

**Results of Archaeological Works at  
Proposed Development at Zip World  
- Penrhyn Quarry Mountain Carts**

**NGR SH 62546 64828 (Centre Point)**



**Report Number CR180-2019**



**CR ARCHAEOLOGY**

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On Behalf of Zip World (Bethesda)

## Summary

C.R Archaeology have been instructed by Zip World to conduct an Archaeological Desk Based Assessment at the proposed site of a recreational development in Penrhyn Quarry. The application site is currently in use as a vehicular access track and the intention is to separate the existing access track with a small bund to accommodate a cart track. An existing service track is also to be utilised and a tunnel excavated.

This Desk Based Assessment examines the historic context and archaeological potential of the proposed development area and determines the possible impact of the development on the setting of the Penrhyn Quarry site.

## Crynodeb

Mae Archeoleg CR dan gyfarwyddyd gan Zip World i ymgymryd Asesiad Wrth Ddesg Archeolegol yn y safle datblygiad adloniadol awgrymedig yn Chwarel Penrhyn. Ar hyn o bryd, mae'r safle cais mewn defnydd fel llwybr mynediad cerbydol gyda'r bwriad i wahanu'r llwybr sy'n bodoli gyda bwnd bach i gymodi llwybr trol.

Mae'r Asesiad Wrth Ddesg hon yn archwilio'r cyd-destun hanesyddol ac y potensial archeolegol o'r datblygiad awgrymed a phenderfynu'r effaith bosib o'r y datblygiad ar y gosodiad o'r safle Chwarel Penrhyn.

## Specification for Archaeological Works at Proposed Development at Zip World - Penrhyn Quarry Mountain Carts

<b>Planning Application Number:</b>	2014.063_10
<b>National Grid Reference:</b>	SH 62546 64828
<b>Client:</b>	Zip World (Bethesda)
<b>Report Author:</b>	Catherine Rees and Matthew Jones
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## **1.0 Introduction**

**1.0.1** C.R Archaeology have been instructed by Zip World to conduct an Archaeological Desk Based Assessment at the proposed site of a recreational development which will necessitate the change of land use at the proposed site (figure 1). The application site is currently in use as a vehicular access track in connection with the existing Big Zipper lines at Zip World Penrhyn Quarry. The intention is to separate the existing access track with a bund. One side of the track is to be retained as an access track to transport riders to the top of the Big Zipper lines, whilst the other side of the track is to be changed to be used as the route for mountain carting activity.

**1.0.2** This document has been prepared to supply the Local Planning Authority Archaeologist with information as to the potential archaeological impacts of the aforementioned scheme.

**1.0.3** A specification (included as Appendix A) was written as a methodology for an initial programme of works. It is intended that the results of this work will inform decisions as to the nature of any further archaeological mitigation strategies or evaluation methodologies which may be required.

**1.0.4** The application site is located to the south of the town Bethesda, within Penrhyn Quarry, which is located along the trunk road of the A5. The boundary of the Snowdonia National Park runs along the eastern line of the A5, although none of the proposed development area lies within the park limits. Penrhyn Quarry is situated within the non-statutory Dyffryn Ogwen Landscape of Outstanding Historic Interest (No. 28 HLW (Gw) 10 (Cadw 1998: 105-8)). It forms one of the most important elements of this landscape. Penrhyn Quarry also falls within Historic Landscape Character Area 41 – Moel y Ci/Gwaen Gynfi unenclosed uplands (GAT Report 351: 2000).

**1.0.5** Penrhyn Quarry, within which the proposed site is located, is included on the UNESCO Tentative Lists of States Parties as a key element of the Slate Industry of North Wales (ref 5678) which is currently being proposed for World Heritage Status nomination for the cultural landscape associated with the industry.

**1.0.6** This Desk Based Assessment examines the historic context and archaeological potential of the proposed development area and determines the possible impact of the development on the setting of the Penrhyn Quarry site.

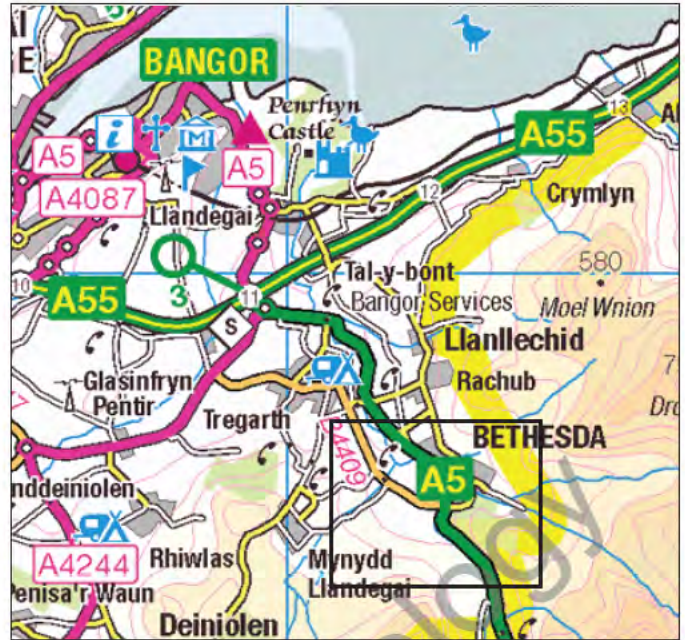
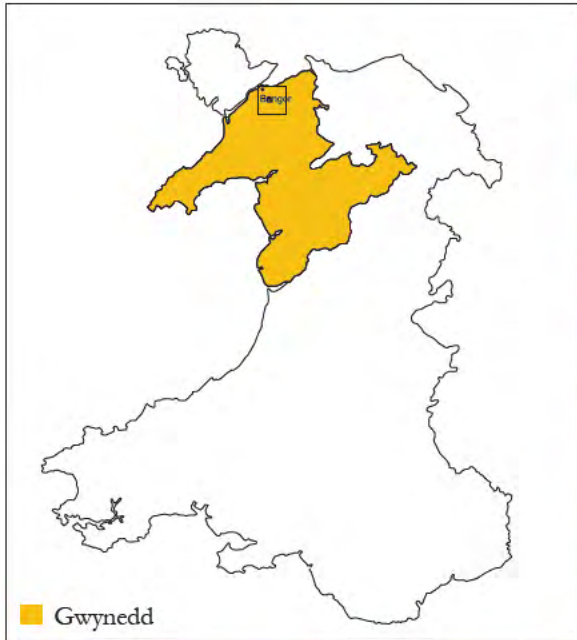
## **2.0 Project Aims & Objectives**

**2.0.1** This programme of works for the development site aimed to undertake a Desk Based Assessment, Walkover Survey and setting examination of the development site.

**2.0.2** The aim of this scheme of works was to undertake desk based historical research exploring the history/archaeology of the site. This information includes a map progression and archival research in order to compile a coherent narrative history of the site and its environs.

**2.0.3** The Gwynedd Historic Environment Record (HER), the Royal Commission on the Ancient and Historical Monuments Wales (RCAHMW) database, Gwynedd Archives, Bangor University Archives and relevant publications were consulted to compile a record of known archaeological sites in the vicinity. Aerial photographs were also examined.

**2.0.4** It is intended that this document be utilised to inform further archaeological planning decisions and conditions at the site.



**Figure 1. Site Location Map**  
 (Source: OS Open Data Mapping. Contains Ordnance Survey data © Crown copyright and database right [2019])

**2.0.5** The objectives of this programme of works were:

- To make full and effective use of existing information to establish the archaeological significance of the site
- To assess the impact of the development proposals on surviving sites, monuments or remains both within the development area and in the surrounding landscape
- To help inform future decision making, design solutions, further evaluation & mitigation strategies

### **3.0 Scheme of Works - Methodology**

**3.0.1** The archaeological works were conducted in three sections and each is detailed separately below.

#### **3.1 Desk Based Research**

**3.1.1** A complete and coherent history of the site was compiled utilising material sourced from Gwynedd Archives and the Bangor University Archives. This allowed as comprehensive a history as possible to be compiled. A full map progression of the area was undertaken and the archive information was supplemented with information from the HER, local libraries and specialist interest websites & journals.

**3.1.2** In order to identify the character of archaeological remains in the vicinity of the proposed development site a search of the Gwynedd HER was conducted examining the Penrhyn Quarry area. This area was been identified rather than utilising a search radius due to the integrated nature of the quarry landscape. The RCAHMW database and aerial photographs of the site were examined. The information collected is discussed within the main report text.

**3.1.3** The works were carried out accordance with the Cifa Standards and Guidance for historic environment desk-based assessment (Cifa (Revised 2014).

**3.1.4** This material forms the historical background for an archaeological report which includes the results of the walkover survey.

#### **3.2 Walk Over Survey**

**3.2.1** A site visit was conducted, and a photographic record was compiled detailing all above ground features and illustrating the general topography of the site. Further photographs were taken to illustrate the setting of the site. The location of all features is noted on a site plan (included as Appendix B).

##### **3.2.1 Equipment**

**3.2.1.1** Survey photographs were undertaken using a 14.2 mega-pixel Sony A350 digital camera with a variety of standard and other lenses. Images were captured in RAW format for later processing into high resolution JPG and TIF files.

#### **3.3 Consideration of Essential Setting of Identified Heritage Assets**

**3.1.1** As the site is currently under consideration for WHS the following points were given consideration in the Desk Based Assessment:

- Existing baseline describing the historic landscape before development, including previous use of site and any links to existing developments, including reference to sources used in DBA where relevant
- Registered Landscape(s) of Historic Interest potentially directly and indirectly affected
- Historic Landscape Character Area(s) (HLCA) potentially directly and indirectly affected

and which HLCAs are to be included in an assessment

- Direct and indirect effects on historic landscape character e.g. landform, land cover, openness/enclosure, key patterns, features and qualities, including maps to determine likely significant historic landscape effects
- Proximity of sensitive historic assets and their setting

### **3.4 Timetable for Proposed Works**

**3.4.1** The walkover survey was undertaken on the 30<sup>th</sup> April. Time has been allotted for archive research, report compilation and site archiving.

### **3.5 Staffing**

**3.5.1** The project was managed and undertaken by Catherine Rees (BA (Archaeology), MA (Archaeology) Postgraduate Diploma (Historic Environment Conservation) & Matthew Jones (BA (Archaeology), MA (Archaeology)).

**3.5.2** All staff have a skill set equivalent to the CIfA ACIfA/MCIfA level. C.Vs for all staff employed on the project can be provided on request. All projects are carried out in accordance with CIfA *Standard and Guidance* documents.

### **3.6 Monitoring**

**3.6.1** The project was subject to monitoring by Gwynedd Archaeological Planning Services.

### **3.7 Health and Safety**

**3.7.1** A risk assessment was conducted prior to the commencement of works and site staff were familiarised with its contents. A first aid kit was located in the site vehicle.

**3.7.2** All staff were issued with appropriate Personal Protective Equipment (PPE) for the site work. This consisted of:

- Hi-visibility vests (EN471)
- Mobile Telephone (to be kept in site vehicle)
- Suitable Walking Boots & Waterproofs

**3.7.3** All staff have passed at least a CITB health and safety test at least operative level and will carry a Construction Related Organisation (CRO) White Card for Archaeological Technician (Code 5363).

**3.7.4** C.R Archaeology staff also complied with any Health and Safety Policy or specific on-site instructions provided by the client or their appointed Principal contractor or H&S coordinator.

### **3.8 The Report**

**3.8.1** The report clearly and accurately incorporates information gained from the programme of archaeological works. It presents the documentary evidence gathered in such a way as to create a clear and coherent record. This includes illustrations of cartographic/pictorial sources. The report contains a site plan showing the locations of any photographs taken.

**3.8.2** The desk-based assessment considered the following:

- the nature, extent and degree of survival of archaeological sites, structures, deposits and landscapes within the study area
- the significance of any remains in their context both regionally and nationally
- the history of the site



- the potential impact of any proposed development on the setting of known sites of archaeological/historic importance
- the potential for further work with appropriate recommendations

**3.8.3** The report also includes:

- a bilingual summary
- a copy of the design brief and agreed specification
- a location plan
- a full bibliography of sources consulted
- a digital copy of the report and an archive compact disc/USB file

**3.8.4** It is intended that this report will inform decisions as to the necessity and/or nature of any further archaeological mitigation strategies which may be required.

**3.8.5** A copy of the report in Adobe PDF format will be sent to the appropriate monitoring archaeologist for approval before formal submission. A bound paper copy and PDF digital copy of the report will be submitted to GAPS as part of the formal submission. A digital Adobe PDF version and a bound paper copy of the final report and will be lodged with the Gwynedd Historic Environment Record within six months of completion of fieldwork.

### **3.8.1 Copyright**

**3.8.1.1** C.R Archaeology and sub-contractors shall retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it hereby provides a licence to the client and the local authority for the use of the report by the client and the local authority in all matters directly relating to the project as described in the Project.

## **4.0 Topographical and Geological Background**

### **4.1 Topography**

**4.1.1** The application site is located to the south of the town Bethesda, within Penrhyn Quarry, which is located along the trunk road of the A5. The boundary of the Snowdonia National Park runs along the eastern line of the A5.

**4.1.2** The Ogwen Valley (Nant Ffrancon) runs through the Snowdonia mountain range on a south east to north-west axis. Together with Nant y Benglog it forms a major pass through the mountains. It is a classic glaciated valley with a flat floor and steep sides, together with hanging valleys formed by smaller valley glaciers. At its north-western extent the valley opens onto the coastal plain bordering the Menai Strait. The Afon Ogwen river which that runs through the valley enters into the Menai Strait at Aberogwen. The Penrhyn Quarry is located at the north-western end of the mountains forming the south-western side of Nant Ffrancon. The area covered by the quarry extends from the valley floor at about 160m AOD to the moorland and bog of Gwaen Gynfi at up to 460m AOD (Kenney & Lowden 2017: 5).

### **4.2 Geology**

**4.2.1** The bedrock geology at the site is recorded as “*Llanberis Slates Formation – Mudstone and Siltstone. Sedimentary Bedrock formed approximately 508 to 526 million years ago in the Cambrian Period. Local environment previously dominated by deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds*” (www.bgs.ac.uk).

**4.2.2** Also present as veins within the geology are “*Unnamed Igneous Intrusion, Ordovician - Microgabbro. Igneous Bedrock formed approximately 444 to 485 million years ago in the Ordovician Period. Local environment previously dominated by intrusions of silica-poor magma. These igneous rocks are magmatic (intrusive) in origin. Poor in silica, they form intruded batholiths, plutons, dykes and sills*” (www.bgs.ac.uk).

**4.2.3** The superficial geology of the site is not recorded (www.bgs.ac.uk).

## **5.0 Historical Background**

**5.0.1** In order to identify the character of archaeological remains in the vicinity of the proposed development site, a search of the Gwynedd HER was conducted examining the Penrhyn Quarry area. This area was been identified rather than utilising a search radius due to the integrated nature of the quarry landscape. The following section is derived from information held by the GAT HER Charitable Trust Database Right.

**5.0.2** This search returned 194 results primarily related to quarrying activities at the site. Of the records returned 47 of the entries were for features whose condition was classified as damaged, 63 were recorded as destroyed, 30 of unknown status with the remaining 54 entries either intact or nearly intact. Relevant records will be discussed in detail in section 5.2.1. A complete list of quarry features is recorded in GAT Report 1397 and has not been duplicated here.

**5.0.3** The application site is located to the south of the town Bethesda, within Penrhyn Quarry. Due to the extensive landscape change caused by Post Medieval quarrying within the study area an in-depth analysis of the Prehistoric – Medieval landscape and archaeology has not been compiled. The following section has been primarily summarised from Kenney & Lowden 2017.

### **5.1 Pre/Non Industrial Activity in the Penrhyn Quarry Area**

**5.1.1** The uplands surrounding Nant Ffracon contain a wealth of Bronze Age funerary monuments including a cairn field of 44 grassed over cairns (PRN 5671). Although it is acknowledged that some of these features may be the result of field clearance and a small number investigated by nineteenth century antiquarians revealed stone cists.

**5.1.2** Iron Age/Romano-British settlement evidence is also recorded in the vicinity of the Penrhyn Quarry area. The sites recorded include hut circles with associated clearance cairns and enclosures (PRN's 5380, 5670, 12195, 12430, 12500 & 12638).

**5.1.3** Slate used in the roofing of the Roman barracks in Chester has been sourced to near Bethesda, indicating Roman use of the material (Hopewell 2005: 19) and Waddlelove (1999: 77 – 101) has postulated that a Roman road (PRN 17819) may have run from the Roman camp at Caer Llugwy to a hypothetical camp at Penrhyn Bangor. Although more evidence is needed to prove this hypothesis, there is circumstantial evidence for contacts between local inhabitants and the Roman military in the area. Should this road have once existed it is likely that it would have crossed the area later used by the quarry.

**5.1.4** It is mentioned that Myrddin ap Morfan, a sixth century poet wrote that the day would come when the stones near Snowdon would be turned into bread and this has been interpreted by some as a prophesy of the coming of the scale of the later slate quarries (Hughes et al 1980: 4).

**5.1.5** It is considered probable that there was small scale quarrying in the Bangor area as early as the thirteenth century, and a record dated 1413 remarks that Penrhyn Estate tenants were working slate on the rented land. Late fifteenth and sixteenth century mentions are made of quarrying in the area including requests to the Deans of Bangor for roofing slates from episcopal lands and a token royalty paid on slates extracted in 1582 from Cae Braich y Cafn, the site of the present quarry.

**5.1.6** Settlement and agricultural use in the area continued into the Medieval and Post Medieval period with cattle as the dominant livestock. Although unexcavated a possible long hut (PRN 12327) and trackway (PRN 12328) are believed to be the remains of a hafoty or summer dwelling which would have been seasonally occupied whilst tending cattle moved to summer pasture.

**5.1.7** Sheep had replaced cattle as the main livestock by the eighteenth century and there are several sheepfolds including a large multicellular example (PRN 29989) recorded.

**5.1.8** Quarrying and agriculture were however not mutually exclusive practises and Kenney & Lowden emphasise this point. *“It is important to recognise that the quarry was not divorced from its landscape and did not merely replace the sheep farming economy of the area. Quarry men could also run sheep on the mountain and maintain a small holding and quarrymen lived on farms in Nant Ffrancon”* (2017: 6-7).

## **5.2 Industrial Quarrying at Penrhyn**

**5.2.1** The older workings are described as haphazard and produced slates *“for their own use and possibly for a small local demand and there would be neither plan nor pattern to the excavations. Although these early ‘quarrymen’ had half-mastered the technique of reducing the slate and splitting and dressing it, their end-product was of a ram, rough nature. As skill and expertise developed, however, the market and demand increased. Horses, ponies and mules were used to cart slates down to Aber Ogwen on the Menai Straits whence they shipped to England and other countries. At first the men produced rather small slates, about the size of a man’s palm, but about 1740 their sizes were doubled, and yet again, at a later date, further doubling of sizes took place. These slates were christened singles, doubles and double-doubles”* (Hughes et al 1980: 5). In this way the Penrhyn Quarry was producing over 2 million slates a year by 1753, all extracted from small scale workings that were leased by the Penrhyn Estate (Kenney & Lowden 2017: 7).

**5.2.2** The rise and development of the slate industry in north west Wales was interwoven with that of the Penrhyn Estate which had become increasingly fragmented over time, and by the mid-18<sup>th</sup> century had been divided into four portions (National Trust 2009: 41). At this time the estate seat was occupied by General Hugh Warburton who saw the financial potential of developing the slate industry and began to take an active interest in the workings, initially claiming a 1/8 share of the slate selling prices. This was not a particularly successful arrangement and in 1765 the system was revised, with the workings leased for the sum of £1 per annum. Eighty of these leases were sold, each for a period of 21 years although none would last their full term (Hughes et al 1980: 5).

**5.2.3** The marriage of Warburton's daughter Ann Susannah to Richard Pennant, the son of his business partner John Pennant, in 1765 began the strategic reconsolidation of the historic estate by the Pennant family. Richard Pennant took possession of a quarter of the estate through this marriage and in 1767 the portion of the estate owned by Lady Yonge was purchased by John and Henry Pennant, (father and uncle of Richard). In 1768 John was also assigned the rents from the portion of the estate owned by Lady Younge's son George. Upon the death of Anne's father General Hugh Warburton in 1771 a further estate portion was inherited by Anne and Richard. In 1772 Henry Pennant died unmarried and without heir and his estate portion was passed to his brother John and on John's death in 1781 to his son Richard. The final estate portion was acquired by Richard 1785 when Pennant purchased the Younge land for which his family had been receiving rent since 1768. This final purchase reunited the various portions of the estate under a single owner once more (National Trust 2009: 41).

**5.2.4** Quarrying at the Penrhyn Quarry site was clearly established by 1768 when a Penrhyn Estate Map (Bangor University Archives: Penrhyn MS 2205) shows the Slate Quarry at Cae Braich y Cafn (figure 2).

**5.2.5** The death of John Pennant in 1781 was to prove a catalyst for the development of the Penryn Quarries as the Pennants were heirs to the prominent Jamaican plantation owner of Edward Pennant. Richard inherited his father's vast wealth which in addition to property in North Wales, significantly also included six sugar plantations and over six hundred enslaved Africans in Jamaica (this had increased to almost 1000 by 1805). It must be noted that Pennant was a strong anti-abolitionist and served as chairman of the West India Committee, an organisation of merchants and plantation owners. From 1788 chaired a special sub-committee to organise opposition to abolition whose tactics included sponsoring petitions to parliament and producing pamphlets that supported the slave trade and explained its economic benefits. Pennant used his position as MP for Liverpool to speak in the House of Commons against the abolition of the slave trade ([www.nationaltrust.org.uk](http://www.nationaltrust.org.uk)).

**5.2.6** The income from Pennant's Jamaican plantations was used to finance the development of the Ogwen Valley quarries and in 1782 Pennant bought out all the quarrying leases and took possession of all the excavations. In order to maintain his monopoly in the area, and to prevent others from working the slate Pennant also leased the adjacent Crown wastes (Dodd 1971: 205; Dodd 1968: 206, 246).

**5.2.7** Pennant undertook significant infrastructure improvements, building a road from the quarry to Aber Cegin where he developed the quay into Port Penrhyn. This allowed a much larger quantity of slate to be transported from the quarries. He also introduced a new standard sizing system of Duchesses, Countesses, Ladies and Doubles. This endeavour and a snapshot of the quarries and its effect on the local area at this time is provided in Pennant's *Tours in Wales* (volume 3). Note the mention of Wyatt, a prominent architect of the period who designed many of the buildings on the estate and who used his influence to promote Penrhyn slate nationwide. Benjamin Wyatt, brother of Samuel was the manager of the Penrhyn Estate:

**5.2.8** *“Aber Cegid, a small creek, fordable at low-water; from whence are annually exported many millions of slates. The quarries are about four miles distant, near the entrance into Nant Francon, at a small distance from the river Ogwen. They are the property of Lord Penrhyn, who has added greatly to the population of the country by the improvements he has made in the slate business. The quarries are become now the source of most prodigious commerce. When his lordship first came to the estate, not a thousand tonnes were exported: the country barely passable: the roads not better than very bad horse-paths: the cottages wretched, the farmers so poor, that in all the tract they could not produce more than three miserable teams. At present a noble coach road is made, even beyond Nant Francon,*



**Figure 2.** 1768 Penrhyn Estate Map Showing Cae Braich y Cafn Quarry



**Figure 3.** 1826 Plan of Penrhyn Slate Quarries

*and the terrors of the Benglog quite done away; about a hundred and three broad wheeled carts are in constant employ in carrying the slates down to the port. In the year 1792, upwards of twelve thousand tones were exported; and it is expected that in a very short time the quantity will be increased to sixteen thousand. The port is going to be enlarged; it is always filled with vessels; I saw one upwards of three hundred tonnes burden: they are served in rotation, but such are the improvements in our flourishing kingdom, that it is with difficulty the quarries can supply the demand. The slates are sent to Liverpool, and up the Mersey by means of the canal to all the internal parts of the kingdom, and to Hull; from whence is a second exportation: numbers are shipped for Ireland, for Flanders, and even the West Indies.*

**5.2.9** *At Port Penrhyn his Lordship has established a great manufacture of writing slates. Previously, we were entirely supplied from Switzerland: that trade has now ceased; the Swiss manufacturers are become bankrupt. The number of writing slates manufactured and exported from Port Penrhyn for the last twelve months, is 36,000; the consumption of timber in this very trifling article is upwards of 3,000 feet in the year; and the number of workmen employed are from 25 to 30. I must recommend to the curious traveller a ride to the quarries: they will merit his attention, as well as the various improvements made of late years by his lordship.*

**5.2.10** *The whole neighbourhood is occupied by the houses and cottages of the quarriers, built after the elegant design of Mr. Wyatt; and Ogwen bank is a beautiful lodge for the reception of lord Penrhyn, whenever he chooses to treat his friends with the sight of his laudable changes in the face of this once desolate country?* (Pennant 1883: 82-83).

**5.2.11** The quarry was placed under great pressure in the late eighteenth and early nineteenth centuries due the outbreak of the Napoleonic wars in 1793. A crippling tax was imposed on all slate carried coastwise and the rate of building which had driven the demand for slate during the previous decade had dwindled. The numbers employed at the quarry dropped from six hundred to little over a hundred (National Trust 2009: 46).

**5.2.12** Despite this obvious difficulty Penrhyn Quarry continued to be an innovative and forward-looking endeavour and was able to continue to draw upon its large reserves of capital. Under the enterprising management of James Greenfield, a method of stepped workings on the hillside was developed, and foreman William Williams oversaw the excavations of working galleries in the quarry faces. In 1800-1801 redundant quarrymen were set to work constructing a 6 ¼ mile-long horse-drawn/gravity iron railway ('lein bach') which had a fall of 500 feet. which was constructed linking the quarry to the coast. A water-driven slab mill was built along its course at Coed y Pare, which opened in 1802 (Gwyn and Davidson 1995: 4; Kenney & Lowden 2017: 7; National Trust 2009: 46).

**5.2.13** The quality of the slate from the Penrhyn quarries lent itself to hand-processing, which together with the scale of the site (which allowed ample room for rubble), and the effective transport systems built by Pennant both within the quarry and to the port, all gave Penrhyn an edge over its competitors. The site developed into the largest slate quarry in the world and is one of the largest hand-made excavations ever undertaken (Gwyn and Davidson 1995: 4).

**5.2.14** Despite the slowing of progress by the Napoleonic wars, the number of quarrymen doubled from 150 in 1792 to 300 in 1802. By the time of Richard Pennant's death in 1808 this number had returned to 600 (Hughes et al 1980: 6-7). Richard Pennant died childless in 1808 and was succeeded by his cousin George Hay Dawkins Pennant who took up his inheritance in 1816 on the death of Richard's wife Anne (National Trust 2009: 46). When the war ended in 1815, the number of quarrymen stood at 800 which had increased to 1000 by 1816 (Hughes et al 1980: 7). Throughout the nineteenth century, the sheer size of Penrhyn Quarry with its thousands of workers drew a great number of tourists. Rides in the open slate carriages hurtling down the inclines gave great pleasure to Victorian thrill-seekers ([www.coflein.gov.uk](http://www.coflein.gov.uk) – NPRN 40564).

**5.2.15** The war and its taxes had taken its toll on the country and unemployment and destitution were serious issues in Caernarfonshire. In 1818 a nightly patrol was introduced in Bangor for the first time for the control of vagrants. Although not to be considered an exercise in job creation, it is likely that the beginning of the building of the Penrhyn Castle around this time was in some small part to take advantage of the supply of cheap labour (National Trust 2009: 49).

**5.2.16** Dawkins Pennant reached an agreement on a system of common prices with his chief rival Thomas Assheton Smith of the Vaynol Estate. This avoided the limiting effects of a price war and allowed the further expansion of the quarry and Penrhyn Quarry produced 40,000 tonnes of slate in 1820. Following the repeal of Pitt's wartime slate duty in 1831 growth at the quarry accelerated under the management of James Wyatt (son of Benjamin). In addition to roofing and writing slates the material was used for a wide array of building and architectural details including fireplaces, table-tops, shelves, shutters and fitting out coffee and public houses along with local use as gravestones and fences. In 1820 Dawkins Pennant had a cast-iron bridge built over the river Cegin so that the line could pass onto the wharf which was extended in 1827-30 (National Trust 2009: 62).

**5.2.17** The rate of growth during this period is exemplified by the production figure for 1839, two years before Dawkins Pennant's death. The quarry had produced approximately 74,000 tonnes of slate which was worth £124,667 and gave the estate a profit of £62,144 (Hughes et al 1980: 8). Figure 3 shows the Penrhyn Quarry in 1826, and figure 4 the quarry in 1848.

**5.2.18** Penrhyn Estate was inherited by the eldest daughter of Dawkins Pennant, Juliana Isabell Mary and her husband Edward Gordon Douglas, who took on the name Douglas-Pennant in 1841. Juliana died in 1842 and her husband retained the estate. Douglas-Pennant owned the quarry for over 45 years, and it was during this era that peak production was reached during the 1860's and 70's (ibid).

**5.2.19** Despite improvements, the working conditions in the quarries were life-threatening with quarry men working suspended from ropes along the rock face, using explosives to remove large slabs of rock. Loss of limb or life was common, and many quarrymen developed silicosis from the particles of dust from splitting slates settling in their lungs. The adverse working conditions and the low wages paid to the quarrymen were notorious and Penrhyn Quarry saw a number of strikes towards in the nineteenth and early twentieth centuries (www.coflein.gov.uk – NPRN 40564).

**5.2.20** The first quarry workers strike at Penrhyn Quarry was in 1825 when 150 workers came out in protest at wide disparities in earnings, complaints of favouritism and accusations of shady practices – particularly following the retirement of William Williams and the death of James Greenfield. The strike was quickly ended due to lack of organisation, the absence of a union and the power of the quarry owner over the lives of the workers. There was a small movement to meet at least some of the grievances and a new overseer was appointed. Industrial action was revived during the 1860's and 1870's and several events took place beginning in 1865 when the Penrhyn quarrymen attempted to form a Trade Union. Like the earlier action this attempt was disastrous and with the threat of dismissal made the majority of the men abandoned the cause. The eighty who stuck with the union were all made redundant over the following few years. A second, more successful attempt was made in 1874 at a time of booming trade, high demand and soaring prices. Under Parry as secretary, and following a three-month strike, union demands led to a new price list and a change of overseer under the Pennant-Lloyd Agreement (Dodd 1968: 254-255). Figure 5 shows the proposed new workings at the quarry in 1872.



**Figure 4.** 1848 Tithe Map Showing Penrhyn Quarry



**Figure 5.** 1872 Plan of Penrhyn Slate Quarries. Proposed New Workings Marked in Red



To increase productivity the workings continued to be modernised under Douglas-Pennant and in the mid-nineteenth century included a large stepped pit with hydraulic lifts to lift raw blocks. These emptied into the Afon Ogwen via over a mile of tunnelling (Gwyn and Davidson 1995: 4). Further works were also undertaken to improve the quarry's internal railway system and upgrade transport links to the port. Between 1874 and 1876 'lein bach' was rerouted to make it suitable to carry steam locomotives, the earliest of which were produced by De Winton's company in Caernarfon. The line was in use until 1962, and the rails were taken up in 1965 (Hughes et al 1980: 8).

**5.2.21** Despite the modernisations of Douglas-Pennant the industry was in decline when, following the death of the 'Old Lord' in 1886, the Penrhyn Estate with its quarry passed to George Sholto Gordon Douglas-Pennant (figure 6 shows the quarry in 1889). It is recorded that by 1894 he was receiving an income of in excess of £100,000 per annum from the quarry and 110,000 tonnes of slate were being produced by 3,000 men (Hughes et al 1980: 9).

**5.2.22** One of the first deeds of George Sholto was to dissolve the Pennant-Lloyd Agreement and the first of the series of strikes under the ownership of George Sholto lasted for eleven months from 1896-7, with a second much longer strike – the longest lasting for 3 years from 1900 to 1903. The "Great Strike of Penrhyn" as it became known, was the longest labour dispute in British history and it is estimated that across north Wales nearly a quarter of the population was affected. It is no understatement to say that the strike split the community with around 500 of the 3,000 men returning to work after 6 months, forced by starvation to accept the golden sovereign offered by Lord Penrhyn to return. Penryn also built a row of houses for the ones who returned to work ([www.coflein.gov.uk](http://www.coflein.gov.uk)). For those who refused there was little option to remain and around 1,500 men left to work in other areas, with many moving to the South Wales coalfields (Jones 2003: xii). The houses of striking men displayed cards in the window announcing 'Nid oes Bradwr yn y Tŷ Hwn' (There is no traitor in this house). It is beyond the scope of this report to explore this topic in detail but a contemporary account is recorded in Charles Sheridan Jones' memoir "What I Saw at Bethesda" which is dedicated to "*The Memory of Bethesda's Dead, The women who hungered in silence, The old men who died in exile, The children who starved at home*" (Jones 2003).

**5.2.23** After three years of stalemate, the quarrymen were forced to return to work at much decreased wages, and in this aftermath the orders for north Welsh slate declined and has continued to in this decline. The effect of this is summed up by Hughes et al who wrote "*it is sufficient to say that the inhabitants of the area suffered extreme hardships and that the whole community was destroyed more or less overnight. There is no doubt that the slate industry suffered a serious blow too, and it would be no exaggeration to state that neither the Penrhyn Quarry, nor Bethesda, nor the Ogwen Valley has ever been the same since*" (Hughes et al 1980: 9). Dodd adds "*it was an epic, not to say tragic, struggle which shook the whole of Wales as well as the Welsh community in America, and was further embittered by sectarian and political undertones. It also helped to ruin the quarry industry, already weakened by foreign competition and the discovery of cheaper roofing materials, and destined within the next half century to meet its Waterloo in the two world wars*" (Dodd 1968: 255).

**5.2.24** George Sholto died in 1907 and the Penrhyn Estate and quarry passed to his son Edward Sholto Douglas Pennant. Edward was less intransigent than his father and accepted the need for reform at the quarry. Revolutionary new technology was adopted, and electric power was introduced to the quarry. In 1912 the first high-tension power cables and the first sub-station in the works were brought into operation. This was accompanied by new sawing and dressing sheds whereby the traditional *gwiliau* were replaced by factory style mill buildings, and the replacement of the old hand drills with pneumatic drills (Hughes et al 1980: 9). Three large air compressors were brought into operation to power drills in the 1920's (Kenney & Lowden 2017: 9).

**5.2.25** Aerial ropeways (known as Blondins, after Charles Blondin who crossed Niagara Falls on a tight rope) appeared around 1900, were used to move material around the quarry. Three Blondins were in use in Penrhyn Quarry by 1912 (Gwyn 2015: 150-152). Initially they were powered by a steam engine, they were electric by 1913 (Lewis 1976). In addition to the horizontal Blondins aerial inclines were used, especially to carry slate down to the mills (Gwyn 2015: 152). These features are visible on the Ordnance Survey editions of 1900 and 1914 which show the continued development of the quarry site (figures 7 and 8).

**5.2.26** The First World War caused the further decline in the quarry and many men left to fight, some for the duration of the war whilst many did not return and the same is true of the Second World War. The industry limped along during the 1930's and 1940's, with Hugh Napier Douglas Pennant taking over the quarry in 1927 on the death of his father being replaced upon his death in 1949 by his niece Lady Janet Douglas Pennant. In 1952 the quarry passed to a private company and in 1964 its control passed to Sir Alfred McAlpine and Sons as majority shareholders. In 1973 McAlpine became the sole owner of the Penrhyn Quarry site (Hughes et al 1980: 9).

**5.2.27** An Alfred McAlpine Minerals Division brochure produced around the mid 1990's details the site as consisting of 3,500 acres with quarry tips of slate waste in excess of 200 million tonnes in weight which had accumulated over the last 200 years. The contemporary excavation dimensions were given as being approximately a mile in length, a third of a mile wide and 1,500 feet deep. McAlpine once again modernised the quarry, introducing new techniques and machinery to improve speed and efficiency and to increase yields. In 1988 invested around £9 million in creating access roads and replacing steam engines with diesel power and £2 million on new plant and machinery including a 1.6m diameter circular saw to cut the slate at the quarry face – the first of its kind in the country (McAlpine Undated: 3).

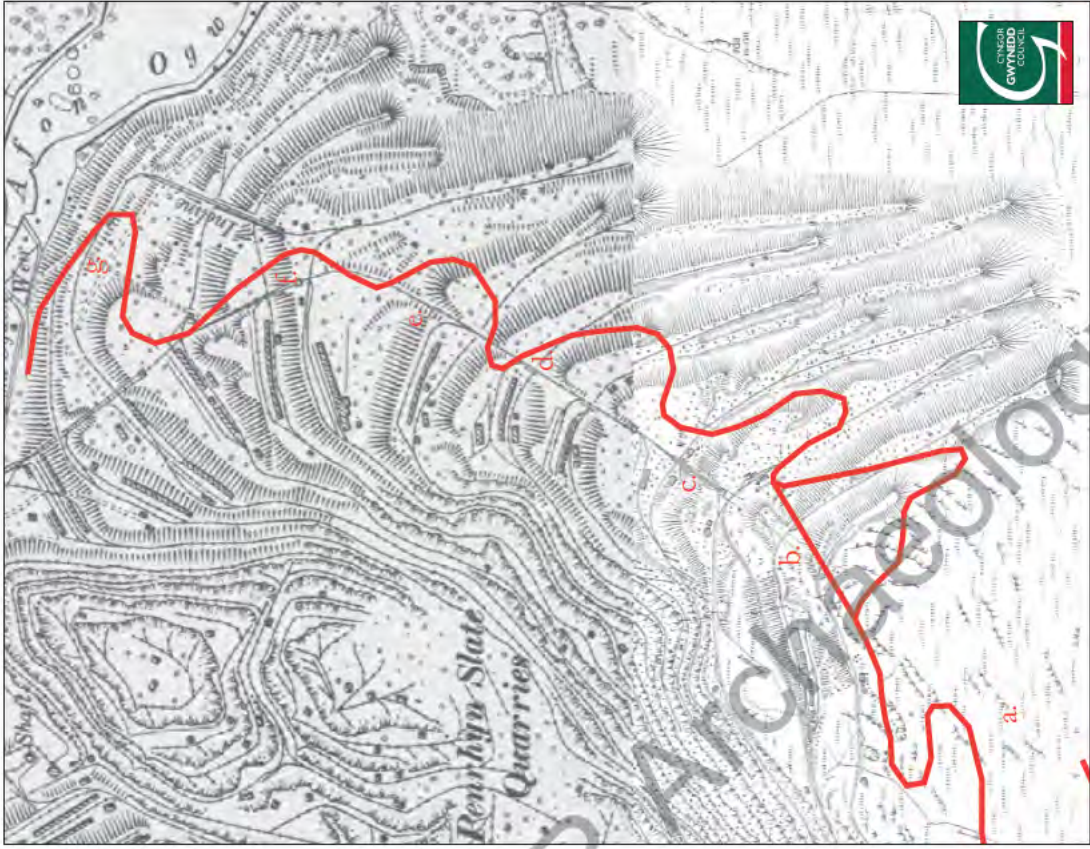
**5.2.28** In 2007, Penrhyn Quarry was purchased by Lagan Group and renamed Welsh Slate Ltd. Welsh Slate Ltd also own Oakeley quarry in Blaenau Ffestiniog, the Cwt Y Bugail quarry and the Pen Yr Orsedd. Penrhyn Quarry continues to produce a wide range of slate products including the traditional roofing material, together with flooring, cladding, interior fittings and aggregates (www.welshslate.com).

**5.2.29** Part of the site remains active, adjacent to the relict historic quarry, and the system of benched galleries dating from the end of the eighteenth/ beginning of the nineteenth centuries remains evident in the relict pit landform and the immense tips of waste rock. The form of the inclined planes remains evident, and the two preserved water-balance shaft-heads 'Sebastopol' and 'Princess May' illustrate the means by which slate and waste rock was raised from the lower workings to a large working and tipping area known as 'Red Lion'. The remains of a series of mills and slate processing shelters also survive in this area. The zip-lines spanning the pit recall the ropeway systems used in the quarry from 1911 to the 1960s (www.coflein.gov.uk – NPRN 40564).

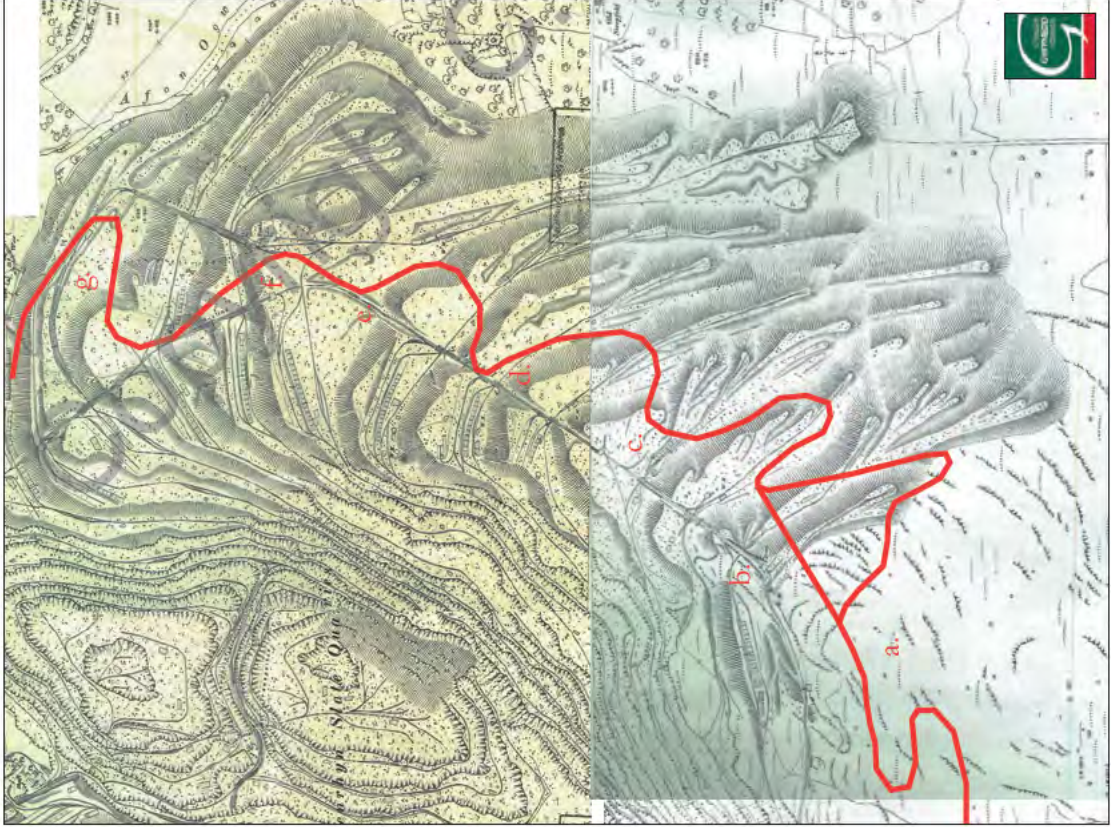
**5.2.30** There are also surviving underground tunnels and drainage levels which preserve a wealth of historic machinery, including a water-pressure engine and associated pumps. One drainage tunnel cut in the 1840s leads from 'George' gallery in the pit to an outfall on the Ogwen river still dewateres the workings (ibid).



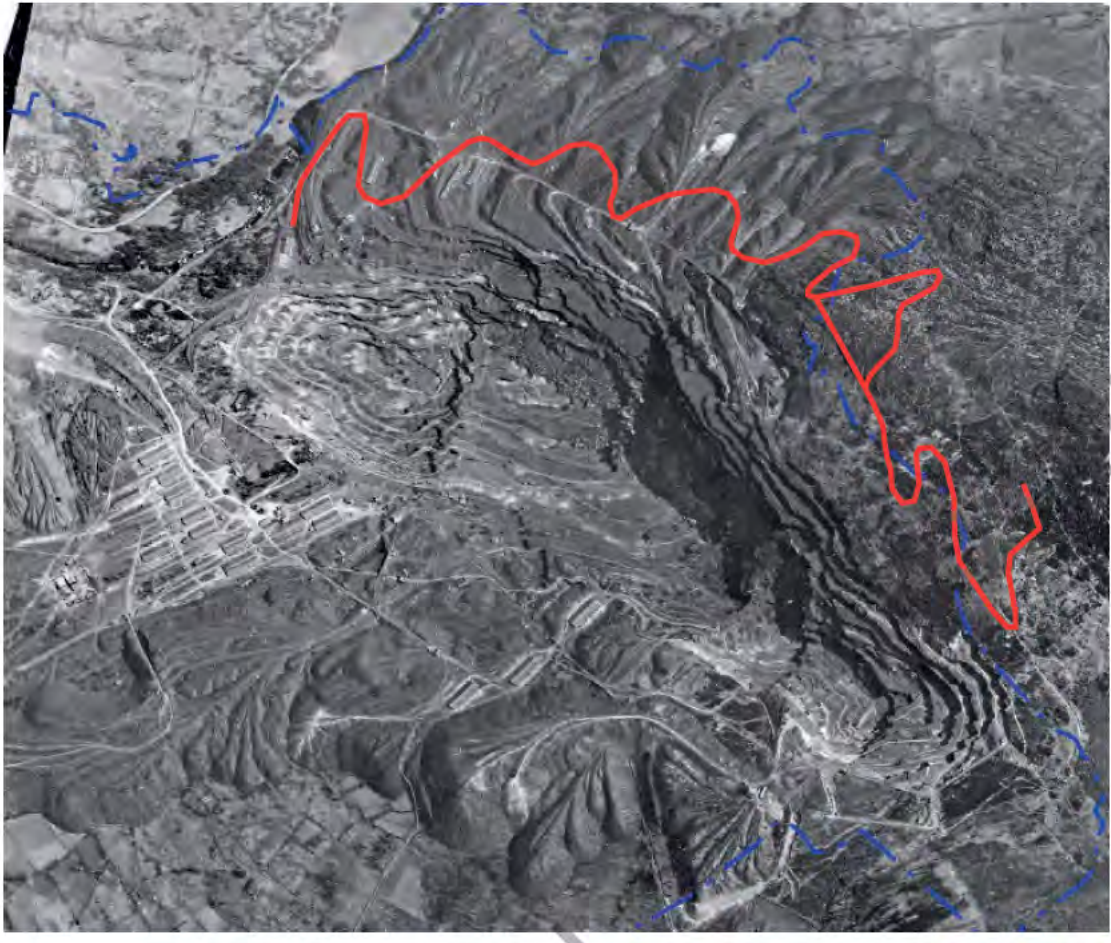
**Figure 6.** 1889 Ordnance Survey Map Showing Pentrhyn Slate Quarries



**Figure 7.** 1900 Ordnance Survey Map Showing Pentrhyn Slate Quarries



**Figure 8.** 1914 Ordnance Survey Map Showing Penrhyn Slate Quarries



**Figure 9.** 1947 Aerial Photograph Showing Penrhyn Slate Quarries (Source: GAT Report 1397)

### **5.3 HER Records and Cartographic Sources Showing the Proposed Cart Track Area**

**5.3.1** Within the application area and immediate vicinity there were 17 entries within the HER record, with the majority clustered on a flattened level around grid reference SH 62610 65089 (figure 10). The following section is derived from information held by the GAT HER Charitable Trust Database Right. These features recorded in the HER are:

**5.3.2 1. PRN 60706** - Part of Lord Penrhyn's road running up Nant Ffrancon from Ogwen Bridge and now completely obscured under slate heaps.

**5.3.3 2. PRN 60138** - A short section of incline PRN 60136 survives with an arch running through it that would have taken a tramway under the incline. The incline here has different phases of build and the arch belongs to the first phase, which the 1889 map shows was actually a short bridge, later incorporated into the incline.

**5.3.4 3. PRN 60137** - Well-preserved arch through incline PRN60136 to take a tramway under the incline. Tramway shown running under incline on 1900 and 1914 maps. On the 1889 map the tramway runs under a short bridge and it is almost certain that the arch dates from this period and the bridge has been incorporated into the later incline.

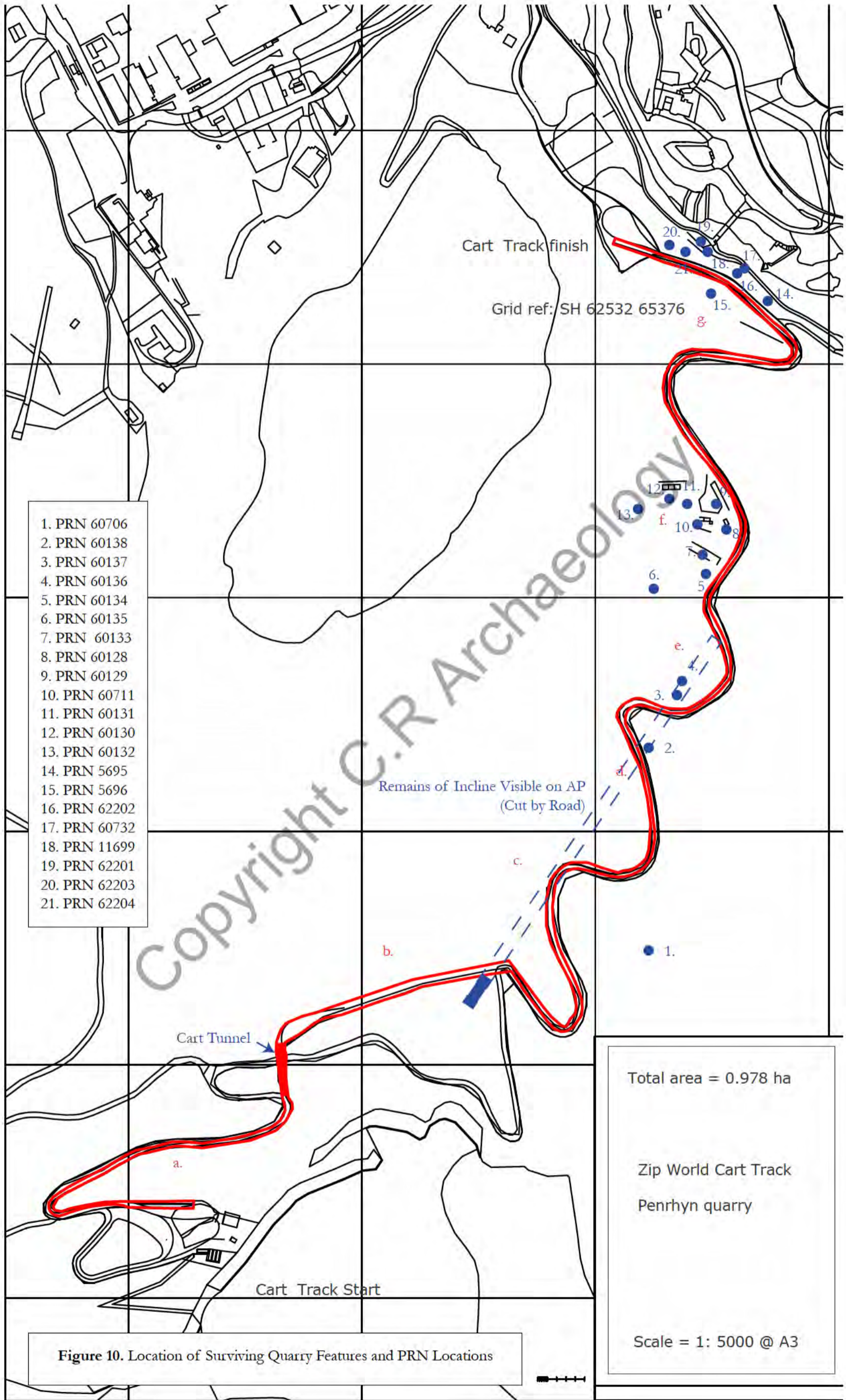
**5.3.5 4. PRN 60136** – Group number for incline. Much of the incline is destroyed or damaged but there is a well-preserved section surviving at the grid reference given. This is built of large slabs of undressed slate and runs downwards towards the NE. On the NW side are overhanging eaves as if a wider track bed was supported at one point. The SW end of this part of the incline splays outwards and this plan is reflected on the 1889 map where a bridge over a tramway was present before the incline was built. This splayed masonry is almost certainly the remains of this earlier bridge. Another section of the same incline survives around SH6255464856. The upper part of this is built of large slate slabs but this ends in a vertical joint and the lower part of the incline is built of much smaller slate pieces. This joint coincides with the end of a bridge shown on the 1889 map, similar to the one lower down. The smaller stones were used when the incline itself was built, reusing the bridge as part of the structure. The incline is shown on the 1900 and 1914 maps but not on the 1889 map which shows a short bridge. A small square slate footing was noted at SH6259664935.

**5.3.6 5. PRN 60134** - Transverse pattern roofing-slate mill - as PRN60133. Remnants of slate - built structure in ruinous condition. Long and narrow in plan, orientated E-W. Walls stand up to 3m high in places but mostly collapsed and structure buried.

**5.3.7 6. PRN 60135** - Transverse pattern roofing-slate mill as PRN60133. Nothing can be seen at the grid reference originally given (SH6257065018), although the area could not be accessed because it is very dangerous. There is no evidence of a third mill in this area. Only two mills are shown on the Davidson and Gwyn 1995 plan. There was a mill at c.SH6262265219 but this area is entirely covered with slate heaps and anything that was there has been demolished.

**5.3.8 7. PRN 60133** - Transverse pattern roofing-slate mill. In ruinous condition, with walls surviving to eaves height in places. Slate-built building orientated NW-SE. Gabled single storey structure. NE gable has fallen off cliff edge. There are 2 doors in the SE elevation. This mill was not shown on the 1914 map or any earlier ones and was of 20th century date.

**5.3.9 8. PRN 60128** - Large winding house with a first floor capable of holding an electric motor to power a haulage drum. Possible allowed for both counterbalance and up-haulage. Tall, slate-



**Figure 10.** Location of Surviving Quarry Features and PRN Locations

built structure, aligned NW-SE, with a small structure on the NW end. There are slate steps up the SW side of the structure to the top. Shown on 1900 and 1914 maps but not 1889.

**5.3.10 9. PRN 60129** - Incline formation, top end of trace only survives. Fairly short section of incline (c.40m long) running NW down from the winding house. Lower part of incline completely destroyed. Shown on 1900 and 1914 maps but not 1889.

**5.3.11 10. PRN 60711** - Slate-built building aligned E-W, with a fireplace in the main room and a toilet on the E end. The walls mostly survive to full height but are suffering from serious subsidence. The whole area is very unsafe, and the ground could slump up to 20m away from the current cliff edge. Shown on 1900 and 1914 maps, but not on 1889 map. An additional room or building has been added on the W end since 1914.

**5.3.12 11. PRN 60131** - Weigh house. In 1995 it was recorded that a structure survives, but no machinery. In 2015 it is noted that nothing survives at this grid reference and the area seems to have been levelled and allowed to revegetate.

**5.3.13 12. PRN 60130** - Gwaliau in ruinous condition, in danger of collapse. Three gwaliau booths in a line aligned W-E. These have no roofs but the walls generally survive to nearly full height. Some of the fallen roof slabs can be seen leaning against the walls. Shown on 1900 and 1914 25 inch maps but not 1889. The 1914 shows 17 booths, most to the W of the surviving structures but at least 1 may have been to the E.

**5.3.14 13. PRN 60132** - Recorded as ruinous structure of unknown function in 1995. In 2015 it is noted that the grid reference places this in a dangerous and inaccessible area. Nothing could be seen from a distance and the recent aerial photographs suggest that this building has been destroyed.

**5.3.15 14. PRN 5695** – Revetment. At the base of waste tips lining the River Ogwen on its western bank are various examples of stone revetting designed to prevent the tips spreading. A series of plinths of slate block construction were recorded in 1993 alongside the river bank adjacent to the revetment. Each measuring c.1.5m x 2.0m x 1.5m, the plinths are spaced between two and three metres apart. They are most likely an industrial feature, constructed for support of a leat or aqueduct system. This entry was revised in 2015 to record feature as a length of revetment about 30m long, up to 3m high in places. No trace of the slate plinths could be seen, and it is assumed that these were lost when the cycle track was constructed.

**5.3.16 15. PRN 5696** - A brick-built structure recorded as 10.0m in length, 2.0m wide and 0.75m high located on the west bank of the River Ogwen at Pont Ogwen. A flat roof of large slate slabs retains two cast iron inspection covers in situ. Within the structure are pipework and tap fittings and it was noted that a brick built dividing wall separates the structure in two.

**5.3.17** Large screw thread projecting from the top. It is built at the base of the revetment to the quarry heap and a channel runs from it. A tank is shown on the 1900 and 1914 25 inch maps associated with an aqueduct, but the aqueduct seems to have been realigned sometime after 1914 (PRN 60732). The tank was probably also rebuilt, and is clearly directly associated with the later aqueduct - although the new tank seems to have been built on the location of the original one.

**5.3.18 16. PRN 62202** - A leat and sluice gate believed to be a water course for an underground pressure engine. A rock cut leat joins the iron girder supported leat from site 3 and runs along the

river-bank in a north-west direction into a tank. This is believed to be a water course for an underground pressure engine.

**5.3.19 17. PRN 60732** - Channel, rock-cut in parts and built up elsewhere. Lined with concrete in places. A slate footbridge crosses it next to an iron gate across it with a mechanism with a screw thread and a long iron pole, which may have operated the sluice in the weir. There is an aqueduct shown on the 1900 and 1014 25 inch maps taking water from the weir, but this runs to the S of PRN 60732. At some point after 1914 the aqueduct has been realigned, although it still seems to be taking water from the same sluice on the weir. PRN 60732 is this later realigned later aqueduct and it is related to tank PRN 5696. Little of the earlier aqueduct seems to have survived.

**5.3.20 18. PRN 11699** - Substantial late eighteenth-century bridge of rubblestone with a slate slab coping and string course. Single wide segmental arch with voussoirs and arch-ring, coping slightly rising to centre; corner piers. Almost certainly built c1790 to connect Lord Penrhyn's now demolished villa at Ogwen Bank, with Penrhyn Quarry. The slate tops of the parapets of the bridge are covered with graffiti. Much of it is recent but some dated to the late 19th century. Fairly early images include an elephant, a man with a pipe and a jug. Of particular interest is a rather worn drawing of a De Winton steam engine.

**5.3.21 19. PRN 62201** - A rock cut leat, c.27m long and 1m wide, and built up at the western end with stone walls. It runs from the Afon Ogwen slightly inland forming a loop and then back into the river.

**5.3.22 20. PRN 62203** - A platform with slate revetting on the north-eastern side, 1.3m high and 6m by 6m in size, located just off the modern trackway

**5.3.23 21. PRN 62204** - A short length of slate-built walling, 2m high and 3m in length, emerging from a slate tip.

### **5.3.1 Cartographic Evidence for Proposed Development Area**

**5.3.1.1** The cartographic evidence for the Penrhyn Quarry workings is largely schematic or lacking in detail prior to the First Edition Ordnance Survey Map of 1889. What is evident from the earlier sources dated 1768 (figure 2), 1826 (figure 3), 1848 (figure 4) and 1872 (figure 5), is that the proposed development area is situated within the area encompassed by these earlier workings but has been later covered with slate waste and redeveloped. The southern most area of the proposed trackway is within an area not developed until the later twentieth century.

**5.3.1.2** The first detailed map of the quarry site is produced by the Ordnance Survey of 1889 (figure 6). This plan shows that the proposed development is within an area characterised by large slate waste tips crossed by an intricate system of inclined planes, aqueducts, track and tramways. Accompanying these features are mills, cutting sheds and gwalia and other associated buildings. These features develop in complexity over time, as can be seen on figures 7 (1900), 8 (1914) and 9 (1947).

**5.3.1.3** For ease of description the route has been described from south to north following the route to be taken by the carts which travel from the highest to the lowest point. Letters have been assigned along the route to allow for specific locations to be identified and discussed.

**5.3.1.4** The beginning of the route (marked a) is shown as undeveloped and uncovered by slate waste on all mapping editions from 1889 – 1914 (figures 6-8). An aerial photograph dated 1947 also shows this area as undeveloped and the haulage road which is to be utilised for the majority



of the cart track post dates these sources. It does appear on an aerial photograph dated 1986 (Kenney & Lowden 2017: 119) allowing us to conclude that it is a late quarry feature, related to the expansion of the works following the involvement of McAlpine at the site.

**5.3.1.5** Area (b) is a cut through along an existing service trackway. This area is at the outer limits of the quarry related activity on the sources examined. In 1889 (figure 6) the area is partially under slate waste and a number of trackways and an aqueduct are shown which are along the route cut by the later road.

**5.3.1.6** The 1900 map edition (figure 7) shows that tipping in this area has been extended and the number of structures to the west increased. There is a structure shown at what would later be developed as the head of the incline. This area has been considerably altered by the 1914 OS edition (figure 8) which shows the full extent of the incline has now been reached, with a bridge crossing the earlier trackway, a weighing machine and drum. Also shown are four gwaliau booths. The remains of the incline (PRN 60136) were recorded during the walk over survey and were observed to have survived beyond the area highlighted in Gat Report 1397.

**5.3.1.7** Area (c) was the starting point for the incline as marked on the 1889 map. As with the remaining strip between points (c) and (f) there is an intensification and extension of workings shown over the map sequence with the adding of railway tracks, gwaliau and mills. Only limited elements of these features now survive.

**5.3.1.8** In the area between point (d) and loop (e) there are three features recorded in the HER. PRN's 60138 (marked as point 2 on figure 10) and 60137 (marked as point 3 on figure 10) survived as short sections of incline with arches to take a tramway under the incline. The incline here has different phases of build and the arch belongs to the first phase and is shown on the 1889 map shows as a short bridge which is later incorporated into the incline.

**5.3.1.9** PRN 60136 is the overall number given to the incline dominating this area of the site. Much of the incline is destroyed or damaged but there is a well-preserved section surviving at point 4. This is built of large slabs of undressed slate and runs downwards towards the NE. On the NW side are overhanging eaves as if a wider trackbed was supported at one point. The SW end of this part of the incline splays outwards and this plan is reflected on the 1889 map where a bridge over a tramway was present before the incline was built. This splayed masonry is almost certainly the remains of this earlier bridge. The upper part of this is built of large slate slabs but this ends in a vertical joint and the lower part of the incline is built of much smaller slate pieces. This joint coincides with the end of a bridge shown on the 1889 map, similar to the one lower down. The smaller stones were used when the incline itself was built, reusing the bridge as part of the structure. The incline is shown on the 1900 and 1914 maps but not on the 1889 map which shows a short bridge.

**5.3.1.10** Area (f) housed a concentration of quarry structures numbered as points 5-13 on figure 10 (see above in PRN section). PRN's 60133, 60128 and 60129 were noted as visible from the existing road.

**5.3.1.11** Area (g) also housed a concentration of features which were predominantly associated with the river (see above).

## 5.4 Statutory and Non-Statutory Designations

There are a number of statutory and non-statutory designations affecting the proposed development site.

### 5.4.1 World Heritage Site

**5.4.1.1** There are no sites with World Heritage Status within the site limits. This confirms that the proposed works will have no direct physical impact on this class of heritage asset. However, although not currently a World Heritage Site, Penryn Quarry is included on the UNESCO Tentative Lists of States Parties as a key element of the Slate Industry of North Wales (ref 5678) which is currently being proposed for World Heritage Status nomination for the cultural landscape associated with the industry. The proposed works will not affect the understanding of the proposed development site as an element of this industrial landscape, and will not have a detrimental effect on the ongoing application.

### 5.4.2 Scheduled Ancient Monuments

**5.4.2.1** There are no Scheduled Ancient Monuments within the study area.

### 5.4.3 Listed Buildings

**5.4.3.1** There are two Listed Buildings within and immediately adjacent to the Penrhyn Quarry site.

**5.4.3.2** Within the quarry itself only the quarry offices (Cadw ID: 23392, PRN 59997) were Listed (Grade II). The quarry office was built c1860 during a period of expansion at the quarry had been considerably extended in later periods. The original offices collapsed into a subsiding tunnel and were rebuilt with nothing remaining of the structure which was Listed.

**5.4.3.3** Pont Ogwen (Cadw ID: 23378/4140, PRN 11699) is situated just on the edge of the study area. It is Grade II listed, and has been assigned 2 different numbers as it spans the boundary between the Llandegai and Llanllechid communities.

**5.4.3.4** It is described as “*Almost certainly built c1790 to connect Lord Penryhn's now demolished villa at Ogwen Bank, designed by Benjamin Wyatt, with Penrhyn Quarry. The Afon Ogwen here forms the boundary with Llanllechid community. Roughly coursed rubblestone with slate slab coping and string course. Single wide segmental arch with voussoirs and arch-ring, coping slightly rising to centre; corner piers*”. The proposed works will have no physical effect on this structure and will not impact upon its setting.

### 5.4.4 Designated Landscape Areas

**5.4.4.1** Penrhyn Quarry is situated within the non-statutory Dyffryn Ogwen Landscape of Outstanding Historic Interest (No. 28 HLW (Gw) 10 (Cadw 1998: 105-8)). It forms one of the most important elements of this landscape and specifically mentioned as of significance to the landscape area are “*large and extensive remains of 19<sup>th</sup> and 20<sup>th</sup> centuries slate quarries, tips, attendant settlements and transport systems; Penrhyn Castle and Park; Telford's Holyhead Road; historic literary and social associations*”.

**5.4.4.2** The character description records “*the area contains extensive and very well-preserved, relict remains of prehistoric and later land use, and in sharp visual contrast, the immense and diverse remains relating directly and indirectly to the industrial extraction of slate in the last and present centuries. As well as Penrhyn Quarry itself, which is one of the few still working in Gwynedd, the contrasting style and scale of the settlements of quarry owner and workers echo the powerful social and economic forces which shaped and still underlie, this landscape*”.

**5.4.4.3** Penrhyn Quarry falls within Historic Landscape Character Area 41 – Moel y Ci/Gwaen Gynfi unenclosed uplands (GAT Report 351: 2000).

**5.4.4.4** The quarry lies just outside the Snowdonia National Park but is clearly visible from within the area of the National Park, especially from the Carneddau on the opposite side of Nant Ffrancon (Kenney & Lowden 2017: 11).

**5.4.4.5** The specific study area containing the trackway and proposed development is recorded in the “Slate Industry of North Wales - World Heritage Site Nomination” produced by Gwynedd Archaeological Trust (and supplied by the client) as:

**5.4.4.6** “Name - DO-03 Penrhyn Quarry, incline and mills

**NGR centre** - SH62566493

**Area** – 4.03 ha.

**Description** – The fragmentary remains of the 470m long incline running from the top of the eastern side of the quarry to mills and other buildings on the edge of a major area of subsidence on the south eastern edge of the pit. The incline has been cut by haul roads and other modern workings and the buildings have partly subsided into the pit. The area around the buildings is considered to be unsafe. A fragment of a second incline is visible at the north of the area.

## **6.0 Results of Walkover Survey**

**6.0.1** The walkover survey was conducted on 30<sup>th</sup> April 2019. The proposed cart trackway is approximately 2.25km in length and will primarily utilise the existing road on the site. As it will embark from the current Zip World departure building, the walk over survey commenced from this location and progressed downhill along the proposed route.

**6.0.2** The cart track follows the existing haul road for approximately 500m where there is a cut through to avoid a large bend (Plates 2, 3 & 4). The cart track then crosses the main road and links to an existing service track (Plate 7). It runs past the remains on of an incline (Plates 8, 9, 10 & 11) which is situated on the corner where the cart track joins the main road.

**6.0.3** From this point the proposed trackway follows the main road. At SH 62612 64882 two features were noted, evidenced by stacked split-slate on the western side of the track and a slate-built revetment/support for the spoil heaps to the east (Plates 13, 14, 15 & 16).

**6.0.4** The track continues along the main road and passes Mill (PRN 60133) to the west (Plates 18 & 19). This feature is of early 20<sup>th</sup> century date. The road continues pass the winding house (PRN 60128), also dating from the early 20<sup>th</sup> century and a large incline (PRN 60129).

**6.0.5** All these features have an existing slate waste bank surrounding them. This bank will be replaced/partially replaced with finer grade material which will be safer materials for the carters and will continue to provide protection for the monuments. It will retain its current appearance. It is unlikely that there will be any buried features below this bund, but it remains a possibility.



**Plate 1.** View Over Quarry Landscape Taken  
From the Cart Track Start Point



**Plate 2.** Cut-Through from Main Road  
To be Used for Cart Track



**Plate 3.** Cut-Through from Main Road  
To be Used for Cart Track



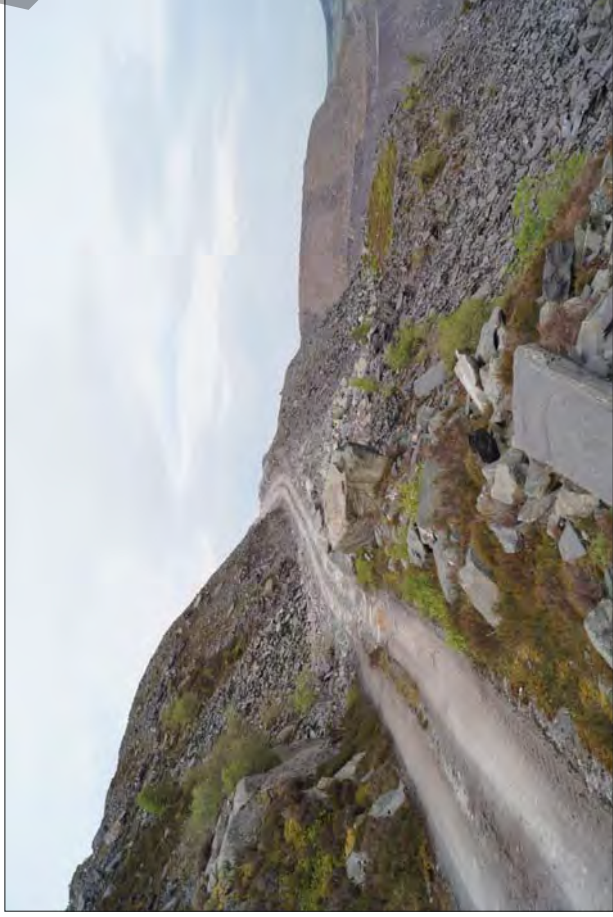
**Plate 4.** Cut-Through from Main Road  
To be Used for Cart Track



**Plate 5.** General View of Main Road



**Plate 6.** General View of Main Road



**Plate 7.** Service Track to be Incorporated into Cart Track



**Plate 8.** Surviving Incline at the Corner of Service Track and Main Road



**Plate 9.** Surviving Incline at the Corner of Service Track and Main Road



**Plate 10.** Surviving Incline at the Corner of Service Track and Main Road



**Plate 11.** Surviving Incline at the Corner of Service Track and Main Road



**Plate 12.** General View of Main Road



**Plate 13.** Evidence of Layered Split Slate -  
Now Covered by a later spoil tip



**Plate 14.** Evidence of Layered Split Slate -  
Now Covered by a later spoil tip



**Plate 15.** Slate Spoil Tip Revetting



**Plate 16.** Slate Spoil Tip Revetting



**Plate 17.** Main Track Looking Uphill from the Mill Building



**Plate 18.** Main Track Looking Down from the Mill Building. Truck Illustrates Width of the Track



**Plate 19.** Early Twentieth Century Mill (PRN 60133)



**Plate 20.** Area Between the Mill and Winding House





**Plate 21.** View Showing Spoil Infill of the Main Quarry



**Plate 22.** View of the Main Track With The Winding House to the Left



**Plate 23.** View of the Main Track with Incline



**Plate 24.** View of the Main Track with Incline

**6.0.6** The track continues along the existing road and terminates at an existing large parking place.

## **7.0 Impact of Proposed Works on Surviving Quarry Features and Characteristics**

**7.0.1** There are no sites with World Heritage Status within the site limits. However, Penryn Quarry is included on the UNESCO Tentative Lists of States Parties as a key element of the Slate Industry of North Wales (ref 5678) which is currently being proposed for World Heritage Status nomination for the cultural landscape associated with the industry. The proposed works will not affect the understanding of the proposed development site as an element of this industrial landscape and will not have a detrimental effect on the ongoing application. The proposed development will not have any direct or indirect effect on any Scheduled Ancient Monuments or Listed Buildings.

**7.0.2** The majority of the proposed works will have no effect on the surviving quarry features. The road itself is a late feature, likely added in the 1960's or later and the addition of a central bund will not alter its characteristics as a transportation system, nor will it affect the understanding of the use of this area of the site or impact upon the local historic characterisation areas.

**7.0.3** There are a pair of tunnels proposed to allow for the carts to pass beneath the truck road (see figure 10). The area in which this is proposed to take place is not within the historic quarrying area, but rather it is a later twentieth century waste area. It is therefore unlikely that any earlier industrial features will be encountered during or disturbed by this work and that preindustrial features are unlikely to have survived.

**7.0.4** The proposed routeway passes several historic structures assigned PRN numbers and where these features are protected by a slate bund (see plates 18 and 19), a barrier is to be maintained at this location. This is currently proposed to be a replacement of similar appearance using finer grade waste material. Where the track passes other existing features with no protection, such as is shown in plate 25, then consideration must be given to appropriate mitigation to protect these structures from possible impact. Consideration must be given to the appropriate materials and appearance for any addition.

**7.0.5** The increased proximity of public access resulting from the cart track is likely to present long-term risks and management implications for the standing buildings, particularly those in poor repair. It is therefore recommended that the consolidation and long-term future of these structures be considered as part of this scheme.

**7.0.6** Plate 7 shows the service track which is proposed to be incorporated into the cart track. It is assumed that some form of safety barrier will be required along the outer edge of this track and consideration must be given to the appropriate materials and appearance for any addition.

**7.0.7** The proposed development site is overlooked by certain areas of the Snowdonia National Park. The proposed works will not affect the understanding of the proposed development site as an element of the existing industrial landscape and changes to the vista will be negligible.

## 8.0 Conclusion

**8.0.1** The proposed site of the development is located within an area renowned for its archaeological/historical remains. It is situated within the Penrhyn Quarry site which is partially in use as an active quarry site, and partially as an outdoor tourist attraction. The quarry site is included on the UNESCO Tentative Lists of States Parties as a key element of the Slate Industry of North Wales (ref 5678) which is currently being proposed for World Heritage Status nomination for the cultural landscape associated with the industry

**8.0.2** This document has considered the potential impact of the proposed cart track change of use at the site. It has determined that, with the employment of a sensitive site design to create track barriers, it could be developed without having an adverse effect on the Essential Setting of the potential World Heritage Site or surviving quarry features on the site.

**8.0.3** No Listed Buildings or Scheduled Ancient Monuments were found to be affected by this development.

**8.0.4** Desk based research and a walkover survey of the site has demonstrated that this area of the quarry was initially developed prior to 1768 when it is shown within the area of workings on an Estate Map. It undergoes changes over time and the current area is characterised by the slate tips and the surviving incline feature and a mill. With careful consideration of appropriate protection bunds, these features will be unaffected by the proposed works.

**8.0.5** It is unlikely that earlier quarry features will be encountered during tunnelling works as this location is outside of the historic quarry area, not being developed until the late twentieth century.

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[www.nationaltrust.org.uk/penrhyn-castle/features/penrhyn-castle-and-the-transatlantic-slave-trade](http://www.nationaltrust.org.uk/penrhyn-castle/features/penrhyn-castle-and-the-transatlantic-slave-trade)

[www.ordnancesurvey.co.uk](http://www.ordnancesurvey.co.uk)

[www.whc.unesco.org/en/tentativelists/5678/](http://www.whc.unesco.org/en/tentativelists/5678/)

**Archive Sources:**

**Gwynedd Archives**

Tithe map for Llandegai parish 1848

Ordnance Survey Map 1889, 1900 & 1914

**Bangor University Archives**

Estate map (Penrhyn MS 2205), date 1768

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Appendix A. Specification for Archaeological Works

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**Specification for Archaeological Works at**

**Proposed Development at Zip World  
- Penrhyn Quarry Mountain Carts**

**NGR SH 62546 64828 (Centre Point)**

**Report Number CR180-2019**

Copyright C.R Archaeology



**CR ARCHAEOLOGY**

Compiled by C. Rees and Matthew Jones  
On Behalf of Zip World (Bethesda)

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**Specification for Archaeological Works at Proposed Development at Zip  
World - Penrhyn Quarry Mountain Carts**

<b>Planning Application Number:</b>	2014.063_10
<b>National Grid Reference:</b>	SH 62546 64828
<b>Client:</b>	Zip World (Bethesda)
<b>Report Author:</b>	Catherine Rees and Matthew Jones
<b>Report Number:</b>	CR180-2019
<b>Date:</b>	24/04/2019



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- 2.0 Project Aims**
- 3.0 Brief Historical Background**
  - 3.1 Topography
  - 3.2 Geology
- 4.0 Scheme of Works – Methodology**
  - 4.1 Desk Based Research
  - 4.2 Walk Over Survey
    - 4.2.1 Equipment
  - 4.3 Consideration of Setting of Identified Heritage Assets
  - 4.4 Timetable for Proposed Works
  - 4.5 Staffing
  - 4.6 Monitoring
  - 4.7 Health and Safety
  - 4.8 The Report
    - 4.8.1 Copyright
- 5.0 Bibliography**

### Appendices

**Appendix A.** Proposed Development Plans

### Illustrations

**Figure 1.** Site Location Map

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## 1.0 Introduction

C.R Archaeology have been instructed by Zip World to conduct an Archaeological Desk Based Assessment at the proposed site of a recreational development which will necessitate the change of land use at the proposed site (figure 1). The application site is currently in use as a vehicular access track in connection with the existing Big Zipper lines at Zip World Penrhyn Quarry. The intention is to separate the existing access track with a small bund. One side of the track is to be retained as an access track to transport riders to the top of the Big Zipper lines, whilst the other side of the track is to be changed to be used as the route for mountain carting activity.

This document has been prepared to supply the Local Planning Authority Archaeologist with information as to the potential archaeological impacts of the aforementioned scheme.

This specification has been written as a methodology for an initial programme of works. It is intended that the results of the works outlined in this document will inform decisions as to the nature of any further archaeological mitigation strategies or evaluation methodologies which may be required.

The application site is located to the south of the town Bethesda, within Penrhyn Quarry, which is located along the trunk road of the A5. The boundary of the Snowdonia National Park runs along the eastern line of the A5, although none of the proposed development area lies within the park limits.

Penryn Quarry, within the which the proposed site is located, is currently included on the UNESCO Tentative Lists of States Parties as a key element of the Slate Industry of North Wales (ref 5678) which is currently being proposed for World Heritage Status nomination for the cultural landscape associated with the industry.

This Desk Based Assessment will examine the historic context and archaeological potential of the proposed development area and will determine the possible impact of the development on the setting of the Penrhyn Quarry site.

## 2.0 Project Aims & Objectives

This programme of works for the development site aims to undertake a Desk Based Assessment, Walkover Survey and setting examination of the development site.

The aim of this scheme of works is to undertake desk based historical research exploring the history/archaeology of the site. This information will include a map progression and archival research in order to compile a coherent narrative history of the site and its environs.

The Gwynedd Historic Environment Record (HER), the Royal Commission on the Ancient and Historical Monuments Wales (RCAHMW) database, Gwynedd Archives, Bangor University Archives and relevant publications will be consulted to compile a record of known archaeological sites in the vicinity. Aerial photographs will also be examined.

It is intended that this document be utilised to inform further archaeological planning decisions and conditions at the site.

The objectives of this programme of works are:

- To make full and effective use of existing information to establish the archaeological significance of the site
- To assess the impact of the development proposals on surviving sites, monuments or remains both within the development area and in the surrounding landscape
- To help inform future decision making, design solutions, further evaluation & mitigation strategies

### 3.0 Brief Historical Background

The following section is, through necessity, very brief and is intended to merely place the site in context. A more detailed history of the site will form a key element in the proposed works.

The application site is located to the south of the town Bethesda, within Penrhyn Quarry.

*“The extensive deposits of high-quality slate in north Wales were exploited as far back as the Roman period, but it was in the 18th century that the industry began to grow significantly, expanding rapidly between 1856 and 1900, and remaining technically innovative until 1914. During the 19th century the north Wales quarries were major providers of roofing materials and slate products throughout the world, and the associated technologies of quarrying and transport infrastructure were also exported worldwide”* (<https://whc.unesco.org/en/tentativelists/5678/>).

#### 3.1 Topography

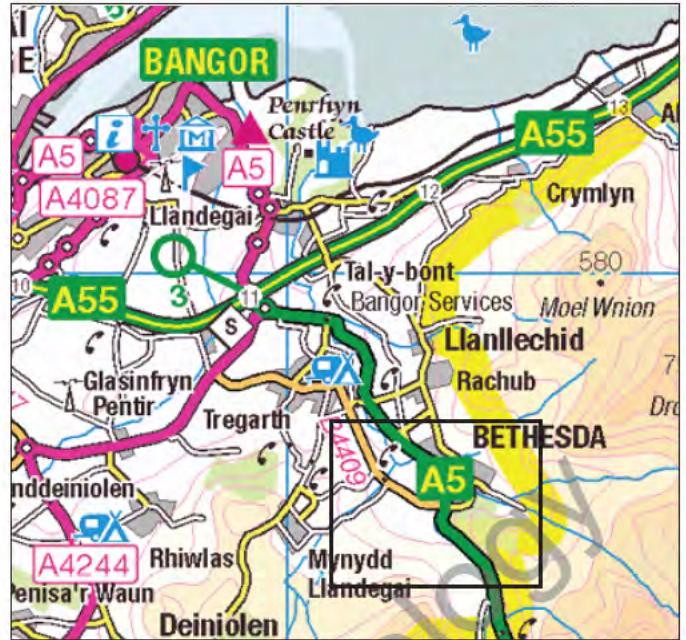
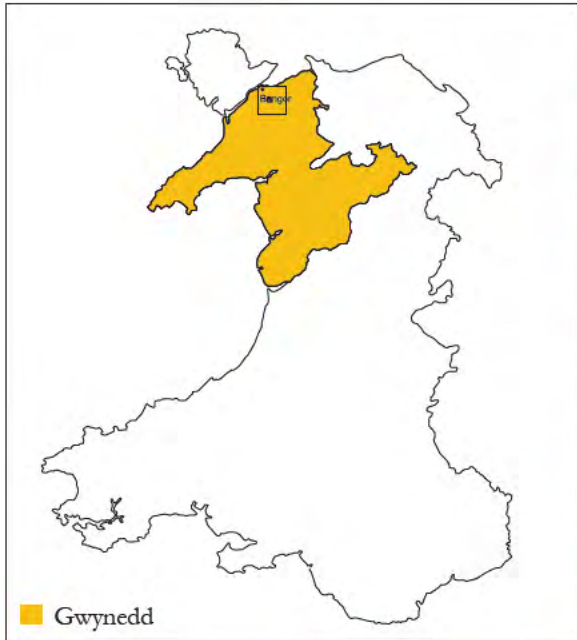
The application site is located to the south of the town Bethesda, within Penrhyn Quarry, which is located along the trunk road of the A5. The boundary of the Snowdonia National Park runs along the eastern line of the A5.

#### 3.2 Geology

The bedrock geology at the site is recorded as *“Llanberis Slates Formation – Mudstone and Siltstone. Sedimentary Bedrock formed approximately 508 to 526 million years ago in the Cambrian Period. Local environment previously dominated by deep seas. These sedimentary rocks are marine in origin. They are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds”* ([www.bgs.ac.uk](http://www.bgs.ac.uk)).

Also present as veins within the geology are *“Unnamed Igneous Intrusion, Ordovician - Microgabbro. Igneous Bedrock formed approximately 444 to 485 million years ago in the Ordovician Period. Local environment previously dominated by intrusions of silica-poor magma. These igneous rocks are magmatic (intrusive) in origin. Poor in silica, they form intruded batholiths, plutons, dykes and sills”* ([www.bgs.ac.uk](http://www.bgs.ac.uk)).

The superficial geology of the site is not recorded ([www.bgs.ac.uk](http://www.bgs.ac.uk)).



 Proposed Development Area

**Figure 1. Site Location Map**

(Source: OS Open Data Mapping. Contains Ordnance Survey data © Crown copyright and database right [2019])

## **4.0 Scheme of Works - Methodology**

It is proposed that the archaeological works be conducted in three sections and each is detailed separately below.

### **4.1 Desk Based Research**

A complete and coherent history of the site will be compiled utilising material sourced from Gwynedd Archives and the Bangor University Archives. This will allow as comprehensive a history as possible to be compiled. A full map progression of the area will be undertaken. Where appropriate the archive information will be supplemented with information from local libraries and specialist interest websites & journals.

In order to identify the character of archaeological remains in the vicinity of the proposed development site a search of the Gwynedd HER will be conducted examining the Penrhyn Quarry area. This area has been identified rather than utilising a search radius due to the integrated nature of the quarry landscape. The RCAHMW database and aerial photographs of the site will be examined. The information collected will be discussed within the main report text.

The works will be carried out accordance with the CIfA Standards and Guidance for historic environment desk-based assessment (CIfA (Revised 2014).

This material will form the historical background for an archaeological report which will include the results of the walkover survey.

### **4.2 Walk Over Survey**

A site visit will be conducted, and a photographic record will be compiled which will detail any above ground features and show the general topography of the site. Further photographs will be taken to illustrate the setting of the site. The location of any features will be noted on a site plan.

#### **4.2.1 Equipment**

It will be undertaken using a 14.2 mega-pixel Sony A350 digital camera with a variety of standard and other lenses. Images will be captured in RAW format for later processing into high resolution JPG and TIF files.

### **4.3 Consideration of Essential Setting of Identified Heritage Assets**

As the site is currently under consideration for WHS the following points will be given consideration in the Desk Based Assessment:

- Existing baseline describing the historic landscape before development, including previous use of site and any links to existing developments, including reference to sources used in DBA where relevant
- Registered Landscape(s) of Historic Interest potentially directly and indirectly affected
- Historic Landscape Character Area(s) (HLCA) potentially directly and indirectly affected and which HLCA's are to be included in an assessment
- Direct and indirect effects on historic landscape character e.g. landform, land cover, openness/enclosure, key patterns, features and qualities, including maps to determine likely significant historic landscape effects
- Proximity of sensitive historic assets and their setting

#### **4.4 Timetable for Proposed Works**

It is envisaged that the walkover survey, archival research and heritage site visits will be undertaken as soon as possible. Time has been allotted for archive research, report compilation and site archiving.

#### **4.5 Staffing**

The project will be managed by Catherine Rees (BA (Archaeology), MA (Archaeology) Postgraduate Diploma (Historic Environment Conservation) & Matthew Jones (BA (Archaeology), MA (Archaeology)).

All staff will have a skill set equivalent to the CIFA ACIFA/MCIFA level. C.Vs for all staff employed on the project can be provided on request. All projects are carried out in accordance with CIFA *Standard and Guidance* documents.

#### **4.6 Monitoring**

The project will be subject to monitoring by Gwynedd Archaeological Planning Services. A projected time-scale and copy of the risk assessment can be provided on request to the monitoring body prior to the commencement of works.

#### **4.7 Health and Safety**

A risk assessment will be conducted prior to the commencement of works and site staff will be familiarised with its contents. A first aid kit will be located in the site vehicle.

All staff will be issued with appropriate Personal Protective Equipment (PPE) for the site work. Initially this is anticipated to consist of:

- Hi-visibility vests (EN471)
- Mobile Telephone (to be kept in site vehicle)
- Suitable Walking Boots & Waterproofs

Any further PPE required will be provided by C.R Archaeology

All staff will have passed at least a CITB health and safety test at least operative level and will carry a Construction Related Organisation (CRO) White Card for Archaeological Technician (Code 5363).

C.R Archaeology staff will also comply with any Health and Safety Policy or specific on-site instructions provided by the client or their appointed Principal contractor or H&S coordinator.

#### **4.8 The Report**

The report will clearly and accurately incorporate information gained from the programme of archaeological works. It will present the documentary evidence gathered in such a way as to create a clear and coherent record. This will include illustrations of any cartographic/pictorial sources. The report will contain a site plan showing the locations of any photographs taken.

The desk-based assessment will consider the following:

- the nature, extent and degree of survival of archaeological sites, structures, deposits and landscapes within the study area
- the significance of any remains in their context both regionally and nationally
- the history of the site
- the potential impact of any proposed development on the setting of known sites of archaeological/historic importance
- the potential for further work with appropriate recommendations

As a minimum the report will also include:

- bilingual summary
- a copy of the design brief and agreed specification
- a location plan
- a full bibliography of sources consulted
- a digital copy of the report and an archive compact disc/USB file

It is intended that this report will inform decisions as to the necessity and/or nature of any further archaeological mitigation strategies which may be required.

A copy of the report in Adobe PDF format will be sent to the appropriate monitoring archaeologist for approval before formal submission. A bound paper copy and PDF digital copy of the report will be submitted to GAPS as part of the formal submission. A digital Adobe PDF version and a bound paper copy of the final report and will be lodged with the Gwynedd Historic Environment Record within six months of completion of fieldwork.

#### **4.8.1 Copyright**

C.R Archaeology and sub-contractors shall retain full copyright of any commissioned reports, tender documents or other project documents, under the Copyright, Designs and Patents Act 1988 with all rights reserved; excepting that it hereby provides a licence to the client and the local authority for the use of the report by the client and the local authority in all matters directly relating to the project as described in the Project.

## **5.0 Bibliography**

English Heritage. 2006. *Management of Research Projects in the Historic Environment (MORPHE)*

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[www.bgs.ac.uk/geologyofbritain/home.html](http://www.bgs.ac.uk/geologyofbritain/home.html)

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[www.ordnancesurvey.co.uk](http://www.ordnancesurvey.co.uk)

[www.whc.unesco.org/en/tentativelists/5678/](http://www.whc.unesco.org/en/tentativelists/5678/)

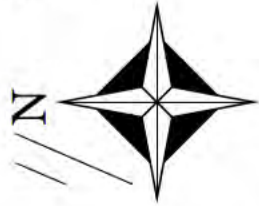
Copyright C.R Archaeology



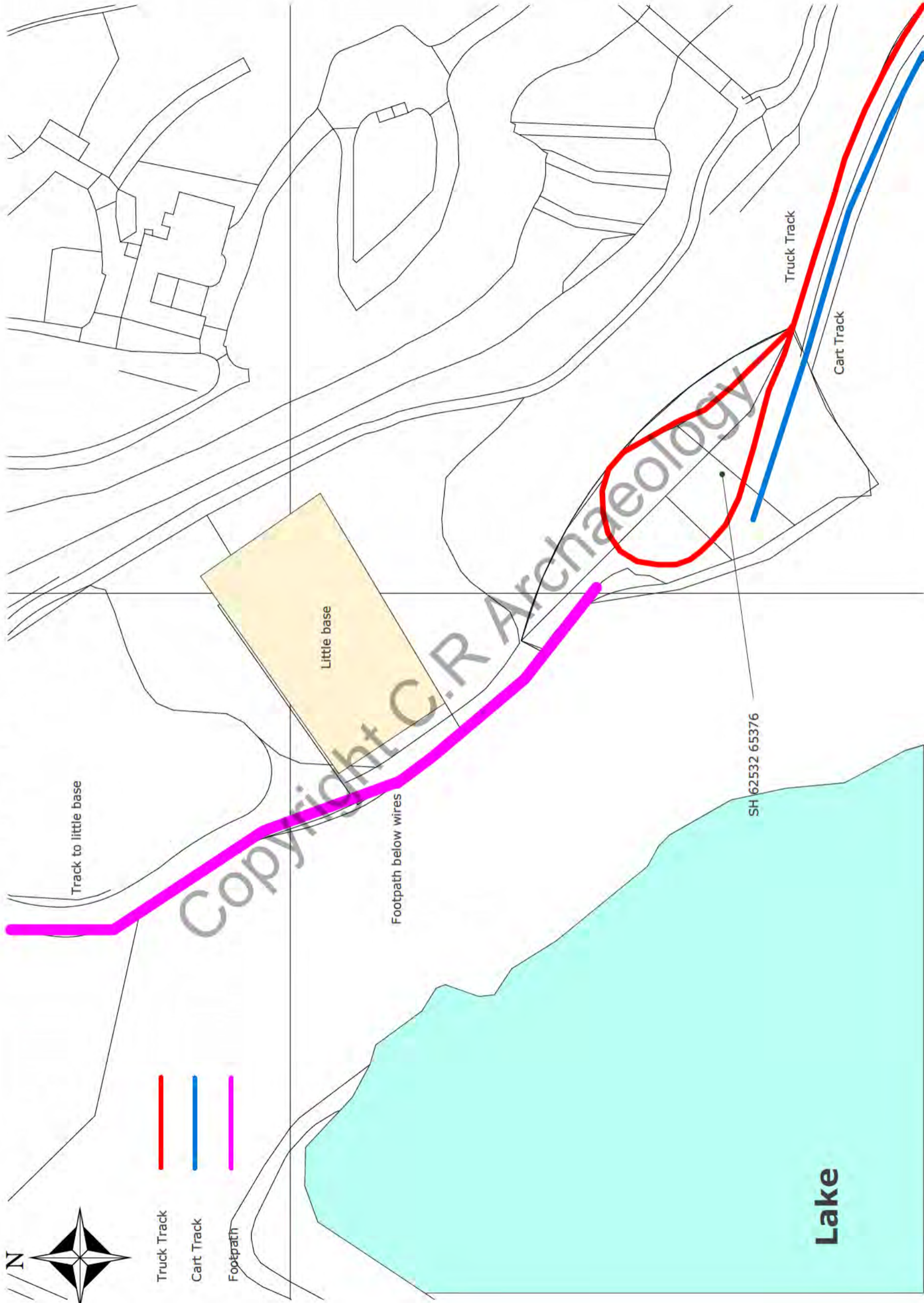
**Appendix B. Proposed Development Plans**

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# Cart Track Base Station



- Truck Track (red line)
- Cart Track (blue line)
- Footpath (magenta line)



Scale 1:1000 @ A3

March 5, 2019

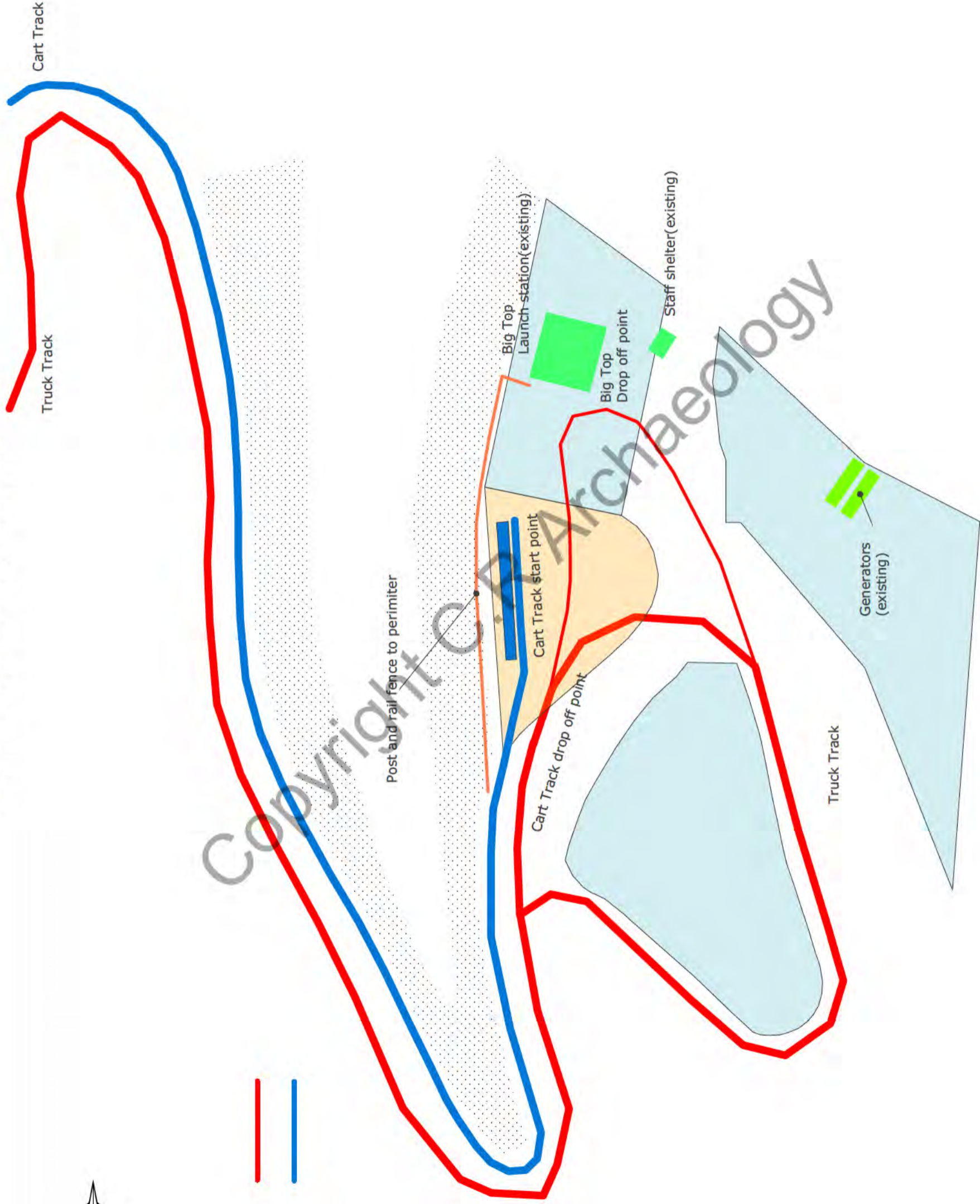
Cart Track, Penrhyn Quarry | ZIP World

A 01

# Cart Track Top Station



Truck Track  
Cart Track



Scale 1:1000 @ A3

March 5, 2019

Cart Track, Penrhyn Quarry | ZIP World

A 02



# Plan View of the Cart tunnel

Cart Track

Truck Track

Cart Track

Truck Track

Truck Track

Cart Track

Truck Track

Cart Track

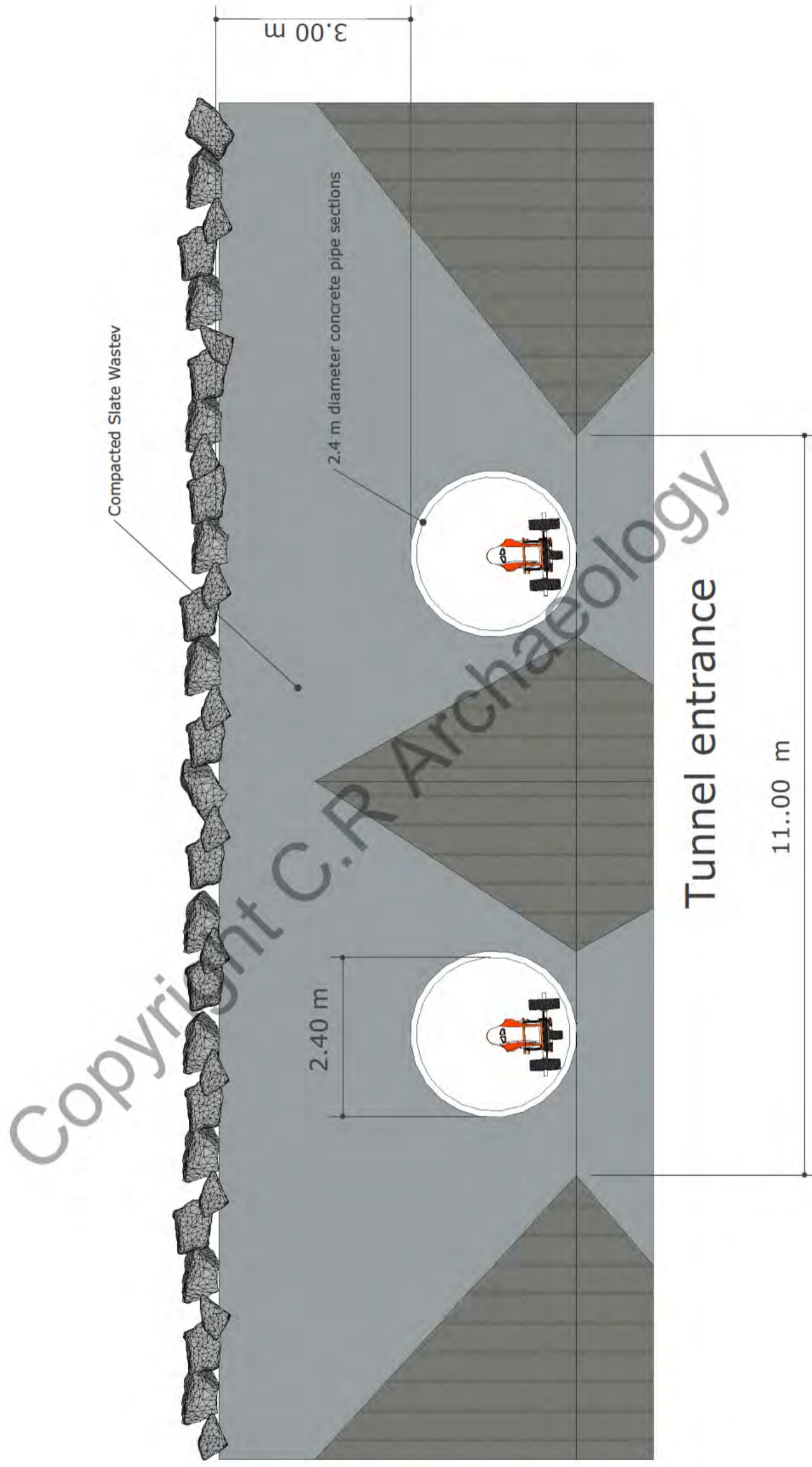
Scale 1:1000 @ A3

March 5, 2019

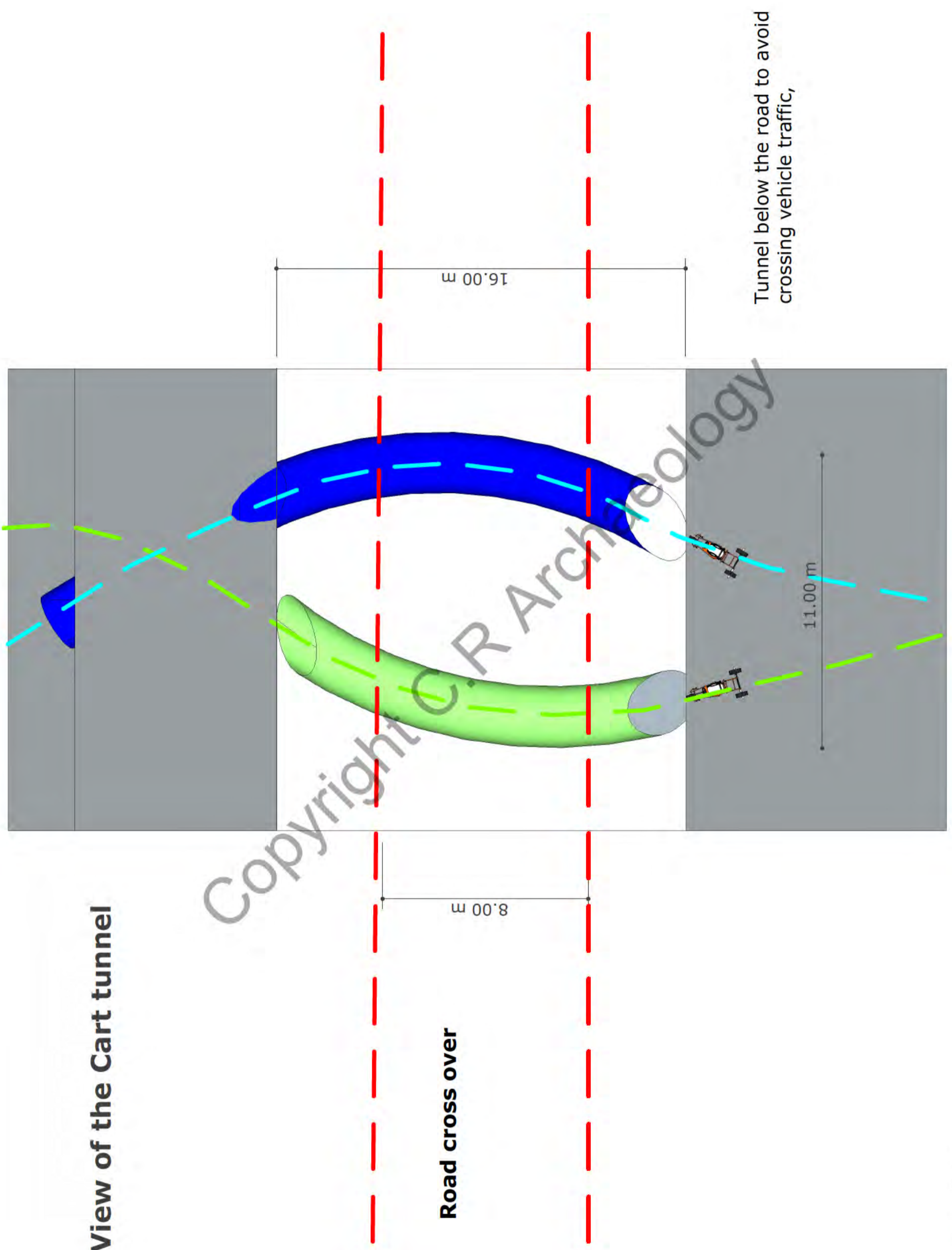
Cart Track, Penrhyn Quarry | ZIP World

A 03

## Typical cross sections of the Cart tunnel



# Plan View of the Cart tunnel

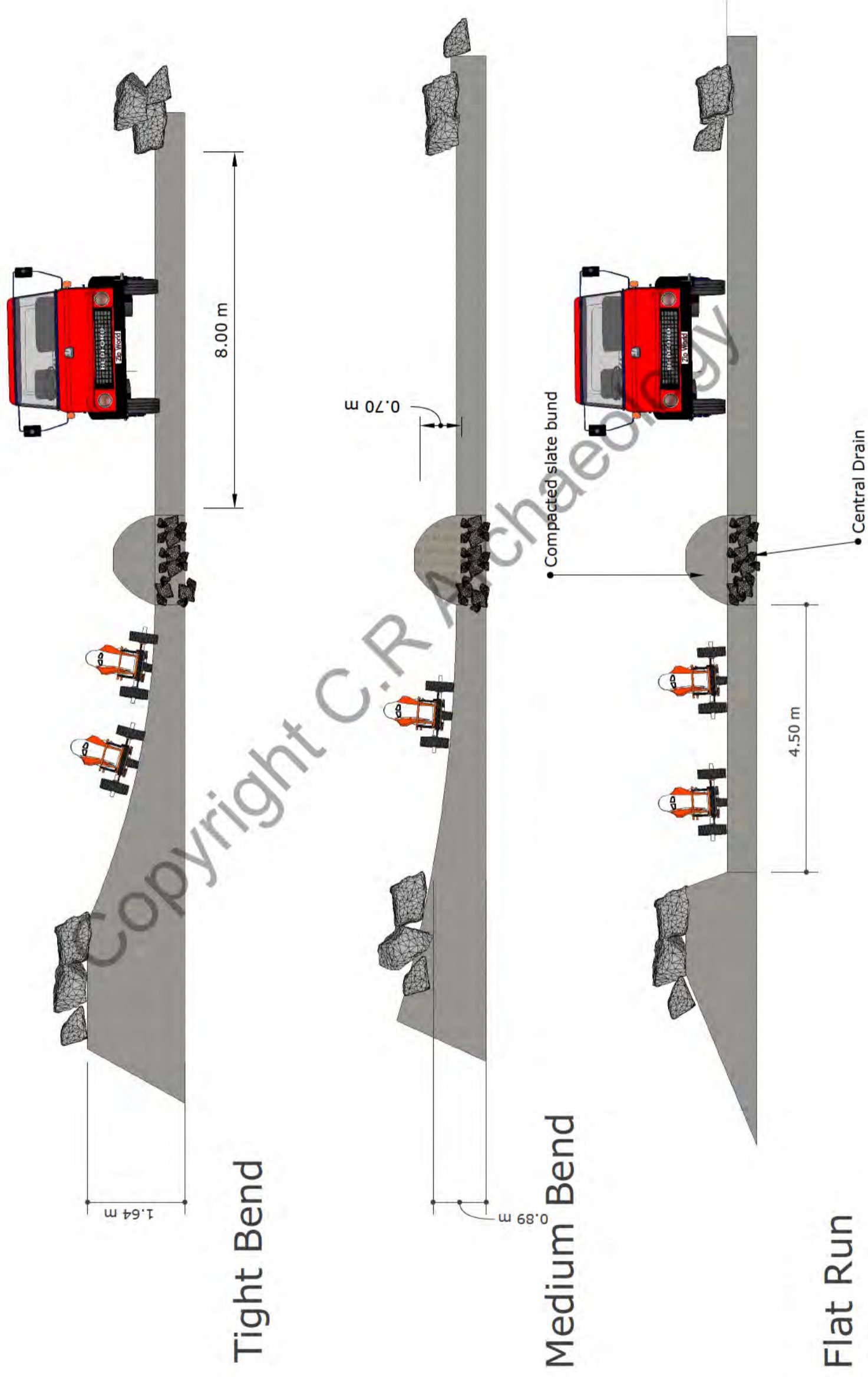


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March 5, 2019

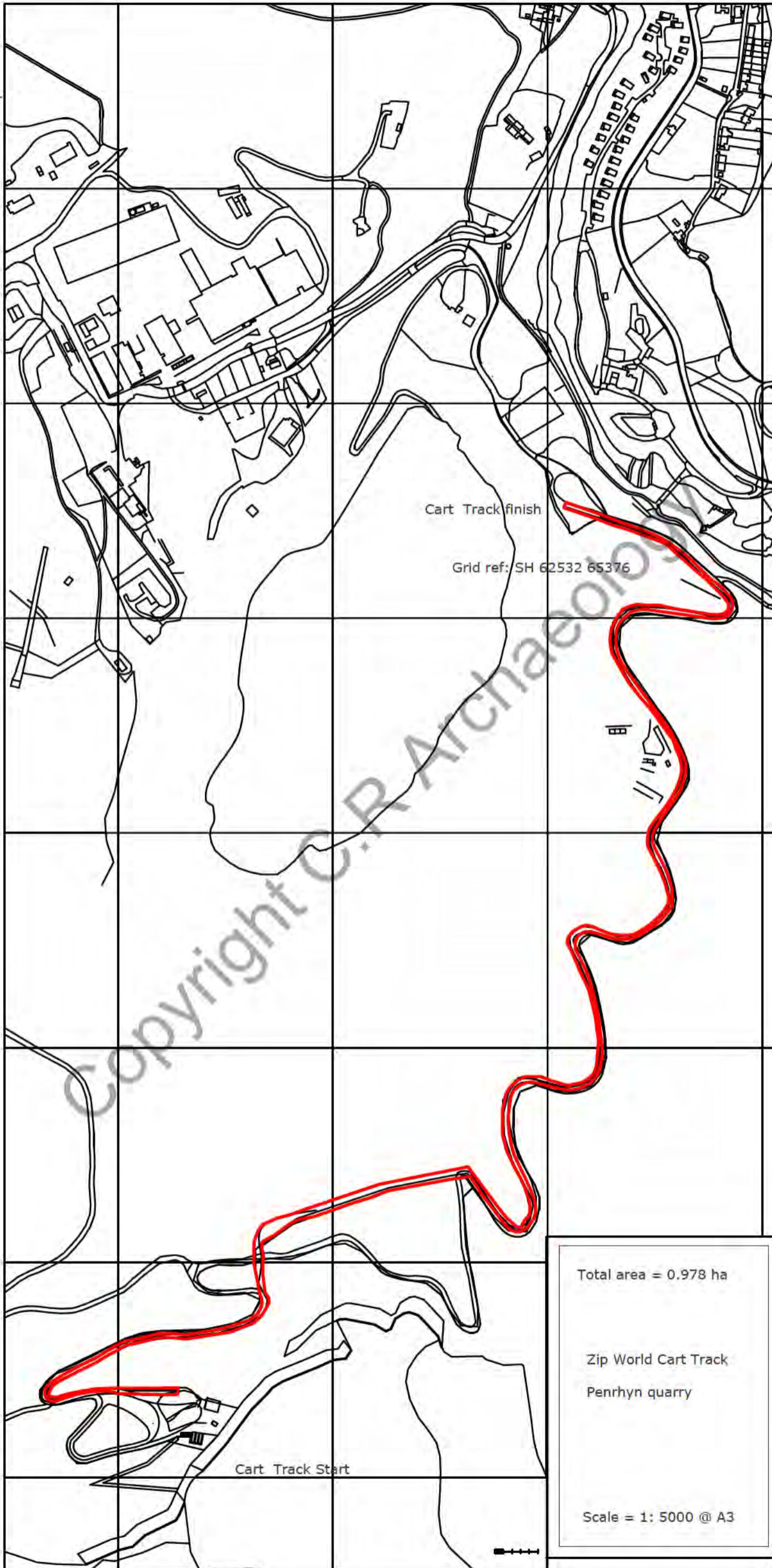
Cart Track, Penrhyn Quarry | ZIP World

# Typical cross sections of the Cart Track



Scale 1:75 @ A3

March 5, 2019



Total area = 0.978 ha

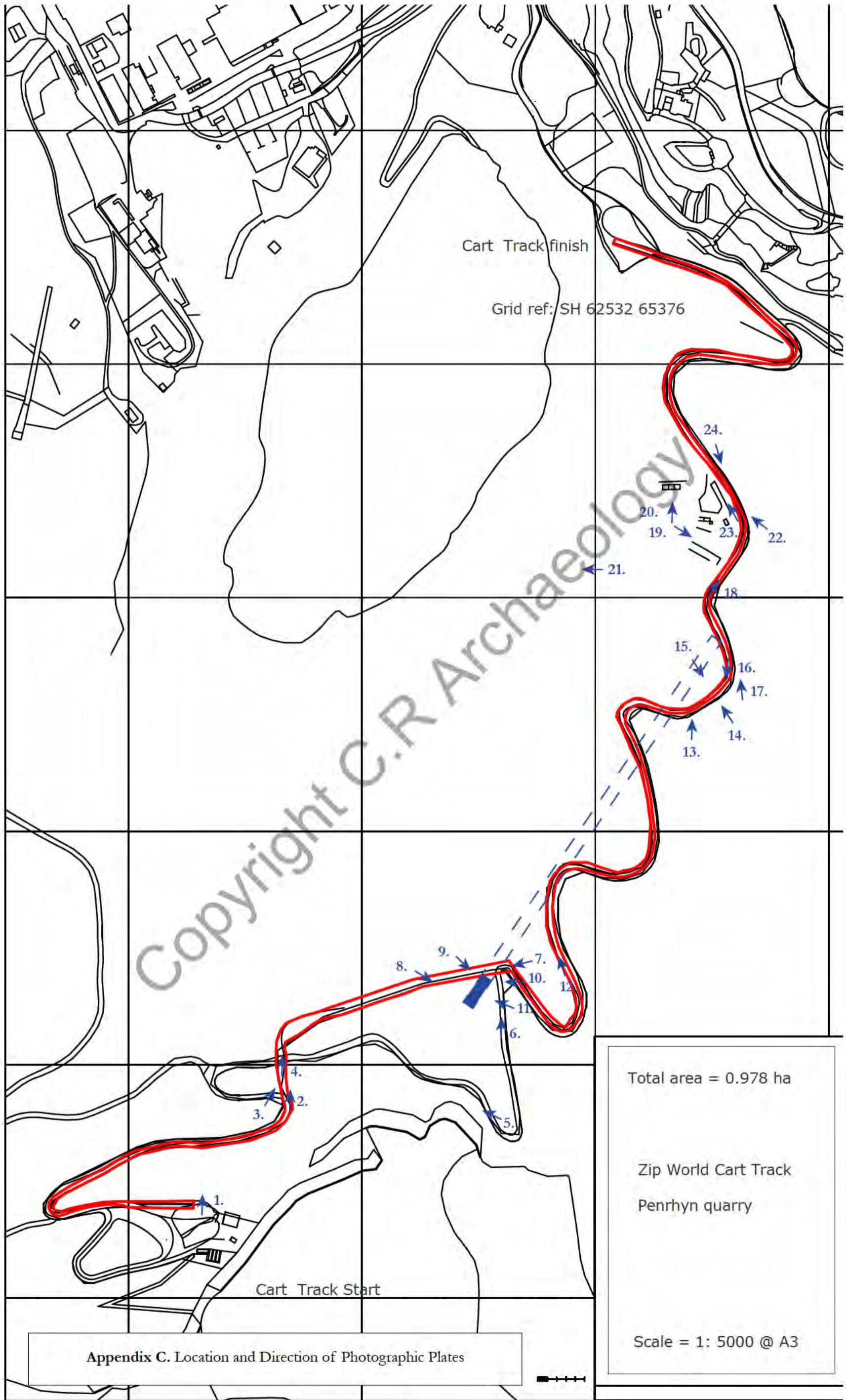
Zip World Cart Track  
Penrhyn quarry

Scale = 1: 5000 @ A3



**Appendix C. Location and Direction of Photographic Plates**

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Appendix C. Location and Direction of Photographic Plates