaster-work is intact. It has suffered recent damage from New Age Travellers. A measured survey was carried out by students on a Snowdonia National Park/Hull University course in August 1996.

The quarry war memorial formerly stood outside the hospital before its removal to Capel Baladeulyn. This is a particularly fine sculpture which includes carved scenes of the quarry at work.

Recommendations: preservation in situ.

39. Shed *Category B*
NGR: SH 5097 5378
Believed to have been constructed as a stores after August 1863; orientated north-west to south-east, the north-westerly half consists of open bays and the south-easterly is an enclosed office.

Recommendations: level 3 recording.

40. Office *Category A*
NGR: SH 5097 5376
The quarry office, believed to have been built in two stages, the westerly north-south orientated portion after 1862, the easterly east-west orientated section between 1899 and 1907. The facing doors through which men went in and out to collect their wages are evident. This building is substantially complete but is losing its window frames and doors, and slates are slipping off the roof. Much of the internal plaster-work is intact. It has suffered recent damage from New Age Travellers. A measured survey was carried out by students on a Snowdonia National Park/Hull University course in August 1996.

Recommendations: preservation in situ.

41. Cottages *Category A*
NGR: SH 5096 5374
A decorated, almost suburban, dwelling, built in 1868 as barracks for quarry workers and their families. This building is substantially complete but is losing its window frames and doors, and slates are slipping off the roof. Much of the internal plaster-work is intact. It has suffered recent damage from New Age Travellers. To the north-west is a garden with a privy. A measured survey has been carried out by students on a Snowdonia National Park/Hull University course in August 1996.

Recommendations: preservation in situ.

42. Marshalling yard *Category C*
NGR: SH 510 537 C
The main quarry marshalling yard; the low slate walls against which the slates were stacked survive.

Recommendations: level 1 recording.

43. Coal yard *Category C*
NGR: SH 5096 5369
A walled coal yard, in which a central depression survives for a turntable. Two 3'6" wagons survive here.

Recommendations: level 1 recording.

44. Incline and drumhouse *Category B*
NGR: SH 5092 5369
The intermediate exit incline on the 3'6" gauge system, constructed in the late 1860s or early 1870s, replacing an earlier axis. The drumhouse survives in excellent condition with the drum and the brake intact, and the course of the incline has been little damaged. Some rails survive *in situ*.

Recommendations: level 4 recording.

45. Locomotive shed *Category B*
NGR: SH 5105 5373
Built between 1899 and 1907, and adapted for use as a *gwal* for tip contractors in the 1950s. Built out of slate rubble, the walls survive up to eaves height, but the roofing slates have gone, leaving only some roof timbers. There is danger of collapse in the south wall.

Recommendations: level 3 recording.

46. Caban *Category B*
NGR: SH 5104 5373
Built between 1899 and 1907, adjacent to (**44**). Built of slate rubble with a pitched roof.

Recommendations: level 3 recording.

47. Shaft-head *Category C*
NGR: SH 5115 5389
A water-balance shaft constructed by DeWinton's Union Ironworks, Caernarfon, for the quarry in 1866-7. The shaft itself has now been covered with iron plates weighted down with slabs, but it proved possible in August 1996 to descend it to a depth of 176', at which point it becomes full of tipped debris. The headframe consisted of a return sheave mounted on four cast-iron columns, substantially similar to the surviving water-balance headframes at Penrhyn Quarry but slightly smaller in scale. It is believed to have been scrapped in the 1960s. Though the ordnance survey maps refer to the feature as a "pump shaft", there is no evidence that a pump was installed here. It reaches to the eastern drainage tunnel or "great tunnel", dug from 1863 to 1866, and which formerly drained the now-buried workings by means of a culvert which opens in Nantlle village and which is believed to be easily accessible.

Recommendations: level 1 recording.

48. Incline and drumhouse *Category B*
NGR: SH 5110 5398
A substantial counter-balanced incline plane connecting levels 6 and 8, crossing over a level tip railway on level 7 by means of a timber bridge, still partly intact. At the foot of the incline some rails survive; it is believed that the two sets of rails were to 3'6" gauge but that one was gauntleted with 2' gauge track to allow the passage of locomotives from level to level. Constructed between 1900 and 1915, and last used in 1970. The drumhouse has been partly demolished.

Recommendations: level 3 recording.

49. Magazine *Category B*
NGR: SH 5109 5387
Built out of slate rubble with a pitched slate roof; locked and bolted. There is a baffle built of slate rubble on the west side.

Recommendations: level 3 recording.

50. Incline and drumhouse *Category B*
NGR: SH 5105 5390
Part of the original transport axis to the quarry, in existence by 1840, and disused between 1862 and 1889, probably by 1874. The drumhouse survives as two stone walls by the east side of the modern road to the top level in the quarry, which passes over the original *crimp* (landing platform); immediately to the west of the road are two low walls which may have been part of the brake arrangement. The incline itself is much degraded and appears to have been pierced by the launder pillars (**33**) to the Bonc yr Offis mill.

Recommendations: level 2 recording.

51. Steps *Category B*
NGR: SH 5093 5388 to SH 5092 5396
A set of slate steps connecting level 6 to level 8.

Recommendations: level 1 recording.

52. Slate mill *Category B*
NGR: SH 5093 5400
The Eureka mill, constructed in 1896 and originally powered by a steam engine. Substantially adapted to accommodate diamond saws in the 1960s and once again to admit road vehicles in the period 1978-79, the core of the mill nevertheless remains a last-century building. Orientated north-west to south-east, it is a two-bay mill, each of which has a half-hipped pitched roof with skylights along the crown. The south-east facing gable is in danger of collapse and has been shored up.

Both bays were initially accessed by railways in the gable ends, and a doorway has been cut in the north-east facing longitudinal wall to admit tracked vehicles. A breeze-block extension with a corrugated-iron roof has been built to the north-east, uniting the mill building to a smaller structure with a monopitch slab roof built out of slab blocks.

The mill contains some modern Anderson Grice saws, and one slate dresser; the others have been removed. A conveyor belt has been installed to take trimming waste out through the south-east facing gable.

Recommendations: level 4 recording.

53. Oil tank *Category C*
NGR: SH 5081 5407
An oil tank on a slate plinth.

Recommendations: level 1 recording.

54. Structure *Category C*
NGR: SH 5084 5407
Possibly a *caban*; built of slate rubble with a slate roof, and in good condition.

Recommendations: level 1 recording.

55. Ropeway system *Category A*
Scheduled Ancient Monument
NGR: SH 5072 5426 to SH 5085 5407
A blondin ropeway system extending across the New Quarry to a lattice-work mast on level 8. At the foot of the mast (SH 5085 5407) a pulley set in steel frames turn the haulage ropes through 90° angles to a further set of pulleys whereby they reach the engine house at SH 5085 5404. This is of slate rubble construction, roofed and in substantially good condition. The winding drum is a substantial casting, formerly operated from a Bruce Peebles three-phase motor of 1906 through reduction gearing. The motor survives, as does the control mechanism and the liquid controller.

Recommendations: preservation in situ.

56. Weighbridge house *Category B*
NGR: SH 5086 5406
A pitched roof weighbridge house, intact, whose weighbridge survives.

Recommendations: level 1 recording.

57. Transfer shed *Category B*
NGR: SH 5088 5408

A slate-built shed containing a loading platform from which slates were unloaded from 3' 6" gauge wagons into lorries; constructed after the quarry had ceased to make exclusive use of the Nantlle railway after the second world war.

Recommendations: level 1 recording.

58. Ropeway system *Category A*
Scheduled Ancient Monument
NGR: SH 5068 5428 to SH 5087 5414
A blondin ropeway system extending across the New Quarry to a lattice-work mast on level 8, at SH 5087 5414, operated by an engine house in direct alignment with the course of the rope at SH 5090 5412. The engine house is of slate rubble construction, roofed and in substantially good condition. The winding drum is a substantial casting, formerly operated from a Bruce Peebles three-phase motor of 1906 through reduction gearing. The motor survives, as does the control mechanism and the liquid controller.

Recommendations: preservation in situ.

59. Ropeway system *Category A*
Scheduled Ancient Monument
NGR: SH 5071 5431 to SH 5096 5419
A blondin ropeway system extending across the New Quarry to a lattice-work mast at SH 5096 5419 on level 8. The engine house is situated at SH 5097 5415 to the south-east of the modern quarry access road from y Fron, which has partly obliterated the rope channel. Recent spoil has been heaped against the north-west gable of the engine house, which otherwise survives in good condition. It is of slate rubble construction, roofed and in substantially good condition, though some of the roofing slates have slipped. The winding drum is a substantial casting, formerly operated from a Bruce Peebles three-phase motor of 1906 through reduction gearing. The motor survives, as does the control mechanism and the liquid controller.

Recommendations: preservation in situ.

60. Drying house *Category B*
NGR: SH 5090 5414
A drying house for the quarrymen's clothes built out of slate rubble with a slate roof. The roof and the central stove survive, though the pegs have gone from the walls. The building is in generally good condition though some slates have slipped.

Recommendations: level 2 recording.

61. Shaft *Category C*
NGR: SH 5089 5414
A trial shaft of uncertain depth.

Recommendations: level 1 recording.

62. Ropeway system *Category A*
Scheduled Ancient Monument
NGR: SH 5097 5418
A collapsed blondin ropeway system extending across the New Quarry to the site of a lattice-work mast on level 8. This survives as a slate plinth and some ironwork at SH 5097 5424; the mast itself lies between (**58**) and (**59**). The engine house does not lie in direct alignment with the ropeway but is situated at SH 5097 5418, and return sheaves were used to change the direction of the ropes. The engine house alone is a Scheduled Ancient Monument; it is of slate rubble construction, roofed and in substantially good condition. The winding drums are substantial castings, operated from a Bruce Peebles three-phase motor of 1906 through reduction gearing. The motor survives, as does the control mechanism and the liquid controller. The engine house is integral with (**60**) below.

Recommendations: preservation in situ.

63. Compressor house *Category A*
Scheduled Ancient Monument
NGR: SH 5097 5418
A monopitch building constructed out of slate rubble and with a slate roof, containing an electric motor and a horizontal single-cylinder Ingersoll Sargeant air compressor and receiving chamber. The building is in good condition but some of the roofing slates have slipped.

Recommendations: preservation in situ.

64. Transformer house *Category A*
NGR: SH 5100 5417
A transformer house, built in 1906 for the first a.c. supply from Cwm Dyli power station. It is constructed of slate rubble with a pitched slate roof surmounted by two gabled dormers set across the ridge at each end of the building. Externally it appears to be in excellent condition, and is locked and boarded up.

Recommendations: level 5 recording.

65. Locomotive shed *Category B*
NGR: SH 5105 5418
A substantial locomotive shed built out of slate rubble and with a pitched slate roof. Constructed post-1916 for development work.

Recommendations: level 2 recording.

66. Incline and winding house *Category B*
NGR: SH 5102 5401
A slate-built engine house for an uphaulage incline from the old pit onto level 8; this feature is thought to date from 1923 or shortly thereafter The electric motor survives intact as does the uphaulage drum. Horizontal sheaves were noted to the west of the building but the incline itself has been quarried away below the lip.

Recommendations: level 4 recording.

67. Locomotive shed *Category B*
NGR: SH 5111 5401
A two-road locomotive shed, built out of slate rubble and with a pitched slate roof, built between 1900 and 1915. An inspection pit was noted inside the building, and it is possible that one of the lengths of rail was for a coal wagon. The east-facing gable end wall of the shed is bowing out, and is danger of collapse.

Outside the shed is an iron tank on a slate plinth for supplying the locomotives with water.

Recommendations: level 4 recording.

68. Weighbridge house *Category B*
NGR: SH 5112 5400
A weighbridge house immediately to the east of (**64**) in which the bridge itself survives as does the balance mechanism in the building.

Recommendations: level 3 recording.

69. Road *Category C*
NGR: SH 5091 5410 to SH 5115 5441
Modern road access to the quarry from y Fron.

Recommendations: level 1 recording.

70. Ropeway system *Category B*
NGR: SH 5071 5436 to SH 5095 5431
A collapsed blondin ropeway system extending across the New Quarry to the site of a mast above level 8. Hand-winches were noted at the north-western end, probably to adjust the ropes periodically.

Recommendations: level 2 recording.

71. Area of trial workings *Category C*
NGR: SH 557 545C
An area pock-marked by trial workings, in the form of shafts and open trenches probably cut to establish the breadth of the slate vein at the end of the nineteenth century. Two contour leats run across it.

Recommendations: level 1 recording.

72. Field boundary *Category D*
NGR: 5054 5421
The trace of a possible field-boundary, possibly of pre-Modern date.

Recommendations: level 1 recording.

73. Adit mouth *Category C*
NGR: 5074 5374
The mouth of a collapsed adit, formerly connecting the Bonc yr Offis mills with the pits.

Recommendations: level 1 recording

74. Adit mouth *Category C*
NGR: 5081 5385
The mouth of a collapsed adit, formerly connecting the Bonc Isa' mills with the pits.

Recommendations: level 1 recording

75. Bridge abutments *Category D*
NGR: 5074 5381
The abutments of a bridge that carried a tip railway.

Recommendations: level 1 recording

76. Buried features *Category E*
It is clear from archive maps that many features from earlier phases of the quarry's history may be buried under subsequent workings. For instance, it is possible that remains of a ropeway base and the waterwheel pits which powered it may survive under the site of the present Eureka mill, though at a considerable depth. It is possible also that one of the locomotives may survive under slate rubble tipped at Bonc yr Offis. Should any attempt be made to remove the tips they should be monitored for buried features.

5. SUMMARY

An archaeological assessment has been carried out of the land within the confines of Pen yr Orsedd slate quarry. The assessment consisted of a desktop study of relevant archival and bibliographical sources, consultation with former quarrymen and others, and a walkover where all features of within the quarry area were noted and assigned to a category of archaeological significance. Recommendations were made for each feature depending on its nature and category.

Twenty-three features were allocated to category A. These are considered to be of national importance and five have already been recognised as such by their status as Scheduled Ancient Monuments.

Twenty-eight features were allocated to category B. It is recommended that these sites be fully recorded (at least to level 3 as defined in the report) if they are to be disturbed.

All but two of the remainder of the sites are of local importance or below (categories C and D) and it is recommended that these be recorded at a basic level (usually level 1 or 2) if they are to be disturbed. The two exceptions are a possible shaft-head and the range of possible buried features.

All the features apart from one (72) are considered to date from the industrial and modern period.

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7. ACKNOWLEDGEMENTS

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YMDDIRIEDOLAETH ARCHAEOLEGOL *GWYNEDD* ARCHAEOLOGICAL TRUST 01248 352535	Project Pen yr Orsedd Quarry G1508 Drwg No 1508/01 Title Map of Archaeological Features Drawn by LAD/AR Scale 1:1250 Date 20.11.97	Client ALFRED McALPINE SLATE PRODUCTS LTD