

CPAT Report No 1062

Llangynog Mountain Biking Centre

CULTURAL HERITAGE ASSESSMENT



THE CLWYD-POWYS ARCHAEOLOGICAL TRUST

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December 2010

Report for Mr Tim Foster



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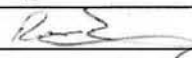
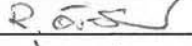


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1 INTRODUCTION

- 1.1 The Contracts and Field Services Section of the Clwyd-Powys Archaeological Trust (CPAT) was invited by Tim Foster in October 2010 to undertake a cultural heritage assessment in connection with proposals for a new mountain biking centre on land to the south of Llangynog, in northern Powys, at SJ 052257. The Curatorial Section of the Clwyd-Powys Archaeological Trust, in their capacity as archaeological advisors to the local authority, had determined that a cultural heritage assessment was required to identify the potential impact on that resource.
- 1.2 The area defined for the proposed creation of the mountain bike centre covers approximately 42.5ha on the south side of the Cwm Pennant valley looking across to the village of Llangynog which developed where the stream in Cwm Pennant debouches into the River Tanat.
- 1.3 As far as it is understood at present the development will consist of:
- The enhancement of existing tracks
 - The creation of new tracks
 - The removal of waste material from spoil heaps to surface tracks
 - The introduction of a site office
- 1.4 Though this is one development, it divides into three quite distinctive areas and this division is meaningful for both our approach to the assessment (or methodology) and also the results. We have termed these areas for convenience and description: A, B & C.
- Area A is a near rectangular block of land running from the minor lane that forms the northern edge of the development area to the quarry which forms its southern boundary. For the most part it is gently sloping towards the valley in the north and is open undulating ground with exposed stone waste and patchy vegetation.
 - Area B, to the east of A, is the abandoned quarry, together with spoil heaps and, around the northern edge, some buildings. The buildings and the rest of the northern perimeter are under deciduous woodland with variable amounts of undergrowth.
 - Area C lies on the moorland edge and is characterised by steepish slopes, for the most part covered by the conifer plantation known as Coed Pengwern, though with a very few deciduous stands as well. It is considerably larger than A and B, lying to the south of them, and is linked by the corridor that carries the main access track.

2 HISTORICAL BACKGROUND TO THE SOUTH LLANGYNOG LEAD MINE AREA

- 2.1 Lead was apparently first discovered on the site in 1692. The veins of ore that were found appear to have been in association with a granite outcrop, although the latter has since been removed by quarrying. In its early years the mine sett (area) was worked in two separate parts as it falls within two adjoining estates, owned by Lord Powis and the Myddelton family of Chirk Castle.
- 2.2 The venture was allegedly very profitable in the early period of its working as the royalties paid to the Powis estates, were said to have amounted to £20,000 per annum for its first 40 years, from 1692 to 1732, although Williams suggested dates of 1705-1745 for the workings undertaken by the 2nd Marquess of Powis and argued that the mine was run by the estate itself, which only leased out its part of the mine in later years. The Chirk Castle part of the mine was

also active in the early 18th century, specifically between 1718 and 1736 when Robert Myddelton entered into a partnership with the London Lead Company to mine the portion within his ownership.

- 2.3 The mine saw only limited production in the latter half of the 18th century, probably due to problems with flooding, as Wren noted that the workings were inundated in 1732, but probably also owing to the rapid turnover of mine lessees when the estates had terminated their direct involvement. Attempts at drainage were instituted in the late 18th century but met with limited success owing to the depth of the workings. By 1848, however, the mine was again in full production (Wren 1968, 123), and from 1851 to 1859 the Powis and Chirk sections were run as a single concern, the Powis section having been purchased by Robert Myddelton-Biddulph of Chirk Castle. Both parts were sold to the Llangynog United Company in 1859 and the combined mine continued in production until this company went into liquidation in 1869, although it was reformed as the New Llangynog Company and survived until 1885.
- 2.4 After the subsequent abandonment of the lead mine, there was some renewed interest by the Vielle Montagne Co in the 1890s, but the next large-scale industrial activity on the site was the opening of the Berwyn Granite Quarry in 1910, an enterprise which exploited the granite outcrop mentioned above. The material seems to have been largely used as roadstone, both as an aggregate and mixed to form tarmacadam, with working continuing through both world wars up to the end of production in 1956. It appears that when the quarry was active, waste material may have been taken and deposited in Area A (see below) potentially masking elements of the earlier mining activity.
- 2.5 The various surviving elements of the mine site are detailed below, but it is worth noting that the ruinous house of Ty-newydd, which lies within the section of Area C that links it with the remainder of the development area, dates to 1708 and was apparently used as the mine managers office from an early date until 1885 (Williams 1985, 67). There are also other parts of the mine that fall outside the proposed development area, including the western end of the mine workings within lands that belonged to the Chirk Castle estate and more particularly an 18th-century magazine (gunpowder store), which lies to the south-east of Area B (see below). It is also known that there was a drainage adit (the Pant-y-calch level) which ran beneath the workings, and therefore the development area, from the main road to the north-east.

3 CULTURAL HERITAGE ASSESSMENT

- 3.1 The initial desk-based study of the area focussed on readily available written, cartographic, and aerial photographic sources held in the following repositories: The Regional Historic Environment Record (HER) maintained by the Clwyd-Powys Archaeological Trust in Welshpool; the National Monument Record (NMR), a department of the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), also in Aberystwyth; and the National Library of Wales (NLW) in Aberystwyth.
- 3.2 Data on scheduled ancient monuments, listed buildings and historic parks and gardens was derived from digital data distributed by Cadw, the Welsh Assembly Government's historic environment service. This informed an assessment of the potential for direct impacts on the designated and registered cultural heritage, and also a consideration of indirect impacts.
- 3.3 The initial walkover study took place on 27 October and was conducted by one of the writers of this report (RJS), with a subsequent visit carried out on 14 December to examine a small area that had been included in the proposal at a late stage. Cultural heritage assets (or their positions), already identified during the desk-top assessment were examined in as far as the

conditions allowed, and open areas were also walked, though not on a systematic transect basis. Parts of Area B were not examined because of dense vegetation and undergrowth, and also because of safety issues with the quarry. Most of Area C could not be examined because of the conifer plantations and even those areas under broad-leaved woodland were difficult to access, while the few open areas tended to be smothered by bracken.

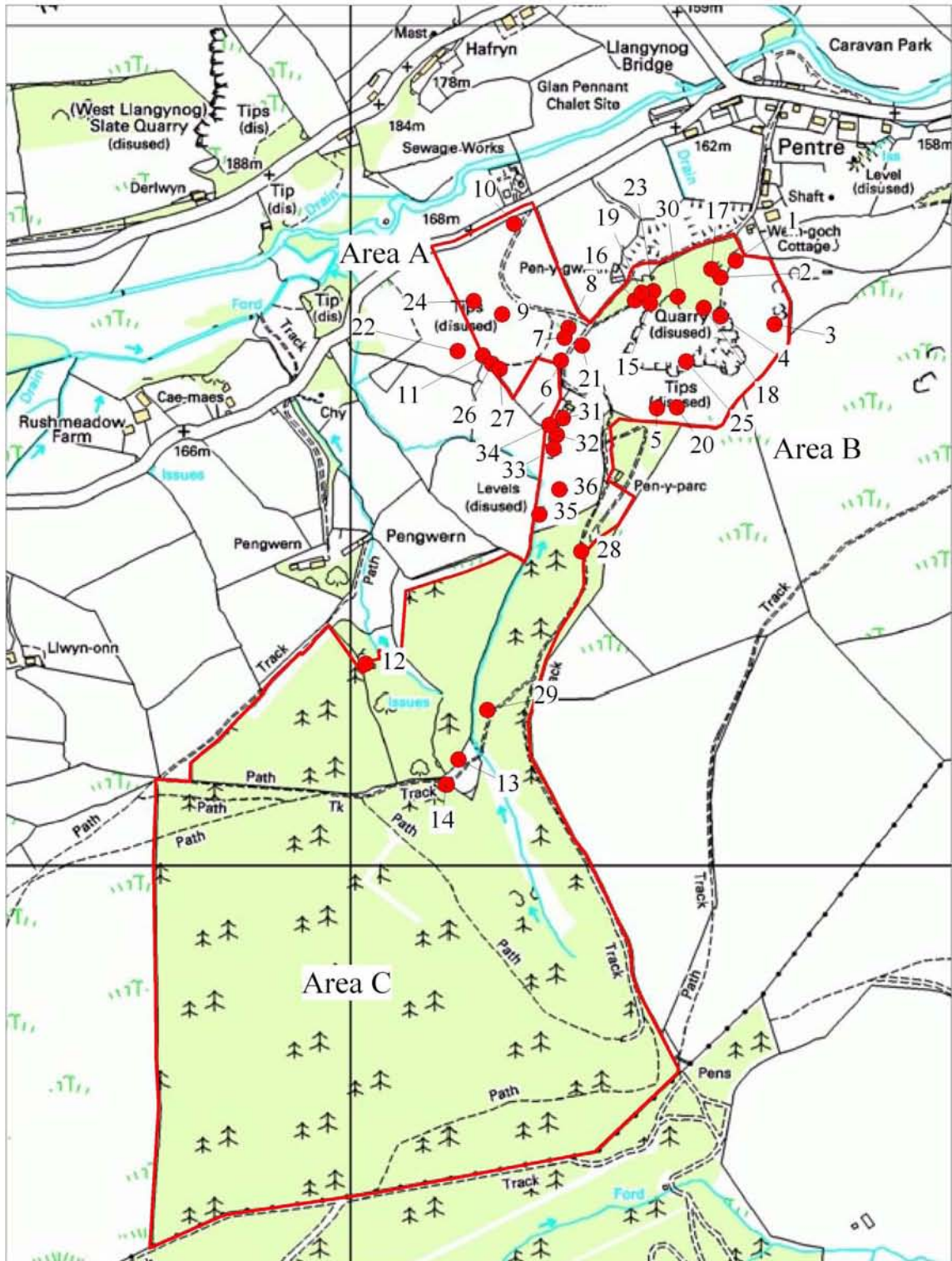


Fig. 1 Plan of the proposed development area showing the identified archaeological sites

Area A

- 3.4 The cultural heritage of Area A does not appear to be particularly distinguished. What is known is tabulated below and described in Appendix 1. There were a scatter of buildings associated with the mining activity, and earthworks which indicate that there were formerly mineshafts here. There is also evidence, both documentary and cartographic, for at least part of this area being mined in the 18th and/or 19th century, though it is not possible to determine whether the whole of Area A was affected in this way.
- 3.5 Building survival is variable and the shaft remains are not always convincing. A horse whim still shows as an earthwork and was recorded by Williams (1985) some years ago; his report supersedes the HER record of the feature which was more vaguely positioned. The horse whim lies just below a shaft which appears to have gone unrecorded until now. However, the appearance of this area is such that it suggests that spoil from the mines and/or quarry has been shifted around and that other assets which were formerly present may have been covered over or perhaps destroyed. This variation comes into play with the two buildings recorded as nos 9 and 10, the formerly seemingly gone, the latter visible in part as foundations and perhaps covered with spoil.

Table 1: Known Cultural Heritage Assets in Area A

Asset no.	Name	NGR	Value
9	South Llangynog Mine building	SJ0518125656	Unknown
10	South Llangynog Mine building	SJ0519525764	Low
11	South Llangynog Mine 'Boundary shaft'	SJ0515825607	Low
24	Llangynog Mine, dressing floor	SJ0514725672	Low
26	Llangynog Mine, horse whim circle	SJ0516925597	Low
27	South Llangynog Mine shaft II	SJ0517825591	Low

Area B

- 3.6 Area B is dominated by the quarry, the spoil around it, and the undulating tips above it on the south side which appear to be the result of the earlier mining. Lead mining may have started around here at the end of the 17th century and continued, with perhaps an occasional interruption until the 1890s. The archaeological residue of the mining works is the shafts and the spoil tips, all of which will have seen varying degrees of modification. There were also buildings around the northern perimeter, some surviving as ruins or foundations, which belong to this phase of activity. The quarry itself originated in 1910, continued until 1956 and is by far the largest archaeological feature in the area. There are associated features such as a granite crusher, just to the south of Pen-y-gwaith farm, and there was also a cottage known as Pen-y-llwyn in the north-east corner of the site. There are no known assets on the proposed site for the new office at SJ 0531 2564.

Table 2: Known Cultural Heritage Assets in Area B

Asset no.	Name	NGR	Value
1	Pen-y-llwyn Cottage	SJ0545925720	Low
2	South Llangynog Mine level (Cady's Level)	SJ0544125700	Unknown
3	South Llangynog Mine level (Eastern Level)	SJ0550525644	Low
4	South Llangynog Mine level	SJ0544125654	Unknown
5	South Llangynog Mine levels (Rock Level)	SJ0536525544	Low
6	South Llangynog Mine workshop I	SJ0525125601	Low
7	South Llangynog Mine workshop II	SJ0525525628	Unknown
8	South Llangynog Mine workshop III	SJ0526025640	Low
15	Pen-y-gwaith inclined plane I	SJ0535725669	Unknown
16	Pen-y-gwaith building	SJ0533925673	Unknown
17	Cady's Level hearth	SJ0543025710	Unknown
18	Pen-y-gwaith inclined plane II	SJ0542125664	Unknown
19	South Llangynog granite crusher	SJ0534725682	Low
20	South Llangynog opencast working	SJ0538925545	Unknown
21	Llangynog Mine	SJ0527625619	Medium
23	Llangynog Mine, engine house	SJ0536125684	Unknown
25	Llangynog granite quarry	SJ05402560	Low
30	Pen-y-gwaith mine shaft	SJ0539025677	Low

Area C

- 3.7 Area C is a large tract of moorland slope, linked by a corridor to Areas A and B and mostly afforested. The main recorded cultural heritage assets are a single cottage known as Hafotty with its enclosures and, more importantly, the former mine manager's house of Ty-newydd with some associated buildings. With such a large area it is very likely that other cultural heritage assets exist under the forestry plantations but locating them would be a very difficult task in the current conditions. A cursory examination of the ground to either side of the modern track demonstrates that there are unrecorded holloways and terraceways running up onto the mountain which are not depicted on Ordnance Survey maps. Area C, then, is currently an area of unknown heritage potential.

Table 3: Known Cultural Heritage Assets in Area C

Asset no.	Name	NGR	Value
12	Pengwern quarry	SJ0502025239	Low
13	Hafotty cottage	SJ0512925126	Low
14	Hafotty sheepfold	SJ0511525096	Negligible
28	Pengwern holloways	SJ0527525373	Low
29	Hafotty quarry	SJ0516325185	Low
31	Ty-newydd house	SJ0525325532	Medium
32	Ty-newydd building I	SJ0524625512	Medium
33	Ty-newydd building II	SJ0524225496	Low
34	Ty-newydd building III	SJ0523725524	Low
35	Ty-newydd mine level I	SJ0522525417	Low
36	Ty-newydd mine level II	SJ0524925447	Low

Assets outside the development area

- 3.8 A number of assets are on the periphery of but outside the development area, including for instance the occupied cottage of Pen-y-parc and the circular mine magazine to the south-east of Area B. With the exception of the wheelpit (Site 22), which lies just outside Area A but is mentioned here as its location was formerly placed (incorrectly) in the regional HER within the area, these sites are not recorded in this report. It should be noted, however, that any could be directly affected in the future by even relatively minor modifications to the boundary of the development area.

Visual Impacts

- 3.9 It is now a standard requirement to consider the indirect impacts of a development on the cultural heritage resource. These indirect impacts can on occasions be off-site physical impacts but are more likely to be visual intrusions. In practice it is statutorily designated and non-statutorily registered assets that are normally assessed under this heading.
- 3.10 There are no designated and registered sites within the development area. The closest scheduled monuments are the prehistoric cairn on Y Gribin (SAM Mg334) which is about 1.5km to the north-west, but because of its topographical setting this will have virtually no intervisibility with the development area, and Craig Rhiwarth hillfort (SAM Mg004) which is a little under 1km to the north and will have very clear views of the development area from its southern defences. The closest, higher-grade listed building is Llwyn-onn about 1.7km to the east.
- 3.11 The development area as it currently exists is a mix of industrial waste deposits and forestry. These are crossed by tracks, and have occasional stone buildings, mostly ruined, scattered across them. The upgrading of existing tracks and the creation of new tracks are unlikely to alter the views from the scheduled hillfort significantly. The only concern is the nature of the proposed office which is to be positioned to the north-east of assets no 7 and 8. There is some vegetation cover, but perhaps not enough to shield the proposed building from the viewer to the north. Consequently, the structure and material of the building and its precise position could be a matter for concern.

Mitigation

- 3.12 In the absence of full and detailed plans of the development, it is inevitable that suggestions for mitigation are at best predictive, and that some, probably a majority of, the assets will not be physically affected, though this too is based on assumptions rather than fact. The range of standard mitigation measures is outlined in Appendix 3.

Table 4: Recommended Mitigation within Area A

Asset no.	Name	Value	Mitigation
9	South Llangynog Mine building	Unknown	Watching brief in the event of significant groundworks in the area of the site
10	South Llangynog Mine building	Low	Preservation in situ
11	South Llangynog Mine 'Boundary shaft'	Low	Preservation in situ
26	Llangynog Mine, horse whim circle	Low	Preservation in situ
27	South Llangynog Mine shaft II	Low	Preservation in situ

Table 5: Recommended Mitigation within Area B

Asset no.	Name	Value	Mitigation
1	Pen-y-llwyn Cottage	Low	Preservation in situ
2	South Llangynog Mine level (Cady's Level)	Unknown	Watching brief in the event of significant groundworks in the area of the site
3	South Llangynog Mine level (Eastern Level)	Low	Watching brief in the event of works in the area
4	South Llangynog Mine level	Unknown	Watching brief in the event of significant groundworks in the area of the site
5	South Llangynog Mine levels (Rock Level)	Low	Watching brief in the event of significant groundworks in the area of the site
6	South Llangynog Mine workshop I	Low	Preservation in situ
7	South Llangynog Mine workshop II	Unknown	Preservation in situ preferred, otherwise watching brief in the event of significant groundworks in the area of the site
8	South Llangynog Mine workshop III	Low	Preservation in situ
15	Pen-y-gwaith inclined plane I	Unknown	Preservation in situ
16	Pen-y-gwaith building	Unknown	Preservation in situ
17	Cady's Level hearth	Unknown	Preservation in situ
18	Pen-y-gwaith inclined plane II	Unknown	Preservation in situ
19	South Llangynog granite crusher	Low	Preservation in situ
20	South Llangynog opencast working	Unknown	Watching brief in the event of significant groundworks in the area of the site
21	Llangynog Mine	Medium	General record - No specific mitigation required
22	Llangynog Mine, wheelpit	Unknown	None - Outside area of development
23	Llangynog Mine, engine house	Unknown	Preservation in situ
24	Llangynog Mine, dressing floor	Unknown	Watching brief in the event of works in the area
25	Llangynog granite quarry	Low	None
30	Pen-y-gwaith mine shaft	Low	Preservation in situ

Table 6: Recommended Mitigation within Area C

Asset no.	Name	Value	Mitigation
12	Pengwern quarry	Low	Preservation in situ
13	Hafotty cottage	Low	Preservation in situ
14	Hafotty sheepfold	Negligible	Watching brief in the event of works in the area
28	Pengwern holloways	Low	Watching brief coupled with mapping
29	Hafotty quarry	Low	Preservation in situ
31	Ty-newydd house	Medium	Preservation in situ
32	Ty-newydd building I	Low	Preservation in situ
33	Ty-newydd building II	Low	Preservation in situ
34	Ty-newydd building III	Low	Preservation in situ
35	Ty-newydd min level I	Low	Preservation in situ
36	Ty-newydd min level II	Low	Preservation in situ

4 SUMMARY

- 4.1 In summary, most assets should be avoided, allowing *preservation in situ*, and it is assumed that the nature of the development is such that this could readily be implemented.
- 4.2 In a minority of cases a *watching brief* by a contracted archaeologist might be necessary if any element of the development threatened to impinge on a known site.
- 4.3 We have not identified any asset which merits either evaluation or full excavation, though this situation might change if any of the assets flagged for *preservation in situ* appear to be under threat.
- 4.4 The one identified anomaly is asset no 28, the Pengwern holloways. These have not been mapped and their full extent is unknown. The creation of new bike tracks in Area C could impact on these features, albeit to a limited degree, so some recording work might be necessary prior to construction work. The density of the plantations in Area C meant that this locality could not be thoroughly examined on the ground, and there may therefore be cultural heritage assets which have not been identified in areas where tree cover prevented access.

5 SOURCES

Written

Walters, M, 1993. *Powys Metal Mines Survey*, CPAT report No 89: Welshpool

Williams, R A, 1985. *The Old Mines of the Llangynog District*, British Mining No 26, Northern Mines Research Society: Sheffield

Wren, W J, 1968. *The Tanat Valley: Its Railways and Industrial Archaeology*, Augustus M Kelley: New York

Documentary

National Monument Record files, RCAHMW Aberystwyth
1839 Llangynog Tithe apportionment

Cartographic

1813 National Library of Wales Roller Map C87 - Survey of property belonging to the late Robert Middleton Biddulph

1840 Llangynog Tithe map

1887 First edition Ordnance Survey 1:2500 map – Montgomeryshire 04.12

1887 First edition Ordnance Survey 1:2500 map – Montgomeryshire 04.16

1901 First edition Ordnance Survey 1:2500 map – Montgomeryshire 04.12

1901 First edition Ordnance Survey 1:2500 map – Montgomeryshire 04.16

1917 National Library of Wales Map 10322 – ‘Mineral Properties near Llangynog belonging to the Earls of Powis’

Aerial photographic

RAF vertical 106G UK 1468 Nos 1287 and 1350

*Appendix 1***Gazetteer of Cultural Heritage Assets within the Development Area**

Asset No	Asset Name	NGR
1	Pen-y-llwyn Cottage	SJ0545925720
	Cottage named and depicted on 1st and 2nd ed OS maps. Three-unit cottage with annexes shows as ruins, heavy with vegetation and undergrowth. Does not appear to have been badly affected by mining or quarrying.	
2	South Llangynog Mine 'Cady's Level'	SJ0544125700
	Mine level depicted on 1st and 2nd ed OS maps. 'Cady's Level' - Wren 1968.	
3	South Llangynog Mine 'Eastern Level'	SJ0550525644
	Mine level whose location is denoted by a spoil tip on the 1st and 2nd ed OS maps. Named by Williams (1985, 66).	
4	South Llangynog Mine level	SJ0544125654
	Mine level depicted on 1st ed OS map, 'Old level' on 2nd ed. Called 'Rock Level' by Wren in 1968, probably incorrectly as this should be Asset No 5.	
5	South Llangynog Mine levels (Rock Level)	SJ0536525544
	Mine levels depicted on 1st ed OS map, named by Williams (1985, 66).	
6	South Llangynog Mine workshop I	SJ0525125601
	Building, probably associated with the mine, depicted on 1st and 2nd ed OS maps. 'Ruin' - Wren 1968, while Williams suggests it was a workshop. Still standing with walls and concrete lintels/joists in place.	
7	South Llangynog Mine workshop II	SJ0525525628
	Building, probably associated with the mine, depicted on the 1st and 2nd ed OS maps. 'Ruin' - Wren 1968, while Williams suggests it was a workshop. North-east of structure just visible as foundations, the rest covered by a large spoil tip.	
8	South Llangynog Mine workshop III	SJ0526025640
	Building depicted on the 1st and 2nd ed OS maps. 'Ruin' - Wren 1968, while Williams suggests it was a workshop. Building survives in outline with walls of variable height to a maximum of 1.5m.	
9	South Llangynog Mine building	SJ0518125656
	Building depicted on the 1st and 2nd ed OS maps. There are no visible surface traces of this structure.	
10	South Llangynog Mine building	SJ0519525764
	Building depicted on the 1st and 2nd ed OS maps. Superficial evidence suggests wall foundations are still present, below rubble mound. No wall faces visible, but partly obscured by gorse bushes.	
11	South Llangynog Mine 'Boundary Shaft'	SJ0515825607
	Old shaft depicted on the 2nd ed OS map. 'Boundary shaft' according to Wren (1968) and Williams (1985). Now consists of a large horseshoe-shaped depression (i.e. open-ended to the north-west), about 2m deep.	
12	Pengwern quarry	SJ0502025239
	Small quarry depicted on 1st and 2nd ed OS maps. Not examined during fieldwork.	

- 13 Hafotty cottage SJ0512925126
Dwelling depicted and named on 1st and 2nd ed OS maps. Visible on 1946 AP as a roofless ruin. Now visible as a two-unit cottage with walls to 1.8m. Building undergoing natural degradation.
- 14 Hafotty sheepfold SJ0511525096
Sheepfold depicted on 2nd ed OS map. No visible traces of this feature on the ground, although at least one of the adjacent enclosure banks can be discerned.
- 15 Pen-y-gwaith inclined plane I SJ0535725669
Inclined plane depicted on a map by Williams (1985, 66). It seems to relate to underground workings rather than surface transport but is not readily visible.
- 16 Pen-y-gwaith building SJ0533925673
There is a building depicted here on the 1st and 2nd ed OS maps. Some traces may survive in a complex of earthworks and walls that are present in the area.
- 17 Cady's Level hearth SJ0543025710
'Hearth' identified by Wren (1968). Possibly evidence of smelting.
- 18 Pen-y-gwaith inclined plane II SJ0542125664
'Incline' identified by Wren (1968) and depicted on a map by Williams (1985, 66) with an associated drum house or 'winder' at its upper end. This area is currently difficult of access and heavily vegetation-covered. The nature of the 'incline' is not known.
- 19 South Llangynog granite crusher SJ0534725682
Location of a granite crusher - Wren 1968. There is a complex of earthworks and walls here which may be the crusher but could relate to the buildings that were here during the mining phase.
- 20 South Llangynog opencast working SJ0538925545
Area of opencast mine workings identified by Wren (1968). Area measures 150m WNW/ESE by 60m.
- 21 Llangynog Mine SJ0527625619
General record relating to the South Llangynog lead mine, operating from the late 17th century to the late 19th century.
- 22 Llangynog Mine, wheelpit SJ0512825612
Wheelpit. This was originally registered within the development area, but subsequent research has demonstrated that it lies outside the proposed development.
- 23 Llangynog Mine, engine house SJ0536125684
Engine house for steam engine. Dated to 1871. (CPAT 1987). There is a building depicted here on 1st and 2nd ed OS maps. There is a complex of earthworks and walls which may form part of the granite crusher of the quarry, but could relate to the buildings that were here during the mining phase.
- 24 Llangynog Mine, dressing floor SJ0514725672
Dressing floors of Llangynog mine on valley bottom at centre of mine site. (CPAT 1987)
- 25 Llangynog granite quarry SJ05402560
Roadstone quarry in former area of Llangynog Lead Mine (PRN 8433). Worked between 1910 and 1956 by the Berwyn Granite Company (Williams 1985).

- 26 Llangynog Mine, horse whim circle SJ0516925597
Horse whim, depicted at this location on a map by Williams (1985, 66).
- 27 South Llangynog Mine shaft II SJ0517825591
Probable mineshaft, up to 9m in diameter and 2m deep with level base. Below it, immediately to the north-west is the horse whim (no. 26).
- 28 Pengwern holloways SJ052253
Wandering up the hill from just above Pen-y-parc and continuing up through most of the forestry are several holloways and terraceways, tracks that took stock and traffic onto the mountain. It has not been established how many there are of these, for they are likely to braid and then amalgamate again. Some, however, are very well-developed. Because of their extent they have not spot-located on Fig 1 as the provision of a specific location for such linear features would be misleading.
- 29 Hafotty quarry SJ0516325185
Small quarry by the side of the modern track. Wedge-shaped, its back face up to 2.5m high.
- 30 Pen-y-gwaith mine shaft SJ0539025677
Mine shaft about 6m across with a visible depth of around 2m. Other earthworks adjacent.
- 31 Ty-newydd house SJ0525325532
Ruinous house, formerly the mine manager's dwelling for the South Llangynog Lead Mine between the early 18th century and the late 19th century. It apparently had a datestone of 1708, which relates to the earliest period of mine working, but this is no longer evident as the building is now in a ruinous condition. It consists of a rambling collection of rooms which have been appended and attached to the core of the structure over the years. The walls are mostly of local slaty shale with some lime mortaring visible and generally stand to 1m-2m high, but up to 5m at the south-west end. There is one sunken, vaulted room at the north-east end whose function is unclear, perhaps a strongroom or a cold store. Joist holes are visible in the walls at the south-west end showing that it was of two storeys. Overall extent about 40m north-east/south-west by 10m.
- 32 Ty-newydd building I SJ0517825591
Curious building of unknown function constructed of local slaty shale with lime mortar. Comprises three units in an overall L-shaped plan, although these are all at different levels internally. The eastern (upslope) was single storey and represents the highest level, while the south-western was also single storey but at a lower (intermediate) level. The north-west unit is attached to the others on its south and east sides and was probably of three floors with a basement forming the lower level and other floors matching the other units. Each unit has a separate entrance but there is an internal link between the east and north-west units; some windows are also evident. Linked by a revetment wall to building No 33. Measures approximately 12m east/west by 10m north/south, with a maximum height of about 7m.
- 33 Ty-newydd building II SJ0524225496
Small building constructed of local slaty shale and linked to building No 32 by a revetment wall. The western wall has collapsed, while the east is formed by the stone revetment, it is odd in that the north wall is shorter, at 3.8m long, than the south wall which is 6.0m long. The function of the building is unknown but it is linked by a revetment wall to building No 33. Measures 6.0m east-west (max) by 4.5m and up to 3m high.
- 34 Ty-newydd building III SJ0523725524
Small, ruinous building, probably a toilet associated with Ty-newydd house as there seems to be a gap (water outlet) in the base of the north-west wall. Square in plan, measuring 3m north-east/south-west by 3m north-west/south-east and up to 2m high. Entrance was probably on the north-east, with a window on the north-west. Built of local slaty shale with lime mortar.

35 Ty-newydd mine level I SJ0522525417
Mine level set in the corner of a triangular cutting, leading off to the south for a considerable distance. Open but not explored. About 1.8m high and 1.4m wide. Cut into slaty shale so probably intended as a trial working, as it seems too high in elevation compared to the rest of the mine to have been a drainage level. Not depicted on the first or second edition OS mapping so perhaps relatively late in date.

36 Ty-newydd mine level II SJ0524925447
Mine level comprising an approach cutting on the north-west, about 30m long and up to 6m deep, leading to an open rock-cut level which is partly flooded. Not explored. Cut into slaty shale so probably intended as a trial working, as it seems too high in elevation compared to the rest of the mine to have been a drainage level. At the north-west end of the cutting a terrace leads off to the south-west, probably the remains of a tip. Not depicted on the first or second edition OS mapping so perhaps relatively late in date.

Appendix 2**The value of Cultural Heritage Assets**

The assessment of the effect of a development on each cultural heritage asset is a function of the value or sensitivity of the asset correlated with the magnitude of change likely to be experienced.

The value of a cultural heritage asset is a reflection of its perceived nature and appearance, its topography and the distribution and nature of other similar or associated assets in the locality. The table below summarises the relative value of cultural heritage assets and is based on DMRB (Volume 11 Section 3 Part 2, HA 208/07).

Table: the value of cultural heritage assets

Value	Asset type
Very High	World Heritage Sites (including those nominated). Assets of acknowledged international importance. Assets that can contribute significantly to acknowledged international research objectives.
High	Scheduled Monuments (including those proposed). Undesignated monuments of which could potentially be worthy of scheduling. Grade I and Grade II* Listed Buildings. Assets that can contribute significantly to acknowledged national research objectives.
Medium	Grade II Listed Buildings. Conservation Areas. Designated or undesignated assets that contribute to regional research objectives.
Low	Designated and undesignated assets of local importance. Assets compromised by poor preservation and/or poor survival of contextual associations. Assets of limited value, but with the potential to contribute to local research objectives.
Negligible	Assets with very little or no surviving cultural heritage interest.
Unknown	The importance of the resource has not been ascertained.

Appendix 3

Mitigation options

The following standard archaeological terms are used as recommended mitigation measures, though not all of them will necessarily be relevant to the current proposal:

Preservation in situ: where a site is considered to be of sufficient significance it may be considered appropriate to preserve the site in its present form, condition and location. This may be achieved during primary design and by layout finalisation, after detailed site survey. Where complete avoidance can be achieved, any impact can be totally avoided.

Preservation by record: where proposals will inevitably lead to the loss of a site sufficient recording should be undertaken to provide a full, accurate and permanent record of its nature, form, significance and dating.

Preservation by record can take a number of forms, depending on the nature of the site in question, and may be achieved with or without excavation and could include any or all of the following: a written record; drawn record; photographic record; artefactual record; survey; and environmental sampling. Unless guidance is requested jointly from the client and archaeological curator, the level of detail required for preservation by record in any specific instance is a decision for the local authority's archaeological advisor to make rather than the writers of this report.

Excavation: where a feature of local or minor significance is to be wholly removed as part of the development, its complete excavation may be required in advance of any construction works.

Evaluation: where insufficient information exists regarding a site for a decision to be made regarding its future management a programme of investigative work may be proposed. Such investigation may include geophysical survey, topographical survey and trial excavation.

Watching brief: a watching brief may be recommended to include archaeological monitoring of relevant groundworks, including topsoiling, in order to identify and record any previously unknown archaeological remains which may be revealed. Sufficient time must be allowed for adequate recording of any remains that are encountered, and in the case of assets considered to be of medium, high or very high value, their continuing preservation may need to be considered by the archaeological curator in conjunction with the developer.

Demarcation: features that are close to planned works or that could be affected by unplanned works should be fenced in advance of the work and monitored (during the watching brief) during the construction phase. Close here is defined as within 50m of the perimeter or boundary of the asset.

Protection: the use of a membrane may be appropriate to protect certain assets from damage during the construction or operational phases.