Gwerthuso Archeolegol (Ffosio Treialon) Archaeological Evaluation (Trial Trenching)





Ymddiriedolaeth Archaeolegol Gwynedd Gwynedd Archaeological Trust

# TIR ODDI AR FFORDD LLANDEGAI / LAND OFF LLANDEGAI ROAD, BANGOR, GWYNEDD

# Gwerthuso Archeolegol (Ffosio Treialon) Archaeological Evaluation (Trial Trenching)

Yr Amgylchedd Hanesyddol yn Cofnodi Prif Gyfeirnod / Historic Environment Record Event Primary Reference Number 46071

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Ysgrifenwyd gan / Written by: Neil McGuinness

Delwedd clawr / Cover image: Eastern end of TR16 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation (1616) including upper trackbed (1610), possible exposed foundation layer (1608), lower trackbed (1607), formation cut [1605] and remains of possible revetment wall (1606). Viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0076).

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# **CRYNHODEB ANHECHNEGOL**

Comisiynwyd Gwynedd Archaeological Trust gan Castle Green Homes Limited i ymgymryd rhaglen o gwerthusiad archeolegol (ffosio treial) a dadansoddiad ôl-gloddio i gefnogi cais cynllunio ar gyfer adeiladu 67 anheddau deulawr a maes parcio ar dir yn Llandegai Road, Bangor.

Cloddiwyd 16 o ffosydd prawf i ymchwilio ddeuddeg anomaleddau archeolegol posibl ac ardaloedd gwag a nodwyd mewn arolwg geoffisegol o'r safle. Nodwyd dau o'r dwydeeg anghysondeb arolwg geoffisegol mewn tair o'r ffosydd, yr olion o'r Penrhyn Slate Quarry Railroad a ffos ffin llinellol sydd ddim yn ymddangos ar unrhyw un o'r mapiau hanesyddol sydd ar gael ar gyfer yr ardal. Mae'r dadansoddiad arbenigol o gwsgwr llechi wedi torri gyda thoriad unigryw ar gyfer cadair a adfetwyd o ddyddodion dealltwriaeth o wahanol gyfnodau'r rheilffordd yn amlwg. Gallai'r ddeg anghysonderau sydd ar o'l di achosir gan nodweddion hwyr sydd wedi torri twry'r uwchbridd, draeniau tir neu ffactorau daearegol.

Mae'r gwerthusiad archeologol wedi darganfod 4 nodwedd archeolegol nad oedd yn hysbys o'r blaen. Cornel lloc ffosio Neolithig Cynnar, pwll bach siap afreolaidd sydd yn dod o'r Mesolithig Diwaeddar neu'r Neolithig Cynnar, pwll bach siap bowlan sydd o'r Oes Efydd Ddiweddar, a haen o ddeunydd y credir ei fod yn gysylltiedig ag adeildau Marchogion Inclined Plane.

Argymhellir bod y datblygiad yn cael ei gynllunio i osgoi unrhyw effeithia corfforol uniongyrchol, ac i leihau new wrthbwyso effeithiau gosod, ar Penrhyn Slate Quarry Railroad a'r Marchogion Inclined Plane, mae'r ddwy ohonynt yn rhan o'r Slate Landscape of Northwest Wales World Heritage Site ac yn gorwedd ar hyd wmy; ddwyreiniol yr ardal ddatblygu arfaethedig.

# NON-TECHNICAL SUMMARY

Gwynedd Archaeological Trust was commissioned by Castle Green Homes Limited to undertake a programme of archaeological evaluation (trial trenching) and subsequent postexcavation analysis in support of a planning application for the erection of 67 no. two-storey dwellings and associated access and car parking on land at Llandegai Road, Bangor. The trenching programme was undertaken between 19th and 30th April 2021.

Sixteen trial trenches were dug to investigate twelve potential archaeological anomalies and blank areas identified in an earlier geophysical survey of the proposed development site.

Two of the twelve geophysical survey anomalies were identified in three of the trenches: the remains of the Penrhyn Slate Quarry Railroad and a straight linear field boundary ditch that does not appear on any of the available historic maps for the area. The specialist analysis of a broken slate sleeper with a distinctive cutout for a chair recovered from the railroad deposits has provided an enhanced understanding of the different phases of the railroad evident. The remaining ten anomalies are thought to have been caused by late features cut through the topsoil, land drains or geological factors.

Four previously unknown archaeological features were also identified: the corner of an Early Neolithic ditched enclosure; a small irregularly shaped Late Mesolithic or Early Neolithic pit; a small bowl-shaped Late Bronze Age pit; and a layer of upcast material thought to be associated with the construction of the nearby Marchogion Inclined Plane.

It is recommended that the development is designed to avoid any direct physical impacts, and to reduce or offset setting impacts, on the Penrhyn Slate Quarry Railroad and the Marchogion Inclined Plane, both of which are part of the Slate Landscape of Northwest Wales World Heritage Site and lie along the eastern edge of the proposed development area.

# **1 INTRODUCTION**

Gwynedd Archaeological Trust (GAT) has been commissioned by Castle Green Homes Limited to undertake a programme of archaeological evaluation (trial trenching) and subsequent post-excavation analysis in support of a planning application for the erection of 67 no. two-storey dwellings and associated access and car parking on land at Llandegai Road, Bangor, Gwynedd, LL57 4HR (NGR: SH5928171847; Figure 01). The proposed development area measures 2.51 ha and is located within a field of improved pasture on the eastern side of the A5 Llandegai Road. The development site has been allocated for housing within the adopted Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (reference T5).

A programme of archaeological assessment has already been completed for the development in September and October 2020 (Evans and Hopewell 2020, GAT Report 1565; McGuinness 2020, GAT Report 1567). The trial trenching programme is the second stage of archaeological evaluation at the site and follows on from a geophysical survey undertaken in September 2020 (Evans and Hopewell 2020, GAT Report 1565). A total of 16 trenches were excavated, predominately sited to investigate anomalies discovered during the geophysical survey and to test blank areas (Figure 02). The archaeological anomalies identified during the geophysical survey included possible Post-medieval and earlier ditches and enclosures, a possible prehistoric Iron Age enclosure and a possible prehistoric or medieval lynchet. The probable formation of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) was also identified running along the eastern edge of the southern part of the proposed development site during the geophysical survey. It was also targeted with two trenches to verify its existence, gain a better understanding of the construction techniques used and to assess and record its condition. It was originally hoped to target the part of the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552) that lies along the proposed developments northeastern edge (McGuinness 2020, GAT Report 1567) for similar assessment and record. However, the proximity of 11kV and LV overhead lines, buried telecoms plant, and trees and shrubs along its route, meant that machine excavation was not feasible at this stage.

The evaluation was undertaken between Monday 19<sup>th</sup> and Friday 30<sup>th</sup> April 2021 and conformed to the following guidelines:

• Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) Version 1.1 (The Welsh Archaeological Trusts 2018);

- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015);
- Management of Archaeological Projects MAP2 (English Heritage 1991);
- Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England 2015); and
- Standard and Guidance for Archaeological Field Evaluation (Chartered Institute for Archaeologists 2020).

The post-excavation work has been undertaken in accordance with guidelines specified in *Management of Archaeological Projects – MAP2* (English Heritage 1991), and relevant guidelines from *Management of Research Projects in the Historic Environment* (Historic England 2015). Five project phases are specified in MAP2:

- MAP2 Phase 1: Project Planning
- MAP2 Phase 2: Fieldwork
- MAP2 Phase 3: Assessment of Potential for Analysis
- MAP2 Phase 4: Analysis and Report Preparation
- MAP2 Phase 5: Dissemination

The current report relates to the analysis, dating, report preparation and dissemination as specified by MAP2 Phases 4 and 5, and also incorporates the results from the preceding phases.

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

The project has been monitored by the Gwynedd Archaeological Planning Service (GAPS) on behalf of the Local Planning Authority and this report has been approved by GAPS prior to final issue.

The GAT Historic Environment Record (HER) Event Primary Reference Number (PRN) for the project is 46071.

# 1.1 Fieldwork Aims and Objectives

The key aims and objectives of the trial trenching programme were:

- to verify and characterise possible prehistoric archaeological anomalies identified during the geophysical survey (Evans and Hopewell 2020, GAT Report 1565) comprising a possible Iron Age ditched enclosure and a possible prehistoric or medieval lynchet. As outlined in *The Research Framework for the Archaeology of Wales,* a greater understanding of settlement chronology, as well as settlement and land use, is required for the Late Bronze Age and Iron Age in Wales. As such, where suitable materials survive radiocarbon dating should be undertaken (Gale 2010);
- to verify and characterise relict enclosures and boundaries identified during the geophysical survey (Evans and Hopewell 2020, GAT Report 1565) which predate historic mapping and may be of medieval (1110 1539 AD) or post-medieval (1539 1750 AD) date. An understanding of these features may contribute to a better understanding of settlement, land use and development as recommended in *A Research Framework for the Archaeology of Wales, Medieval 1110 1539* (Davidson, Davies and Gray 2017), and *Earlier Post Medieval 1539 1750* (Bezant and Bailey 2017);
- to establish the degree of survival, method of construction and the condition of two parts of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) within the proposed development area; transport is identified as a key theme in a *Research Framework for the Archaeology of Wales, Later Post Medieval and Industrial (1750 -1900)* (Gerrard and Bailey 2017) and the significance, form and archaeological survival of industrial railroads are recognised as priorities for assessment;
- to test apparently archaeologically blank areas on the geophysical survey to establish the potential for undetected archaeological remains; and
- if no additional archaeological activity is identified, establish why this may be the case.

# 1.2 Acknowledgements

GAT would like to thank the following for their contribution and support:

The GAT project team David Hopewell, Neil McGuinness and project manager John Roberts; Castle Green Homes who commissioned the works and design manager Matt Christie; the land agent Penrhyn Estate; Gwynedd Archaeological Planning Services Senior Planning Archaeologist Jenny Emmet; Ashley Batten, Cadw Inspector of Ancient Monuments; Gareth and Richard at RG Hire Ltd for supply of plant and fencing; and Glyn O Evans Ltd for supplying the welfare facilities.

# 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The proposed development is located c.740m northeast of Scheduled Monument CN153 (NGR SH59557100). The Scheduled Monument was originally identified by aerial photography in the early 1960s and then by subsequent excavation by C.Houlder in 1966-7, which revealed a complex multi-period site comprising elements from the early Neolithic to the Medieval period, incorporating the scheduled area and what is now an industrial estate to the west. The complex included two large henge monuments (Henge A and Henge B), from the late Neolithic, located within the industrial estate, with the western end of the cursus located between the two henges and continuing east into the area of the cricket pitch, c.40m south of the current clubhouse. In addition, within the industrial estate area, a timber postbuilt house dated to the Early Neolithic was identified, along with a small barrow of Early Bronze Age date, Iron Age settlement activity, limited Roman activity and an Early Medieval inhumation cemetery that included a small rectangular mortuary enclosure with a central grave.

In 2005, GAT completed an archaeological excavation (Kenney 2008, GAT Report 764) in advance of the Parc Bryn Cegin business park development to the south of the industrial estate and cricket club and c.1.0km south of the proposed development. The excavation identified multiple features dating from the Early Neolithic onwards. The most significant discovery was the remains of an Early Neolithic rectangular timber building, followed by several clusters of Mid to Late Neolithic pits, sixteen burnt mounds, the remains of a Mid Iron Age ring-groove roundhouse, overlaid by early medieval smithing activity, a Late Iron Age/Romano-British settlement and a medieval corn drier. The two areas of excavation (those undertaken in 1966/7 and those in 2005/6) are no more than 90.0m apart at the closest point and together formed an area of landscape that preserved evidence for extensive prehistoric activity.

In 2011, GAT completed a geophysical survey of the northern end of the Bangor Cricket Club cricket field, which incorporates scheduled monument CN153 (GAT, unpublished). The survey interpretation plan identified the end of the cursus and it appeared to be further east than previously thought. The other identifiable features appeared to be land drains. In 2009, GAT completed an archaeological evaluation at Unit 01 on the industrial estate (Rees 2009, GAT Report 816). The evaluation area was located across the location of the cursus and medieval cemetery and a 3m wide x 15m long trench was excavated. Parts of the cursus, along with nine medieval graves, with the tip of a tenth grave in the northeast facing section, were identified during the excavation.

Probable prehistoric activity has been identified in the footprint of the Energy Centre Building at Penrhyn Castle, extant as a small pit filled with burnt stone (Jones and Evans 2016, GAT Report 1341). The provenance of the feature is unclear but what this feature does signify is the survival of prehistoric activity despite extensive landscaping. It may represent transient domestic activity and may also be associated with the archaeology of the wider surrounding area.

An aerial reconnaissance survey of northwest Wales was undertaken by RCAHMW in July 2005. Two new cropmark enclosures were discovered in the park of Penrhyn Castle c.700m north of the development area. The first (Penrhyn Park Enclosure I (SH59627204) NPRN 403359) is an oval enclosure defined by a narrow ditch, c.148m east-west by c.84m north-south. It tapers to the west, towards the summit of a low ridge. Within the eastern part of the enclosure is a smaller square enclosure at NGR SH59547204, and is of unknown date. Some 280m to the south is a second enclosure in a lower-lying setting: Penrhyn Park Enclosure II (SH59667175) NPRN 403367. This is a D-shaped ditched enclosure, possibly defensive, measuring c.63m northwest/southeast by 56m northeast/southwest, bisected by a modern field boundary. Surrounding these two main enclosures are extensive areas of pitting, linear features and smaller possible enclosures. The enclosures and associated markings are thought to most likely belong to the prehistoric period.

An archaeological desk-based assessment and walkover survey for the proposed development site was commissioned by Castle Green Homes Limited and completed by GAT in 2020 (Roberts and Hopewell 2020, GAT Report 1565). It identified the following known historic assets in proximity to the proposed development, which lies:

- adjacent to the Grade II Listed Building Incline Cottage (LB 4085; GAT HER PRN 24862);
- adjacent to, and partially containing, the route of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) including the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552), part of the *Penrhyn Slate Quarry Railroad and Penrhyn Slate Quarry Railway* (1.3) Element of Component Part 1 of the *Slate Landscape of Northwest Wales* World Heritage Site (WHS);
- adjacent to the route of the Penrhyn Slate Quarry Railway (GAT HER PRN 59452) that forms part of *The Penrhyn Slate Quarry Railroad and Penrhyn Slate Quarry*

*Railway* (1.3) Element of Component Part 1 of the *Slate Landscape of Northwest Wales* WHS; and

 within the Essential Setting of the Grade II\* Penrhyn Castle Registered Historic Park and Garden (PGW (Gd) 40 (GWY)) and the Dyffryn Ogwen Registered Landscape of Outstanding Historic Interest (HLW (Gw) 10).

In addition to being part of the *Slate Landscape of Northwest Wales* WHS, both The Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) (including the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552)) and the Penrhyn Slate Quarry Railway (GAT HER PRN 59452) have been proposed for designation as Scheduled Monuments (Batten, pers. comm.).

The desk-based assessment identified that historically, the development plot has been part of the landholdings of the Penrhyn Estate and its antecedents from at least the 16th century. Numerous maps relating to the Penrhyn Estate holdings cover the area, most notably an estate map of 1768 shows the area prior to the arrival of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451). It shows the wider pre-industrial area as formed by a patchwork of irregularly shaped fields, with the proposed development plot in Field H Maes y Bont Isaf and Field G Higher Gwern. A Penrhyn Estate map of 1803 shows Incline Cottage (GAT HER PRN 24862) and the route of the Penrhyn Slate Quarry Railroad running through plot 17. By the time of the Llandygai Parish Tithe Map of 1841, the development area is shown within plot 93, with the Penrhyn Slate Quarry Railroad running along its eastern edge and Telfords A5 Road, the Bangor to Llandegai section of which was completed in 1819, bounding it to the west. The description of plot 93 in the Tithe Apportionment document as 'demesne out of the park' indicates that it was land used for the benefit of Penrhyn Castle itself, but lay outside the ornamental parkland, and it was on this land that permission to build the Penrhyn Slate Quarry Railroad had been granted.

The First to Third Editions Ordnance Survey 25-inch to 1-mile County Series Map Sheets of the area shows the proposed development area with the Penrhyn Slate Quarry Railway (GAT HER PRN 59452), the replacement for the now disused Penrhyn Slate Quarry Railroad (GAT HER PRN 59451), running northwards along the Cegin Valley before turning to skirt the northern edge of the proposed development plot. The proposed development plot is depicted divided into three large plots, rather than the single plot currently. This included a square plot by the field entrance, which disappears between the Second (1890) and Third (1901) Edition maps, and also northern and southern plots sub-dividing the site. A small structure or building 10m by 4m and orientated north-northeast-south-southwest was located

in the northeast corner of the southern plot within its own enclosure 14m long by 9m wide, at NGR SH59297185. It is shown on all three editions of the Ordnance Survey maps, however no trace of this is now visible on the ground. A small rectangular enclosure, 30m by 15m, orientated north-northeast-south-southwest and located at NGR SH5931472013, is also noted in the southeast corner of the northern rectangular plot on the 1st and 2nd edition Ordnance Survey maps of 1890 and 1901, but it had gone by 1913, the date of the Third Edition map.

A walkover survey conducted as part of the same assessment/evaluation (Roberts and Hopewell 2020, GAT Report 1565) identified the route of the Penrhyn Slate Quarry Railroad, running along the western side of the Penrhyn Park boundary wall on the southeastern side of the site. A slate built water trough was also amongst several post-medieval features within the field, but no clear evidence of other buried archaeological features was identified. The somewhat terraced nature of the proposed development site was however noted as was its suitability for prehistoric and later settlement. The presence of buried archaeology was considered to be moderately likely given the proximity of the site to the substantial prehistoric and medieval archaeological remains discovered during excavations at the nearby Llandygai Industrial Estate and Parc Bryn Cegin Business Park.

A geophysical survey commissioned by Castle Green Homes Limited and conducted by GAT in 2020 (Roberts and Hopewell 2020, GAT Report 1565) identified a number of anomalies within the field including evidence for possible structures, boundaries and enclosures, some of which are depicted on historic mapping and some of which predate the earliest mapping available for the area. Of particular note are a group of anomalies (14 and 15) that may represent the remains of a prehistoric, possibly Iron Age, enclosure and an anomaly that may represent a possible prehistoric, or medieval, lynchet (05).

The 2020 deskbased assessment and geophysical survey report (Roberts and Hopewell 2020, GAT Report 1565) concluded with recommendations that included that a programme of archaeological trial trenching should be undertaken to verify and characterise a selection of features identified during map regression and geophysical survey.

# **3 FIELDWORK METHODOLOGY**

# 3.1 Trial Trenching

The trial trenching programme aims to expose and characterise the possible archaeological anomalies identified during the map regression and geophysical survey and to test blank areas. Trial trenching forms part of a phased process of archaeological investigation and the results may be used to inform subsequent strategies.

A total of 14 30x2m (TR01-TR10; TR12-TR15) and 2 15x2m (TR11; TR16) trial trenches were excavated (Figure 02); the details of the individual trenches are shown below in Table 3.1:

			Centrepoint	
Trench	Size	Orientation	(E / N m OSGB	Rationale / Target
			1936)	
TR01	30x2m	NNE-SSW	259290.37 371890.11	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey
TR02	30x2m	N-S	259289.44 371951.23	Blank area on Geophysical Survey
TR03	30x2m	E-W	259256.56 371958.08	Geophysical Survey Anomalies 5 (possible Iron Age or Medieval lynchet) and 6 (field boundary that predates the 1803 Penrhyn Estate Map)
TR04	30x2m	E-W	259256.74 371975.41	Geophysical Survey Anomalies 4 (double bank and ditch field boundary that appears on the 1803 Penrhyn Estate Map), 5 (possible Iron Age or Medieval lynchet) and 7 (linear cluster of ferrous material possibly part of former field boundary that predates the 1803 Penrhyn Estate Map or modern debris)
TR05	30x2m	NE-SW	259259.41 372007.21	Geophysical Survey Anomalies 8 (field boundary that predates the 1803 Penrhyn Estate Map) and 10 (field boundary shown on 1889 First Edition OS map)

			Centrepoint	
Trench	Size	Orientation	(E / N m OSGB	Rationale / Target
TR06	30x2m	N-S	259309.80 372035.49	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey
TR07	30x2m	NE-SW	259265.10 371813.25	Interior of possible Iron Age enclosure
TR08	30x2m	NW-SE	259274.04 371843.43	Geophysical Survey Anomaly 14 (possible Iron Age enclosure ditch) and interior of possible Iron Age enclosure
TR09	30x2m	NE-SW	259265.30 371789.15	Geophysical Survey Anomaly 15 (possible Iron Age enclosure ditch), and interior of possible Iron Age enclosure
TR10	30x2m	NW-SE	259260.68 371843.59	Geophysical Survey Anomalies 14 (possible Iron Age enclosure ditch) and 16 (field boundary that predates the 1803 Penrhyn Estate Map)
TR11	15x2m	WNW-ESE	259285.70 371805.50	Geophysical Survey Anomaly 17 (Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) and interior of possible Iron Age enclosure
TR12	30x2m	E-W	259257.50 372031.28	Geophysical Survey Anomaly 20 (enclosure shown on 1889 First Edition OS map)
TR13	30x2m	N-S	259295.89 372057.12	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey
TR14	30x2m	E-W	259257.14 371915.71	Blank area on Geophysical Survey
TR15	30x2m	NNW-SSE	259264.22 371718.27	Blank area on Geophysical Survey
TR16	15x2m	E-W	259293.60 371842.54	Geophysical Survey Anomaly 17 (Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) and interior of possible Iron Age enclosure

#### Table 3.1 Trench details

Fieldwork was undertaken between Monday 19th April and Friday 30th April 2021 and was completed in accordance with the GAPS approved WSI (Appendix II), industry standards and the GAT Field Manual.

- The centre-lines of the trial trenches were staked out in advance by GAT staff using a Trimble R8s GNSS GPS receiver (<1cm accuracy). The Trimble R8s unit was also used for all subsequent digital surveying. All survey data were collected and recorded with reference to the EPSG:27700 OSGB 1936 / British National Grid projection using OSTN02/OSGM02 transformation;
- The location of the trial trenches was scanned with a cable avoidance tool (CAT) by a suitably qualified and competent operative from RG Hire Ltd prior to opening to determine the presence or absence of any services. Existing service drawings were also consulted before the works began;
- The 16 trenches were carefully de-turfed and then excavated under archaeological direction using a 13-tonne tracked mechanical excavator fitted with a 2m wide toothless bucket supplied by RG Hire Limited;
- Trenches were excavated to a maximum depth of 1.2m, the glacial horizon or an archaeological horizon, whichever was encountered first;
- Turf, topsoil and subsoil were stockpiled and stored in separate bunds;
- A written record of all 16 trenches and identified archaeological features was created using GAT pro-formas. All trenches and identified archaeological features were also recorded photographically with an appropriate scale, located via GPS and a measured survey completed, either hand-drawn or using the Trimble R8 GPS unit;
- The remains of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) were encountered in trenches TR11 and TR16 and the features were hand cleaned and recorded, no further excavation of the features took place. Other archaeological features encountered in trenches were manually cleaned and examined to determine extent, function, date and relationship to adjacent activity. The following excavation strategy generally applied: 50% sample of each sub-circular feature, 25% sample of each linear feature.
- A total of 184 photographic images were taken using digital SLR cameras (Pentax K200D and Nikon D3100) set to maximum resolution (Pentax: 3872 x 2592 pixels, 10.2

effective megapixels; Nikon: 4608 × 3072 pixels, 14.2 effective megapixels) in RAW format (archive refs G2663\_TT\_0001-0108 and G2663\_TT\_1001-1075).

- An additional series of 139 overlapping oblique vertical photographs of the remains of the Penrhyn Quarry Railroad in TR11 and TR16 were taken at maximum resolution in JPEG format using a Nikon D5600 digital SLR camera mounted on a pole (6000 x 4000 pixels; 24 effective megapixels; archive refs G2663\_TT\_PG\_0001-0139). The photographs were processed in Agisoft Metashape 1.7.2 to produce photogrammetric vertical orthoviews of the trenches which were scaled and orientated using control points surveyed to EPSG:27700 OSGB 1936 grid co-ordinates using the Trimble R8s GPS receiver;
- A3 full-colour prints of the generated orthoviews were then annotated in the field to record the location and extent of the archaeological contexts that comprise the remains of the railroad;
- Other plans and sections of archaeological features were hand-drawn at a minimum 1:10 scale using GAT A4 or A2 pro-forma permatrace;
- Once recording was completed, the trenches were carefully backfilled using the mechanical excavator, first with the excavated subsoil, then topsoil and then re-turfed.

# 3.2 Data Processing and Archiving

Following the completion of fieldwork, the written and drawn records were checked and prepared for archiving. Both paper and digital archives have been compiled, including plans, photographs, written material and other material resulting from the project. The paper archive has also been scanned and digitized in .pdf format to form part of the digital archive.

Photographic images taken using the Pentax K200D and Nikon D3100 cameras were converted from RAW to full resolution TIFF format using Adobe Photoshop CS6 (archive refs G2663\_TT\_0001-0108 and G2663\_TT\_1001-1075). The paper record of metadata for the photographs taken with the Pentax K200D and Nikon D3100 cameras has been digitised using Microsoft Excel 2010 (reproduced as Appendix I).

Survey data was downloaded and processed using QGIS 3.18.2 and used to prepare the figures in the report, in combination with photogrammetry derived orthoviews and digitized copies of the hand-drawn plans. Survey data has been archived in AutoCAD .dxf format and a comma separated values (.csv) file (EPSG:27700 OSGB 1936 / British National Grid).

The photographs taken with the Nikon D5600 have been archived in full resolution JPEG format. The photogrammetry data generated from them has been archived as a geo-referenced (EPSG:27700 OSGB 1936 / British National Grid) coloured point cloud in .laz format, and a separate scaled and geo-referenced rendered 3D model in Wavefront .obj format.

The digital archive, including this report, will be deposited with the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW). Deposition will be completed in accordance with the RCAHMW *Guidelines for Digital Archives* (RCAHMW 2015).

The paper archive resulting from the fieldwork is stored at Gwynedd Archaeological Trust.

The report provides a description of the work, conclusions and recommendations, in line with the GAT Historic Environment Record (HER) requirements. The HER was contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER following the guidance set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (Version 1.1) (The Welsh Archaeological Trusts 2018). The GAT HER Event Primary Reference Number (PRN) for the project is 46071. Digital and paper copies of this report will be supplied to the GAT HER following approval by GAPS.

# 4 FIELDWORK RESULTS

A total of 16 trenches (TR01-TR16) were excavated as part of the trial trenching programme. Six of the trenches (TR01, TR06, TR07, TR09, TR11 and TR16) contained archaeological features, the other 10 contained no features of archaeological interest.

Three of the trenches containing archaeology successfully identified the geophysical survey anomalies that they targeted: The Penrhyn Quarry Railroad (Anomaly 17) was identified along the western side of the Penrhyn Park boundary wall at the eastern ends of TR11 and TR16, and the remains of a ditch originally thought to be part of a possible Iron Age enclosure (Anomaly 15) was revealed in the central portion of TR09.

Previously unknown archaeological features were identified in four trenches: two isolated small shallow pits were identified, one in TR01 to the south of Incline Cottage and one in TR07 within the interior of the possible enclosure; a relatively substantial curvilinear ditch was identified at the western end of TR16; and a layer of mixed material containing redeposited glacial substrate was identified below the topsoil along the length of TR06, just to the west of the route of the Marchogion Inclined Plane.

With respect to the ten archaeologically sterile trenches, two trenches (TR04, TR05) contained agricultural land drains which may correspond with some of the geophysical survey anomalies that they targeted. Visible natural variation in the underlying drift geology and soils may explain geophysical survey anomalies targeted in TR03, TR04 and TR12. Modern features, none of which were targeted geophysical survey anomalies, were identified in TR02 and TR03, TR13 and TR14.

Trench	Rationale / Target	Archaeology encountered	Target identified
	Geophysical Survey Anomaly 1 (medieval or later	Yes	No
TR01	ridge and furrow) and blank area on Geophysical		
	Survey		
TR02	Blank area on Geophysical Survey	No	N/A
	Geophysical Survey Anomalies 5 (possible Iron Age	No	No
TR03	or Medieval lynchet) and 6 (field boundary that		
	predates the 1803 Penrhyn Estate Map)		

A summary of the results of the trial trenching programme is shown in Table 4.1 below.

Trench	Rationale / Target	Archaeology encountered	Target identified
TR04	Geophysical Survey Anomalies 4 (double bank and ditch field boundary that appears on the 1803 Penrhyn Estate Map), 5 (possible Iron Age or Medieval lynchet) and 7 (linear cluster of ferrous material possibly part of former field boundary that predates the 1803 Penrhyn Estate Map)	No	Yes
TR05	Geophysical Survey Anomalies 8 (field boundary that predates the 1803 Penrhyn Estate Map) and 10 (field boundary shown on 1889 First Edition OS map)	No	Yes
TR06	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey	Yes	No
TR07	Interior of possible Iron Age enclosure	Yes	N/A
TR08	Geophysical Survey Anomaly 14 (possible Iron Age enclosure ditch) and interior of possible Iron Age enclosure	No	No
TR09	Geophysical Survey Anomaly 15 (possible Iron Age enclosure ditch) and interior of possible Iron Age enclosure	Yes	Yes
TR10	Geophysical Survey Anomalies 14 (possible Iron Age enclosure ditch) and 16 (field boundary that predates the 1803 Penrhyn Estate Map)	No	No
TR11	Geophysical Survey Anomaly 17 (Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) and interior of possible Iron Age enclosure	Yes	Yes
TR12	Geophysical Survey Anomaly 20 (enclosure shown on 1889 First Edition OS map)	No	Yes
TR13	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey	No	No
TR14	Blank area on Geophysical Survey	No	N/A
TR15	Blank area on Geophysical Survey	No	N/A

Trench	Rationale / Target	Archaeology encountered	Target identified
	Geophysical Survey Anomaly 17 (Penrhyn Slate	Yes	Yes
TR16	Quarry Railroad (GAT HER PRN 59451) and interior		
	of possible Iron Age enclosure		

Table 4.1 Results summary

Detailed descriptions of each trench are listed below. Unless stated otherwise, all cut features revealed in the bases of the trenches were cut into the underlying natural drift geology and sealed by subsoil.

## 4.1 TR01

TR01 (centred on NGR SH 59290 71890) was placed in the central-eastern part of the proposed development area to the south of Incline Cottage, on ground that sloped gently from south to north. It was located to investigate geophysical survey Anomaly 1, medieval or later ridge and furrow, and to test a blank area on the geophysical survey (Figure 2).

The trench was orientated north-northeast by south-southwest, measured 30x2m and was dug to a maximum depth of 0.50m (Plate 01).

The topsoil (0101) was 0.20m deep and consisted of a mid-greyish brown silty clay (Plate 02). The subsoil (0102) below was 0.20m deep and consisted of a mid-orangey brown sandy clayey silt with occasional small and medium-sized rounded and sub-angular stones. The natural glacial horizon (0103) was encountered at a minimum depth of 0.40m and consisted of yellowish-grey clayey silt with darker brown manganese flecks and nodules.

The trench contained one archaeological feature (Figure 03.1; Figure 03.2; Plate 03; Plate 04). Shallow bowl-shaped pit [0104] was cut through the natural glacial horizon (0103) approximately halfway along the length of the trench. It was sub-circular in plan, 0.82m long and 0.73m wide, with shallow concave sides that broke gradually to an irregular base 0.10m deep. The pit was filled with (0105) a firm mid to light grey silt with occasional sub angular and sub rounded stones 3-10cm long. No finds were associated with the pit. A 20 litre bulk environmental sample <06> was recovered from fill in order to provide a date for the feature and to aid the interpretation of its function. The results of the analysis of this sample are included in Sec Sec 5.1.2.4 and Sec 5.2.1.3.

## 4.2 TR02

TR02 (centred on NGR SH 59289 71951) was located to investigate a blank area identified during the geophysical survey. It was situated on the eastern side of the proposed development area, just to the northwest of Incline Cottage, on ground that sloped gently from south to north (Figure 2).

The trench was orientated north-south, measured 30x2m and was dug to a maximum depth of 0.58m (Plate 05).

The topsoil (0201) was 0.21m deep and consisted of mid-brown clayey silt with frequent small sub-angular and sub-rounded stones (1-4cm long), occasional flecks of charcoal and occasional fragments of post-medieval pottery (Plate 06). The subsoil (0202) below this consisted of a 0.20m deep slightly orangey mid-brown clayey silt with occasional sub-angular and sub-rounded stones (2-5cm long). The natural glacial horizon (0203) was encountered at a minimum depth of 0.41m and consisted of a light yellowish-grey clay with frequent dark brown manganese flecks.

No archaeological features or finds of archaeological interest were encountered within the trench.

A straight linear arrangement of closely spaced rectangular slabs of machined slate (0204) was identified at the southern end of the trench, on the surface of the topsoil just below the turf line (Plate 07; Plate 08). The slabs, generally around 14-20cm wide, 2-3cm thick and up to 1.41m long, were laid flat and arranged side by side, 2 slabs (approximately 35cm) wide, on a southeast-northwest alignment which continued beyond the bounds of the trench. The slabs were unbonded and no evidence for a cut or side slabs which might indicate that they were capping stones for a drain or conduit was evident.

Despite their location just underneath the turf line, there did not appear to be any evidence that they had been struck by a plough suggesting the field had not been ploughed since they were laid. The middle-aged son of the current elderly resident of Incline Cottage informed us that he remembered them being visible in the field when he was a child, but he had no idea what their purpose was. Given their modern appearance, their extremely recent stratigraphic location, and their orientation, which gives the impression that they may run in a straight line towards Incline Cottage to the southeast, they are probably best interpreted as a modern marker for a service that runs southeast across the field from the roadside towards the cottage. A small hand-cut trial hole dug underneath the slabs to the level of the natural ground surface 0.22m below did not reveal any evidence for the nature of that service however.

#### 4.3 TR03

TR03 (centred on NGR SH 59257 71958) was orientated east-west and placed on the western side of the central part of the proposed development area, on ground that fell steeply away to the west approximately halfway along its length. It was located in order to target geophysical survey Anomalies 5, a possible Iron Age or Medieval lynchet, and 6, a field boundary that predates the 1803 Penrhyn Estate Map (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.69m (Plate 09). The soil at the base of the steep slope at the centre of the trench was considerably deeper than at either the eastern or western ends which were each 0.44m deep.

The topsoil (0301) was 0.25m deep and consisted of a loose mid-greyish-brown clayey silt with moderate small sub-angular and sub-rounded stones (1-3cm long), occasional small flecks of charcoal and occasional sherds of post-medieval pottery (Plate 10). The subsoil (0302) was between 0.14m and 0.39m deep and consisted of mid-orangey-brown clayey silt with occasional patches of blue-grey clay and moderate sub-angular and sub-rounded stones (1-5cm long). The natural glacial horizon (0303) was encountered at depths between 0.39m (at the ends of the trench) and 0.69m (at the base of the steep slope in the centre) and generally consisted of orange and blue-grey mottled clay with bands of greyish brown silty sand with abundant rounded and sub-rounded stones and cobbles (1-10cm long). The natural glacial horizon in the higher, eastern end of the trench, consisted of mottled yellow and brown clay with frequent flecks of manganese.

No features or finds of archaeological interest were encountered within the trench.

No evidence for the possible field boundary Anomaly 6 was encountered. It was initially thought that a north-south aligned band of natural silty sand with cobbles in the glacial horizon (0303) (Plate 12) may correspond with the location of Anomaly 6, however, analysis of the survey data suggests that the natural feature lies too far to the west. Given the absence of evidence for any visible archaeological feature in the trench, it seems likely that the anomaly was caused by a ditch cut through the topsoil. Similarly, no evidence for Anomaly 5, a possible lynchet, was encountered in the trench. The geophysical survey report (Evans and Hopewell 2020) acknowledged that the anomaly may be geological in origin, and it seems likely that Anomaly 5 is caused by the deeper soils at the base of the natural slope at the trench's centre (Plate 12).

#### 4.4 TR04

TR04 (centred on NGR SH 59257 71975) was located on the western side of the central part of the proposed development area, 17m to the north of TR03. It was orientated east-west, on ground that sloped from east to west. The trench targeted geophysical survey Anomalies 4, a double bank and ditch field boundary that appears on the 1803 Penrhyn Estate Map, 5, a possible Iron Age or Medieval lynchet, and 7, a linear cluster of ferrous material possibly part of former field boundary that predates the 1803 Penrhyn Estate Map or modern debris (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.93m at its deeper, eastern end (Plate 13).

The topsoil (0401) was 0.25m deep and consisted of a loose mid-greyish-brown clayey silt with moderate small sub-angular and sub-rounded stones (1-3cm long), occasional small flecks of charcoal and occasional sherds of post-medieval pottery (Plate 14). The subsoil (0402) had a maximum depth of 0.68m at the eastern end of the trench and consisted of mid-orangey-brown clayey silt, becoming greyer towards its base, with occasional sub-angular and sub-rounded stones and small cobbles (1-10cm long). The natural glacial horizon (0403) was encountered at depths between 0.40m (at the western end of the trench) and 0.93m (at the higher eastern end). The nature of the glacial deposits varied across the trench: at the eastern end the horizon was formed by a grey clay with frequent dark brown manganese flecks; at the centre of the trench it consisted of a light yellowish-grey clay; at the lower, western end, it generally consisted of a 'marbled' brown and yellowish-grey clay.

No archaeological features or finds of archaeological interest were encountered within the trench.

Three land drains, each containing abundant sherds of post-medieval pottery, were identified towards the centre of the trench. Only one of the drains appears to have been picked up on the geophysical survey. A substantial northeast-southwest aligned drain whose base was filled with large rounded cobbles (Plate 16), appears to correspond with the geophysical survey Anomaly 4, suggesting that the initial interpretation of the anomaly here as a double bank and ditch field boundary is incorrect.

A slate filled land drain (Plate 15) was identified at the location where the trench should have cut Anomaly 7, a linear cluster of ferrous material which had possibly accumulated against a former field boundary. The land drain lies on a different orientation to the anomaly however,

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and it seems more likely that ferrous material has accumulated in the topsoil, though no concentration or associated field boundary feature was noted at the time of excavation.

No evidence for a lynchet was identified at the eastern end of TR04 and, as in TR03 to the south, it seems that Anomaly 5 is most likely a geological phenomenon caused by the significantly deeper soils at the higher, eastern end of the trench.

A linear arrangement of 6 flat sub-rectangular slabs of slate (0404) was identified at the eastern end of the trench. The slabs, the largest of which was 92cm long, 29cm wide and 2cm thick, were laid flat on a southeast-northwest alignment on the surface of the topsoil, just below the turf line (Plate 17). No evidence for a cut or side slabs that might indicate a capped drain were evident. Though the slabs were more roughly hewn and widely spaced than the examples identified in TR02, they lie on the same alignment and most likely represent part of the same system of markers for a modern buried service running southeast from the roadside towards Incline Cottage.

## 4.5 TR05

TR05 (centred on NGR SH 59259 72007) was located in the northwestern part of the proposed development area. It was orientated northeast-southwest on ground that generally sloped from southeast to northwest and it was significantly higher at its northeastern end. It was located to target geophysical survey Anomalies 8, a field boundary that predates the 1803 Penrhyn Estate Map, and 10, a field boundary shown on the 1889 First Edition OS map (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.66m (Plate 18).

The topsoil (0501) was 0.25m deep and consisted of a soft mid-greyish-brown clayey silt with moderate small sub-angular and sub-rounded stones (1-3cm long) (Plate 19). The subsoil (0502) had a maximum depth of 0.25m and consisted of a mid/light slightly orangey-brown clayey silt, with moderate sub-angular and sub-rounded stones and small cobbles (1-8cm long). Occasional flecks and small accumulations of manganese were also noted in the subsoil at the lower, southwestern end of the trench. The natural glacial horizon (0403) was encountered at a depth of 0.50m. It generally consisted of a greyish-brown stony silty clay with dark reddish-grey manganese mottles; at the higher northeastern end, bands of gravelly stony material were also evident.

No archaeological features or finds of archaeological interest were encountered within the trench.

A 1.2m wide northwest-southeast aligned cut feature [0504] was identified towards the northeastern end of the trench at the expected location of geophysical survey Anomaly 8 (a suspected field boundary that predates the 1803 Penrhyn Estate Map) (Plate 20). It quickly became apparent however that the feature was an active land drain packed with large rounded cobbles running down the slope. The drain lies on the same orientation as Anomaly 8 and it would appear that its previous interpretation was incorrect.

No evidence was encountered for Anomaly 10 (a field boundary shown on the 1889 First Edition OS map), suggesting that the boundary was cut within the topsoil and therefore not identifiable during excavation.

#### 4.6 TR06

TR06 (centred on NGR SH 59310 72035) was located in the northeastern corner of the proposed development area. The trench was orientated north-south on ground that generally sloped relatively steeply from south to north. It was located parallel with and just to the west of the Marchogion Inclined Plane to target geophysical survey Anomaly 1, the possible medieval or later ridge and furrow, and to test a blank area on the geophysical survey.

The trench measured 30x2m and was dug to a maximum depth of 1.20m (Plate 21). Unfortunately, the lower northern half of the trench could not be excavated to the glacial horizon due to the depth of overlying soil exceeding the maximum safe depth.

The topsoil (0601) was 0.20m deep and consisted of a soft dark greyish-brown clayey silt with moderate small sub-angular and sub-rounded stones (1-5cm long) and occasional charcoal flecks and fragments of post-medieval pottery (Plate 22). Below this was (0602), a 0.40m deep layer of mid-greyish-brown clayey silt with moderate sub-angular and sub-rounded stones (1-7cm long) and frequent patches and lenses of blue-grey and yellowish-grey silty clay and nodules of manganese (Figure 04). The deposit appeared to contain a high proportion of dumped mixed redeposited natural substrate and extended along the entire length of the trench. A subsoil (0603) lay below (0602). It had a maximum observed depth of 0.60m and consisted of orangey-brown clayey silt which became greyer towards its base and contained a moderate proportion of small sub-angular and sub-rounded stones (1-5cm long). The natural glacial horizon (0604) was first encountered at a depth of 1.20m halfway (15m) along the trench. At the trench's shallower northern end it lay 0.50m below the level of the current ground surface. It generally consisted of a greyish-orange clay with a high proportion of coarse sand and gravel.

The only feature in TR06 which is of archaeological interest is the mixed deposit (0602) (Figure 04; Plate 22). The deposit appears to be a mixture of redeposited subsoil and natural glacial substrate and represents material excavated elsewhere and dumped. The ground on the eastern side of the trench slopes away to the route of the Marchogion Inclined Plane, which appears to sit in a north-south aligned cutting along the northeastern edge of the proposed development site. It is quite plausible that deposit (0602) represents upcast material from the original excavation of the cutting for the Inclined Plane which was subsequently dumped in the open field to its west.

No trace of geophysical survey Anomaly 1 (medieval or later ridge and furrow) was identified within the trench. The anomalies cut across the trench location at right angles so they are

unlikely to be represented by the mixed dumped deposit (0602) whose depth was consistent along the length of the trench. It seems likely that the features that caused the anomalies are contained within the topsoil and were therefore not identified during excavation.

## 4.7 TR07

TR07 (centred on NGR SH 59265 71813) was placed in the central part of the proposed development area on ground that sloped gently from northeast to southwest. It was orientated northeast-southwest and was located to investigate the interior of the possible Iron Age enclosure (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.85m (Plate 23).

The topsoil (0701) was 0.31m deep and consisted of mid-brown sandy silt with frequent small sub-rounded and sub-angular stones (1-4cm long) and occasional sherds of post-medieval pottery (Plate 24). The subsoil (0702) below was 0.41m deep and consisted of a mid, slightly greyish, orangey-brown clayey silt with moderate small sub-rounded and sub-angular stones (1-5cm long) and occasional sherds of post-medieval pottery. The natural glacial horizon (0703) was encountered at a minimum depth of 0.72m and consisted of yellowish-grey clayey silt with frequent dark brown manganese flecks and mottles.

The trench contained one archaeological feature, a shallow irregularly shaped pit [0704] (Figure 05.1; Figure 05.2; Plate 25).

The pit [0704] was cut through the natural glacial horizon (0703), and was located in the central part of the trench. It was irregularly shaped in plan, 1.19m long and 0.75m wide, with gently sloping slightly concave sides that broke gradually to a flattish irregular base on its western side which stepped down to a deeper, slightly concave base on its east. The maximum depth of the feature was 0.17m on its western side, and it is possible that the feature represents two intercutting shallow sub-circular pits, the deeper one lying to the west. Both sides of the feature were filled with the same material (0705), a soft mid-brown clayey silt with lighter yellowish-grey mottles which contained occasional small sub-rounded stones (1-5cm long) and frequent flecks and small fragments of charcoal.

Despite the charcoal rich nature of fill (0705), cut [0704] showed no evidence for burning in situ and it appears that the fill was intentionally deposited into the pit(s) following burning elsewhere. No finds were recovered from fill (0705). A 10 litre bulk environmental sample <02> was recovered from the feature in order to provide a date for the feature and possibly help to interpret its function (see Sec 5.1.2.2 and Sec Sec 5.2.1.1).

#### 4.8 TR08

TR08 (centred on NGR SH 59274 71843) was placed in the central part of the proposed development area on ground that sloped gently from northeast to southwest. It was orientated northwest-southeast and was located to investigate geophysical survey Anomaly 14, the western, northeast-southwest aligned, portion of a possible Iron Age enclosure ditch, and the interior of the enclosure (Figure 2). The trench measured 30x2m and was dug to a maximum depth of 0.68m (Plate 26).

The topsoil (0801) was 0.40m deep and consisted of a mid-greyish-brown silty clay with moderate small sub-rounded and sub-angular stones (1-4cm long), occasional sherds of post-medieval pottery, and small fragments of modern glass and cinders (Plate 27). The subsoil (0802) below was 0.15m deep and consisted of a mid, slightly greyish, yellowish-brown silty clay with moderate small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (0703) was encountered at a minimum depth of 0.55m and generally consisted of banded yellowish-grey and greyish brown silty clay. A 2.3m wide band of natural glacial sand and gravel material with lenses of manganese panning ran southwest-northeast across the central portion of the trench.

No archaeological features or finds of archaeological interest were encountered within the trench.

The expected location of Anomaly 14, the western, northeast-southwest aligned, portion of the possible Iron Age enclosure ditch, corresponds with the surveyed location and orientation of the band of natural glacial sand and gravel in (0803) at the centre of the trench. It is, therefore, possible, in this location at least, that this part of Anomaly 14 is caused by a natural geological phenomenon. It is also possible, as appears to be the case in TR10 just to the south, that the anomaly represents a relatively late ditch cut within topsoil and therefore indiscernible within the trench.

#### 4.9 TR09

TR09 (centred on NGR SH 59265 71789) was placed in the central part of the proposed development area on ground that sloped gently from northeast to southwest. It was orientated northeast-southwest and was located to investigate geophysical survey Anomaly 15, the southern, northwest-southeast aligned, portion of a possible Iron Age enclosure ditch, and the interior of the enclosure (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.88m (Plate 28).

The topsoil (0901) was 0.33m deep and consisted of mid-greyish-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long), and occasional sherds of post-medieval pottery (Plate 29). The subsoil (0902) below was 0.36m deep and consisted of a mid, slightly orangey-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (0903) was encountered at a minimum depth of 0.69m and consisted of yellowish-grey brown clayey silt with darker brown, manganese mottles and patches of grey coarse gravel and sand.

One archaeological feature, a straight linear ditch [0904], was encountered within the trench (Plate 30; Plate 31; Figure 06.1; Figure 06.2).

The ditch [0904] ran across the centre of TR09 on a northwest-southeast alignment, perpendicular to the long axis of the trench. It was 1.15m wide with slightly concave sides that broke gradually to a flattish, slightly concave base 0.30m deep. It contained a single fill, (0905), a soft mid-brown clayey silt with very occasional small sub-rounded stone inclusions (1-3cm long). No finds were recovered from the fill.

The ditch appears to have silted naturally over time and its appearance is consistent with a field boundary. Its date is unknown, however a complete lack of post-medieval pottery in fill (0905) may suggest that it is a relatively early feature, possibly prehistoric, medieval or post-medieval. A 20 litre bulk environmental Sample <01> was recovered from fill (0905) in order to potentially recover material that can be used to date the feature (See Sec 5.1.2.1).

The nature, location and orientation of straight linear ditch [0904] is consistent with geophysical survey Anomaly 15, the southern, northwest-southeast aligned, portion of a possible Iron Age enclosure ditch. No trace of the western side of the possible enclosure, Anomaly 14 (targeted in TR08 and TR10) was identified however. The enclosure does not appear as a continuous anomaly in the survey results and it is possible that the two

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anomalies are two distinct unrelated features. It seems likely that ditch [0904] is part of a straight linear northwest-southeast aligned field boundary feature; there is currently little evidence to suggest that it is part of a larger sub-circular enclosure, the original interpretation of Anomaly 15.

## 4.10 TR10

TR10 (centred on NGR SH 59261 71844) was placed on the western side of the central part of the proposed development area on ground that sloped gently from southeast to northwest. It was orientated northwest-southeast and was located to investigate geophysical survey Anomaly 16, a field boundary that predates the 1803 Penrhyn Estate Map, and geophysical survey Anomaly 14, the western, southwest-northeast aligned, portion of the possible Iron Age enclosure ditch (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.70m (Plate 32).

The topsoil (1001) was 0.30m deep and consisted of mid-greyish-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long) (Plate 33). The subsoil (1002) below was 0.25m deep and consisted of a mid- orangey-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (0903) was encountered at a minimum depth of 0.55m and consisted of mottled yellowish-grey and greyish brown clayey silt with patches and bands of coarse gravel and sand and strong areas of manganese panning.

No archaeological features or finds of archaeological interest were encountered within TR10.

No evidence for Anomaly 14, the possible Iron Age enclosure ditch, was encountered. It was initially thought that a northeast-southwest aligned band of sand and gravel in the glacial horizon (1003) (Plate 34) may correspond with the location of Anomaly 14, as appeared to be the case in TR08 just to the northeast. However, comparison of its surveyed location with the geophysical survey results suggests that the natural feature lies too far to the northwest. Given the absence of evidence for any visible archaeological feature in the trench, it seems likely that Anomaly 14 was caused by a relatively late ditch cut within the topsoil and therefore difficult to identify within the trench.

Similarly, no evidence for Anomaly 16, a possible field boundary that predates the 1803 Penrhyn Estate Map, was identified at the northwestern end of the trench. Again, it may be that the anomaly represents a relatively late ditch cut high within the topsoil.

#### 4.11 TR11

TR11 (centred on NGR SH 59286 71806) was placed perpendicular to the Penrhyn Park estate wall on the eastern side of the central part of the proposed development area, on ground that sloped from west to east. It was orientated west-northwest-east-southeast and, along with TR16, was one of the two trenches located to investigate geophysical survey Anomaly 17, the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451), and the interior of possible Iron Age enclosure (Figure 2).

TR11 measured 15x2m and was dug to a maximum depth of 0.70m (Plate 35).

The topsoil in the trench (1101) was 0.15m deep and consisted of dark-greyish-brown clayey silt, becoming a lighter mid-brown colour towards the west, with occasional to moderate small sub-rounded and sub-angular stone inclusions throughout (1-5cm long) (Plate 42). A subsoil (1102) was noted below the topsoil at the western end of the trench. (1102) was 0.23m deep and consisted of a mid- orangey-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (1103) was encountered at the western end of the trench at a minimum depth of 0.38m and consisted of mottled and striped yellowish-grey and greyish clayey silt with patches of coarse sand and gravel.

One archaeological feature, the remains of the Penrhyn Slate Quarry Railroad (1111), 6.2m wide and running north-northeast-south-southwest along the western side of the Penrhyn Park estate wall (1105), were identified at the eastern end of the trench (Figure 07; Figure 08.1).

Machine excavation had revealed a 6.2m wide deposit of greyish-brown clayey silt with patches of redeposited yellowish-grey silty clay (1104) at the eastern end of the trench. It lay below the topsoil at a depth of 0.15m and had a sharp north-northeast-south-southwest aligned boundary with natural substrate (1103) to the west. Deposit (1104), which appears to be a deliberate infill over the surface of the railroad formation, was carefully cleaned off by hand and proved to be up to 0.55m deep (Plate 42). Once removed, several archaeological deposits were revealed below (Plate 36; Plate 37). Following their exposure, these deposits were cleaned and recorded; no further excavation was carried out.

A 4.7m wide linear north-south aligned deposit of compacted crushed blue-grey slate and pebbles (1106) was identified at the eastern end of the trench (Plate 38). The surface of the deposit sloped gently from east to west. Unfortunately, water seeping from the base of the foundation of the Penrhyn Park estate wall (1105) meant that the eastern end of the deposit

became waterlogged upon exposure, however, it was still possible to establish that it abutted the wall (Plate 41). The deposit is consistent with trackbed ballast, upon which would have been set the sleepers and rails that carried the wagons.

On the western edge of the ballast was a 0.98m wide (max) broadly north-south aligned linear deposit of broken angular slate blocks (1110) in a loose greyish-orange silty clay matrix (Plate 41). The deposit, which also included a breezeblock sized chunk of metal slag, appeared to run underneath the trackbed ballast (1106) to the east. One of the blocks was a broken slate railway sleeper (72cm long, 23cm wide and 8cm thick) with what appeared to be the remains of a heavily rusted ferrous metal fitting attached (Plate 43) (see discussion of SF003 below), suggesting (1110) was possibly a demolition layer from an earlier phase of the railroad which had subsequently been used as part of a later formation supporting ballast (1106) above.

The western edge of the railroad was defined by a steep-sided north-northeast-southsouthwest aligned straight linear cut [1107] which could clearly be seen cutting through subsoil (1102) and the natural glacial substrate (1103) on its western side (Plate 39). On the eastern side of the cut, lying between it and demolition deposit (1110), was a between 1.49 and 1.72m wide deposit of orangey-brown clayey silt containing numerous angular slate slabs blocks up to 30cm long (1108) (Plate 39). Some of the blocks rested against the side of cut [1107] and appeared to be in situ, the rest appeared to have been moved or collapsed on the eastern side of the cut. They appear to represent the demolished remains of a revetment wall that originally marked the western edge of the railroad formation.

Following the removal of (1104) on the western side of the railroad formation, an approximately 60cm diameter sub-circular deposit of compacted crushed blue-grey slate (1109) was noted on the southern side of the trench (Plate 39; Plate 40). The deposit appeared to underlie demolished revetment wall (1108). The excavator felt that it may represent a surface that originally lay on the eastern side of the revetment wall, or that it may be the upper fill of a trackside ditch incorporating material eroded from ballast deposit (1106). Without the benefit of further intrusive excavation it was impossible to give a more confident interpretation.

Three finds of archaeological interest were recovered from the railroad deposits in TR11, small finds SF001-SF003.

SF001 consists of three large fragments of glassy metal slag recovered from the surface of ballast deposit (1106) during cleaning. SF002 is a slate slab with a hole drilled in it recovered from demolition/formation deposit (1110).

SF003 is the fragment of slate sleeper (72cm long, 23cm wide and 8cm thick) with an apparently attached heavily rusted ferrous metal fitting mentioned above in the discussion of demolition/formation deposit (1110) (Plate 43). SF003 was firmly embedded within the deposit, and it was originally planned to leave the object in situ. Unfortunately, an overnight intruder visited the site and dislodged the sleeper from the deposit. Consequently, it was noted that it had been the underside of the object that had been visible previously (Plate 44), and that the topside of the sleeper contained a 13.2x10.5cm rectangular cut-out and drilled holes for a metal chair that would have originally supported a rail (Plate 45; Plate 46). Following discussion with Cadw, a decision was made to recover the sleeper for specialist analysis and comment (see Sec 6.3; Appendix V).

## 4.12 TR12

TR12 (centred on NGR SH 59258 72031) was placed in the northwestern corner of the proposed development area. It was orientated east-west on ground that generally slopes from southeast to northwest, with the western end of the trench located in a hollow in the corner of the field. It was located to investigate Geophysical Survey Anomaly 20, an enclosure shown on the 1889 First Edition OS map (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 1.10m at its lower, western end (Plate 47).

The topsoil (1201) was 0.20m deep and consisted of dark-greyish-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long) (Plate 48). The subsoil (1202) below was between 0.20m deep at the eastern end of the trench 0.90m deep at the west and consisted of mid-orangey-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long). It became greyer and more gravelly with depth at the western end of the trench and contained occasional larger sub-rounded cobbles (8-18cm long) close to its interface with the natural glacial deposits (1203) in its deeper sections. The natural glacial horizon (1203) was formed of three different bands of material. At the higher eastern end of the trench, an 8m wide band of yellowishgrey clayey silt was recorded 0.4m below the level of the current ground surface. In the central portions of the trench, a 9.5m wide band of silty gravel and large rounded cobbles was identified. The cobbles were particularly concentrated along the western side of the deposit which sloped down steeply to the west, the bottom of the slope lying 1.1m below the level of the current ground surface. To the west of the slope, in the lower, western end of the trench, the glacial substrate was formed by a sedimentary deposit of orangey-grey silt and coarse sand. Given its location and proximity to the Afon Cegin, it seems likely that the gravel bank is the eroded edge of a riverbank formed by post-glacial fluvial processes.

No archaeological features or finds of archaeological interest were encountered within TR12.

A north-south aligned band of rounded cobbles at the base of the gravel bank in TR12 was investigated to establish whether it was an intentionally built stone revetment at the base of the slope. It was established they were not closely packed, and that they were clearly embedded within a matrix formed of glacial silt and gravel (Plate 49). The bank and cobbles however are consistent with the location and orientation of Anomaly 20, which consequently appears to be a geological anomaly due to the sudden change between shallower and

deeper soils here rather than the enclosure shown on the 1889 First Edition OS map as initially thought.

## 4.13 TR13

TR13 (centred on NGR SH 59296 72057) was placed in the northeastern corner of the proposed development area. It was orientated north-south on ground that slopes relatively steeply from south to north. It was located to investigate geophysical survey Anomaly 1, medieval or later ridge and furrow, and to test a blank area on the survey (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 1.20m (Plate 50). As with the northern half of TR06 to the east, unfortunately, the trench could not be excavated to the glacial horizon due to the depth of overlying soil exceeding the maximum safe depth.

The topsoil (1301) was 0.26m deep and consisted of a soft dark-greyish-brown clayey silt with occasional small sub-rounded and sub-angular stones (1-5cm long), occasional charcoal flecks and occasional sherds of post-medieval pottery (Plate 51). Below this lay (1302), a 0.45m deep layer of mid, slightly orangey, brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones and small cobbles (1-8cm long). Subsoil (1303), a slightly yellowish mid-brown clayey silt, lay below and was at least 0.51m deep. The subsoil contained numerous darker brown bioturbated areas throughout.

No definite archaeological features or finds of archaeological interest were encountered within the trench.

It is possible that (1302) represents another dumped horizon as seen with (0602) in TR06 just to the east. It lacked the redeposited natural substrate components seen in high proportions in (0602) however and has been interpreted as a ploughsoil.

A modern bovine burial was identified at the northern end of TR13. The grave was cut through the topsoil, the carcass still retained fur attached to its skeleton and a plastic ear tag could clearly be seen (Plate 52).

No traces of geophysical survey Anomaly 1, medieval or later ridge and furrow, were identified within the trench. The anomalies cut across the trench location at right angles so they are unlikely to be represented by the ploughsoil (1302) whose depth was consistent along the length of the trench. It seems likely that the features that caused the anomalies are contained within the topsoil and were therefore not identified during excavation.

## 4.14 TR14

TR14 (centred on NGR SH 59257 71916) was placed on the western side of the central part of the proposed development area, to the west of Incline Cottage on ground that sloped gently from south to north. It was orientated east-west and was located to investigate a blank area on the geophysical survey (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 0.50m (Plate 53).

The topsoil (1401) was 0.20m deep and consisted of a mid/dark greyish-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long) (Plate 54). The subsoil (1402) below was 0.15m deep and consisted of a mid- orangey-brown clayey silt with occasional small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (1403) was encountered at a minimum depth of 0.35m and consisted of bands of yellowish-grey and grey clayey silt with patches of coarse gravel and sand.

No archaeological features or finds of archaeological interest were encountered within TR14.

While under excavation, a modern plastic water pipe was breached at the centre of the trench. The pipe appears to supply water to the slate drinking trough which lies just to the south. A repair was effected by RG Hire contractors the same day (Plate 55; Plate 56).

## 4.15 TR15

TR15 (centred on NGR SH 59264 71718) was placed in the southern part of the proposed development area on ground that sloped gently from north to south. It was orientated north-south and was located to investigate a blank area on the geophysical survey (Figure 2).

The trench measured 30x2m and was dug to a maximum depth of 1.18m (Plate 57).

The topsoil (1501) was 0.30m deep and consisted of mid-greyish-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long) (Plate 58). The subsoil (1502) below was 0.45m deep and consisted of mid-orangey-brown clayey silt with yellowish-orange mottles which contained occasional small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (1403) was encountered at a minimum depth of 0.75m and consisted of yellowish-grey silty clay with patches of grey silty clay, coarse sand, gravel and areas of strong manganese panning.

No archaeological features or finds of archaeological interest were encountered within TR15.

## 4.16 TR16

TR16 (centred on NGR SH 59294 71843) was placed perpendicular to the Penrhyn Park estate wall on the eastern side of the central part of the proposed development area on fairly level ground. It was orientated east-southeast-west-southwest and, along with TR11, was one of the two trenches sited to investigate geophysical survey Anomaly 17, the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451), and the interior of possible Iron Age enclosure (Figure 2).

TR16 measured 15x2m and was dug to a maximum depth of 0.52m (Plate 59).

The topsoil in the trench (1601) was 0.15 – 0.20m deep and consisted of dark-greyish-brown clayey silt, becoming a lighter mid-brown colour towards the west, with occasional to moderate small sub-rounded and sub-angular stone inclusions throughout (1-5cm long) (Plate 60). A subsoil (1602) was noted below the topsoil at the western end of the trench. (1602) was 0.20m deep and consisted of a mid- orangey-brown clayey silt with occasional to moderate small sub-rounded and sub-angular stones (1-5cm long). The natural glacial horizon (1603) was encountered at the western end of the trench at a minimum depth of 0.35m and consisted of mottled and striped yellowish-grey and greyish clayey silt with patches of coarse sand and gravel.

Two archaeological features were identified within TR16. The remains of the Penrhyn Slate Quarry Railroad (1616), 6.84m wide and running north-northeast-south-southwest along the western side of the Penrhyn Park estate wall (1611), were identified at the eastern end of the trench (Figure 09; Figure 08.2); a 1.41m wide ditch [1604], possibly the southeastern corner of an enclosure, was identified at the western end (Figure 09; Figure 10.1; Figure 10.2).

Machine excavation had exposed a 6.84m wide deposit of greyish-brown clayey silt with patches of redeposited yellowish-grey silty clay (1612) at the eastern end of the trench. It lay below the topsoil at a depth of 0.20m and had a sharp north-south aligned boundary with natural substrate (1603) to the west. Deposit (1612), which, like deposit (1104) in TR11, appeared to be a deliberate infill over the surface of the railroad formation, was carefully cleaned off by hand and proved to be up to 0.40m deep. Once removed, a number of archaeological deposits were revealed below (Plate 61). Following their exposure, these deposits were cleaned and recorded; no further excavation was carried out.

A 1.2m wide linear north-northeast-south-southwest aligned deposit of compacted mid-grey silty sandy gravel with moderate sub-rounded stones (1-5cm long) and occasional small fragments of non-magnetic black glassy slag and small angular fragments of slate (1-3cm

long) (1610) was identified at the eastern end of the trench (Plate 62). The surface of the deposit sloped slightly from east to west and it clearly abutted the Penrhyn Park estate wall (1611) on its eastern side (Plate 62). Though narrower and lacking the quantities of crushed slate seen in the equivalent deposit (1106) in TR11 and (1607) further to the west in TR06, the deposit was consistent with the appearance of trackbed ballast which would have held the sleepers and rails for the railroad.

A 0.5m wide deposit of yellowish-grey silty clay (1609) sloped steeply down to the west along the western edge of trackbed ballast (1610) (Plate 62; Plate 63). The clay may have been exposed natural substrate, or redeposited material laid as a formation to support trackbed ballast (1609). It also appeared to underlie deposit (1607) to its west.

Deposit (1607) was a 4m wide band of hard orangey-brown silt and grey and coarse sand and gravel with a high proportion of crushed angular blue-grey slate fragments incorporated into it (Plate 63). It also had the appearance of a trackbed ballast deposit but was lower and wider than upper ballast deposit (1610) to its east.

A 1.2m wide north-south aligned linear deposit of large mixed sub-rounded stone cobbles (up to 25cm long) and angular slate blocks (up to 30cm long) (1608) was recorded at the centre of lower trackbed ballast deposit (1607) (Plate 63). It was unclear whether the deposit represented an exposed demolition/formation deposit similar to (1110) in TR11, or a repair to lower formation deposit (1607)

As was seen in TR11, the western edge of the railroad in TR16 was defined by a steepsided north-south aligned straight linear cut [1605] which could clearly be seen cutting through subsoil (1602) and the natural glacial substrate (1603) to the west (Plate 60; Plate 64). On the eastern side of the cut, lying between it and lower trackbed ballast deposit (1607), was a 1.0 m wide deposit of orangey-brown clayey silt containing numerous angular slate slabs and blocks (1606) (Plate 64). Two of the slabs in (1606) at the northern end of cut [1605], the largest of which was square with sides 36cm long, appeared to be in-situ. The others were generally tilted to the east, suggesting they have slipped or collapsed from the eastern side of cut [1605] to the west. Deposit (1606) appears to represent the demolished remains of a revetment wall that originally sat against cut [1605] and marked the western edge of the railroad formation in TR16. Curiously, the demolition of the wall may predate the lower trackbed ballast deposit (1607) which appeared to overly the eastern edge of (1606), however intrusive excavation, outside the scope of these works, would be required to demonstrate this stratigraphic relationship conclusively. No finds of archaeological interest were recovered from any of the deposits associated with the Penrhyn Slate Quarry Railroad (1616) at the eastern end of TR16.

A relatively substantial ditch [1604] was encountered at the western end of TR16 (Figure 9; Plate 65; Plate 66). The ditch was 1.41m wide, 2.72 m long and cut through the glacial substrate (1603). It was curvilinear in plan and emerged from the northern baulk of the trench running northeast-southwest before turning approximately 90° and heading northwest to exit the trench at its western end underneath the access ramp. Its appearance in plan suggests that it may be the southeastern corner of a larger ditched enclosure that continues to the north and west beyond the confines of the trench.

At the eastern end of the intervention through [1604], the ditch had irregular slightly concave straightish sides that broke imperceptibly to an irregular, slightly concave, base 0.29m deep (Figure 10.1; Plate 68). The lower northern side of the cut at the eastern end of the intervention was heavily disturbed by bioturbation. At the western end of the intervention, the ditch had a more asymmetric 'V' shaped profile with sloping irregular flattish sides that generally broke sharply to a narrow concave base 0.42m deep (Figure 10.2; Plate 67). At the western end of the intervention, the cut was noticeably stepped on the northern side, suggesting the possibility of a 0.28m deep recut with a 0.24m wide flattish base.

The ditch contained three fills (Figure 10.1; Figure 10.2; Plate 67; Plate 68). The upper fill (1613) was a 0.3m deep and up to 1.0m wide deposit of mixed firm yellowish-brown and greyish-brown slightly clayey silt. At the western end of the intervention this deposit filled the stepped upper part of the cut and may have been a single fill associated with a later recut. Upper fill (1613) appeared to have been deliberately dumped into the ditch rather than having accumulated by natural silting. Below this was an up to 0.81m wide and 0.10m deep layer of firm dark-grey to reddish-grey clayey silt with abundant flecks and fragments of charcoal (1614). Charcoal rich fill (1614) appeared to contain reddened heat-affected soil however it does not appear to have been burned in situ, but dumped into the ditch in a deliberate backfilling event. The primary fill of the ditch was (1615), an up to 1.19m wide and 0.20m deep deposit of greyish-brown clayey silt with occasional flecks of charcoal. At the eastern end of the intervention fill (1615) was heavily disturbed by bioturbation. Again, the excavator felt that the deposit had been deliberately deposited within the ditch.

No finds were recovered from any of the fills of ditch [1604], however, the complete lack of post-medieval pottery from any of the fills suggested a relatively early date. Three bulk environmental samples were recovered from the ditch to date the feature and interpret its function: a 20 litre sample <03> was taken from upper fill (1613); a 20 litre sample <04> was

recovered from charcoal rich fill (1614); and a 10 litre sample <05> was taken from primary fill (1615). The samples have subsequently been processed and analysed and the results are included in Sec 5.1.2.3 and Sec 5.2.1.2.

# 5 POST-EXCAVATION RESULTS

## 5.1 Ecofact Assessment

A total of 6 bulk ecofact soil samples were recovered during the archaeological evaluation at Llandegai Road (Table 6.1). The primary aim of the ecofact assessment was to recover charcoal and charred macroplant remains to provide additional interpretative material, both for individual features and the site as a whole, for radiocarbon dating and to recover any additional artefacts not identified during excavation.

Sample No.	Context No.	Trench No.	Description of context	Volume of Sample (Litres)	Reason for sample
01	0905	TR09	Single fill of a straight linear ditch [0904]	20	General site economy, interpretation and dating
02	0705	TR07	Single fill of irregularly shaped pit [0704]	10	General site economy, interpretation and dating
03	1613	TR16	Upper fill of enclosure ditch [1604]	20	General site economy, interpretation and dating
04	1614	TR16	Charcoal rich fill of enclosure ditch [1604]	20	General site economy, interpretation and dating
05	1615	TR16	Primary fill of enclosure ditch [1604]	10	General site economy, interpretation and dating
06	0105	TR01	Single fill of shallow bowl-shaped pit [0104]	10	General site economy, interpretation and dating

Table	61	Bulk	ecofact	samn	les
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The ecofact post-excavation assessment was completed as a two-stage process:

- The bulk soil samples were processed in house by GAT. This consisted of flotation and wet sieving using a 500-micron mesh to collect the residue, with the flot collected in a 250-micron mesh. The residues were also sorted and examined to recover artefacts and non-floating ecofacts. Once examined the residues were discarded.
- Flots potentially containing recovered charcoal and macroplant remains were sent for specialist assessment to AOC Archaeology (Appendix III). The submitted material

was scanned using a stereo-microscope at x10-40 magnification to identify any plant material, including fruits, seeds, chaff, tubers, charcoal and wood fragments. A maximum of 20 wood charcoal fragments 4mm and larger were selected for assessment from each context. Wood taxonomy followed *The identification of the Northern European woods* (Hather 2000). The palaeoenvironmental assessment report also included recommendations for any subsequent analysis and radiocarbon dating.

## 5.1.1 Bulk Sample Processing

Flots potentially containing charcoal and or charred macroplant remains were recovered from all 6 of the samples. The flots were subsequently submitted to AOC Archaeology for palaeoenvironmental assessment and analysis. No archaeological artefacts were identified in the residues of any of the bulk samples.

## 5.1.2 Palaeoenvironmental Assessment

The palaeoenvironmental assessment by AOC Archaeology (Appendix III) did not identify any charred fruits, seeds, chaff, or tubers in any of the 6 flots. All 6 of the flots contained wood charcoal, however, the fragments from Sample <01>, taken from the single fill (0905) of the straight linear ditch [0904] in TR09, were too small for successful species identification. The total charcoal assemblage was small (48.5g) and 48 fragments were identified to species from five samples. Most of the charcoal was concentrated within the fill (0705) of pit [0704] in TR07 and deposit (1614) in ditch [1604] in TR16.

The species were alder (Alnus glutinosa L.), birch (Betula sp.), hazel (Coryus avellana L.), oak (Quercus sp.) and elm (Ulmus sp.). The dominant species was oak (44%) followed by alder (29%), hazel (21%), birch (4%) and elm (2%). The species identified likely grew in the surrounding landscape. Alder and birch are found in damp habitats, hazel and elm favour hedgerows, scrub or more open woods whereas oak is adaptable to a variety of growing conditions. Preservation of the charcoal ranged from adequate to excellent with most described as good.

The assemblage appears to be mainly composed of re-deposited fuel debris however the concentration of exclusively oak charcoal in pit [0704] could represent the remains of a small structural element such as a post or stake, or an artefact, that was destroyed elsewhere before being deposited within the feature.

The assessment suggested that Samples <02>, <03>, <04> and <05> contained material suitable for radiocarbon dating, but that the charcoal from potentially long-lived species such

as oak (Quercus sp.) from fill (0705) of pit [0704] in TR07 (Sample <02>) and the primary fill (1615) of enclosure ditch [1604] in TR 16 (Sample <05>), may be subject to 'old wood effect' as no evidence of bark edge material or pieces of roundwood were identifed, and any resultant date relates to when the tree was alive and not necessarily when it was burnt.

Sample No.	Context No.	Description of context	Species	Name	No. of Fragments > 4mm	Weight (g)	Radiocarbon dating potential
01	0905	Single fill of a straight linear ditch [0904]	N/A	N/A	N/A	N/A	Yes
02	0705	Single fill of irregularly shaped pit [0704]	Quercus sp.	Oak	20	15	Yes, but potentially subject to 'old wood effect'
03	1613	Upper fill of enclosure ditch [1604]	Alnus glutinosa L.	Alder	4	<1	Yes
03	1613	Upper fill of enclosure ditch [1604]	Betula sp.	Birch	2	<1	Yes
03	1613	Upper fill of enclosure ditch [1604]	Corylus avellana L.	Hazel	4	3	Yes
04	1614	Charcoal rich fill of enclosure ditch [1604]	Alnus glutinosa L.	Alder	5	<1	Yes
04	1614	Charcoal rich fill of enclosure ditch [1604]	Corylus avellana L.	Hazel	5	28	Yes
05	1615	Primary fill of enclosure ditch [1604]	Corylus avellana L.	Hazel	1	<1	Yes
05	1615	Primary fill of enclosure ditch [1604]	Ulmus sp.	Elm	1	<1	Yes
05	1615	Primary fill of enclosure ditch [1604]	Quercus sp.	Oak	1	1	Yes, but potentially subject to 'old wood effect'
06	0105	Single fill of shallow bowl- shaped pit [0104]	Alnus glutinosa L.	Alder	5	1.5	Yes

A summary of the charcoal species identified in the flots is shown in Table 6.2.

Table 5.2 Charcoal species

The palaeoenvironmental assessment results are also summarised below by archaeological feature.

## 5.1.2.1 TR09 Ditch [0904], single fil (0905), Sample <01>

Only small flecks of charcoal were recovered from the flot, none of which could be identified to species. The charcoal was likely re-worked into this ditch fill when the feature began to silt up.

## 5.1.2.2 TR07 Pit [0704], single fill (0705), Sample <02>

This undated pit was described as charcoal rich but there was no evidence that burning occurred in situ. Instead, it is believed the charcoal was deposited after the burning event. The charcoal (15.0g) was composed entirely of oak. This concentration of a single species could represent the remains of a small structural element such as a post or stake, or an artefact, that was destroyed elsewhere before being deposited within this feature.

# 5.1.2.3 TR16 Ditch [1604], upper fill (1613), lower charcoal rich fill (1614) and primary fill (1615), Samples <03>, <04> and <05>

Charcoal (32.0g) was recovered from upper fill (1613), lower fill (1614) and primary fill (1615) all located within ditch [1604]. The charcoal was concentrated within (1614) which had 28.0g compared to 3.0g in (1613) and 1.0g in (1615). The species present comprised hazel (44%), alder (39%), birch (9%), oak (4%) and elm (4%). Alder and hazel were noted in deposits (1613) and (1614) whereas birch was recorded only in (1613). One fragment of oak and one piece of elm was recovered from (1615). These finds are considered to represent fuel debris. The charcoal build up in deposit (1614) likely occurred when the ditch was deliberately backfilled. Some of those fragments in (1613) and (1615) were possibly re-deposited from the larger concentration in (1614).

## 5.1.2.4 TR01 Pit [0104], single fill (0105), Sample <06>

The ecofacts recovered were sparse, comprising five fragments of alder charcoal (1.5g). The value of this material in understanding the function of the pit is limited.

## 5.2 Radiocarbon Dating

Eight charcoal fragments, two from each of the four archaeological contexts selected, (0705), (1614), 1615) and (0105), were submitted to the Scottish Universities Environmental Research Centre (SUERC) Accelerator Mass Spectrometry (AMS) Laboratory, East Kilbride (Appendix IV). The purpose of the radiocarbon dating was to provide calibrated date ranges for the selected material in order to identify the chronology of activities and events represented by selected features. The radiocarbon ages established for the submitted samples are expressed as conventional years BP (before 1950 AD) with errors quoted at one standard deviation. These radiocarbon ages have been calibrated to a conventional calendar timescale by SUERC using the University of Oxford Radiocarbon Accelerator Unit calibration program OxCal4 with reference to the IntCal13 atmospheric calibration curve. The calibrated date range is expressed at 95.4% confidence. The results of the radiocarbon dating programme are shown in Table 6.3 below.

Lab No.	Sample No.	Context No.	Description of context	Name (Species)	δ13C (‰)	Radiocarbon Age (BP)	Calibrated date (95.4% probability)
SUERC -99857	02	0705	Single fill of irregularly shaped pit [0704]	Oak (Quercus sp.)	-23.4	5873 ± 26	4830-4686 cal BC
SUERC -99858	02	0705	Single fill of irregularly shaped pit [0704]	Oak (Quercus sp.)	-23.5	5900 ± 26	4837-4714 cal BC
SUERC -99859	04	1614	Charcoal rich fill of enclosure ditch [1604]	Alder (Alnus glutinosa L.)	-27.7	4951 ± 26	3779-3651 cal BC
SUERC -99860	04	1614	Charcoal rich fill of enclosure ditch [1604]	Hazel (Corylus avellana L.)	-28.8	4955 ± 26	3784-3651 cal BC
SUERC -99861	05	1615	Primary fill of enclosure ditch [1604]	Hazel (Corylus avellana L.)	-26.8	5070 ± 26	3954-3796 cal BC
SUERC -99865	05	1615	Primary fill of enclosure ditch [1604]	Elm (Ulmus sp.)	-25.3	5048 ± 26	3951-3777 cal BC
SUERC -99866	06	0105	Single fill of shallow bowl- shaped pit [0104]	Alder (Alnus glutinosa L.)	-27.5	2711 ± 26	906-809 cal BC
SUERC -99867	06	0105	Single fill of shallow bowl- shaped pit [0104]	Alder (Alnus glutinosa L.)	-26.5	2655 ± 26	896-789 cal BC

 Table 5.3 Radiocarbon Dates

The radiocarbon dating results are discussed below by archaeological feature.

## 5.2.1.1 TR07 Pit [0704], single fill (0705)

Unfortunately, due to the absence of other charcoal species within irregularly shaped pit [0704], two fragments of oak charcoal had to be selected for dating. One fragment returned a date 4830-4686 cal BC, the other 4837-4714 cal BC. The differences between the two dates are not statistically significant and both lie within the Late Mesolithic period (7000-4000 BC). As was noted above (Sec 6.1.2), oak is a long-lived species and the dates represent points in time during the period when the tree was growing, not necessarily when it was felled, used or burnt. It is reasonable to say however that the burnt material and the pit result from activity in either the Late Mesolithic or perhaps the Early Neolithic period (4000-3500 BC).

## 5.2.1.2 TR16 Ditch [1604], lower charcoal rich fill (1614) and primary fill (1615)

Four dates were obtained from charcoal recovered from enclosure ditch [1604], two from charcoal rich fill (1614), and two from the primary fill (1615). A fragment of alder from (6014) returned a date of 3779-3651 cal BC and a piece of hazel charcoal was dated to 3784-3651 cal BC. The two dates from this context are virtually identical and demonstrate that (1614) represents activity in the Early Neolithic period (4000-3500 BC). Primary fill (1615), stratigraphically earlier than (1614), returned dates of 3954-3796 cal BC from a hazel fragment and 3951-3777 cal BC from a piece of elm charcoal. Again, the set of two dates from context (1615) are virtually identical and demonstrate Early Neolithic activity, albeit most likely earlier than the activity represented by (1614) above. During excavation, it was felt that the boundary between (1614) and (1615) may actually represent a recut of the backfilled ditch (see Sec 4.16), an observation that is supported by the two sets of dates from the fills.

## 5.2.1.3 TR01 Pit [0104], single fill (0105)

Two radiocarbon dates were obtained from fragments of alder recovered from the flot from the single fill (0104) of the shallow bowl-shaped pit [0104] in TR01. The two dates returned were 906-809 cal BC and 896-789 cal BC. Though the function of the pit is uncertain, it represents activity at the site in the Late Bronze Age (1000-700 BC).

#### 5.3 Artefact Assessment: Slate Railway Sleeper SF003

The Slate Railway Sleeper SF003, recovered from the demolition/formation deposit (1110) associated with the remains of the Penrhyn Slate Quarry Railroad in TR11, was sent to Dr David Gwyn MCIfA FSA, Govannon Consultancy, for specialist analysis and comment. Dr Gwyn is an expert in Industrial Archaeology and the Slate Quarrying Industry of North Wales.

Dr Gwyn describes the artefact as an irregularly shaped slab of Cambrian vein slate measuring 720mm long, 230mm wide and 80mm thick (Plates 43-46). One long face runs smoothly along the grain of the slate, probably mechanically sawn, whereas the other faces reflect natural planes of fracture. The slab bears a shallow rectangular imprint measuring 105mm (4<sup>1</sup>/<sub>8</sub>") across by 132mm (5<sup>1</sup>/<sub>4</sub>") along the grain in which two holes each 20mm (<sup>13</sup>/<sub>16</sub>") have been drilled. The fragments of ferrous material adhering to both the upper and lower faces of the slab are not associated with the holes in any way.

The slate slab is identified as a broken railway sleeper, and was an off-cut from the side of a larger slate slab which appears to have been cut by a reciprocating sand-saw, such as were used at the former Penryhn Quarry Felin Fawr slab mills at Bethesda. The imprint, or cut-out, on the slab would have once held a chair that supported the railtrack.

Rails and sleepers would have been replaced throughout the lifespan of the railroad, both piecemeal as part of routine maintenance activities and wholesale as new rail technologies were developed and deployed. The railroad opened at the beginning of the nineteenth century and initially utilised cast iron 'fish-belly' rails, oval in cross-section, and set into wooden sleepers. Within 4 years of its opening, cast iron sills consisting of two chairs and a tie bar resting on slate blocks, began to be utilised to support the 'fish-belly' rails and by 1811, flat top rails were introduced. From 1820 onwards another type of sill, and separate chairs with semi-circular seatings, were deployed on the railroad. New wrought iron 'T' section rails supported by cast-iron sills were introduced on the Railroad in 1832, apart from on the inclined planes which continued to utilise cast iron rails until the Penrhyn Slate Quarry Railroad closed in the late 1870s. Wrought iron flat-bottom rails began to displace the 'T' section rails from 1849 onwards and the earlier 'T' section rails were redeployed to Penrhyn Quarry where, by the 1870s at least, some were mounted on chairs with two dowels and a centre-bolt set on slate sleepers.

#### Land off Llandegai Road, Bangor Archaeological Evaluation (Trial Trenching)

The chair cut-out on Slate Sleeper SF003 is not an exact match for any of the chairs historically known to have been utilised on the railroad. It does however seem most likely that the chair that the sleeper held would have supported the wrought-iron 'T' section rails in use on the railroad between circa 1832-1849. The cut-out is wider and is missing a central hole to take a centre bolt as described for the chairs that supported the reused 'T' section rails in Penrhyn Quarry in the 1870s. It is however possible that more substantial chairs were utilised in the light of experience, or that the sleeper had been used at a rail-joint, where two lengths of the 'T' section rails would have been butt-jointed, necessitating the use of a larger chair.

The location of SF003 within demolition/formation deposit (1110) is consistent with it having been removed from the railroad when the wrought iron flat-bottom rail was installed in 1849 or later, and therefore provides a potential chronological framework for the different phases of the Penrhyn Slate Quarry Railroad identified within TR11.

A copy of Dr Gwyn's assessment is included as Appendix V. The Slate Sleeper SF003 will be accessioned to the Gwynedd Museum and Archives Service Storiel facility, in line with current guidelines.

# 6 DISCUSSION

## 6.1 Geophysical Survey Anomalies

The magnetic anomalies identified during the geophysical survey (Evans and Hopewell 2020, GAT Report 1565) and targeted during trial trenching are discussed below. In each case, the features that the anomalies represent have been assessed as having either no, low, moderate or high archaeological potential based upon:

- the quality, value and level of preservation of the archaeological remains that; and
- their potential to be accurately dated in order to facilitate an understanding of the historical development of the area.

## 6.1.1 Geophysical Survey Anomaly 1 Medieval or Later Ridge and Furrow

No traces of Anomaly 1 were identified in TR13 or TR06. It seems likely that they are postmedieval or later agricultural features cut within topsoil, and therefore difficult to identify during excavation. The features that comprise Anomaly 1 are assessed as having no archaeological potential.

# 6.1.2 Geophysical Survey Anomaly 4 Double Bank and Ditch Field Boundary That Appears on the 1803 Penrhyn Estate Map

Only the southwestern end of Anomaly 4 was targeted during the evaluation and the remains encountered were a substantial post-medieval land drain. The feature revealed in TR04 is of minimal archaeological value and therefore Anomaly 4 is assessed as having no archaeological potential.

## 6.1.3 Geophysical Survey Anomaly 5 Possible Iron Age or Medieval Lynchet

Geophysical survey Anomaly 5 was targeted in TR03 and TR04. In both trenches, the anomaly appears to have been caused by the differential magnetic signatures of soils of variable depth. As an anomaly of pedological origin, Anomaly 5 is assessed as having no archaeological potential.

# 6.1.4 Geophysical Survey Anomaly 6 Field Boundary That Predates the 1803 Penrhyn Estate Map

Geophysical survey Anomaly 6 was targeted in TR03. No evidence for Anomaly 6 was encountered in the trench and it seems likely that the anomaly was caused by a relatively

late ditch cut within the topsoil. As it was not detected during trial trenching and appears to be a relatively recent feature, Anomaly 6 is assessed as having no archaeological potential.

# 6.1.5 Geophysical Survey Anomaly 7 Linear Cluster of Ferrous Material Possibly Part of a Former Field Boundary That Predates the 1803 Penrhyn Estate Map

Geophysical survey Anomaly 7 was targeted in TR03. No evidence for Anomaly 7 was encountered in the trench and it seems likely that the anomaly was caused by a cluster of ferrous material in the topsoil. The geophysical survey report (Evans and Hopewell 2020) acknowledges that the anomaly may have a modern origin and its likely location in topsoil supports this. As no physical evidence for the anomaly, the antiquity of the ferrous metal that caused it, or an associated boundary, was detected during trial trenching, Anomaly 7 is assessed as having no archaeological potential.

# 6.1.6 Geophysical Survey Anomaly 8 Field Boundary That Predates the 1803 Penrhyn Estate Map

Geophysical Survey Anomaly 8 was targeted in TR05. The anomaly was caused by an active post-medieval land drain, and therefore Anomaly 8 is assessed as having no archaeological potential.

# 6.1.7 Geophysical Survey Anomaly 10 Field Boundary Shown on the 1889 First Edition OS Map

Geophysical survey Anomaly 10 was targeted in TR05. No evidence for Anomaly 10 was encountered in the trench and it seems likely that the anomaly was caused by a relatively late ditch cut within the topsoil. As it was not be detected during trial trenching and appears to have been caused by a relatively recent feature, Anomaly 10 is assessed as having no archaeological potential.

# 6.1.8 Geophysical Survey Anomaly 14 Possible Iron Age Enclosure Ditch

Geophysical survey Anomaly 14 was initially interpreted as the western, southwest-northeast aligned part of a discontinuous enclosure ditch that may have been Iron Age in origin. It was targeted in TR08 and TR10. No trace of a ditch was encountered in either trench. In TR08 its expected location corresponded with a band of natural glacial sand and gravel at the centre of the trench. Given that the band of gravel appeared too far to the west in TR10 to have caused the anomaly, it seems more likely that Anomaly 14 represents a relatively late undetected ditch cut within the topsoil. Anomaly 14 is therefore assessed as having no archaeological potential.

## 6.1.9 Geophysical survey Anomaly 15 Possible Iron Age Enclosure Ditch

Geophysical survey Anomaly 15 was initially interpreted as the southern, southeastnorthwest aligned part of a discontinuous curvilinear enclosure ditch that may have been Iron Age in origin. It was targeted in TR09 where it was encountered as a silted up straight linear southeast-northwest aligned ditch [0904] (Plate 30; Plate 31; Figure 06.1; Figure 06.2). Given that no evidence for Anomaly 14 was encountered in TR08 or TR10, there is no longer enough evidence to support the initial interpretation of Anomaly 15 as a part of a curvilinear enclosure ditch, and instead, it appears to be a straight linear field boundary feature. No finds were recovered from the excavated portion of ditch [0904] and an environmental bulk Sample <01> taken from (0905) did not contain charcoal of sufficient quality to identify wood species or provide a date for the feature (see Sec 5.1.2.1). It does not appear on any of the known historic maps for the area and a lack of post-medieval pottery in its fill (0905) may suggest an early date. Though a seemingly isolated feature, a better understanding of the ditch may contribute to a better understanding of historic settlement, land use and development in the area. Anomaly 15 has been assessed as being of moderate archaeological potential.

# 6.1.10 Geophysical survey Anomaly 16 Field Boundary That Predates the 1803 Penrhyn Estate Map

Geophysical survey Anomaly 16 was targeted in TR10. No evidence for Anomaly 16 was encountered in the trench and it seems likely that the anomaly was caused by a relatively late ditch cut within the topsoil. As it was not detected during trial trenching and appears to be a relatively recent feature, Anomaly 16 is assessed as having no archaeological potential.

## 6.1.11 Geophysical Survey Anomaly 17 Penrhyn Slate Quarry Railroad GAT HER PRN 59451

Geophysical survey Anomaly 17, the Penrhyn Slate Quarry Railroad, was targeted in two trenches, TR11 and TR16. The railroad was constructed in 1801 as a single track 0.6 metre (2') gauge iron railroad built for horse and inclined plane operation. It originally ran for a distance of approximately 9 km from the Penrhyn Slate Quarry, once the largest slate quarry in the world, to Port Penrhyn, Bangor. The northern end, including the section within the proposed development site, utilised parts of the earlier Llandygai Tramway built in the late 18th century to carry flint to the Penlan flint mill at Llandygai from Port Penrhyn. The railroad included at least 4 inclined planes along its length, one of which, the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552) partially lies in a cutting along the northeastern edge of the proposed development site. The former winding house for the inclined plane,

Incline Cottage (GAT HER PRN 24862), sits at its southern end, immediately to the east of the proposed development site.

The railroad remained in use until the 1870s when it was replaced by the steam-powered Penrhyn Slate Quarry Railway (GAT HER PRN 59452) which runs along the Cegin Valley to the north and west of the proposed development site. The railroad is part of the *Penrhyn Slate Quarry Railroad and Penrhyn Slate Quarry Railway* (1.3) Element of Component Part 1 of the *Slate Landscape of Northwest Wales* WHS and is soon to be designated as a Scheduled Monument.

The railroad was identified in both trenches and was recorded as (1111) in TR11 (Figure 07; Figure 08.1; Plate 36; Plate 37) and (1616) in TR16 (Figure 09; Figure 08.2; Plate 62). It ran hard along the western side of the Penrhyn Park estate wall along the southeastern edge of the proposed development site. Its remains were cleaned and recorded but not subject to excavation. The railway's formation appears to have been between 6.20m (TR11) and 6.84m (TR16) wide and bounded on its western side by a now-demolished broadly north-south aligned revetment wall (1106)/(1606) set against a steep-sided cut [1107]/[1605].

Evidence for probable trackbed ballast deposits, used to support the sleepers and rails of the railroad, was identified in both trenches: one in TR11 (1106); and two discreet linear deposits in TR16, upper ballast deposit (1610) and lower ballast deposit (1607). In both trenches, the trackbed ballast (4.7m wide (1106) in TR11; 1.2m (1610) and 4m (1607) wide in TR16) appears to have been wider than that required to support one pair of 0.6 metre gauge rails. The route of the Railroad to the south of TR11 appears as a much narrower earthwork running along the western side of the Penrhyn Park estate wall, and it is possible that the parts of the railroad to the immediate south of Incline Cottage, above the Marchogion Inclined Plane, contained multiple tracks or sidings for wagon storage.

No traces of in situ sleepers or rails were identified. It is possible that they survive at a lower level or, alternatively, that they were salvaged when the railroad went out of use. A former slate sleeper SF003 (Plate 43; Plate 44; Plate 45; Plate 46) had however been reused in demolition/trackbed foundation deposit (1110) supporting the ballast (1106) in TR11 suggesting at least two phases of railroad. The use of gravel instead of crushed slate in the narrower upper trackbed ballast (1610) compared to the lower ballast deposit (1607) in TR16, may also suggest the presence of multiple phases, and perhaps the survival of part of the earlier Llandegai Tramway (1610) within the trench. Specialist analysis of the slate sleeper SF003, in particular the cut-out for the chair on the topside, may provide information

on the chronology of the phases if the size and shape of the cut-out is diagnostically significant.

Anomaly 17, the Penrhyn Slate Quarry Railroad, is assessed as having high archaeological value and potential.

# 6.1.12 Geophysical Survey Anomaly 20 Enclosure Shown on the 1889 First Edition OS Map

Geophysical survey Anomaly 20 was targeted in TR12. The anomaly appears to correlate with a north-south aligned band of rounded cobbles and a steep natural gravel bank which creates a sudden change of depth in the subsoil and appears to be geological in origin. As a geological anomaly, Anomaly 20 is assessed as having no archaeological potential.

## 6.2 Previously Unknown Archaeological Features

Four previously unknown features of archaeological interest were identified and are discussed below. In each case, the features have been assessed as having either low, moderate or high archaeological potential based upon:

- the quality, value and level of preservation of the archaeological remains; and
- their potential to be accurately dated in order to facilitate an understanding of the historical development of the area

## 6.2.1 Shallow Bowl Shaped Pit [0104], TR01

Shallow bowl-shaped pit [0104] was identified halfway along TR01 (Figure 03.1; Figure 03.2; Plate 03; Plate 04). No finds were associated with the pit that may suggest function and date, however, a lack of post-medieval finds in its single fill (0105) hinted that it was a relatively early feature. Alder charcoal recovered from the bulk environmental Sample <06> taken from the fill did not provide any clues to the function of the pit but they did return Late Bronze Age dates of 906-809 cal BC and 896-789 cal BC (for full details see Sec 5.1.2.4 and Sec 5.2.1.3). Prior to the post-excavation phase of the project, the archaeological potential of pit [0104] in TR01 was assessed as moderate. Though it demonstrates prehistoric activity at the site, now that it has been excavated and subject to ecofact analysis and radiocarbon dating, pit [0104]'s remaining potential is assessed as low. Though the pit appears isolated, it is possible that associated but currently unknown archaeological features may survive in the vicinity outside of the confines of the trench. Pit [0104] has been assigned PRN 93586.

## 6.2.2 Mixed Redeposited Natural Deposit (0602), TR06

Deposit (0602) was recorded below the topsoil along the entire 30m length of TR06 (Figure 04; Plate 22). It appears to consist of redeposited subsoil and natural substrate, and may be the discarded upcast from the original excavation of the cutting of the Marchogion Inclined Plane which lies a few metres to the east of TR06. As a mixed deposit containing material with multiple origins, and limited interpretative potential beyond that already proposed, the archaeological potential of deposit (0602) in TR06 is assessed as low.

## 6.2.3 Shallow Irregularly Shaped Pit [0704], TR07

Shallow irregularly shaped pit [0704] was identified halfway along TR07 (Figure 05.1; Figure 05.2; Plate 25). Though the geophysical survey results initially indicated that its location was potentially within a prehistoric enclosure, convincing evidence for the enclosure was not identified during trial trenching. No finds were associated with the pit, however, a lack of

#### Land off Llandegai Road, Bangor Archaeological Evaluation (Trial Trenching)

post-medieval pottery in the pit's single charcoal rich fill (0705) suggested a relatively early date. Analysis of the bulk environmental Sample <02> taken from (0705) showed that the charcoal present was composed entirely of oak, which may be suggestive of a small structural element such as an artefact or post which was burnt elsewhere and then subsequently deposited in the pit (see Sec 5.1.2.2). Radiocarbon dates of 4830-4686 cal BC and 4837-4714 cal BC obtained from two fragments of oak charcoal suggest that the tree that the burnt wood was derived from was growing during the Late Mesolithic Period, the feature however may date to the Late Mesolithic or Early Neolithic (for full details see Sec 5.2.1.1). As with pit [0104] in TR01, prior to the post-excavation phase of the project, the archaeological potential of pit [0704] in TR07 was assessed as moderate. Though it too demonstrates prehistoric activity at the site, now that it has been excavated and subject to ecofact analysis and radiocarbon dating, pit [0704]'s remaining potential is assessed as low. Pit [0704] appears to be an isolated feature, however, it is possible that associated but currently unknown archaeological features may survive in the vicinity outside of the confines of the trench. Pit [0704] has been assigned PRN 93587.

#### 6.2.4 Enclosure ditch [1604], TR16

Curvilinear ditch [1604] was identified at the western end of TR16 (Figure 9; Figure 10.1; Figure 10.2; Plate 65; Plate 66; Plate 67; Plate 68). It appears likely that is the southeastern corner of a ditched enclosure whose full extent in plan is unknown. No finds were associated with the ditch that may give a clue to its function or date. Though it is located in proximity to the Penrhyn Slate Quarry Railroad, it is not necessarily functionally or chronologically related, and a lack of post-medieval pottery, or, given the proximity of the railroad remains, slate fragments, in its fills suggested that it may be a relatively early feature. As with pit [0704] in TR07, the suggestion from the geophysical survey that it lies within a larger prehistoric enclosure can no longer be supported.

The ditch appears to have been deliberately infilled, and subsequently possibly recut and reestablished before being infilled again. Analysis of environmental bulk samples taken from its upper fill (1613) (Sample <03>), lower charcoal rich fill (1614) (Sample <04>) and primary fill (1615) (Sample <04>) showed that a mixture of charcoal species were present throughout the fills, indicative of burnt fuel wood being dumped into the ditch (see Sec 5.1.2.3). Four radiocarbon dates were obtained from the two lowest fills in the ditch. A fragment of alder from (6014), the charcoal rich fill, returned a date of 3779-3651 cal BC and a piece of hazel charcoal from the same deposit was dated to 3784-3651 cal BC. A fragment of hazel charcoal from primary fill (1615) was dated to 3954-3796 cal BC and a piece of elm charcoal from the same depost returned a date of 3951-3777 cal BC (see Sec 5.2.1.2). The two dated
fills in the enclosure ditch can therefore be confidently attributed to the Early Neolithic period, and the gap between the two sets of dates supports the field observation that the boundary between (1614) and (1615) may represent a recut of the deliberately infilled ditch. The full extent of the enclosure has not been established and other related features may survive nearby outside of the confines of TR16. The archaeological potential of enclosure ditch [1604] in TR09 is assessed as high. Enclosure ditch [1604] has been assigned PRN 93588.

## 7 CONCLUSION AND RECOMMENDATIONS

The trial trenches have established the existence of archaeological remains relating to two of the twelve magnetic anomalies identified during the geophysical survey that were selected for evaluation: Anomaly 17, the Penrhyn Slate Quarry Railroad, and Anomaly 15 the southern part of an anomaly originally thought to be a possible Iron Age enclosure. The other 10 anomalies appear to have been caused by a combination of topsoil features (Anomaly 1; Anomaly 6; Anomaly 7; Anomaly 10; Anomaly 14; Anomaly 16), land drains (Anomaly 4; Anomaly 8) and geological phenomena (Anomaly 5; Anomaly 20).

Two sections of the Penrhyn Slate Quarry Railroad, an important early iron railway, have been exposed and recorded, one in TR11 and one in TR16. The degree of survival and condition of the feature has been established, and a partial understanding of the methods used in its construction gained. A fragment of slate sleeper recovered from a demolition/trackbed deposit in TR11 illustrates the regime of maintenance and modernisation of the Railroad. The Railroad remains have been assessed to be of high archaeological potential. Anomaly 15 in TR09, previously thought to be a possible Iron Age enclosure ditch, is now better interpreted as a straight linear field boundary ditch. It does not appear on any of the available historic mapping for the area and may be a relatively early feature. Unfortunately, the excavated portion of the ditch contained insufficient material to obtain a radiocarbon date. Despite this, it has been assessed as retaining moderate archaeological potential to provide an understanding of historic settlement and land use in the area.

The programme of trial trenching has also demonstrated the potential for previously unknown archaeological remains to be encountered and four examples have been identified. A mixed redeposited natural deposit in TR06 may be the result of the dumping of upcast material from the original excavation of the Marchogion Inclined Plane just to the north. As it has limited scope for further interpretation, it has been assessed as having low archaeological potential. A curvilinear ditch in TR16 which appears to be the corner of a ditched enclosure has been radiocarbon dated to the Early Neolithic period. Its archaeological potential has been assessed to be high. Two seemingly isolated shallow pits, a Late Mesolithic or Early Neolithic irregularly shaped pit in TR07, and a bowl-shaped Late Bronze Age pit in TR01, were also encountered. Radiocarbon dates have been obtained from charcoal from the fills of both pits and the surviving archaeological potential of the pits as individual archaeological features is assessed as low. Along with the enclosure ditch in TR16 however, they demonstrate the potential for prehistoric activity at the proposed

development site which lies within a wider landscape that contains nationally important prehistoric remains.

The trial trenching programme has demonstrated that the archaeological remains of the Penrhyn Slate Quarry Railroad survive along the southeastern edge of the proposed development area. The asset is part of the *Slate Landscape of Northwest Wales* WHS and is also awaiting designation as a Scheduled Monument. Given the very high value of the historic asset, it is recommended that the proposed development is designed to avoid any direct physical impact and reduce or offset potential impacts on the setting of the Railroad. Similarly, it should also be designed to avoid any direct physical impact and to reduce or offset the potential setting impact on the Marchogion Inclined Plane, also part of the WHS and awaiting designation, which runs in a cutting along the northeastern edge of the proposed development site.

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## FIGURES

























## PLATES



Plate 01: TR01 post-machining, viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0094).



Plate 02: TR01 representative section, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0097).



Plate 03: Pit [0104] pre-ex, viewed from the east (scale: 2x1m; archive ref: G2663\_TT\_0096).



Plate 04: North facing section across Pit [0104], viewed from the north (scale: 1x1m; archive ref: G2663\_TT\_0098).



Plate 05: TR02 post-machining, viewed from the south (scale: 2x1m; archive ref: G2663\_TT\_1045).



Plate 06: TR02 representative section, viewed from the east (scale: 1x1m; archive ref: G2663\_TT\_1049).



Plate 07: Linear arrangement of slate slabs (0204) laid flat just below turfline in TR02, viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1047).



Plate 08: Linear arrangement of slate slabs (0204) laid flat just below turfline in TR02, viewed from the northeast (scale: 1x1m; archive ref: G2663\_TT\_1046).



Plate 09: TR03 post-machining, viewed from the east (scale: 2x1m; archive ref: G2663\_TT\_1027).



Plate 10: TR03 representative section, viewed from the south (scale: 1x1m; archive ref: G2663\_TT\_1031).



Plate 11: Steep slope at the centre of TR03, viewed from the west (scale: 1x1m; archive ref: G2663\_TT\_1030).



Plate 12: Band of natural cobbles and gravel in TR03, viewed from the west (scale: 1x1m; archive ref: G2663\_TT\_1029).



Plate 13: TR04 post-machining, viewed from the east (scale: 2x1m; archive ref: G2663\_TT\_1032).



Plate 14: TR04 representative section, viewed from the north (scale: 1x1m; archive ref: G2663\_TT\_1043).



Plate 15: Slate filled land drain in TR04, viewed from the west (scale: 1x1m; archive ref: G2663\_TT\_1035).



Plate 16: Land drains in TR04, viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1036).



Plate 17: Linear arrangement of slate slabs (0404) laid flat just below turfline in TR04, viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1037).



Plate 18: TR05 post-machining, viewed from the southwest (scale: 2x1m; archive ref: G2663\_TT\_1052).



Plate 19: TR05 representative section, viewed from the southeast (scale: 1x1m; archive ref: G2663\_TT\_1054).



Plate 20: Active land drain in TR05, viewed from the southwest (scale: 1x1m; archive ref: G2663\_TT\_1053).



Plate 21: TR06 post-machining, viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0106).



Plate 22: TR06 representative section, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0108).



Plate 23: TR07 post-machining, viewed from the southwest (scale: 2x1m; archive ref: G2663\_TT\_1021).



Plate 24: TR07 representative section, viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1024).



Plate 25: North facing section across pit [0704], viewed from the north (scale: 1x1m; archive ref: G2663\_TT\_1022).



Plate 26: TR08 post-machining, viewed from the southeast (scale: 2x1m; archive ref: G2663\_TT\_0056).



Plate 27: TR08 representative section, viewed from the southwest (scale: 2x1m; archive ref: G2663\_TT\_0060).



Plate 28: TR09 post-machining, viewed from the southwest (scale: 2x1m; archive ref: G2663\_TT\_1012).



Plate 29: TR09 representative section, viewed from the southeast (scale: 1x1m; archive ref: G2663\_TT\_1017).



Plate 30: Ditch [0904] pre-ex, viewed from the west-southwest (scale: 1x1m; archive ref: G2663\_TT\_1014).



Plate 31: Northwest facing section across ditch [0904], viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1015).



Plate 32: TR10 post-machining, viewed from the west-northwest (scale: 2x1m; archive ref: G2663\_TT\_0065).



Plate 33: TR10 representative section, viewed from the south-southwest (scale: 2x1m; archive ref: G2663\_TT\_0067).



Plate 34: Band of gravel in natural in TR10, viewed from the north-northeast (scale: 2x1m; archive ref: G2663\_TT\_0066).



Plate 35: TR11 post-machining, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0044).



Plate 36: Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0046).



Plate 37: Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation including trackbed (1106), demolition deposit (1110), cut [1107], remains of possible revetment wall (1108) and possible earlier surface (1109). Viewed from the northwest (scale: 2x1m; archive ref: G2663\_TT\_0050).



Plate 38: Penrhyn Quarry Railroad formation at eastern end of TR11 showing trackbed (1106) and demolition deposit (1110), viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0047).



Plate 39: Penrhyn Quarry Railroad formation cut [1107], remains of possible revetment wall (1108) and possible earlier surface (1109), viewed from the east (scale: 1x1m; archive ref: G2663\_TT\_0054).



Plate 40: Possible earlier surface (1109), viewed from the north (scale: 1x1m; archive ref: G2663\_TT\_0053).


Plate 41: Base of Penryhn Park Estate Wall (1105) in TR11, viewed from the west (scale: 1x1m; archive ref: G2663\_TT\_0051).



Plate 42: South facing baulk section across Penrhyn Quarry Railroad in TR11, viewed from the south (scale: 2x1m; archive ref: G2663\_TT\_0055).



Plate 43: Slate sleeper with ferrous metal fitting SF003 within demolition deposit (1110), viewed from the east (scale: 1x1m; archive ref: G2663\_TT\_0052).



Plate 44: Underside of slate sleeper with ferrous metal fitting SF003, viewed from the north (scale: 1x80cm; archive ref: G2663\_TT\_0089).



Plate 45: Topside of slate sleeper with ferrous metal fitting SF003 showing cutout for chair, viewed from the north (scale: 1x80cm; archive ref: G2663\_TT\_0091).



Plate 46: Detail of cutout for chair and ferrous metal fitting on topside of slate sleeper SF003, viewed from the north (scale: 1x50cm; archive ref: G2663\_TT\_0090).



Plate 47: TR12 post-machining, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0101).



Plate 48: TR12 representative section, viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0104).



Plate 49: Naturally deposited cobbles at end of band of glacial gravel in TR12, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0102).



Plate 50: TR13 post-machining, viewed from the south (scale: 2x1m; archive ref: G2663\_TT\_1055).



Plate 51: TR13 representative section, viewed from the east (scale: 1x1m; archive ref: G2663\_TT\_1058).



Plate 52: Modern bovine burial in TR13, viewed from the northwest (scale: 1x1m; archive ref: G2663\_TT\_1057).



Plate 53: TR14 post-machining, viewed from the east (scale: 2x1m; archive ref: G2663\_TT\_0068).



Plate 54: TR14 representative section, viewed from the south (scale: 1X1m; archive ref: G2663\_TT\_0071).



Plate 55: Breached water pipe in TR14, viewed from the west (archive ref: G2663\_TT\_1008).



Plate 56: Repaired water pipe in TR14, viewed from the west (scale: 1X1m; archive ref: G2663\_TT\_0070).



Plate 57: TR15 post-machining, viewed from the south (scale: 2x1m; archive ref: G2663\_TT\_0041).



Plate 58: TR15 representative section, viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0043).



Plate 59: TR16 post-machining, viewed from the west-northwest (scale: 2x1m; archive ref: G2663\_TT\_0058).



Plate 60: TR16 representative section showing formation cut [1605], viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0078).



Plate 61: Eastern end of TR16 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation including upper trackbed (1610), possible exposed foundation layer (1608), lower trackbed (1607), formation cut [1605] and remains of possible revetment wall (1606). Viewed from the west (scale: 2x1m; archive ref: G2663\_TT\_0076).



Plate 62: TR16, Penrhyn Quarry Railroad upper trackbed (1610), surface (1609) and Penryhn Park Estate Wall (1605), viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0072).



Plate 63: TR16, lower trackbed (1607) of Penrhyn Quarry Railroad and possible exposed foundation layer (1608), viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0073).



Plate 64: Remains of possible revetment wall (1606) and railroad formation cut [1605] in TR16, viewed from the north (scale: 2x1m; archive ref: G2663\_TT\_0074).



Plate 65: Ditch cut [1604] pre-ex, viewed from the east (scale: 2x1m; archive ref: G2663\_TT\_0063).



Plate 66: Intervention across ditch [1604], viewed from the southeast (scale: 2x1m; archive ref: G2663\_TT\_0084).



Plate 67: East facing section across ditch [1604], viewed from the east (scale: 1x1m; archive ref: G2663\_TT\_0085).



Plate 68: Southwest facing section across ditch [1604], viewed from the southwest (scale: 2x1m; archive ref: G2663\_TT\_0086).

## **APPENDIX I:**

Reproduction of Gwynedd Archaeological Trust photographic record metadata

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0001	-	Pre-commencement photo of access road	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0002	-	Pre-commencement photo of access road	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0003	-	Pre-commencement photo of access road	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0004	-	Pre-commencement photo of access road and disturbed ground in field	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0005	-	Pre-commencement photo of north end of field	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0006	-	Pre-commencement photo of north end of field and overgrown incline	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0007	-	Pre-commencement photo of northeast corner of field	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0008	-	Pre-commencement photo of north end of field	-	E	not used	Dave Hopewell	19/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0009	-	Pre-commencement photo of northwest corner of field	-	NE	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0010	-	Pre-commencement photo of northwest corner of field	_	N	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0011	-	Pre-commencement photo of cows to the north of the access road	-	E	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0012	-	Pre-commencement photo of access road and disturbed ground in field	-	E	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0013	-	Pre-commencement photo of field to the south of access road	-	NE	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0014	-	Pre-commencement photo of field to the south of access road	-	N	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0015	-	Pre-commencement photo of field to the south of access road	-	NW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0016	-	Pre-commencement photo of field to the south of access road	-	W	not used	Dave Hopewell	19/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0017	-	Pre-commencement photo of field to the south of access road	-	NW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0018	-	Pre-commencement photo of field to the south of access road showing Incline Cottage	-	NW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0019	-	Pre-commencement photo of field to the south of access road showing Incline Cottage	-	NW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0020	-	Incline Cottage western property boundary	-	NW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0021	-	Incline Cottage cesspit located in field to the southwest of the cottage	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0022	-	Pre-commencement photo of field to the south of access road	-	SE	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0023	-	Pre-commencement photo of field to the south of access road	-	NE	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0024	-	Pre-commencement photo of field to the south of access road	-	NE	not used	Dave Hopewell	19/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0025	-	Pre-commencement photo of field to the south of access road	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0026	-	Incline Cottage southern boundary	-	SW	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0027	-	Pre-commencement photo of field to the south of access road showing Penrhyn Park Estate Wall	-	Ν	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0028	-	Pre-commencement photo of field to the south of access road showing Penrhyn Park Estate Wall	-	Ν	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0029	-	Pre-commencement photo of field to the south of access road showing Penrhyn Park Estate Wall	-	N	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0030	-	Pre-commencement photo of field to the south of access road showing Penrhyn Park Estate Wall	-	Ν	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0031	-	Pre-commencement photo of field to the south of access road showing Penrhyn Park Estate Wall	-	N	not used	Dave Hopewell	19/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0032	-	Breach in Estate Wall	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0033	-	Breach in Estate Wall	-	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0034	-	Pre-commencement photo of western side of field to the south of access road	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0035	-	Pre-commencement photo of western side of field to the south of access road	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0036	-	Slate drinking trough	-	NE	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0037	-	Pre-commencement photo of western side of field to the south of access road	-	S	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0038	TR11	TR11 pre-ex	TR11	W	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0039	TR11	TR11 pre-ex	TR11	W	not used	Dave Hopewell	19/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0040	TR15	TR15 pre-ex	TR15	N	not used	Dave Hopewell	19/04/2021	-
G2663_TT_0041	TR15	TR15 post-machining	TR15	S	2x1m	Dave Hopewell	19/04/2021	57
G2663_TT_0042	TR15	TR15 post-machining	TR15	N	2x1m	Dave Hopewell	19/04/2021	-
G2663_TT_0043	TR15	TR15 representative section	TR15	W	2x1m	Dave Hopewell	19/04/2021	58
G2663_TT_0044	TR11	TR11 post-machining	TR11, 1103	W	2x1m	Dave Hopewell	20/04/2021	35
G2663_TT_0045	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	E	2x1m	Dave Hopewell	20/04/2021	-
G2663_TT_0046	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	W	2x1m	Dave Hopewell	20/04/2021	36
G2663_TT_0047	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	N	2x1m	Dave Hopewell	20/04/2021	38

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0048	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	NW	2x1m	Dave Hopewell	20/04/2021	-
G2663_TT_0049	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	N	2x1m	Dave Hopewell	20/04/2021	-
G2663_TT_0050	TR11	Eastern end of TR11 following hand cleaning of overburden showing Penrhyn Quarry Railroad formation	1106, 1107, 1108, 1109, 1110	NW	2x1m	Dave Hopewell	20/04/2021	37
G2663_TT_0051	TR11	Base of Penrhyn Park Estate Wall	1105	W	1x1m	Dave Hopewell	20/04/2021	41
G2663_TT_0052	TR11	Slate sleeper SF003 with ferrous metal fitting	1110	E	1x1m	Dave Hopewell	20/04/2021	43
G2663_TT_0053	TR11	Gravelly grey surface	1109	N	1x1m	Dave Hopewell	20/04/2021	40
G2663_TT_0054	TR11	Penrhyn Quarry Railroad formation cut	1107	E	1x1m	Dave Hopewell	20/04/2021	39
G2663_TT_0055	TR11	South facing baulk section across Penrhyn Quarry Railroad	1101, 1104	S	2x1m	Dave Hopewell	20/04/2021	42
G2663_TT_0056	TR08	TR08 post-machining	TR08, 0803	SE	2x1m	Dave Hopewell	21/04/2021	26

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0057	TR08	TR08 post-machining	TR08, 0803	NW	2x1m	Dave Hopewell	21/04/2021	-
G2663_TT_0058	TR16	TR16 post-machining	TR16, 1603	WNW	2x1m	Dave Hopewell	21/04/2021	59
G2663_TT_0059	TR16	TR16 post-machining	TR16, 1603	ESE	2x1m	Dave Hopewell	21/04/2021	-
G2663_TT_0060	TR08	TR08 representative section	0801, 0802, 0803	SW	2x1m	Dave Hopewell	21/04/2021	27
G2663_TT_0061	TR08	Modern cut feature	0804	NE	1x1m	Dave Hopewell	21/04/2021	-
G2663_TT_0062	TR16	Ditch cut 1604	1604	N	2x1m	Dave Hopewell	23/04/2021	-
G2663_TT_0063	TR16	Ditch cut 1604	1604	E	2x1m	Dave Hopewell	23/04/2021	65
G2663_TT_0064	TR10	TR10 post-machining	TR10, 1003	ESE	2x1m	Dave Hopewell	23/04/2021	-
G2663_TT_0065	TR10	TR10 post-machining	TR10, 1003	WNW	2x1m	Dave Hopewell	23/04/2021	32
G2663_TT_0066	TR10	Band of gravel in natural	1003	NNE	2x1m	Dave Hopewell	23/04/2021	34
G2663_TT_0067	TR10	TR10 representative section	1001, 1002, 1003	SSW	2x1m	Dave Hopewell	23/04/2021	33
G2663_TT_0068	TR14	TR14 post-machining	TR14, 1403	E	2x1m	Dave Hopewell	23/04/2021	53

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0069	TR14	TR14 post-machining	TR14, 1403	W	2x1m	Dave Hopewell	23/04/2021	-
G2663_TT_0070	TR14	Repaired water pipe in TR14	TR14	E	1X1m	Dave Hopewell	23/04/2021	56
G2663_TT_0071	TR14	TR14 representative section	1401, 1402, 1403	S	1X1m	Dave Hopewell	23/04/2021	54
G2663_TT_0072	TR16	Upper trackbed of Penrhyn Quarry Railroad	1610	N	2x1m	Dave Hopewell	23/04/2021	62
G2663_TT_0073	TR16	Lower trackbed of Penrhyn Quarry Railroad	1607, 1608	N	2x1m	Dave Hopewell	23/04/2021	63
G2663_TT_0074	TR16	Tumbled wall	1606	N	2x1m	Dave Hopewell	23/04/2021	64
G2663_TT_0075	TR16	Penrhyn Quarry Railroad formation cut	1605	E	1X1m	Dave Hopewell	23/04/2021	-
G2663_TT_0076	TR16	Penrhyn Quarry Railroad formation	1604, 1605, 1606, 1607, 1608, 1609, 1610, 1611	W	2x1m	Dave Hopewell	23/04/2021	61
G2663_TT_0077	TR16	Penrhyn Quarry Railroad formation	1604, 1605, 1606, 1607, 1608, 1609, 1610, 1612	E	2x1m	Dave Hopewell	23/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0078	TR16	TR16 representative section	1602, 1603, 1605, 1606, 1612	Ν	2x1m	Dave Hopewell	26/04/2021	60
G2663_TT_0079	TR16	TR16 representative section	1602, 1603, 1605, 1606, 1613	N	2x1m	Dave Hopewell	26/04/2021	-
G2663_TT_0080	TR16	Detail of fluvio-glacial deposits in natural 1603	1603	E	1x1m	Dave Hopewell	27/04/2021	-
G2663_TT_0081	TR16	Detail of fluvio-glacial deposits in natural 1603	1603	E	not used	Dave Hopewell	27/04/2021	-
G2663_TT_0082	TR16	East facing section across ditch 1604	1604	E	1x1m	Dave Hopewell	27/04/2021	-
G2663_TT_0083	TR16	East facing section across ditch 1604	1604	E	1x1m	Dave Hopewell	27/04/2021	-
G2663_TT_0084	TR16	Intervention across ditch 1604	1604	SE	2x1m	Dave Hopewell	27/04/2021	66
G2663_TT_0085	TR16	East facing section across ditch 1604	1604	E	1x1m	Dave Hopewell	27/04/2021	67
G2663_TT_0086	TR16	Southwest facing section across ditch 1604	1604	SW	2x1m	Dave Hopewell	27/04/2021	68
G2663_TT_0087	TR16	Southwest facing section across ditch 1604	1604	SW	2x1m	Dave Hopewell	27/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0088	TR11	Underside of slate sleeper SF003 with ferrous metal fitting	SF003, 1110	N	1x30c m	Dave Hopewell	28/04/2021	-
G2663_TT_0089	TR11	Underside of slate sleeper SF003 with ferrous metal fitting	SF003, 1110	N	1x80c m	Dave Hopewell	28/04/2021	44
G2663_TT_0090	TR11	Topside of slate sleeper SF003 with ferrous metal fitting and cutout for chair	SF003, 1110	N	1x50c m	Dave Hopewell	28/04/2021	46
G2663_TT_0091	TR11	Topside of slate sleeper SF003 with ferrous metal fitting and cutout for chair	SF003, 1110	N	1x80c m	Dave Hopewell	28/04/2021	45
G2663_TT_0092	TR11	Topside of slate sleeper SF003 with ferrous metal fitting and cutout for chair	SF003, 1110	N	1x80c m	Dave Hopewell	28/04/2021	-
G2663_TT_0093	TR11	Topside of slate sleeper SF003 with ferrous metal fitting and cutout for chair	SF003, 1110	N	1x80c m	Dave Hopewell	28/04/2021	-
G2663_TT_0094	TR01	TR01 post-machining	TR01, 0103	N	2x1m	Dave Hopewell	28/04/2021	01
G2663_TT_0095	TR01	TR01 post-machining	TR01, 0103	S	2x1m	Dave Hopewell	28/04/2021	-
G2663_TT_0096	TR01	Pit 0104 pre-ex	0104	E	2x1m	Dave Hopewell	28/04/2021	03

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0097	TR01	TR01 representative section	0101, 0102, 0103	W	2x1m	Dave Hopewell	28/04/2021	02
G2663_TT_0098	TR01	North facing section across Pit 0104	0104, 0105	N	1x1m	Dave Hopewell	28/04/2021	04
G2663_TT_0099	TR01	Pit 0104 post-ex	0104, 0105	E	1x1m	Dave Hopewell	29/04/2021	-
G2663_TT_0100	TR12	TR12 post-machining	TR12, 1203	E	2x1m	Dave Hopewell	29/04/2021	-
G2663_TT_0101	TR12	TR12 post-machining	TR12, 1203	W	2x1m	Dave Hopewell	29/04/2021	47
G2663_TT_0102	TR12	Naturally deposited cobbles at end of band of glacial gravel	1203, 1204	W	2x1m	Dave Hopewell	29/04/2021	49
G2663_TT_0103	TR12	Naturally deposited cobbles at end of band of glacial gravel	1203, 1204	N	2x1m	Dave Hopewell	29/04/2021	-
G2663_TT_0104	TR12	TR12 representative section	TR12	N	2x1m	Dave Hopewell	29/04/2021	48
G2663_TT_0105	TR06	TR06 post-machining	TR06, 0603	S	2x1m	Dave Hopewell	29/04/2021	
G2663_TT_0106	TR06	TR06 post-machining	TR06, 0603	Ν	2x1m	Dave Hopewell	29/04/2021	21
G2663_TT_0107	TR06	TR06 representative section	0601, 0602, 0603, 0604	W	2x1m	Dave Hopewell	29/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_0108	TR06	TR06 representative section	0601, 0602, 0603, 0604	W	2x1m	Dave Hopewell	29/04/2021	22
G2663_TT_1001	TR09	TR09 pre-ex	TR09	NE	not used	Neil McGuinness	20/04/2021	-
G2663_TT_1002	TR07	TR07 pre-ex	TR07	SW	not used	Neil McGuinness	20/04/2021	-
G2663_TT_1003	TR10	TR10 pre-ex	TR10	SE	not used	Neil McGuinness	20/04/2021	-
G2663_TT_1004	TR08	TR08 pre-ex	TR08	SE	not used	Neil McGuinness	20/04/2021	-
G2663_TT_1005	TR16	TR16 pre-ex	TR16	WNW	not used	Neil McGuinness	21/04/2021	-
G2663_TT_1006	TR01	TR01 pre-ex	TR01	SSW	not used	Neil McGuinness	21/04/2021	-
G2663_TT_1007	TR14	TR14 pre-ex	TR14	E	not used	Neil McGuinness	21/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1008	TR14	Breached water pipe in TR14	TR14	W	not used	Neil McGuinness	21/04/2021	55
G2663_TT_1009	TR03	TR03 pre-ex	TR03	E	not used	Neil McGuinness	21/04/2021	-
G2663_TT_1010	TR02	TR02 pre-ex	TR02	N	not used	Neil McGuinness	22/04/2021	-
G2663_TT_1011	TR09	TR09 post-machining	TR09, 0903	NE	2x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1012	TR09	TR09 post-machining	TR09, 0903	SW	2x1m	Neil McGuinness	22/04/2021	28
G2663_TT_1013	TR09	Ditch 0904 pre-ex	0904, 0905	SW	1x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1014	TR09	Ditch 0904 pre-ex	0904, 0905	WSW	1x1m	Neil McGuinness	22/04/2021	30
G2663_TT_1015	TR09	Northwest facing section across ditch 0904	0904, 0905	NW	1x1m	Neil McGuinness	22/04/2021	31

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1016	TR09	Northwest facing section across ditch 0904	0904, 0905	NW	1x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1017	TR09	TR09 representative section	0901, 0902, 0903	SE	1x1m	Neil McGuinness	22/04/2021	29
G2663_TT_1018	TR09	TR09 post-ex	TR09, 0903	SW	2x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1019	TR09	TR09 post-ex	TR09, 0903	NE	2x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1020	TR07	TR07 post-machining	TR07, 0703	NE	2x1m	Neil McGuinness	22/04/2021	-
G2663_TT_1021	TR07	TR07 post-machining	TR07, 0703	SW	2x1m	Neil McGuinness	22/04/2021	23
G2663_TT_1022	TR07	North facing section across pit 0704	0704, 0705	Ν	1x1m	Neil McGuinness	22/04/2021	25
G2663_TT_1023	TR04	TR04 pre-ex	TR04	E	not used	Neil McGuinness	23/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1024	TR07	TR07 representative section	0701, 0702, 0703	NW	1x1m	Neil McGuinness	23/04/2021	24
G2663_TT_1025	TR07	TR07 post-ex	TR07, 0703	SW	2x1m	Neil McGuinness	23/04/2021	-
G2663_TT_1026	TR07	TR07 post-ex	TR07, 0703	NE	2x1m	Neil McGuinness	23/04/2021	-
G2663_TT_1027	TR03	TR03 post-machining	TR03, 0303	E	2x1m	Neil McGuinness	26/04/2021	09
G2663_TT_1028	TR03	TR03 post-machining	TR03, 0303	W	2x1m	Neil McGuinness	26/04/2021	-
G2663_TT_1029	TR03	Band of natural cobbles and gravel in TR03	TR03	W	1x1m	Neil McGuinness	26/04/2021	12
G2663_TT_1030	TR03	Steep slope at the centre of TR03	TR03	W	1x1m	Neil McGuinness	26/04/2021	11
G2663_TT_1031	TR03	TR03 representative section	0301, 0302, 0303	S	1x1m	Neil McGuinness	26/04/2021	10

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1032	TR04	TR04 post-machining	TR04, 0403	E	2x1m	Neil McGuinness	26/04/2021	13
G2663_TT_1033	TR04	TR04 post-machining	TR04, 0403	E	2x1m	Neil McGuinness	26/04/2021	-
G2663_TT_1034	TR04	TR04 post-machining	TR04, 0403	W	2x1m	Neil McGuinness	26/04/2021	-
G2663_TT_1035	TR04	Slate filled land drain in TR04	TR04	W	1x1m	Neil McGuinness	26/04/2021	15
G2663_TT_1036	TR04	Land drains in TR04	TR04	NW	1x1m	Neil McGuinness	26/04/2021	16
G2663_TT_1037	TR04	Linear arrangement of slate slabs 0404 laid flat just below turfline in TR04	0404	NW	1x1m	Neil McGuinness	26/04/2021	17
G2663_TT_1038	TR04	Linear arrangement of slate slabs laid flat just below turfline in TR04	0404	SE	1x1m	Neil McGuinness	26/04/2021	-
G2663_TT_1039	TR06	TR06 pre-ex	TR06	S	not used	Neil McGuinness	27/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1040	TR13	TR13 pre-ex	TR13	S	not used	Neil McGuinness	27/04/2021	-
G2663_TT_1041	TR12	TR12 pre-ex	TR12	E	not used	Neil McGuinness	27/04/2021	-
G2663_TT_1042	TR05	TR05 pre-ex	TR05	NE	not used	Neil McGuinness	27/04/2021	-
G2663_TT_1043	TR04	TR04 representative section	0401, 0402, 0403	N	1x1m	Neil McGuinness	28/04/2021	14
G2663_TT_1044	TR02	TR02 post-machining	TR02, 0203	N	2x1m	Neil McGuinness	28/04/2021	-
G2663_TT_1045	TR02	TR02 post-machining	TR02, 0203	S	2x1m	Neil McGuinness	28/04/2021	05
G2663_TT_1046	TR02	Linear arrangement of slate slabs 0204 laid flat just below turfline in TR02	0204	NE	1x1m	Neil McGuinness	28/04/2021	08
G2663_TT_1047	TR02	Linear arrangement of slate slabs 0204 laid flat just below turfline in TR02	0204	NW	1x1m	Neil McGuinness	28/04/2021	07

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1048	TR02	Linear arrangement of slate slabs 0204 laid flat just below turfline in TR02	0204	SE	1x1m	Neil McGuinness	28/04/2021	-
G2663_TT_1049	TR02	TR02 representative section	0201, 0202, 0203	E	1x1m	Neil McGuinness	28/04/2021	06
G2663_TT_1050	TR02	Exploratory test excavation (30x30x22cm) under slate slabs 0204 showing natural ground surface 0203	0201, 0202, 0203, 0204	NW	1x50c m	Neil McGuinness	28/04/2021	-
G2663_TT_1051	TR05	TR05 post-machining	TR05, 0503	NE	2x1m	Neil McGuinness	29/04/2021	-
G2663_TT_1052	TR05	TR05 post-machining	TR05, 0503	SW	2x1m	Neil McGuinness	29/04/2021	18
G2663_TT_1053	TR05	Active land drain in TR05	0504	SW	1x1m	Neil McGuinness	29/04/2021	20
G2663_TT_1054	TR05	TR05 representative section	0501, 0502, 0503	SE	1x1m	Neil McGuinness	29/04/2021	19
G2663_TT_1055	TR13	TR13 post-machining	TR13, 1303	S	2x1m	Neil McGuinness	29/04/2021	50

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1056	TR13	TR13 post-machining	TR13, 1303	N	2x1m	Neil McGuinness	29/04/2021	-
G2663_TT_1057	TR13	Modern bovine burial in TR13	TR13	NW	1x1m	Neil McGuinness	29/04/2021	52
G2663_TT_1058	TR13	TR13 representative section	1301, 1302, 1303	E	1x1m	Neil McGuinness	29/04/2021	51
G2663_TT_1059	TR15	TR15 post-reinstatement	TR15	NNW	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1060	TR09	TR09 post-reinstatement	TR09	NE	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1061	TR11	TR11 post-reinstatement	TR11	NW	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1062	TR07	TR07 post-reinstatement	TR07	NE	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1063	TR16	TR16 post-reinstatement	TR16	NW	not used	Neil McGuinness	30/04/2021	-

Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
G2663_TT_1064	TR08	TR08 post-reinstatement	TR08	SE	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1065	TR10	TR10 post-reinstatement	TR10	SE	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1066	TR01	TR01 post-reinstatement	TR01	S	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1067	TR14	TR14 post-reinstatement	TR14	E	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1068	TR02	TR02 post-reinstatement	TR02	S	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1069	TR03	TR03 post-reinstatement	TR03	E	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1070	TR04	TR04 post-reinstatement	TR04	E	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1071	TR05	TR05 post-reinstatement	TR05	NE	not used	Neil McGuinness	30/04/2021	-
Archive reference	Trench	Description	Contexts	View from	Scale (s)	Originating person	Date	Report Plate
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G2663_TT_1072	TR05	TR05 post-reinstatement	TR05	SW	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1073	TR12	TR12 post-reinstatement	TR12	E	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1074	TR13	TR13 post-reinstatement	TR13	S	not used	Neil McGuinness	30/04/2021	-
G2663_TT_1075	TR06	TR06 post-reinstatement	TR06	S	not used	Neil McGuinness	30/04/2021	-

## **APPENDIX II**

Written Scheme of Investigation

Land off Llandegai Road, Bangor, Gwynedd (G2663)

## WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL EVALUATION (TRIAL TRENCHING)

Prepared for Castle Green Homes Limited

April 2021



Ymddiriedolaeth Archaeolegol Gwynedd Gwynedd Archaeological Trust

Approvals Table					
	Role	Printed Name	Signature	Date	
Originated by	Document Author	Neil McGuinness	REDACTED FOR FINAL VERSION	08/04/21	
Reviewed by	Document Reviewer	John Roberts	REDACTED FOR FINAL VERSION	08/04/21	
Approved by	Principal Archaeologist	John Roberts	REDACTED FOR FINAL VERSION	08/04/21	

Revision History						
Rev No.	Summary of Changes	Ref Section	Purpose of Issue			
0.1	Changes to trench length and layout including	1, 3.1,	GAPS advice			
	2 half-size trenches across the Penrhyn	Figure 02				
	Quarry Railroad					
	Inserted explicit reference to gaining a better	1.1	Cadw advice			
	understanding of the construction of the					
	formation of the Penrhyn Quarry Railroad as a					
	part of Aims and Objectives along with a					
	reference to The Research Framework for the					
	Archaeology of Wales					
	Inserted paragraph on ferrous metal finds and	3.5	Cadw advice			
	relevant specialist to be consulted if required					

All GAT staff should sign their copy to confirm the project specification is read and understood and retain a copy of the specification for the duration of their involvement with the project. On completion, the specification should be retained with the project archive:

Name

Signature

Date

## Land off Llandegai Road, Bangor, Gwynedd (G2663)

# WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL EVALUATION (TRIAL TRENCHING):

Prepared for Castle Green Homes Limited, April 2021

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## **1 INTRODUCTION**

Gwynedd Archaeological Trust (GAT) has been commissioned by Castle Green Homes Limited to prepare a written scheme of investigation (WSI) for a programme of archaeological evaluation (trial trenching) in support of a planning application for the erection of 67 no. two-storey dwellings and associated access and car parking on land at Llandegai Road, Bangor, Gwynedd, LL57 4HR (NGR: SH5928171847; Figure 01). The proposed development area measures 2.51 ha and is located within a field of improved pasture on the eastern side of the A5 Llandegai Road. The development site has been allocated for housing within the adopted Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026 (reference T5).

A programme of archaeological assessment has already been completed for the development in September and October 2020 (Evans and Hopewell 2020, GAT Report 1565; McGuinness 2020, GAT Report 1567). The trial trenching is the second stage of archaeological evaluation at the site and follows on from a geophysical survey undertaken in September 2020 (Evans and Hopewell 2020, GAT Report 1565). A total of 16 trenches are proposed, predominately sited to investigate anomalies discovered during the geophysical survey and to test blank areas (Figure 02). The archaeological anomalies identified during the survey include Post-medieval and earlier ditches and enclosures, a possible prehistoric Iron Age enclosure and a possible prehistoric or medieval lynchet. The formation of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) was also identified running along the eastern edge of the southern part of the proposed development site during the geophysical survey. It will also be targeted with two trenches to verify its existence, gain a better understanding of the construction techniques used and assess and record its condition. It was originally hoped to target the part of the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552) that is thought to lie along the proposed developments northeastern edge (McGuinness 2020, GAT Report 1567) for similar assessment and record. However, the proximity of 11kV and LV overhead lines, buried telecoms plant, and trees and shrubs along its suspected route, means that machine excavation is not feasible at this stage.

The evaluation will be undertaken in April 2021 and will conform to the following guidelines:

• Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) Version 1.1 (The Welsh Archaeological Trusts 2018);

- *Guidelines for digital archives* (Royal Commission on Ancient and Historic Monuments of Wales, 2015);
- Management of Archaeological Projects (English Heritage 1991);
- Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide (Historic England 2015); and
- Standard and Guidance for Archaeological Field Evaluation (Chartered Institute for Archaeologists 2020).

GAT is certified to ISO 9001:2015 and ISO 14001:2015 (Cert. No. 74180/B/0001/UK/En) and is a Registered Organisation with the Chartered Institute for Archaeologists and a member of the Federation of Archaeological Managers and Employers (FAME).

The project will be monitored by the Gwynedd Archaeological Planning Service (GAPS) on behalf of the Local Planning Authority.

#### 1.1 Fieldwork Aims and Objectives

The key aims and objectives are to:

- to verify and characterise possible prehistoric archaeological anomalies identified during the geophysical survey (Evans and Hopewell 2020, GAT Report 1565) comprising a possible Iron Age ditched enclosure and a possible prehistoric or medieval lynchet. As outlined in *A Research Framework for the Archaeology of Wales,* a greater understanding of settlement chronology, as well as settlement and land use, is required for the Late Bronze Age and Iron Age in Wales. As such, where suitable materials survive radiocarbon dating should be undertaken (Gale 2010);
- to verify and characterise relict enclosures and boundaries identified during the geophysical survey (Evans and Hopewell 2020, GAT Report 1565) which predate historic mapping and may be of medieval (1110 1539 AD) or post-medieval (1539 1750 AD) date. An understanding of these features may contribute to a better understanding of settlement, land use and development as recommended in *A Research Framework for the Archaeology of Wales, Medieval 1110 1539* (Davidson, Davies and Gray 2017), and *Earlier Post Medieval 1539 1750* (Bezant and Bailey 2017);
- to establish the degree of survival, method of construction and the condition of two parts of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) within the proposed development area; transport is identified as a key theme in *A Research Framework for the Archaeology of Wales, Later Post Medieval and Industrial (1750 -1900)* (Gerrard and Bailey 2017) and the significance, form and archaeological survival of industrial railroads are recognised as priorities for assessment; and
- if no additional archaeological activity is identified, establish why this may be the case.

#### **1.2 Monitoring Arrangements**

The archaeological evaluation will be monitored by the Gwynedd Archaeological Planning Service (GAPS). The content of this WSI and all subsequent reporting by GAT must be approved by GAPS prior to final issue. The GAPS Planning Archaeologist will be kept informed of the project timetable and of the subsequent progress and findings. This will allow time to arrange monitoring visits and attend site meetings (if required) and enable discussion about the need or otherwise for further works (if required) as features of potential archaeological significance are encountered. GAPS contact details are:

Jenny Emmett 07824481052

Tom Fildes 07920264232

#### **1.3 Historic Environment Record**

In line with the GAT Environment Record (HER) requirements, the HER will be contacted at the onset of the project to ensure that any data arising is formatted in a manner suitable for accession to the HER and follows the guidance set out in *Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs)* (The Welsh Archaeological Trusts, 2018). In line with this guidance, all submitted reporting will need to include a non-technical summary in Welsh and English at the front of the report combined with short bilingual summaries of the principal Historic Assets recorded during the event. These requirements are mandatory. The GAT HER enquiry number is GATHER1311 and the GAT Event Primary Reference Number (PRN) is 46071.

The GAT HER will also be responsible for supplying PRNs for new assets identified and recorded during the course of the evaluation.

## 2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

The proposed development is located c.740m northeast of Scheduled Monument CN153 (NGR SH59557100). The Scheduled Monument was originally identified by aerial photography in the early 1960s and then by subsequent excavation by C.Houlder in 1966-7, which revealed a complex multi-period site comprising elements from the early Neolithic to the Medieval period, incorporating the scheduled area and what is now an industrial estate to the west. The complex included two large henge monuments (Henge A and Henge B), from the late Neolithic, located within the industrial estate, with the western end of the cursus located between the two henges and continuing east into the area of the cricket pitch, c.40m south of the current clubhouse. In addition, within the industrial estate area, a timber postbuilt house dated to the Early Neolithic was identified, along with a small barrow of Early Bronze Age date, Iron Age settlement activity, limited Roman activity and an Early Medieval inhumation cemetery that included a small rectangular mortuary enclosure with a central grave.

In 2005, GAT completed an archaeological excavation (Kenney 2008, GAT Report 764) in advance of the Parc Bryn Cegin business park development to the south of the industrial estate and cricket club and c.1.0km south of the proposed development. The excavation identified multiple features dating from the Early Neolithic onwards. The most significant discovery was the remains of an Early Neolithic rectangular timber building, followed by several clusters of Mid to Late Neolithic pits, sixteen burnt mounds, the remains of a Mid Iron Age ring-groove roundhouse, overlaid by early medieval smithing activity, a Late Iron Age/Romano-British settlement and a medieval corn drier. The two areas of excavation (those undertaken in 1966/7 and those in 2005/6) are no more than 90.0m apart at the closest point and together formed an area of landscape that preserved evidence for extensive prehistoric activity.

In 2011, GAT completed a geophysical survey of the northern end of the Bangor Cricket Club cricket field, which incorporates scheduled monument CN153 (GAT, unpublished). The survey interpretation plan identified the end of the cursus and it appeared to be further east than previously thought. The other identifiable features appeared to be land drains. In 2009, GAT completed an archaeological evaluation at Unit 01 on the industrial estate (Rees 2009, GAT Report 816). The evaluation area was located across the location of the cursus and medieval cemetery and a 3m wide x 15m long trench was excavated. Parts of the cursus, along with nine medieval graves, with the tip of a tenth grave in the northeast facing section, were identified during the excavation.

Probable prehistoric activity has been identified in the footprint of the Energy Centre Building at Penrhyn Castle, extant as a small pit filled with burnt stone (Jones and Evans 2016, GAT Report 1341). The provenance of the feature is unclear but what this feature does signify is the survival of prehistoric activity despite extensive landscaping. It may represent transient domestic activity and may also be associated with the archaeology of the wider surrounding area.

An aerial reconnaissance survey of northwest Wales was undertaken by RCAHMW in July 2005. Two new cropmark enclosures were discovered in the park of Penrhyn Castle c.700m north of the development area. The first (Penrhyn Park Enclosure I (SH59627204) NPRN 403359) is an oval enclosure defined by a narrow ditch, c.148m east-west by c.84m north-south. It tapers to the west, towards the summit of a low ridge. Within the eastern part of the enclosure is a smaller square enclosure at NGR SH59547204, and is of unknown date. Some 280m to the south is a second enclosure in a lower-lying setting: Penrhyn Park Enclosure II (SH59667175) NPRN 403367. This is a D-shaped ditched enclosure, possibly defensive, measuring c.63m northwest/southeast by 56m northeast/southwest, bisected by a modern field boundary. Surrounding these two main enclosures are extensive areas of pitting, linear features and smaller possible enclosures. The enclosures and associated markings are thought to most likely to belong to the prehistoric period.

An archaeological deskbased assessment and walkover survey for the proposed development site was commissioned by Castle Green Homes Limited and completed by GAT in 2020 (Roberts and Hopewell 2020, GAT Report 1565). It identified the following known historic assets in proximity to the proposed development, which lies:

- adjacent to the Grade II Listed Building Incline Cottage (LB 4085; GAT HER PRN 24862);
- adjacent to, and partially containing, the route of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) including the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552), part of the nominated *Penrhyn Slate Quarry Railroad and Penrhyn Slate Quarry Railway* (1.3) Element of Component Part 1 of the nominated *Slate Landscape of Northwest Wales World Heritage Site*;
- adjacent to the route of the Penrhyn Slate Quarry Railway (GAT HER PRN 59452) that forms part of *The Penrhyn Slate Quarry Railroad and Penrhyn Slate Quarry*

*Railway* (1.3) Element of Component Part 1 of the nominated *Slate Landscape of Northwest Wales World Heritage Site*; and

 within the Essential Setting of the Grade II\* Penrhyn Castle Registered Historic Park and Garden (PGW (Gd) 40 (GWY)) and the Dyffryn Ogwen Registered Landscape of Outstanding Historic Interest (HLW (Gw) 10).

Though the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) (including the Marchogion Inclined Plane (GAT HER PRNs 65551 & 65552)) and the Penrhyn Slate Quarry Railway (GAT HER PRN 59452) are currently undesignated, their remains have been deemed to meet the criteria for statutory protection and they have been proposed for designation as Scheduled Monuments (Hopewell, pers. comm.).

The deskbased assessment identified that historically, the development plot has been part of the landholdings of the Penrhyn Estate and its antecedents from at least the 16th century. Numerous maps relating to the Penrhyn Estate holdings cover the area, most notably an estate map of 1768 shows the area prior to the arrival of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451). It shows the wider pre-industrial area as formed by a patchwork of irregularly shaped fields, with the proposed development plot in Field H Maes y Bont Isaf and Field G Higher Gwern. A Penrhyn Estate map of 1803 shows Incline Cottage (GAT HER PRN 24862) and the route of the Penrhyn Slate Quarry Railroad running through plot 17. By the time of the Llandygai Parish Tithe Map of 1841, the development area is shown within plot 93, with the Penrhyn Slate Quarry Railroad running along its eastern edge and Telfords A5 Road, the Bangor to Llandegai section of which was completed in 1819, bounding it to the west. The description of plot 93 in the Tithe Apportionment document as 'demesne out of the park' indicates that it was land used for the benefit of Penrhyn Castle itself, but lay outside the ornamental parkland, and it was on this land that permission to build the Penrhyn Slate Quarry Railroad had been granted.

The First to Third Editions Ordnance Survey 25-inch to 1-mile County Series Map Sheets of the area shows the proposed development area with the Penrhyn Slate Quarry Railway (GAT HER PRN 59452), the replacement for the now disused Penrhyn Slate Quarry Railroad (GAT HER PRN 59451), running northwards along the Cegin Valley before turning to skirt the northern edge of the proposed development plot. The proposed development plot is depicted divided into three large plots, rather than the single plot currently. This included a square plot by the field entrance, which disappears between the Second (1890) and Third (1901) Edition maps, and also northern and southern plots sub-dividing the site. A small structure or building 10m by 4m and orientated north northeast-southsouthwest was located

in the northeast corner of the southern plot within its own enclosure 14m long by 9m wide, at NGR SH59297185. It is shown on all three editions of the Ordnance Survey maps, however no trace of this is now visible on the ground. A small rectangular enclosure, 30m by 15m, orientated north-northeast-south-southwest and located at NGR SH5931472013, is also noted in the southeast corner of the northern rectangular plot on the 1st and 2nd edition Ordnance Survey maps of 1890 and 1901, but it had gone by 1913, the date of the Third Edition map.

A walkover survey conducted as part of the same assessment/evaluation (Roberts and Hopewell 2020, GAT Report 1565) identified the route of the Penrhyn Slate Quarry Railroad, running along the western side of the Penrhyn Park boundary wall on the southeastern side of the site. A slate built water trough was also amongst several post-medieval features within the field, but no clear evidence of other buried archaeological features was identified. The somewhat terraced nature of the proposed development site was however noted as was its suitability for prehistoric and later settlement. The presence of buried archaeology was considered to be moderately likely given the proximity of the site to the substantial prehistoric and medieval archaeological remains discovered during excavations at the nearby Llandygai Industrial Estate and Parc Bryn Cegin Business Park.

A geophysical survey commissioned by Castle Green Homes Limited and conducted by GAT in 2020 (Roberts and Hopewell 2020, GAT Report 1565) identified a number of anomalies within the field including evidence for possible structures, boundaries and enclosures, some of which are depicted on historic mapping and some of which predate the earliest mapping available for the area. Of particular note are a group of anomalies (14 and 15) that may represent the remains of a prehistoric, possibly Iron Age, enclosure and an anomaly that may represent a possible prehistoric, or medieval, lynchet (05).

The 2020 deskbased assessment and geophysical survey report (Roberts and Hopewell 2020, GAT Report 1565) concluded with recommendations that included that a programme of archaeological trial trenching is undertaken to verify and characterise a selection of features identified during map regression and geophysical survey.

## 3 METHODOLOGY

## 3.1 Trial Trenching

The trial trenching programme aims to expose and characterise the possible archaeological anomalies identified during the map regression and geophysical survey and to test blank areas. Trial trenching forms part of a phased process and the results will inform subsequent strategies.

A total of **14** 30x2m and **2** 15x2m trial trenches will be excavated (Figure 02); the details of the individual trenches are shown below in Table 3.1:

Tronch	Sizo	Centreline Start	Centreline End	Pationalo / Targot
mench	0126	(E / N m OSGB)	(E / N m OSGB)	Rationale / Target
TR01 TR02	30x2m 30x2m	259289.08 371875.58 259288.78 371966.68 259240.81	259291.79 371905.45 259289.84 371936.70 259270.81	Geophysical Survey Anomaly 1 (medieval or later ridge and furrow) and blank area on Geophysical Survey Blank area on Geophysical Survey Geophysical Survey Anomalies 5 (possible Iron Age or Medieval
TR03	30x2m	371958.13	371958.25	lynchet) and 6 (field boundary that predates the 1803 Penrhyn Estate Map)
TR04	30x2m	259240.39 371975.25	259270.39 371975.37	Geophysical Survey Anomalies 6 (field boundary that predates the 1803 Penrhyn Estate Map) and 7 (linear cluster of ferrous material possibly part of former field boundary that predates the 1803 Penrhyn Estate Map or modern debris)
TR05	30x2m	259248.63 371996.93	259270.09 372017.90	Geophysical Survey Anomalies 8 (field boundary that predates the 1803 Penrhyn Estate Map) and 10 (field boundary shown on 1889 First Edition OS map)

Tronch	Size	Centreline Start	Centreline End	Potionala / Targat	
Trench	Size	(E / N m OSGB)	(E / N m OSGB)	Rationale / Target	
				Geophysical Survey Anomaly 1	
TR06	30x2m	259310.07	259309.15	(medieval or later ridge and furrow)	
1100	3072111	372065.46	372035.49	and blank area on Geophysical	
				Survey	
TROZ	2012	259256.23	259273.11	Interior of possible Iron Age	
INU7	5082111	371800.06	371824.87	enclosure	
				Geophysical Survey Anomaly 14	
TPOS	20v2m	259285.69	259261.61	(possible Iron Age enclosure ditch)	
TRUO	5072111	371834.79	371852.67	and interior of possible Iron Age	
				enclosure	
				Geophysical Survey Anomaly 15	
TR09	30x2m	259257.18	259272.64	(possible Iron Age enclosure ditch)	
		371775.56	371801.26	and interior of possible Iron Age	
				enclosure	
	30x2m	259266.07	259241.97	Geophysical Survey Anomaly 16	
TR10		371839.56	371857.45	(field boundary that predates the	
				1803 Penrhyn Estate Map)	
		250277.24	250200.20	Geophysical Survey Anomaly 17	
TR11	15x2m	259277.21	259289.39	(Penrhyn Slate Quarry Railroad (GAT	
		371807.88	371799.16	HER PRN 59451) and interior of	
				possible from Age enclosure	
TD12	20,42,00	259243.02	259273.02	Geophysical Survey Anomaly 20	
IKIZ	30x2m	372031.80	372031.92	(enclosure shown on 1889 First	
		250206 25	250205 17	Geophysical Survey Anomaly 1	
TR13	30x2m	259290.25	259295.17	(medieval or later ridge and furrow)	
		372073.38	372043.40		
				Guivey	
TR14	30x2m	259241.48	259271.48	Blank area on Geophysical Survey	
		371915.70	371915.82		
	2012-	259262.13	259266.73	Plank area an Coanhysical Survey	
1472	SUXZIII	371732.08	371702.45	Diank area on Geophysical Survey	

Trench	Size	Centreline Start (E / N m OSGB)	Centreline End (E / N m OSGB)	Rationale / Target
				Geophysical Survey Anomaly 17
TR16	15x2m	259285.96	259299.49	(Penrhyn Slate Quarry Railroad (GAT
		371843.52	371837.08	HER PRN 59451) and interior of
				possible Iron Age enclosure
1				

#### Table 3.1 Trench details

The trenches will be opened and closed by a 13-tonne tracked mechanical excavator supplied by a GAT appointed sub-contractor *RG Hire Ltd*. The trenches will be carefully deturfed by the mechanical excavator fitted with a toothless bucket; the turf will be stored close to the trench and topsoil and subsoil stored in separate bunds. Once the excavation and recording of a trench and any archaeological features identified within it is complete, the trench will be backfilled by machine, first with excavated subsoil, then topsoil and then the turf will be re-laid. All fieldwork will be completed in accordance with industry standards and the GAT Field Manual.

The trial trenching works are currently scheduled to on Monday 19th April 2021 be completed by Tuesday 4th May 2021.

- The trial trenches will be surveyed in advance by GAT staff using a Trimble R8 GNSS/R6/5800 GPS receiver (<1cm accuracy). The Trimble R8 unit will also be used for all subsequent digital surveying. The site grid will be established relative to the OS National Grid;
- The location of the trial trenches will be scanned with a cable avoidance tool (CAT) by a suitably qualified and competent operative prior to opening to determine the presence or absence of any services. Existing service drawings have also been consulted;
- The 16 trenches will be excavated under archaeological direction by a machine fitted with a toothless bucket as far as the glacial horizon or an archaeological horizon, whichever is encountered first;
- All 16 trenches and any identified archaeological features will be recorded using GAT pro-formas (Appendix I; Appendix II; Appendix III). The records will include topsoil and subsoil depths, as well as the composition of the glacial horizon. All encountered subsurface features will be recorded on GAT pro-formas with detailed notations and will be recorded photographically with an appropriate scale, located via GPS and a measured survey completed, either hand-drawn or using a Trimble R8 GPS unit;

- Photographic images will be taken using a digital SLR (Nikon D3100) camera set to maximum resolution (4,608 × 3,072 14.2 effective megapixels) in RAW format; the photographic record will be digitised in *Microsoft Access* as part of the fieldwork archive and dissemination process. Photographic images will be archived in TIFF format using Adobe Photoshop; the archive numbering system will start from G2663\_035. A photographic ID board will be used during the evaluation to record site code, image orientation and any relevant context numbers;
- If remains that form part of the Penrhyn Slate Quarry Railroad (GAT HER PRN 59451) are encountered in trenches TR11 and TR16, the features will be hand cleaned and recorded, no further excavation of the features will take place. Any other archaeological features/deposits/structures encountered in trenches will be manually cleaned and examined to determine extent, function, date and relationship to adjacent activity. The following excavation strategy will generally apply: 50% sample of each sub-circular feature, 25% sample of each linear feature (terminal ends and intersection points with other features will be prioritised). However, if discrete features are identified, these will be 100% excavated. Any features that comprise a spread of material rather than a cut feature, will be completed in quadrants (if fully extant) or 100% excavated if present as a discrete spread;
- Any required plans or sections to be drawn at a minimum 1:10 scale using GAT A4, A3 or A2 pro-forma permatrace;
- A trench plan and long section of all trenches that contain archaeology will be hand drawn at 1:10 and 1:20 scale using GAT pro-forma permatrace.

Should dateable artefacts, human remains and/or ecofacts be recovered, an interim report will be submitted summarising the results of the mitigation, along with an assessment of potential for analysis post-excavation project design (in line with the MAP2 process). *Additional time, resourcing and costs will be required to undertake any post-excavation programme of works.* 

## 3.2 Data Processing and Report compilation

Following completion of the stages outlined above, a report will be produced within one month (June 2021) incorporating the following:

- 1. Non-technical summary
- 2. Introduction
- 3. Aims and objectives
- 4. Background
- 5. Methodology
- 6. Results
- 7. Conclusions and further recommendations
- 8. List of sources consulted.
- 9. Appendix I approved GAT project design
- 10. Appendix II photographic metadata
- 11. Appendix III context register
- 12. Appendix IV ecofact register
- 13. Appendix V artefact register

Should dateable artefacts and ecofacts be recovered, an **interim report** will be submitted summarising the results, along with an assessment of potential for analysis written scheme of investigation (in line with the MAP2 process).

Illustrations will include plans of the location, site plans and sections. Historical maps, when appropriate and if copyright permissions allow, will be included. A draft copy of the report will be sent to the GAPS Planning Archaeologist and to the client prior to production of the final report.

#### 3.3 Human Remains

If any human remains are identified during the course of the evaluations, the GAPS Planning Archaeologist will be informed immediately. If the remains cannot be preserved in situ their recovery will take place under appropriate regulations, with due sensitivity and regard for health and safety issues as recommended in *Updated Guidelines to the Standards for Recording Human Remains* (Chartered Institute for Archaeologists, 2017). In order to excavate human remains, a Ministry of Justice licence is required under Section 25 of the Burials Act 1857 for the removal of anybody or remains of any body from any place of burial. In accordance with the Ministry of Justice licence, recovered remains will be reburied once the investigation and/or assessment/analysis are complete.

Non-fragmented skeletal remains will be excavated using wooden tools and collected and stored in polyethylene bags (with appropriate references for context, grave number, et al) and placed in a lidded cardboard archive box (note: separate boxes for each grave) and stored in a suitable manner within GAT premises. If significant quantities of human remains are encountered, a human osteologist will be contacted and appointed to advise the team during the fieldwork. The osteologist will be an external appointment: <u>Dr. Genevieve Tellier |</u> <u>Tel: 01286 238827 | email: northwalesosteology@outlook.com</u> who will assist in devising the excavation, recording and sampling strategy for features containing human remains. The osteologist should also help to ensure that adequate post-excavation processing of human remains is carried out so that the material is in a fit state for assessment during the post-excavation stage. For inhumations, this will involve washing, drying, marking and packing.

If human remains are recovered that are deemed suitable for further assessment/analysis, this will be completed in accordance with the osteologist's requirements and with *The Role of the Human Osteologist in an Archaeological Fieldwork Project* (Historic England, 2018).

#### 3.4 Ecofacts

Should any archaeological features and/or sealed deposits be identified that are deemed suitable for dating, ecofact samples will be taken of not less than 40 litres for bulk samples (or 100% if the feature is smaller). The sampling strategy will be undertaken in accordance with the principles set out in *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (Historic England, 2011). Recourse will be made to specialist contact will be <u>Jackeline Robertson (AOC Archaeology | telephone: 0208 843 7380)</u> for palaeoenvironmental analysis and dating. Any required specialists will be consulted during the evaluation to advise GAT on a sampling strategy. For any ecofact samples taken from human burials, this will be completed in accordance with Dr. Genevieve Tellier's guidance.

#### 3.5 Artefacts

Diagnostic artefacts will be retained for further examination and identification. Pottery sherds of 19<sup>th</sup> and 20<sup>th</sup> century date will be examined on-site and the context from which they were retrieved noted but the sherds will not be retained. Retained artefacts will be treated according to guidelines issued by the UK Institute of Conservation, in particular the advice provided within First Aid for Finds (Watkinson and Neal 2001).

There is a high potential for ferrous metal artefacts related to the Penrhyn Quarry Railroad to be recovered, specifically from the two trenches that target it, but also more generally from the other trenches in the proposed development area. These may include lengths of rail, wagon hooks, horse fittings, etc, all of which will be recovered and retained for post-excavation analysis unless they survive in situ. Advice will be sought from an external industrial metalwork specialist for any ferrous metal objects whose form and function can not be positively identified on-site, in this instance <u>David Gwyn (Govannon Consultancy | telephone: 01286 881857).</u>

Any waterlogged artefacts (e.g. wood or leather) that are to be recovered for post-excavation assessment and analysis will be processed in accordance with *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage, 2011) and specifically in accordance with Brunning and Watson (2010) for waterlogged wood and Historic England (2012) for waterlogged leather. In such cases an external specialist will be contacted to agree an appropriate sampling and recovery strategy via Jackeline Robertson (AOC Archaeology | telephone: 0208 843 7380).

All finds are the property of the landowner; however, it is Trust policy to recommend that all finds are donated to an appropriate museum (in this case Storiel, Ffordd Gwynedd, Bangor LL57 1DT) where they can receive specialist treatment and study. Access to finds must be granted to the Trust for a reasonable period to allow for analysis and for study and publication as necessary. Trust staff will undertake initial identification, but any additional advice would be sought from a wide range of consultants used by the Trust, including National Museums and Galleries of Wales at Cardiff.

All finds of treasure must be reported to the coroner for the district within fourteen days of discovery or identification of the items. Items declared Treasure Trove become the property of the Crown, on whose behalf the Portable Antiquities Scheme acts as advisor on technical matters, and may be the recipient body for the objects.

The Treasure Valuation Committee, based at the British Museum, and informed by the Portable Antiquities Scheme, will decide whether they or any other museum may wish to acquire the object. If no museum wishes to acquire the object, then the Secretary of State will be able to disclaim it. When this happens, the coroner will notify the occupier and landowner that he intends to return the object to the finder after 28 days unless he receives no objection. If the coroner receives an objection, the find will be retained until the dispute has been settled.

GAT will contact the landowner for agreement regarding the transfer of artefacts, initially to GAT and subsequently to the relevant museum (Storiel). A GAT produced pro-forma will be issued to the landowner where they are given the option to donate the finds or to record that they want them returning to them once analysis and assessment has been completed. Artefacts to be donated will then be transferred to Storiel in accordance with the National Standard and Guidance to Best Practice for Collecting and Depositing Archaeological Archives in Wales (National Panel for Archaeological Archives in Wales 2019).

## 4 FIELDWORK ARCHIVING

Following the completion of the fieldwork, a programme of fieldwork archiving will be completed based on following task list:

- 1. Pro-formas: all cross referenced and complete;
- Photographic Metadata: completed in *Microsoft Access* and cross-referenced with all pro-formas;
- 3. Sections: all cross referenced and complete;
- 4. Survey data: downloaded using a Computer Aided Design package;
- 5. Plans: all cross referenced and complete;
- 6. Artefacts (if relevant): quantified and identified; register completed;
- 7. Ecofacts (if relevant): quantified and register completed;
- 8. Context register (if relevant): quantified and register completed.

All data will be processed, final illustrations will be compiled and a report will be produced which will detail and synthesise the results. A full archive including plans, photographs, written material and any other material resulting from the project will also be prepared.

On completion, the following dissemination will apply:

- A paper report(s) plus digital report(s) will be provided to the client/consultant and the GAPS Planning Archaeologist (draft report then final report);
- A paper report plus a digital report will be provided to the Gwynedd HER within six months of project completion (final report only). If appropriate, digital information such as the project database, GIS table(s) and photographs, will also be submitted to the regional Gwynedd HER. All digital datasets submitted will conform to the required HER standards;
- A digital report and archive (including photographic and drawn) data will be provided to the Royal Commission on Ancient and Historic Monuments Wales (final report only). This will be in accordance with the *RCAHMW Guidelines for Digital Archives Version 1*. Digital information will include the photographic archive and associated metadata.

## **5 PERSONNEL**

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The trial trenching will be completed by two Project Archaeologist who will have responsibility for conducting fieldwork, preparing the site archive, liaising with GAPS and Castle Green Homes Limited and preparing the draft report and final report. The project manager will be responsible for reviewing and approving the report prior to submission.

Any hazards, risks and recommended risk mitigation will be identified prior to the start of work in a site-specific risk assessment, copies of which will be supplied to the client and subcontractor prior to the beginning of fieldwork. All GAT staff will be issued with required personal safety equipment, including high visibility jacket, steel toe-capped boots and hard hat. All GAT fieldwork is undertaken in accordance with the Trust's Health and Safety Manual, Policy and Handbook (prepared by Ellis Whittam) and both the Welsh Government's and GAT's guidelines on Covid-19.

## 6 SOCIAL MEDIA

One of the key aims in the GAT mission statement is to improve the understanding, conservation and promotion of the historic environment in our area and inform and educate the wider public. To help achieve this, GAT maintains an active social media presence and seeks all opportunities to promote our projects and results. With permission, GAT would like the opportunity to promote our work on this scheme through our social media platforms. This could include social media postings during our attendance on-site as well as any postings to highlight results. In all instances, approval will be sought from client prior to any postings.

## 7 INSURANCE

## **Public/Products Liability**

Limit of Indemnity- £5,000,000 any one event in respect of Public Liability INSURER Aviva Insurance Limited POLICY TYPE Public Liability POLICY NUMBER 24765101CHC/UN/000375 EXPIRY DATE 21/06/2021

## **Employers Liability**

Limit of Indemnity- £10,000,000 any one occurrence. The cover has been issued on the insurers standard policy form and is subject to their usual terms and conditions. A copy of the policy wording is available on request. INSURER Aviva Insurance Limited POLICY TYPE Employers Liability POLICY NUMBER 24765101 CHC / UN/000375 EXPIRY DATE 21/06/2021

## **Professional Indemnity**

Limit of Indemnity- £5,000,000 in respect of each and every claim POLICY TYPE Professional Indemnity POLICY NUMBER PL-PSC10002389775/00 EXPIRY DATE 22/07/2021

#### 8 SOURCES CONSULTED

Brunning, R, and Watson, J, 2010, *Waterlogged Wood: Guidelines on the Recording, Sampling, Conservation and Curation of Waterlogged Wood* (3rd edition)

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## FIGURE 01

Location of the Proposed Development Site



## FIGURE 02

Proposed Trenching Plan



## **APPENDIX I**

Gwynedd Archaeological Trust Trench Sheet pro-forma

#### TRENCH SHEET

Project Name and Number		Trench number	
Trench size	Plans		
Max. trench depth	Sections		
Orientation	Photos		
Date/Initials	Area/chainage		

List of layers and/or features in trench (continue on back of sheet if necessary)

Context No.	Depth below surface	Brief description

General summary	


# Test Pit/Trial Trench Record

Ymddiriedolaeth Archaeolegol Gwynedd	
Gwynedd Archaeological Trust	

Sketch plan:		Add north arrow:	Sketch section:
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# **APPENDIX II**

Gwynedd Archaeological Trust Photographic Metadata pro-forma



# **Digital Photographic Record**

Include main context numbers for each shot, drawing numbers for sections and any other relevant numbers for cross referencing. Delete any unwanted photos **immediately** from the camera. Regularly upload photographs to computer.

Projec	t Name:		Project Number:				
Photo No.	Sub - Division	Description	Contexts	Scales	View From	Initials	Date

# APPENDIX III

Gwynedd Archaeological Trust Context Sheet pro-forma

<u>GWYNEDD ARCHA</u>	EOLOGICAL TRUST	C	ONTEXT RECORD FORM
SITE CODE	GRID SQUARE	SITE SUB-DIV	CONTEXT NUMBER
CATEGORY/TYPE	PROVISIONAL DATE/PERIOD/PHASE		
LENGTH	BREADTH	DIAMETER	DEPTH/HEIGHT
DEPOSIT		1	СИТ
1. Compaction			1. Shape in plan
2. Colour			2. Corners
3. Matrix Composition			3. Break of slope top
4. Inclusions			4. Sides
5. Clarity of Interface			5. Break of slope base
6. Other comments			6. Base
7. Methods & conditions			7. Orientation
			8. Truncated (if known)
			9. Other comments
			Draw sketches overleaf
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PLANS		SECTIONS	
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## DESCRIPTION/INTERPRETATION CONTINUED

# **APPENDIX III**

Specialist Report: Robertson, J, 2021, *Land off Llandegai Road, Bangor, Gwynedd: Environmental Assessment*, AOC Project 25929

# Land off Llandegai Road, Bangor, Gwynedd: Environmental Assessment

AOC Project no: 25929 Site Code: G2663 Date: July 2021



# Land off Llandegai Road, Bangor, Gwynedd:

# **Environmental Assessment**

On Behalf of: Gwynedd Archaeological Trust (GAT)

National Grid Reference (NGR):

AOC Project No:	25929
Prepared by:	Jackaline Robertson
Illustration by:	N/A
Date of Fieldwork:	19 <sup>th</sup> to 30 <sup>th</sup> April 2021
Date of Report:	26/07/2021

This document has been prepared in accordance with AOC standard operating procedures.

Author: Jackaline Robertson Approved by: Ciara Clarke Date: 26/07/2021 Date: 29/07/21

Enquiries to: AOC Archaeology Group Edgefield Industrial Estate Edgefield Road Loanhead EH20 9SY Tel. 0131 440 3593 Fax. 0131 440 3422 e-mail. edinburgh@aocarchaeology.com



# www.aocarchaeology.com

#### Introduction

A total of six wash over samples were submitted for environmental assessment from the archaeological evaluation and trial trenching undertaken at Land at Llandegai Road, Bangor. The samples were collected from a series of ditches and pits of unknown archaeological function and date. The ecofact assemblage was composed entirely of charcoal. The main objectives of this assessment were to identify the charcoal fragments to species, assess their suitability for radiocarbon dating, their potential for further analysis and what archaeological information they can offer about the deposits from which they were collected.

#### **Methods**

The six wash overs were collected from bulk samples which were processed by GAT using standard flotation procedures. The wash overs were received by AOC in a dry and stable condition in glass containers. These were sieved using a stack system of 4mm, 2mm, 1mm and 0.3mm sieves and scanned using a stereomicroscope at x10-40 magnification.

Where possible a maximum of 20 charcoal fragments larger than 4mm were selected for assessment from each context. Species identifications were confirmed using keys and texts (Hather 2000; Schweingruber 1990). The following criteria were used as a guideline for interpreting feature usage. Those samples which contained two or more species were typically designated as fuel waste, whereas larger concentrations of a single species were viewed as more likely to represent burning of a structural element or artefact.

## **Results**

The results are recorded in table 1 the charcoal species.

The total charcoal assemblage was small (48.5g) and 48 fragments were identified to species from five samples. Flecks of charcoal were noted in ditch [904] but these were all smaller than 4mm and were not suitable for further study. The species were alder (*Alnus glutinosa* L), birch (*Betula* sp), hazel (*Coryus avellana* L), oak (*Quercus* sp) and elm (*Ulmus* sp). The dominant species was oak (44%) followed by alder (29%), hazel (21%), birch (4%) and elm (2%). Preservation of the charcoal ranged from adequate to excellent with most described as good. The charcoal was concentrated within pit [704] and deposit (1614) in ditch [1604]. The rest of the assemblage was scattered throughout the site with no evidence of selective or deliberate disposal. The assemblage is composed of re-deposited fuel debris along with a possible structural/artefact element.

The results are summarised below by feature.

#### Context (905), Ditch [904] Sample 1

The ditch was described during excavation as being consistent with a field boundary that had silted over naturally. The absence of any post medieval pottery led to speculation that this could be a relatively early feature and it was hoped that any surviving ecofacts would confirm its age. However, only small flecks of

charcoal were recovered from the wash over, none of which could be identified to species. The charcoal was likely re-worked into this ditch fill when the feature began to silt up.

#### Context (705), Pit [704] Sample 2

This undated pit was described as charcoal rich but there was no evidence that burning occurred in situ. Instead, it is believed the charcoal was deposited after the burning event. The charcoal (15.0g) was composed entirely of oak. This concentration of a single species could represent the remains of a small structural element such as a post or stake, or an artefact, that was destroyed elsewhere before being deposited within this feature.

#### Contexts (1613), (1614), (1615), Ditch [1604] Samples 3, 4, and 5

Charcoal (32.0g) was recovered from upper fill (1613), lower fill (1614) and primary fill (1615) all located within ditch [1604]. The charcoal was concentrated within (1614) which had 28.0g compared to 3.0g in (1613) and 1.0g in (1615). The species present comprised hazel (44%), alder (39%), birch (9%), oak (4%) and elm (4%). Alder and hazel were noted in deposits (1613) and (1614) whereas birch was recorded only in (1613). One fragment of oak and one piece of elm was recovered from (1615). These finds are considered to represent fuel debris. The charcoal build up in deposit (1614) likely occurred when the ditch was deliberately backfilled. Some of those fragments in (1613) and (1615) were possibly re-deposited from the larger concentration in (1614).

#### Context (105), Pit [104] Sample 6

The function and date of this pit was unclear from the excavated evidence although the absence of post medieval finds hinted at a possible early date. The ecofacts recovered were sparse, comprising five fragments of alder charcoal (1.5g). The value of this material in understanding the function of the pit is limited.

## Discussion

The charcoal assemblage has derived mostly from re-deposited fuel debris along with a possible small structural element or artefact. The species identified likely grew in the surrounding landscape. Alder and birch are found in damp habitats, hazel and elm favour hedgerows, scrub or more open woods whereas oak is adaptable to a variety of growing conditions (Stace 2010, Linford 2009).

## **Recommendations**

The charcoal assemblage has been assessed in full and no further species identifications are required. If material is required for radiocarbon dating then the alder, birch, hazel and elm charcoal are all suitable. Where possible oak should be avoided for dating as it is a long-lived wood species and there was no evidence of bark edge material, or pieces of roundwood, in the fragments identified. Once the chronology of the features is confirmed, and if they are deemed to be of archaeological significance, a short analysis report drawing on comparisons with other similar sites in this area, and focussing on the exploitation of wood resources, is recommended.

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Schweingruber, F. H. 1990. *Microscopic Wood Anatomy: Structural Variability of Stems and Twigs in Recent and Subfossil Woods from Central Europe 3rd edition.* Swiss Federal Institute for Forest, Snow and Landscape Research. Geneva.

Stace, C. 2010. New Flora of the British Isles. Cambridge University Press. Cambridge.

Sample	Feature	Context	Species	Name	Fragment	Weight(g)
1	Ditch 904	905	N/A	N/A	N/A	N/A
2	Pit 704	705	Quercus sp.	Oak	20	15
3	Ditch 1604	1613	Alnus glutinosa L.	Alder	4	
3	Ditch 1604	1613	<i>Betula</i> sp.	Birch	2	
3	Ditch 1604	1613	Corylus avellana L.	Hazel	4	3
4	Ditch 1604	1614	Alnus glutinosa L.	Alder	5	
4	Ditch 1604	1614	Corylus avellana L.	Hazel	5	28
5	Ditch 1604	1615	Corylus avellana L.	Hazel	1	
5	Ditch 1604	1615	<i>Ulmus</i> sp.	Elm	1	
5	Ditch 1604	1615	Quercus sp.	Oak	1	1
6	Pit 104	105	Alnus glutinosa L.	Alder	5	1.5

Table 1 Charcoal species

Key: N/A=not applicable

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# **APPENDIX IV**

SUERC Radiocarbon Dating Certificates



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99857 (GU58856)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 705 2
Material	Charcoal : Quercus sp.
δ <sup>13</sup> C relative to VPDB	-23.4 ‰

**Radiocarbon Age BP**  $5873 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) Radiocarbon 58(1) pp.9-23.

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Bragny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99858 (GU58857)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 705 2
Material	Charcoal : Quercus sp.
δ <sup>13</sup> C relative to VPDB	-23.5 ‰

**Radiocarbon Age BP**  $5900 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Bragny

Checked and signed off by : E Dunbar



niversity Jasgow The University of Glasgow, charity number SC004401



The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.

Radiocarbon determination (BP)



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99859 (GU58858)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 1614 4
Material	Charcoal : Alnus glutinosa L.
δ <sup>13</sup> C relative to VPDB	-27.7 ‰

**Radiocarbon Age BP**  $4951 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

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For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Brigny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99860 (GU58859)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 1614 4
Material	Charcoal : Corylus avellana L.
δ <sup>13</sup> C relative to VPDB	-28.8 ‰

**Radiocarbon Age BP**  $4955 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) Radiocarbon 58(1) pp.9-23.

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Brigny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99861 (GU58860)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 1615 5
Material	Charcoal : Corylus avellana L.
δ <sup>13</sup> C relative to VPDB	-26.8 ‰

**Radiocarbon Age BP**  $5070 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

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Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) Radiocarbon 58(1) pp.9-23.

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Bragny

Checked and signed off by : E Dunbar



niversity Jasgow The University of Glasgow, charity number SC004401



The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.

Radiocarbon determination (BP)





# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99865 (GU58861)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 1615 5
Material	Charcoal : Ulmus sp.
δ <sup>13</sup> C relative to VPDB	-25.3 ‰

**Radiocarbon Age BP**  $5048 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) Radiocarbon 58(1) pp.9-23.

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Brigny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99866 (GU58862)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 105 6
Material	Charcoal : Alnus glutinosa L.
δ <sup>13</sup> C relative to VPDB	-27.5 ‰

**Radiocarbon Age BP**  $2711 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

Detailed descriptions of the methods employed by the SUERC Radiocarbon Laboratory can be found in Dunbar et al. (2016) Radiocarbon 58(1) pp.9-23.

For any queries relating to this certificate, the laboratory can be contacted at suerc-c14lab@glasgow.ac.uk.

Conventional age and calibration age ranges calculated by :

Bragny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.



# RADIOCARBON DATING CERTIFICATE 13 September 2021

Laboratory Code	SUERC-99867 (GU58863)
Submitter	John Roberts Gwynedd Archaeological Trust Craig Beuno Ffordd y Garth Bangor Gwynedd LL57 2RT
Site Reference Context Reference Sample Reference	G2663_Llandygai_Road 105 6
Material	Charcoal : Alnus glutinosa L.
δ <sup>13</sup> C relative to VPDB	-26.5 ‰

**Radiocarbon Age BP**  $2655 \pm 26$ 

N.B. The above <sup>14</sup>C age is quoted in conventional years BP (before 1950 AD) and requires calibration to the calendar timescale. The error, expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Laboratory and should be quoted as such in any reports within the scientific literature. The laboratory GU coding should also be given in parentheses after the SUERC code.

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Conventional age and calibration age ranges calculated by :

Bragny

Checked and signed off by : E Dunbar







The above date ranges have been calibrated using the IntCal20 atmospheric calibration curvet

Please contact the laboratory if you wish to discuss this further.

Radiocarbon determination (BP)

# **APPENDIX V**

Specialist Report: Gwyn, D, 2021, *Slate Slab Artefact From Trial Trenching, Land Off Llandegai Road, Bangor, Gwynedd*, Govannon Consultancy Report GC440



# govannon consultancy

Consultant Dr David Gwyn MCIfA FSA

Nant y Felin, Llanllyfni Road, Penygroes, Caernarfon, LL54 6LY, UK 2 +44 (0)1286 881857 govannonconsult@hotmail.com

## SLATE SLAB ARTEFACT FROM TRIAL TRENCHING, LAND OFF LLANDEGAI ROAD, BANGOR, GWYNEDD

GAT reference: G2663 03 Tc11

Govannon consultancy has been commissioned by Gwynedd Archaeological Trust (Neil McGuinness MA MClfA, Project Archaeologist) to undertake a report on an artefact recovered from trial trenching carried out on land adjacent to Llandegai Road, Bangor, Gwynedd. This trial trenching was itself commissioned as part of an archaeological evaluation by Castle Green Homes Limited in support of a planning application for the erection of dwellings and associated access and car parking on the site. This was undertaken between 19 and 30 April 2021, ands has been written up in draft form (GAT 1594, *Tir oddi ar Ffordd Llandegai / Land off Llandegai Road, Bangor, Gwynedd: Gwerthuso Archeolegol (Ffosio Treialon) Archaeological Evaluation (Trial Trenching).* Among the artefacts recovered was a piece of slate which had been drilled to receive a fitting, and which is associated with some ferrous material. This forms the subject of this report.

#### Archaeological context

This artefact was recovered from the formation of the Penrhyn Quarry Railroad (PRN: 59451) at trench 11, at SH 59286 71806. It was firmly embedded within the deposit, and it was originally planned to leave the object *in situ*. However, an overnight intruder visited the site and dislodged it, exposing the rectangular imprint described below, and revealing that it was the underside that had previously been visible.

GAT 1594 suggests that it was located within a demolition layer from an early phase of the railroad underlying the ballast which supported a later track-type.

#### Description

The artefact is an irregularly shaped slab of Cambrian vein slate measuring 72cm long, 23cm wide and 8cm thick. One long face runs smoothly along the grain of the slate, probably mechanically sawn, whereas the other faces reflect natural planes of fracture.

The slab bears a shallow rectangular imprint measuring 105mm across by 132mm along the grain in which two holes each 20mm wide have been drilled.

Some ferrous material adheres both to the upper and lower faces of the slab but is not associated with the holes in any way.

GAT 1594 plates 43-46 show this item.

Trench 11 was cut perpendicular to the line of the Penrhyn park wall and across the formation of the Penrhyn Quarry Railroad, which at this point was 6.2m across.

#### **Historical context**

## Terminology

A *railroad* is defined for the purpose of this document as a system which uses cast-iron rails to support and guide flanged wheels on the vehicles which use it, as distinct from the *plateway*, a technology much in use from the 1790s to the 1820s, in which the guiding flange is on the rails, and *railways*, where malleable wrought-iron or steel rails support and guide flanged wheels.

#### History

The Penrhyn Quarry Railroad was a horse and inclined plane-operated transport system installed 1800-1801 to serve the slate industry on the estate of Richard Pennant, Lord Penrhyn in the Ogwen valley. It connected the slate quarries with the slate-slab mill at Felin Fawr, where the undertaking's foundry and workshops also came to be located, and with the sea at Port Penrhyn. It was designed by Benjamin Wyatt, the estate manager, and initially made use of cast-iron rails of a type developed by the canal engineer Thomas Dadford, and used in South Wales. It continued to operate until the late 1870s, when it was replaced by a locomotive-worked system on a different alignment.

The Penrhyn Quarry Railroad is significant as the longest overland iron railroad in the world when built, an early example of the use of a railway system within a quarrying industry, for the influence of canal engineering in its construction, by using inclined planes in a similar way to flights of locks, as the means by which Penrhyn slate was exported from 1801 to the 1870s, and as the design ancestor of the 0.6 metre gauge railway world-wide.

The Penrhyn Quarry Railroad was the first significant overland rail system in north-west Wales, and the first known to connect the slate industry of Wales with national and international markets, where they continued to be built until 1931 (Gwyn 2015, 231-238).

#### Sources

The Penrhyn Quarry Railroad was a subject of considerable interest to engineers and travellers in the early years of its existence. Their accounts, together with archival documents preserved at Bangor University and Gwynedd Archives and later published histories, make it possible to trace its development. The earliest description was written by Benjamin Wyatt in the visitors' book of the Capel Curig Hotel at some time between 21 and 29 October 1803, where he stresses the way that it had benefitted both the quarry and the agricultural economy of the Ogwen valley, by lessening transport costs and by reducing the number of horses required to move slate to the sea, freeing them up for farm work (Gwynedd archives; XM/5171/1). Wyatt wrote this up as an article for the Repertory of Arts and Manufacture in 1803 (Wyatt 1803), which was adapted by an anonymous writer in the Paris Annales des Arts et Manufactures the following year (Anon 12). The Bavarian engineer and physician Joseph von Baader (von Baader 1822, 30) draws on Wyatt 1803 but also describes changes initiated by Wyatt in 1811, including the substitution of flat-top rail castings for the original oval profile in order to allow the wheels to run more freely. Thomas Tredgold similarly draws on Wyatt 1803 (Tredgold 1825, 24-25, 29-30, 45, 99). The Bohemian engineer Franz Anton Ritter von Gerstner, who designed and built the Budweis to Linz horse railway and the Tsarskoye Selo Railway, briefly refers to Anon 12 in his text-book of mechanics and physics, Die Mechanik fester Körper (Gerstner 1831, 602).

Dr Heinrich Spiker, librarian to the king of Prussia, left an account of his visit in 1816 (Spiker 1820, 37), as did Michael Faraday the following year (Tomos 1972, 91). The two Prussian mining engineers, von Oeynhausen and von Dechen, visited it in 1826 or 1827, by which time it had lost most of its novelty (Oeynhausen and Dechen 1829, 130-132). They were unimpressed by its construction and maintenance.

Two historians who published on the railroad were Charles Edward Lee (1901-1983) and James Ian Craig Boyd (1921-2009). Boyd is believed to have access to some of the undertaking's engineering records which are not otherwise available to researchers. Dr Michael Lewis has extensively researched early railway history and has written on the development of early permanent way (Lewis 2003). His unpublished research note *Fish-belly and Flat-bottom: Rails in the Slate Industry of North Wales* was consulted in the preparation of this document.

#### Rail types

Several different types of rail were used on the Penrhyn Quarry Railroad. These were successive replacements reflecting improved technology and the wearing out of earlier equipment. Replacements were not necessarily comprehensive but may have been partial, where particular sections of track had worn out.

They reflect the very rapid evolution of track technology from the late 1790s to the early 1830s, the period when the modern iron railway evolved from earlier forms of wooden waggonway. In particular they demonstrate the move from cast-iron components produced in a foundry to a mixture of materials in which the rails themselves are of wrought iron, produced in a rolling mill. Penrhyn Quarry established its own foundry, at Felin Fawr, but there was no rolling mill in the region.

#### Cast-iron rails

The first rails were designed by Benjamin Wyatt, and were cast-iron, oval in cross-section, and initially dovetailed into wooden sleepers. However, within four years of opening, Samuel Worthington, the Liverpool merchant who was Lord Penrhyn tenant on the estate's grist mills and the flint mill at Penlan (Lill 2019), and who had taken over the running of the railroad, replaced the sleepers on the upper section with sills (a combination in iron of two chairs and a tie-bar) (Bangor University: Penrhyn Further Additional 12/6). These iron sills rested on slate blocks and had a distinctive downward curve on the cross-bar to bed them in the ballast and to avoid causing obstructions for the horses. By 1820 another type of sill, and separate chairs, with semi-circular seatings, had been introduced, which provided intermediate support for the rails. Though these types were superseded by those described below, the inclined planes are believed to have used cast-iron rails until the railroad was dismantled in the 1870s (Boyd 1985, 83-84).

## Wrought-iron T-section rails

In 1832 wrought-iron parallel T-section rails were introduced on the Penrhyn Quarry Railroad, possibly as a complete replacement for the cast-iron track on the horse-worked sections. This was the first use in the region of a track technology which was becoming common in the United Kingdom, continental Europe and the USA, and which had the merit of being easily bent to form curves. The initial examples on the Penrhyn Quarry railroad were 4.572m (15') long, and a later batch of 1842, 7.3152m (24'). They were held in cast-iron sills. When these rails were in turn displaced by wrought-iron flat-bottom rails, they were re-used in the quarry (Boyd 1985, 84-85). By the 1870s, some of these sills had been replaced by chairs on slate sleepers; the railway historian Charles E. Lee described these chairs as 5¼" by 2½" and as held down 'by a centre bolt cast into the chair and two dowels, also cast in the chair' (Lee 1945, 12).

#### Wrought-iron flat-bottom rails

A North American invention that made its way to Britain, wrought-iron flat-bottom rail was first devised for the Camden & Amboy (New Jersey) in 1830 by its President, Robert Livingston Stevens, and was adopted by Charles Blacker Vignoles, who recommended its use on the London & Croydon in 1836 (Vignoles 1889, 200). Its use on the Penrhyn Quarry Railroad appears to have been the first in Wales, in 1849, where it began to displace the T-section (Boyd 1985, 85).

## Discussion

The slate slab itself is evidently a broken railway sleeper, and was an off-cut from the side of a larger slate slab which appears to have been cut by a reciprocating sand-saw, such as were used at the Felin Fawr slab mills.

Of the three main types of rail used on the Penrhyn Quarry Railroad set out above, the best fit for the one it could have supported is the wrought-iron T-section.

The 132mm x 105mm imprint on the slate slab is  $5\frac{1}{4}$ " by  $4\frac{1}{8}$ " in imperial terms, and does not correspond to the  $5\frac{1}{4}$ " by  $2\frac{1}{2}$ " chair-base described by Lee, neither was it attached by a centre bolt cast into the chair and two dowels. However, it is possible that practice had changed, and that the foundry at Felin Fawr had produced more substantial chairs in the light of experience, or that the recovered sleeper had been used at a rail-joint, where two lengths of the T-section rails would have been butt-jointed, and the chair would have been larger.

The suggestion made by GAT 1594, that it was located within a demolition layer from an earlier phase of the railroad, is entirely plausible. It may have been left there when the flat-bottom rail was installed in 1849 or later.

The width of the formation revealed by trench 11, 6.2m, at a location approximately 100m south of the Marchogion inclined plane winding house, leaves open the possibility that this section of the Penrhyn Quarry Railroad was double track, perhaps part of a loop to allow wagons to be marshalled for operation either in a train on the rest of the near-level section or as a shorter run on the inclined plane.

## Conclusion

This artefact has shed light on the regime of maintenance and modernisation of an important early iron railway, showing how practice changed in the light of experience with the innovative but not entirely practical original cast-iron track, leading to the decision to relay with a more effective form of permanent way in the 1830s, followed by a better system still from 1849, reflecting experience gained on the development of railways in England, France and the USA.

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