
PORTH Y NANT QUARRY, NANT GWRTHEYRN, LLITHFAEN, GWYNEDD

GAT Project no. G1967

Report No. 703



Prepared for Headland Design

November 2007

By Robert Evans and Andrew Davidson



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Cover: View of Quarry Village, Nant Gwrtheyrn, from the South

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THE FORMER QUARRY OF PORTNANT, NANT GWRTHEYRN, LLITHFAEN, GWYNEDD (G1967).

ARCHAEOLOGICAL ASSESSMENT

SUMMARY

An archaeological assessment was carried out on 70ha. of land to the south of the Nant Gwrtheyrn Welsh Language and Heritage Centre that included the disused Porth-y-nant quarries, with a mixture of coniferous forest, upland grazing to the south and east, and 200 m² of low lying coastal land to the west. No prehistoric sites were identified within the study area, although a settlement of round houses and field walls exists at Mount Pleasant just outside the study area to the south (this is a scheduled ancient monument, and therefore of national importance). Significant remains from the medieval period lie within the forest plantation, and survive remarkably well preserved. These are thought to represent the medieval township of Nant, which was deserted sometime after the 14th century. Two newly identified medieval or post-medieval homesteads were located within the forest, and one on the lowland coastal strip, which may be contemporary with the more nucleated settlement remains. All potential medieval remains are considered to be of regional importance. In post-medieval times a number of farmsteads were established in the valley, and the remains of two of these lie within the study area. These are considered to be of local importance. The principal activity in the 19th century was the granite quarrying for setts, and the construction of the quarrying village at Porth y Nant. The village remains are considered to be a particularly good example of an industrial settlement, and their importance is raised by its subsequent use as a Welsh language centre. The principal buildings of the settlement are listed grade II, and are here identified as being of national importance. The quarry was investigated and the structures, built on six quarrying levels and a landing stage, were found to have been built in three main phases relating to the changing commercial exploitation of the quarry between the 1860s and the start of the Second World War. In general, the earlier structures associated with sett production are considered to be of regional importance, and the later structures of local importance. Recommendations are made for recording the structures in advance of any impact from development or conservation programmes.

1 INTRODUCTION

Gwynedd Archaeological Trust was asked by Headland Design Associates to carry out an archaeological assessment which would contribute towards a conservation plan of the land owned by the Canolfan Iaith a Threftadaeth Cymru (Welsh Language and Heritage Centre), Nant Gwrtheyrn. The study area incorporates the original land holding of the centre and a more recent acquisition to the south.

The site incorporates and lies south of a steep sided valley, centred on NGR SH 351446. The south-east side of the valley is now largely forested, and west of this lie abandoned quarry workings on steep cliffs, with smaller areas of marginal upland and a small lower lying coastal area, occupying some 70 hectares (Fig. 1). Prehistoric and medieval sites are known both within and adjacent to the study area.

2 PROJECT DESIGN

Gwynedd Archaeological Trust's proposals for an archaeological assessment at Nant Gwrtheyrn, accepted by Headland Design, required the fulfilling of the following requirements:

- Desktop study
- Field Walkover
- Initial Report

The desktop study and field walkover comprised the whole of the study area, and this report is the result of these investigations, along with recommendations for any further field evaluation.

The project conforms to the guidelines specified in *Standard and Guidance for Archaeological Desk-based Assessment* (Institute of Field Archaeologists, 1994, rev. 2001).

3 METHODS AND TECHNIQUES

3.1 Desk top study

This comprised the consultation of maps, documents, computer records, written records and reference works, which form part of the Historic Environment Record (HER), located at GAT, Bangor. The archives held by the Gwynedd Archives, Caernarfon and of the University of Wales, Bangor, were also consulted. Information about buildings was obtained from Cadw records held in the Gwynedd HER and by consultation of CARN, which is the online index of the Royal Commission on Ancient and Historic Monuments, Wales, who also provided information on aerial photographs (Fig. 3).

Sites, buildings and find spots listed in the GAT HER were identified (Fig. 1) within the study area, and just outside it to give background information relevant to the understanding of the landscape.

3.2 Field Search

The field search was undertaken on the 17th, 21st October and 4th November 2007 by the author and Adele Thackray. The weather was fine and clear for observation on all the days. The area was walked over and notes and photographs were taken. However level

five of the quarry workings was inaccessible due to rock falls and was not closely examined for health and safety reasons.

3.3 Report

The available information was synthesised to give a summary of the archaeological and historic background and of the assessment and recommendations, as set out below. The separate features, their evaluation and recommendations are listed separately, and a summary of the overall assessment is given at the end.

The criteria used for assessing the value of any features found are based upon those used by the Secretary of State for Wales when considering sites for protection as Scheduled Ancient Monuments, as set out in the Welsh Office circular 60/96. The definitions of categories used for impact, field evaluation and mitigation are set out in Appendix 2.

The archive is stored with GAT as Project No. G1967

4 ARCHAEOLOGICAL RESULTS

4.1 Topographic description

Nant Gwrtheyrn is a steep sided valley located to the north west of Llithfaen, Gwynedd. A stream cuts through a steep channel from Graig Ddu falling 275m to its outfall to the north of Porth y Nant. The upland grazing slopes fall away with steep cliffs of a prominent igneous intrusion over Ordovician rocks on which the Port Nant quarries are located close to the sea (Bassett and Davies 1977, 18-20). Soils consist of a shallow humic horizon on weathered rock, with thicker organic horizons in areas where drainage is impeded. Much of the valley was planted with conifers in the 1970's, although it can be seen in its earlier form on a 1946 aerial photograph (Fig. 3), and the access road now winds its way through the forest down the valley side.

4.2 Archaeological and historical background

4.2.1 Introduction

The upland archaeology in the region is extensive, well preserved and largely unrecorded (Browne and Hughes 2003, 7). Indeed there are many prehistoric and later sites in the region around Nant Gwrtheyrn, similar to those examined nearby at Moel Bronmiod by GAT in the 'Uplands Initiative' under the auspices of Cadw (Geary 2003, 75-80).

Nant Gwrtheyrn itself plays a very important role in the legends and folklore of post Roman Wales. The name *gwrtheyrn* is thought to derive from *gor* meaning 'super' and *teyrn* meaning 'king', suggesting associations with local elites who gained power after the collapse of Roman authority. Since the 8th century writings of Nennius it has been associated with the final place of refuge of the Kentish prince Vortigern (Gwrtheyrn)

with whom legend associates the fatal error of inviting assistance from Saxon mercenaries and thus 'being hated by all the people of Britain', forcing his subsequent flight to the Nant, and his building of a fortress there (Morris 1980, 31). This story has a theme recurrent in Welsh literature, in which the tragic hero is forced to roam the mountains after disaster strikes.

It has been suggested that the name Gwynus, now given to a farmhouse close to Llithfaen and 3 km south of Nant Gwrtheyrn, but once the name of a medieval township in the commote of Dinllaen, represents the name of an early medieval ruler in the area. This hints at the former importance of the region (Richards 1963, 22-24).

Nant Gwrtheyrn is referred to in the 13th century as forming part of a grant from Llywelyn to Heilyn ap Tudur before 1282, and the 16th century it is referred to as 'Vortigers' Valley' by Leyland (*ibid.*, 25).

Later folk tales such as the marriage of Rhys and Meinir are also set in the valley. Thomas Pennant, touring North Wales in the 1770s reports that a stone cist grave *bedd Gwrtheyrn* had been opened by the people of the valley and that the bones of a tall man were discovered, possibly that of the royal fugitive (Pennant 1783, 213-214).

Whilst these stories may contain elements of a traditional folk memory of actual events, another significance of these tales from an archaeological point of view is that they give Nant Gwrtheyrn a sense of place and significance in the landscape which may have affected the way later people interacted with the area.

It is certainly the case that important prehistoric and early medieval sites are situated not far from Nant Gwrtheyrn and relatively easy access from the sea means that it would not have seemed as remote as it does today. In archaeological terms, the presence of a possible early medieval chapel and medieval township hint at the significance of the area in the post Roman period.

4.2.2 Prehistoric and Roman

A Bronze Age spearhead (PRN 2,248) has been found on the steep scarp at NGR SH 35114495. There is no further information on when this happened. No other prehistoric or Roman finds or sites have been identified within the boundary of the study area, however the wider landscape has preserved good examples of prehistoric settlement and funerary sites, including the hillfort at Tre'r Ceiri (PRN 613) on the summit of the easternmost peak of Yr Eifl, and Bronze Age cairns on the summits of Yr Eifl (PRN 610, 623). An excavation has been carried out to the south west of the study area at Carreg y Llam (Hogg 1957, 46-55) in advance of quarrying, where a fortified oval enclosure 30m long by 15m wide with single round hut built into the inner face of the rampart was found. Immediately adjacent to the study area, and partially surrounded by it, lies a level rocky outcrop with remains of an extensive prehistoric settlement (PRN 620) at SH 35114426. It consists of a 'D' shaped enclosure c.48m east-west by 40m, containing and connecting up to eight circular ruined stone structures 4-6m in diameter. Additional

structures within the enclosure include sheepfolds and shepherd's shelters. The site is a Scheduled Ancient Monument (ref. CN 249). It is likely that further prehistoric sites remain to be discovered in the area.

4.2.3 Medieval and Later

A number of medieval sites have been identified within or just outside the study area including a possible ruined chapel (PRN 2,231) at SH 35114495. Traces of a rectangular structure 20m by 10m aligned east-west have been interpreted as a possible early medieval chapel. The tithe map of 1841 for the parish of Pistyll (Gwynedd Archives) gives the name *fonwent* (graveyard) to the field in which it is located, further suggesting that this is an ecclesiastical site (RCAHMW 1964, 92). Extensive remains of a settlement of rectangular buildings and enclosures, almost certainly of medieval date, lie within the forested area west of the access road (PRN 621 NGR SH 35194448, PRN622 SH 35264434 [*ibid.* 1964, 94-95- including plans]). This settlement is thought to represent the medieval township of Nant (PRN 6,525). The long huts, which are probably both medieval and post-medieval in date, may have housed people and beasts under the same roof, although many of the small ones may have served as *hafodydd* occupied only during the summer months (Silvester 2003, 129).

4.2.4 Post medieval and modern

In 1776 Thomas Pennant wrote that there were three families living in Nant Gwrtheyrn at Ty Hen, Ty Canol and Ty Uchaf, and that 'they find it very difficult to get their small amount of produce to the market' (Pennant 1783, 213). The study area of Nant Gwrtheyrn came into the possession of the Vaynol estate during the early 19th century. In 1841 the area that later became part of the Port Nant quarry lay within Ty Ucha Nant farm, occupied by Robert Williams. Attempts were made to develop a quarry here from 1851, initially by Hugh Owen, and later by a Mr Dodd. Around 1861 Kneeshaw and Lupton and Co., a Liverpool firm took over and developed a quarries in the Nant. The industry was based around the production of granite setts for road surfaces in the burgeoning industrial towns and cities, in particular Manchester and Liverpool. Between 1861 and 1871 the number of people employed in the sett-making industry in Caernarfonshire rose from under 500 to over 2000 (Dodd 1971, 228). The granite was fashioned into 'setts', stone cubes or rectangular blocks, by specialist hand workers who worked in small open 3-sided shelters. Between 1875 and 1878 the 24 houses which now form part of the Canolfan Iaith Nant Gwrtheyrn were built to house the expanding quarrying community for the three adjacent quarries of Cae'r Nant, Porth y Nant and Carreg y Llam. In December 1879 the Vaynol estate issued a lease for quarrying sets from Port Nant to the Cambrian Granite Co. (Gwynedd Archives, Vaynol 569).

The demand for setts diminished in the early 20th century, and most granite quarries switched to the production of crushed stone for roads and railway ballast. Around 1900 a crushing mill was added at Porth Nant quarry, and is included in an inventory of 1910 (XM/623/287) which details all the structures and machinery present on the quarry at that time. This inventory indicates that the upper three working levels, or 'boncs' had been

abandoned by then. The demand for setts continued to decline, and competition from other quarries, particularly those with good rail access, meant many smaller quarries closed in the first half of the 20th century. The Porth Nant quarry had closed by 1939, and the houses in the village had been abandoned by 1959 (Mai 1990, 20-21; Penmaenmawr and Welsh Granite Co. n.d.). In 1978 the quarry houses were purchased by a trust fund from the Amie Road Stone Company for a new national language centre, the Canolfan Iaith Nant Gwrtheyrn, with courses beginning in 1982.

4.3 The Archaeological Survey

The categories of importance (A to E) are defined in Appendix 2

1. Medieval settlement (PRN 621) *Category B*

An extensive settlement of rectangular houses and enclosures, located on a broad shelf above a steep drop down to the bottom of the valley. There are over ten buildings and related enclosures, which were mapped by the RCAHMW prior to forestation (RCAHMW 1964, fig 107; reproduced in this report on fig 1). The trees now make identification of all the structures difficult, however there does seem to be good preservation of the structures within the trees, though the ploughing and subsequent planting will have had an impact upon the archaeological layers below ground. The probable identification of these remains as the medieval township of Nant provides an unusual example in north Wales of a deserted medieval settlement. The site can be seen prior to forestation on the 1946 aerial photograph (Fig. 3).

2. Medieval settlement (PRN 622) *Category B*

This is the remains of a rectangular structure and adjoining enclosure, also lying within the forest, and again best interpreted as a medieval long house. It lies a short distance south of the more nucleated settlement described above.

Porth y Nant – village and structures

The village provides a very good example of a purpose-built settlement to house industrial workers. Whilst other examples, for example Trefor, are still occupied, Porth y Nant provides a small complete example which retains all the essential elements, including the manager's house, the workers housing, the former shop and office and the chapel. The subsequent use of the buildings as a Welsh Language Centre raises the cultural value of the settlement, and it is therefore considered that the principal buildings are of national importance.

3. Terraced Cottages at Porth y Nant *Category A* Listed Building Grade II (Record No's 21722, 21723)

Two terraces built c. 1875 for quarry workers. The terraces included the company offices, a shop and a bakehouse. The houses remained unoccupied between 1959 and renovation after 1978 for use with the Canolfan. The terraces form two sides of a square, the north terrace, Trem y Mynydd (originally called Mountain View) contains eleven

houses built of rubble stonework with slate roofs. The east terrace, Trem y Mor (Sea View), contains twelve houses, with the former shop and bakery at the south end.

4. Plas, Porth y Nant *Category A*

Listed Building Grade II (Record No. 21725)

A house built for the quarry manager c. 1878-80. It is rendered, with a hipped slate roof and central stack, and is of two storeys with a main south facing front of two bays. It is now used for teaching and library purposes by the centre.

5. Capel Seilo (NPRN 7,094) *Category A*

Listed Building Grade II (Record No. 21724)

The chapel was built as part of the quarry village established here 1875-8. It was modernised in 1978. It is of rendered stone with slate roof, with the principal entrance in the west facing gable. There is a slate slab within the west pediment inscribed 'SEILO A.D. 1878'.

Sites Identified as part of the Field Survey

Much of the land within the study area consists of steep slopes, and some is covered in bracken, whilst other extensive areas are forested. However a number of sites were noted during the walk over survey that are worthy of attention in two distinct areas, the valley bottom itself where Ty Canol farm is located, and on the plateau land at a height of about 250m OD to the east.

6. Ty Canol Farmhouse and outbuildings (NGR SH 35184488) *Category C*

Substantial remains of this farmhouse and farmyard survive. The farm is almost certainly one of the three mentioned by Pennant (1783), although most of the structure of the ruined farmhouse appears to be of mid 19th century date as it is built of quarried stones that clearly show evidence of blasting from the rock face, probably from Porth y Nant quarry itself (Fig. 7). The building consists of a single living room with single bedroom above, and a two storey bay to the east. The farm buildings lie to the north of the house, in a single range, with evidence for a corn barn (at the north end) and probable cattle byres and stables. There was an upper floor in some of the buildings which would have been used for grain and feed storage, and possibly accommodation for workers (Fig. 8). The range is built of random rubble and almost certainly predates the quarry and farmhouse. Fragmentary remains survive of other structures within the farmyard, including a possible garden area, and a trackway.

7. Retaining Walls at NGR SH 35144490 *Category D*

The stream at Nant Gwrtheyrn forms a steep cutting as it passes to the north of Ty Canol, and there are stone-built retaining walls around the edge, presumably designed to prevent land slippage (Fig. 9).

8. Sheepfolds at NGR SH 35224437 *Category C*

Two enclosures, marked as sheepfolds on the 1900 OS map, are located at the upper end of the valley adjacent to the present car park, and within the woodland plantation. Low walls survive within the plantation (fig 6).

9. Long Hut at NGR SH 35204340 *Category B*

Remains of a rectangular long house situated within the forestry.

10. Long Hut at NGR SH 35184433 *Category B*

Remains of a rectangular long house situated within the forestry.

11. Quarry at NGR SH 35314475 *Category D*

A small area of quarrying was observed at NGR SH 35314475 next to the road down Nant Gwrtheyrn. This probably predates the main workings at Porth y Nant, but there are no surviving accounts of these workings.

12. Trackway and Possible Settlement at NGR SH 34714469 *Category E*

On the lowland coastal strip there is an area not affected by the quarrying. A trackway leading to a complex of walled enclosures and at least one building was observed, centred on NGR SH 34724474. The area was heavily overgrown with bracken, so detailed observation was impossible, however it is possible the remnants of a medieval or post medieval long hut and associated structures are present in this area, and this would merit further investigation (Fig. 1). These may be part of the pre-quarry farm of Ty Hen.

Port Nant Quarry

Port Nant quarry consists of six working levels, known as ‘boncs’ and connecting inclines of at least three different phases. These led down to a pier on the seashore from which the stone was collected and taken to ports such as Liverpool to be distributed throughout the northern industrial towns of England and beyond. On some of these levels ancillary structures are noted, and a crusher and workshop area is located above the pier. These levels are described in detail in the 1910 inventory as they were in working condition (XM/623/287). Extensive areas of the hillside have been used for tipping.

Loading Pier, Landing Stage and Yard

Upon the landing stage a number of ancillary structures survive.

13. Pier *Category C*

Only fragmentary remains survive of the timber pier, which was constructed of pitch pine. It was 135m long, with an average width at the top of 3.65 (XM/623/287) and at the base surviving post stumps of the pier supports indicate that it was 4.26 wide. The random rubble built pier support on the shore survives to a considerable extent.

14. Drum House *Category C*

The drum house has traces of surviving strong timber framing.

15. Office *Category C*

An office building was attached to the workshops to the north. It is of rubble built construction

16. Mill Category C

A large crushing mill with bins survives, the walls almost to full height, and it appears that it was roofed with corrugated iron (Fig. 12).

17. Incline Category C¹

There are also surviving remnants of random rubble walling of the incline retaining wall, and a winding house with remains of the lever and brake surviving on the winding drum (Fig. 10).

18. Workshops Category C

A large block of buildings that appear to have been workshops, including a smithy was built of random rubble in lime mortar. Fragments of machinery survive in this area, including a lathe by *Reiley* of Keighley (Fig.14). There is a yard area that may possibly have been a coal store.

Level 1

From the yard an incline rises to the first bank, known as *bonc ucha*. Fragments of the tramway rails survive, but most of the evidence is in the form of retaining walls. On the first level a winding house survives with winding drum with a level and brake. Adjacent to this is a drystone wall built shelter. There is evidence of the inclines being at least partially replaced by chutes, now blocked with rubble (Fig. 11).

On the main working level, a semi circular bowl cut into the hillside, there is a spread of abandoned quarry material such as trucks from the incline (Fig. 13).

A second working face, known as *bonc issa* appears to have been the older workings, with associated incline and winding houses. Fragmentary remains of the winding house, including the eastern wall have survived. These formed part of an incline that ran north north east to south south west down the hill slope, crossing level 1 on the level before running down towards the pier along the later route. Remnants of huts can also be observed, these were probably for sett makers. They had been abandoned by 1910, when the quarry had gone over from setts to crushed stone and ballast production.

On this level fragmentary evidence of a former tramway linking the quarry with the village was observed running northeast-southwest. Towards the northern end of this tramway two buildings were located.

19. Older Incline with Retaining Walls and Winding Houses Category B²

¹ The inclines observed in the survey have been treated as single structures although clearly they can be observed on a number of working levels.

The winding houses consist of two rubble built granite walls 3.4m apart, with a winding mechanism of three iron wheels, of which one is a larger drive wheel.

20. Sett makers Huts *Category B*

The southern one consisted of a building 25.7m long and 6.4m wide divided into six rooms that survived to foundation level. These are probably the remnants of sett makers Huts.

21. Chutes *Category C*

In the latest phase of quarry workings chutes seem to have replaced inclines as the main method of ballast removal (Fig. 13). The chutes are constructed of mortared granite blocks.

22. Ty Hen Farmhouse *Category C*

Ty Hen is one of the three farmhouses within the valley referred to by Pennant (1783). Ty Hen appears to have been used as a quarry office during its period of operation. The building seems to be of similar construction to Ty Canol farmhouse (No. 6) as a two storey gable ended building of rubble construction. The use of quarried stone suggests rebuilding in the 19th century.

23. Ruined Building *Category C*

Level 2

On the second bank a winding house with associated well preserved shelter survives. The fragmentary remains of another shelter of uncertain use were observed. On this level the winding house consists of two granite walls 4.7m by 0.68m and 3.4m apart, between which is the mechanism (Fig. 10). The large wheel, 2.1m in diameter supported the drive mechanism. The other wheels 1.7m in diameter supported the trucks as they were raised and lowered on the incline. The incline here rises at an angle of 45 degrees to the later incline, running northeast – southwest.

24. Shelter Shed *Category C*

A shelter shed for the quarrymen to shelter in during blasting associated with the *bonc issa* workings was observed at this level (Fig. 11)

Level 3

30. Incline and winding houses Banks 3 – 5 *Category C*

The remains on bank 3 were similar to those observed on bank 2, with a winding house and shelters, and a retaining wall for the incline. These survive in good condition. The incline continues up to bank 5, with winding houses on levels 4 and 5.

² The older incline with its associated winding houses and shelter sheds should be treated as a single structure

A detached portion of workings at this level, associated with the *bonc issa* workings was observed. This was attached to the main workings by a tunnel (site 27) 126 ft long, 7ft. wide and 6 ft 6in high under a tip. This was not entered for safety reasons, and appears to have been disused by 1910 (XM/623/287).

Levels 4 to 5

Three further levels of works were observed, although these are in a fragmentary condition and had been abandoned by 1910 (XM/623/287). Bank 5 was not examined in detail owing to the difficulty of accessing it safely.

25. Smithy Category B

Evidence for a winding house and smithy (Fig.17) was observed, including sett makers huts. The uppermost level of the quarry working appears only to have surviving structures associated with the earlier sett making phase of working *bonc issa*.

26. Winding House and Turntable Category B

There is a well preserved winding house and turntable, although difficult of access, at this level. The winding house is similar in type to those seen throughout the earlier workings.

27. Tunnel Category E

A tunnel associated with the *bonc issa* workings is believed to exist at this level but was not observed.

Level 6

Two powder magazines have been identified at this level, at opposite ends of the quarry workings.

28. Powder Magazine Category B

At the north-east end there is a substantial barrel vaulted structure with a 'king-post' style roof structure (Fig. 18).

29. Powder Magazine Category E

Ordnance Survey map evidence indicated the presence of a magazine to the south of the smithy (No. 25), although this was not observed during the survey.

5 SUMMARY AND RECOMMENDATIONS

There is considerable evidence for prehistoric to post medieval settlement around Porth y Nant. The most significant of the prehistoric sites lies immediately adjacent to the study area, and partially surrounded by it. This is the settlement of round houses and field boundaries (PRN 620; scheduled ancient monument Cn 249) that lies on a level plateau above the south-east edge of the quarry. Though this settlement lies outside the immediate study area, any proposed changes in land management would need to consider

the impact upon the ‘setting’ of the scheduled ancient monument. The medieval and early-modern periods are represented by a well-preserved sequence of long houses and adjacent paddocks (Sites 1, 2, 8, 9) that now lie within the forest, but are still clearly recognisable. These are of particular importance as they can almost certainly be identified as part of the township of Nant, mentioned as a hamlet to Trefgoed in the 1352 Extent. The settlement has a degree of nucleation that is relatively rare within north Wales in the medieval period. The chapel site (PRN 2231) located on the east side of the valley may be contemporary with this settlement. All sites thought to date from the medieval period are of regional importance (Category B). Whilst each of the sites is presently treated as individual units, their number and spread would indicate a well preserved medieval landscape, and a more intensive study might allow the identified components to be better contextualised at both local and regional level.

By the 18th century at least, and probably long before, the nucleated settlement had been replaced by the dispersed farmsteads of Ty Canol, Ty Uchaf and Ty Hen, of which the first and last lie within the study area, whilst Ty Uchaf lies on the east side of the valley. Both farmhouses appear to have been rebuilt in the mid-19th century, and Ty Hen may have been used as a quarry office, however there is good potential for the survival of earlier remains in the vicinity of both.

The 19th century history of the valley was dominated by the quarrying concerns. At Porth Nant quarry there were three main phases of construction. The initial phase dates from the 1850s when the quarry was producing setts. To this phase can be attributed the earlier incline, shelter sheds and sett makers huts, along with the magazine on the upper quarry level. The second phase of quarry working involved the construction of the east-west incline and its associated structures, and many of the workshops, storage sheds and other buildings on the landing stage, although some may have been present in the earlier phase. The later incline appears to have been at least partially converted to a chute system, to which the concrete structures and concrete facing to earlier buildings should be attributed. The latter phases represent the predominance of ballast production at the quarry.

There has been no systematic survey of stone quarry sites in north Wales (such as those that have been undertaken for slate quarries and metal mines) so it is difficult to define the importance of the remains at Porth Nant (Gwyn 2006, 77). However, the authors of this report have taken the view that structures associated with crushed stone production survive at a number of sites around the Llŷn peninsula, whilst those associated with sett production are less common. Consequently most of the quarry buildings are considered of local importance (Category C), however those structures associated with the earlier quarry workings during the sett production phase, being in many cases reasonably well preserved, are considered to be of regional significance (Category B).

In the event of development or conservation works being planned, recommended mitigatory measures for the quarry structures are noted below. The categories of mitigation are those referred to in Appendix 2. Relevant works that could impact upon the archaeological resource include conservation or demolition of buildings; natural

decay; forest management or tree felling and removal. This latter applies particularly to the medieval remains, and any significant management or felling work should be carefully undertaken to avoid further damage to the archaeology. The recommendation for detailed recording may include the need for archaeological excavation. The recommendations given below would only be necessary if there is to be any impact upon the archaeological resource.

Site	Category	Mitigation
1. Medieval settlement	B	Detailed Recording
2. Long Hut	B	Detailed Recording
3. Terraced houses	A	Detailed Recording
4. Plas, Porth y Nant	A	Detailed Recording
5. Nant Chapel	A	Detailed Recording
6. Ty Canol Farmhouse	C	Basic Recording
7. Retaining Walls	D	Basic Recording
8. Sheepfolds	C	Basic Recording
9. Long Hut	B	Detailed Recording
10. Long Hut	B	Detailed Recording
11. Quarry	D	Basic recording
12. Trackway and Settlement	E	Detailed Recording
13. Pier	D	Basic Recording
14. Drum House	C	Basic Recording
15. Office	C	Basic Recording
16. Mill	C	Basic Recording
17. Incline	C	Basic Recording
18. Workshops	C	Basic Recording
19. Older Incline	B	Detailed Recording
20. Sett Makers Huts	B	Detailed Recording
21. Chutes	C	Basic Recording
22. House on Trackway	C	Basic Recording
23. Ruined Building	D	Basic Recording
24. Shelter Shed	C	Basic Recording
25. Sett Makers Huts	B	Detailed Recording
26. Winding House and Turntable	B	Detailed Recording
27. Tunnel	C	Basic Recording
28. Powder magazine	C	Basic Recording
29. Powder magazine	B	Detailed Recording

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RAF Aerial Photograph 106G/UK 1469 F/20 540 SQDN. Taken on 4th May 1946

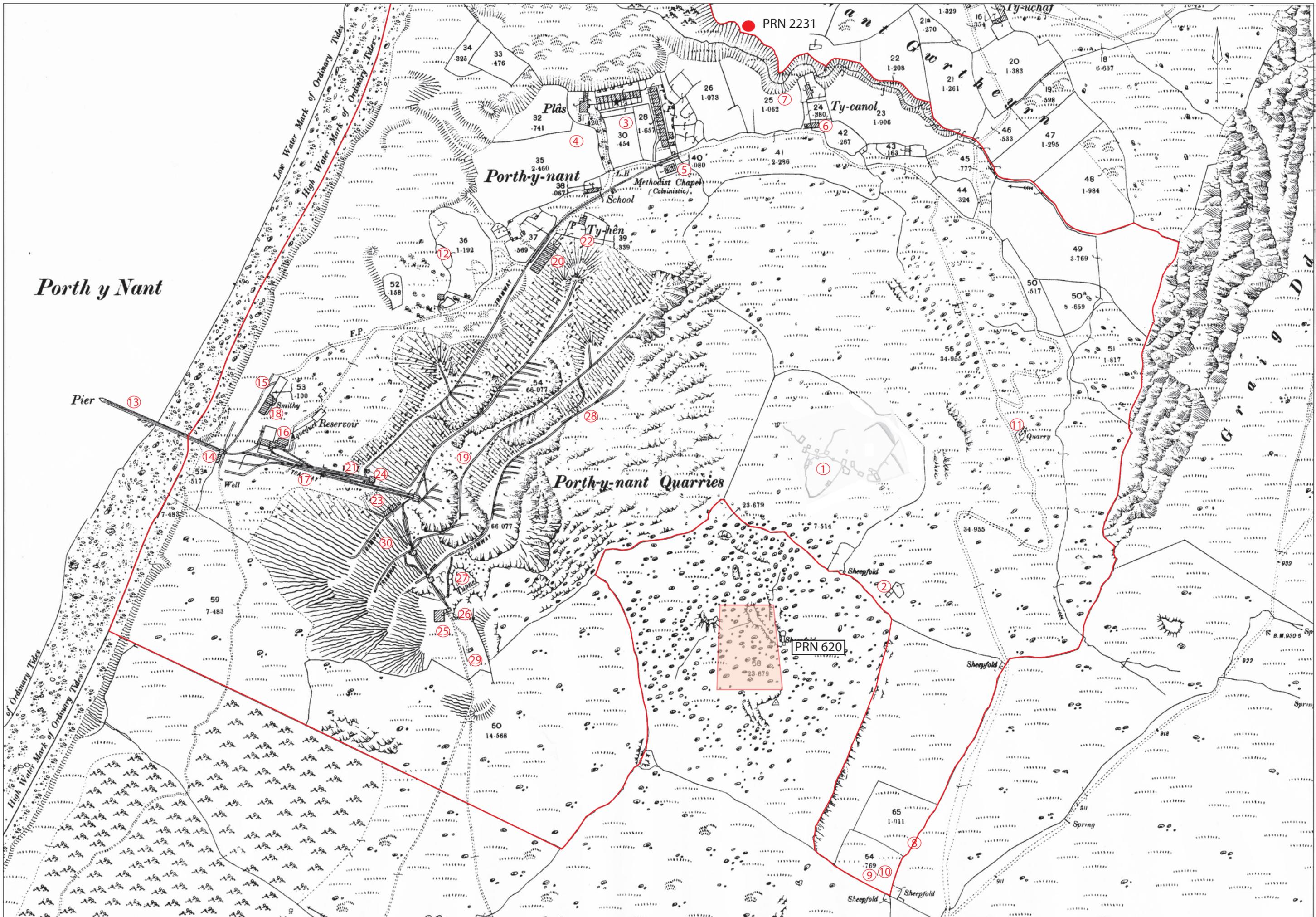


Figure 1: Location of study area and features. Scale 1:4000. Background map OS County Series Caernarfon Sheet 25.15 dated 1900.

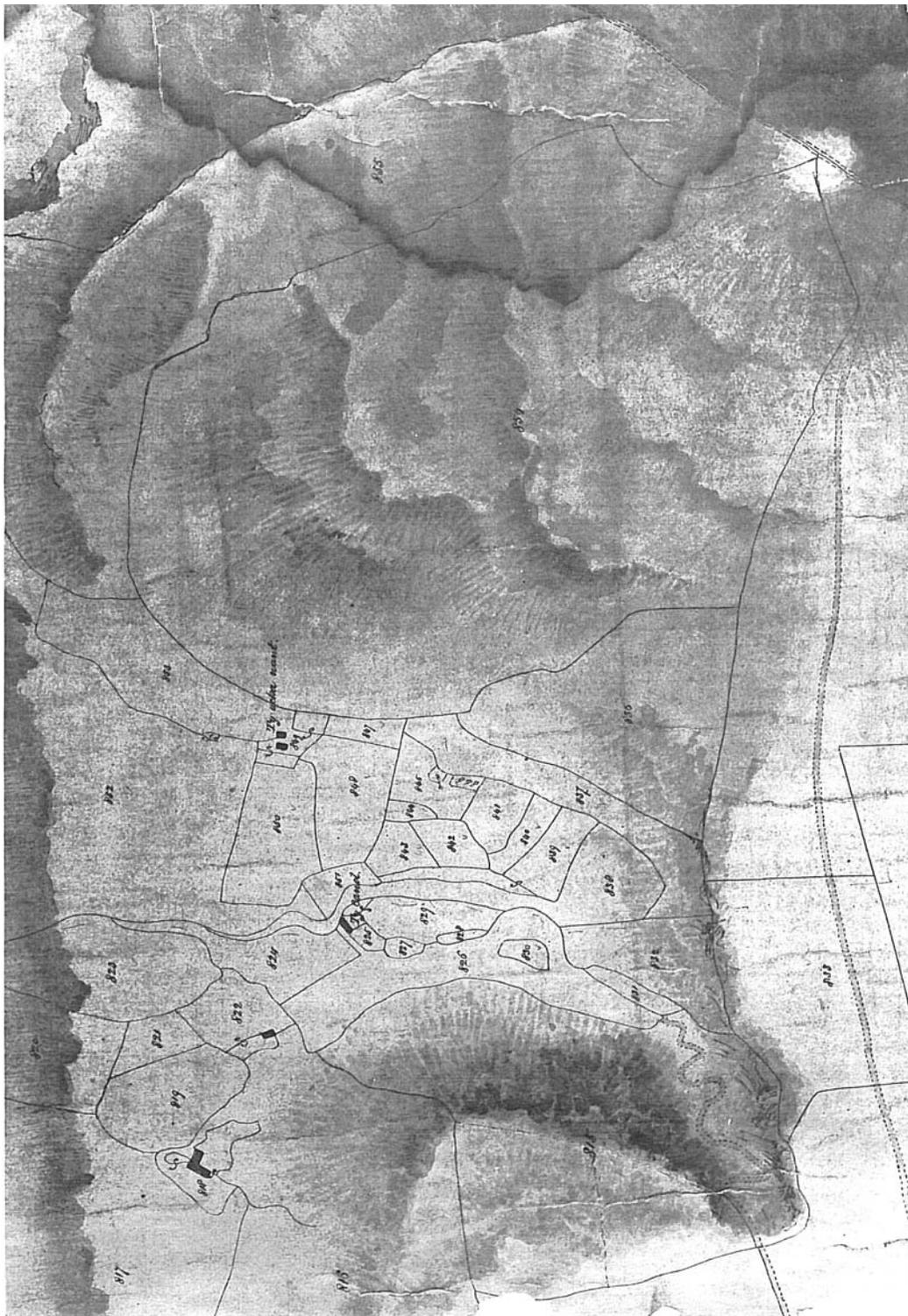


Fig. 2 Tithe Map of the parish of Pistyll dated 1841 showing the pre-Quarry Landscape of Nant Gwrtheyrn



Fig. 3 RAF Vertical Photograph of Nant Gwrtheyrn and Porth y Nant Quarry taken on 4th May 1946. It Shows the Area Prior to Forestation (RAF 106G/UK 1469 F/20 540 SQDN).



Fig. 4 Site 12: Possible Remains of Long House at SH 34714469, facing East



Fig. 5 Long Hut (PRN 622), facing north



Fig. 6 Site 8: Sheepfolds at SH35224437



Fig. 7 Site 6: *Ty Canol* Farmhouse from the west (Scale 2m with 50cm divisions)



Fig. 8 Site 6: Farm buildings to the north of *Ty Canol* and trackway leading north from farmhouse



Fig. 9 Site 7: Retaining Walls to north of *Ty Canol* (Scale 2m with 50cm divisions)



Fig. 10 Site 24: winding House on Level 2, facing North East



Fig. 11 Site 21: shelter on Level 2, facing west



Fig. 12 Site 17: Remains of Winding House and Retaining Wall on Level 1



Fig. 13 Site 21: Chute on Level 1,



Fig. 14 Site 16: Storage Bins on Landing Stage, facing West



Fig. 15 Abandoned Incline Trucks on *Bonc Issa* Main Working Level, facing South



Fig. 16 Site 18: Lathe in workshop by *Reiley of Keighley*, facing North



Fig. 17 Site 25: The Sett Makers Huts on Level 5 from South-East



Fig. 18 Site 28: The Powder Magazine on Level 6 viewed from the south-east.

APPENDIX 1

List of sites adjacent to the study area recorded in the Gwynedd Historic Environment Record and CARN (RCAHMW database, indicated by N in front of PRN number), with their record numbers.

1. Archaeology

PRN 620 Scheduled Ancient Monument Cn 249 (NGR SH 35114426) Mount Pleasant Settlement, a 'D' shaped enclosure c.48m east-west by 40m, containing and connecting four circular, ruined stone wall defined structures 10-18m in diameter.

PRN 2,231 (NGR SH 35114495) Ruined Chapel, fynwent field

2. Buildings

NPRN 16,733 Plas, Porth y Nant (SH 34944488) Quarry manager's house

NPRN 7,094 Nant chapel (SH 35014482) Chapel first built in 1782, modified 1819 and rebuilt 1876-8.

APPENDIX 2

Definitions of terms for assessment and recommendation

1 Categories of importance

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

Category A - Sites of National Importance.

This category includes Scheduled Ancient Monuments and Listed Buildings of grade II* and above, as well as those sites 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 Importance

This category includes grade II Listed Buildings and sites which would not fulfil the criteria for scheduling, 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

These sites are not of sufficient importance to justify a recommendation for preservation if threatened, but nevertheless merit adequate recording in advance of damage or destruction.

Category D - Minor and Damaged Sites

These are sites, which are of minor importance, or are so badly damaged that too little remains to justify their inclusion in a higher category. For these sites rapid recording either in advance 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. By the end of the assessment there should be no sites remaining in this category.

2 Definition of Impact

The direct impact of the proposed development on each site was estimated. The impact is defined as *none, slight, unlikely, likely, significant, considerable or unknown* as follows:

None:

There is no construction impact on this particular site.

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 feature, *e.g.* part of a trackway or field bank.

Unlikely:

This category indicates sites that fall on the margins of the study area, but are unlikely to be directly affected.

Likely:

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

Significant:

The partial removal of a site affecting its overall integrity. Sites falling into this category may be linear features such as roads or field boundaries where the removal of part of the feature could make overall interpretation problematic.

Considerable:

The total removal of a feature or its partial removal which would effectively destroy the remainder of the site.

Unknown:

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

3 Definition of field evaluation techniques

Field evaluation is necessary to allow the reclassification of the category E sites, and to allow the evaluation are 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.

Geophysical survey

This technique involves the use of a magnetometer, which detects variation in the earth's magnetic field caused by the presence of iron in the soil. This is usually in the form of weakly magnetised iron oxides, which tend to be concentrated in the topsoil. Features cut

into the subsoil and back-filled or silted with topsoil contain greater amounts of iron and can therefore be detected with the gradiometer. Strong readings can be produced by the presence of iron objects, and also hearths or kilns.

Other forms of geophysical survey are available, of which resistivity survey is the other most commonly used. However, for rapid coverage of large areas, the magnetometer is usually considered the most cost-effective method. It is also possible to scan a large area very rapidly by walking with the magnetometer, and marking the location of any high or low readings, but not actually logging the readings for processing.

Trial trenching

Buried archaeological deposits cannot always be detected from the surface, even with geophysics, and trial trenching allows a representative sample of the development area to be investigated. Trenches of an appropriate size can also be excavated to evaluate category E sites. These trenches typically measure between 20m and 30m long by 2m wide. The turf and topsoil is removed by mechanical excavator, and the resulting surface cleaned by hand and examined for features. Anything noted is further examined, so that the nature of any remains can be understood, and mitigation measures can be recommended.

4 Definition of Mitigatory Recommendations

None:

No impact so no requirement for mitigatory measures.

Detailed recording:

Requiring a photographic record, surveying and the production of a measure drawing 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.

Watching brief:

Requiring observation of particular identified features or areas during works in their vicinity. This may be supplemented by detailed or basic recording of exposed layers or structures.

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.