Dolgarrog Hydro-Electric Works:
Dolgarrog, Conwy

Report on an archaeological watching brief

GAT Project No. 2158
Report No. 978
May 2011

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HYDRO-ELECTRIC PIPELINE, DOLGARROG, CONWY

ARCHAEOLOGICAL WATCHING BRIEF ON

GROUND INVESTIGATION PROGRAMME

Prepared for

Capita Symonds
On behalf of RWE Npower Renewables Ltd (RWE NRL)

By
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May 2011

Ymddiriedolaeth Archaeolegol Gwynedd
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Front cover: CCG staff recording trial pit TP19

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HYDRO-ELECTRIC PIPELINE, DOLGARROG

ARCHAEOLOGICAL WATCHING BRIEF ON THE GROUND INVESTIGATION PROGRAMME (G2158)

Summary

Gwynedd Archaeological Trust (GAT) was asked by Capita Symonds on behalf of RWE Npower Renewables Ltd (RWE NRL) to carry out an archaeological watching brief during a Ground Investigation scheme in advance of works to the pipelines which feed Dolgarrog Hydro-Electric Power Station, Conwy.

A total of 41 trail pits were monitored as part of the archaeological watching brief. With the exception of a thin layer of stone in TP20 no archaeological deposits were identified in the trial pits. However information on the depth of the plough soil and the nature of the glacial deposits was obtained and the results suggested that features 69 and 79, initially interpreted as possible prehistoric field boundaries, were of a glacial origin.

1. INTRODUCTION

Gwynedd Archaeological Trust (GAT) was asked by Capita Symonds on behalf of RWE Npower Renewables Ltd (RWE NRL) to carry out an archaeological watching brief during a Ground Investigation scheme in advance of works to the pipelines which feed Dolgarrog Hydro-Electric Power Station, Conwy.

It is proposed to replace the upper part of the existing pipe from Coedty Reservoir to the valve house with a new pipe which is to be buried below ground along most of its route (SH7558 6673 to SH7656 6718) (see figure 1). In advance of this boreholes and trial pits were dug along the route to investigate ground and rock conditions. The locations of the boreholes and trial pits are shown on figure 2, which is based on 'Constraints map for WSEDGA-611 with access routes'.

2. SPECIFICATION AND PROJECT DESIGN

The definition of an archaeological watching brief 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 (Reproduced from IFA. 2008. *Institute for Archaeologists 2008 Standard and Guidance for an archaeological watching brief).*

The purpose of a watching brief is:

- to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works
- to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment to a satisfactory and proper standard
- A watching brief is not intended to reduce the requirement for excavation or preservation of known or inferred deposits, and it is intended to guide, not replace, any requirement for contingent excavation or preservation of possible deposits.

The objective of a watching brief is:

- to establish and make available information about the archaeological resource existing on a site.

This watching brief was designed to respond to the immediate impact of the Ground Investigation Works but it also provides information that will inform future archaeological works.

This document reports on the results of the watching brief of the ground investigation works. Further archaeological mitigation is to be completed at a later stage and will include an archaeological evaluation

programme as recommended in assessment report GAT 928; this will be discussed in a future archaeological project design.

The current work conforms to the guidelines specified in *Standard and Guidance for Archaeological Watching Brief* (Institute for Archaeologists, 1994, rev. 2001, 2008) and *Standard and Guidance for Archaeological Evaluation* (Institute for Archaeologists, 1994, rev. 2001, 2008).

3. ARCHAEOLOGICAL BACKGROUND

The pipe route runs through part of the valley of the Afon Porthllywd from the base of the Coedty dam to the valve house known as 'Marble Arch', at the top of Coed Dolgarrog and the steep escarpment forming the main valley side (SH7558 6673 to SH7656 6718).

Gwynedd Archaeological Trust completed an initial scoping assessment of the study area (Evans 2010, GAT Report 900), followed by a full assessment to take into account the revised project layout (Kenney 2011, GAT report 928). This identified 105 sites within the study area, and included recommendations for further assessment and mitigation.

The assessment identified a complex and well preserved landscape within the study area for which a significant amount of evidence survives in the form of farmsteads, structures and associated field systems. The earlier field systems consisted of irregular enclosures probably dating from the 15th to 18th centuries, generally around or close to the homesteads on mid- slope terraces, whilst a more regular field pattern was created as a result of 19th century enclosure, which extended into the more upland areas. Some of the settlement pattern identified may have had its origins in the later Middle Ages, but no definitely medieval features were recognised. Two cairns may be prehistoric and fragments of possibly prehistoric field systems were identified but prehistoric activity was poorly represented, despite the number of sites known in the wider vicinity.

The construction of a hydro-electricity generating station and associated aluminium works in the early years of the 20th century led to significant changes within the upland landscape involving construction of a series of dams and leats to provide a water catchment system for the new works. New roads and tramways were built to service the construction. The different phases of leats, the pipelines and the dam now form 'a remarkable industrial landscape' (Gwyn 2006, 126). The developments at Dolgarrog were part of the first phase of global innovation in hydro-electric power and as such 'the physical remains are a nationally, and possibly internationally, important survival' (Gwyn and Nevell 2006, 14).

4. METHODOLOGY

4.1. Ground Investigation Works

The Ground Investigation Programme included:

- 15 boreholes
- 41 trial pits

The trial pits were dug between 8th and 26th April 2011, with the boreholes being drilled over a longer period. The work was carried out by CCGeotechnical and Alwyn Jones Ltd. Trial pits were up to 2.0m wide and 4.8m long with most measuring no more than 3.0m by 2.0m. The pits were dug by a 13 tonne 360° tracked excavator. In most cases a toothless 1.8m ditching bucket was used to excavate to the top of the glacial deposits, after which a narrower toothed bucket was used to dig through these deposits to bedrock. The upper layers were removed in thin spits under the control of the archaeologist. Where the ground was clearly stony from the surface the toothed bucket was used throughout, but only after consultation with the archaeologist.

Boreholes were done with both cable percussive and rotary rigs. The drilling operation was not watched by the archaeologist but routes to borehole positions were agreed with the archaeologist.

4.2 Archaeological Watching Brief

The watching brief recorded the excavation of the trial pits and the archaeologist gave advice on access routes to minimise damage to archaeological features. No watching brief was proposed on the boreholes but advice was given on the access routes for these.

It was not considered justifiable to watch all the trail pits. Much of the rocky woodland at the eastern end of the proposed pipe route was considered of low archaeological potential in the assessment report. Trial pits 30 to 37 were monitored by the archaeologist in this area. These showed thin woodland soils over glacial substrates with many boulders. There was no indication of cultivation or other use. It was therefore considered unnecessary to monitor trial pits 38, 40, 41, 43, 44, 45, 47 and 48, located in similar conditions. Topsoil depths as recorded in these trial pits by CCGeotechnical have been included in appendix 1. Trial pit 07 was located in the bed of Afon Porth-llwyd and had no archaeological potential. Trial pit 08 was on the river bank in a position probably disturbed by the flood of 1925 and by later construction. Both TP 07 and TP 08 were not archaeologically monitored.

The access routes for both the boreholes and the trial pits were chosen in consultation with the archaeologist on site and the contractor to find a route that was both safe and avoided most of the known archaeology. Where known archaeological features could not be avoided these were linear boundaries of which only a small proportion was damaged. The archaeologist took photographs of boundaries to be breached before the work and monitored breaching.

- A photographic record was maintained throughout, using a digital SLR camera set to maximum resolution.
- Notes were made of all subsurface deposits on individual watching brief record sheets.
- The archive is to be held by GAT until ready for permanent archiving, under project code G2158.

5. RESULTS

5.1 Trial pits

The detailed results of each trial pit are presented in appendix 1 and a summary of the total depth of topsoil, ploughsoil and made-ground is given in appendix 2. See figure 2 for the location of the trial pits and boreholes.

The only archaeological deposit indentified was a thin layer of stones just beneath the topsoil in TP20. This may be rubble from structures relating to the track to Coed Sadwrn (feature 09, also see feature 73 and 74), but it is possible that it represents a very disturbed stone surface. No dating evidence was recovered. A large horizontal stone was seen close to the surface in the end of the trial pit but this directly overlaid a larger stone that seemed to be securely embedded in the natural, so it is possible that both were natural boulders (plate 1).

A length of rail was exposed when the mechanical excavator tracked back from trial pit 20. This rail (plate 2) is almost certainly a piece of contractor's flat-bottom rail from the 1920s probably from one of the sidings used during the pipe construction. It is not part of the original Cwm Eigiau railway, as this used T-section rails in chairs. The rail is of no particular interest as these rails were mass-produced and sold all over the world (Dr D Gwyn pers com). At present the rail remains where it was found and it is <u>not</u> recommended that it is recovered and retained.

With the exception of TP 20 no archaeological deposits were found, but the trial pits gave a good understanding of the depth of topsoil and the nature of the natural sub-soil deposits, which will inform future archaeological mitigation works. While the A horizon of the soil was as little as 0.05m deep in places it was seen to reach 0.6m in depth, especially in fields where ploughing had occurred in the 18th century (e.g. TPs 21-25). In these areas a distinct layer of ploughsoil could be recognised (plate 3). In trial pits 09-12, 13 and 16 also had a developed A horizon which may have been due to ploughing but more likely was the result of soil development under grass (plate 4). Trial pits 13 and 16 are within a field shown on the 1788 map as being under arable, which may account for the horizon. However TP15 was also in this field and it had active topsoil directly on the glacial deposits. Also this field was covered with large surface boulders and it seems hard to imagine it being ploughed unless significant quantities of soil had been eroded away in the last couple of centuries.

Made-ground, mainly the result of dumping material from levelling the original pipe route, was seen in trail pits 02, 03 and 04.

In many of the trial pits the natural glacial deposit was a variation on yellow-brown sandy silt with numerous stones and large boulders. The surface was often more red-brown in colour and the deposit merged into a grey-brown silty clayey gravel with numerous stones. Most of the large boulders were on or close to the surface of the glacial deposit. Towards the eastern end of the pipe route there were often many more boulders throughout the profile with silty clay between them.

In trial pits 03 and 04 water-logged sandy deposits were found buried under recently dumped material from the creation of the present pipeline. These deposits appear to be river deposits but the trial pits lie significantly to the north-west of the river as shown on the 1889 OS map; TP 04 was within the area of a former field. These deposits are therefore probably related to a much earlier phase of the river when it ran along a slightly different route or possibly to glacial outwash. Trial pit 05 was about 30m north-west of the bank of the former river, but it had a deep deposit of what appeared to be alluvial silt over a silty sand (plate 5). In the top of the deposit were boulders. Some of these may have originated from a former field boundary no longer visible on the ground but indicated by a row of trees on the 1889 map. However the presence of many boulders at this level in the adjacent field shows that most of these were natural. The boulders were presumably deposited shortly after the valley glacier retreated, perhaps moving downslope due to freeze/thaw action. The alluvial deposits must therefore pre-date this and be due to either glacial outwash or the retreat of the glacier. The fine silts suggest much slower flowing water than is usually associated with fluvio-glacial deposits, so perhaps some ponding occurred in this area.

Trial pit 02 showed banded sands and gravels at a high level. This pit was on the edge of the former river and these are probably river deposits from immediately before the area was remodelled with made-ground during the construction of the dam. However it is possible that they are deposits relating to the flood of 1925 and that the overlying made-ground was due to remodelling after the flood or in the 1950s when the spillway was constructed.

Several of the test pits showed that boulders were restricted to the surface of the natural deposits and seem to have slipped or tumbled into place after most of the glacial sediment had been deposited. It is probable that frost action had a part in this process. This is particularly relevant to feature 79, which was interpreted as a possible ancient, heavily denuded field wall. In context of the information from the trial pits, especially adjacent trail pit TP 15, this feature appears more likely to be the result of frost sorting of the boulders to form a rough line.

Feature 69 was interpreted as the possible corner of a prehistoric field. However trial pit 10, which lay within this area, had the same depth of A horizon as TP 11, just outside the projected field. The trial pits suggested that the scarp visible on the ground surface was not caused by a build-up of ploughsoil and that it is probably of glacial origin.

5.2 Access routes and field boundary breaches

Access routes for both the tracked excavator and the Landrover towing the borehole rig were discussed with the contractors on site to ensure any damage to known archaeological features, mainly ancient field walls, was minimised. In the cases of features 31, 68, 75 and 104 for access to TP30 pre-existing gaps through the field boundaries were used for access and no damage was caused to the remains of the walls. Other boundaries were crossed through existing gates.

Four field boundaries dated to the late 18th century or earlier had to be crossed or breached during the works (shown on figure 2). Of these only one (F82) was significantly disturbed for a 4m section (at (a) on figure 2) to allow access for the borehole rig. The wall at this point was little more than a revetment surviving to a height of 0.5m on the western side but hardly projecting above ground level next to the road (plate 6). The stones of the wall were pushed towards the west to create a ramp for the rig. In the other cases (features 26, 34 and 104 for access to TP 31 (b-d on figure 2)) the walls were crossed by the tracked excavator with relatively little disturbance beyond some crushing of stones and the movement of occasional individual stones (plate 7).

To gain access to TP 33, 35, 35 and borehole 14 a rock ridge had to be crossed. In order for the borehole rig to cross the ridge a ramp had to be built (approximately located at (e) on figure 2). This was made of soil taken from a shallow pit close to the crossing point (plate 8). The removal of the soil from the pit was monitored by the archaeologist and no archaeological features were exposed or damaged.

Trial pit 08 was at the base of a river cliff and trial pit 07 was in the middle of the river. Boreholes 03 and 04 were also in this area. There was no access down the very steep bank but a track had previously been created along the river bank. This track was probably dug in the 1950s and formed a branch from the track recorded as

feature 70. The original creation of this track had resulted in the dumping of a conical mound of spoil, now entirely overgrown, at the base of the river cliff. The existing track was not wide enough so this was widened by the mechanical excavator cutting through the conical mound of spoil and other dumped material (approximately located at (e) on figure 2) (plate 9). This area had previously been disturbed by the river and by the creation of the track and the widening of this track revealed no archaeological features or deposits.

Borehole 15 lay to the west of features recorded in the assessment as F90. These include a stone-lined drainage feature and a disused surge pipe. The drain had to be infilled with soil, but was emptied again after the rig had been removed (plate 10). The end of the concrete surge pipe had to be broken through and the earth bank on which it rests was also breached (plate 11). The majority of the pipe remains intact.

At borehole 08 a small amount of benching was required to position the drilling rig. This was carried out on 10th May 2011, when the archaeologist was not present but topsoil alone was stripped to a depth of no more than 0.2m. Photographs were taken, which are included in the archive.

6. SUMMARY AND CONCLUSIONS

With the exception of the stony layer in TP 20 the trial pits revealed no archaeological deposits. It must be emphasised that the general absence of archaeological deposits in the trial pits does not exclude the presence of unknown buried archaeological deposits and features along the proposed pipe route. However the results from the trial pits in the rocky woodland at the eastern end of the route does support the impression from the assessment that this area is of low archaeological potential. The results also suggest that features 69 and 79 are probably of glacial rather than archaeological origin.

In fields where arable cultivation took place in the 18th century there is sufficient build-up of ploughsoil to obscure archaeological features, even the foundations of stone structures. Elsewhere it is probable that any stone-built features, even those of a prehistoric date, would be visible through the turf. Pits, postholes and other negative features from any period could be obscured by the thinnest soil covering so may be present without being detected. The presence of so many boulders at or close to the surface make it unlikely that geophysical survey would be successful in detecting buried archaeology.

7. BIBLIOGRAPHY

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APPENDIX 1. List of trial pits

Trial pit 01
Notes: Cancelled

Trial pit 02
Trial pit size: 2.9m x 1.9m Photos: 135-137
Max Depth: 1.9m Orientation: E-W
Notes: TP on edge of drainage channel. Revealed partly made-ground but also water deposited sands and gravels that might be flood deposits.

Layer	Depth below surface	Description
0201	0m	Topsoil. Grey-brown sandy loam with small and medium stones and gravel and some large stones.
0202	0.3m	Flood deposit. Grey-brown laminated sands and gravels. Layered as if water-lain rather than dumped. Contains occasional large stones. Layer of iron pan runs through the deposit. It is possible that this was laid down in the 1925 flood.
0203	1.5m	River deposits. Very wet, grey clayey gravel.
0204	0.3m-1.5m	Made ground. Fairly firm, grey-brown clayey gravel. Contains a glass bottle and becomes deeper towards north. Seems to be the fill of the cut for the drainage channel adjacent to the test pit.

Trial pit 03
Trial pit size: 2.3m x 0.8m Photos: 138-139
Max Depth: 2.8m Orientation: E-W
Notes: TP on edge of bank made of material from levelling pipe route.

Layer	Depth below surface	Description
0301	0m	Topsoil. Dark grey-brown sandy loam with occasional large stones and bracken roots.
0302	0.2m	Dumped material. Mixed very loose brown sand and gravel with some large stones. Forms a bank along side the pipe. Material removed from pipe route to level it and dumped along side.
0303	1.1m	River deposits. Blue-grey sand and sandy clay becoming gravelly with depth.

Trial pit 04
Trial pit size: 2.6m x 0.9m Photos: 143-144
Max Depth: 2.9m Orientation: E-W
Notes: TP dug through bank of spoil from pipe just E of field boundary F26.

Layer	Depth below surface	Description
0401	0m	Topsoil. Dark grey-brown sandy loam with numerous stones. Very dark and organic on the surface.
0402	0.2m	Dumped material. Slightly silty sand with c.50% sub-rounded large and medium stones. Forms a bank along side the pipe. Material removed from pipe route to level it and dumped along side.
0403	1.2m	River deposits. Blue-grey and grey sandy clay with organic matter, turning into sandy clay lower down, then wet gravel with more stones and occasional large boulders. The organic material near the surface of this layer suggests a buried land surface.

Trial pit 05
Trial pit size: 2.3m x 0.7m Photos: 147-150
Max Depth: 3.7m Orientation: NE-SW
Notes: TP on what appeared to be a rocky scarp just W of the pipe, but the boulders proved to be on the surface of possible alluvial silts over sands and gravels.

Layer	Depth below surface	Description

0501	0m	Topsoil. Grey-brown gritty silt with bracken roots.
0502	0.3m	Alluvial deposits. Yellowish-brown silt with occasional medium stones and some large boulders. Mottled and iron stained. Becomes greyer with depth and merges into silty sand. Boulders are restricted to the top of the deposit within and overlying the

Trial pit 06
Notes: Cancelled

Trial pit 07
Notes: In middle of river, not monitored. Photos: 132-134

Trial pit 08
Notes: In disturbed area next to river, not monitored. Photos: 132-134

Trial pit 09
Trial pit size: 4.5m x 1.9m Photos: 116-119
Max Depth: 3.1m Orientation: SW-NE
Notes: TP W of boundary F31

Layer	Depth below surface	Description
0901	0m	Topsoil. Dark brown silty loam with bracken roots.
0902	0.2m	Lower A horizon. Mid brown gritty silt with c.25% small stones and occasional boulders.
0903	0.4m	Natural. Yellow-brown sandy silt, red-brown on the surface, merging into a grey-brown silty gravel.
0904	3.1m	Bedrock or boulders

Trial pit 10
Trial pit size: 3.4m x 1.9m Photos: 112-115
Max Depth: 3.8m Orientation: SW-NE
Notes: TP in possible prehistoric field but depth of soil is no different to outside this area.

Layer	Depth below surface	Description
1001	0m	Topsoil. Dark brown silt with bracken roots.
1002	0.25m	Lower A horizon. Mid brown gritty silt with c.50% small stones and occasional boulders.
1003	0.46m	Natural. Orange-brown silty gravel with large boulders at the surface merging into a grey-brown silty gravel with stones.
1004	3.8m	Weathered rock, difficult for the excavator to continue

Trial pit 11
Trial pit size: 4.8m x 1.9m Photos: 108-111
Max Depth: 3.0m Orientation: SW-NE
Notes:

Layer	Depth below surface	Description
1101	0m	Topsoil. Dark brown silt with bracken roots.
1102	0.25m	Lower A horizon. Mid brown silt with one boulder floating in it but generally few stones.
1103	0.46m	Natural. Yellow-brown sandy silt with numerous stones. Red-brown on surface. Merges gradually into a grey-brown silty clayey gravel with numerous stones. Very large boulders in top of the deposit.
1104	2.3m	Bedrock

Trial pit 12
Trial pit size: 3.0m x 1.9m Photos: 105-107
Max Depth: 3.2m Orientation: SW-NE
Notes: TP to W of boundary F68

Layer	Depth below	Description

	surface	
1201	0m	Topsoil. Dark brown silt with bracken roots.
1202	0.3m	Natural. Yellow-brown sandy silt with numerous stones and large boulders. Red-brown on surface. Merges gradually into a grey-brown silty clayey gravel with numerous stones. Most of the large boulders are on or close to the surface of the deposit.
1203	3.2m	Bedrock

Trial pit 13

Trial pit size: 3.0m x 1.9m Photos: 101-104
Max Depth: 2.4m Orientation: SW-NE
Notes: TP in rocky field, a thin layer of possible ploughsoil is visible.

Layer	Depth below surface	Description
1301	0m	Topsoil. Dark brown silt with occasional stones and a large number of bracken roots.
1302	0.2m	Lower A horizon. Mid brown gritty silt with occasional stones.
1303	0.4m	Natural. Yellow-brown sandy silt with numerous stones. Merges gradually into a grey-brown silty clayey gravel with numerous stones
1304	2.4m	Weathered rock/boulders

Trial pit 14

Notes: Cancelled

Trial pit 15

Trial pit size: 2.7m x 1.9m Photos: 099-100
Max Depth: 2.8m Orientation: SW-NE
Notes: No ploughsoil, topsoil directly over large boulders that are sorted to the top of the natural.

Layer	Depth below surface	Description
1501	0m	Topsoil. Dark brown silt with occasional stones and a large number of bracken roots.
1502	0.3m	Natural. Grey-brown clayey gravel with numerous stones. There are many large boulders in the upper part of the deposit with almost no boulders lower down, showing that the boulders have either been sorted to the top or were deposited after most of the layer. This may be due to boulders slipping down hill or being concentrated by the glacier. However it is possible that frost action may have been involved which may explain stones on edge and in rows as in F79.
1503	2.8m	Bedrock

Trial pit 16

Trial pit size: 2.9m x 2.0m Photos: 096-098
Max Depth: 2.8m Orientation: SW-NE
Notes:

Layer	Depth below surface	Description
1601	0m	Topsoil. Dark brown silt with occasional stones and a large number of bracken roots.
1602	0.2m	Lower A horizon. Mid brown gravelly silt with relatively few stones.
1603	0.4m	Natural. Yellow-brown silty sand with stones and gravel. Rather red-brown as first appears on the surface.
1604	0.8m	Natural. Grey-brown sandy clayey gravel with numerous angular stones
1605	2.7m	Weathered rock

Trial pit 17

Notes: Cancelled

Trial pit 18

Notes: Cancelled

Trial pit 19

Trial pit size: 3.6m x 1.2m Photos: 087-089
Max Depth: 1.8m Orientation: SW-NE
Notes: TP in woodland. Almost no overburden, directly onto natural. Bedrock visible from ground level, TP excavated by removing weathered bedrock and excavating between split bedrock.

Layer	Depth below surface	Description
1901	0m	Topsoil. Dark brown organic silt.
1902	0.1m	Natural. Orange-brown silt with numerous stones including massive boulders of split bedrock.
1903	0.8m	Natural. Yellow-brown silty sand with gravel and large stones including boulders of weathered bedrock.

Trial pit 20

Trial pit size: 2.2m x 2.0m Photos: 083-086, 090-091
Max Depth: 2.4m Orientation: NE-SW
Notes: TP near track to Coed Sadwrn. A stony layer is present just below the surface, which might be from the collapse of structures. It did not seem coherent enough to be a cobbled surface but if it had been disturbed by roots this might be possible. There was a large flat stone at the NE end of the trench which might be an in situ part of a structure but a similar horizontal but much larger stone lay under it that seemed securely in the natural.

Layer	Depth below surface	Description
2001	0m	Topsoil. Dark brown organic silt.
2002	0.13m	Stony layer. Dark brown silt with c.40% sub-rounded stones up to 0.3m in length. This layer lies above the natural deposits and may be tumble from nearby structures, although it is possible that it is a very disturbed stone surface.
2003	0.4m	Natural. Yellow-brown silty sand containing small stones and occasional larger ones. Quite red-brown in colour just on the surface.
2004	2.3m	Bedrock

Trial pit 21

Trial pit size: 2.6m x 2.0m Photos: 001-003
Max Depth: 2.8m Orientation: SW-NE
Notes: Bedrock not reached at 2.8m, water ingress and trench collapsing. Edge of trench 0.6m NE of peg

Layer	Depth below surface	Description
2101	0m	Topsoil. Dark brown silt with occasional stones.
2102	0.2	Ploughsoil. Dark brown slightly gritty silt with numerous medium stones.
2103	0.3m	Natural. Yellow-brown sandy clay with numerous stones and boulders.
2104	1.9m	Natural. Grey-brown clayey gravel with numerous angular stones and large boulders.

Trial pit 22

Trial pit size: 2.5m x 2.0m Photos: 004-005
Max Depth: 3.6m Orientation: SW-NE
Notes: TP NW of the peg

Layer	Depth below surface	Description
2201	0m	Topsoil. Dark brown silt with occasional stones.
2202	0.25m	Ploughsoil. Red-brown gritty silt with few stones.
2203	0.4m	Natural. Yellow-brown silty clay with occasional stones, some quite large. Mottled with pale patches and patches of strong red. Generally ochre yellow in colour.
2204	1.9m	Natural. Silty gravels with angular stones
2205	3.2m	Large boulders

Trial pit 23

Trial pit size: 2.8m x 2.0m Photos: 006-010

Max Depth: 3.8m Orientation: SW-NE
Notes:

Layer	Depth below surface	Description
2301	0m	Topsoil. Dark brown silt with occasional stones.
2302	0.28m	Ploughsoil. Red-brown gritty silt with occasional small stones.
2303	0.4m	Natural. Strong red-brown gritty silt with numerous stones.
2304	1.2m	Natural. Grey-brown clayey gravel with numerous angular stones
2305	3.8m	Bedrock

Trial pit 24
Trial pit size: 2.8m x 2.0m Photos: 014-017
Max Depth: 4.5m Orientation: SW-NE
Notes: 2.5m SE of the peg

Layer	Depth below surface	Description
2401	0m	Topsoil. Dark brown silt with occasional stones and numerous roots.
2402	0.3m	Ploughsoil. Dark red-brown silt with occasional small stones.
2403	0.6m	Natural. Yellow-brown gritty silt with numerous stones and boulders.
2404	2.0m	Natural. Grey-brown clayey gravel with numerous angular stones and some large boulders
2405	4.5m	Bedrock

Trial pit 25
Trial pit size: 3.2m x 2.0m Photos: 018-021
Max Depth: 4.0m Orientation: SW-NE
Notes: TP c4m SW of peg and 3m NW to avoid overhead cables

Layer	Depth below surface	Description
2501	0m	Topsoil. Dark brown silt with numerous roots and some large stones.
2502	0.3m	Ploughsoil. Dark red-brown silt with c.20% stones up to 0.3m in length, sub-rounded.
2503	0.6m	Natural. Yellow-brown gritty silt with c.70% sub-rounded stones, some very large. Surface red-brown in colour.
2504	2.5m	Natural. Grey-brown clayey gravel with numerous angular stones and some large boulders
2505	4.0m	Bedrock or boulders

Trial pit 26
Notes: Cancelled

Trial pit 27
Trial pit size: 3.0m x 2.0m Photos: 022-024
Max Depth: 1.5m Orientation: N-S
Notes:

Layer	Depth below surface	Description
2701	0m	Topsoil. Dark brown silt with numerous roots.
2702	0.2m	Ploughsoil. Dark red-brown silt, soft and friable with few stones.
2703	0.46m	Natural. Yellow-brown gritty silt with numerous stones and boulders.
2704	0.75m	Natural. Yellow-brown loose stony silt with angular broken bedrock fragments.
2705	1.1m	Bedrock

Trial pit 28
Trial pit size: 3.2m x 2.0m Photos: 025-028
Max Depth: 1.7m Orientation: E-W
Notes:

Layer	Depth below surface	Description

2801	0m	Topsoil. Dark brown silt.
2802	0.2m	Ploughsoil. Dark red-brown clayey silt with c.20% small and medium stones, sub-rounded.
2803	0.5m	Natural. Yellow-brown gravelly silt with c.70% medium and large sub-angular stones.
2804	1.7m	Bedrock, first appears c.1.0m

Trial pit 29

Trial pit size: 3.2m x 2.0m Photos: 029-033
Max Depth: 1.9m Orientation: N-S
Notes: TP 2m W of peg

Layer	Depth below surface	Description
2901	0m	Topsoil. Dark brown silt with numerous roots and some boulders.
2902	0.15m	Ploughsoil. Red-brown silt with occasional large stones.
2903	0.4m	Natural. Red-brown silt with c.70% sub-rounded medium and large stones.
2904	1.9m	Bedrock, outcrops on the surface and juts out at various levels

Trial pit 30

Trial pit size: 3.0m x 2.0m Photos: 038-042
Max Depth: 1.8m Orientation: SW-NE
Notes: TP dug to reveal rock face in SW end

Layer	Depth below surface	Description
3001	0m	Topsoil. Very dark brown organic loam, becoming greyer with depth. Numerous
3002	0.3m	Natural. Red-brown gritty silt with c.70% stones up to 0.5m in length, mainly sub-angular. Becoming yellow-brown and gravelly with depth.
3003	1.8m	Bedrock, slopes down from surface from SW end of trench

Trial pit 31

Trial pit size: 2.6m x 1.5m Photos: 043-045
Max Depth: 1.9m Orientation: N-S
Notes: Trial pit in woodland

Layer	Depth below surface	Description
3101	0m	Topsoil. Very dark brown organic loam, with numerous roots.
3102	0.15m	Lower A horizon. Soft, fine light brown silt with occasional stones.
3103	0.3m	Natural. Red-brown gritty silt with c.70% sub-rounded stones and boulders. Becoming yellow-brown silty gravelly with depth, but always mixed.
3104	1.5m	Bedrock

Trial pit 32

Trial pit size: 3.4m x 0.8m Photos: 047-048
Max Depth: 2.2m Orientation: N-S
Notes: On slope with boulders and rock outcrops in woodland

Layer	Depth below surface	Description
3201	0m	Topsoil. Very dark brown organic loam, with numerous roots.
3202	0.15m	Lower A horizon. Medium brown clayey silt.
3203	0.3m	Natural. Red-brown clayey silt with boulders.
3204	0.6m	Natural. Grey-brown silty gravel with numerous stones.

Trial pit 33

Trial pit size: 3.5m x 1.0m Photos: 049-050
Max Depth: 1.8m Orientation: N-S
Notes: TP in woodland

Layer	Depth below surface	Description

3301	0m	Topsoil. Very dark brown organic loam, with numerous roots.
3302	0.12m	Lower A horizon. Medium brown clayey silt, some stones.
3303	0.14m	Natural. Red-brown clayey silt with numerous stones and boulders.
3304	0.4m	Natural. Grey-brown silty gravel with numerous stones and boulders.

Trial pit 34

Trial pit size: 2.8m x 1.3m Photos: 053-054
Max Depth: 0.8m Orientation: E-W
Notes:

Layer	Depth below surface	Description
3401	0m	Topsoil. Very dark brown organic loam, with numerous roots.
3402	0.15m	Lower A horizon. Medium brown silt.
3403	0.35m	Natural. Red-brown clayey silt with numerous stones and boulders.
3404	0.6m	Degraded rock. Pale yellow-grey gravel and stone.

Trial pit 35

Trial pit size: 2.3m x 1.1m Photos: 056-058
Max Depth: 1.6m Orientation: E-W
Notes: Weathered rock at 1.05m, bedrock at 1.45m

Layer	Depth below surface	Description
3501	0m	Topsoil. Medium grey-brown clayey silt.
3502	0.15m	Natural. Red-brown clayey silt with numerous stones and boulders.
3503	0.9m	Natural. Pale grey-brown gravel and stone.
3504	1.05m	Weathered rock
3505	1.45m	Bedrock

Trial pit 36

Trial pit size: 3.0m x 1.0m Photos: 059-060
Max Depth: 1.7m Orientation: NW-SE
Notes:

Layer	Depth below surface	Description
3601	0m	Topsoil. Dark brown silt with numerous roots.
3602	0.26m	Natural. Red-brown clayey silt with numerous stones and boulders.
3603	0.4m	Natural. Pale grey-brown gravel and stone.
3604	1.5m	Weathered rock

Trial pit 37

Trial pit size: 2.9m x 0.8m Photos: 061-062
Max Depth: 2.2m Orientation: NE-SW
Notes: TP in woods

Layer	Depth below surface	Description
3701	0m	Topsoil. Dark brown silt with numerous roots.
3702	0.2m	Natural. Red-brown clayey silt with numerous stones.
3703	0.9m	Natural. Pale grey-brown silty gravel and stone.
3704	1.5m	Weathered rock

Trial pit 38

Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
3801	0-0.3m	Topsoil as recorded by CCG

Trial pit 39
Notes: Cancelled

Trial pit 40
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4001	0-0.4m	Topsoil as recorded by CCG

Trial pit 41
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4101	0-0.05m	Topsoil as recorded by CCG

Trial pit 42
Notes: Cancelled

Trial pit 43
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4301	0-0.05m	Topsoil as recorded by CCG

Trial pit 44
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4401	0-0.4m	Topsoil as recorded by CCG

Trial pit 45
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4501	0	No topsoil recorded by CCG, straight on to clay.

Trial pit 46
Notes: Cancelled

Trial pit 47
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4701	0-0.05m	Topsoil as recorded by CCG

Trial pit 48
Notes: TP in woods with very low archaeological potential so not monitored

Layer	Depth below surface	Description
4801	0-0.05m	Topsoil as recorded by CCG

Trial pit 49
Trial pit size: 3.0m x 1.0m Photos: 076-077
Max Depth: 2.2m Orientation: N-S
Notes: TP on edge of track and on hill slope but still 2.2m deep

Layer	Depth below surface	Description
4901	0m	Topsoil. Dark brown silt with occasional stones.

4902	0.1m	Natural. Red-brown sandy clay with numerous stones and boulders.
4903	2.2m	Bedrock

Trial pit 50

Trial pit size: 3.0m x 1.0m Photos: 078-080
Max Depth: 0.6m Orientation: E-W
Notes: Trench on edge of track.

Layer	Depth below surface	Description
5001	0m	Track surface. Dark brown silty sand with 80% small sub-angular stones. Layer of make-up with thin layer of just stone on the surface.
5002	0.3m	Natural. Red-brown gritty silt with roots.
5003	0.6m	Bedrock

APPENDIX 2. Summary of depth of topsoil, ploughsoil and made ground

Trial pit	Total depth of topsoil, ploughsoil and made ground
02	1.5m max
03	1.1m
04	1.2m
05	0.3m
07	0
08	?
09	0.4m
10	0.46m
11	0.46m
12	0.3m
13	0.4m
15	0.3m
16	0.4m
19	0.1m
20	0.4m
21	0.3m
22	0.4m
23	0.4m
24	0.6m
25	0.6m
27	0.46m

Trial pit	Total depth of topsoil, ploughsoil and made ground
28	0.5m
29	0.4m
30	0.3m
31	0.3m
32	0.3m
33	0.14m
34	0.35m
35	0.15m
36	0.26m
37	0.2m
38	0.3m
40	0.4m
41	0.05m
43	0.05m
44	0.4m
45	0
47	0.05m
48	0.05m
49	0.1m
50	0.3m

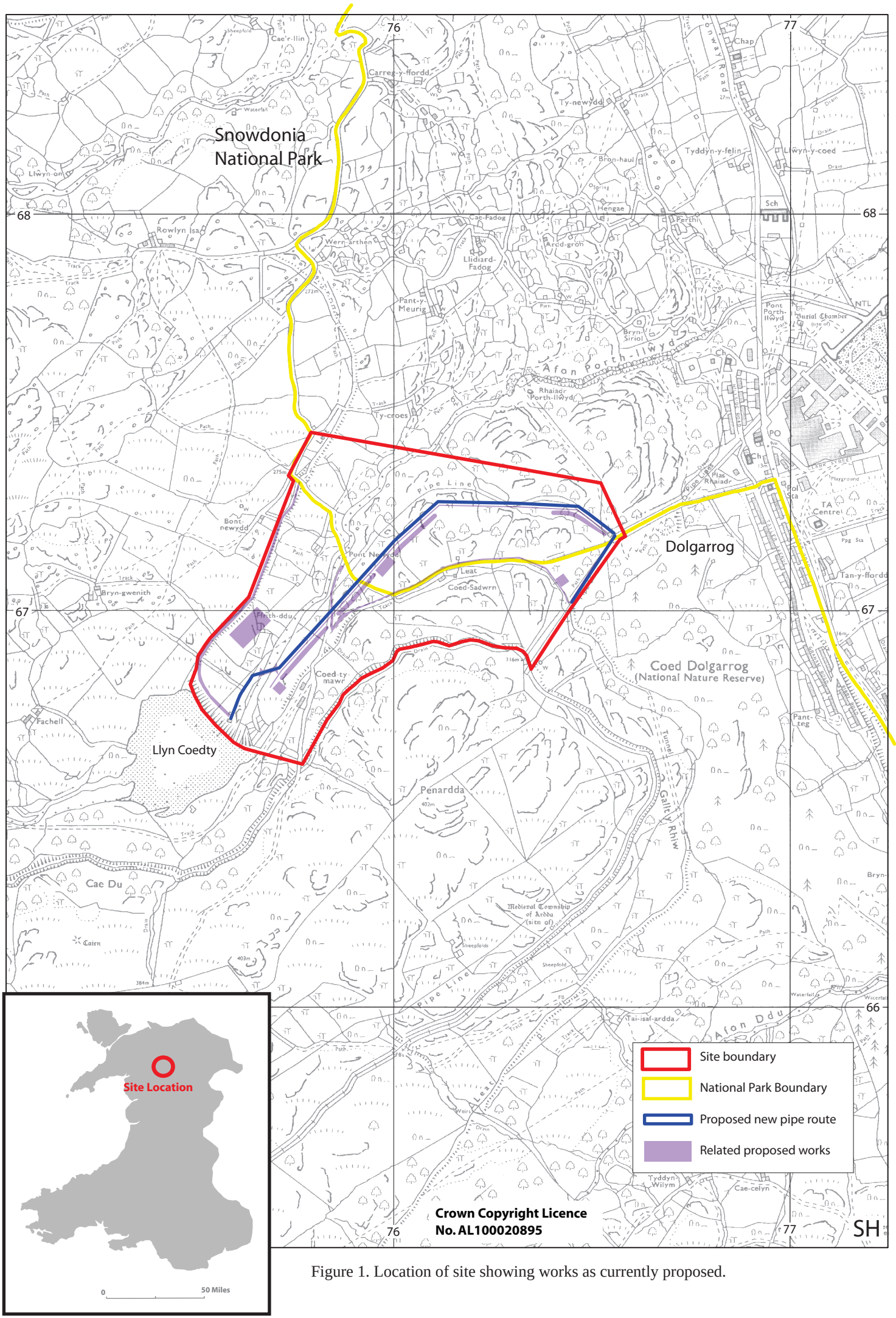

Figure 1. Location of site showing works as currently proposed.

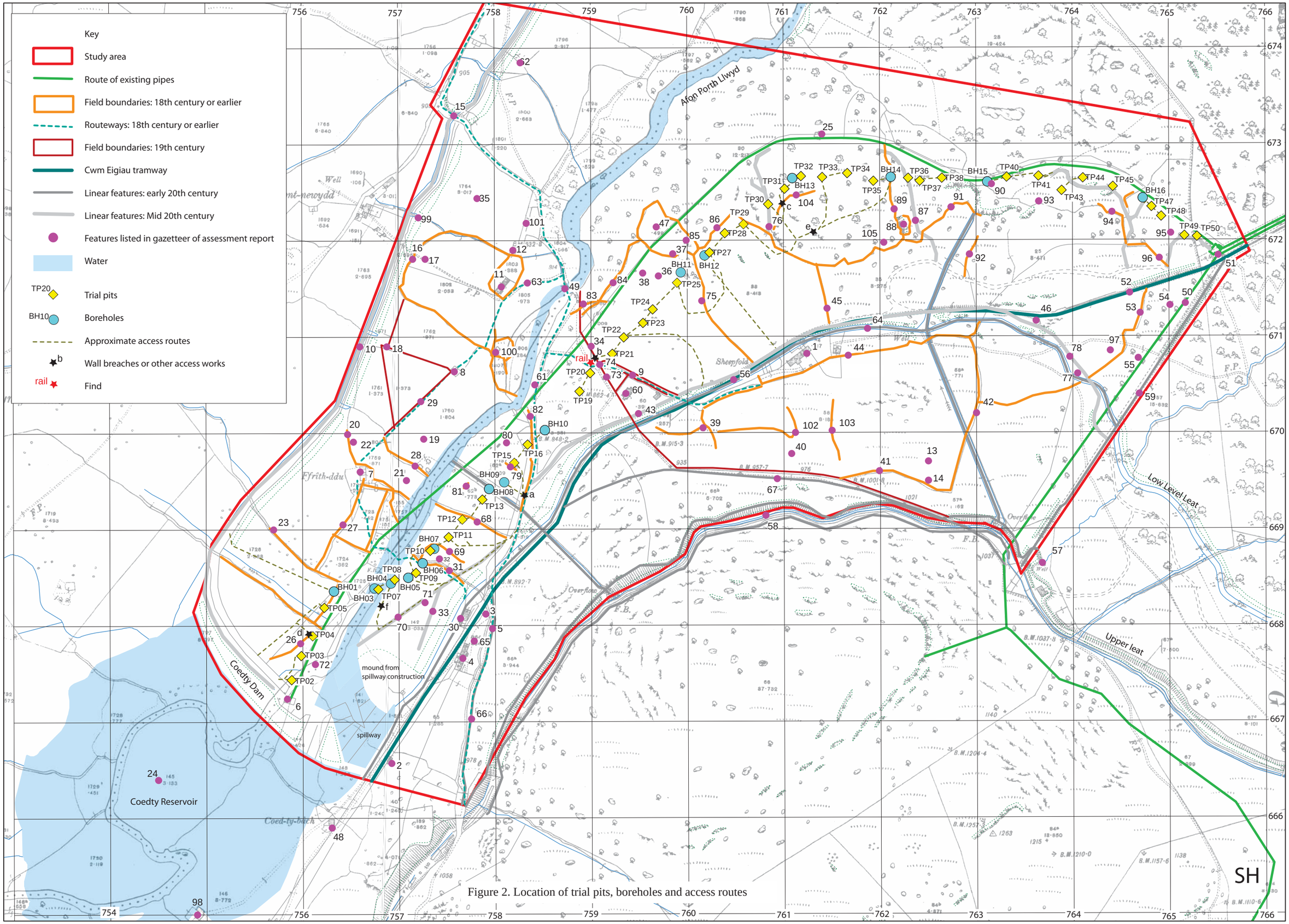

Figure 2. Location of trial pits, boreholes and access routes

Figure 2

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and boreholes and , fro

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to allo access to borehole

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ARCHAEOLOGICAL
TRUST

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