

11 ARCHAEOLOGY AND CULTURAL HERITAGE

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11 ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 Introduction

11.1.1 This chapter presents the Archaeology and Cultural Heritage Impact Assessment undertaken following guidelines from the Chartered Institute for Archaeologists. The known archaeological remains and built heritage assets in the area of the Development have been examined, and the potential for previously unrecorded archaeological remains has been considered. This chapter also contains an assessment of the likely significant effects of the Development upon heritage assets. The site location can be seen in Volume 4 Figure 1.1 and its components in Volume 4 Figure 4.1. Details of the Development are described in Chapter 4 Project Description.

11.1.2 An immediate study area of approximately 1km from the Order Limits was studied to allow the assessment of effects on heritage assets as well as to gain an understanding of the nature of the surrounding archaeological landscape and to place sites within their wider context.

11.1.3 The assessment in this chapter involved gathering information from the Gwynedd Archaeological Trust (GAT), Historic Environment Record (HER), Coflein, managed by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW), Caernarfon Archives, Llanberis Library and Caernarfon Library. Available historic maps were examined and walkover surveys were undertaken. These walkover surveys were undertaken in April and June 2012, with additional visits linked to the preliminary GI works undertaken in October 2014 and sporadically from March to September 2015.

Summary of 2012 Environmental Statement Chapter

11.1.4 Archaeological features range in date from the prehistoric to the modern period. The majority of archaeological and heritage features are associated with the slate extraction industry. The re-modelling of spoil heaps and

construction of dams will result in the loss or partial loss of archaeological assets, as will the construction of access tracks, work compounds, and associated infrastructure. Impacts will be mitigated through building recording, landscape survey, archaeological excavation and recording, and archaeological monitoring for the potential uncovering of new archaeological features. In terms of archaeology and cultural heritage, the Development will have a residual effect of moderate adverse.

Scope of 2015 Environmental Statement Chapter

- 11.1.5 This chapter has been updated from the original 2012 ES chapter to reflect the updated Development and legislative and planning policy context prior to the current application for a DCO.
- 11.1.6 This chapter includes an updated planning policy section (Section 11.3) and incorporates responses to the post-submission queries from the Senior Planning Archaeologist for Gwynedd Archaeological Planning Service (GAPS) and the archaeological advisor to Gwynedd Council, which were included in an amended version of the ES chapter issued in 2013 (AECOM 2013).
- 11.1.7 These changes were largely clarifications and additional information added to the walkover survey and aerial photography sections, and minor details throughout the chapter. Other amendments were to the sensitivity of the Glyn Rhonwy Lower Slate quarry and ammunitions store (239)¹, which was raised to high sensitivity to reflect GAPS consideration that they are of national significance. Alterations were also made to the mitigation section, and the final summary was updated to reflect the changes throughout the document.
- 11.1.8 An updated impact assessment has been undertaken in light of the revised proposals, namely the changes in Order Limits and updated Rochdale Envelope. While the impacts on the archaeology and cultural heritage of the site are of the same nature, the wider area of the Order Limits has resulted

¹ Within this chapter, the bracketed numbers after site descriptions relate to those in Volume 3 Appendix 11.1 and on Volume 4 Figure 11.1.

in a larger number of sites that potentially could be impacted by the Development.

11.1.9 Alterations have been made to the walkover survey section and to the mitigation section reflecting more recent consultations and site visits relating to the preliminary GI works.

11.2 Scope of assessment

11.2.1 The scope of the assessment was to:

- Determine the presence of known archaeological and built heritage sites that may be affected by the Development;
- Assess the likely potential of finding previously unrecorded archaeological remains during the construction programme;
- Identify effects upon archaeological features;
- Identify potential effects upon the heritage significance of assets caused by changes to their setting; and
- Suggest mitigation measures based upon the results of the above research.

11.3 Legislation and Policy Framework

National Planning Policy

11.3.1 National legislation and guidance which is relevant to archaeology and cultural heritage comprises:

- Ancient Monuments and Archaeological Areas Act 1979 – relates to the protection of nationally important archaeological sites, either as Scheduled Monuments or as Areas of Archaeological Importance, and also provides for taking monuments into state care;
- Planning (Listed Buildings and Conservation Areas) Act 1990 – the act gives the provisions for the listing of buildings of special architectural or historic interest and the designation of Conservation Areas, and covers details about listed building consent, rights of owners, enforcement, and the prevention of deterioration or damage;

- National Policy Statement (Energy) EN-1, Section 5.8 – this is the national policy for energy infrastructure. Section 5.8 deals with the historic environment and highlights that heritage assets, both designated and non-designated may be affected by energy infrastructure developments. It requires an assessment of the significance of any affected assets to be included in the Environmental Statement, including an assessment of the contribution made by their setting. It also includes a presumption in favour of conservation, but allows for preservation by record should the benefits of the Development outweigh the negative impact on affected assets;
- Planning Policy in Wales Edition 7 (July 2014) – Policy 6.5: Development Management and the Historic Environment – this policy sets out the Welsh Assembly’s policies for the protection and management of archaeological remains, listed buildings, Conservation Areas, World Heritage Sites and historic landscapes, parks and gardens;
- Welsh Office Circular 1/98: Planning and the Historic Environment: directions by the Secretary of State for Wales – this document is an update of the earlier circular 61/96 giving the updated guidance on listed buildings and Conservation Areas, including definitions of demolition and details about the requirements for consultation during application for listed building consent;
- Welsh Office Circular 60/96: Planning and the Historic Environment – Archaeology – this document relates to the importance of archaeology and gives advice on how archaeological matters should be handled during the planning process; and
- Welsh Office Circular 61/96: Planning and the Historic Environment – Historic Buildings and Conservation Areas – this relates to the legislative protection given to listed buildings and their settings, World Heritage Sites, Historic Parks and Gardens, and Conservation Areas. Local Planning Policy.

11.3.2 Local policy is contained within the Gwynedd Unitary Development Plan 2001-2016. The policies relevant to archaeology and cultural heritage are as follows:

- Built And Historic Environment - Strategic Policy 3: relates to the protection of the area's built and historic environment and design standards for new development which will maintain or improve their special character.
- Policy B1 – Demolition of Listed Buildings: relates to the protection of listed buildings and states that applications will be refused unless there are exceptional circumstances.
- Policy B3 - Development Affecting the Setting of Listed Buildings: relates to proposals on sites affecting the setting of Listed Buildings , including the protection of important views to and from the building.
- Policy B4 - Developments in or Affecting the Setting of Conservation Areas: relates to the preservation and enhancement of Conservation Areas and their setting, including the protection of important views across, into or out of the Conservation Area.
- Policy B7 – Sites of Archaeological Importance: relates to the protection of archaeological remains, whether designated or not, and includes the criteria under which development affecting remains would be permitted. This includes the requirement for archaeological assessment and/or evaluation, and for designs which allow preservation *in situ* of nationally important remains .
- Policy B10 – Protecting and Enhancing Landscape Conservation Areas: related to proposals within Landscape Characterisation Areas and includes the criteria under which applications will be assessed.
- Policy B12 - Protecting Historic Landscapes, Parks and Gardens: relates to proposals which may cause significant harm to the character, appearance or setting of registered sites.
- Policy C6 - Glyn Rhonwy Redevelopment Site: proposals must not, *inter alia*, adversely affect the outstanding visual and natural environment that

it is set within. Any new buildings or associated development will have to integrate effectively with the topography, character and setting of the site.

11.4 Consultation

- 11.4.1 Consultation was undertaken with the Senior Planning Archaeologist for Gwynedd Archaeological Planning Service (GAPS) and the archaeological advisor to Gwynedd Council. It was stated that if Q5 was to be used, an archaeological survey of the site would be required using climbing equipment to access the site. At the time, the quarry is not part of the Development therefore this work was not be required. However, consultation did reveal that further mitigation work would be required if the Development was to be taken forwards, such as a detailed landscape survey and excavation.
- 11.4.2 Further consultation was undertaken GAPS on the 27th June 2012 and at a meeting held on the 28th June 2012 when the revised plans were issued to GAPS. GAPS considered that the proposed cut and fill trench option should be avoided as the adverse impact on the archaeology would be too great. If the open trench method was to be used GAPS advised that the line of the trench would need to be re-routed. They also stated that they would prefer the penstock and tailrace to be tunnelled as this would limit the effects on the archaeology.
- 11.4.3 Consultation was also undertaken with Cadw. They had no comments on the Development as no Scheduled Monuments had been identified within the Development site boundary. It was noted that as the Development fell within a significant historic landscape an ASIDOHL (Assessment of the Significance of Impact of Development on Historic Landscapes) would be required. Details of this consultation can be found in the Consultation Matrix in Volume 3 Appendix 2.4.
- 11.4.4 An informal scoping letter was submitted to GAPS and Cadw on the 12th November 2014. At a later meeting held on the 1st December 2014, there representative from GAPS confirmed that he worked for both organisations and that he would respond separately on behalf of each consultee as part of

the DCO process. No response to this scoping letter was received before the decision was taken to submit the scoping report formally to PINS on the 5th January 2015. However it was verbally indicated at the 1st December 2014 meeting that as long as the principles of the Development had not changed (avoiding the bombstore, no change to penstock construction method and no additional above ground workings) then the conclusions of the previous assessment for the 49.9MW project would remain valid.

11.4.5 Consultation with GAPS was also undertaken as part of the program of geotechnical investigation (GI) works which took place from April to July 2015. As part of this an archaeological Written Scheme of Investigation was prepared by AECOM and approved by GAPS in January 2015 (Appendix 11.4). This approval was followed up with a site visit by GAPS while the GI works were taking place on the 16th April 2015.

11.4.6 A final stage of consultation was undertaken with the Senior Planning Archaeologist at GAPS prior to the final submission of the Environmental Statement in October 2015. This included the Senior Planning Archaeologist reviewing both the current chapter of the Environmental Statement and the ASIDHOL with comments received by email on the 1st October 2015. Minor amends were requested but no objections to the assessment were raised.

11.5 Methodology

Data Sources

11.5.1 The archaeological assessment has been undertaken following guidelines from the Chartered Institute for Archaeologists (CIfA) for archaeological desk-based assessments (2014).

11.5.2 The sources consulted were:

- Gwynedd Archaeological Trust HER;
- Caernarvonshire Archives;
- Coflein managed by RCAHMW at <http://www.coflein.gov.uk/en/search/>;
- Aerial photographs from the National Monuments Record of Wales (NMRW);

- Caernarvon Library;
- Llanberis Library;
- Geotechnical data and other assessments as appropriate; and
- Envirocheck Report.

11.5.3 These sources were consulted as part of the 2012 ES and have not been updated as these are considered valid.

11.5.4 A walkover survey of accessible areas of the Development site was undertaken on the 17th April 2012 and the 28th June 2012. A further walkover survey was undertaken on the 2nd – 3rd October 2014 in relation to the preliminary GI works associated with the Development. These preliminary GI works were also monitored by AECOM, and rope access provided to Q1 as part of these works allowed a rapid archaeological walkover survey of the base of Q1 on the 13th May 2015. The site walkovers were undertaken to assess the Development site for the presence of any above ground previously unrecorded heritage assets.

11.5.5 An assessment of the site investigation works is not provided in this ES as they do not form part of the DCO application. Therefore, they are only mentioned further for context.

Assessment Methodology

11.5.6 No standard method of evaluation and assessment is available for the assessment of impact significance with regards to cultural heritage. Therefore, a set of evaluation and assessment criteria have been developed using available cultural heritage guidance.

11.5.7 The IfA (2014) guidance also requires the significance of heritage assets to be assessed. This criteria refers to the English planning guidance but is still of relevance for Wales. Heritage significance should be assessed of the archaeological, historic, architectural and artistic interests of the affected heritage assets.

11.5.8 The criteria for assessing the sensitivity of heritage assets are presented in Table 11-1.

Table 11-1 Cultural Heritage Sensitivity	
Sensitivity	Examples
Very High	World Heritage Sites; Assets of acknowledged international importance; Other buildings of recognised international importance; and Historic landscapes of international sensitivity, whether designated or not.
High	Scheduled Monuments; Undesignated sites/features of schedulable quality and importance; Listed Buildings; Undesignated structures of clear national importance; and Designated & undesignated historic landscapes of outstanding interest.
Medium	Sites/features that contribute to regional research objectives; Unlisted buildings that can be shown to have exceptional qualities in their fabric or historical association; Conservation Areas; Historic townscape or built-up areas with historic integrity in their buildings, or built settings; and Designated special historic landscapes and undesignated historic landscapes of regional sensitivity.
Low	Undesignated sites/features of local importance; 'Locally Listed' buildings and unlisted buildings of modest quality in their fabric or historical association; and Historic landscapes whose sensitivity is limited by poor preservation and/or poor survival of contextual associations or with specific and substantial importance to local interest groups.
Negligible	Assets with very little or no surviving archaeological interest; Buildings of no architectural or historical note; buildings of an intrusive character; Landscapes with little or no significant historical interest.
Unknown	Archaeological sites/features where the importance of the resource cannot be ascertained; and Buildings with some hidden (i.e. inaccessible) potential for historic significance. Further work may be required to assess the sensitivity of these

Table 11-1 Cultural Heritage Sensitivity	
Sensitivity	Examples
	sites.

11.5.9 When professional judgement is considered, some sites may not fit into the specified category in this table. For example, some Grade II listed buildings may only be of medium sensitivity or the rarity value of a certain asset regionally may raise its sensitivity. Each heritage asset is assessed on an individual basis and takes into account regional variations and individual qualities of sites.

11.5.10 The magnitude of impact resulting from the Development is assessed for each heritage asset independently of its archaeological or heritage sensitivity. The magnitude of impact categories are adapted from DMRB guidance and are presented in Table 11-2.

Table 11-2 Determining Magnitude of Impact	
Magnitude	Example Criteria
High	Change to most or all key archaeological/historic building/historic landscape elements or their setting, such that the significance of the asset is totally altered.
Medium	Changes to many key archaeological/historic building/historic landscape elements or their setting, such that the significance of the asset is clearly modified.
Low	Changes to key archaeological/historic building/historic landscape elements, such that the significance of the asset is slightly altered.
Negligible	Very minor changes to elements.
No Change	No change

11.5.11 The magnitude of impact may be either beneficial or adverse.

11.5.12 By combining the sensitivity of the cultural heritage resource with the predicted magnitude of impact, the significance of the effect can be determined. This is shown in Table 11-3.

Table 11-3 Significance of Effect					
Magnitude	Sensitivity				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

11.5.13 Any effects considered to be minor or negligible are therefore not significant; those effects considered major or moderate are therefore significant.

11.5.14 An assessment of the predicted significance of effect is made both prior to the implementation of mitigation and after the implementation of mitigation to identify residual effects. This first highlights where mitigation may be appropriate and then demonstrates the effectiveness of mitigation and provides the framework for the assessment of significance which takes mitigation measures into consideration.

11.6 Baseline Conditions

11.6.1 The 1km study area was taken from and refined to the new Order Limits. Within the 1km study area, 280 heritage assets were recorded from the Gwynedd Archaeological Trust HER and the Coflein database run by the RCAHMW. Four of these sites are recorded but not plotted due to limited location information. An additional 38 sites were recorded from analysis of historic mapping, aerial photographs, and during the walkover survey. Eleven numbers in the known archaeology table were not used as further investigation found the assets they represented to be duplicates of assets already recorded.

11.6.2 Within this chapter, the bracketed numbers after site descriptions relate to those in Volume 3 Appendix 11.1 and in Volume 4 Figure 11.1.

Designated Sites

11.6.3 There is a single Scheduled Monument recorded within the immediate study area, which consists of the earthwork remains of a collection of prehistoric hut circles at Gallt-y-Celyn (1). There are also two listed buildings, both of which are Grade II listed and associated with Glyn Padarn. The first is the lodge (2), while the second is the screening walls surrounding the house (3).

11.6.4 There are no World Heritage Sites, Registered Parks and Gardens, Registered Battlefields, or Conservation Areas within the 1km study area. However, the Development is located immediately outside of the Snowdonia National Park, and the Development site is also located within a landscape considered as being of high value due its industrial remains. These remains have also resulted in the Development area being included as part of the Slate Industry of North Wales on the UK's tentative list for World Heritage Site nomination (<http://whc.unesco.org/en/tentativelists/5678/>).

Historic Landscape Characterisation

11.6.5 The current Development area is included in the landscape examined by Gwynedd Archaeology Partnership for their Historic Landscape Characterisation Project. The Development site falls into Area 6, the Glynrhonwy Quarries, and forms the southern limit of CADWs undesignated Landscape of Historic Interest Number 24 where it is classed as the Dinorwig Quarry Landscape. The Glynrhonwy Quarries are described as:

“Quarry machinery comprehensively removed in 1930. Some lower tips recently removed and landscaped, and mill complex is in reuse for the manufacture of climbing equipment. Wartime bomb store includes concrete roof covered with slate rubble and traces of sidings. Elsewhere stone embankments for ropeways into pits, and inclines, remain as impressive features.” (GAT 2000a, 40).

11.6.6 Conservation priorities and management issues were considered to be the *“preservation of the quarry landscape in its integrity, including tips” (ibid 2000a, 40).*

11.6.7 GAT has also undertaken a review of all quarry sites in an attempt to assess the condition of slate mining sites and aid their preservation. A total of eight quarries and elements of their infrastructure were identified within the study area, of which three are located within the Order Limits. These three sites are the Cefn Dû (Q1/2, site 54), Chwarel Fawr (Q1, site 281) and Bryn-Mawr (14-16). All sites assessed were given a category rating between 1 and 5, with the Cefn Dû area categorised as 2, and the remaining two quarry complexes considered to be Category 3. The five sites outside of the Development area, but within the study area, consisted of the Cook and Ddol Quarry (177) and the Glyn Rhonwy Upper Quarry (241), both of which were graded Category 2, and the Bwlch-y-Groes Quarry (47), Caermeinciau Quarry (50), and Cambrian Quarry (52) which were classified as Category 3. The Glyn Rhonwy Lower Quarry (Q8) was not categorised as a separate quarry in the report. These categories are defined as the following:

- Category 2 – Site or remains of National (Welsh) archaeological importance. A substantial range of quarry buildings, structures, and some machinery, but with few or no features of special merit.
- Category 3 – Sites or remains of Regional (Gwynedd) archaeological importance. A quarry with associated structures of which only foundations remain.

Prehistoric (to AD 43)

11.6.8 There are a total of six recorded sites of prehistoric date. Of these, five have been narrowed down to more specific dates with one dating to the Bronze

Age and four dating to the Iron Age, although the remaining undated site is assumed to be Iron Age.

11.6.9 The earliest evidence for activity within the study area is in the form of a Bronze Age axe found near the Glyn Rhonwy quarries (226). Although only a find spot, the item represents evidence of early activity, and it is possible that sites associated with prehistoric land use have been removed by subsequent mining and quarrying.

11.6.10 The main evidence for prehistoric activity within the study area is largely associated with settlement activity with a number of clusters of hut circles recorded on the uplands surrounding the Development site. These include the cluster at Gallt-y-Celyn, which is also a Scheduled Monument (1), and a collection of huts at Maen-Llwyd (269). Three grouping of huts have been dated to the Iron Age at Gallt-y-Celyn (1), Ffridd-Glyn (212), and Dinas Tŷ-Duand (192). This latter site is also located near the Iron Age hill fort of Dinas Tŷ-Du (190) to the south.

11.6.11 It is also possible that the mining of slate within the study area commenced during the prehistoric period as it is known that exploitation of the resource took place from at least the Roman period with the nearby fort of Segontium at Caernarfon, approximately 7.5km to the west, constructed of the material (Roberts 2006, 74). However, such exploitation would be difficult to detect due to later workings.

Roman (AD 43 to 450)

11.6.12 Roman activity within the study area is limited with only two previously known assets recorded. These consist of a number of hut circles on the lower slopes of Dinas Tŷ-du to the south (251) and part of the Roman road from Segontium to Bryn-y-gefeiliau (259). A number of the Iron Age sites recorded within the study area might also have continued to be occupied into the Roman period, although a lack of fieldwork means that many sites are undated.

11.6.13 The route of the Roman road is speculative with no firm evidence for the road identified through excavation. It has been suggested that the road may run over a low ridge between Cefn Dû and Bryn Mawr, which would position

the road near the eastern and southern limits of the Order Limits (Waddelove 1999, 286). However, no firm evidence of this route has been obtained through excavation or fieldwork.

11.6.14 As discussed above, it is also possible that exploitation of the slate resources in the area was taking place from the Roman period (Roberts 2006, 74), although such activities would be very difficult to identify due to subsequent mining and quarrying operations.

Early Medieval (AD 450 to 1066)

11.6.15 There are no previously recorded archaeological sites dating to the early medieval period within the study area, although it would seem likely that the upland area continued to be used during this period for agriculture. It has been suggested that at least some of the prehistoric round houses recorded on the high ground may have been used into the 5th and 6th centuries (GAT 1999a, 4). It is also possible that slate mining took place during this period as many prestigious buildings were using slate as the main building material (Richards 1995, 12), although which quarries were being exploited is uncertain.

Medieval (AD 1066 to 1500)

11.6.16 As with the early periods, sites dating to the medieval period within the study area are limited with only eight assets recorded. These sites are again concentrated on the uplands surrounding the site and are associated with the agricultural communities who were living in the area during this time.

11.6.17 It is clear that by this period a settlement had been established to the south east of the Order Limits in what is now known as Llanberis, although at this period the village was known as Coed y Ddôl (Owen 1998, 46). A smaller settlement known as Nant Peris was located slightly further to the east of the main settlement on the strategically important transport route of the Llanberis Pass which ran through the mountainous area which contained limited transport routes. The village is reported to have taken its name from Saint Peris who is reported to have had a church or cell in the area in the 11th and 12th centuries (*ibid* 1998, 46). Llanberis later took its name from

the smaller settlement of Nant Peris, although it remained centred on the village of Coed y Ddôl (Roberts 2006, 73).

11.6.18 As mentioned above the settlement formed an important location on the Llanberis Pass and documentary evidence records that Dolbadarn Castle, located at the eastern limit of the village, was built in the early 13th century by the Welsh prince Llywelyn the Great (Roberts 2006, 73). The castle fell to the Earl of Pembroke in 1282, though the village survived as a small settlement (Roberts 2006, 73).

11.6.19 All of the previously recorded heritage assets within the study area are related to the upland settlement and agriculture and include a number of long house platforms, including examples at Barrack-Mawr (4), Dinas Ty-Du (193) and Ty'n-y-Mynydd (295). Other structural remains have also been recorded at Garreg Lefain (46), Cefn Dû (56), Chwarel Cefn Dû (121), and Ffridd-Glyn (211).

11.6.20 Although no remains dating to this period have been recorded, it is possible that many of the quarries were worked in a small scale way. From at least the 14th century slate was being exported, while from the 15th century the material was becoming common for roofing (Richards 1995, 12). However, traces of many of these early mining sites may have been removed by later large scale mining enterprises, while other quarry sites would be hard to date due to the minor changes in the methods of extraction employed.

Post-Medieval (AD 1500 to 1899)

11.6.21 The post-medieval period marks a dramatic change in the activities taking place in the study area, and the period certainly includes the largest number of known heritage assets, with 209 previously recorded post-medieval sites identified. A further 21 assets have been dated to the post-medieval or modern period.

11.6.22 The use of the uplands for agriculture within the study area continued to take place throughout the post-medieval period with a number of farmsteads (210, 211, 261 & 292) (see Photographs 11.1 and 11.2 in Volume 3 Appendix 11.2) recorded along with associated infrastructure such as sheepfolds (188, 189, 194-197, 217, 220 & 297-299) and field boundaries.

The upland nature of the landscape meant that the area was also suitable for transhumance, the seasonal use of upland pasture, which involved taking livestock onto the high ground to take advantage of the spring and summer grazing and conserve the lowland arable land. In Wales the terms Hafod, Hafoty, and Hafotai all signify shieling grounds or summer pastures (Tomas 2005, 25) and this name appears in a number of locations on the slopes of Cefn Dû. These include Hafod Oleu Isaf to the west (SH 5346 5975), Hafod Owen to the north west (SH 5331 6179), and Hafod Lydan to the south east (SH 5739 5940). It seems highly likely that this use of the uplands continued into the western, or upland, sections of the Order Limits, although traces of the small structures associated with the practice may have been removed by subsequent mining.

11.6.23 The clearest evidence for activity within the Order Limits dates to the post-medieval period and is linked to the exploitation of natural resources in the area. Slate had been quarried from the hills surrounding the study area from at least the Roman period due to the materials suitability for construction (Roberts 2006, 74). The exploitation seems to have continued in a piecemeal fashion until the late 18th and early 19th century when documentary and cartographic evidence notes that a number of the quarries within the study area were being worked. Indeed the importance of the material can be clearly seen in Gwynedd with over 400 quarry sites identified (Gwyn 2006, 42).

11.6.24 Up until the late 18th century much of the uplands were considered Crown Common with areas leased on a small scale for localised slate extraction with men working for a ninth of the slate extracted (Dodd 1971, 209). However, by the 1790s the value of slate extraction had been recognised which resulted in large areas being leased to the local gentry who invested in the sites and set about erecting features such as pumps, waterwheels, and other machinery to aid their ventures (*ibid* 1971, 209-210). A number of quarries are recorded within the Order Limits and are named, from west to east, Chwarel Fawr (281) (Photographs 11.3 & 11.4 in Volume 3 Appendix 11.2), Cefn Dû (54), Cook and Ddôl (177), and Glynrhonwy (238).

11.6.25 The earliest survey of the area identified was the 1841 Tithe Plan of the Parish of Llanberis (CA 2 Tithe 28). This survey lacks any significant detail and fails to show any of the quarries although it marks the Victoria Hotel in Llanberis, along with a number of buildings scattered throughout the area of the quarries which presumably represent quarry buildings. The survey also depicts the farmstead of Tynewydd which still survives (313), as well as the farmsteads of Caerfran (314), Dol Tydu (not accurately located), and the Dol Padarn Inn (316).

11.6.26 The next detailed survey of the area identified as part of the current research dates to 1858 and accompanies a document inviting prospective interested parties to take on a share in the quarry (CA XD2/12831). At the time of the document the quarry is reported to be leased to Mr Hussey Taylor of Llanberis who proposed to open new quarries on the lower slopes above the lake side road from Caernarvon to Llanberis, as well as rework the older quarries known as Chwarrel Fownog and Chwarrel Fain. The reworking of the aforementioned quarries required the construction of a new tunnel depicted on the plan, and the plan also shows that the lake edge had been used extensively for slate working with “*waste deposited in Llyn Padarn*”. This survey also shows a number of small buildings near the main road and the rubbish ground or slate making area which were presumably used by slate workers, along with a number of reservoirs higher up the hill to the west. However, it has not been possible to accurately relate many of these sites with features surviving as ruins or earthworks due to the large number of sites within the area.

11.6.27 It is assumed that working continued at the site as a second survey, dated 1860, outlines proposals by Captain Hussey Taylor to re-route an existing private road running across the area of slate workings (CA XD2/12833). However, this survey is hand drawn and limited in detail, although it does mark one of the structures by the road as an ‘old office’ with a garden adjacent, along with a danger flag near the edge of the workings.

11.6.28 In the years that followed the importance of slate extraction in the area continued to grow, with a number of quarries within the Order Limits owned

and managed by wealthy men who held the leases to the workings. By the 1880s the number of men working in the quarries was often considerable and a vast range of buildings were erected to undertake tasks such as cutting, tool making, and to house engines used for transporting the slate (Richards 1995, 78-79). Figures dating to the last quarter of the 19th century state that in 1872 Glynrhonwy Lower employed 200 men who mined 8,000 tonnes of slate, while Glynrhonwy Upper employed 40 men (Lindsay 1974, 321). By 1882 the lower site seems to have dropped in importance employing only 53 men and producing 1,514 tonnes of slate while the upper site employed 90 men and extracted 2,181 tonnes (*ibid* 1974, 321).

11.6.29 Figures for other quarries within the Order Limits also point at the importance of the quarries with the Cefn Dû quarry employing 197 men who extracted 5,640 tonnes of slate in 1882 (*ibid* 1974, 313). In the same year the smaller Cook and Ddôl Quarry employed 26 men who extracted 616 tonnes in 1882 (*ibid* 1974, 315). It is clear that such large operations required a major network of structures to support the industry and in 1879 the Llanberis Slate Company who operated Cefn Dû, as well as two other quarries, had four fixed steam engines, one tramway locomotive, two steam rock drills, two waterwheels with turbine hoisting kit, steel wire and ropes, and a large number of slate and rubble wagons (*ibid* 158). These features have not been located but it is likely that the remains of buildings that are littered over large areas of the Order Limits house items such as those listed above.

11.6.30 The first accurate survey of the area is the 1888 Ordnance Survey plan which shows the Order Limits as being extensively used for slate quarrying (Volume 4 Figure 11.3). This survey names a number of different quarries, although the lower area is depicted as a combined unit under the name Glyn-rhonwy Slate Quarry. A large number of structures are recorded across the Development site which presumably relate to slate quarrying, and although most are unnamed there is a smithy (306) and a magazine (307) marked near the minor road which still runs near Tynewydd. The smithy site can still be observed as a ruin amongst trees near the edge of the road. A large number of inclines on both the north and south side of the workings

are also depicted along with a possible winding house on the long southern incline, while the tunnel proposed by Hussey Taylor in 1858 also seems to have been constructed.

11.6.31 The development of the landscape is not just confined to the lower quarries as the survey also depicts a large complex of buildings on the upper slopes around Chwarel Cefn Du slate mine and the Cook and Ddôl Slate Quarry. A large building named as Barrack-mawr is also recorded in the upper area, and this appears to represent a barrack used to house quarrymen (8). Such buildings were constructed on quarries with the men arriving on a Monday morning and living on site until the Saturday afternoon when they would return home, thus saving them the long walk home after every shift (Richards 1995, 68).

11.6.32 Further land reclamation resulting from the dumping of slate waste in Llyn Padarn occurred on the shore edge (301), while a series of workshops also appeared to have been constructed on the lake edge (302). A railway had been constructed along the shore edge (309), while a wharf is depicted to the south east of the man-made land mass that is observed jutting into the lake (303). The railway is recorded as being in operation from as early as the 1830s to transport slate from Llanberis to Port Dinorwic, although the quarries at Glynrhonwy continued to use farmers to transport slate as late as the 1840s/50s (Dodd 1971, 217-218).

11.6.33 A continuing reliance on agriculture as well as mining is also supported with a number of farms depicted either side of the quarries, along with sheepfolds used for the management of livestock. These include Pen-gilfach to the north and Glyn-rhonwy (311) and Beudy-y-geifr (312) to the south. It is also clear that the settlement of Llanberis has also expanded as a result of the quarrying in the area.

11.6.34 Very few major changes appear to have taken place by the time of the 1899 Ordnance Survey of the area, although it is clear that the quarries continued to develop and increase in size (Volume 4 Figure 11.4). A number of new structures are recorded, while many on the inclines appear to have increased in size. The complex of structures at Cae-ty (also referred to as

Cae'r-ty) also seems to have grown dramatically, although the exact purpose of these buildings is not known.

11.6.35 The most striking change appears to be on the edge of Llyn Padarn where the workshops that were depicted on the 1888 survey had been regulated to form a long line of buildings alongside a large rail terminal and marshalling yard (302). Further dumping in to the lake had also increased the size of the manmade landmass, while a rail system with associated structures was established on the reclaimed area to aid in dumping of waste slate into the lake (304 & 305).

11.6.36 The importance of slate mining and the impact it had on the archaeological record can be seen in the known archaeology of the study area with the majority of the 209 assets recorded relating to the slate industry. These assets include workers hostels (8) (see Photograph 11.5), shelters (27, 29, 30, 124 & 144-150), tramways (39, 113, 134 & 162-166), inclines (122 & 123) (see Photographs 11.6-11.8), and other structures such as explosives stores (119 & 210), winding houses (139, 140 & 237), and general quarry buildings (126-131) (Photographs 11.4 & 11.6).

11.6.37 The spiritual needs of the workers and their families were met with a number of chapels and churches constructed during the growth of the slate mining industry and the settlement of Llanberis. New churches included Clegir Chapel (176), Fach-Wen Chapel (204), and Preswylfa Chapel (268) all of which are Calvinistic Methodist chapels, Nant Padarn Welsh Independent Chapel (257), and Seion Baptist Chapel (274).

Modern (AD 1900 to present)

11.6.38 Although the importance of slate had fluctuated in the 19th century due to outside pressures, such as the wars with the French and the industrial revolution (Richards 1995, 115-117), a downturn in the latter years of the 19th century resulted in strikes at a number of quarries including Glynrhonwy (Merfyn-Jones 1999, 109-113). However, the quarries around Llanberis continued to operate with extraction continuing into the 20th century, and a number of the 68 assets assigned to the modern period, as

well as the 21 assigned to the post-medieval and modern period, are associated with quarrying.

11.6.39 The 1914 Ordnance Survey of the area shows some signs of the continuing development of the area as a result of quarrying, as the man-made island in Llyn Padarn expanded further and a number of new structures appeared on the island (308) (Volume 4 Figure 11.4). However, it also appears that some of the lower quarries had reduced in their extent as one incline that operated in this area is marked as 'old incline'. However, the main quarries appear to be still operating although there have been very few noticeable changes to the buildings and infrastructure that was associated with the quarries.

11.6.40 In 1919 the Upper Glynrhonwy Quarry purchased the Lower Glynrhonwy Quarry and the Premier Glynrhonwy Slate Quarries Company Limited was formed (Lindsay 1974, 321). However, the end of slate quarrying within the study area was nearing and by the early 1930s a number of the large quarries closed including Cefn Dû and Glynrhonwy, both of which ceased operations in 1930 (*ibid* 1974, 158, 321). When the former closed the plant was dismantled and auctioned with the sale including a store house, a powder magazine, sheltering sheds, miners hut, and dinner sheds, providing some idea of the structures that were used until the final years of operations (*ibid* 1974, 158). The Cook and Ddôl Slate Quarry lasted a little longer but it had also closed by 1937 (*ibid* 1974, 315).

11.6.41 The closure of the quarries at Glyn Rhonwy did not, however, mark the complete end of slate exploitation within the study area. The closure of the mines and the depression of the 1930s resulted in many former quarrymen, and their families, struggling to survive and some turned to the slate tips associated with the quarries as a source of income (Gwyn 2015, 74). Slate that had in the past been overlooked as it was not considered to be of a good enough quality or large enough for building, was now reworked for products such as damp proof courses, which required smaller pieces of slate. Although this re-working can be hard to identify, narrow pieces of waste slate, such as those encountered at the Chwarel Cefn-Du quarry (141) can suggest later damp proof course production. Furthermore, small

structures were often erected by the men reworking the material in the tips, and possible examples of shelters have been recorded at a number of locations across the study area (270, 271 & 323).

11.6.42 Although slate quarrying had largely ended by the middle of the 20th century the lower mines were reused during the Second World War as a munitions store which opened on the 2nd June 1941 (Sloan 1991, 140), and formed part of RAF Llanberis (319) (Photographs 11.9 & 11.10). The site included a large underground munitions store (239), belting sheds where female workers placed ammunition into belts, and above ground storage areas (Chambers-Jones 1995, 39). The ammunition and bombs were brought in by train, with the above ground storage involving bombs stored in clusters and covered by tarpaulin (*ibid* 1995, 39), and it is possible that a number of platforms apparent on a 1940s plan² were areas set aside for above ground storage. Sections of the below ground storage seem to have been less successful as a large section of one of the stores collapsed on the 25th January 1942 (Chambers-Jones 1995, 37).

11.6.43 From May 1943 much of the work undertaken at the site involved destroying old and obsolete ordnance that could no longer be used operationally. This was achieved by constructing a shoot into one of the quarries down which ordnance could be dropped resulting in the incendiary bombs catching fire and burning in the quarry bottom (Chambers-Jones 1995, 39). Between December 1943 and September 1944 a total of 173,000 25lb incendiaries and 88,000 4lb incendiaries were destroyed, while between September 1944 and December 1944 95 tonnes of incendiaries were destroyed (*ibid* 1995, 39-40). The use of the site for storage and destruction continued until 1956 when the site finally closed, although work in the early 1970s revealed that not all of the ordnance had been disposed of (*ibid* 1995, 71). This resulted in one of the quarries being drained of 20 million gallons of water so that a bomb disposal team could clear the site with the final clearance work finished in October 1975 (*ibid* 1995, 71).

² Plan viewed at the GAP office by not reproduced due to copyright and reproduction issues

11.6.44 The main area of the RAF base was not accessible and as a result it is difficult to say how much of the site survives. However, a total of 89 previously recorded assets dating to the modern period or the post-medieval and modern period were recorded as part of the current work, with the majority associated with slate mining activities from the first half of the 20th century. These assets include bases from the aerial ropeways (17 & 20-24), quarry buildings (152 & 246-250), and tramways (162-164), and spoil heaps (158 & 284). However, the majority of assets recorded and dating to the modern period are associated with the Cefn Dû radio station. This site was the first successful Marconi long-wave transmitting station operating between 1912 and 1938, and was, for most of its life, the most important long-wave station in Britain³.

11.6.45 In all, over 45 structures relating to the radio station have been recorded including numerous buildings (57-61), concrete bases (63-96), trackways (100-105), and cables (62). The main military site recorded is the underground munitions store, which formed a major part of the RAF Llanberis complex (239).

Sites of Unknown Date

11.6.46 There are nine sites of unknown date within the study area. A number of these may date to the prehistoric period and include clusters of possible hut circles at Gallt y Celyn (228) and a cairn at Carnedd Wen (51). A field clearance cairn at Cefn Dû may relate to agricultural improvements in the prehistoric or later period (55), as might a boundary bank at Bwlch-y-Groes (9), and a similar bank at Dinas Ty-Du (191).

11.6.47 The copper mines at Llanberis appear to date to the post-medieval period (255) as they are recorded as operating in the early 19th century, although they may also have been exploited during earlier periods (Hall 1952, 173, 183).

³ See

<http://www.coflein.gov.uk/en/site/405838/details/MARCONI+LONG+WAVE+TRANSMITTING+STATION%2C+WAUNFAWR+TRANSMITTING+STATION%2C+PLAS-Y-CELYN%2C+CEFN+DU/> for more information.

11.6.48 The remaining undated sites include a mound at Donen Las (199) and a spring at Barrack-Mawr (5).

Walkover Survey

11.6.49 All walkover surveys were limited to the land covered by the Order Limits as per Volume 4 Figure 3.9.

11.6.50 A basic walkover survey was undertaken on the 17th April 2012, with the main quarry sites examined from public roads, and Q6, which is partially flooded, entered by foot. However, as the conditions were wet and windy and many areas were considered to be dangerous, a full walkover survey was not undertaken on this occasion. As a result of this the area to the north of quarries 1 to 4, most of which falls outside of the Order Limits was not visited.

11.6.51 Much of the landscape around quarries 6 and 7 has been subject to extensive landscaping linked to the formation of an industrial estate, and as a result no remains linked to mining were encountered. Likewise, the base of Q6 was relatively free from features although a collapsed tunnel which seemed to allow access to the lower bomb store was observed. Access to the bomb store was not possible, although the main structure of the bomb store falls outside of the Order Limits.

11.6.52 A further walkover survey as undertaken on the 28th June 2012. During this visit the proposed route of the pipeline was examined from the former Chwarel Fawr Quarry (Q1), which will act as the upper reservoir, in the south west, to the Ffordd Clegir in the north east. Once again adverse weather conditions meant it was not possible to examine all features in detail, and none of the quarries were entered. However, most of the land to the south of quarries 1 to 5 was examined, and at least three clusters of buildings were observed within the Chwarel Fawr Quarry (316, 317, & 318), while other sites previously recorded were found to survive as extant, but ruined, structures. These included the workers' hostel at Barrack-Mawr (8), Pen-y-Bwlch farmstead (261), and features linked to the inclines such as the Pen-y-Mawr winder (264).

- 11.6.53 A walkover survey of the land to the west south west of Q1 was not possible due to heavy plantations covering the area, while the land to the north west of Q1 was not accessible due to inclement weather and ground conditions.
- 11.6.54 An additional walkover survey was undertaken on the 2nd and 3rd October 2014 as part of the preliminary GI works. Fine weather conditions allowed further investigation of the quarries and the surrounding landscape, including all areas surrounding Q1 and Q6. Examination of these areas identified and confirmed the presence of slate mining remains to the north, north west and north east of Q1 (324–326 & 328), while limited remains were identified to the south south-east of Q1 (323), partially covered by spoil tips. No access was available to the bottom of Q1.
- 11.6.55 Similar structural remains were also identified around Q6 (329), with a concentration of relatively well preserved structures on the north and north-eastern side of Q6 (320-323). Traces of the areas agricultural past were also identified on the slopes with possible terraces recorded to the east of Q1 (327).
- 11.6.56 Archaeological monitoring was also undertaken during the GI works completed between March and June 2015. This monitoring allowed further walkover surveys to be undertaken throughout the study area, but no additional features were recorded. However, archaeological monitoring during limited excavations for borehole starter pits and trial holes, did reveal that the depth of topsoil and subsoil was very limited, with the natural bedrock (largely slate) encountered between 0.2m and 0.3m below the present ground surface. The exception to this was an area of former forestry plantation to the south of Q1 where disturbed subsoil was found to be up to 0.5m deep, although no archaeological deposits were encountered due to heavy disturbance linked to the plantation.
- 11.6.57 As part of the GI works, rope access was provided to Q1 on the 12th and 13th May 2015 allowing an archaeological walkover survey of the base of the quarry on the 13th May 2015. This walkover survey identified a number of structures in the base of the quarry including a number of small sections of wall or possible shelters (43, 247, 249 & 250). Access also confirmed the

presence of possible structures previously observed from the top of the quarry (316, 317, & 318), as well as recording a large iron loop possibly linked to the aerial ropeways (246) and a tunnel in the north east corner (248).

ASIDOHL

11.6.58 ASIDOHL is an abbreviation for the Assessment of the Significance of Impact of Development on Historic Landscapes. It comprises a five-stage process to quantify direct and indirect effects of Development upon areas of Wales considered to be of outstanding or special historic value.

11.6.59 A detailed survey was also undertaken as part of the ASIDOHL report and is discussed below. The effects of the Development upon the Dinorwig historic landscape have been considered as part of this assessment. The full ASIDOHL assessment can be found in Volume 3 Appendix 6.1.

Aerial Photography

11.6.60 The area of the current investigation had been heavily exploited for slate throughout the 19th century which resulted in much damage to the landscape prior to the advent of aerial photography.

11.6.61 Cartographic sources also provided a good review of the changing mining landscape, and as a result it was agreed, with GAPS, that a review of aerial photographs covering the whole site would not be undertaken as part of the present study. However, a review of aerial photographs covering the area of the former site of RAF Llanberis was undertaken (see Volume 3 Appendix 11.3 for a full list of aerial photos examined). Very little information was available from the majority of aerial photographs reviewed due to the altitude from which the photographs were taken. However, RAF photographs taken on the 10th May 1946 did show the former RAF Llanberis site near the southern quarries in some detail. Most elements of the RAF base and bomb store fall outside of the Order Limits, although what appear to be piles of ordnance can be seen to the south and east of Q6. These areas have been extensively landscaped, partially terraced, and turned into car parking. A possible Nissen Hut can also be observed near the western end of Q6,

although this also falls within the area which has been cleared and landscaped.

11.6.62 Outside of the Order Limits there are further remains associated with the RAF base and bomb storage facility. The layout of the ordnance storage areas largely represents that depicted on the official RAF plan of the site dating to the mid/late 1940s. Sites visible also include the large bomb store constructed in Q8 which falls outside of the Order Limits (239), while storage areas are also visible on top of the spoil heaps to the north of Q6.

11.6.63 A later aerial photograph of the area taken in June 1962 shows most of the site free from features, although the Nissen Hut towards the western end of Q6 is still visible. A possible structure is also visible at the eastern end of Q6, while the large bomb store can also be seen (239). All structures appear to have been removed by the 1980s, as aerial photographs from October 1986 show no clear features other than the main bomb store (239). This photograph, as well as later photographs, also show much of the area covered in scrub and trees.

Archaeological Potential

11.6.64 There are 101 heritage assets recorded within or immediately adjacent to the Order Limits. The majority of these assets are post-medieval in date and are associated with the slate mining heritage of the area. These sites include structures linked to the Chwarel Cefn Dû Quarry (126, 131, 136, 137 & 139), the Chwarel Fawr Quarry (43, 142, 147, 148, 150, 153, 154, 155, 159-161, 165-169, 246-248, 270, 271, 275, 277, 281- 283 & 316-318), the Bryn-Mawr Quarry (15, 31, 32, 34, 36 & 39), and the Glyn Rhonwy Lower Quarry (239). A large number of these sites are structures linked to the general operation of the quarries (32, 34, 36, 126 & 316-318) although other features such as inclines, tramways, and winders used for the movement of materials (39, 162-165, 166, 168 & 320), barracks/shelters (142, 148, 147, 150, 275 & 277), and a smithy (306) are also represented. Indeed, many of the spoil heaps resulting from the industry are also recorded on the GAT HER including several within the Order Limits (158, 159, 160 & 283).

Quarries and possible trial pits were also noted on the 2014 walkover survey (325 & 329).

11.6.65 Other assets included within, or immediately adjacent to the Order Limits, are linked to the agricultural past of the area and include sheepfolds (201 & 202), possible agricultural terraces (327) and a series of walls and field boundaries (170-173 & 323) although these latter walls may also be associated with mining. A Calvinistic Methodist chapel (243) is also recorded. A number of possible structural remains and building foundations noted on the walkover survey may relate to either agricultural or mining activities (321, 322, 324, 326 & 328).

11.6.66 The final sites are more recent in date and are linked to the areas military past. During the Second World War the area around Glyn Rhonwy Lower Quarry was occupied by RAF Llanberis (319). This site operated into the post-war period and was used for ammunition storage and disposal, and part of the Order Limits falls within the Lower Quarry which was used as an underground munitions store (239). Unfortunately the full extent of remains within this area could not be determined as access was not available at the time of writing.

11.6.67 Table 11-4 summarises the current visibility of archaeological sites within the study area and the predicted likelihood of further discovery.

Table 11-4 Predicted Likelihood of Further Discovery of Heritage Assets			
Period	Visibility of Assets	Presence/ Absence	Likelihood of further discovery within Order Limits
Prehistoric	Limited – Certain site types still visible - Revealed by archaeological fieldwork.	Present – Limited.	Low
Roman	Limited – Certain site types still visible - Revealed by archaeological fieldwork.	Present – Limited.	Low

Table 11-4 Predicted Likelihood of Further Discovery of Heritage Assets			
Period	Visibility of Assets	Presence/ Absence	Likelihood of further discovery within Order Limits
Early Medieval	Limited – Certain site types still visible - Revealed by archaeological fieldwork.	Absent	Low
Medieval	Limited – Certain site types still visible - Revealed by archaeological fieldwork.	Present – Limited.	Low
Post-Medieval	Good – Remains still present and good cartographic coverage.	Present – Frequent.	Medium
Modern	Good – Remains still present and good cartographic coverage.	Present – Frequent.	Low/Medium

11.6.68 There is no evidence for activity or settlement within the Order Limits before the post-medieval period, although earlier sites are recorded within the surrounding area. Prehistoric settlement activity has been recorded on the high ground to the north and south of the Order Limits with hut circles and associated enclosures recorded at Gallt-y-Celyn (1), Dinas Tŷ-Du (190 & 192), Ffridd Glyn (212), and Maen-Llwyd (269). Finds of Bronze Age axes were also recorded from within the quarries in the 19th century suggesting that there may have been some prehistoric activity taking place within the area of the quarries, although this will have been removed by quarrying (226). As a result of the heavy disturbance caused by quarrying, it is predicted that there is a **low** potential for further discoveries dating to the prehistoric period.

11.6.69 Evidence for activity during the Roman period is also limited with only two assets identified. These are possible settlement sites at Dinas Tŷ-Du (251) and part of the Roman road between Segontium to Bryn-y-gefeiliau (259). It is possible that some of the earlier settlement sites may have been occupied into the Roman period, and that some of the quarries may have been worked during the Roman period (Roberts 2006, 74). However, it is likely

that earlier remains may have been lost by quarrying and later agriculture and as a result the potential for further Roman discoveries is considered to be **low**.

11.6.70 There are no early medieval sites recorded within the study area, although it has been suggested that some of the prehistoric and Roman settlement sites may have continued in use during the early medieval period (GAT 1999a, 4). Medieval sites are also limited, although those recorded suggest that the high ground around the quarries was being exploited for agriculture with farmsteads or building remains recorded at a number of locations. These include Barrack-Mawr (4), Dinas Ty-Du (193), Ty'n-y-Mynydd (295), Garreg Lefain (46), Cefn Dû (56), Chwarel Cefn Dû (121), and Ffridd-Glyn (211). It is assumed that slate quarrying has removed traces of other sites that may have existed, and the potential for further discoveries of both early medieval and medieval date is considered to be **low**.

11.6.71 The post-medieval period is by far the best represented period when considering evidence for human activity and settlement. A large number of assets have been recorded within the study area, with most relating to the exploitation of slate, although a number of sites linked with agriculture have also been identified. Sites linked to quarrying include the actual quarries (19, 52, 54, 109, 142, 239, 325 & 329), as well as features such as inclines and tramways (122, 123, 162-169, 280 & 320), barracks (8), and magazines (210). Sites linked to agriculture include farmsteads (261, 265, 292) as well as ancillary structures such as sheepfolds (116, 156, 189, 194-197) and enclosures and boundaries (191). Although many of the remains are visible as extant ruins or earthworks the fluid nature of quarry development and expansion means that further sites may survive under spoil heaps. Such features have been recorded during landscaping and development work near the lower area of the Glynrhonwy Quarry where foundations of the 19th century slate mill were recorded (GAT 1999, 2). There is also the chance that the detailed landscape survey might reveal additional sites as discoveries have been made during similar construction activities. As a result the potential for the discovery of further post-medieval assets is considered to be **medium**.

11.6.72 The gradual decline of the slate industry in the first quarter of the 20th century resulted in the closure of the quarries within the Order Limits as well as the wider study area. These closures resulted in many of the sites being partially demolished and sold off. Therefore, there are very few modern sites associated with the quarrying. The Second World War RAF base known as RAF Llanberis which was used for bomb and munitions storage and disposal (319) is recorded within the Order Limits. At present the full extent of this site is not known and a full visit was not possible due to access issues. However, the lower quarry was roofed to make a munitions store (239) and survives as an extant feature, and it is possible that other remains associated with the site, including concrete bases used to store ammunition, may survive. The potential for the discovery of further sites dating to the modern period is considered to be medium for remains associated with RAF Llanberis and low for other site types.

11.7 Potential Effects

Sensitivity & significance of heritage assets

- 11.7.1 There are 101 recorded heritage assets located within the Order Limits, along the line of the diverted access track, and in the immediate surroundings (Volume 4 Figure 11.1).
- 11.7.2 Of these 101 recorded assets, a number of sites have been grouped together, as they are closely related and will be affected by the Development in the same way.
- 11.7.3 The significance of all heritage assets within the Order Limits has been assessed in line with the IfA guidance (2014).
- 11.7.4 The sensitivity of heritage assets considered for assessment is shown in Table 115. These sensitivities are based on the categories contained within Table 11-1.

Table 11-5 Sensitivity of Heritage Assets		
Site Name	Sensitivity	No. on Volume 4 Figure 11.1
Slate quarry I, Bryn-Mawr.	Medium	15 & 34
Bryn-Mawr, slate quarry, quarry buildings, including building VI.	Medium	31, 32, 35, 36 & 37
Bryn-Mawr, tramway.	Medium	39
Bryn-Mawr Trial Mine I and II.	Medium	40 & 41
Chwarel Cefn Dû, slate quarry II.	High	122, 126, 131, 133, 136 & 328
Chwarel Cefn Dû Farmstead and Pen-y-Bwylch Farmstead	Medium	120 & 261
Stile at Chwarel Cefn Dû.	Low	132
Chwarel Cefn Dû, trial mine III.	Medium	137
Chwarel Fawr Quarry and associated features	Medium	43, 142-148, 150-153, 155, 157-169, 170-173, 246-249, 250, 270, 271, 275, 277, 281, 283, 316-318, 323-325
Cook and Ddol Quarry and associated features	Medium	178-183
Ffidd-Glyn Quarry and associated features	Medium	209, 210, 213, 216 & 225
Glyn-Rhonwy Quarry and associated feature	Medium	237, 240, 241 & 280
Glyn Rhonwy Lower slate quarry and later munitions store.	High	239
Trial mine and complex of inclines	Medium	139 & 262

Table 11-5 Sensitivity of Heritage Assets		
Site Name	Sensitivity	No. on Volume 4 Figure 11.1
and winding houses.		
Railway over reclaimed land in Llyn Padarn.	Low	304 & 305
Complex of buildings near Llyn Padarn.	Low	308
RAF Llanberis	Low	319
Sheepfold	Low	201
Sheepfold	Low	156
Agricultural remains	Low	326 & 327
Find spot of Bronze Age palstave.	Low	226
Roman Road now incorporated in the modern road.	Low	259
Glyn Rhonwy Quarry (Lower) (Q6) and associated features.	Medium	306, 320-322, 329
Sheep pen marked on old mapping.	Low	312

- 11.7.5 Chwarel Cefn Dû slate quarry and its associated assets (122, 126, 131, 133, 136 & 328) form part of the mining landscape associated with the former mine. They have archaeological significance as the study of their archaeological remains could improve the understanding of the site. They also have historic significance as they represent a key feature in the development of slate mining in the area. Although this site is undesignated, it is considered to be of **high** sensitivity by Gwynedd Archaeology Partnership (GAT 1994b, Appendix 1).
- 11.7.6 The Glyn Rhonwy Lower Slate Mine (239) has historic significance associated with its use as a slate quarry and its later re-use as a munitions store during the Second World War., It also has architectural significance due to its re-use as a munitions store as its conversion required significant re-modelling and the construction of a specific form of structure. Although not designated as a listed building this asset is considered to be of **high** sensitivity by GAP due to the rarity of the bomb store and the quarries later reuse as a munitions store. However, due to the high sensitivity of the asset, the main structure has been excluded from the Order Limits.
- 11.7.7 The Chwarel Fawr Quarry landscape include the quarry as well as a large number of associated features such as buildings, tramways, and other remains linked to the extraction of slate (43, 142, 147, 148, 150, 153, 155, 159, 161, 165-169, 170-173, 246-249, 270, 271, 275, 277, 281-283, 316-318 & 323-325). All of these features have archaeological significance as the study of the remains would further our understanding of the site and its chronology and development. They also all have historical significance as they form an important part of the slate mining landscape of the area, and contribute a great deal to our understanding of slate exploitation. Finally, the assets that represent built features such as labourers' shelters (147, 148 & 150) and the numerous miscellaneous buildings all have some architectural significance as they represent a specific style of building associated with slate extraction. The asset is considered to be of **medium** sensitivity.
- 11.7.8 The Cook and Ddol Quarry landscape contains a large number of features linked to the operation of the quarry, including inclines as well as miscellaneous buildings linked to slate extraction (178-183). All of the

recorded remains have archaeological significance as the study of the assets would further our understanding of the site and its chronology and development. They also all have historical significance as they form an important part of the slate mining landscape of the area, and contribute a great deal to our understanding of slate exploitation. Finally, the assets that represent built features such as the inclines (178 & 179) and the miscellaneous buildings (180 & 181) all have some architectural significance as they represent a specific style of building associated with slate extraction. The asset is considered to be of **medium** sensitivity

11.7.9 The assets associated with the Ffridd-Glyn Quarry (209, 210, 213, 216 & 225) represent key features linked to the operational history of the quarry and the development of the landscape. As such, they all have historical significance. They also have archaeological significance as their study has the potential to provide information regarding their use and development. Finally, the built structures, such as the explosives store (210) and the incline (213), represent a distinctive type of architecture associated with quarrying, and as such they have architectural significance. The assets are considered to be of **medium** sensitivity.

11.7.10 Glyn-Rhonwy Quarry landscape contains a large number of assets linked to the operation of the quarry, and a number fall within the Order Limits (237, 240, 241 & 280). As with other quarry remains, the assets have archaeological significance as their study could increase our knowledge of the slate quarrying in the study area. They also have historical significance associated with their role in the development of the quarrying landscape, while their distinctive form provides them with an element of architectural significance. They are considered to be of **medium** sensitivity.

11.7.11 The Bryn-Mawr Slate Quarry No. I (15 & 34), Bryn-Mawr Trail Mine No. I and II (40 & 41), and Chwarel Cefn Dû Slate Quarry Trial Mine No. III (137) all have archaeological significance as the study of their archaeological remains could improve the understanding of the site. They also have historic significance as they represent a key feature in the development of slate mining in the area. These assets are considered to be of **medium** sensitivity.

- 11.7.12 The Glyn Rhonwy Quarry (Lower) (Q6)(329), and its associated features which include a number of structures, some of which may have been linked to the aerial ropeway or winder mechanisms (306, 320-322), all have archaeological significance as the study of their archaeological remains could improve the understanding of the site. They also have historic significance as they represent a key feature in the development of slate mining in the area. These assets are considered to be of **medium** sensitivity.
- 11.7.13 The Bryn-Mawr slate quarry buildings (35) and buildings VI (36) and other quarry buildings (31 & 32) have archaeological significance as the study of the archaeological remains of these sites could improve our understanding of their use. They also have some architectural significance as they represent a specific form of structure linked to the exploitation of slate. They also have historic significance as they form a key part in the development of slate extraction in the area. These assets are considered to be of **medium** sensitivity.
- 11.7.14 The remains of the post-medieval farmstead at Chwarel Cefn Dû (120) and a post-medieval farmstead at Pen-y-Bwylch (261) have historic significance associated with the history of farming in the area. Further study and investigation could reveal information about the Development of the farming landscape in the area and its interrelationship with the mining landscape in the vicinity. As a result, they also have some archaeological significance. These assets are considered to be of **medium** sensitivity.
- 11.7.15 As the study and excavation of the Bryn-Mawr tramway (39) could improve the understanding of the asset and its place in the Development of the slate mining landscape, the site is considered to have archaeological significance. It is also considered to have historic significance due to its association with the development of slate mining in the area, and specifically the infrastructure required for the operation of a slate mine. This asset is considered to be of **medium** sensitivity.
- 11.7.16 The trial mine and complex of inclines and winding houses (139 & 262) is considered to have historic significance due to its association with the

development of slate mining in the area, and the infrastructure required to operate it. Further study and excavation could improve the understanding of the asset and how it relates to the other aspects of the slate mining landscape in the vicinity. This asset is considered to be of **medium** sensitivity.

11.7.17 Although the stile at Chwarel Cefn Dû (132) forms part of the infrastructure of the footpath system of the area, it is considered to be a very minor feature. As a result it is considered to be of limited historical significance only. This asset is considered to be of **low** sensitivity.

11.7.18 Both the railways (304 & 305) and complex of buildings (308) on the edge of Llyn Padarn are known from mapping evidence of the area, although it is not currently known if they survive as earthwork remains or sub-surface features. As a result they are assumed to have archaeological significance as analysis could improve our knowledge and understanding of their use. If elements of them are found to survive they will also have historical significance as they represent structures linked to the slate mining industry in the area. This asset is considered to be of **low** sensitivity.

11.7.19 The former site of RAF Llanberis (319) was developed in the Second World War and continued to operate into the post-war period. It mainly has historical significance due to its role in the military history of the area. Any structures that are found to survive may also have architectural significance as they may be of a specific style of military architecture. This asset is considered to be of **low** sensitivity.

11.7.20 Three sheepfolds within the site (156, 201 & 312) and other agricultural remains (326 & 327) have historical significance due to the way they relate to the historic farming landscape of the area. They form part of a wider group of farming related heritage assets in the area. These assets are considered to be of **low** sensitivity.

11.7.21 Part of the Roman road from Segontium to Bryn-y-Gefeilliau is believed to have been incorporated into the modern road (259). This asset is of archaeological significance as excavation of the asset would add to

archaeological knowledge of the road, and its form and date. This asset is considered to be of **low** sensitivity.

Construction Effects

11.7.22 An effect is defined as a change resulting from the Development on a cultural heritage resource. During the construction, operation and decommissioning of the Development the following types of effects can be anticipated:

- Physical effects upon heritage assets during construction; and
- Effects upon the setting of heritage assets during operation.

11.7.23 The effects on the setting of assets during construction and decommissioning have not been assessed in this report. Effects are temporary and are not considered to be significant.

11.7.24 Effects considered to be of moderate or major potential significance are Significant in terms of the EIA.

11.7.25 Physical effects upon the archaeology could be caused by the following construction activities:

- Excavation of the quarry and construction of the dam to create the reservoir;
- Excavation of starter pits for the tunnelling machine which will excavate the penstock;
- Construction of shafts and valve chambers for the penstock;
- Creation of construction compounds;
- Excavation of access roads, tracks, and temporary diverted track;
- Construction of the turbine house;
- Remodelling of existing spoil heaps and construction of new spoil heaps;
- Construction of the overflow routes; and
- Construction of the pump house.

11.7.26 A total of 24 construction effects have been identified on assets or groups of assets. These are direct physical effects resulting from the excavation of the quarries and construction of the dams to form the reservoirs, and the associated works linked to the Development listed above. Effects have been assessed using the criteria in Tables 11-2 and 11-3. The assessment of effects can be seen in Table 11-6. These are based on the worst-case scenario and effects may be reduced through micro-siting.

Table 11-6 Construction Effects					
Site Name	Sensitivity	Probability	Magnitude of Impact	Significance of Effect	No. on Volume 4 Figure 11.1
Slate quarry I, Bryn-Mawr.	Medium	Certain	Low	Minor adverse	15 & 34
Bryn-Mawr, slate quarry, quarry buildings, including building VI.	Medium	Likely	High	Moderate adverse	31, 32, 35, 36 & 37
Bryn-Mawr, tramway.	Medium	Unlikely	Low	Minor adverse	39
Bryn-Mawr Trial Mine I and II.	Medium	Certain	Medium	Moderate adverse	40 & 41
Chwarel Cefn Dû, slate quarry II and associated features.	High	Certain	Medium	Moderate adverse	122, 126, 131, 133, 136 & 328
Chwarel Cefn Dû Farmstead and Pen-y-Bwylch Farmstead	Medium	Unlikely	Medium	Moderate adverse	120 & 261
Stile at Chwarel Cefn Dû.	Low	Unlikely	High	Moderate adverse	132
Chwarel Cefn Dû, trial mine III.	Medium	Unlikely	High	Moderate adverse	137
Chwarel Fawr Quarry and associated features	Medium	Certain	High	Moderate adverse	43, 142-148, 150-153, 155, 157-169, 170-173, 246-249, 250, 270, 271, 275, 277, 281-283, 316-318, 323-325
Cook and Ddol Quarry and associated features	Medium	Unlikely	Medium	Moderate adverse	178-183

Table 11-6 Construction Effects					
Site Name	Sensitivity	Probability	Magnitude of Impact	Significance of Effect	No. on Volume 4 Figure 11.1
Ffidd-Glyn Quarry and associated features	Medium	Unlikely	Medium	Moderate adverse	209, 210, 213, 216 & 225
Glyn-Rhonwy Quarry and associated feature	Medium	Unlikely	Medium	Moderate adverse	237, 240, 241 & 280
Glyn Rhonwy Lower slate quarry and later munitions store.	High	Certain	High	Major adverse	239
Trial mine and complex of inclines and winding houses.	Medium	Unlikely	Medium	Moderate adverse	139 & 262
Railway over reclaimed land in Llyn Padarn.	Low	Certain	Low	Negligible adverse	304 & 305
Complex of buildings near Llyn Padarn.	Low	Unlikely	High	Moderate adverse	308
RAF Llanberis	Low	Certain	Low	Negligible	319
Sheepfold	Low	Likely	Low	Negligible	201
Sheepfold	Low	Certain	High	Major adverse	156
Agricultural remains	Low	Likely	Medium	Minor adverse	326 & 327
Find spot of Bronze Age palstave.	Low	Unlikely	No change	No change	226
Roman Road now incorporated in the modern	Low	Unlikely	Low	Negligible	259

Table 11-6 Construction Effects					
Site Name	Sensitivity	Probability	Magnitude of Impact	Significance of Effect	No. on Volume 4 Figure 11.1
road.					
Glyn Rhonwy Quarry (Lower) (Q6) and associated features.	Medium	Certain	High	Moderate adverse	306, 320-322, 329
Sheep pen marked on old mapping.	Low	Unlikely	Low	Negligible	312

- 11.7.27 All effects are considered to be physical effects during construction, and effects are predicted on 24 assets or groups of assets, which are either wholly or partially affected.
- 11.7.28 In most cases the physical effects will result in the full or the partial loss of assets. This is especially true of assets within and immediately around the Chwarel Fawr Quarry and the Lower Glyn Rhonwy Quarry as both of these sites will be converted into reservoirs. Construction of the reservoirs will involve the re-profiling of the quarry sides with some of the waste slate removed and utilised in the construction of the reservoir dams. These extensive groundworks will therefore impact on the quarries as well as assets both within and around the quarries.
- 11.7.29 The Development will also require the formation of construction compounds, the sinking of a shaft for the excavation of the penstock, construction of associated infrastructure, and construction of new spoil heaps. This latter work will use waste slate excavated during construction and will impact on the assets on and around the existing spoil heaps, many of which are associated with the Chwarel Fawr Quarry.
- 11.7.30 Physical effects are also predicted on assets located on the line of a new access track that will be constructed to provide access over the moor as the current access track runs through the Development site. Sites on the line of the track include assets associated with the Bryn-Mawr Quarry including trial quarries and a tramway (15, 31, 34, 35, 39 & 40, 41 & 136), although in many cases works on the route alignment should result in partial rather than complete loss of assets.
- 11.7.31 Due to the fluid way many slate mines expanded there is the possibility that earlier structures survive under spoil heaps. It is therefore considered that there is the potential for further post-medieval and modern remains to be discovered in these areas during construction. As the exact nature of any such sites is currently unknown the magnitude of change cannot be determined at this stage. Further archaeological investigation will be required within the Order Limits to inform the requirement for additional archaeological mitigation.

11.7.32 Although a number of assets are located on the line of the penstock, there are no predicted physical effects as the penstock will be tunnelled rather than constructed through an open and fill trench (122, 178-183, 209, 213, 216, 237, 225, 240 & 280). This tunnelling will remove any physical effects from the heritage assets on the penstock route. There will be further GI works required in advance of the tunnelling works commencing, but where possible these will use existing tracks and avoid heritage assets. Any works will also be undertaken after consultation with the GAT Planning Archaeologist and in accordance with a WSI, which will be produced as per the working methods in place after the initial phase of GI works. As a result, effects on assets on the Penstock route have not been considered.

Operational Effects

11.7.33 Due to the nature of the Development, the majority of physical effects on the heritage assets identified within the Order Limits will be limited to the construction phase. Operational effects would be limited to setting issues and are not anticipated. Should any additional heritage assets be identified as part of any new amended Development, proposed extensions or remodelling after the proposed site becomes operational, they would be subject to an additional planning application.

Decommissioning Effects

11.7.34 No decommissioning effects are anticipated.

ASIDOHL

11.7.35 Stage 2 of the ASIDOHL considered the direct impacts of the Development. These effects mirror those identified in this chapter and relate to the damage or destruction of sites of post-medieval date and of industrial character. The assessment concluded that the direct physical effects of the Development will principally be confined to Historic Landscape Character Area (HLCA) 06 (Glynrhonwy Quarry). These effects will be permanent and HLCA 06 will be subject to an impact of **considerable** magnitude. There will also be a minor loss of land (<2%) from two other HLCAs: 07 (Gallt Celyn) and 45 (Cefn Du/Garreg Lefain). The ASIDOHL methodology imposes an impact score of

considerable on both of these HLCAs, but this is argued to be an overstatement of the true level of effect.

11.7.36 There will be no indirect physical effects arising from the Development.

11.7.37 The Development will be visible from a number of the surrounding HLCAs, in particular from those to the east and south. However, the greater part of Dinorwig historic landscape will have no views of the Development and will be entirely unaffected by its presence. Only HLCA 06 will be subject to a significant visual impact (scored as **considerable**). Elsewhere the changes to existing views range between **slight** and **moderate**, and it is concluded that the development will not adversely affect the visual setting of any of these HLCAs.

11.7.38 In conclusion, the ASIDOHL demonstrates that the Development will have a localised effect which is principally confined to a single character area – HLCA 06 (Glynrhonwy Quarry). The impact of Development (direct and indirect) on the whole Dinorwig historic landscape will be **low**. The reduction in historic landscape value will also be **low**. The Dinorwig historic landscape will be essentially unaltered and its fundamental characteristics will not be eroded. As such, the overall significance of impact grade (Stage 5 ASIDOHL) is **Slight**.

11.8 Mitigation, Compensation and Enhancement Measures

11.8.1 Where possible surviving remains associated with the former industrial use of the area should be avoided and left in situ. Where this is not possible a full program of archaeological and building recording will be required to provide a record of the structures and remains. This should be undertaken alongside a landscape survey so that the surviving remains are recorded in context with the surrounding associated features. The archaeological contractor undertaking the work should also seek the advice and support of an expert in the industrial archaeology of the region. Archaeological evaluation and excavation will also be required in addition to building recording and all works should be undertaken in consultation with the Senior Planning Archaeologist for GAPS and archaeological advisor to Gwynedd Council.

- 11.8.2 There is no mitigation suitable for the physical impact on Q1 and Q6 themselves which will be developed as part of the construction of the reservoirs. However, the detailed recording and evaluation of the surviving structures and infrastructure associated with the slate mining and the quarries will contribute to the mitigation against their loss. These data should be disseminated through the publication of the results. Further compensation and enhancement elements, such as improved access to surviving sites and the use of interpretation boards, should also be used where it is considered appropriate to do so.
- 11.8.3 All other areas, including the associated infrastructure and access tracks, will be subject to an archaeologically monitored topsoil strip to ensure that any previously unrecorded features are excavated and recorded. This should be undertaken with the support of a suitably qualified archaeologist with a background in the industrial archaeology of the area as many features linked to slate mining can be difficult to identify.
- 11.8.4 All further archaeological work will be undertaken in consultation with the Senior Planning Archaeologist for GAPS and archaeological advisor to Gwynedd Council and will follow guidance from the IfA.

11.9 Residual Effects

- 11.9.1 Residual effects upon the cultural heritage sites for the construction phase can be seen in Table 11-7. The magnitude of impact and significance of effects have been reassessed with mitigation in place.

11.10 Evaluation of significance

- 11.10.1 The significance of effect of the Development on archaeology and cultural heritage is considered to be **moderate adverse** and is therefore significant.

11.10.2 Table 11-7 presents a summary of the residual impacts for the Development, accounting for the effects of mitigation measures on the worst-case impacts as determined within this assessment.

Table 11-7 Summary of Assessment												
Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
15 & 34	Slate quarry I, Bryn-Mawr.	Medium	Groundworks associated with construction of the new reservoirs, including but not limited to, reprofiling quarry sides, creation of construction compounds, new spoil heaps, sinking of TBM and construction of related infrastructure	Certain	Direct physical effect (adverse)	Permanent	Low	Minor adverse	Building recording & evaluation of features	Low	Minor adverse Not Significant	No change
31, 32, 35, 36 & 37	Bryn-Mawr, slate quarry, quarry buildings, including building VI.	Medium		Likely	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Building recording	Medium	Minor adverse Not Significant	No change
39	Bryn-Mawr, tramway.	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Low	Minor adverse	Survey, recording and possible evaluation excavation	Low	Minor adverse Not Significant	No change
40 & 41	Bryn-Mawr Trial Mine I and II.	Medium		Certain	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording of remains	Medium	Moderate adverse Significant	No change

Table 11-7 Summary of Assessment												
Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
122, 126, 131, 133, 136 & 328	Chwarel Cefn Dû, slate quarry II.	High		Certain	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Building recording & evaluation of features	Medium	Moderate adverse Significant	No change
120 & 261	Chwarel Cefn Dû Farmstead and Pen-y-Bywlch Farmstead	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording of remains	Medium	Moderate adverse Significant	Not included in 2012 chapter
132	Stile at Chwarel Cefn Dû.	Low		Unlikely	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Photographic recording	Medium	Minor adverse Not Significant	No change
137	Chwarel Cefn Dû, trial mine III.	Medium		Unlikely	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Recording of remains	Medium	Moderate adverse Significant	No change

Table 11-7 Summary of Assessment												
Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
43, 142-148, 150-153, 155, 157-169, 170-173, 246-249, 250, 270, 271, 275, 277, 281-283, , 316-318, 323-325	Chwarel Fawr Quarry and associated features	Medium		Certain	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Recording and evaluation excavation	Medium	Moderate adverse Significant	No change
178-183	Cook and Ddol Quarry and associated features	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording and evaluation excavation if micro-siting not possible	Medium	Moderate adverse Significant	Not included in 2012 chapter
209, 210, 213, 216 & 225	Ffidd-Glyn Quarry and associated features	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording and evaluation excavation if micro-siting not possible	Medium	Moderate adverse Significant	Not included in 2012 chapter
237, 240, 241 & 280	Glyn-Rhonwy Quarry and associated feature	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording and evaluation excavation if micro-siting not possible	Medium	Moderate adverse Significant	Not included in 2012 chapter

Table 11-7 Summary of Assessment

Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
239	Glyn Rhonwy Lower slate quarry and later munitions store.	High		Certain	Direct physical effect (adverse)	Permanent	High	Major adverse	Building recording (drawn & photographic)	Medium	Moderate adverse Significant	Sensitivity increased to high resulting in increase in potential significance to major adverse. No change to residual effect
139 & 262	Trial mine and complex of inclines and winding houses.	Medium		Unlikely	Direct physical effect (adverse)	Permanent	Medium	Moderate adverse	Recording and evaluation excavation	Medium	Moderate adverse Significant	Not included in 2012 chapter
304 & 305	Railway over reclaimed land in Llyn Padarn.	Low		Certain	Direct physical effect (adverse)	Permanent	Low	Negligible	Monitored topsoil removal	Low	Negligible Not Significant	No change
308	Complex of buildings near Llyn Padarn.	Low		Unlikely	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Building recording (drawn & photographic)	Medium	Minor adverse Not Significant	No change

Table 11-7 Summary of Assessment

Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
319	RAF Llanberis	Low		Certain	Direct physical effect (adverse)	Permanent	Low	Negligible	Monitored topsoil removal	Low	Negligible Not Significant	No change
201	Sheepfold	Low		Likely	Direct physical effect (adverse)	Permanent	Low	Negligible	Monitored topsoil removal	Low	Negligible Not Significant	Not included in 2012 chapter
156	Sheepfold	Low		Certain	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Recording prior to destruction	Low	Negligible Not Significant	Not included in 2012 chapter
326 & 327	Agricultural remains	Low		Likely	Direct physical effect (adverse)	Permanent	Medium	Minor adverse	Monitored topsoil removal	Low	Negligible Not Significant	Not included in 2012 chapter

Table 11-7 Summary of Assessment												
Description of Receptor			Description of Potential Effect						Description of Residual Effect			Change from 2012 Chapter
Number of Volume 4 Figure 11.1	Receptor	Value / Sensitivity	Effect	Probability	Nature of Effect	Duration	Magnitude	Potential Significance	Summary of Mitigation	Residual Effect	Residual Significance	
226	Find spot of Bronze Age palstave.	Low		Unlikely	No effect	No effect	No change	No change	Not applicable	No change	No change Not Significant	Not included in 2012 chapter
259	Roman Road now incorporated in the modern road.	Low		Unlikely	Direct physical effect (adverse)	Permanent	Low	Negligible	Monitored removal of made ground	Low	Negligible Not Significant	Not included in 2012 chapter
306, 320-322, 329	Glyn Rhonwy Quarry (Lower) (Q6) and associated features.	Medium		Certain	Direct physical effect (adverse)	Permanent	High	Moderate adverse	Recording and evaluation excavation	Medium	Moderate adverse Significant	Not included in 2012 chapter
312	Sheep pen marked on old mapping.	Low		Unlikely	Direct physical effect (adverse)	Permanent	Low	Negligible	Monitored topsoil removal	Low	Negligible Not Significant	Not included in 2012 chapter

11.11 Assessment of Effects on Historic Features (APFP Regulations 2009)

11.11.1 Regulation 5(2)(m) of the Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 requires DCO applicants to provide, where applicable:

“a plan with accompanying information identifying any statutory or non statutory sites or features of the historic environment, including scheduled monuments, World Heritage sites, listed buildings and other historic structures, archaeological sites and registered battlefields, together with an assessment of any effects on such sites, features or structures likely to be caused by the proposed development.”

11.11.2 The sites and features of the historic environment mentioned in regulation 5(2)(m) are shown on Volume 4 Figure 11.1 and are listed in Volume 3 Appendix 11.1.

11.11.3 Sections 11.7 of this chapter assess any potential effects of the Development on these features of the historic environment, and consider whether or not they are 'significant' for EIA purposes. This environmental impact assessment process, relative to cultural heritage and archaeology assessment, has determined that there are no effects anticipated on the setting of historic assets within the study areas resulting from the Development. All assets are presented in Volume 4 Figure 11.1, and itemised in, Volume 3 Appendix 11.1.

11.11.4 It is recognised that there is the potential for buried historic assets within the Order Limits, although this is considered to be limited to the areas currently occupied by spoil heaps. Further archaeological investigation will be required within the Order Limits to inform the requirement for additional archaeological mitigation. As the sensitivity of previously undiscovered buried historic assets is not known, the residual effect cannot currently be established. This is shown in Table 11.7.

11.12 Summary and Conclusions

11.12.1 This chapter has addressed the archaeological and cultural heritage issues surrounding the Development at Glyn Rhonwy, Wales. The assessment has

collated data from the GAT, HER, The RCAHMMW database, historic mapping and other documentary sources. A site visit was also undertaken. The assessment of the archaeological and cultural heritage sites within a 1km study area found a total of 329 sites.

11.12.2 It is anticipated that all effects on heritage assets will be restricted to the construction phase with 24 assets or groups of assets potentially impacted by the Development. The majority of these assets are associated with the slate extraction industry in the area, and the construction of the reservoirs and associated dams will result in the total loss of a number of assets. The re-modelling of spoil heaps and construction of new spoil heaps will also result in the loss or partial loss of further assets, as will the construction of access tracks, work compounds, and associated infrastructure.

11.12.3 There is potential for previously unrecorded archaeological features to be present within the Order Limits, although this is considered to be limited to areas currently occupied by spoil heaps. Following consultation with the Senior Planning Archaeologist at GAPS and archaeological advisor for Gwynedd Council, further archaeological investigation will be required within the Order Limits. This will inform the requirement for additional archaeological mitigation.

11.12.4 Mitigation is likely to comprise building recording, landscape survey, archaeological excavation and recording, and archaeological monitoring. This work will be agreed with the Senior Planning Archaeologist at GAPS, and the consultant undertaking the work will seek the advice of a specialist in the industrial archaeology of the area. This will provide a record of the affected assets.

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A Map of the Parish of Llanberis in the County of Carnarvon, 1841. Tithe Award/28 Prospectus with Map and Sections of a Scheme by Mr. Hussey Taylor, Llanberis, for Working the Glyn Rhonwy Slate Quarries Held on Lease from Lord Newborough, 1858 Ref: XD2/12831

Plans of the Glyn-Rhonwy Slate Works by Captain Hussey Taylor Showing the Proposed New Road and the Proposed Excavations, 1860 Ref: XD2/12833

Plan of the Cook and Ddôl Slate Quarry, Llanberis, in the County of Carnarvon, to be Offered for Sale by Public Auction, 26th Day of August 1910 Ref: XPQ/1000

Historic Mapping

Ordnance Survey Map Sheet XVI.7 1888

Ordnance Survey Map Sheet XVI.7 1900

Ordnance Survey Map Sheet XVI.7 1914

Ordnance Survey Map Sheet XVI.8 1888

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Ordnance Survey Map Sheet XVI.12 1889

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