

Moel Caws Hydro Scheme, Llanuwchllyn, Gwynedd

Archaeological Desk Based Assessment

Project Code: A0007

Report no. 0006



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Date: 28/01/2013

Client: North Wales Hydro Power Ltd

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MOEL CAWS HYDRO SCHEME, LLANUWCHLLYN, BALA: A0007

NON-TECHNICAL SUMMARY

Aeon Archaeology has undertaken an archaeological desk-based assessment on behalf of North Wales Hydro Power Ltd, of a proposed hydro-electric scheme located on the northern bank of the Afon Dyfrdwy, Moel Caws. The site lies approximately 4.2km southwest of the village of Llanuwchllyn, Gwynedd and within the Snowdonia National Park Authority (SNPA). The proposed scheme is to include an intake weir located on the Afon Dyfrdwy and a c.1057.0m long buried pipe leading to a turbine house located adjacent to the former Bala and Dolgellau railway embankment. An outfall pipe will pass through the railway embankment and discharge back into the Afon Dyfrdw, and the power generated will be fed into the national grid via an underground cable route.

The archaeological desk-based assessment identified seventeen sites of archaeological and historic interest within, or in close proximity to, the proposed pipeline route. The proposed scheme is expected to have a low direct adverse physical impact upon six sites, four of which are post medieval field boundaries and trackways, but one is the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082). Recommendations have been made for the rerouting of the pipe away from the SAM polygon.

The pipeline route is also expected to have a medium direct adverse physical impact upon a revetment wall and trackway (feature 8) which is of unknown importance but if prehistoric in date would be of regional/ county importance. It has been recommended that the pipe be rerouted away from this feature and if this is not possible than a hand dug trial trench be placed across it prior to the commencement of works, to assess it further.

It is recommended that the pipe route follow the post medieval trackway (feature 12) north-eastward from the Afon Dyfrdwy. If this is done then a partial watching brief would be sufficient mitigation during groundworks in this area. Once the pipe route leaves the trackway and continues northeast there is a high potential to encounter buried archaeological remains, and an intensive watching brief should be maintained. The potential for buried remains becomes less once the pipe is northeast of the revetment wall and trackway (feature 8) and a partial watching brief should be maintained during this part of the route.

The cable trench, turbine house and intake weir are not expected to have any direct impacts upon any archaeological features, however the outfall pipe leading from the turbine house to the Afon Dyfrdwy will breach the Bala and Dolgellau railway embankment (feature 1). This feature is considered to be of local to regional/county importance, however the pipe will be inserted via directional drill and thus the expected impact upon the monument will be low. It is recommended that the revetment wall to the east be reinstated upon the completion of works.

It is expected that there will be a low adverse visual impact from the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082) and the Cairn 225m south of Moel Caws Scheduled Ancient Monument (ME081) during the construction phase. This will however be time limited to the period of construction.

Where a Scheduled monument will be impacted upon, either physically or non-physically, Scheduled Ancient Monument consent must be obtained from Cadw prior to the commencement of works.

1.0 INTRODUCTION

Aeon Archaeology was asked by North Wales Hydro Power Ltd to undertake an archaeological desk-based assessment of a proposed hydro-electric scheme located on the northern bank of the Afon Dyfrdwy, Moel Caws as part of a planning application (ref: **Tbc**). The site lies approximately 4.2km southwest of the village of Llanuwchllyn, Gwynedd and within the Snowdonia National Park Authority (SNPA). The land is owned and tenanted by the farm of Llwyn Gwern located to the northwest.

The proposed scheme is to include an intake weir (NGR **SH 84197 27403**) located on the Afon Dyfrdwy and a c.1057.0m long buried pipe leading to a turbine house located adjacent to the former Bala and Dolgellau railway embankment (NGR **SH 85078 27915**). An outfall pipe will pass through the railway embankment and discharge back into the Afon Dyfrdwy to the east, and the power generated will be fed into the national grid via an underground cable route (Figure.1).

The pipe will be made from 455.0mm (external diameter) plastic buried in a trench 600.0mm wide and 1.0m in depth. A tracked excavator will be used to excavate the pipe trench and will require a working corridor of approximately 2.5m, running on the grass. The scheme will be connected to the national grid via a new cable which will run approximately 25.0m north of the turbine house location.

2.0 AIMS

This archaeological desk-based assessment is for the proposed development area, which included the intake weir location, pipeline route, turbine house, and cable trench route. Due to the proximity of a number of important archaeological sites to the proposed pipeline route, an assessment corridor measuring 60.0m centred on the route was assessed for archaeological remains.

As part of the archaeological assessment a 1.0km search area centred on the pipeline route was utilised for a search of the Gwynedd Historic Environment Record (HER). This provided a background historical narrative of the area and included source material from the Royal Commission on the Ancient and Historic Monuments in Wales (RCAHMW) and Cadw.

3.0 SPECIFICATION AND PROJECT DESIGN

A detailed brief was not prepared for this project by the Snowdonia National Park Authority (SNPA) archaeologist John Roberts, but an archaeological assessment of the proposed development area was requested by North Wales Hydro Power Ltd prior to planning application.

The following report conforms to the guidelines specified in *Standard and Guidance for Archaeological Desk-based Assessment* (Institute of Field Archaeologists, 1994, rev. 2007).

The archaeological desk-based assessment considered the following:

- (i) The history of the site;
- (ii) The assessment of impact of development on archaeological remains;
- (iii) The assessment of impact of development on the setting of sites of archaeological importance;

- (iv) The requirements for further assessment in the form of non-intrusive and intrusive field evaluation.

The archaeological desk-based assessment was undertaken in four stages:

- (i) Archival research
- (ii) Site walkover including environmental hand auger transects
- (iii) Written report
- (iv) Project archive

4.0 METHODS AND TECHNIQUES

4.1 Archival research

The archaeological desk-based assessment involved the study of the following records:

- (i) The regional Historic Environment Record (Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, LL57 2RT) was examined for information concerning the study area. This included an examination of the core HER, and secondary information held within the record which included unpublished reports, the 1:2500 County Series Ordnance Survey maps, the National Archaeological Record index cards and aerial photography if relevant.
- (ii) The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth, SY23 1NJ) was checked for sites additional to the HER, including aerial photography, and additional supporting information will be examined at the NMR if useful.
- (iii) Information about Listed Buildings and Scheduled Ancient Monuments from Cadw was examined in the regional HER. The Register of Outstanding and Special Historic Landscapes and the Register of Parks and Gardens was checked, as well as the location of World Heritage Sites.
- (iv) The National Library of Wales (Aberystwyth) was checked for information concerning the study area and monuments within close proximity.
- (v) Secondary sources were examined, including the Inventories of the (RCAHMW), and works held within the regional libraries. Indices to relevant journals, including county history and archaeology society journals, as well as national society journals were checked. In addition topographical dictionaries, antiquarian tours and trade directories were examined where relevant.
- (vi) Historic aerial photographs from the Welsh Government were obtained and examined for sites that have been demolished and/or sites which were visible only as cropmarks. All photographs examined are listed in the assessment report.
- (vii) The Gwynedd Archives (Dolgellau) was searched for archive maps, including estate and tithe maps as well as information from Land Tax Assessments.
- (viii) Results from previous archaeological work within the area were also reviewed.

4.2 Site walkover

The site walkover was carried out on Friday 16th January 2013 by Richard Cooke BA MA MifA, archaeological contractor and consultant at Aeon Archaeology. The site was partially covered in a dusting of snow but this helped highlight some features which would have otherwise been difficult to identify.

4.3 Written report

All identified features were assessed and allocated to categories of international, national, regional/county, local and none/unknown importance as listed in Appendix 2. These are intended to give an idea of the importance of the feature and the level of response likely to be required; descriptions of the features and specific recommendations for further assessment or mitigatory measures, as appropriate, are given in the relevant sections of this report. The criteria used for allocating features to categories of importance are based on existing statutory designations and, for non-designated assets, the Secretary of State's non-statutory criteria for Scheduling Ancient Monuments; these are set out in National Planning Policy Framework (NPPF).

3.4 Definitions

Definitions of Impact, evaluation methods and mitigation methods as used in the gazetteer (section 5 below) can be found in Appendix 2.

4.0 THE STUDY AREA

4.1 Topographic Description

Meirionnydd forms part of the unitary authority of Gwynedd and is the largest administrative area in northwest Wales. Much of this area is upland, and as this approaches the western coast there is little in the way of good quality agricultural land. The proposed hydro-electric scheme, including pipeline route, is located on the southern slopes of Moel Caws, within the Snowdonia National Park Authority (SNPA). The intake weir is to be located on the Afon Dyfrdwy, which runs from west to east before turning north.

The pipeline route will be approximately 1057.0m in length and is to follow the natural downward slope of Moel Caws to a turbine house, located within a field located adjacent to the former Bala and Dolgellau railway embankment, approximately 4.2km southwest of the village of Llanuwchllyn. The site lies within the civil parish of Llanuwchllyn.

The landscape is dominated by enclosed and semi-enclosed fields utilised for sheep grazing, and interspersed with occasional rocky outcrops. The vegetation is limited to short upland grasses with occasional wetland sedge towards wetter areas around streams.

The bedrock geology is of the Aran Fawddwy Formation. This is an igneous bedrock formed approximately 449 to 458 million years ago in the Ordovician Period in a local environment previously dominated by explosive eruptions of silica-rich magma (British Geological Survey).

4.2 Statutory and non-statutory designations

The site lies within or in close proximity to the following areas/ sites:

- (i) Within the Snowdonia National Park Authority (SNPA).

- (ii) Listed within the Register of Landscapes of Special Historic Interest in Wales (ICOMOS UK) *Bala and Bala Lakesides* Historic Landscape Area (HLW(Gw)16).
- (iii) Partially within the Scheduled Ancient Monument polygon *Hut Group & Enclosures 117m south of Moel Caws* (ME082; NPRN: 93768; PRN: 1788).
- (iv) Approximately 2.0m west of the Bala and Dolgellau Railway (PRN 9805).
- (v) Approximately 29.0m southeast of the Sheepfold southwest of Ty'ny cefn (PRN: 27809).
- (vi) Approximately 40.0m north of the Trial Level northwest of Pant Gwyn (PRN: 27842).
- (vii) Approximately 76.0m north of Sheepfold 4 northwest of Pant Gwyn (PRN: 27841).
- (viii) Approximately 86.0m south of the Sheepfold, Moel Caws (PRN: 6873).
- (ix) Approximately 103.0m north of the Scheduled Ancient Monument polygon *Cairn 225m south of Moel Caws* (ME081; NPRN: 303151; PRN: 1787).
- (x) Approximately 108.0m south of the Long Huts, Moel Caws (PRN: 6872).
- (xi) Approximately 117.0m east of the Rectangular Structure, west of Moel Caws (PRN: 6874).
- (xii) Approximately 144.0m south of Sheepfold 3 northwest of Pant Gwyn (PRN: 27840).
- (xiii) Approximately 167.0m west of the Enclosures/Walls, west of Moel Caws (PRN: 6875).
- (xiv) Approximately 171.0m north of the Cairn, south of Moel Caws (PRN: 6870).
- (xv) Approximately 207.0m northwest of the Long Hut, Moel Caws (PRN: 6869).
- (xvi) Approximately 207.0m northwest of the Square Foundations, Moel Caws (PRN: 6868).

The lists of non-designated sites recorded within the Gwynedd Historic Environment Record (HER) are shown on figures 2 and 3. Scheduled Ancient Monuments (SAMs) and sites from the National Monuments Record (NMR) housed at the Royal Commission on the Ancient and Historic Monuments in Wales (RCAHMW) are shown on figure 2 and 4. The sites are shown with their reference numbers which are listed in Appendix 1.

5.0 THE HISTORICAL CONTEXT

The following sections describe the known archaeological record within the general area of the proposed development. Sites are identified by their Primary Reference Number (PRN) which is the number by which they are identified in the Gwynedd Historic Environment Record (HER), or by their Scheduled Ancient Monument reference, or Listed Building reference numbers if applicable. The intention of this section is to provide a historic and

archaeological context to the site. This aids in establishing the relative importance of an archaeological feature within its landscape, as well as assessing the potential for unknown buried archaeological remains on the proposed development site.

5.1 Prehistoric and Roman Period

The lack of lowland and good quality fertile soils in Meirionnydd is reflected in the low density of modern population, and indeed the density of well preserved prehistoric settlement and monuments. Where these monuments are encountered they are usually restricted to upland areas of poor soil fertility. These areas were perhaps more fertile in the prehistoric period than they currently are, and offered land with better drainage and natural topographic protection.

The proposed location of the hydro scheme is located within a historically rich localised landscape. The pipeline route will partially run through the prehistoric Scheduled Ancient Monument polygon of the *Hut Groups and Enclosures 117m south of Moel Caws* (ME 082), as well as approximately 103.0m north of the Scheduled Ancient Monument polygon of the prehistoric *Cairn 225m south of Moel Caws* (ME 081). A second undesignated prehistoric cairn (PRN: 6870) lies approximately 171.0m south of the pipeline route.

The Hut Groups and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME 082) comprises three roughly square enclosures, located on ground gently falling away to the south and the Afon Dyfrdwy. The settlement is of two distinct parts which may or may not be contemporary. The western part, and that which is closest to the proposed pipeline route, consists of two large huts of about 7.5m internal diameter, placed one above the other and cut into the natural slope forming level terraces. Beside these is a triangular paddock measuring approximately 20.0m in length and bounded by small banks of stone and earth. The eastern part of the site is a sub-rectangular enclosure bounded by large banks of earth and stone and measuring approximately 20.0m in length. A large hut circle measuring approximately 7.5m internal diameter is located in the southwest corner of the enclosure, cut into the natural slope (Bowen and Gresham. 1967).

This Scheduled Ancient Monument was periodically visited by Cadw and the Gwynedd Archaeological Trust (GAT) since 1967 and its condition recorded both by description and sketch plans. The site appears to have not visibly declined in condition since having been scheduled, but it was noted that a belt of irregular enclosed and terraced fields extended for approximately 500.0m to the west, which appeared to belong to the hut group settlement. This would include a large section of the south-western part of the proposed pipeline route, and although no obvious field enclosures could be discerned during the field visit, other features including trackways and relict walls were observed (see section 5.6).

The Cairn 225m south of Moel Caws Scheduled Ancient Monument (ME081) measures approximately 8.5m in diameter and is located upon a low natural hillock. The cairn stands to approximately 0.6m in height and has the remnants of kerbing, although it appears to have been disturbed and much of the stone appears not to be in situ.

In the wider landscape the prehistoric period is rather poorly represented. Within 1.0km of the proposed development site at least three Bronze Age cairns (PRNs: 4830, 9429, 9438) have been recorded from documentary sources but are now no longer in existence, most probably destroyed through agricultural land improvements. Moreover, there are no other prehistoric monuments that are known within 1.0km of the site, although several enclosures have been identified whose date is unknown but which may belong to this era.

The Roman period is rather better represented within the wider landscape. The auxillary fort and Scheduled Ancient Monument of *Caer Gai* (ME 018) lies approximately 5.0km to the

northeast. The fort was garrisoned AD 75-80 to 130 and stands above the left bank of the Afon Dyfrdwy below the south west end of Llyn Tegid. The name is Welsh and taken from the legend of the giant Cai Hir, the Roman name is unknown. The site is on a spur on the north side of the valley above the flood plain (HER).

Approximately 830.0m to the southeast of the proposed pipeline location is the route of the Caer Gai – Brithdir Roman road (PRN 17643). This linked the auxillary fort of Caer Gai with the fortlet of Brithdir, located on the south side of the Wnion valley overlooking Dolgellau from the east. This fortlet may have been on an important junction of Roman military routes. It lies to the immediate north of the Caer Gai-Brithdir roads, which would have met the road heading southeast from the fort at Tomen y Mur somewhere close to Dolgellau. The main coastal route almost certainly continued southwest to the Roman fort and settlement at Pennal, but there is not much evidence for the actual route it took southwards or the location of the road junction (Margary. 1957).

5.2 Early Medieval and Medieval Periods

The Early Medieval period is poorly represented within this part of northwest Wales and there are no known sites within 1km of the pipeline location. However, by the 12th and 13th centuries the kingdom of Gwynedd was divided into administrative *commotes*, administered through a network of local centres governed by a royal court or *Llys*. The township of a commote associated with a llys was known as the *maerdref*, in which the Prince’s agent would reside. The component parts of a llys included the royal hall and other buildings associated with the residence, as well as the royal demesne worked by bond tenants, and the settlements of these tenants which constituted small hamlets. The llys and royal lands became the property of the English King upon the conclusion of the conquest of Wales.

By the 13th century King Edward I had constructed a ring of castles around north Wales to help secure the conquest, and had established boroughs where English settlers could live and trade. There were three such boroughs in Meirionnydd, these were Harlech, Bere, and Bala (Carr, 1995). By 1310 the Marcher lord Roger Mortimer had laid out fifty-three burgages for the king, thirty-four of which occupied the former Welsh prince’s demesne land within the commote. By 1310 the hamlet of Bala was enlarged and the market was transferred from nearby Llanfor. By 1324 Bala had received its Burghal charter (HER).

The nearest surviving remains of the Medieval period to the proposed development site includes long huts on the southern slopes of Moel Caws (PRN: 6872) approximately 108.0m to the north of the proposed pipeline route. As well as a second suspected long hut (PRN: 6869) located approximately 207.0m to the southeast.

5.3 Post Medieval Period

The Llanuwchllyn parish tithe map of 1849 (figure 5.) depicts the proposed hydro route location as within one large triangular field (field 398). The map has not been drawn to scale or to include every field boundary, and as such it is unlikely that the pipeline route location was entirely within one field as shown, but is indicative of groups of fields separated by land use, natural boundaries, and field name. The field is depicted as lying to the southeast of Llwyn Gwern farm and to the immediate northwest of the Afon Dyfrdwy. There are no buildings or features of note depicted within or in proximity to the pipeline route.

Table 1. The tithe apportionment of 1849

Plot	Landowner	Tenant	State of cultivation	Plot Name	A/R/P
390	Hon. Lord	Robert Jones	Arable and	House, garden	4/0/16

	Vivian		pasture	and bank	
391	Hon. Lord Vivian	Robert Jones	Arable and pasture	Maes gwilim	2/2/8
392	Hon. Lord Vivian	Robert Jones	Arable	Tyddin mawr	18/0/20
393	Hon. Lord Vivian	Robert Jones	Arable	Cae'r odyn	1/0/23
394	Hon. Lord Vivian	Robert Jones	Arable	Llechwedd	2/1/7
395	Hon. Lord Vivian	Robert Jones	Pasture	Pen cae lloian	2/1/37
396	Hon. Lord Vivian	Robert Jones	Arable	Llechwedd Cae Ibian	6/3/22
397	Hon. Lord Vivian	Robert Jones	Arable	Braich	2/2/20
398	Hon. Lord Vivian	Robert Jones	Arable	Bryn Bartyn	5/3/7
399	Hon. Lord Vivian	Robert Jones	Arable	Gwerglodd bryn bartyn	1/3/22
400	Hon. Lord Vivian	Robert Jones	Arable	Pwllcywarch and afon cain	4/2/3
401	Hon. Lord Vivian	Robert Jones	Pasture	Rhosbach and rho sty hwnt ir afon	13/3/17

As can be seen from the 1849 tithe apportionment (table 1), the proposed development site was owned by the Honourable Lord Vivian (Charles Crespigny Vivian). He was the eldest legitimate son of Hussey Vivian, 1st Baron Vivian and became 2nd Baron Vivian upon the death of his father in 1841. Charles Crespigny Vivian was a prominent British peer and Whig politician, he sat as a Member of Parliament for Bodmin between 1835 and 1842, entering the House of Lords in the latter year upon succession of the Barony title. He also served as Lieutenant of Cornwall from 1856 to 1877. Lord Vivian married Arabella, daughter of the Reverend John Middleton Scott in 1833. She died in January 1837 and Lord Vivian remained a widower until his death in April 1886, aged seventy-seven. He was succeeded by his son Hussey, who became a prominent diplomat (Vivian. C.H. 1897).

As can be seen from the tithe apportionment of 1849 the tenant farmer at this time was Robert Jones. He is also recorded in the slightly earlier 1841 Wales census as being a fifty-eight year old farmer and residing with Margaret Jones (forty-four years old), and his offspring John Jones (thirty years old), Robert Jones (twenty-seven years old), Evan Jones (thirteen years old), Howell Jones (eight years old), John Jones (five years old), Lowry Jones (seventeen years old), and Margaret Jones (eleven years old).

The tithe apportionment shows that at this time the land tenanted by Llwyn Gwern farm was being cultivated for mixed farming but with a bias towards arable use. This is probably due in part to the slightly deeper and more fertile soils in proximity to the flood plain of the Afon Dyfrdwy. The field which the proposed hydro scheme is located within (field no. 398) is named as *Bryn Bartyn* in the tithe apportionment which means *Martyn Hill* in English. This is most likely in reference to the presence of Pine Martens in the area, a mammal which was hunted to extinction in England by the early 20th century and was last sighted in Wales in 1971. These animals were hunted for their highly prized fur and are mostly tree dwellers, suggesting that the proposed development area had at least some trees in the mid 19th century.

The proposed development area is not included on the first, second and third edition 1 to 25 inch Ordnance Survey maps but is shown on the first, second and fourth edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively (figures 6, 7, and 8). The pipeline route, intake weir, and turbine house locations are depicted much like it exists today. The Bala and Dolgellau railway is shown to the east of the area, as well as what is the current A494 road. The area is shown divided into the field system which is present now, aside from field boundary feature 4 (see section 5.6) and the existing sheepfold feature 3 is also shown. The Hut Circle settlement Scheduled Ancient Monument ME082 is not depicted on any of the maps and neither is the Bronze Age cairn Scheduled Ancient Monument ME082, although they were obviously in existence. No new archaeological sites were observed on any of the maps.

5.4 Aerial Photographs

A range of aerial photographs of the proposed development area were examined from the Welsh Government. These included high level photographs taken by the Royal Air Force in 1946 and 1948, as well as Ordnance Survey photographs from 1972, 1991, 1996, 2003, and 2005. Recent aerial coverage of the proposed development area from 2012 was also inspected. No new archaeological sites were identified from the aerial photographs.

5.6 Site Gazetteer

The field walkover discovered seventeen sites of archaeological and historic interest within, or in close proximity to the proposed development corridor, as listed below. Each entry contains an assessment of importance, ranked from International through to National, Regional/County, Local, and None. If it is not possible to assess the importance of the site from the visible remains, then it is ranked Unknown with the suspected level of importance placed in brackets. Identified sites were also assigned a level of impact ranked from high through to medium, and low. Levels of impact can be considered as both adverse or beneficial, and can be direct (physically impacting upon a site) or indirect (visually or indirectly physically impacting upon a site). Where it is expected that a site will be impacted upon by the proposed works then mitigation recommendations are provided. All archaeological/historical sites identified are depicted on figure.1. Direction and location of photographs are shown in figure 9.

1. Bala and Dolgellau railway embankment (plate 1)	Category: Local to regional/ county	PRN: 9805
SH 85088 27916	Period: Post Medieval	Impact: Low adverse direct physical
<p>The railway connection between Bala and Dolgellau was opened on the 4th August 1868 (Awdry, C. 1990) and was a standard gauge branch line of the Great Western Railway. It was a single track with passing places at Llanuwchllyn and Bala Junction. The whole line was officially closed to passenger trains on 18th January 1965 and lifting of the track was completed by 1969.</p> <p>The line of the railway exists today as an embankment overgrown with grass and trees along the edges. The western edge of the embankment is stabilised via a 1.0m high dry-stone single skin revetment wall, which lies approximately 4.0m east of the proposed turbine house location. The outflow pipe of the proposed scheme will run from the turbine house through the railway embankment. It is expected that there will be a low adverse direct physical impact upon the embankment, however as the pipe will be inserted via directional drill no mitigation will be required during the works. It is recommended that the revetment wall be reinstated upon the completion of works.</p>		

<i>Recommendations for further assessment:</i> None
<i>Recommendations for mitigatory measures:</i> Reinstatement of revetment wall

2. Field boundary wall (plate 2)	Category: Local	PRN: 36411
SH 84928 27696	Period: Post Medieval	Impact: Low adverse direct physical
<p>A single skin dry-stone wall measuring approximately 1.4m in height and 0.5m in width runs from east to west and marks the division between two fields. It is constructed from medium sized sub-angular stone cobbles with a rudimentary stock-proof course. The boundary is depicted on the first, second, and fourth edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, and is almost certainly of post medieval date.</p> <p>The field boundary will require breaching by the proposed hydro scheme and as such a basic record of the feature should be taken prior to the commencement of works. However, the photographic and descriptive record contained in this report should be seen as being commensurate with a basic record, and as such no further recording work is required. The field boundary wall should be reinstated upon the completion of works.</p>		
<i>Recommendations for further assessment:</i> None		
<i>Recommendations for mitigatory measures:</i> Reinstatement		

3. Sheepfold (plate 3)	Category: Local	PRN: 27809
SH 84887 27694	Period: Post Medieval	Impact: None
<p>The remains of an irregular shaped sheepfold wall runs from southeast to northwest before turning and heading west. The fold is of a single skin dry-stone construction, measures approximately 0.8m in height and is constructed from medium and large sized sub-angular cobbles. The fold is depicted on the first, second, and fourth edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, and is almost certainly of post medieval date.</p> <p>This feature will not be impacted upon by the proposed development and thus no further recommendations for assessment or mitigatory measures are required.</p>		
<i>Recommendations for further assessment:</i> None		
<i>Recommendations for mitigatory measures:</i> None		

4. Former field boundary wall (plate 4)	Category: Local	PRN: 36412
SH 84770 27581	Period: Post Medieval	Impact: Low adverse direct physical
<p>A single skin dry-stone, former field boundary wall measuring approximately 0.2m in height and 0.5m in width runs from northeast to southwest and marks the division between two fields. The wall only exists at foundation level and has been replaced by a modern wooden post and wire fence. It is constructed from medium sized sub-angular stone cobbles. The boundary is not depicted on the first, second, or fourth edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively but a trackway is shown in approximately the same location and on the same orientation. This feature is most probably post medieval in date and possibly marked one edge of the trackway depicted.</p> <p>The field boundary will require breaching by the proposed hydro scheme and as such a basic record of the feature should be taken prior to the commencement of works. However, the photographic and descriptive record contained in this report should be seen as being commensurate with a basic record, and as such no further recording work is required. The field boundary wall should be reinstated upon the completion of works.</p>		

Recommendations for further assessment: None
Recommendations for mitigatory measures: Reinstatement.

5. Cairn (plate 5)	Category: Unknown (regional/ county)	PRN: 36413
SH 84699 27573	Period: Unknown (prehistoric)	Impact: None
<p>A cairn constructed from medium and large sized sub-rounded cobbles and measuring approximately 2.0m in diameter and 0.7m in height is present at this location. The cairn does not appear to show any evidence of kerbing or in-situ structure and may be the result of modern field clearance. However, the cairn is in fairly close proximity (approximately 243.0m) to the Bronze Age cairn Scheduled Ancient Monument ME081, and the localised landscape is covered in loose moraine, suggesting little field clearance has taken place. The cairn may therefore be prehistoric in date. The cairn lies in close proximity to two other similar sized cairns (see features 6 and 7).</p> <p>The feature does not lie within the proposed development corridor and will not be impacted upon by the proposed development. The cairn should however be avoided.</p>		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Avoidance		

6. Cairn (plate 6)	Category: Unknown (regional/ county)	PRN: 36414
SH 84689 27570	Period: Unknown (prehistoric)	Impact: None
<p>A cairn constructed from medium and large sized sub-rounded cobbles and measuring approximately 2.0m in diameter and 0.7m in height is present at this location. The cairn does not appear to show any evidence of kerbing but one upright stone located towards the centre may be in situ. The cairn may be the result of modern field clearance, however it is in fairly close proximity (approximately 236.0m) to the Bronze Age cairn Scheduled Ancient Monument ME081, and the localised landscape is covered in loose moraine, suggesting little field clearance has taken place. The cairn may therefore be prehistoric in date. The cairn lies in close proximity to two other similar sized cairns (see features 5 and 7).</p> <p>The feature does not lie within the proposed development corridor and will not be impacted upon by the proposed development. The cairn should however be avoided.</p>		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Avoidance		

7. Cairn (plate 7)	Category: Unknown (regional/ county)	PRN: 36415
SH 84681 27549	Period: Unknown (prehistoric)	Impact: None
<p>A cairn constructed from medium and large sized sub-rounded cobbles and measuring approximately 2.0m in diameter and 1.0m in height is present at this location. The cairn does not appear to show any evidence of kerbing but one large upright stone located towards the centre may be in situ. The cairn may be the result of modern field clearance, however it is in fairly close proximity (approximately 215.0m) to the Bronze Age cairn Scheduled Ancient Monument ME081, and the localised landscape is covered in loose moraine, suggesting little field clearance has taken place. The cairn may therefore be prehistoric in date. The cairn lies in close proximity to two other similar sized cairns (see features 5 and 6).</p>		

The feature does not lie within the proposed development corridor and will not be impacted upon by the proposed development. The cairn should however be avoided.
Recommendations for further assessment: None
Recommendations for mitigatory measures: Avoidance

8. Revetment wall and trackway (plate 8)	Category: Unknown (regional/ county)	PRN: 36416
SH 84661 27505 – SH 84661 27490 – SH 84644 27476	Period: Unknown (prehistoric)	Impact: Medium adverse direct physical

A dry-stone revetment wall constructed from medium sized sub-angular cobbles and measuring approximately 0.4m in height and 1.3m in width, runs from southwest to northeast for approximately 18.0m before turning and heading north for approximately 22.0m. The wall marks the eastern side of a possible trackway which appears to head for the cairns to the north (features 5, 6 and 7). It is possible that this feature is in fact the result of field clearance which in turn created an area devoid of stone which has been identified as a trackway. However, the proximity of the Hut Circle settlement Scheduled Ancient Monument ME082 (approximately 94.0m) and the Bronze Age cairn Scheduled Ancient Monument ME082 (approximately 134.0m) to the southwest increases the possibility that this feature is prehistoric in date.

Both the trackway and revetment wall will require breaching by the proposed works, and due to the potential compression damage from the use of a tracked excavator as well as the pipe trench, the physical impact is expected to be medium adverse. It is therefore recommended that the pipe route is either rerouted to avoid this feature or if not possible, then a hand dug trial trench be placed across it to assess it further.

Recommendations for further assessment: None <u>or</u> trial trench
Recommendations for mitigatory measures: Avoidance and rerouting of pipe <u>or</u> further assessment trial trench (see above)

9. Relict field wall (plate 9)	Category: Regional/ County	PRN: 36417
SH 84531 27496 – SH 84522 27527	Period: Prehistoric	Impact: None

A relict field wall measuring approximately 0.4m in height, 1.4m in width and 34.0m in length runs from southeast to northwest away from the Hut Circle settlement Scheduled Ancient Monument ME082. The feature is almost certainly a relict boundary wall enclosing a field associated with the settlement and is of probable prehistoric date. The wall may be part of a prehistoric field system associated with wall feature 8 to the east and wall feature 14 to the southwest.

The feature does not lie within the proposed development corridor and will not be impacted upon by the proposed development. The wall should however be avoided.

Recommendations for further assessment: None
Recommendations for mitigatory measures: Avoidance

10. Hut Group & Enclosures 117m south of Moel Caws Scheduled Ancient Monument (plate 10)	Category: National	PRN: 1788 NPRN: 93768 SAM: ME082
SH 84518 27444	Period: Prehistoric	Impact: Low direct adverse physical; low adverse visual (construction)

The *Hut Groups and Enclosures 117m south of Moel Caws* Scheduled Ancient Monument (ME082) comprises three roughly square enclosures, located on ground gently falling away to

the south and the Afon Dyfrdwy. The settlement is of two distinct parts which may or may not be contemporary. The western part, and that which is closest to the proposed pipeline route, consists of two large huts of about 7.5m internal diameter, placed one above the other and cut into the natural slope forming level terraces. Beside these is a triangular paddock measuring approximately 20.0m in length and bounded by small banks of stone and earth. The eastern part of the site is a sub-rectangular enclosure bounded by large banks of earth and stone and measuring approximately 20.0m in length. A large hut circle measuring approximately 7.5m internal diameter is located in the southwest corner of the enclosure, cut into the natural slope (Bowen and Gresham. 1967).

This Scheduled Ancient Monument was periodically visited by Cadw and the Gwynedd Archaeological Trust (GAT) since 1967 and its condition recorded both by description and sketch plans. The site appears to have not visibly declined in condition since having been scheduled, but it was noted that a belt of irregular enclosed and terraced fields extended for approximately 500.0m to the west, which appeared to belong to the hut group settlement.

The proposed pipeline route passes through approximately 52.0m of the north-western end of the Scheduled Ancient Monument polygon, and although the route will not pass through any discernible hut circle structures, this area and approximately 500.0m to the west was identified as possibly retaining field systems belonging to the settlement. It is advised that the pipeline be rerouted to the northwest to avoid the Scheduled Ancient Monument polygon, and that an intensive watching brief be maintained during groundworks in proximity to the monument polygon. Furthermore, the provision should be made for the detailed recording of any archaeological remains uncovered by the works and it is recommended that the size of tracked excavator be limited in this area to avoid compression damage to buried remains.

Furthermore, it is expected that the proposed scheme will have a low adverse visual impact upon the monument when viewing north and west during the construction phase. There will not be any visual impact upon the monument once the proposed works have been completed.

Where a Scheduled monument will be impacted upon, either physically or non-physically, Scheduled Ancient Monument consent must be obtained from Cadw prior to the commencement of works.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Avoidance; rerouting of pipeline to the northwest; intensive watching brief; limit size of tracked excavator. Scheduled Ancient Monument consent.

11. Trackway (plate 11)	Category: Local	PRN: 36418
SH 84491 27480	Period: Post Medieval	Impact: Low adverse direct
<p>A trackway measuring approximately 1.5m in width runs from east to west linking the access road to the east with the forestry plantations to the west. The track becomes eroded in places creating a shallow linear depression, and in parts stones have been thrown to the edges of the track creating rough earth and stone walls. The trackway runs through the northern part of the <i>Hut Groups and Enclosures 117m south of Moel Caws</i> Scheduled Ancient Monument polygon (ME082) but is most probably not contemporary with it. The trackway is depicted on the first, second, and third edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, and is likely of post medieval date but may have earlier origins in the medieval period.</p> <p>The trackway will require breaching by the proposed development and a basic record should be taken prior to the commencement of works. However, the photographic and descriptive record contained in this report should be seen as being commensurate with a basic record, and</p>		

as such no further recording work is required. Due to the proximity of the trackway to the Scheduled Ancient Monument (ME082) it is recommended that an intensive watching brief be maintained during groundworks in this area and that any uncovered remains are recorded.
Recommendations for further assessment: None
Recommendations for mitigatory measures: Intensive watching brief

12. Trackway (plate 12)	Category: Local	PRN: 36419
SH 84380 27449	Period: Post Medieval	Impact: Medium adverse direct
<p>A trackway measuring approximately 1.0m in width runs from northeast to southwest linking the trackway (feature 11) to the northeast with the Afon Dyfrdwy to the southwest. The track becomes eroded in places creating a shallow linear depression, and in parts stones have been thrown to the edges of the track creating rough earth and stone walls. The trackway runs through the northern part of the <i>Hut Groups and Enclosures 117m south of Moel Caws</i> Scheduled Ancient Monument polygon (ME082) but is most probably not contemporary with it. The trackway is depicted on the first, second, and third edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, and is likely of post medieval date but may have earlier origins in the medieval period.</p> <p>The trackway will require breaching by the proposed development and the pipeline will follow its route for approximately 180.0m. A basic record should be taken of the feature prior to the commencement of works, however the photographic and descriptive record contained in this report should be seen as being commensurate with a basic record, and as such no further recording work is required. Due to the proximity of the trackway to the Scheduled Ancient Monument (ME082) it is recommended that an intensive watching brief be maintained during groundworks in this area and that any uncovered remains are recorded.</p>		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Intensive watching brief		

13. Cairn 225m south of Moel Caws Scheduled Ancient Monument (plates 13 and 14)	Category: National	PRN: 1787 NPRN: 303151 SAM: ME081
SH 84557 27359	Period: Bronze Age	Impact: Low adverse visual (construction)
<p>The <i>Cairn 225m south of Moel Caws</i> Scheduled Ancient Monument (ME081) measures approximately 8.5m in diameter and is located upon a low natural hillock. The cairn stands to approximately 0.6m in height and has the remnants of kerbing, although it appears to have been disturbed and much of the stone appears not to be in situ.</p> <p>This monument lies outside of the 60.0m assessment corridor centred on the pipe route, but due to its reasonably close proximity to the scheme (approximately 103.0m) and its Scheduled Ancient Monument status, the visual impact upon the monument was assessed. It is expected that the proposed scheme will have a low adverse visual impact upon the monument when viewing northwards across the <i>Hut Groups and Enclosures 117m south of Moel Caws</i> Scheduled Ancient Monument (ME082) towards the scheme during the construction phase. There will not be any visual impact upon the monument once the proposed works have been completed.</p> <p>The cairn will not be physically impacted upon by the proposed development and thus no further assessment or mitigatory measures are proposed aside from avoidance essential.</p> <p>Where a Scheduled monument will be impacted upon, either physically or non-physically,</p>		

Scheduled Ancient Monument consent must be obtained from Cadw prior to the commencement of works.
Recommendations for further assessment: None
Recommendations for mitigatory measures: Avoidance essential. Scheduled Ancient Monument consent.

14. Relict field wall (plate 15)	Category: Regional/ County	PRN: 36420
SH 84323 27433 – SH 84309 27453	Period: Prehistoric	Impact: None
<p>A relict field wall measuring approximately 0.3m in height, 1.0m in width and at least 37.0m in length runs from southeast to northwest away from the existing field boundary. The feature is almost certainly a relict boundary wall enclosing a field associated with the Hut Circle settlement Scheduled Ancient Monument (ME082) and is of probable prehistoric date. The wall may be part of a prehistoric field system associated with wall features 8 and 9 to the northeast.</p> <p>The wall is cut through by the later trackway (feature 12) and as the pipeline will be following the track, it will thus not be physically impacted upon by the proposed scheme. However, a trackway depicted on the modern Ordnance Survey maps is very likely the continuation of this feature southeast and as such any deviation of the pipe route away from trackway feature 12 would result in the physical impact upon this relict field wall.</p> <p>The feature does not lie within the proposed development corridor and will not be impacted upon by the proposed development. The wall should however be avoided.</p>		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Avoidance		

15. Rectangular foundations (plate 16)	Category: Unknown	PRN: 36421
SH 84365 27418	Period: Unknown	Impact: None
<p>The foundations of a rectangular structure measuring approximately 0.4m in height, 2.5m in width and 3.5m in length are located at this point. The structure is orientated northeast to southwest and appears to be missing the majority of the south-eastern wall. The foundations are of a dry-stone construction utilising medium and small sized sub-rounded river cobbles placed around existing bedrock. The feature is in reasonably close proximity (approximately 113.0m) to the Hut Circle settlement Scheduled Ancient Monument (ME082), but is more likely to be a later long hut belonging to the medieval period or a sheepfold/ shepherd's hut of post medieval date.</p> <p>The structure lies outside of the proposed development corridor and will not be impacted upon, but should be avoided.</p>		
Recommendations for further assessment: None		
Recommendations for mitigatory measures: Avoidance		

16. Trackway (plate 17)	Category: Local	PRN: 36422
SH 84367 27374 – SH 84512 27408	Period: Post Medieval	Impact: None
<p>A trackway measuring approximately 2.0m in width runs from northeast to southwest linking the Hut Circle settlement Scheduled Ancient Monument (ME082) to the northeast with the Afon Dyfrdwy to the southwest. The track is heavily eroded in places creating a shallow linear depression, and in parts stones have been thrown to the edges of the track creating rough earth and stone walls. The trackway runs through the southern part of the <i>Hut Groups</i></p>		

<p><i>and Enclosures 117m south of Moel Caws</i> Scheduled Ancient Monument polygon (ME082) but is most probably not contemporary with it. It is depicted on the first, second, and third edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, and is likely of post medieval date but may have earlier origins in the medieval period.</p> <p>The trackway will not be impacted upon by the proposed development.</p> <p>Recommendations for further assessment: None</p> <p>Recommendations for mitigatory measures: None</p>
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17. Trackway (plate 18)	Category: Local	PRN: 36423
SH 84375 27370 – SH 84469 27352	Period: Post Medieval	Impact: None
<p>A trackway measuring approximately 1.5m in width runs from southwest to northeast before turning and heading southeast into a wetland bog located to the immediate north of the Afon Dyfrdwy. The track is heavily eroded in places creating a shallow linear depression, and in parts stones have been thrown to the edges of the track creating rough earth and stone walls. The trackway runs in close proximity to the <i>Hut Groups and Enclosures 117m south of Moel Caws</i> Scheduled Ancient Monument polygon (ME082) but is most probably not contemporary with it. It is not depicted on the first, second, and third edition 6 inch Ordnance Survey maps of 1890, 1901, and 1953 respectively, but is likely of post medieval date. The way in which the track runs from the Afon Dyfrdwy into a wetland bog is unusual and it may be the case that rather than a trackway this feature was deliberately created as an overflow channel to the river in times of flood.</p> <p>The trackway will not be impacted upon by the proposed development.</p> <p>Recommendations for further assessment: None</p> <p>Recommendations for mitigatory measures: None</p>		

6.0 IMPACT AND RECOMMENDATIONS

6.1 General recommendations

6.1.1 Direct physical impact (see table 2)

Construction phase

The proposed Moel Caws hydro-electric scheme is expected to have a *low direct adverse physical* impact upon six sites (features 1, 2, 4, 10, 11 and 12) of archaeological and historic significance during the construction phase. Four of these sites (features 2, 4, 11 and 12) are considered to be of *local* importance, and one site is of *local to regional/ county* importance. The sixth site is the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082) and is of *national* importance.

In addition the proposed scheme is expected to have a *medium direct adverse physical* impact upon one site, the revetment wall and trackway (feature 8). This feature is of *unknown* importance but if proven to be prehistoric in date would be considered to be of *regional/ county* importance.

Completion phase

The proposed hydro-electric scheme is not expected to have any further direct physical impact upon any archaeological features upon completion.

6.1.2 Indirect physical and non-physical (visual) impact

Construction phase

The proposed scheme is not expected to have any *indirect physical* impacts upon any of the sites identified in the report during the construction phase.

The proposed scheme is expected to have a *low indirect non-physical (visual)* impact upon the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082) and the Cairn 225m south of Moel Caws Scheduled Ancient Monument (ME081) during the construction phase, both of which are of *national* importance. This impact will be on the view north and westward while viewing from the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082), as well as from the Cairn 225m south of Moel Caws Scheduled Ancient Monument (ME081) when viewing across SAM ME082.

Completion phase

The proposed scheme is not expected to have any *indirect physical* or *indirect non-physical (visual)* impacts upon any of the sites identified in the report during the completion phase.

6.2 Site Specific Recommendations

Although the proposed hydro-electric scheme at Moel Caws is expected to impact physically upon seven sites of archaeological importance, four of these (features 2, 4, 11 and 12) are considered to be of local importance. Moreover, they are all linear in form (either trackways or field boundaries) and as such the impact will be low. Recommendations have been made for the reinstatement of the field boundary walls (features 2 and 4) upon completion of the works. Furthermore, recommendations have also been made for an intensive watching brief during the breaching of the trackways (features 11 and 12) not because of their importance, but because of the potential to encounter earlier remains associated with the hut group SAM located in close proximity to the east.

The proposed outfall pipe leading from the turbine house to the Afon Dyfrdwy will be required to breach the Bala and Dolgellau railway embankment (feature 1). This feature is considered to be of local to regional/county importance, however the outfall pipe will be inserted via directional drill and thus the impact upon the embankment will be low adverse direct physical. As such no further mitigation work is required but it is recommended that the revetment wall to the east be reinstated upon the completion of works.

The proposed works are expected to have a medium adverse physical impact upon the revetment wall and trackway (feature 8). This feature is currently of unknown importance as it is not clear whether it is a product of post medieval field clearance or does in fact have origins in the prehistoric period. The proximity of prehistoric monuments of national importance not only increases the likelihood of this feature being prehistoric in date but also increases its potential group value within the localised prehistoric landscape. As such it has been recommended that this feature be avoided and the pipe route be rerouted to avoid it. If this is not possible then it should be further assessed by a hand dug trial trench being excavated across it prior to the commencement of works. This will help categorise its level of importance and any further mitigatory measures, if required.

The hydro scheme will also have a low adverse physical impact upon the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082) as the proposed pipe route will run through approximately 52.0m of the north-western end of the SAM polygon. Even though no physical remains could be seen within the actual pipe route

the potential to encounter buried remains during the works is very high. As such it is strongly recommended that the pipe be rerouted to the northwest to miss the limits of the SAM polygon. Moreover, recommendations have been made for an intensive watching brief to be maintained during groundworks within proximity to the SAM and that the size of the tracked excavator be limited to help avoid compression damage on buried archaeological remains.

Through studying field monument records of the hut group SAM (ME082) it has become clear that there is a high potential for associated remains extending approximately 500.0m to the west away from the settlement, through which the first half of the pipeline will run. However, the pipeline route will follow the post medieval trackway (feature 12) in this area, and it is clear that this trackway has already cut through remains associated with the Hut Group SAM such as field boundary wall feature 14. It is strongly recommended that the pipeline does not deviate from the trackway and that a partial watching brief be maintained during groundworks. There is a greater potential for the preservation of archaeological remains between the Hut group SAM and the relict revetment wall and trackway (feature 8) to the north and it is recommended that an intensive watching brief be maintained in this area.

Where a Scheduled monument will be impacted upon, either physically or non-physically, Scheduled Ancient Monument consent must be obtained from Cadw prior to the commencement of works.

The potential for buried archaeological remains to be encountered in the north-eastern half of the pipeline (northeast of feature 8) is considered to be low, and as such a partial watching brief is recommended during groundworks in this area (figure 10.).

It is expected that there will be a low adverse visual impact from the Hut Group and Enclosures 117m south of Moel Caws Scheduled Ancient Monument (ME082) and the Cairn 225m south of Moel Caws Scheduled Ancient Monument (ME081) during the construction phase. This will however be time limited to the period of construction.

Table 2: Archaeological features					
Number	Name	Category	Impact	Further Assessment	Mitigation Recommendations
1	Bala and Dolgellau railway embankment	Local to regional/ county	Low adverse direct physical	None	Reinstatement of revetment wall
2	Field boundary wall	Local	Low adverse direct physical	None	Reinstatement
3	Sheepfold	Local	None	None	None
4	Former field boundary wall	Local	Low adverse direct physical	None	Reinstatement
5	Cairn	Unknown (regional/ county)	None	None	Avoidance
6	Cairn	Unknown (regional/ county)	None	None	Avoidance
7	Cairn	Unknown (regional/ county)	None	None	Avoidance
8	Revetment wall and trackway	Unknown (regional/ county)	Medium adverse direct physical	None	Avoidance and rerouting of pipe <u>or</u> trial trench
9	Relict field wall	Regional/ county	None	None	Avoidance
10	Hut Group and Enclosures 117m south of Moel Caws SAM	National	Low adverse direct physical; low adverse visual (construction)	None	Avoidance; rerouting of pipeline to the northwest; intensive watching brief; limit size of tracked excavator. Scheduled Ancient Monument consent.
11	Trackway	Local	Low adverse direct physical	None	Intensive watching brief
12	Trackway	Local	Low adverse direct physical	None	Intensive watching brief

13	Cairn 225m south of Moel Caws SAM	National	Low adverse visual	None	Avoidance essential. Scheduled Ancient Monument consent.
14	Relict field wall	Regional/ County	None	None	Avoidance
15	Rectangular foundations	Unknown	None	None	Avoidance
16	Trackway	Local	None	None	None
17	Trackway	Local	None	None	None

7.0 ARCHIVE

The archive consists of field notes, historic maps and photographs taken on the field visit. It is currently held by Aeon Archaeology under the project code **A0007**.

8.0 SOURCES

OS Maps

1st edition 6 inch Ordnance Survey Map of 1890

2nd edition 6 inch Ordnance Survey Map of 1901

4th edition 6 inch Ordnance Survey Map of 1953

OS 1:10 000 Series sheet SH 82 NE, SH 82 SE, SH 82 SW, and SH 82 NW

Aerial Photographs

RAF Aerial Photographs

RAF 106G/UK/1468. Frames 3376-3380. 4th May 1946

RAF CPE/UK/2492. Frames 3102-3106. 11th March 1948

OS Aerial Photographs

Ordnance Survey 72-411 frames 1094 and 1181. 4th October 1972

Ordnance Survey 91-206 frames 044. 30th August 1991

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GAT report 638. March 2007. *Historic landscape characterisation of Bala and Bala lakesides*.

APPENDIX 1

Sites within 1km of the proposed development area as listed on the Gwynedd HER

Prn	Name	Form	Ngr	Type	Period	Status
17643	Part of Roman Road, Caer Gai - Brithdir	Document	SH85092686	Road	Roman	-
17644	Part of Roman Road, Caer Gai - Brithdir	Earthwork	SH85512773	Road	Roman	-
17645	Part of Roman Road, Caer Gai - Brithdir	Earthwork	SH85742837	Road	Roman	-
1787	Cairn, 225m S of Moel Caws	Other Structure	SH84602736	Cairn	Bronze Age	Snowdonia National Park,Scheduled Ancient Monument
1788	Hut Groups and Enclosures, 117m S of Moel Caws	Multiple	SH84502745	Hut Circle Settlement	Prehistoric	Snowdonia National Park,Scheduled Ancient Monument
21081	Trial Level, Derlwyn	Other Structure	SH83902830	Level	Post-Medieval	Snowdonia National Park
21082	Level, Penaran	Other Structure	SH83902690	Level	Post-Medieval	Snowdonia National Park
2755	Roman Practice Camp, Rhyd Sarn	Earthwork	SH85772783	Practice Camp	Roman	-
2756	Roman Practice Camp, Pont Rhyd Sarn	Earthwork	SH85972781	Practice Camp	Roman	-
29545	Creigau Bychain Level		SH84022707	Level	Unknown	-
34171	Pant y Drain, Moel	Building	SH85062763	Cottage	Post-Medieval	Snowdonia National

	Caws					Park
4142	Nr Nant Derlwyn, House Platform	Building - Ruined	SH83682813	House Platform	Medieval	-
4830	Cairn, Site of, Llanuwchllyn	Other Structure	SH85682751	Cairn	Prehistoric	-
6867	Water Mill (rems. Of), Moel Caws	Building - Ruined	SH84002746	Water Mill	Unknown	-
6868	Square Foundations, Moel Caws	Building - Ruined	SH84772736	Building	Unknown	-
6869	Long Hut, Moel Caws	Building - Ruined	SH84752735	Long Hut	Medieval	-
6870	Cairn, S of Moel Caws	Other Structure	SH84662733	Cairn	Prehistoric	-
6871	Shelter, Moel Caws	Building - Ruined	SH84382772	Building	Post-Medieval	-
6872	Long Huts, Moel Caws	Building - Ruined	SH84552757	Long Hut	Medieval	-
6873	Sheepfold, Moel Caws	Other Structure	SH84512756	Sheep Fold	Unknown	-
6874	Rectangular Structure, W of Moel Caws	Other Structure	SH84912783	Structure	Unknown	-
6875	Enclosures/Walls, W of Moel Caws	Other Structure	SH84872785	Enclosure	Unknown	-
6876	Rectangular Building,s of Llwyngwern	Building - Ruined	SH84872804	Building	Post-Medieval	-
6877	Railway Bridge, S of Llwyngwern	Other Structure	SH85152809	Bridge	Post-Medieval	-
9429	Pemmaen Cairn		SH84402660	Cairn	Prehistoric	-
9433	Nant Bryn-y- fedwen Level		SH84122702	Level	Unknown	-

9434	Creigau Bychain Hut Platform,		SH84292719	Hut Platform	Unknown	-
9435	Creigau Bychain Hut Platform,		SH84282716	Hut Platform	Unknown	-
9437	Dolydd Yr Afon Sheepfold		SH83592725	Sheep Fold	Unknown	-
9438	Nant Ddu Cairn		SH83502730	Cairn	Prehistoric	-
9441	Nant Ddu Enclosure		SH83902740	Enclosure	Unknown	-
9442	Drysgol Sheepfold 1		SH83692826	Sheep Fold	Unknown	-
9443	Derlwyn Enclosure		SH83812807	Enclosure	Unknown	-
9447	Bryn Glas		SH85372769	House	Post-Medieval	-
9448	Well, Former Site Of, Bryn Glas	Document	SH85392770	Well	Post-Medieval	-
9449	Hollow Way, Bryn Glas	Earthwork	SH85372768	Hollow Way	Post-Medieval	-
9450	House, Remains Of, Bryn Glas	Earthwork	SH85372769	House	Post-Medieval	-
9451	Dwrnudson Farm		SH86032802	Farmhouse	Post-Medieval	-
9452	Dwrnudson Farm		SH86032801	Pigsty	Post-Medieval	-
9453	Dwrnudson Farm		SH86032802	Shed	Post-Medieval	-
9454	Dwrnudson Farm		SH86042802	Field	Post-Medieval	-
9455	Dwrnudson Bridge		SH85962790	Bridge	Unknown	-
9705	Drysgol House Platform		SH83702816	House	Unknown	-
9804	Afon Dyfrdwy Sheepfold		SH84692708	Sheep Fold	Unknown	-
9805	Bala and Dolgellau Railway		SH85032762	Railway	Modern	-
9979	Penaran Medieval Township	Document	SH83802710	Township	Medieval	-

New sites within 1km of the proposed development area as listed on the Gwynedd HER

Prn	Sitename	Ngr	Sitetype	Period
27803	Llwyn-Gwern House And Outbuildings	SH85082858	House And Outbuildings	Unknown
27804	Beudy Isaf	SH85282845	Buildings	Unknown
27805	Stepping Stones SE Of Beudy Isaf	SH85542839	Stepping Stones	Unknown
27806	Well SE Of Beudy Isaf	SH85542837	Well	Unknown
27807	Footbridge SW Of Beudy Isaf	SH85402832	Footbridge	Unknown
27808	Sheepfold 1 SW Of Beudy Isaf	SH84852804	Sheepfold	Unknown
27809	Sheepfold SW Of Ty'ny Cefn	SH84882769	Sheepfold	Unknown
27838	Sheepfold 1 NW Of Pant Gwyn	SH84662802	Sheepfold	Unknown
27839	Sheepfold 2 NW Of Pant Gwyn	SH84612801	Sheepfold	Unknown
27840	Sheepfold 3 NW Of Pant Gwyn	SH84332757	Sheepfold	Unknown
27841	Sheepfold 4 NW Of Pant Gwyn	SH84332736	Sheepfold	Unknown
27842	Trial Level NW Of Pant Gwyn	SH84282737	Trial Level	Unknown
27847	Old Sheepfold SW Of Beudy Isaf	SH84932799	Sheepfold	Unknown
27856	LLWYNGWERN, COTTAGE SITE AT	SH84992859	House	Post-Medieval?
27857	Gwern-Grug	SH85252862	House	Post-Medieval?

Sites within 1km of the proposed development area as listed on the NMR

Nprn	Nmrwname	Type	Period	Ngr	Community
28160	Banc	Dwelling	Post Medieval?	Sh8628	Llanuwchllyn
28214	Bryn Glas	Dwelling	Post Medieval?	Sh8527	Llanuwchllyn
28872	Tyn-Y-Weirglodd	House	Post Medieval?	Sh8527	Llanuwchllyn
28542	Llwyngwern, Cottage Site At	House	Post Medieval?	Sh850286	Llanuwchllyn
28460	Gwern-Y-Grug	House	Post Medieval?	Sh85262862	Llanuwchllyn
15501	Nant Derwyn	Settlement	Medieval?	Sh83712814	Llanuwchllyn
28615	Pant Gwyn	Farmhouse	Post Medieval?	Sh84992680	Llanuwchllyn
28206	Bryn Amlwg	Dwelling	Post Medieval?	Sh85662735	Llanuwchllyn
28619	Pant-Y-Drain	House	Post Medieval?	Sh85062763	Llanuwchllyn
28740	Swch, Y	Dwelling	Post Medieval?	Sh8528	Llanuwchllyn
28719	Rhyd-Y-Mawn	Dwelling	Post Medieval?	Sh8527	Llanuwchllyn
28718	Rhyd-Y-Drain	House	Post Medieval?	Sh85052761	Llanuwchllyn
28404	Garneddwen, Y	House	Post Medieval?	Sh859276	Llanuwchllyn
28847	Tyn Twll	Dwelling	Post Medieval?	Sh85642787	Llanuwchllyn
93768	Hut Group & Enclosures 117m S Of Moel Caws	Settlement	Prehistoric;Medieval	Sh84542743	Llanuwchllyn
303162	Roman Practice Camp, Wnion Valley; Rhyd Sarn I	Practice Camp	Roman	Sh85772783	Llanuwchllyn
303163	Roman Camp, Wnion Valley; Rhyd Sarn Ii	Practice Camp	Roman	Sh85972781	Llanuwchllyn
303151	Cairn, On The Slopes Of Moel Caws	Cairn	Bronze Age	Sh84552735	Llanuwchllyn

Scheduled Ancient Monuments within 1km of the proposed development area

Sam_No	Sam_Name	Ngr_X	Ngr_Y	Site_Type	General_Period	Broadclass
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Me081	Cairn 225m S Of Moel Caws	284557	327359	Round Cairn	Prehistoric	Religious, Ritual And Funerary
Me082	Hut Group & Enclosures 117m S Of Moel Caws	284533	327438	Hut Group	Prehistoric	Domestic

APPENDIX 2: DEFINITIONS OF IMPORTANCE AND RECOMMENDATION

1. Definition of Categories of importance

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

Significance	Description
International (Very High)	Archaeological sites or monuments of international importance, including World Heritage Sites. Structures and buildings inscribed as of universal importance as World Heritage Sites. Other buildings or structures of recognised international importance.
National (High)	Ancient monuments scheduled under the Ancient Monuments and Archaeological Areas Act 1979, or archaeological sites and remains of comparable quality, assessed with reference to the Secretary of State's non-statutory criteria. Listed Buildings. Undesignated structures of national importance.
Regional/ County (Medium)	Conservation Areas Archaeological sites and remains which, while not of national importance, score well against most of the Secretary of State's criteria.
Local (Low)	Archaeological sites that score less well against the Secretary of State's criteria. Historic buildings on a 'local list'.
None	Areas in which investigative techniques have produced no or only minimal evidence for archaeological remains, or where previous large-scale disturbance or removal of deposits can be demonstrated.

2. Definition of Impact

The direct impact of the proposed development on each site was estimated. The impact is defined as follows:

Magnitude	Direct Impacts	Indirect Impacts
High Adverse	Complete removal of an archaeological site. Complete destruction of a designated building or structure.	Radical transformation of the setting of an archaeological monument. A fundamental change in the setting of a building.
Medium Adverse	Removal of a major part of an archaeological site and loss of research potential. Extensive alteration (but not demolition) of a historic building or feature, resulting in an appreciable adverse change.	Partial transformation of the setting of an archaeological site (e.g. the introduction of significant noise or vibration levels to an archaeological monument leading to changes to amenity use, accessibility or appreciation of an archaeological site). Partial adverse transformation of the setting of a designated building.
Low Adverse	Removal of an archaeological site where a minor part of its total area	Minor change to the setting of an archaeological monument or historic

Magnitude	Direct Impacts	Indirect Impacts
	is removed but the site retains a significant future research potential. Change to a historic building or feature resulting in a small change in the resource and its historical context and setting.	building.
Negligible/ Neutral	No impact from changes in use, amenity or access. No change in the ability to understand and appreciate the resource and its historical context and setting.	No perceptible change in the setting of a building or feature.
Low Beneficial	Land use change resulting in improved conditions for the protection of archaeological remains or understanding/ appreciation of a historic building or place	Decrease in visual or noise intrusion on the setting of a building, archaeological site or monument. Improvement of the wider landscape setting of a building, archaeological site or monument.
Medium Beneficial	Land use change resulting in improved conditions for the protection of archaeological remains, or understanding/ appreciation of a historic building or place, including through interpretation measures (heritage trails, etc). Removal of harmful alterations to better reveal the significance of a building or structure, with no loss of significant fabric.	Significant reduction or removal of visual or noise intrusion on the setting of a building, archaeological site or monument; and Improvement of the wider landscape setting of a building, archaeological site or monument Improvement of the cultural heritage amenity, access or use of a building, archaeological site or monument.
High Beneficial	Arrest of physical damage or decay to a building or structure;	Exceptional enhancement of a building or archaeological site, its cultural heritage amenity and access or use

3. Definition of field evaluation techniques

Field evaluation is sometimes necessary when the importance of an identified archaeological feature cannot be ascertained via an archaeological desk based assessment alone. There are several different techniques but the three most common are geophysical survey, trial trenching, and supervised metal detector survey:

Geophysical survey

This technique is a non-intrusive form of archaeological field evaluation. It utilises a magnetometer which detects differences within the earth's magnetic field caused by the presence of iron in the soil. This iron often takes the form of magnetised iron oxides in the topsoil which have been re-deposited into lower archaeological features through cutting and backfill. A magnetometer can also detect iron artefacts within the soil and the presence of burnt stone material such as on hearths, kilns, and burnt mounds.

Trial trenching

Where a site is suspected to contain more subtle archaeological features such as pits, a geophysical survey may not be appropriate due to its lack of sensitivity in detecting these features. Indeed, trial trenching can also be utilised when anomalies have been identified during the geophysical survey and clarification is required in order to identify them. Trial trenches usually measure 20m by 2m although can vary in size if targeting geophysical anomalies. Trenches are excavated using a mechanical tracked excavator and supervised by an archaeologist. The topsoil and subsoil are removed onto buried features or if absent, on to the natural glacial substrata. Any archaeological remains found are usually evaluated and recorded prior to backfilling of the trench, so that further site specific mitigatory recommendations can be made.

Supervised Metal Detector Survey

Some types of underlying substrata and bedrock can mask the results of investigation techniques such as geophysical survey. In such instances an archaeologically supervised metal detector survey can be undertaken. This involves the supervision of metal detectorists by a suitably qualified archaeologist and the spatial mapping of artefacts as they are discovered. This technique can give a geographical spread of metal finds and thus be indicative of 'hotspot' areas which may require further investigation by trial trenching for example.

4. Definition of Mitigatory Recommendations

None:

No further action is required.

Detailed recording:

A photographic and concise descriptive record is required, along with a digital survey.

Basic recording:

A photographic and basic descriptive record is required.

Watching brief:

Monitoring is required by a suitably qualified archaeologist during the proposed development. An archaeological watching brief is divided into four categories according to the IFA. 2001. *Institute for Archaeologists 2001 Standard and Guidance for an archaeological watching brief*:

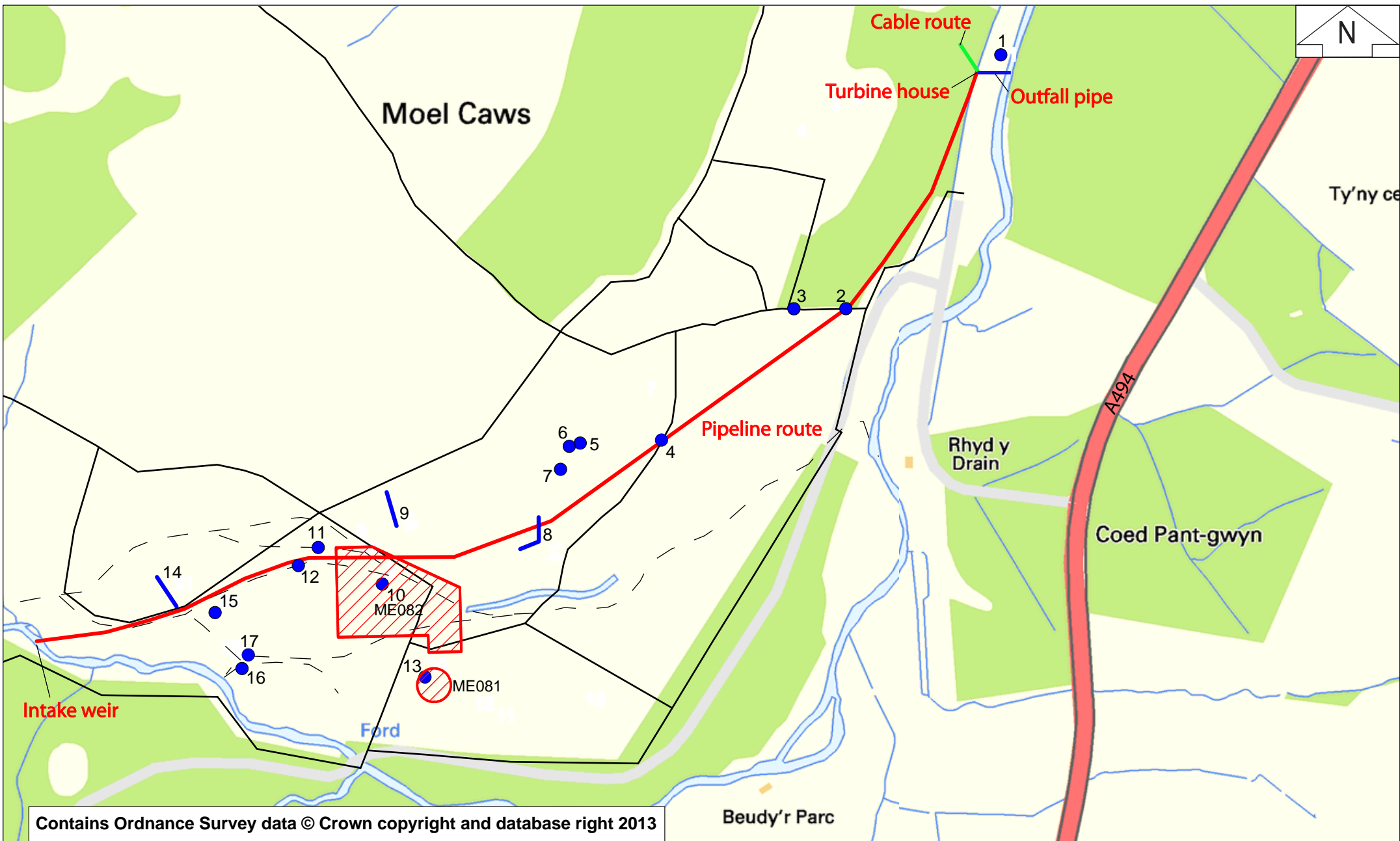
- comprehensive (present during all ground disturbance)
- intensive (present during sensitive ground disturbance)
- intermittent (viewing the trenches after machining)
- partial (as and when seems appropriate).

Avoidance:

These features should be avoided by the proposed development and any ancillary works including the establishment of compound and material lay-down areas. It may be necessary to surround the feature with a barrier and/or signage to avoid accidental damage.

Reinstatement:

These features should be reinstated to their original location and condition. Supervision by an archaeologist is required.

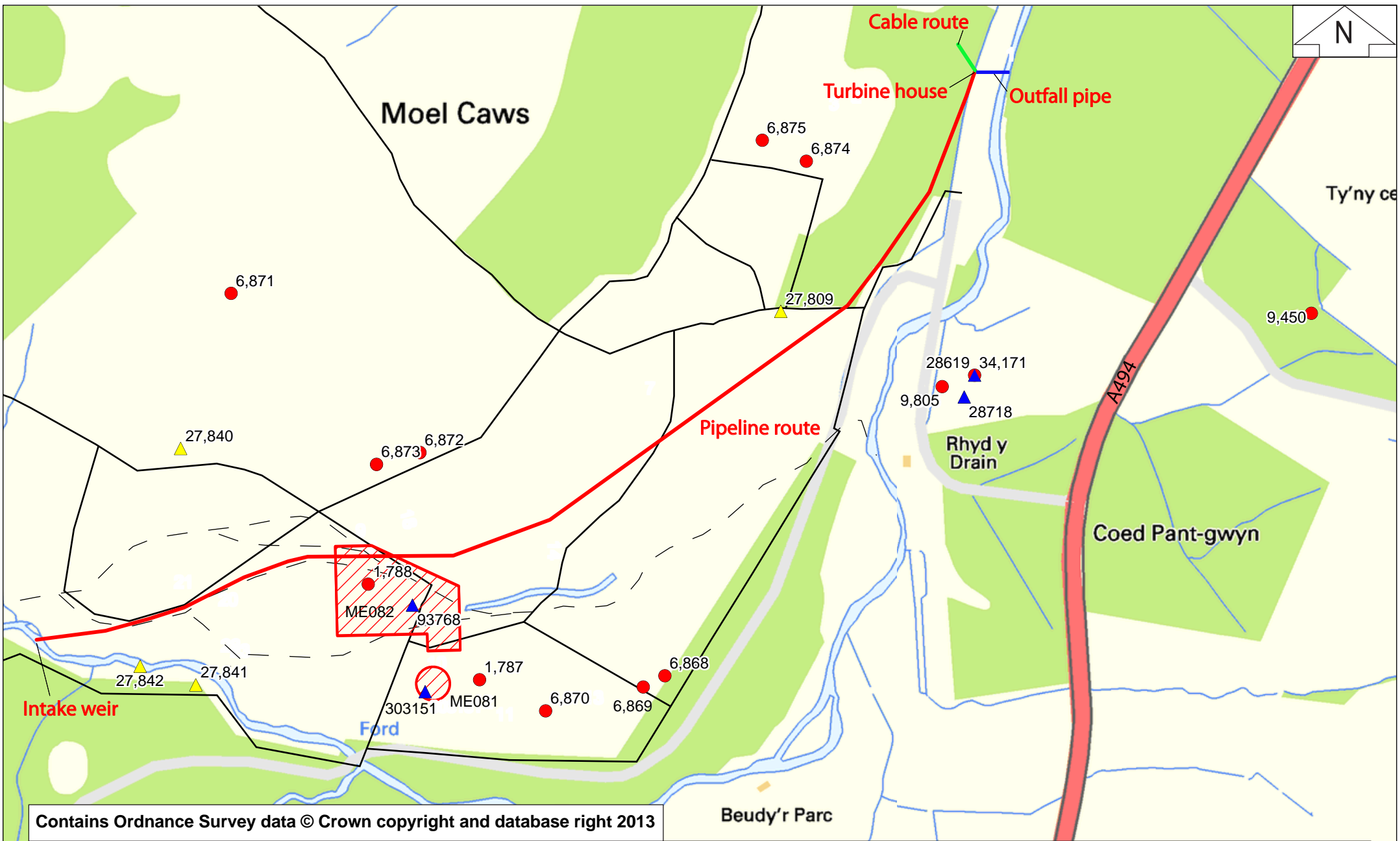


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Figure 1: Location of proposed hydro scheme. Scale 1:4,500 at A4. (Sites identified during the field walkover shown in blue; pipeline route shown in red; SAM polygons shaded in red).

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Figure 2: Location of known historic sites (Sites from the HER shown as red dots and yellow triangles; sites from the NMR shown as blue triangles; SAMs shown as red shaded area). Scale 1:4,500 at A4.

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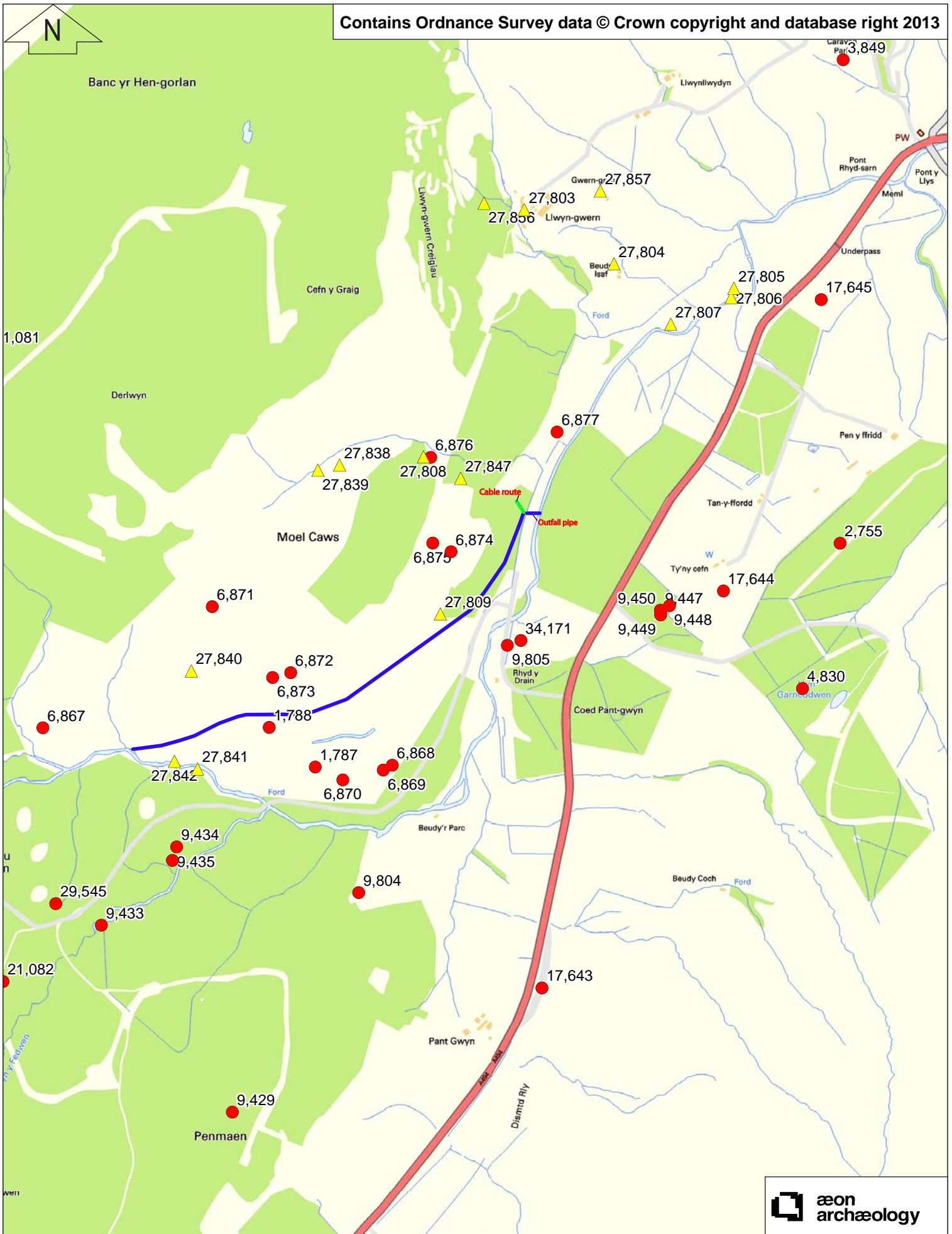


Figure 3: Location of sites from the Gwynedd HER. Scale 1:10,500 at A4. (Sites from the Gwynedd HER shown as red dots and yellow triangles; hyrdo route shown in blue)



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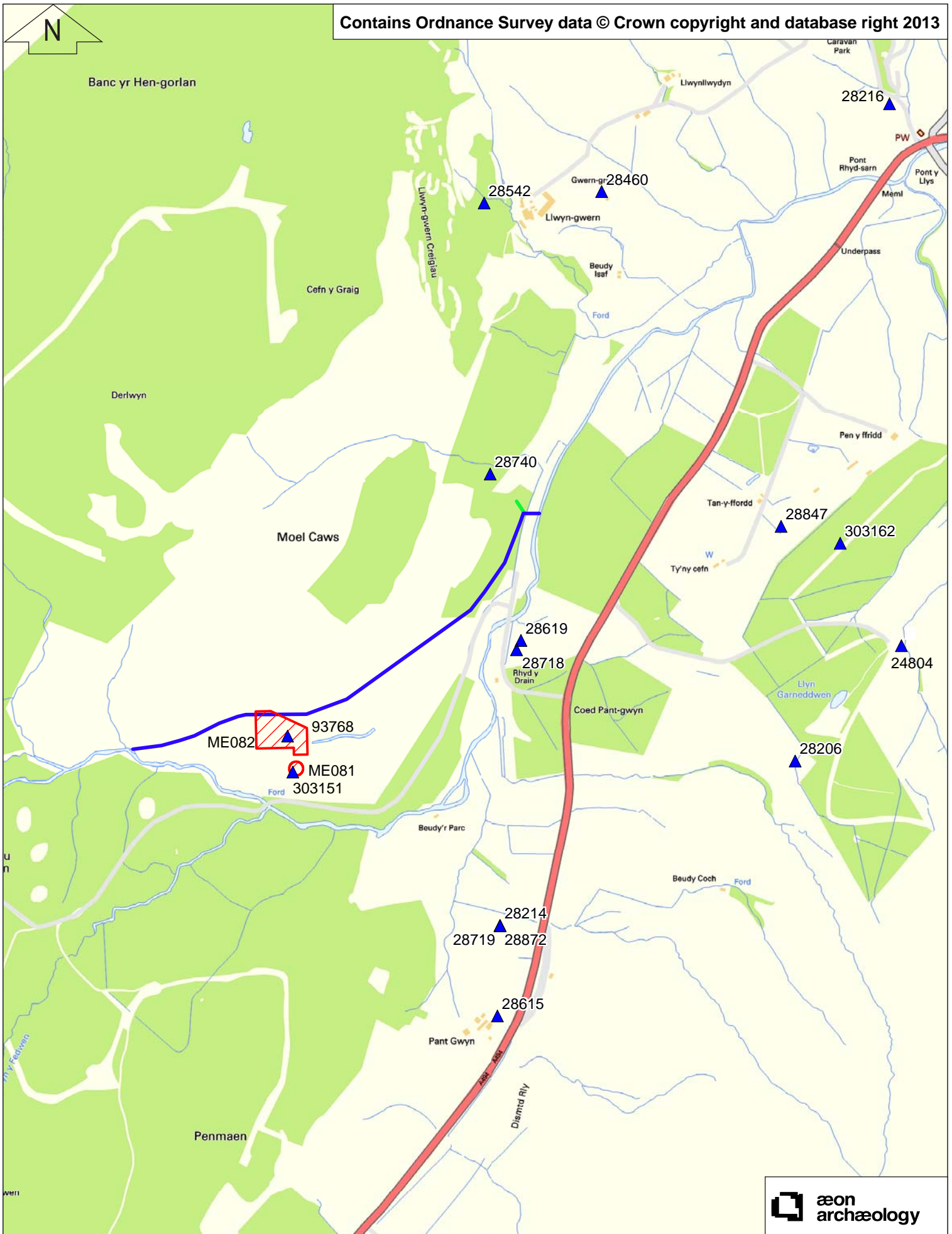


Figure 4: Location of Scheduled Ancient Monuments (SAMs) and sites from the National Monuments Record (NMR), scale 1:10,500 at A4. (SAMs shaded in red; NMR sites shown as blue triangles; hydro route shown in blue)



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Figure 5: Tithe map of 1849 (Pipeline route outlined in red).

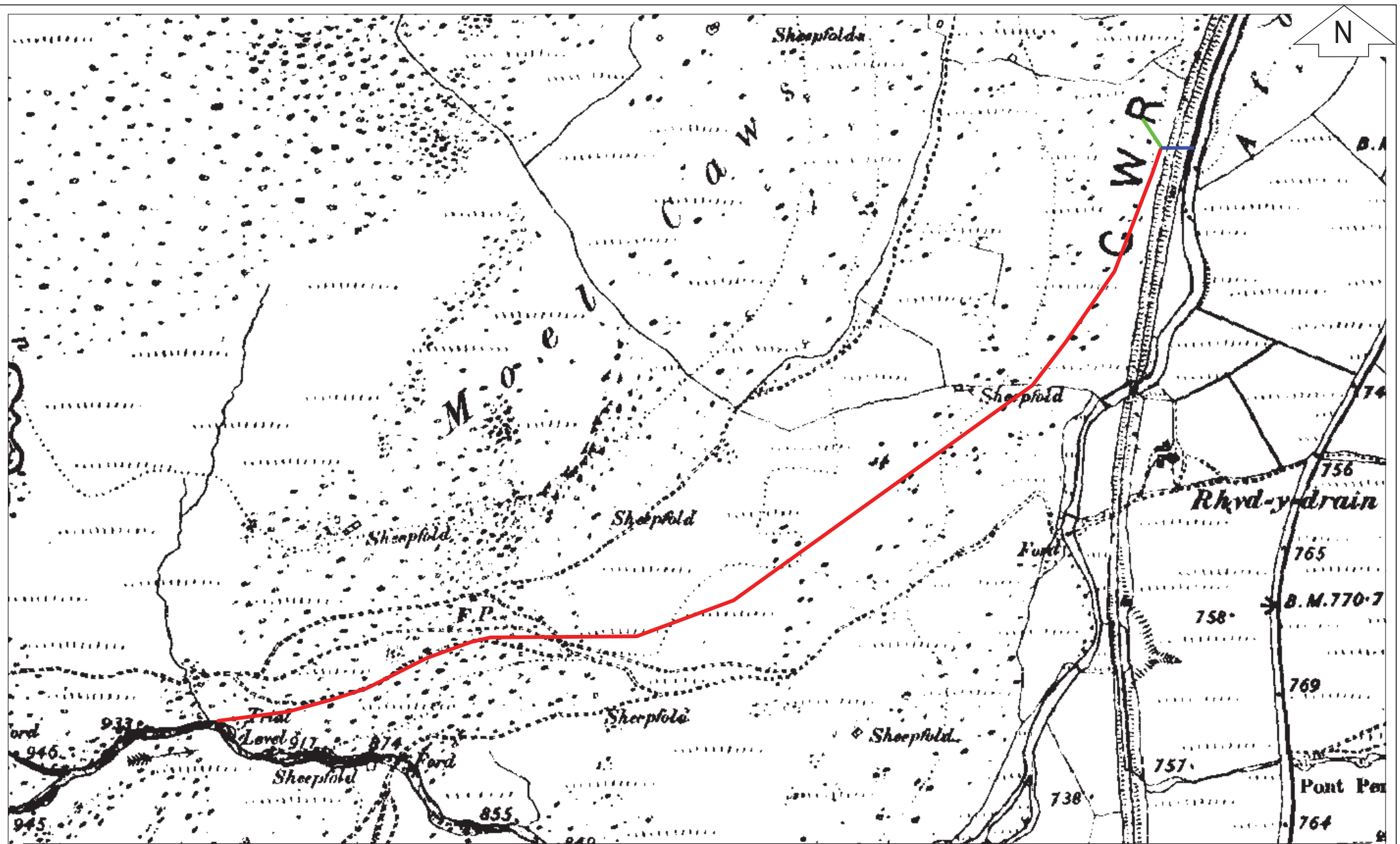


Figure 6: First edition 6 inch Ordnance Survey map of 1890.
Scale 1:4,500 at A4. (Pipeline route outlined in red).

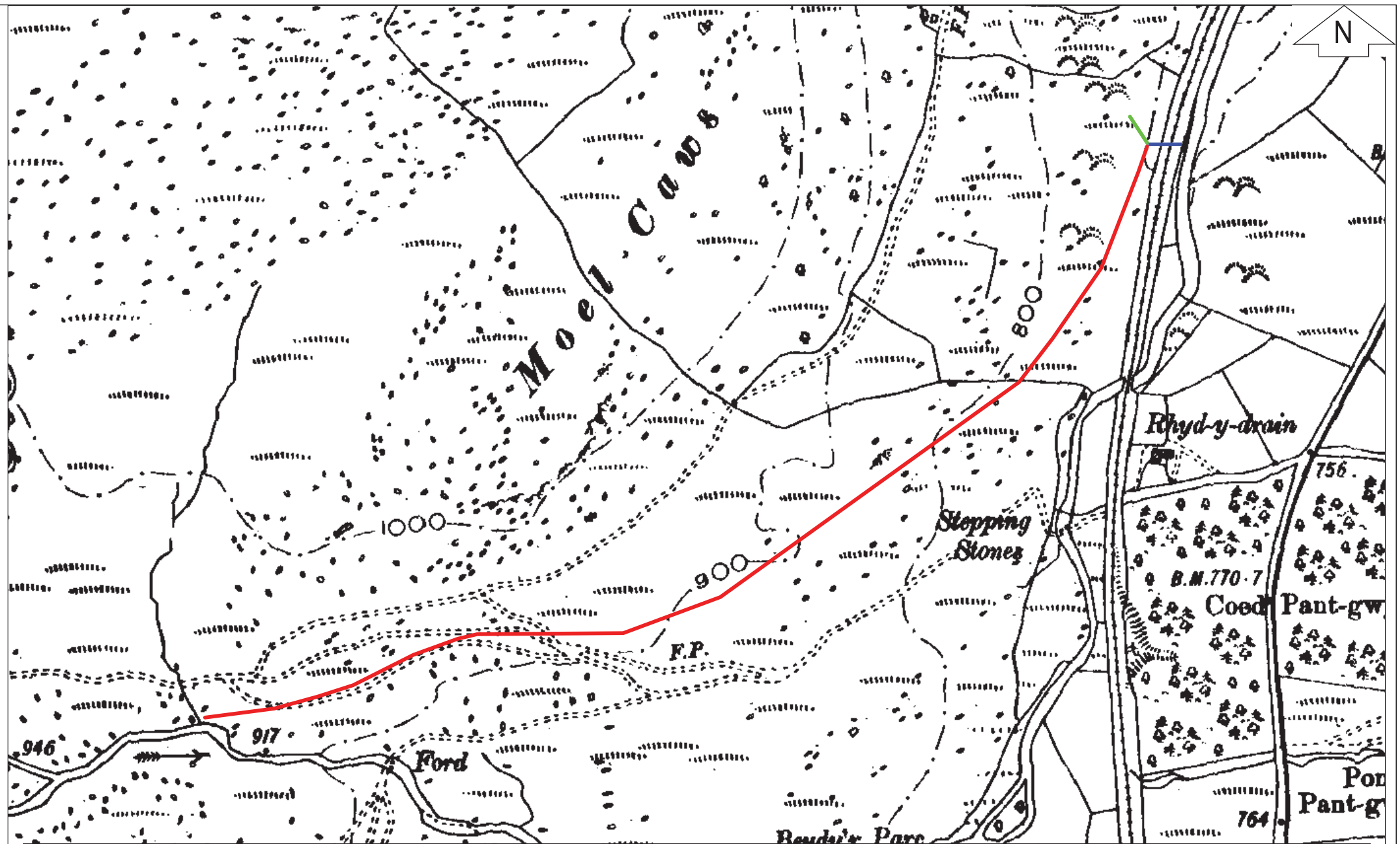


Figure 7: Second edition 6 inch Ordnance Survey map of 1901.
 Scale 1:4,500 at A4. (Pipeline route outlined in red).

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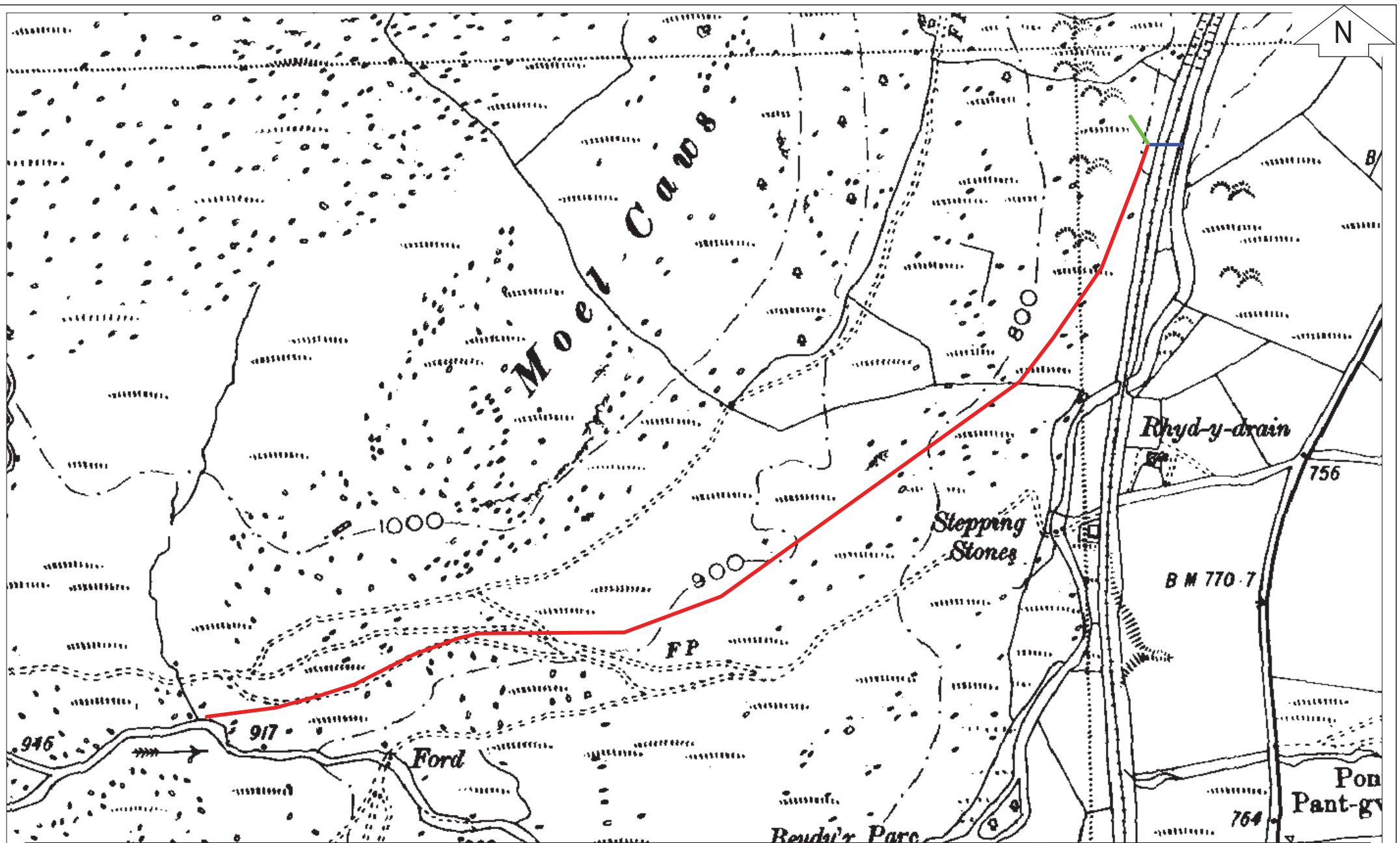
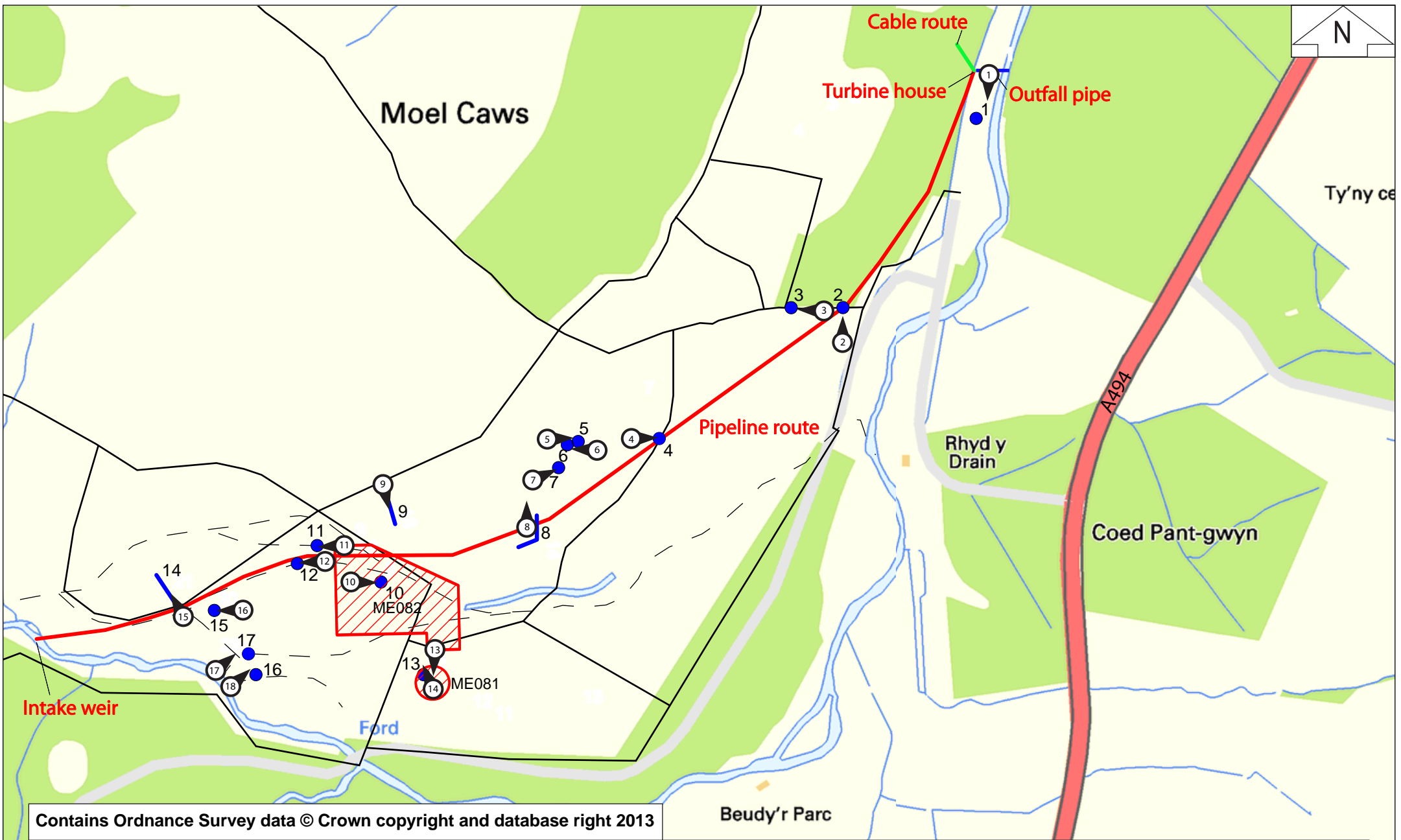


Figure 8: Third edition 6 inch Ordnance Survey map of 1953.
 Scale 1:4,500 at A4. (Pipeline route outlined in red).

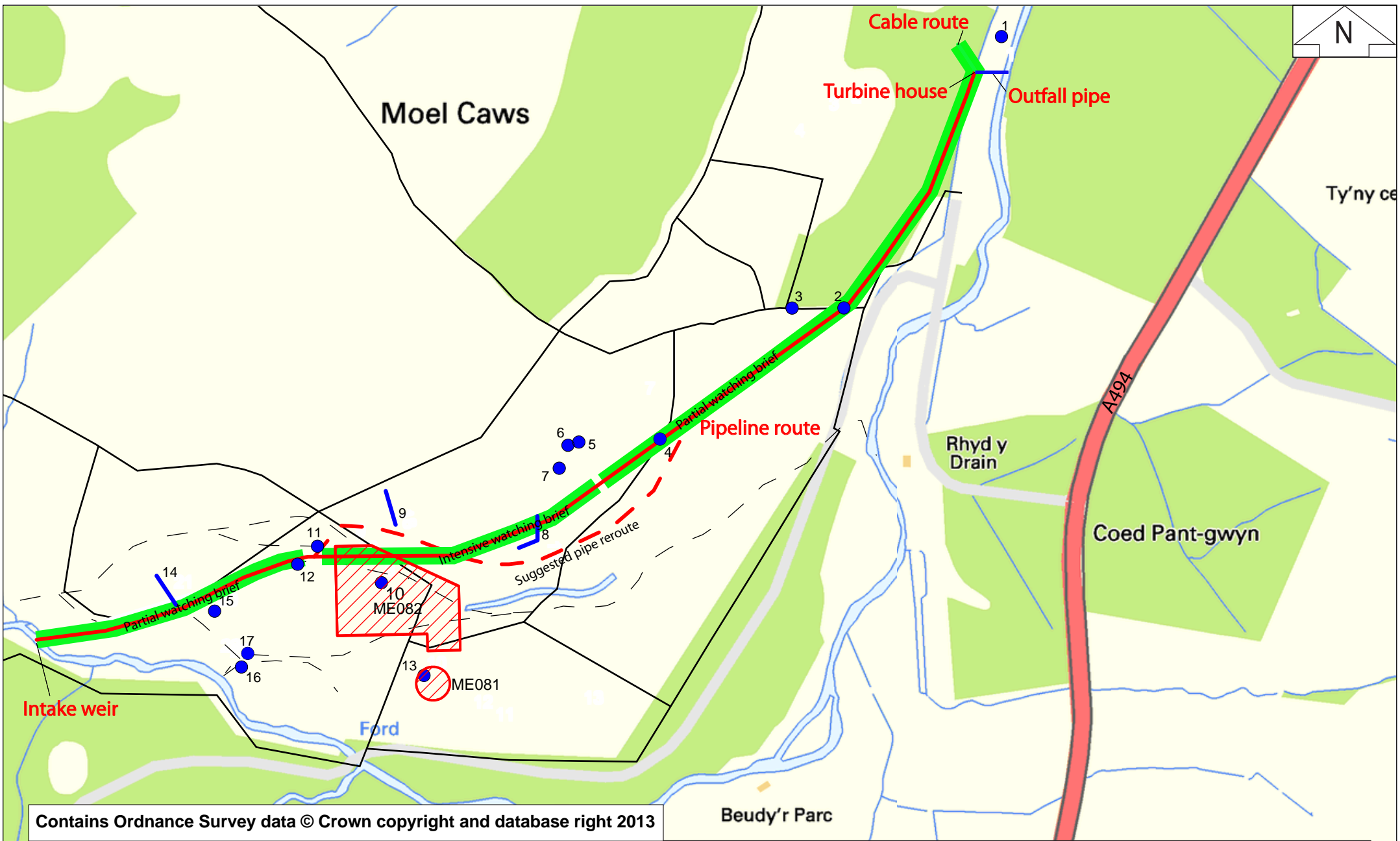


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Figure 9: Location of photographs. Scale 1:4,500 at A4. (Sites identified during the field walkover shown in blue; photographs shown as numbered circles; SAM polygons shaded in red).

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Figure 10: Proposed hydro scheme mitigation. Scale 1:4,500 at A4. (Sites identified during the field walkover shown in blue; pipeline route shown in red; SAM polygons shaded in red).

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Plate 01: Bala and Dolgellau railway embankment (feature 1) from the north. Scale 1.0m.



Plate 02: Field wall (feature 2), from the south. Scale 1.0m



Plate 03: Sheepfold (feature 3) from the east. Scale 1.0m.



Plate 04: Field wall (feature 4), from the northwest. Scale 1.0m



Plate 05: Cairn (feature 5) from the west. Scale 1.0m.



Plate 06: Cairn (feature 6), from the east. Scale 1.0m



Plate 07: Cairn (feature 7) from the southwest. Scale 1.0m.



Plate 08: Relict field wall and trackway (feature 8), from the south. Scale 1.0m



Plate 09: Relict field wall (feature 9) from the northwest. Scale 1.0m.



Plate 10: Hut Circle settlement SAM ME082 (feature 10), from the west. Scale 1.0m



Plate 11: Trackway (feature 11) from the east. Scale 1.0m.



Plate 12: Trackway (feature 12), from the east. Scale 1.0m



Plate 13: Cairn SAM ME081 (feature 13) from the north. Scale 1.0m.



Plate 14: View from Cairn SAM ME081 (feature 13) across Hut Circle settlement SAM (ME082) towards pipeline location, from the southeast. Scale 1.0m. (Approximate location of pipeline route outlined in red).



Plate 15: Relict field wall (feature 14) from the southeast. Scale 1.0m.



Plate 16: Rectangular structure (feature 15), from the east. Scale 1.0m.



Plate 17: Trackway (feature 16) from the southwest. Scale 1.0m.



Plate 18: Trackway (feature 17), from the southwest. Scale 1.0m.

