

Llyn Bran, Gwynedd

Archaeological Assessment



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Front cover image: General view of the reservoir looking northwards from the dam wall (archive reference: G2580_006)

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CRYNODEB ANNHECHNEGOL

Comisiynwyd Ymddiriedolaeth Archaeolegol Gwynedd gan Stillwater Associates Limited ar ran Dwr Cymru i ymgymryd ag asesiad archaeolegol fel rhan o ymchwiliad mewn i ddichonoldeb posibl o ddileu argae sy'n bodoli yn Llyn Bran, Bylchau, Sir Dinbych. Mae tystiolaeth o ddefnydd yr ardal gyfagos yn ystod y cyfnod cynhanesyddol cynnar, yn enwedig yr Oes Efydd yn eang. Ychydig iawn o dystiolaeth sydd yno o ddefnydd yr ardal yn ystod yr Oesoedd Rhufeinig a'r Oesoedd Canol, er ei bod yn debygol fod yr ardal wedi'i ddatblygu i fod yn faes o borfa haf, gydag amaethyddiaeth trawstrefa yn cael ei ymarfer.

Yn ystod y cyfnod ol-canoloesol roedd yr ardal astudio yn dir comin, ac o fewn tirwedd o rostir ucheldirol. Yn ystod y blynyddoedd olaf o'r 19eg ganrif sicrhawyd yr ardal gan yr Arglwydd Davenport fel ystâd saethu, a ddatblygwyd yn ystod blynyddoedd cynnar yr 20fed ganrif. Daeth yr ardal i goedwigo yng nghanol yr 20fed ganrif ar ôl i'r ystâd gael ei werthu ym 1925.

Adeiladwyd y gronfa ddŵr yn Llyn Bran ym 1896-7 i gyflenwi dŵr i Wallgofdy Gogledd Cymru yn Ninbych, ac fe olygwyd creu argae ar draws y llyn naturiol. Mae yno dystiolaeth o ychydig o weithgaredd yn ystod ganol yr 20fed ganrif, ar ffurf tŷ cychod a hefyd isadeiledd yn gysylltiedig â chronfa ddŵr.

Mae'r effaith ar y safleoedd hysbys o'r gweithgaredd hyn, gyda eithrio'r argae ac chored ei hun, yn debygol i fod yn minimol ond argymhellir bod yr holl strwythurau sydd yn cael eu dileu yn cael cofnod Lefel 2, a bod briff gwyllo rhannol yn cael ei wneud wrth ddileu'r argae.

Byddai mynediad i'r argae ar hyd trac coedwigaeth bresennol o'r de-orllewin, gyda mynediad ychwanegol efallai yn ofynnol ar ben darluniol y gronfa ar draws y rhostir presennol. Mae potensial cymedrol y bod olion archeolegol wedi'i gladdu o fewn ardal y mynediad sy'n croesi'r rhostir, yn enwedig olion yr Oes Efydd a phaleoamgylcheddol. Os defnyddir dulliau effaith isel i wella y trac mynediad hwn bydd angen crynodeb gwyllo rhannol yn unig yn ystod y gwaith daear. Os defnyddir dulliau mwy ymwithiol byddai angen crynodeb gwyllo cynhwysfawr yn ystod gwaith paratoi'r tir, ac efallai y bydd yn rhaid cynnal strategaeth samplu amgylcheddol, yn seiliedig ar gyngor arbenigol.

NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust was commissioned by Stillwater Associates Limited on behalf of Dŵr Cymru to undertake an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam at Llyn Brân, Bylchau, Denbighshire. Evidence for the use of the surrounding area in the earlier prehistoric period, particularly the Bronze Age, was widespread. There is little evidence of the use of the area in Roman and medieval times, although it is likely to have developed into an area of rough summer pasture, with transhumance agriculture being practiced.

In post-medieval times the study area was common land, and sat within a landscape of upland heath. In the latter years of the 19th century the area was secured by Lord Davenport as a shooting estate, which developed during the early years of the 20th century. The area became afforested in the mid-20th century after the estate had been sold off in 1925.

The reservoir at Llyn Bran was constructed in 1896-7 to supply water to the North Wales Counties Lunatic Asylum in Denbigh, and involved the damming of the natural lake. There is evidence of some mid-20th century activity, in the form of a boathouse and also reservoir related infrastructure.

The impact on the known sites from this activity, with the exception of the dam and weir structure itself, is likely to be minimal, but it is recommended that all structures that are removed are given a Level 2 record, and that a partial watching brief is carried out during the removal of the dam.

Access to the dam would be via an existing forestry track from the southwest, with possible additional access required at the southwestern end of the reservoir across the existing heath. There is moderate potential for buried archaeological remains within the access area crossing the heath, particularly Bronze Age and palaeoenvironmental remains. If low impact methods of improving this access track are used, then only a partial watching brief would be required during the groundworks. If more intrusive methods are used a comprehensive watching brief would be required during ground preparation works, and an environmental sampling strategy may have to be carried out, based on specialist advice.

1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) was commissioned by Stillwater Associates Limited on behalf of Dŵr Cymru to undertake an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam (reservoir discontinuance) at Llyn Brân (Primary Reference Numbers (PRN) 36831 and 81837), near the junction of the A543 and B4501 roads southwest of Bylchau, Denbighshire (NGR SH96205930; Figure 01). As specified in data supplied by Stillwater Associates Limited, Llyn Brân is a raised natural lake, impounded by a small gravity dam, built in about 1896-7 at the southern end of the reservoir, which is reported to have raised the level of the lake by 8ft. (2.4m). The dam incorporates the overflow weir, from which water passes down the original watercourse downstream of the lake, flowing into Llyn Brenig c.2km to the south. The outlet works from the reservoir are located near the northern end, from where a tunnel (about 450m long) containing the raw water main passes through a saddle to the north of the reservoir to the site of the former filter beds. By the time that the reservoir was taken out of service in about 1994, the filter beds had been replaced by a water treatment works at Bylchau, some 2km to the northeast of Llyn Brân. It is understood that Llyn Brân remains as an emergency raw water source, by pumping overland into Aled Isaf reservoir. The reservoir measures c.630m long north–south by up to 330m wide east–west. The removal strategy has not been confirmed, but may include removing all concrete parts above ground (possibly leaving in concrete foundations/cut-off walls), with smaller infrastructure possibly also left behind, such as a small weir to control future water levels. The water body would then be returned to a natural lake. Access to the dam would be via an existing forestry track from the southwest, with possible additional access required at the southwestern end of the reservoir across the existing heath (Figure 01).

The assessment was undertaken in accordance with guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014), MoRPHE (English Heritage 2015) and MAP2 (English Heritage, 1991, *Management of Archaeological Projects*) was undertaken in October 2018.

The assessment was monitored by the Development Control Archaeologist, Clwyd-Powys Archaeological Trust (CPAT) and undertaken in accordance with an approved written scheme of investigation prepared by GAT ([Appendix I](#)).

The Clwyd-Powys Archaeological Trust Historic Environment Record Enquiry Reference Number for this project was E6412.

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

2 METHODOLOGY

2.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment included the study of the following resources:

1. The regional Historic Environment Register ((HER) Clwyd-Powys Archaeological Trust, 41 Broad St, Welshpool SY21 7RR) was examined for information concerning the study area, defined as the Llyn Brân and immediate environs, including the possible access line, as detailed on Figure 01. This included an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. All identified assets were mapped, described and added to a gazetteer of sites and the relative importance of any assets defined;
2. The National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) were checked for assets additional to the HER;
3. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) were examined for potential assets;
4. An on-line catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU) was completed;
5. Archive data, including primary and secondary sources, historic maps and estate maps were examined at the regional archives (Denbighshire Archives, 46 Clwyd St, Ruthin LL15 1HP). The examination of the archive data included historic mapping such as the local tithe map and schedule;

6. Light Detection and Ranging (LiDAR) data was examined from the Lle Geo-Portal at <http://lle.gov.wales/home> for information on potential surface features using digital terrain modelling and digital surface modelling.

2.2 Walkover Survey

A walkover survey was undertaken on the 15th October 2018 of Llyn Brân, the immediate environs and the access road, as detailed on Figure 01. All known and new archaeological features on the ground were located and described on GAT pro-formas; the sites were then added to the overall gazetteer and their relative importance defined. The potential for sub-surface archaeology was estimated and defined. A photographic record was maintained in RAW format using a digital SLR (Nikon D5100) camera set to maximum resolution (4,928 x 3,264; 16.2 effective megapixels) and were converted to TIFF format for archiving using Adobe Photoshop; the photographic record was digitised in *Microsoft Access* using archive numbering system G2580_001 to G2580_029 ([Appendix II](#)). A handheld GPS unit was also used during the walkover survey.

2.3 Gazetteer

A gazetteer was compiled for all identified sites within and within proximity to the assessment based on information sourced from the regional HER; the gazetteer included the following:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Impact
10. Recommendation for further assessment/evaluation
11. Recommendation for mitigatory measures

The following categories were used to define the assessment category of the archaeological asset:

Category A - Sites of National Importance.

Scheduled Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. Sites that 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.

Grade II listed buildings and 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 that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

Category E - Sites needing further investigation.

Sites, the importance of which 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. In this report several sites of unknown potential have been allocated to this category.

The impact of the proposed works on any asset were identified using the following impact criteria, defined either as *none, slight, unlikely, likely, significant, considerable or unknown* as follows:

None:

There is no construction impact on this asset.

Slight:

This has generally been used where the impact is marginal and would not by the nature of the site cause irreversible damage to the remainder of the asset, e.g. part of a trackway or field bank.

Unlikely:

This category indicates sites that fall within the band of interest but are unlikely to be directly affected. This includes sites such as standing and occupied buildings at the margins of the band of interest.

Likely:

Sites towards the edges of the study area, which may not be directly affected, but are likely to be damaged in some way by the construction activity.

Significant:

The partial removal of an asset affecting its overall integrity. Assets falling into this category may be linear features such as roads or tramways where the removal of part of the feature could make overall interpretation problematic.

Considerable:

The total removal of an asset or its partial removal which would effectively destroy the remainder of the site.

Unknown:

This is used when the location of the asset is unknown, but thought to be in the vicinity of the proposed works.

Definition of field evaluation techniques

Field evaluation is necessary to fully understand and assess most class E sites and to allow the evaluation of areas of land where there are no visible features but for which there is potential for sites to exist. Two principal techniques can be used for carrying out the evaluation: geophysical survey and trial trenching. Topographic survey may also be employed where sites are thought to survive as earthworks.

Geophysical survey most often involves the use of a magnetometer, which allows detection of some underground features, depending on their composition and the nature of the subsoil. Other forms of geophysical survey, including resistivity survey and ground penetrating radar might also be of use.

Trial trenching allows a representative sample of the development area to be investigated at depth. Trenches of appropriate size can also be excavated to evaluate category E sites. Trenching is typically carried out with trenches of between 20 to 30m length and 2m width. The topsoil is removed by machine and the resulting surface is cleaned by hand, recording features. Depending on the stratigraphy encountered the machine may be used to remove stratigraphy to deeper levels.

Definition of Mitigatory Recommendations

None:

No impact so no requirement for mitigatory measures.

Detailed recording:

This requires a full photographic record and measured survey prior to commencement of works.

Archaeological excavation may also be required depending on the particular feature and the extent and effect of the impact.

Basic recording:

Requiring a photographic record and full description prior to commencement of works.

Controlled Strip (Strip/Map/Sample):

The technique of Controlled Strip (Strip/Map/Sample) involves the examination of machine-stripped surfaces to identify archaeological remains. The stripping is undertaken under the supervision of an archaeologist. Stripping and removal of the overburden is undertaken in such a manner as to ensure damage does not take place to surfaces that have already been stripped, nor to archaeological surfaces that have not yet been revealed.

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

Watching brief:

This is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

Avoidance:

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

Reinstatement:

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

3 RESULTS

3.1 Desk based assessment

3.1.1 Location and geological summary

Llyn Brân (Primary Reference Numbers (PRN) 36831 and 81837) is located on upland moorland near the junction of the A543 and B4501 roads southwest of Bylchau, Denbighshire (NGR SH96205930; Figure 01). Llyn Brân consists of a raised natural lake, impounded by a small gravity dam, built in about 1896-7 at the southern end of the reservoir, which is reported to have raised the level of the lake by 8ft. (2.4m). The dam incorporates the overflow weir, from which water passes down the original watercourse downstream of the lake, flowing into Llyn Brenig c.2km to the south.

The underlying geology consists of Silurian Denbighshire Grit Facies of the Wenlock Series (Smith and George 1961, 48-50). This is overlain by ferric stagnopodzols of the Hafren Association (BGS 1980).

3.1.2 Statutory and non-statutory designations

Llyn Brân is located within the Mynydd Hiraethog Landscape Characterisation area, specifically, the Bryn-y-gors-goch character area (HLCA 1110). The Mynydd Hiraethog Landscape Characterisation area includes uninterrupted areas of heather moorland that were deliberately managed and maintained as a grouse moor and a shooting estate in the early part of the 20th century. Llyn Brân is located at the northern end of the Bryn-y-gors-goch character area, which is characterised by modern coniferous forest plantation overlying relict medieval and later enclosed landscape of scattered farmsteads with associated field systems and stone quarrying (source:

<http://www.cpat.org.uk/projects/longer/histland/hiraeth/1110.htm>). The Mynydd Hiraethog SSSI, which contains much upland blanket bog, lies adjacent to the reservoir to the north and to the west on the far side of the B4501 but it does not lie within it (Natural Power 2015, Figure 1).

There are no known archaeological assets or Listed Buildings within the reservoir or the immediate environs. The closest Scheduled Monument is a prehistoric cairn (De168; PRN 100618), located 660m to the northeast at NGR SH97386025, with two additional cairns (De168; PRN 100618), located 1.4km to the northeast at NGR SH97386025 (Figure 01). Former roadside quarries are located in the vicinity of the reservoir along the former turnpike

road, now the A543, whilst a former hunting lodge, Gwylfa Hiraethog, is located 1.34km to the west at NGR SH94725906.

3.1.3 *Environmental remains and soil morphology*

The area around Llyn Brân consists of an upland landscape of shallow soils over bedrock, with deeper patches of waterlogged deposits, and numerous watercourses. Much of the area is now forested. Waterlogged deposits survive in the vicinity of the reservoirs, which mean that the potential for survival of organic deposits is significantly increased. However in places these deposits may be already significantly disturbed as part of the reservoir modification, or as part of peat cutting up to the 19th century. All the reservoir locations were formerly rough upland grazing in nature, with evidence of underlying deposits of peat. There has been much afforestation since the 1930s. The paleo-environmental potential of the peat deposits identified within the study area might require a specific programme of **paleo-environmental recording**. This is only likely to be the case if the access track to the west (Figure 01) is significantly disturbed as part of the project works, and could be avoided if mitigation such as the use of bog mats is used to reduce the risk of damage to the peaty deposits. Any such programme, carried out in advance of ground works, would require specialist advice in advance.

3.1.4 *Historical and Archaeological Background*

3.1.4.1 Prehistoric and Roman

The moorland landscape originated in the Neolithic and Bronze Age and possibly in the Mesolithic period when the areas of the moorland might have been deliberately burnt and cleared for hunting

(source: http://www.cpat.org.uk/projects/longer/histland/hiraeth/mhiraeth.htm#1110_Bryn_y_Gors-goch).

Bronze Age burial cairns were also established on the local summits. The closest of these to the site, Gorsedd Bran is also a Scheduled Monument (De168; PRN 100618), located 660m to the northeast at NGR SH97386025 and appear to be undisturbed. Two additional cairns (De168; PRN 100618-9) are located 1.4km to the northeast at NGR SH97386025 These cairns were larger, up to 12m in diameter and 1.6m high and were contiguous with each other. The smaller one consisted of a round cairn 9m in diameter and 0.7m high, with a hole in the summit, suggesting disturbance thought to be Victorian excavations carried out around 1850 (Davies, Rev. E. 1929, 377-379). These are thought to have been opened by quarry workers in the 19th century and a cist and a cremation urn were uncovered. The barrows are

visible from the lower ground towards Bylchau, to the north, and seem likely to have been constructed by particular prehistoric communities which exploited both lowland and upland resources in this area. A standing stone at Ffynnon-naid-y-march (PRN 81829; SH96415979), shown on the 1st edition Ordnance Survey Map (Figure 03) is thought likely to date from this time also.

After a significant period of activity in the Bronze Age, there is little evidence for later prehistoric activity or settlement on the uplands. The landscape of the uplands was modified subsequently through continued seasons of summer grazing, based on temporary summer settlements or *hafodau* sited in the valleys and along the edges of the moor (*ibid.*).

No known activity dating from the Roman period has been identified within the study area.

3.1.4.2 Medieval

The prehistoric landscape of the uplands was modified subsequently through continued seasons of summer grazing, based on temporary summer settlements or *hafodau* sited in the valleys and along the edges of the moor (*ibid.*).

Medieval and later settlement is represented by a scatter of small farmsteads and smallholdings generally occupying the south-facing slopes, at a height of between about 370-400m whose fields and buildings are now mostly abandoned and either engulfed by the coniferous plantations or in the wider area submerged below the Alwen Reservoir. A number of the farms, notably Hafod-y-llan-isaf and -uchaf, contain the element hafod 'summer house' suggesting that they began life as seasonally-occupied dwellings each connected with a hendre or all-year-round settlement on lower ground. Within the study area a farmstead has been identified at Mona Farm, about 750m east of the reservoir dam (PRN 125,179; SH96965897), which whilst of post-medieval date, may have earlier origins as the site of a former *hafod*. Documentary evidence indicates that permanent farms with associated fields had been established in a number of instances by a least the middle of the 16th century, replacing the earlier more transhumance agriculture.

3.1.4.3 Post-Medieval

Surviving settlement in the study area is limited to a probably early 19th-century dwelling Tan-bryn-trillyn, noted on the Henllan tithe map of 1841, which had become renamed as the Sportsman's Arms public house by the 1870s which, at a height of about 455m above OD, styles itself as 'The Highest Inn in Wales' (PRN 36815; SH95255907). The stone dwelling is now rendered, with an early 19th-century cart shed at the rear, and is set at the middle of a distinctive rectangular series of banked fields set out symmetrically between the early 19th-century Pentrefoelas to Denbigh turnpike road and Henllan-Llansannan parish boundary (the modern road has been diverted to run close to the public house), and was probably set up as a coaching inn with grazing in the early 19th century to serve travellers, tourists and later sportsmen, when it became associated with the now ruinous 20th-century hunting lodge of Gwylfa Hiraethog, set in moorland just to the west. Other field boundaries and roadside boundaries in the area are largely of post-and-wire, but an unroofed structure of unknown date, now almost totally destroyed by afforestation (PRN 13629; SH95865880) has been identified south-west of the reservoir. Whilst this is of an unknown, but clearly post-medieval date, it probably relates to pre afforestation upland agricultural activity.

Much of the area was subject to peat extraction in the last century, typified by the remains of cuts and drying stacks and post-medieval farmsteads (*ibid.*). From the early 20th century this landscape was overlain by managed moorland, as well as an extensive shooting estate created by Viscount Devonport between 1908 and 1925, which included the establishment of hunting lodges, shooting butts and shelters, some of which lie within the study area. Whilst the former hunting lodge, Gwylfa Hiraethog, is located 1.34km to the west at NGR SH94725906 and was built in 1908, the land surrounding the reservoir was part of the shooting estate of Viscount Devonport (Hubbard 1986), which had formerly been common land (Figure 02). Within the study area about 200m north-west of the reservoir at Gors Penrhiwiau a line of four grouse shooting butts of earth construction and orientated north-south are located (PRN 120676; SH95445960). The lodge and estate was put up for sale in 1925 (NLW Denbighshire Sale Catalogues No. 20), and since that date the house was used by estate gamekeepers, finally being abandoned in the 1960s (RCAHMW *Coflein* database).

Former roadside quarries are located in the vicinity of the reservoir along the former turnpike road, now the A543. The closest to the reservoir site are immediately north of the reservoir (PRN 36819; SH96235957) and at the Sportsman's Arms quarry (PRN 36815; SH95255907) about 300m to the west. Other quarries existed in the vicinity, with the Nantglyn quarry

located in woodland about 600m to the east of the reservoir (PRN 36827; SH96855938). These quarries relate to the era of road improvements associated with the development of turnpike roads in the 18th to early 19th centuries.

The other post-medieval characteristic of the area is the presence of boundary markers (PRN 81824; SH95996016, PRN 81825; SH95715962, PRN 81830; SH96255962). These stones mark the boundary between the parishes of Henllan and Nantglyn, and would have been significant for administrative purposes in areas such as this where boundaries were not always clearly defined features within the landscape.

The North Wales Lunatic Asylum in Denbigh was designed by architect Thomas Fulljames in 1848 to accommodate between 60 and 200 patients. The hospital was a very substantial institution and originally had its own farm and gasworks, which by the 1890s needed its own water supply due to created demand than could be supplied by the town of Denbigh. The North Wales Counties Lunatic Asylum (Water Supply) Act of 1896 allowed for the modification of Llyn Bran, damming the natural lake to create a reservoir to supply the asylum, which by this time had become a very substantial institution with a larger number of staff and patients than had originally been intended. The act was gazetted on July 21 1896, and work on the project began in earnest in 1897 (The London Gazette, seen at <https://www.thegazette.co.uk/London/issue/26760/page/4148/data.pdf>). The work to create a water supply for the asylum can be seen as part of the wider Victorian philanthropic drive to improve treatment and conditions for those found to be in unfortunate circumstances, whose previous treatment had been considered harsh.

A dilapidated boathouse was located at the north eastern end of the reservoir (PRN 152059; SH96235947; Plate 15). The boathouse was not present on the historic mapping and is a twentieth century construction, post 1913. It appears to have been associated with social activity on the reservoir in the earlier to mid-20th century, and was possibly related to activities associated with the Gwylfa Hiraethog estate, or just after this was sold off in 1925. A jetty (Plate 12) was located 11m to the west and was positioned in the same general location as a sluice visible on the Third Edition 25-inch to 1 mile Ordnance Survey maps of the area (Figure 05). A reinforced concrete and brick structure was located 11m north of the boathouse (PRN 152060; SH96235947; Plate 15). The exact function of the building was unclear, but it was utilitarian in appearance suggesting it had a former function associated with the reservoir and was possibly mid-twentieth century in date based on general appearance and materials used.

The wider study area is now largely covered by the modern coniferous forestry, dating mainly from the 1930s, subdivided into different parcels by roads and rides (*ibid.*).

3.1.5 Cartographic evidence

The title of the parish of Nantglyn of 1841 shows Llyn Brân in its pre-dammed state within an area of common land, crossed by unfenced roads (Figure 02). This indicates that the area was one of land used for common grazing and had public access. There was therefore no private landowner until the land was secured as a shooting estate by Viscount Davenport in the latter years of the 19th century. This evidence also suggests that there is unlikely to be any earlier estate or other maps created of the area. A brief examination of the First to Third Edition 25-inch to 1 mile Ordnance Survey maps of the area (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5) shows impact on the immediate area from the establishment of the reservoir. The First Edition and Second Edition maps, published in 1874 and 1899 respectively (cf. Figures 03 and 04), shows Llyn Brân before the establishment of the dam and sluice at the southern end of the lake, with the lake covering a smaller surface area. The Third Edition map (1913; cf. Figure 05), shows the reservoir in place, covering an enlarged area that matches the current reservoir footprint. The reservoir is listed as belonging to the *North Wales Counties Lunatic Asylum Water Works*. Later Ordnance Survey maps show the presence of the boathouse (PRN 152059) on the east bank of the reservoir.

3.1.6 Artefact potential

The potential for the recovery of artefacts is generally considered to be low, due to the lack of knowledge of significant archaeological activity in the area for most historical periods. The exception to this is for the Bronze Age, where there is considerable evidence for barrows and cairns, some of which are known to have contained cremation urns and cists. This evidence for Bronze Age activity suggests that there is a moderate potential for the recovery of Bronze Age artefacts over the wider study area, and the possible presence of burnt mounds (Bronze Age cooking places using heated stones), dating to prior to the deposition of the peat, must be considered as the area is close to a suitable water supply. There is also a moderate potential for the discovery of modern material culture, including that relating to the use of the area as a shooting estate. The likelihood for the recovery of artefactual evidence of other periods is considered to be low.

3.1.7 Aerial photographs and LiDAR

No LiDAR information was available for the assessment area. Vertical aerial photograph 3G/TUD/UK/35 Part II, frame 5211, taken by the RAF on 16th January 1946 shows the reservoir and the surrounding clearly. There is clear evidence of the afforestation of the area shown, with irregular open areas shown. The area around the boathouse and concrete roofed building is also clear (Features 02 and 03; PRNs 152059 and 152060), and they appear to be well maintained at this time. Whilst the topography around the reservoir is clearly shown, no new archaeological sites were identified, with the exception of an additional linear feature running north-south from the west side of the dam, leading off the A543. This appears to be a forest track and would appear to be of no great antiquity, but was not seen on the ground on the site visit. Another image, 106G/UK 1455, frames 4324-5 taken by the RAF on 2nd May 1946 was taken from a far greater height, and whilst the topography is clear no additional detail can be picked out.

Meridian Airships image 034 74 185, taken on 14th June 1974 shows the site clearly. Evidence of the quarries adjacent to the A453 is clear, and there had been much tree felling to the east of the reservoir, and there was evidence of recent ploughing. The areas of afforestation were shown to be much as they are today, and the area of the boathouse appears unchanged from the earlier image.

The track ways can also be seen, but no features were identified along the proposed access track. There are possible outlines of linear and circular features in the area to the south and east of the reservoir in the areas that appear to have been recently ploughed or cleared of cover. These are unlikely archaeological parch marks, but a north south feature running west of the B4501 can be seen, which is possibly a channelled watercourse, along which there is possible evidence of enclosures. It runs about 810m east of the reservoir. This is not going to be affected by any proposed works, and is of unknown date (it may be of no great antiquity), but does warrant further investigation. Most of the marks seen in this area appear to be of recent date and of agricultural character.

3.2 Walkover survey

The reservoir was located south of the A543 road within an area of moorland that was surrounded by early twentieth century forestry plantations. Both banks of the reservoir were covered in heather, juncus, reeds and some small patches of grass, extending to an average height of 0.5m to 0.6m (Plates 7 and 8). No additional features were noted within the surrounding area, but potential for below ground palaeoenvironmental potential was noted.

The general route for the proposed access track and work area required during the reservoir discontinuance was walked. The route was located at the southwestern end of the reservoir, with an expected length of 240m, connected to a forestry track. The area was characterised by a broad spread of heather, juncus, reeds and small tussocks of grass (Plates 16 to 19) and was yielding underfoot indicating an area prone to waterlogging. No features were identified.

The walkover survey identified three assets within the assessment area:

- Feature 01: Llyn Bran Reservoir Dam/Reservoir (PRN 36831 & PRN 81837; NGR SH96205889);
- Feature 02: Boathouse (PRN 152059; NGR SH96235947); and
- Feature 03: Reinforced concrete and brick structure (PRN 152060; NGR SH96235947).

Feature 04 (Cefn Tan y Graig Structure) was located 120m southwest of the walkover survey and was identified via the desk-based assessment.

3.3 Gazetteer of features

Feature Number	01
Site name	Llyn Bran Reservoir Dam/Reservoir
PRN number	36831 & 81837
Grid reference	NGR SH96205889
Period	Post-Medieval (late nineteenth century)
Site type	Reservoir
Assessment category	B
Description	<p>The reservoir is located south of the A543 road within an area of moorland that was surrounded by early twentieth century forestry plantations. The reservoir was originally a lake on a smaller footprint within open moorland, as visible on the First and Second Edition 25-inch to 1 mile Ordnance Survey maps of the area (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5; cf. Figures 03 and 04). The construction of the dam in 1897 increased the surface area of the lake. The dam is located at the southern end of the reservoir and comprised a gravity dam wall and central weir (Plate 1). The dam wall was visible to a height of 1.8m and was constructed from rendered concrete (Plate 2), with a central weir over which the water debouched into a stream (Plates 3 and 4), which was channelled and continued southwards through a forested area to join Afon Brenig. The weir had two stub walls either side, extending 1.2m in a curve from the top, which protruded 0.4m out from the return. The dam wall measured 1.3m wide and was surmounted by a metal gantry, with a tubular steel pipe safety barrier on the southern side (Plate 5). Due to the render it was not possible to identify any structural phasing, alterations or modifications and it was assumed the main dam structure was original. The sides of the reservoir included shale slabs that measured up to 0.6m x 0.5m each in size (l x w) (Plate 9). The slabs were not used continuously around the reservoir and appear to have been used where reinforcement was required. The drop from the reservoir edge to the water level was up to 1.5m (Plate 8).</p>
Impact	Considerable
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Watching Brief during the dam breach

Feature Number	02
Site name	Boathouse
PRN number	PRN 152059
Grid reference	NGR SH96235944
Period	Post-Medieval (twentieth century)
Site type	Boathouse
Assessment category	D
Description	A dilapidated boathouse was located at the north eastern end of the reservoir (Plate 15), connected to the reservoir via a jetty and accessed from the A543 via an 84m long track. The boathouse was set into the reservoir bank (Plate 10) and measured 5m in length, 3m in width and 2m in height and was constructed from stretcher bond brick, painted white and partially rendered, surmounted by a double-pitched corrugated iron roof, gable end on to the water (Plate 11). The boathouse was not present on the historic mapping and is a twentieth century construction, post 1913. The jetty (Plate 12) was located 11m to the west and was positioned in the same general location as a sluice visible on the Third Edition 25-inch to 1 mile Ordnance Survey maps of the area (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5; cf. Figure 05).
Impact	Unknown
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Level 2 record (as defined in <i>Understanding Historic Buildings: A guide to good recording practice</i>) if to be removed

Feature Number	03
Site name	Reinforced concrete and brick structure
PRN number	PRN 152060
Grid reference	NGR SH96235946
Period	Post-Medieval (twentieth century)
Site type	Building
Assessment category	D
Description	<p>A reinforced concrete and brick structure was located 11m north of the boathouse (Plate 15). The structure was set further away from the reservoir bank and measured 8m in length, 5m in width and over 2m in height (Plate 13). The exterior was roughcast rendered, with a rusted steel frame visible beneath a flat roof. Two single door openings were present on the rear, northeastern side, with a 1.5m high lean-to on the southeastern side and blocked windows with concrete sills on the southwestern and northwestern sides (Plate 14). Patches of exposed brickwork were visible on the corners of structure where the render had failed; not enough was visible to confirm bonding style. The exact function of the building was unclear, but it was utilitarian in appearance suggesting it had a former function associated with the reservoir and was possibly mid-twentieth century in date based on general appearance and materials used. The use of steel reinforcements suggested it was designed to withstand more than just the elements and has the appearance of a blast proof structure.</p>
Impact	Unknown
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Level 2 record (as defined in <i>Understanding Historic Buildings: A guide to good recording practice</i>) if to be removed

Feature Number	04
Site name	Cefn Tan y Graig Structure
PRN number	13629
Grid reference	NGR SH95865880
Period	Post-Medieval
Site type	Building
Assessment category	D
Description	A dilapidated unroofed structure located 120m southwest of the access road. Located in a clear felled area, on the crest of a hill, with alignment of walls partially visible. Almost totally destroyed by afforestation. Visible on the First to Third Edition 25-inch to 1 mile Ordnance Survey maps of the area (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5; cf. Figures 03 to 05).
Impact	Unlikely
Recommendation for further assessment/evaluation	None
Recommendation for mitigatory measures	Avoidance

4 CONCLUSION & RECOMMENDATIONS

4.1 Conclusion

Evidence for the use of the study area in the earlier prehistoric period, particularly the Bronze Age, in the form of burial barrows and cairns, was widespread, although there is not thought to be any risk to the known archaeological sites from the proposed works. There is little evidence of the use of the area in Roman and medieval times, although it is likely to have developed into an area of rough summer pasture, with transhumance agriculture being practiced.

The study area was common land, as shown on the Nantglyn tithe map of 1841, and sat within a landscape of upland heath. This is likely to have been the case back to the 16th century or earlier. In the latter years of the 19th century the area was secured by Lord Davenport as a shooting estate, which developed during the early years of the 20th century, and became afforested in the mid-20th century after the shooting estate had been sold off in 1925. Both these uses of the landscape are likely to have had a significant impact upon it.

The reservoir at Llyn Bran was noted to have been constructed in 1896-7 following an Act of Parliament to supply water to the North Wales Counties Lunatic Asylum in Denbigh, and involved the damming of the natural lake, with the water flowing northwards to the hospital in Denbigh. Much of the reservoir infrastructure dates to this time, although there is evidence of some mid-20th century activity, in the form of a boathouse on the lake and also reservoir related infrastructure. In the inter-war years the area became significantly afforested, obscuring much of the earlier landscape elements.

4.2 Recommendations

The dam removal strategy has not been confirmed, but may include removing all concrete parts above ground, possibly leaving in concrete foundations/cut-off walls, with smaller infrastructure possibly also left behind, such as a small weir to control future water levels. This would result in the water body returning to a natural lake. The impact on the known archaeology from this activity, with the exception of the dam and weir structure itself, is likely to be minimal, but if the concrete and brick building (Feature 03) or the boathouse (Feature 02) are to be altered they should be subject to a **Level 2 record** as defined in *Understanding Historic Buildings: A guide to good recording practice* (Historic England, 2016). In addition

the dam structure should be subject to a **partial watching brief** during demolition in order that its character can be identified and recorded.

Access to the dam would be via an existing forestry track from the southwest, with possible additional access required at the southwestern end of the reservoir across the existing heath. The level of archaeological mitigation required in this area is dependent upon the level of impact. There is moderate potential for buried archaeological remains within the access area crossing the heath, particularly palaeoenvironmental remains. If low impact methods of improving this access track are used, such as the use of bog mats, then only a **partial watching brief** would be required during the groundworks. If more intrusive methods are used a comprehensive watching brief would be required during ground preparation works, and an **environmental sampling strategy** may have to be carried out in advance. The methodology for this would need to be agreed with an appropriate specialist.

5 SOURCES CONSULTED

5.1 Primary Sources

Denbighshire Archives, Ruthin

DRO NTD/466 *Information on the sale of Gwylfa Hiraethog* 1983

DD/DM/1451/1-5 - Papers relating to water supply from Nantglyn for the North Wales Hospital (1900-1905)

National Library of Wales

Sale catalogue of the Gwylfa Hiraethog Estate (Denbighshire No. 20)

Tithe Map and Apportionment of the parish of Nantglyn 1840

Welsh Assembly Government Aerial Photographic Unit, Cardiff

RAF 3G/TUD/UK/35 Part II, frame 5211, taken on 16th January 1946

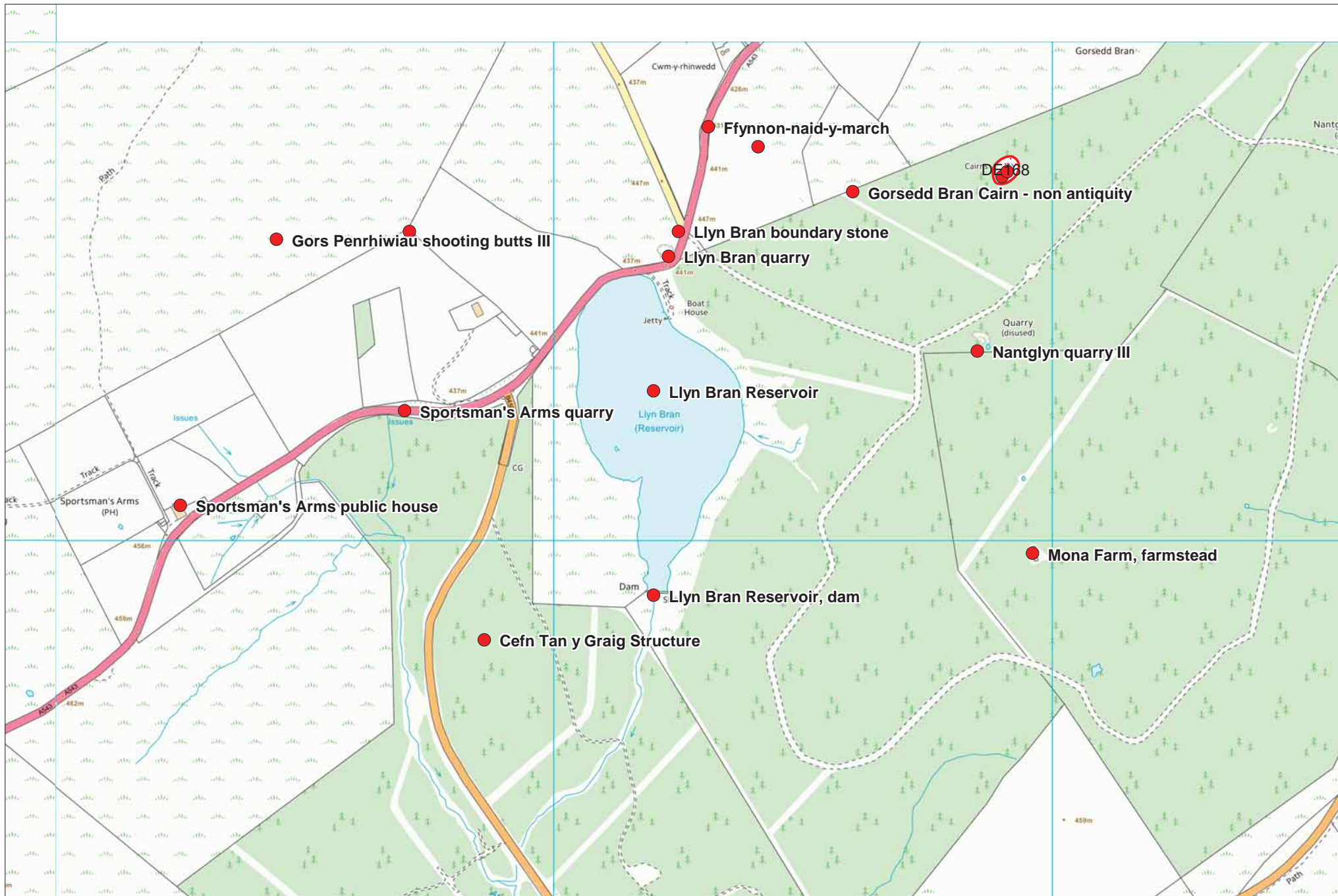
RAF 106G/UK 1455, frames 4324-5 taken on 2nd May 1946

Meridian Airships image 034 74 185, taken on 14th June 1974

5.2 Secondary Sources

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6. Hubbard, E. 1986 *The Buildings of Wales, Clwyd* (Pevsner Buildings of Wales Series)
7. <http://www.cpat.org.uk/projects/longer/histland/hiraeth/1110.htm>
8. Natural Power 2015 *Pant y Maen Wind Farm, Denbighshire, North Wales Environmental Statement, Volume 4 of 4: Non-Technical Summary*
9. Ordnance Survey (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5 First to Third Edition 25-inch to 1 mile)
10. Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*
11. Smith, B. and George, T.N. 1961 *British Regional Geology, North Wales*
12. Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014).



● Gors Penrhiwiau shooting butts III

● Ffynnon-naid-y-march

● Gorsedd Bran Cairn - non antiquity

● Llyn Bran boundary stone

● Llyn Bran quarry

● Nantglyn quarry III

● Sportsman's Arms quarry

● Llyn Bran Reservoir

● Sportsman's Arms public house

● Mona Farm, farmstead

● Llyn Bran Reservoir, dam

● Cefn Tan y Graig Structure

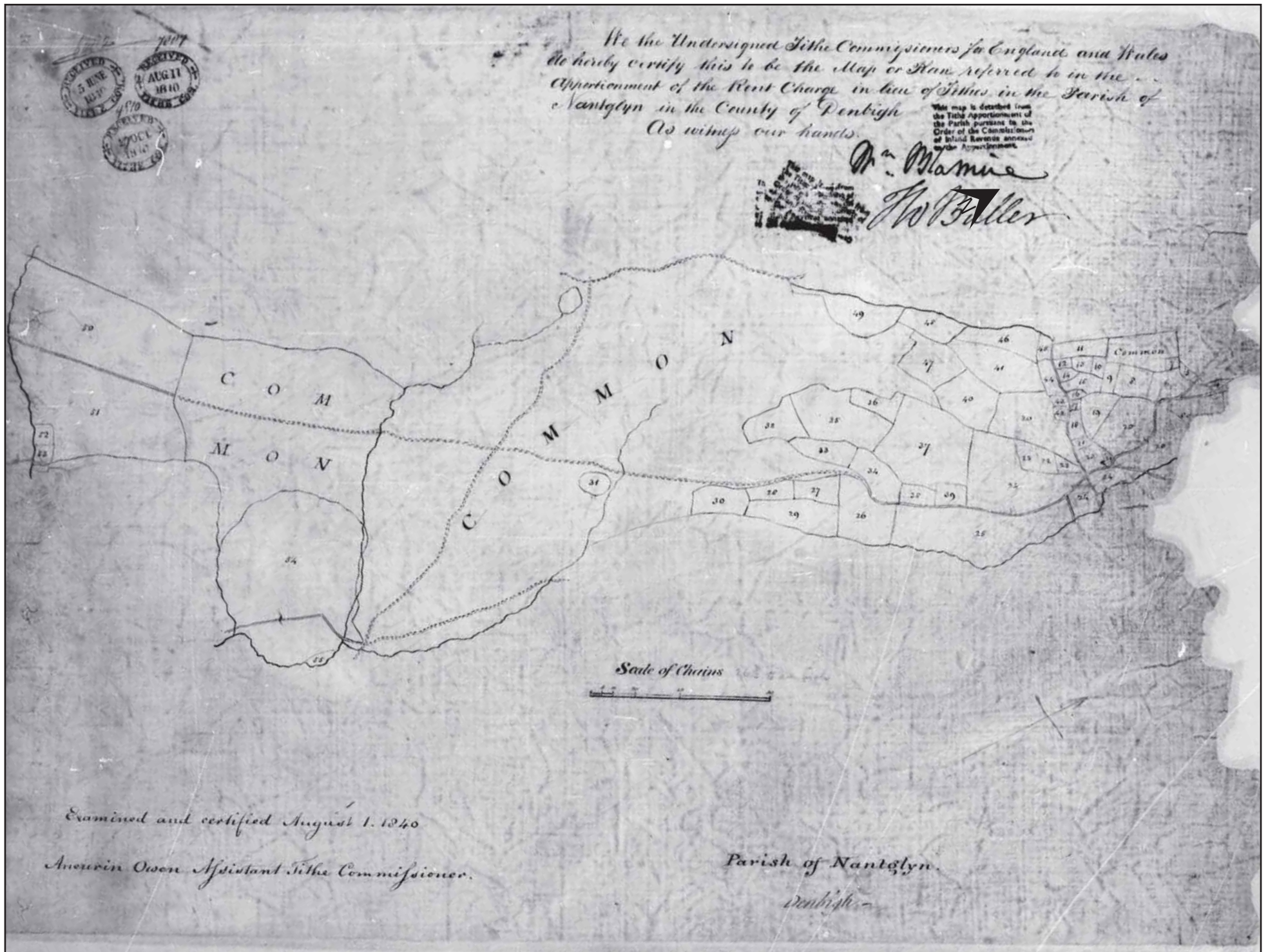


Figure 02: Reproduction of Nantglyn Parish Tithe Map, published 1841. Llyn Bran is located within the large area marked "Common". Not to scale (Source: NLW)

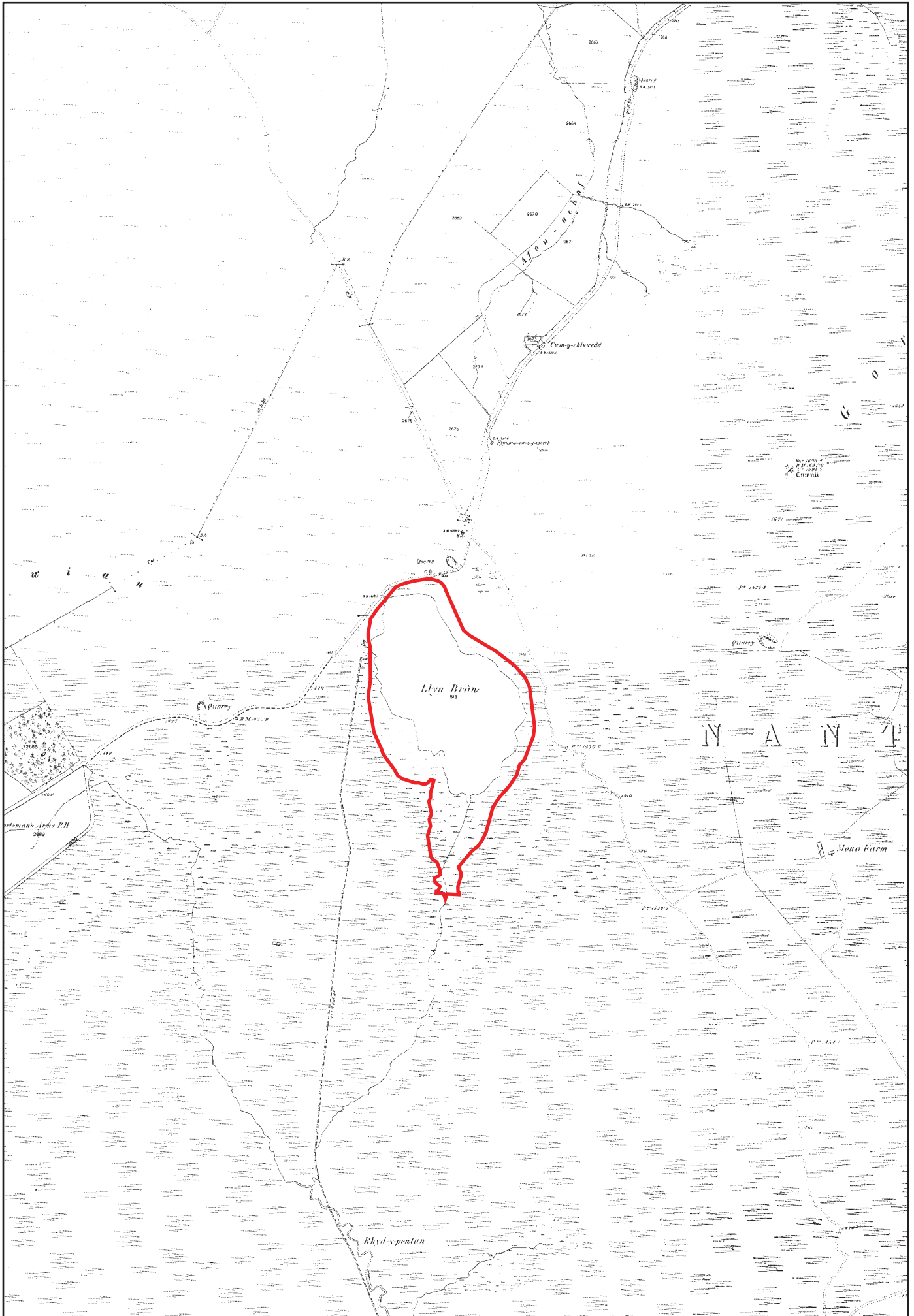


Figure 03: Reproduction of First Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1874. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

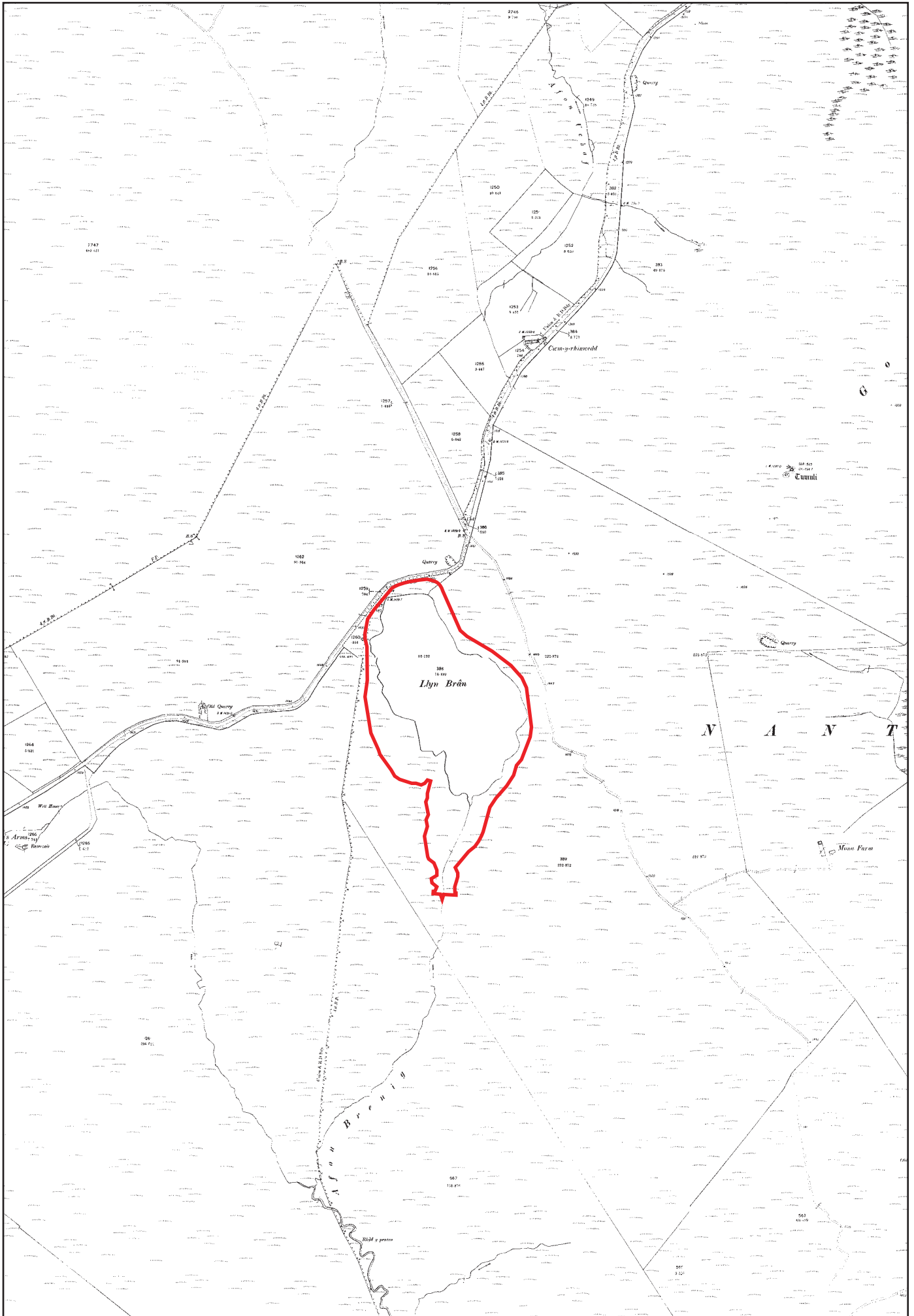


Figure 04: Reproduction of Second Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1889. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

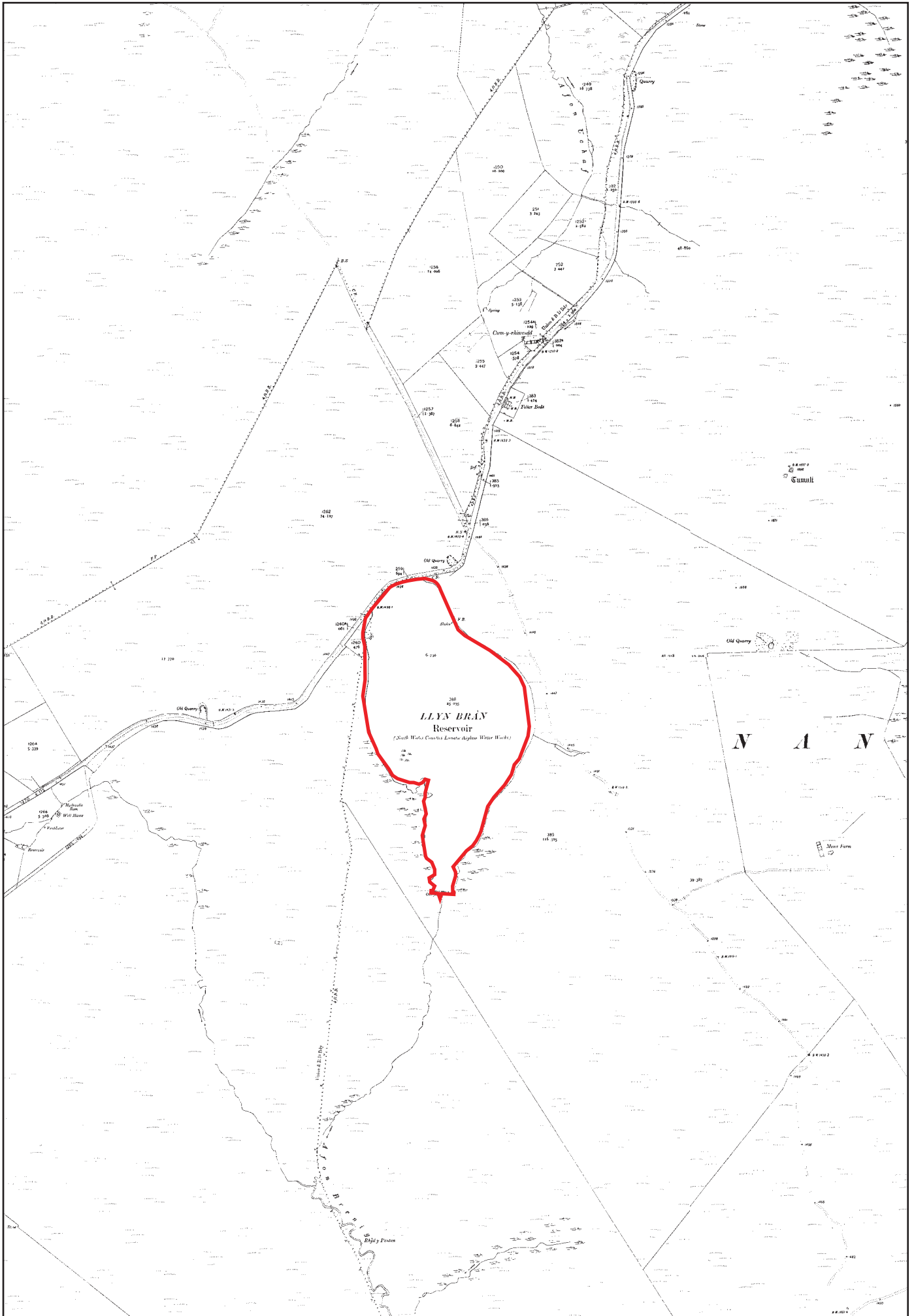


Figure 05: Reproduction of Third Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1913. Modern reservoir outlined in red. Scale: 1 to 10000@A4.



Plate 1: General view of dam with central weir; scale: 1x1m (archive reference: G2580_001).



Plate 2: View of weir in the dam wall; scale: 1x1m (archive reference: G2580_002).



Plate 3: View of concrete walls of weir and dam; scale: 1x1m (archive reference: G2580_003).



Plate 4: Weir structure from the dam wall; scale: not used (archive reference: G2580_004).



Plate 5: View along the dam parapet; scale: 1x1 m (archive reference: G2580_005).



Plate 6: General view of the reservoir looking northwards from the dam wall; scale: not used (archive reference: G2580_006).



Plate 7: General view of heather, reeds and grass moorland that bounds the reservoir; scale: 1x1m (archive reference: G2580_010).



Plate 8: View of reservoir bank showing 1.5m drop to the water level; scale: 1x1m (archive reference: G2580_012).



**Plate 9: Detail of slate reservoir edging; scale: 1x1m
(archive reference: G2580_013).**



**Plate 10: View of boathouse (Feature 2); scale: 1x1m
(archive reference: G2580_014).**



Plate 11: View of boathouse (Feature 2); scale: 1x1m (archive reference: G2580_015).



Plate 12: View of DCWW jetty; scale: 1x1m (archive reference: G2580_016).



Plate 13: View of brick and concrete building to the north of the DCWW jetty (Feature 3); scale: 1x1m (archive reference: G2580_017).



Plate 14: View of blocked up windows on the brick and concrete building; scale: 1x1m (archive reference: G2580_018).



Plate 15: View of boathouse (Feature 2) and disused building (Feature 3) from the west bank of the reservoir; scale: not used (archive reference: G2580_022).



Plate 16: View along path from forest track towards the reservoir dam; scale: 1x1m (archive reference: G2580_025).



Plate 17: View along path from forest track towards the reservoir dam; scale: not used (archive reference: G2580_026).



Plate 18: The lower part of the access track towards the reservoir dam; scale: 1x1m (archive reference: G2580_027).



Plate 19: General view of the reservoir; scale: not used (archive reference: G2580_028).

6 APPENDIX I

Gwynedd Archaeological Trust approved written scheme of investigation, October 2018.




LLYN BRÂN RESERVOIR
(G2580)

WRITTEN SCHEME OF INVESTIGATION FOR
ARCHAEOLOGICAL ASSESSMENT

Prepared for Stillwater Associates Limited
October 2018



Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Approvals Table				
	Role	Printed Name	Signature	Date
Originated by	Document Author	JOHN ROBERTS		10/10/18
Reviewed by	Document Reviewer	ROBERT EVANS		10/10/18
Approved by	Principal Archaeologist	JOHN ROBERTS		10/10/18

Revision History			
Rev No.	Summary of Changes	Ref Section	Purpose of Issue

All GAT staff should sign their copy to confirm the project specification is read and understood and retain a copy of the specification for the duration of their involvement with the project. On completion, the specification should be retained with the project archive:

Name

Signature

Date

LLYN BRÂN RESRVOIR (G2580)

WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL ASSESSMENT

Prepared for *Stillwater Associates Limited*, October 2018

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1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by Stillwater Associates Limited on behalf of Dŵr Cymru to prepare a written scheme of investigation for an archaeological assessment as part of a feasibility study looking into the possible removal of an existing dam (reservoir discontinuance) at Llyn Brân (Primary Reference Numbers (PRN) 36831 and 81837), near the junction of the A543 and B4501 roads southwest of Bylchau, Denbighshire (NGR SH96205930; Figure 01). As specified in data supplied by Stillwater Associates Limited, Llyn Brân is a raised natural lake, impounded by a small gravity dam, built in about 1899 at the southern end of the reservoir, which is reported to have raised the level of the lake by 8ft. (2.4m). The dam incorporates the overflow weir, from which water passes down the original watercourse downstream of the lake, flowing into Llyn Brenig c.2km to the south. The outlet works from the reservoir are located near the northern end, from where a tunnel (about 450m long) containing the raw water main passes through a saddle to the north of the reservoir to the site of the former filter beds. By the time that the reservoir was taken out of service in about 1994, the filter beds had been replaced by a water treatment works at Bylchau, some 2km to the northeast of Llyn Brân. It is understood that Llyn Brân remains as an emergency raw water source, by pumping overland into Aled Isaf reservoir. The reservoir measures c.630m long north–south by up to 330m wide east–west. The removal strategy has not been confirmed, but may include removing all concrete parts above ground (possibly leaving in concrete foundations/cut-off walls), with smaller infrastructure possibly also left behind, such as a small weir to control future water levels. The water body would then be returned to a natural lake. Access to the dam would be via an existing forestry track from the southwest, with possible additional access required at the southwestern end of the reservoir across the existing heath (Figure 01).

The assessment will conform to the guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014). The format of this written scheme of investigation corresponds to the requirements of section 2.3 of MoRPHE (English Heritage 2015) and to MAP2 (English Heritage, 1991, *Management of Archaeological Projects*). The assessment is scheduled to be completed in October 2018.

The assessment will be monitored by the Development Control Archaeologist, Clwyd-Powys Archaeological Trust (CPAT); the content of this written scheme of

investigation and all subsequent reporting by GAT must be approved by CPAT prior to final issue.

The Clwyd-Powys Archaeological Trust Historic Environment Record Enquiry Reference Number for this project is E6412.

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

Llyn Brân is located within the Mynydd Hiraethog Landscape Characterisation area, specifically, the Bryn-y-gors-goch character area (HLCA 1110). The Mynydd Hiraethog Landscape Characterisation area includes uninterrupted areas of heather moorland that were deliberately managed and maintained as a grouse moor and a shooting estate in the early part of the 20th century. The moorland landscape originated in the Neolithic and Bronze Age and possibly in the Mesolithic period when the areas of the moorland might have been deliberately burnt and cleared for hunting (source: [http://www.cpat.org.uk/projects/longer/histland/hiraeth/mhiraeth.htm#1110 Bryn y Gors-goch](http://www.cpat.org.uk/projects/longer/histland/hiraeth/mhiraeth.htm#1110_Bryn_y_Gors-goch)). Bronze Age burial cairns were also established on the local summits. The prehistoric landscape of the uplands was modified subsequently through continued seasons of summer grazing, based on temporary summer settlements or hafodau sited in the valleys and along the edges of the moor (*ibid.*). Much of the area was also subject to peat extraction in the last century, typified by the remains of cuts and drying stacks and post-medieval farmsteads (*ibid.*). From the early 20th century this landscape was overlain by managed moorland, as well as an extensive shooting estate created by Viscount Devonport between 1908 and 1925, which included the establishment of hunting lodges, shooting butts and shelters. Llyn Brân is located at the northern end of the Bryn-y-gors-goch character area, which is characterised by modern coniferous forest plantation overlying relict medieval and later enclosed landscape of scattered farmsteads with associated field systems and stone quarrying (source: <http://www.cpat.org.uk/projects/longer/histland/hiraeth/1110.htm>). The area is now largely covered by the modern coniferous forestry, dating mainly from the 1930s, subdivided into different parcels by roads and rides (*ibid.*).

There are no known archaeological assets or Listed Buildings within the reservoir or the immediate environs. The closest Scheduled Monument is a prehistoric cairn (De168; PRN 100618), located 660m to the northeast at NGR SH97386025, with two additional cairns (De168; PRN 100618), located 1.4km to the northeast at NGR SH97386025. Former roadside quarries are located in the vicinity of the reservoir along the former turnpike road, now the A543, whilst a former hunting lodge, Gwylfa Hiraethog, is located 1.34km to the west at NGR SH94725906.

A brief examination of the First to Third Edition 25-inch to 1 mile Ordnance Survey maps of the area (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5) shows impact on the immediate area from the establishment of the reservoir. The First Edition and Second Edition maps,

published in 1874 and 1899 respectively (cf. Figures 02 and 03), shows Llyn Brân before the establishment of the dam and sluice at the southern end of the lake, with the lake covering a smaller surface area. The Third Edition map (1913; cf. Figure 04), shows the reservoir in place, covering an enlarged area that matches the current reservoir footprint.

3 METHODOLOGY

3.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment will involve a study of the following resources:

1. The regional Historic Environment Register ((HER) Clwyd-Powys Archaeological Trust, 41 Broad St, Welshpool SY21 7RR) will be examined for information concerning the study area, defined as the Llyn Brân and immediate environs, including the possible access line, as detailed on Figure 01. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. All identified assets will be mapped, described and added to a gazetteer of sites and the relative importance of any assets defined;
2. The National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for assets additional to the HER;
3. Aerial photographs from the National Monuments Record of Wales (Royal Commission on the Ancient and Historical Monuments of Wales, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential assets;
4. An on-line catalogue search of the National Library of Wales (Penglais Rd, Aberystwyth SY23 3BU) will be completed;
5. Archive data, including primary and secondary sources, historic maps and estate maps will be examined at the regional archives (Denbighshire Archives, 46 Clwyd St, Ruthin LL15 1HP). The examination of the archive data will include historic mapping including the local tithe map and schedule;

6. If available for the assessment area, Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at <http://lle.gov.wales/home> for information on potential surface features using digital terrain modelling and digital surface modelling.

3.2 Walkover Survey

A walkover survey will be undertaken that will incorporate the reservoir area as located on Figure 01. All known and new archaeological assets identified within close proximity to the reservoir will be located and described on GAT pro-formas and a written description and photographic record of the visible reservoir infrastructure will be completed. Any recorded assets, as well as the reservoir, will then be added to the overall gazetteer and their relative importance defined. The potential for sub-surface archaeology will be estimated and defined.

A photographic record will be maintained in RAW format using a digital SLR set to maximum resolution (Nikon D3000; resolution: 3,872 × 2,592 [10.2 effective megapixels]) and a photographic metadata table will be completed and included in the report. Photographic images will be archived in TIFF format; the archive numbering system will start from **G2580_001**. A handheld GPS unit will also be used during the walkover survey

3.3 Gazetteer

A gazetteer will be compiled for any identified sites within and within proximity to the specified route based on information sourced from the regional HER; the gazetteer will include:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Impact
10. Recommendation for further assessment/evaluation
11. Recommendation for mitigatory measures.

The following categories will be used to define the assessment category of the archaeological asset:

Category A - Sites of National Importance.

Scheduled Monuments, Listed Buildings of grade II* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both. Sites that 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.

Grade II listed buildings and 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 that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category. For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

Category E - Sites needing further investigation.

Sites, the importance of which 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. In this report several sites of unknown potential have been allocated to this category.

The impact of the proposed works on any asset will be identified using the following impact criteria, defined either as *none*, *slight*, *unlikely*, *likely*, *significant*, *considerable* or *unknown* as follows:

None:

There is no construction impact on this asset.

Slight:

This has generally been used where the impact is marginal and would not by the nature of the site cause irreversible damage to the remainder of the asset, e.g. part of a trackway or field bank.

Unlikely:

This category indicates sites that fall within the band of interest but are unlikely to be directly affected. This includes sites such as standing and occupied buildings at the margins of the band of interest.

Likely:

Sites towards the edges of the study area, which may not be directly affected, but are likely to be damaged in some way by the construction activity.

Significant:

The partial removal of an asset affecting its overall integrity. Assets falling into this category may be linear features such as roads or tramways where the removal of part of the feature could make overall interpretation problematic.

Considerable:

The total removal of an asset or its partial removal which would effectively destroy the remainder of the site.

Unknown:

This is used when the location of the asset is unknown, but thought to be in the vicinity of the proposed works.

3.4 Data processing and report compilation

Following completion of the stages outlined above, a report will be produced incorporating the following:

1. Front cover;
2. Inner cover;
3. Figures and Plates List
4. Non-technical summary;
5. Introduction;
6. Methodology
 - a. Desk-based assessment
7. Results
 - a. Desk based assessment
 - i. Location and geological summary
 - ii. Statutory and non-statutory designations
 - iii. Environmental remains and soil morphology
 - iv. Historical and archaeological background
 - v. Cartographic evidence
 - vi. Artefact potential
 - vii. Aerial photographs and LiDAR;
 - b. Gazetteer of features
8. Conclusions and recommendations
 - a. Conclusion
 - b. Table of sites and recommendations
9. Acknowledgements
10. Bibliography
 - a. Primary sources
 - b. Secondary sources
11. Figures; inc.:
 - location plan;
 - historic mapping;
 - location plan with identified features
12. Appendix I (approved written scheme of investigation)
13. Appendix II (Sites listed on GAT Historic Environment Record)
14. Appendix III (Definition of mitigation terms)
15. Appendix IV Photographic metadata (walkover survey)

16. Back cover

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included.

A full archive including plans, photographs, written material and any other material resulting from the project will be prepared. The archaeological assessment outlined in this written scheme of investigation will be submitted in draft format in October 2018; a final report will be submitted to the Historic Environment within six months of submitting the draft report (April 2019).

The following dissemination will apply:

- A paper report(s) plus digital report(s) will be provided to the client/consultant and CPAT (draft report then final report);
- A paper report plus a digital report will be provided to the regional Historic Environment Record, Clwyd-Powys Archaeological Trust; this will be submitted within six months of project completion (final report only), along with any relevant, digital information such as the project database, GIS table(s) and photographs. All digital datasets submitted will conform to the required standards set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1);
- A digital report and archive (including photographic and drawn) data will be provided to Royal Commission on Ancient and Historic Monuments, Wales (final report only), in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata;

4 PERSONNEL

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The assessment will be completed by a project archaeologist who will have responsibility for completing the desk based assessment, maintaining the site archive, liaising with CPAT and *Stillwater Associates Limited* and submitting the draft report and final report. The project manager will be responsible for reviewing and approving the report prior to submission.

5 INSURANCE

5.1 Public/Products Liability

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability

INSURER Aviva Insurance Limited

POLICY TYPE Public Liability

POLICY NUMBER 24765101CHC/UN/000375

EXPIRY DATE 21/06/2019

5.2 Employers Liability

Limit of Indemnity- £10,000,000 any one occurrence.

The cover has been issued on the insurers standard policy form and is subject to their usual terms and conditions. A copy of the policy wording is available on request.

INSURER Aviva Insurance Limited

POLICY TYPE Employers Liability

POLICY NUMBER 24765101 CHC / UN/000375

EXPIRY DATE 21/06/2019

5.3 Professional Indemnity

Limit of Indemnity- £5,000,000 in respect of each and every claim

INSURER Hiscox Insurance Company Limited

POLICY TYPE Professional Indemnity

POLICY NUMBER 9446015

EXPIRY DATE 22/07/2019

6 SOURCES CONSULTED

1. English Heritage, 1991, Management of Archaeological Projects
2. English Heritage, 2015, Management of Research Projects in the Historic Environment (MoRPHE).
3. *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1)
4. <http://www.cpat.org.uk/projects/longer/histland/hiraeth/1110.htm>
5. Ordnance Survey (Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5 First to Third Edition 25-inch to 1 mile
6. Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*
7. Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists, 2014).

FIGURE 01

Location Map with assessment area outlined red. Based on Ordnance Survey 1:10000 County Series Map Sheets SH95. Scale 1:7500 @ A4. © Crown Copyright. All Rights Reserved. License Number AI100020895.

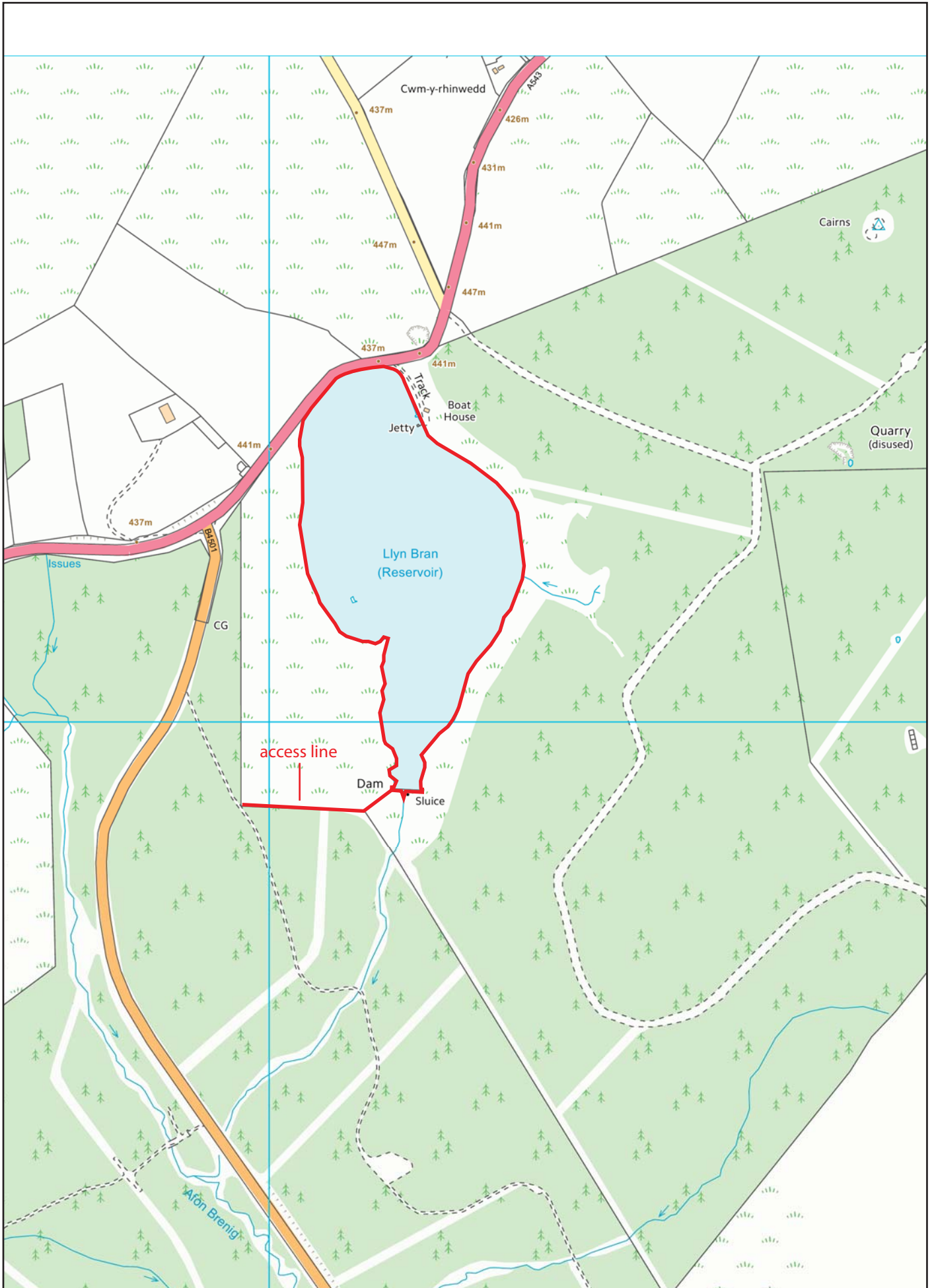


Figure 01: Location Map with reservoir and assessment area outlined red.
 Based on Ordnance Survey 1:10000 County Series Map Sheets SH95.
 Scale 1:7500 @ A4. © Crown Copyright. All Rights Reserved. License Number AI100020895.

FIGURE 02

Reproduction of First Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5), published 1874. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

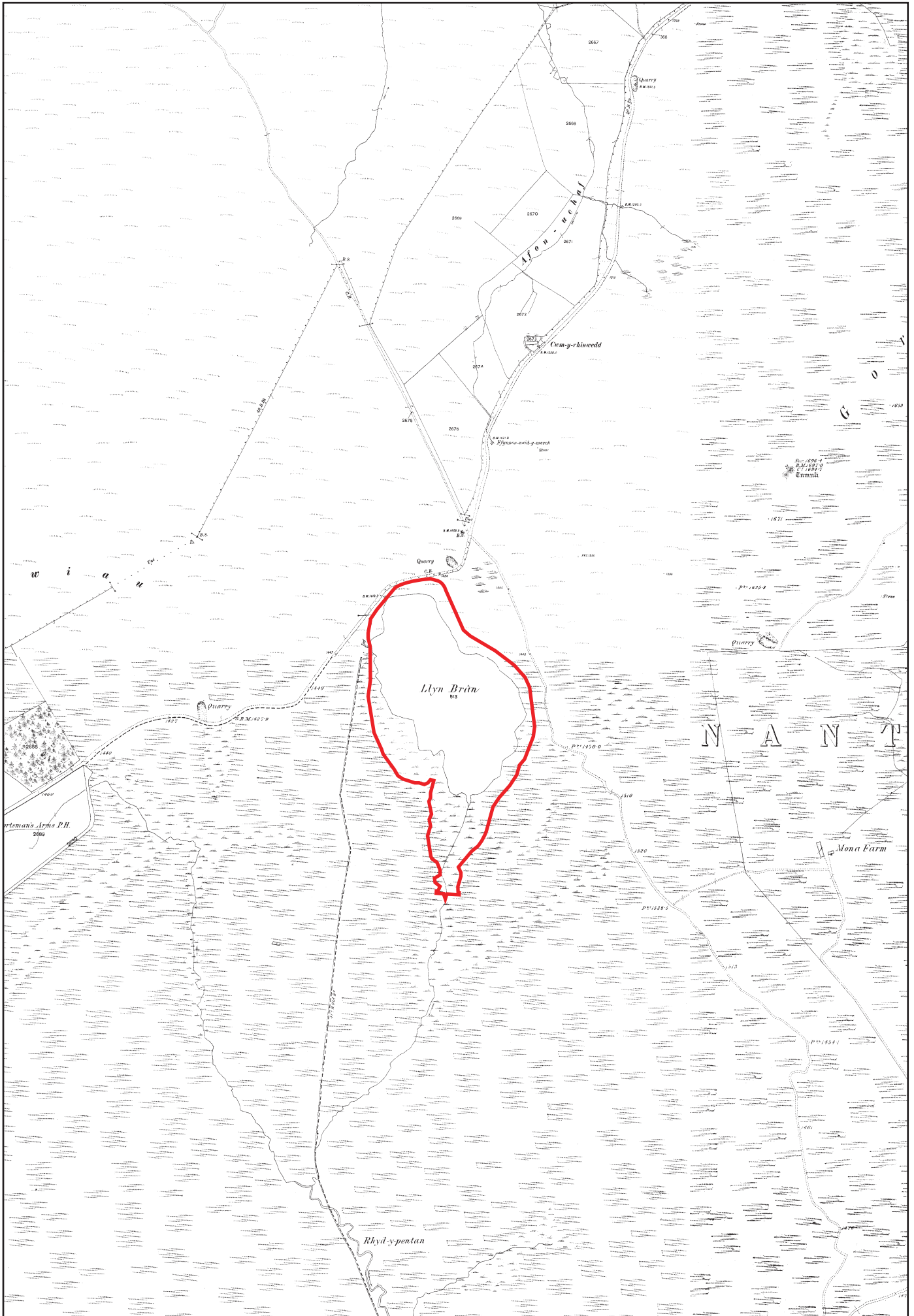


Figure 02: Reproduction of First Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1874. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

FIGURE 03

Reproduction of Second Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1889. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

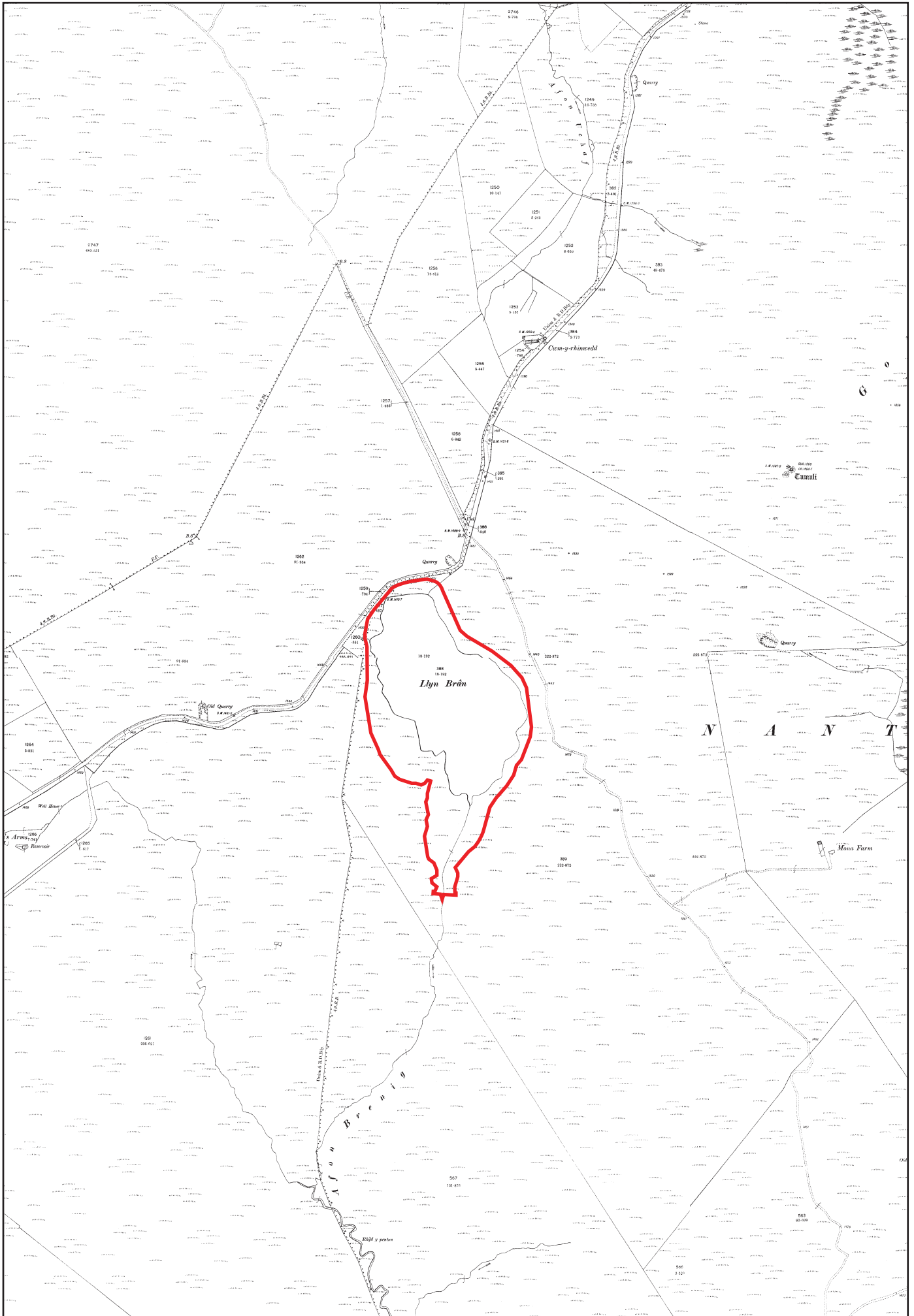


Figure 03: Reproduction of Second Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1889. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

FIGURE 04

Reproduction of Third Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1913. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

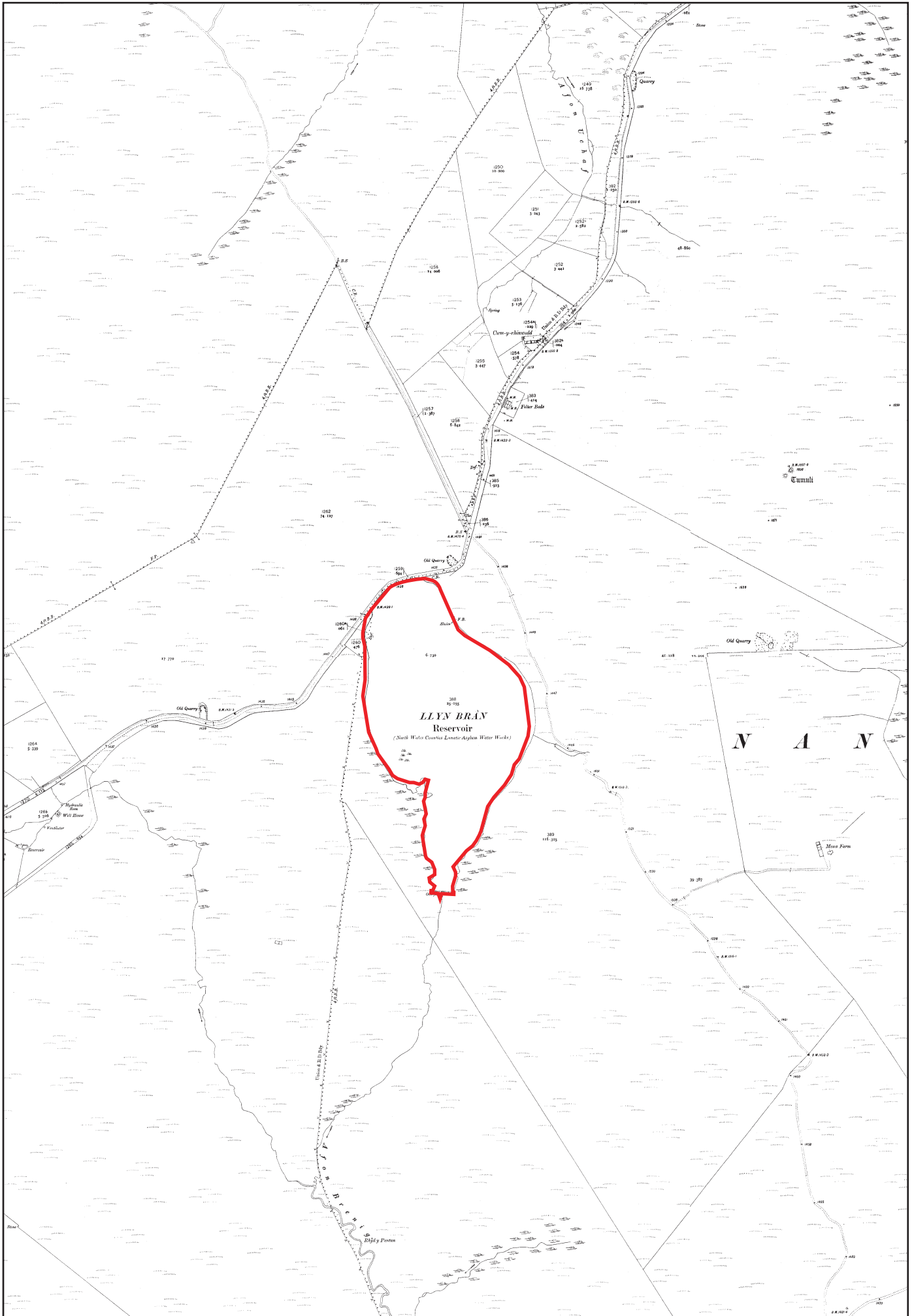


Figure 04: Reproduction of Third Edition 25-inch to 1 mile Ordnance Survey Sheets XVII.4, XVII. 8, XVIII.3 and XVIII.5, published 1913. Modern reservoir outlined in red. Scale: 1 to 10000@A4.

7 APPENDIX II

Gwynedd Archaeological Trust Photographic Metadata

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_001	Llyn_Bran	Assessment	n/a	General view of dam with central weir	n/a	S	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	1
G2580_002	Llyn_Bran	Assessment	n/a	View of weir in the dam wall	n/a	SSW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	2
G2580_003	Llyn_Bran	Assessment	n/a	View of concrete walls of weir and dam	n/a	W	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	3
G2580_004	Llyn_Bran	Assessment	n/a	Weir structure from the dam wall	n/a	N	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	4
G2580_005	Llyn_Bran	Assessment	n/a	View along the dam parapet	n/a	W	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	5
G2580_006	Llyn_Bran	Assessment	n/a	General view of the reservoir looking northwards from the dam wall	n/a	S	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	6
G2580_007	Llyn_Bran	Assessment	n/a	View along the dam wall	n/a	E	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_008	Llyn_Bran	Assessment	n/a	General view of heather, reeds and juncus along eastern bank of dam	n/a	SSW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_009	Llyn_Bran	Assessment	n/a	General view across reservoir showing heath and moorland	n/a	E	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_010	Llyn_Bran	Assessment	n/a	General view of heather, reeds and grass moorland that bounds the reservoir	n/a	NNE	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	7
G2580_011	Llyn_Bran	Assessment	n/a	View of shale slabs on end forming the side of the reservoir (Feature 1)	n/a	N	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_012	Llyn_Bran	Assessment	n/a	View of reservoir bank showing 1.5m drop to the water level	n/a	NW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	8
G2580_013	Llyn_Bran	Assessment	n/a	Detail of shale reservoir edging	n/a	NNW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	9
G2580_014	Llyn_Bran	Assessment	n/a	View of boathouse (Feature 2)	n/a	W	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	10
G2580_015	Llyn_Bran	Assessment	n/a	View of boathouse (Feature 2)	n/a	N	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	11
G2580_016	Llyn_Bran	Assessment	n/a	View of DCWW jetty	n/a	E	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	12
G2580_017	Llyn_Bran	Assessment	n/a	View of brick and concrete building to the north of the DCWW jetty (Feature 3)	n/a	N	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	13

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_018	Llyn_Bran	Assessment	n/a	Viwe of blocked up windows on the brick and concrete building	n/a	S	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	14
G2580_019	Llyn_Bran	Assessment	n/a	General views of the reservoir from the A453 road at the north end	n/a	N	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_020	Llyn_Bran	Assessment	n/a	General views of the reservoir from the A453 road at the north end	n/a	NNW	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_021	Llyn_Bran	Assessment	n/a	General view along the west bank of the reservoir	n/a	N	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_022	Llyn_Bran	Assessment	n/a	View of boathouse (Feature 2) and disused buildign (Feature 3) from the west bank of the reservoir	n/a	ESE	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	15
G2580_023	Llyn_Bran	Assessment	n/a	View along west bank along reservoir	n/a	NW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_024	Llyn_Bran	Assessment	n/a	View along path from forest track towards the reservoir dam	n/a	NW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	
G2580_025	Llyn_Bran	Assessment	n/a	View along path from forest track towards the reservoir dam	n/a	NW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	16

PHOTO RECORD NUMBER	PROJECT NAME	PROJECT PHASE	SITE SUB-DIVISION	DESCRIPTION	CONTEXT NUMBER (S)	VIEW FROM	SCALE(S)	CREATOR	DATE	ORIGINATING ORGANISATION	PLATES
G2580_026	Llyn_Bran	Assessment	n/a	View along path from forest track towards the reservoir dam	n/a	SE	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	17
G2580_027	Llyn_Bran	Assessment	n/a	The lower part of the access track towards the reservoir dam	n/a	NW	1x1m	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	18
G2580_028	Llyn_Bran	Assessment	n/a	General view of the reservoir	n/a	SW	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	19
G2580_029	Llyn_Bran	Assessment	n/a	General view of the landscape showing the Sportsman Inn	n/a	NE	not used	Robert Evans	15/10/2018	Gwynedd Archaeological Trust	



Gwynedd Archaeological Trust
Ymddiriedolaeth Archaeolegol Gwynedd

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