

# DCWW Dinorwig Wastewater Treatment Works

## Desk Based Assessment



Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



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## Desk Based Assessment

Prosiect Rhif / Project No. G2492

Adroddiad Rhif / Report No.1356

Prepared for: Waterco Ltd

January 2017

Written by: Rob Evans & Stuart Reilly & John Roberts

**\*front cover image: View southeast of assessment area/location of proposed wastewater treatment works;  
scale: 1.0m (archive image: G2492\_012)**

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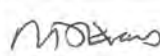


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1	Clarification about Historic Landscape Characterisation Areas	4.1.2	For approval by GAPS
2	Further information about quarries, PRN numbers	4.1.4	For approval by GAPS
3	Referencing	4.1.6	For approval by GAPS
4	Further information about scheme	5.1	For approval by GAPS



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Figure 01: Location map detailing WWTW assessment area (outline red) and assessment features. Based on Ordnance Survey 1:10000 County Series (Sheet SH56). Scale: 1:5000@A4. Crown Copyright. All Rights Reserved. License number AL100020895

Figure 02: Reproduction of DCWW Drawing Now2281-9005, detailing the assessment area. Scale: 1:500@A3.

Figure 03: Reproduction of the 1838 Parish Tithe Map Llanddeniolen. Not to scale.

Figure 04: Reproduction of Vaynol Valuation Sketch 4149 No. 37 (1866). Not to Scale.

Figure 05: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889/90), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.

FIGURE 06: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Second Edition (1900), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.

Figure 07: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.

Figure 08: Reproduction of DCWW Drawing No. w2281-9205-A00

Figure 09: Reproduction of DCWW Drawing No. w2281-9206-A00



## PLATES

Plate 01: View east of assessment area/location of proposed wastewater treatment works; scale: 1.0m (archive image: G2492\_001)

Plate 02: View west of assessment area/location of proposed wastewater treatment works; scale: 1.0m (archive image: G2492\_008)

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Plate 07: Assessment Feature 3 (former farmstead of Tynyrardd) as viewed from the southwest; scale: 1.0m (archive image: G2492\_013)

Plate 08: Assessment Feature 3 (former farmstead of Tynyrardd) as viewed from the southeast; scale: 1.0m (archive image: G2492\_014)





## 1 NON-TECHNICAL SUMMARY

*Gwynedd Archaeological Trust has been commissioned by Waterco Ltd to undertake an archaeological assessment in advance of a proposed wastewater treatment works at Dinorwig, Gwynedd.*

*The archaeological assessment identified that the landscape around the proposed development area was characterised by industrial settlement for Dinorwic quarry workers, regulated by the Vaynol estate and represented by small parciau (enclosures) each supporting a cottage, and some larger sheepfolds. The development area itself was characterised by natural water channels, visible on the surface as sinuous lines bifurcating the field, with outcrops of rushes dotted along the channels. The presence of the school and Dinorwig Chapel close by was due to the needs of the expanding industrial population of the area in the late 18<sup>th</sup> and 19<sup>th</sup> centuries. There was also evidence for an agricultural landscape that had undergone improvement in the 18<sup>th</sup> and 19<sup>th</sup> centuries, of which the former farm of Tynyrardd and its associated fields and structures is a good example.*

*Five features were identified during the assessment, all of post-medieval date; for all of these sites either there will be no impact from the scheme, or avoidance is recommended. In one case, a drystone wall of possible 18<sup>th</sup> century or earlier date, basic recording was recommended if any impact upon it takes place. No surface features suggested the presence of any further unidentified archaeological features.*

*Whilst no evidence for prehistoric or medieval archaeology has been encountered, and the evidence from the geotechnical test pitting suggests that its presence is unlikely in the development area, there remains the possibility of the recovery of some archaeological information. There is therefore a general recommendation that a **partial watching brief** be carried out during the groundworks for the wastewater treatment scheme.*

## 2 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been commissioned by *Waterco Ltd* to undertake an archaeological assessment in advance of a proposed wastewater treatment works (WWTW) at Dinorwig, Gwynedd (NGR SH58746145; Figure 01). The designated area measures 1010m<sup>2</sup> and is located within a large irregular shaped field close to Capel Dinorwig. The scheme is located within the area specified in DCWW Drawing No. w2281-9005-L04 (Figure 02) and the specific design of the WWTW is detailed in DCWW Drawing No. w2281-9205-A00 (Figure 08) and w2281-9206-A00 (Figure 09).

The WWTW will encompass an area c.20m wide by c.20m long, with the infrastructure located in an area c.15m wide and c.18m long. The infrastructure will be set within a reduced area and comprise the following:

- a retaining wall;
- a concrete internal access road;
- an internal access road an olive green biodisc treatment plant;
- a sample chamber;
- a dark green 1.6m high control kiosk; and
- a dark green 1.51m high wash water kiosk.

A timber stock proof fence will enclose the WWTW area within the existing field. Site access will be from an existing local road, which will be improved, with the existing hardcore track resurfaced with tarmac. The northern boundary wall for the road will be breached to accommodate an entrance into the WWTW, rebuilt using existing stone, as will designated lengths of the road boundary wall. The existing internal field boundary wall will not be modified. As specified on DCWW Drawing No. w2281-9205-A00 (Figure 08) and w2281-9206-A00 (Figure 09) the construction of the WWTW will involve the reduction of the existing sloping ground level. Elevations B, C and D on DCWW Drawing No. w2281-9206-A00 (Figure 09) indicate a ground reduction of over 2.5m at the deepest point, resulting in the WWTW sitting in a hollow.

The assessment has been undertaken in accordance with guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014). Submission of digital information to the Royal Commission on the Ancient and Historical Monuments of

Wales has been undertaken in accordance with the RCAHMW Guidelines for Digital Archives Version 1 (2015).

The assessment has been monitored by the Gwynedd Archaeological Planning Services (GAPS) and a project specific design prepared by GAT has been approved by GAPS (cf. Appendix I).

Gwynedd Archaeological Trust is certified to ISO 9001:2008 and ISO 14001:2004 (Cert. No. 74180/A/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).

### 3 METHODOLOGY

#### 3.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment included a study of the following resources:

1. The regional Historic Environment Register (HER, Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, Gwynedd LL57 2RT) was examined for information concerning the study area. This included an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. A list of archaeological assets was prepared for the report using information from the HER; this included information sourced from within a **50m assessment buffer** surrounding the designated area, to examine any potential physical impact. The location and impact of the proposals on statutory and non-statutory designated areas was also examined. This information has been used to prepare a gazetteer and incorporate information from the walkover survey;
2. The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) was checked for sites additional to the HER;
3. On-line catalogue search of the National Library of Wales;
4. Archive data, including primary and secondary sources, historic maps and estate maps were examined at the regional archives (Gwasanaeth Archifau Gwynedd, Cyngor Gwynedd, Caernarfon LL55 1SH) and at the Bangor University Department of Manuscripts (Bangor University, Bangor, Gwynedd, LL57 2DG).
5. Aerial photographs from the National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) were examined for potential features;
6. Light Detection and Ranging (LiDAR) data was examined from the Lle Geo-Portal at <http://lle.gov.wales/home> digital terrain modelling and information on potential surface

features. This included LiDAR Composite Dataset DSM Version 1m (ref. sh5861\_dsm\_1m) and LiDAR Composite Dataset DTM Version 1m (ref. sh5861\_dtm\_1m).

### **3.2 Walkover Survey**

Part of the assessment involved a walkover of the study area, as defined in Figures 01 and 02; the aim of this stage of the work was to:

- verify the results of the desktop study.
- identify any further archaeological sites which may exist as above ground features
- photograph and record the present condition of all sites noted.

The walkover survey was completed on 23/01/2017. A photographic record was maintained in RAW format using a digital SLR set to maximum resolution (Nikon D3100; resolution: 4608 × 3072 [14.1 effective megapixels]) and a photographic metadata table was completed for archiving (G2492\_001 to G2492\_014; q.v. Appendix II). A total of 14 photographic images were archived in TIFF format.

### **3.3 Gazetteer of features**

A Gazetteer of features has been compiled for identified sites within and within proximity of the WWTW are, based on information sourced from the regional HER and the walkover survey; the gazetteer includes:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Impact
10. Recommendation for further assessment/evaluation
11. Recommendation for mitigatory measures

### **3.4 Data processing and report compilation**

A copy of this report will be sent to the client and to Gwynedd Archaeological Planning Services. It will be to the Historic Environment Record located at the Gwynedd Archaeological Trust. Submission of digital information to the Royal Commission on the Ancient and Historical Monuments of Wales will be undertaken in accordance with the RCAHMW Guidelines for Digital Archives Version 1 (2015). Digital information will include the photographic archive and associated metadata.



## **4 RESULTS**

### **4.1 Desk based assessment**

The WWTW scheme is located within an area characterised by post-medieval agricultural and industrial activity as represented by local slate quarries and the settlement of Dinorwig. This assessment considers these in relation to the local industry and landscape and how this is reflected in the archaeological record.

#### *4.1.1 Location and geological summary*

The hills of Moel y Ci and Parc Drysgol are composed of lavas and related rocks of the Pre and Early Cambrian period. This forms part of the Padarn Ridge running from Bethesda to Penygroes, including those of the Padarn Tuff Formation. Immediately to the south-east are of much greater economic importance as these are slates (Smith and George, 1961), exploited in the Ogwen valley by the Penrhyn Quarry and in Nant Peris by the Dinorwic Quarry. These are formed by Green mudstones of the Llanberis Slates Formation.

The hard geology has been much eroded and shaped by glaciation. This formed the major valleys and the small corries in which the Marchlyn lakes developed. On the more level ground and in the valleys gleyed soils have developed over the boulder clay, with podsolised soils on the better drained slopes (Ball 1963). The vegetation is restricted to heather and rough grass on the hills and a rich marshland community built on peat within the boggy plateau. The soils to the east of the study area are typical Brown Earths of the Denbigh 1 Association, changing to Cambic Stagnogley soils of the Cegin Association to the west of the Afon Galedffrwd (Soil Survey of England and Wales 1980).

#### 4.1.2 Statutory and non-statutory designations

There are no sites with statutory designations within the study area and a 50m buffer zone around it. The nearest Scheduled Monument is the Vivian Slate Quarry, Inclines Walls and associated structures, which lies 690m to the south. The nearest Listed Building is Ty'n Fawnog Bryn, which lies 310m to the north northwest of the study area, and is a Grade II listed building (Ref: 22642). The site is located within the Dinorwig *Landscape of Outstanding Historic Interest in Wales* (Ref: HLW (Gw) 6; Cadw/ICOMOS 1999, 88-91), which is described as 'a low coastal plateau...containing evidence of land use and settlement from the prehistoric period onwards, superimposed by recent extensive and outstanding remains of the 19<sup>th</sup> and 20<sup>th</sup> centuries slate industry' (*ibid.*, 91).

The site is located within the Historic Landscape Characterisation Area of Gwaen Gynfi (Area 42). It lies 55m southeast of the Allt Ddu Historic Landscape Characterisation Area (Area 8), which is concerned with the adjacent industrialised quarrying landscape. The Gwaen Gyfni landscape area is characterised by industrial settlement for Dinorwic quarry workers, regulated by the Vaynol estate and represented by small parciau (enclosures) each supporting a cottage, and some larger sheepfolds, contrasting with the industrialised Allt Ddu Landscape.

#### *4.1.3 Environmental remains and soil morphology*

The results from the three trial holes excavated at the site (GAT Report no. **1360**) confirmed the initial impression at surface level of a semi-improved field that saw limited agricultural use, with. There was no evidence that it was used for cultivation and appears to have been used for pasture. Whilst the surface conditions suggested potential for sealed waterlogged/organic deposit, these were not encountered and the topsoil directly sealed the glacial horizon; the presence of clay in the glacial horizon provided explanation for the presence of wetland areas across the field, due to more limited the permeability of the below surface deposits.

In these circumstances, the potential for the survival of environmental remains is considered to be low to moderate, with some potential for the identification of peat deposits. In the event of peat deposits being encountered, a sampling strategy would need to be adopted to enable the material to be studied for palaeoenvironmental remains. The survival of plant macrofossils in the topsoil deposits identified is thought to be low.

#### *4.1.4 Historical and archaeological background, with cartographic evidence*

In the wider Dinorwig valley, considerable evidence for late prehistoric land use, settlement and for medieval land holdings has survived. However these tend to have been superimposed by the extensive 19<sup>th</sup> and 20<sup>th</sup> century industrial landscapes. The evidence for late prehistoric landscape organisation is not well preserved, and only the massive robust settlement sites tend to survive, although there is evidence for many such sites. The best example of this is the late prehistoric multivallate hillfort of Dinas Dinorwig (PRN 5; SH54976530). Whilst not much archaeology recorded close to the study area itself, to some extent this reflects the fact that there's been no previous archaeological study in the area and as there is prehistoric and medieval archaeology in the wider locality, there is potential for further surviving remains in undisturbed ground.

By the late 16<sup>th</sup> century the Vaynol estate was the principal landowner in the area and ruthlessly consolidated its interest by the acquisition and extinction of the remaining medieval bond hamlets in the area (Barnes 1970). From the mid-18<sup>th</sup> century, following a period when they were in poor condition, tenancies were remodelled as they fell vacant, and the estate was improved and expanded by the enclosure of common land. From the 1850s capital was spent on estate improvements and plantations (Cadw/ICOMOS 1999, 90). It is in this context that the holdings around the study area were developed, including Tynyrardd (PRN 25,629). The Gwaen Gyfni landscape area (PRN 15,685) is characterised by industrial settlement for Dinorwic quarry workers, regulated by the Vaynol estate and represented by small parciau (enclosures) each supporting a cottage, and some larger sheepfolds. The study area fits closely within this pattern. This contrasts with the very close by industrialised landscape of Allt Ddu (PRN 15,834). Much of this area was very extensively landscaped between 1982 and 1988, after initial design work completed in 1976. This involved bulldozing slate rubble into the quarry pits, grading the whole area and covering surfaces with crushed waste, as a result of which nearly all the quarry features were lost.

There are a limited number of known archaeological receptors within the immediate study area, as identified on the Gwynedd Historic Environment Record. There are no prehistoric or medieval archaeological sites within the study area or the 50m buffer zone around the development area. Post medieval sites include Capel Dinorwic (PRN 62,526) located in the immediate vicinity of the scheme, the former Chwarel Fawr slate quarry (PRN 20,088), centred 213m to the northeast of the study area, and the former Allt-ddu slate quarry (PRN 20,089), lies 500m to the southeast. Chwarel Fawr, with its outlier quarries, run by the Vaynol estate, was the second largest quarry in the area after Penrhyn. It covered almost

the whole of the lower slopes of the Elidir Mountain in an interlinked pattern of gallery workings and deep pits connected by tunnels and inclines, many still retaining their winding drums and gear. The tip levels display the remains of many mills and other buildings, some still containing machinery (Davidson *et al.* 1994, 20).

The first documentary reference to the development area is in a lease of the premises of Tynyrardd by the Vaynol estate to Jabez Williams and Thomas Roberts of Tynymynydd in Llanddeiniolen on 8<sup>th</sup> August 1832 (Gwynedd Archives, X/Vaynol 320). The origin of the farm of Tynyrardd (PRN 25,629) is not known, but it is likely to have its origins in the late 18<sup>th</sup> or early 19<sup>th</sup> century. The land on which it stands is known to have been in the hands of the Vaynol estate from the 18<sup>th</sup> century. The field in which the development is located is shown on the 1838 tithe map of the parish of Llanddeiniolen as forming part of the large holding number 198 (Figure 03). This is described on the apportionment as *Glan y Bala, Hafotty etc.*, and covered an area of 315 acres 1 rood 15 perches. It was owned by Thomas Assheton Smith of Vaynol and occupied by Ellis Griffith Johnes. It is possible that some of the parcels of land seen in the area now had not been created by then, but it is much more likely that the area was not sub-divided into all its holdings as part of the tithe apportionment because all the land was owned by the vast Vaynol estate, and sub-dividing was not required for taxation purposes. Certainly all the field boundaries and buildings present at that time are not shown, as Tynyrardd (PRN 25,629) is known to have been in existence in 1832.

The earliest detailed and fully surveyed map evidence for the area identified comes from a Vaynol estate survey of 1866 (Gwynedd Archives, X/Vaynol/4149; Figure 04). The field including the development area is shown as A8, and includes the property known as Tynyrardd (Plates 07-08). This is the now ruined building north west of the development area (PRN 25,629), and includes a probable attached outbuilding. The map also shows that this property had a small garden to the south of it, with a probable privy in its south-east corner (A7). There is also a small freestanding building to the east of the farmhouse, the function of which is unknown (PRN 62,528). The wall at the eastern boundary of A8, has a sinuous course, suggesting an earlier date than the other field boundaries in the area (PRN 62,529; Plate 04). Dinorwig Chapel and the school are also clearly shown to the west of a short and narrow lane (PRN 62,526 -62,527). Dinorwig Methodist Chapel was built in 1833 and rebuilt in 1844 in the Classical style of the gable entry type (*Coflein*, NPRN 6940; Plate 02).

The schedule of the fields around Tynyrardd shown on the 1866 map is given below in the schedule associated with it (Gwynedd Archives, X/Vaynol/4081), with the field numbers being those shown on the map (Figure 04).

<b>Number on the Plan</b>	<b>Name of Tenant</b>	<b>Description of Parcel</b>	<b>State of Cultivation</b>	<b>Quantity</b>
A7	William Thomas Morgan	House and Garden		14p
A8		Rardd	Meadow	1a 0r 3p
A9		Weglodd	Meadow	3r 4p

The first to third edition Ordnance Survey 1-inch to 25-mile County Series maps of the area published in 1889/90, 1900 and 1914 respectively (Sheets XVI.04, XVI.08, XVII.05 and XVII.01; Figures 05 to 07). The field systems shown are also predominantly the same as those shown in 1866. Little change is shown with the buildings noted above still being present, and the maps detail a field system and industrial layout which is also similar to the present day map (Figure 01). This reflects the well-established nature of the Vaynol Estate lands and industry by this time. The specific fields encompassed by the proposed WWTW are the same layout as the present day. The main difference is the farm to the north northwest, which is named Bethlemouth in 1866, had changed to Gelliody by 1889. There is also evidence of quarry expansion, which continued into the 20<sup>th</sup> century.

#### *4.1.5 Artefact potential*

The potential for the survival of medieval or earlier artefacts is considered to be low. There are no identified prehistoric, Roman or medieval sites in the vicinity, and there is only shallow topsoil. There is moderate potential for the presence of post medieval artefacts relating to the settlement in the area, particularly around the former farmstead of Tynyrardd.

#### *4.1.6 Aerial photographs and LiDAR*

The LiDAR Composite Dataset DSM Version 1m (ref. sh5861\_dsm\_1m) and LiDAR Composite Dataset DTM Version 1m (ref. sh5861\_dtm\_1m) were examined for further archaeological evidence. No new archaeological sites were identified in the study area or the 50m buffer zone around it that had not been identified by other sources. Surface features, in the form of natural drainage channels and other natural topographic features were identified. Aerial Photograph ADAS Film 452 frame 241 taken on 1<sup>st</sup> May 1990 shows the landscape as it is today, showing small semi-improved pasture fields and paddocks along with dispersed settlement, adjacent to the former quarry workings. No additional information was obtained through the examination of aerial photograph.



## **4.2 Walkover survey**

The walkover survey was completed on 23/01/2017; conditions were clear and dry. The proposed WWTW is located within a large irregular shaped field east of a former chapel and schoolhouse (Figure 01). The field comprises semi-improved pasture and slopes to the east and south, with drystone walls forming the boundary lines (Plates 03 and 04). The views to the east and south include the Allt-Ddu quarry landscape. The field was characterised by natural water channels, visible on the surface as sinuous lines bifurcating the field, with outcrops of rushes were dotted along the channels. No surface features indicative of additional archaeological activity were identified and archaeological activity was limited to known features, including the boundary walls and the former farmstead of Tynyrardd (Plates 07 and 08). The garden walls south of the farmstead were present as a disparate line of stones,

### 4.3 Gazetteer of features

The features listed below (located on Figure 01) were identified during the analysis of the cartographic evidence and field visit at Dinorwig WWTW, with recommendations for further assessment and mitigatory measures, where appropriate. The use of (C) in the grid reference indicates that the reference given is the central point of linear or larger more complex features; (A) indicates an approximate location. Definitions of the categories used and impact assessments are given in Appendix IV.

*NB: The archaeological recommendations reflect the information currently provided by the client; any change to the scheme may require the recommendations to be reconsidered.*

#### **FEATURE 1 (PRN 62,526; NPRN 6940; Plate 02)**

**Site Name:** Former Capel Dinorwig

**Grid reference:** SH58726148

**Period:** Post-medieval

**Category:** B

**Impact:** None

**Description:** Dinorwig Methodist Chapel was built in 1833 and rebuilt in 1844 in the Classical style of the gable entry type. It is rendered externally, and has undergone modifications in recent times, having been converted into a dwelling and guest house accommodating up to 15 people.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None

**FEATURE 2 (PRN 62,527; Plate 02)**

**Site Name:** Former School House

**Grid reference:** SH58746147

**Period:** Post-medieval

**Category:** C

**Impact:** None

**Description:** A former school house of mid-19<sup>th</sup> century date. It is now a private dwelling, but is shown on the 1866 estate map as a school building (Figure 04).

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** None

### **FEATURE 3 (PRN 25,629); Plates 07-08)**

**Site Name:** Former Tynyrardd and garden to the south

**Grid reference:** SH58776149

**Period:** Post-medieval

**Category:** C

**Impact:** Unlikely

**Description:** The former farmstead of Tynyrardd is located to the northwest of the development area. It consists of two elements, the farmhouse to the west and agricultural buildings attached to it to the east. The farmhouse is of large local rubble stone construction, with the entrance facing south, without any evidence for the use of cut slate. The outbuilding consists of rubble stone build, with some cut slate, particularly in the lintels, and is about 2.5m high to eaves level. This suggests that the farmhouse is of an earlier date than the farm building, possibly late 18<sup>th</sup> or early 19<sup>th</sup> century. The farm building is likely to be of 19<sup>th</sup> century date. The farm holding is recorded in the historic record as being leased by the Vaynol estate in 1832 (Gwynedd Archives; X/Vaynol/320), so must predate this in origin.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** Avoidance

#### **FEATURE 4 (PRN 62,528)**

**Site Name:** Building to the east of Tynyrardd

**Grid reference:** SH58806147 (A)

**Period:** Post-medieval

**Category:** E

**Impact:** Unlikely

**Description:** A former small building, approximately 7m by 4m and orientated northeast southwest is noted on the historic mapping at this location, starting with the Vaynol estate map of 1866 (Figures 04 to 07). It is of unknown date and function, but was probably a former outbuilding associated with Tynyrardd which lies to the west. It lies to the north of the development area and it unlikely to be encountered as part of the development works.

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** Avoidance

## **FEATURE 5 (PRN 62,529; Plate 04)**

**Site Name:** Sinuous drystone wall to the east of the development area

**Grid reference:** SH58776142 to SH58086146 (C)

**Period:** Post-medieval

**Category:** B

**Impact:** Unlikely

**Description:** The field boundary wall is up to 1m high and 0.8m wide and consists of random fieldstone rubble of medium to large sized angular and irregular blocks. The wall is cut through by the boundary wall to the lane to the south, and has a sinuous course as it heads northwards. This morphology suggests that it is earlier in date than the surrounding boundaries, possibly 18<sup>th</sup> century or earlier in date. It appears to predate the current pattern of settlement and fields in the area. It is now somewhat collapsed, with hawthorn growing adjacent to it. It is shown on the 1866 Vaynol Estate map following its sinuous course (Figure 04).

**Recommendations for further assessment:** None

**Recommendations for mitigatory measures:** Avoidance, or basic recording along with a drawn section through any breach in the wall.

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusion**

The archaeological assessment identified that the landscape around the proposed development area was characterised by industrial settlement for Dinorwic quarry workers, regulated by the Vaynol estate and represented by small parciau (enclosures) each supporting a cottage, and some larger sheepfolds. The presence of the school and Dinorwig Chapel was due to the needs expanding industrial population of the area in the late 18<sup>th</sup> and 19<sup>th</sup> centuries. There was also evidence for an agricultural landscape that had undergone improvement in the 18<sup>th</sup> and 19<sup>th</sup> centuries, of which the former farm of Tynyrardd and its associated fields and structures is a good example (Features 3 and 4). Some elements, such as the eastern field boundary (Feature 5) are probably remnants of an earlier settlement pattern.

The area of the development itself was noted to be within a semi-improved field, with evidence of small patches of surface wetland, and natural drainage running downslope. Geotechnical test pitting has demonstrated that the topsoil is never more than 400mm deep, and overlies a glacial stony clay. No evidence of prehistoric or medieval archaeology was encountered in the assessment.

The scheme is located within the area specified in DCWW Drawing No. w2281-9005-L04 (Figure 02) and the specific design of the WWTW is detailed in DCWW Drawing No. w2281-9205-A00 (Figure 08) and w2281-9206-A00 (Figure 09). The proposed WWTW will encompass an area c.20m wide by c.20m deep, with the infrastructure located in an area c.15m wide and c.18m long. The infrastructure will be set within a reduced area and comprising a retaining wall, a concrete internal access road, an olive green treatment plant, a sample chamber, a dark green 1.6m high control kiosk; and a dark green 1.51m high wash water kiosk. A timber stock proof fence will enclose the WWTW area within the existing field. Site access will be from the existing lane to the south which will be improved, with the existing hardcore track resurfaced with tarmac. The northern boundary wall for the road will be breached to accommodate an entrance into the WWTW, rebuilt using existing stone, as will designated lengths of the road boundary wall. The construction of the WWTW will involve the reduction of the existing sloping ground level and the elevations B, C and D on DCWW Drawing No. w2281-9206-A00 (Figure 09) indicate a ground reduction of over 2.5m at the deepest point, resulting in the WWTW sitting in a hollow. This will mean that the built structures within the WWTW will not be any higher than the original ground slope and will

reduce the visibility of the WWTW within the wider landscape. The use of sympathetic materials for the walling, including existing materials, and muted colours for the treatment plant and kiosk are designed to minimise its impact on the landscape.



## 5.2 Table of sites and recommendations

No.	PRN	Name	Impact	Recommendations for Further Assessment	Recommendations for Mitigatory Measures
1	62,526	Former Capel Dinorwig	None	None	None
2	62,527	Former School House	None	None	None
3	25,629	Former Tynyrardd Farmhouse	Unlikely	None	Avoidance
4	62,528	Building to the east of Tynyrardd	Unlikely	None	Avoidance
5	62,529	Sinuous drystone wall	Unlikely	None	Avoidance, or basic recording

The site specific recommendations are noted above, which recommend avoidance for three sites. In the case of any impact upon these features being required, further mitigatory measures would be needed. This is most likely in the case of Feature 5, where basic recording, along with a section through the wall being drawn if the wall is breached, will be required.

Whilst no evidence for prehistoric or medieval archaeology has been encountered, and the evidence from the geotechnical test pitting suggests that its presence is unlikely in the development area (Evans and Roberts 2017), there remains the possibility of the recovery of some archaeological information. It is therefore recommended that a **partial watching brief** be carried out during the groundworks for the WWTW scheme.

## **6 ACKNOWLEDGEMENTS**

Jenny Emmett of GAPS is thanked for her guidance and assistance with this project.

## 7 SOURCES CONSULTED

### 7.1 Primary Sources

Tithe Map of the Parish of Llanddeiniolen

ADAS Aerial Photography Unit, Cambridge

Aerial Photograph, Film 452 frame 241 taken on 1<sup>st</sup> may 1990

Gwynedd Archives, Caernarfon

X/Vaynol/320 Assignment of a lease of premises called Tynyrardd in the Parish of Llanddeiniolen, dated 8<sup>th</sup> August 1832

X/Vaynol 4149 Estate Map for Valuation Purposes of the Vaynol Estate in the Parish of Llanddeiniolen, dated to 1866

X/Vaynol/4081 Schedule of the above *Vaynol Estate in the parish of Llanddeiniolen No.1 South part*, dated to 1866

### 7.2 Secondary Sources

Barnes, F.A. 1970 'Settlement and Landscape Changes in a Caernarvonshire Slate Quarrying Parish', in R.H. Osborne, F.A. Barnes and J.C. Doornkamp (eds.) *Geographical Essays in Honour of K.C. Edwards*, 119-130 (Nottingham)

Cadw/ICOMOS 1999 *Landscapes of Historic Interest in Wales. Part 2.1 Landscapes of Outstanding Historic Interest*

Davidson, A., Jones, G.P. and Gwyn D. Rh., 1994 *Gwynedd Quarrying Landscapes. Slate Quarries (G1107)*. Unpublished GAT Report No. **129**

DCWW Drawing No. w2281-9005-L04

DCWW Drawing No. w2281-9205-A00

English Heritage, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*.

English Heritage, 1991, *Management of Archaeological Projects*

Evans, R. and Roberts, J. 2017 *DCWW Dinorwig Wastewater Treatment Works. Archaeological Watching Brief*. Unpublished GAT Report No. **1360**

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889 & 1890)

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Second Edition (1900)

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914)

Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*

*Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014).

## **APPENDIX I**

**Reproduction of Gwynedd Archaeological Trust project design for an archaeological assessment (January 2016).**

## **APPENDIX II**

### **Photographic Metadata**

## **Appendix III**

### **Definition of terms**

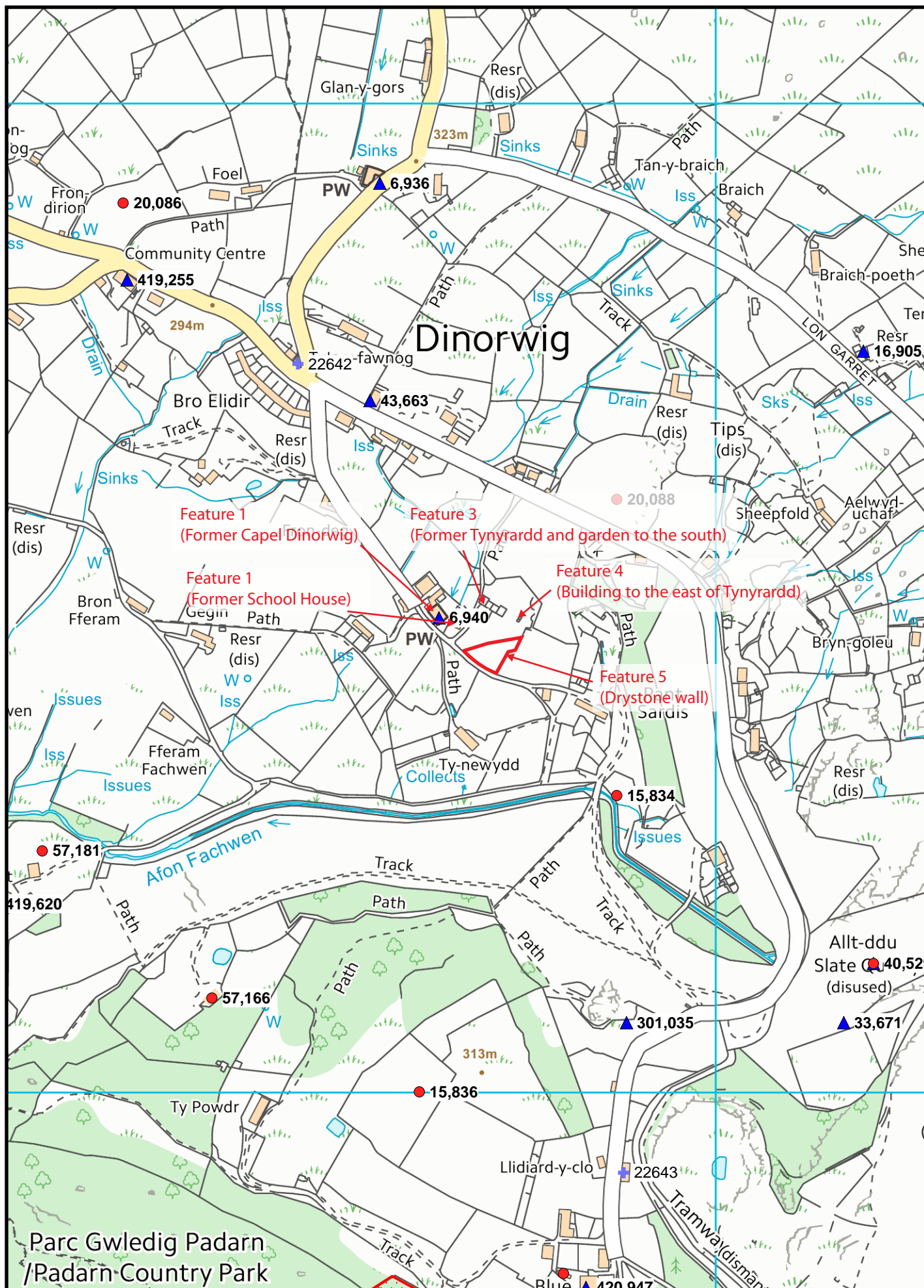
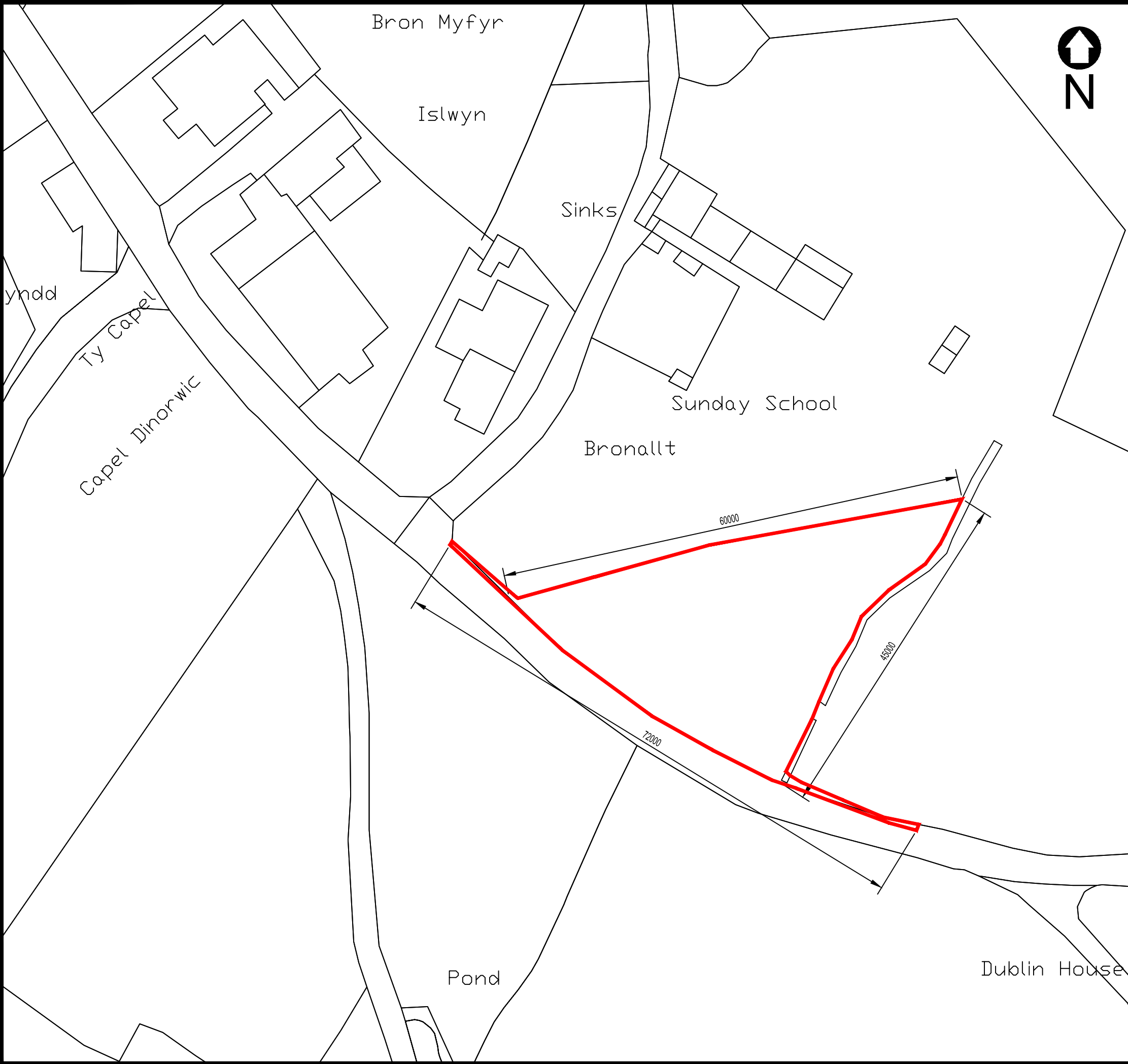


FIGURE 01: Location map detailing WWTW assessment area (outline red), assessment features and known archaeological activity. Based on Ordnance Survey 1:10000 County Series (Sheet SH56). Scale: 1:5000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.





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Based from the Ordnance Survey 1:1250 maps of various dates with the permission of the controller of Her Majesty's Stationery Office. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or Civil proceedings.  
© CROWN COPYRIGHT

**OWNER**  
DILYS WILLIAMS  
BRON EILIAN  
DINORWIC  
CAERNARFON  
LL55 3ES

**LEGEND**  
 LAND TO BE ACQUIRED = 1010m<sup>2</sup> APPROXIMATELY

N.G.R. 258750, 361453

SCALE 1 : 1000 AT A3

m 20

0

20

40 m

L04	WORKING AREA REMOVED	RWP	DRD	KJP	23.01.17
L03	LAND AREA CHANGE	VJ	DRD	KJP	05.12.16
L02	REVISED LAN BOUNDARY	VJ	DRD	KJP	02.12.16
L01	REVISED SITE LOCATION	VJ	DRD	KJP	23.10.16
L00	FIRST ISSUE	VJ	DRD	KJP	31.08.16
Rev.	Nature of Revision	Drawn	Chkd.	Appd.	Date

NOTICE PLAN



DINORWIC CHAPEL WWTW

WwTW AT DINORWIC CHAPEL

Drawn	Checked	Approved	Date
VJ	DRD	KJP	31.08.16
 <small>Waterco Ltd., Eden Court, Ruthin LL15 1NJ Tel: (01824) 702220 www.waterco.co.uk</small>			Scale: 1 : 500 AT A3
			Drawing No. w2281-9005

FIGURE 02: Reproduction of DCWW Drawing No 2281-9005, detailing theassessment area. Scale: 1:500@A3.



Figure 03: Reproduction of the 1838 Parish Tithe Map Llanddeniolen. Not to scale.





Figure 04: Reproduction of Vaynol Valuation Sketch 4149 (1866). Not to Scale.  
Source: Gwasanaeth Archifau Gwynedd, Cyngor Gwynedd



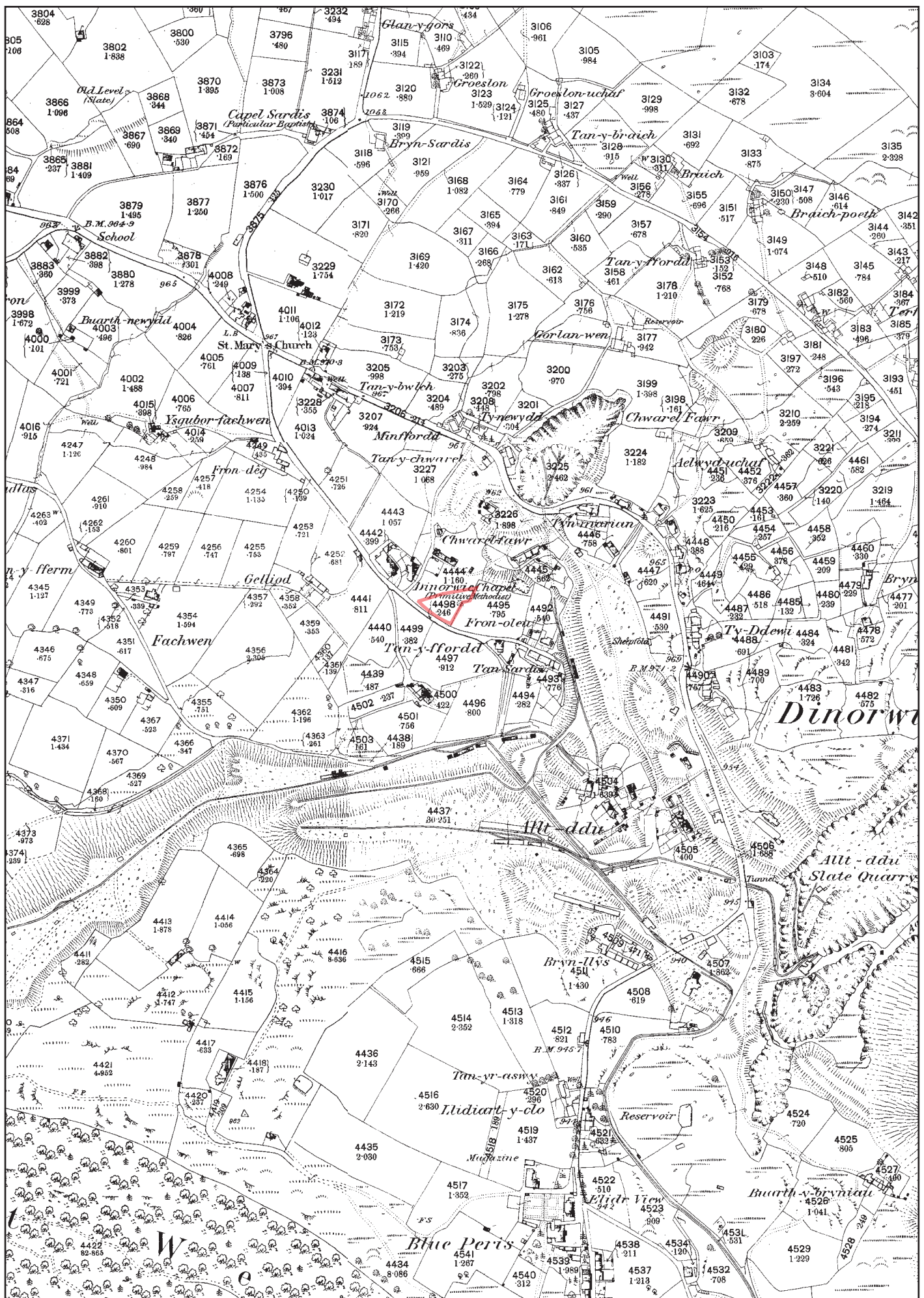


FIGURE 05: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889/90), including WWTW assessment area (outlined in red).

Scale: 1:5000@A4.

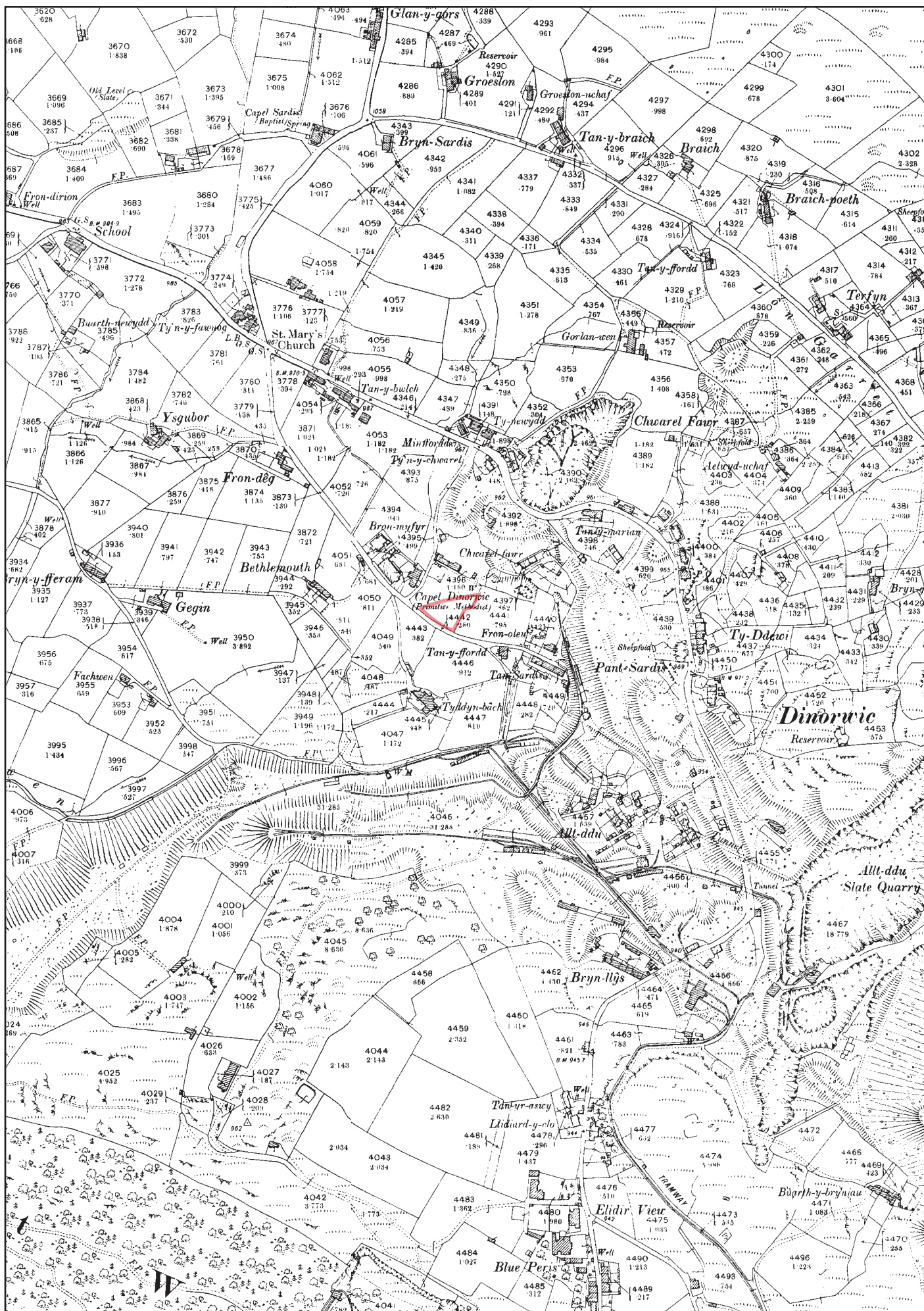


FIGURE 06: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Second Edition (1900), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.



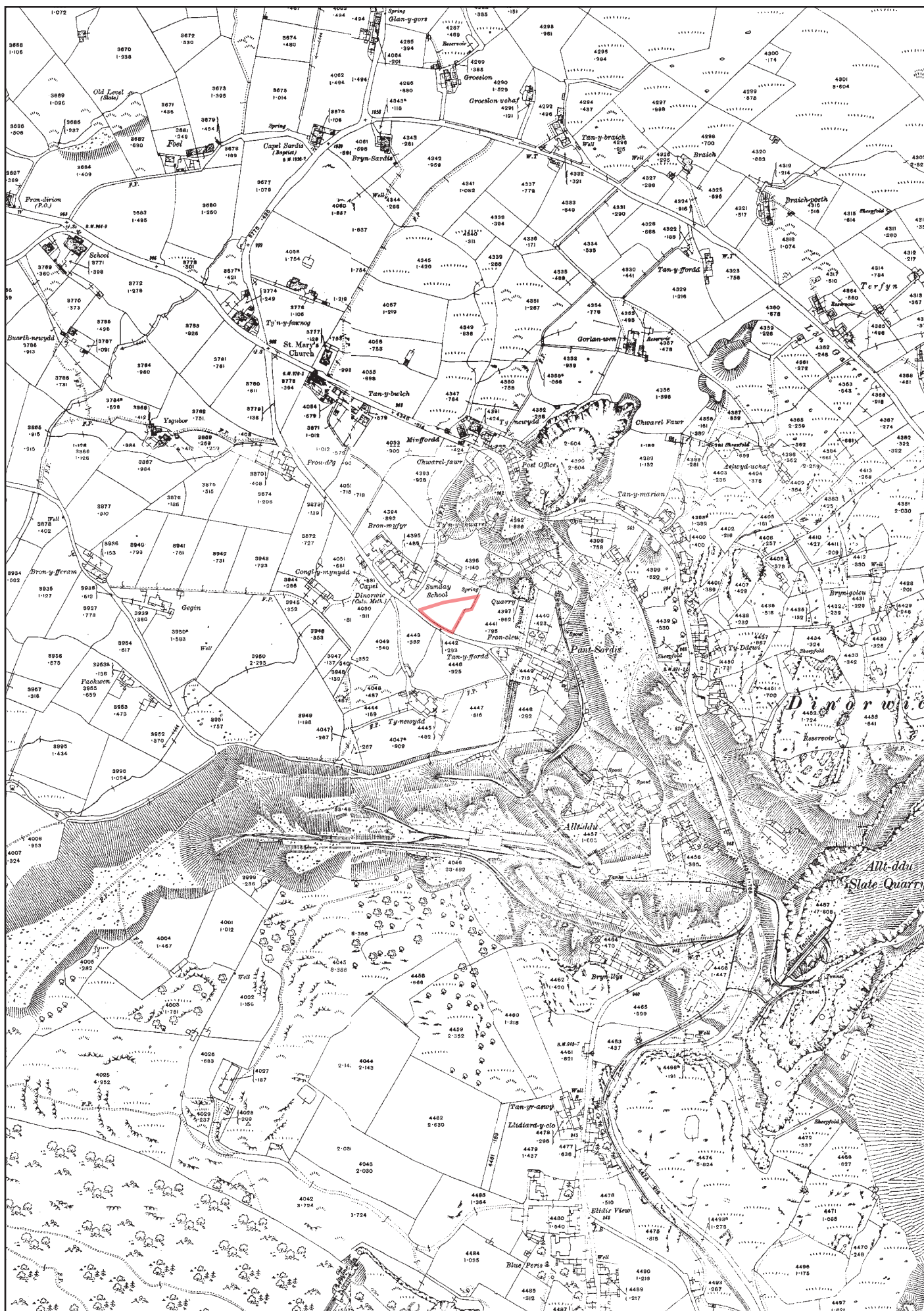
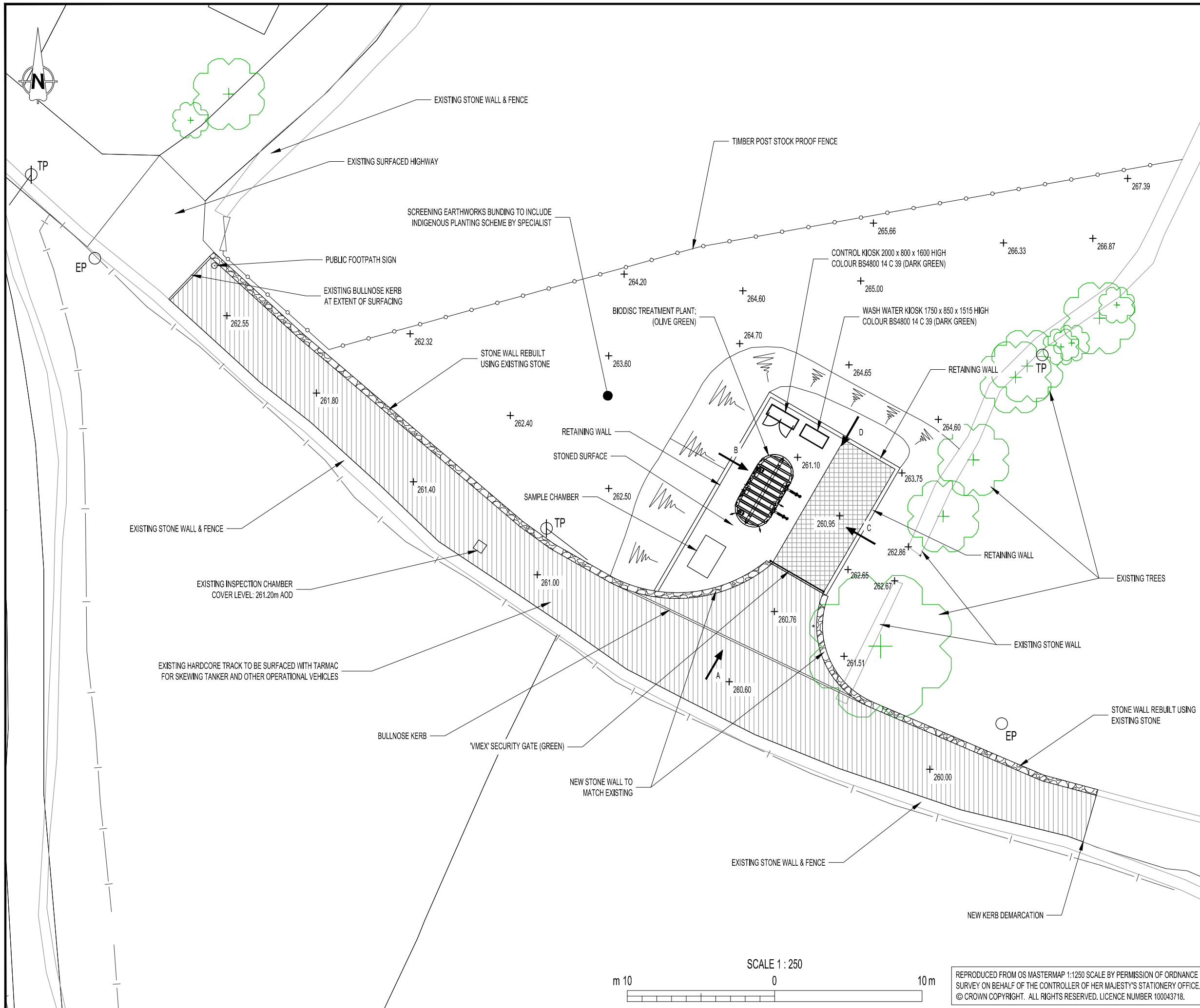


FIGURE 07: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.



- NOTES
- ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS SHOWN OTHERWISE.
  - REFER TO DRAWING NO. w2281-9206 FOR PROPOSED ELEVATIONS.

KEY

	CONCRETE SURFACE
	TARMAC SURFACE
	STOCK PROOF FENCE
	PROPOSED LEVEL (APPROX.)

SITE LOCATION  
GRID REFERENCE: 258775 361430  
SITE ADDRESS: DINORWIG, CAERNARFON, LL55 3ER

A00	19-12-16	FIRST ISSUE	EO	KJP	TM
REV.	DATE	DESCRIPTION	DSGND	CHK'D	APP'D

CLIENT

PRINCIPAL DESIGNER  
DŴR CYMRU WELSH WATER

Waterco Ltd., Eden Court,  
Lon Parcwr Business Park, Ruthin LL15 1NJ  
tel (+44) 1824 702220  
www.waterco.co.uk

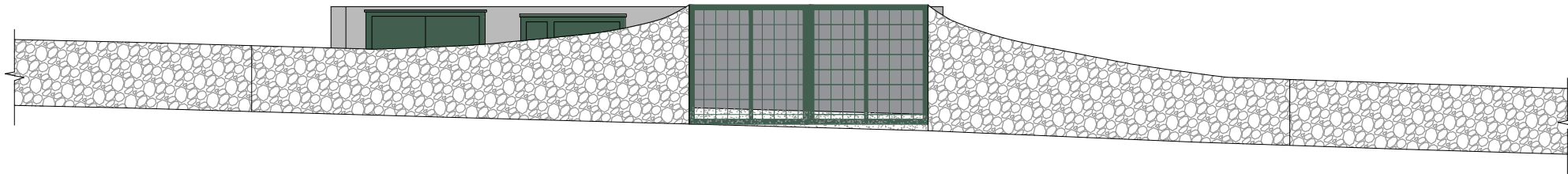
SCHEME  
DINORWIG CHAPEL WwTW

TITLE  
PROPOSED SITE LAYOUT PLAN

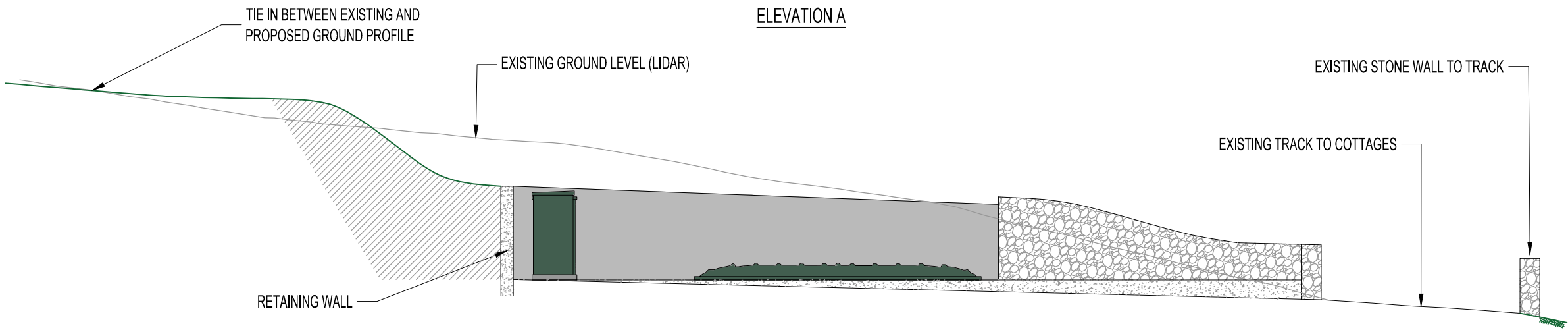
STATUS  
PLANNING APPLICATION

DESIGNED EO	CHECKED KJP	APPROVED TM	SCALE / SHEET SIZE 1:250 / A3
DRAWING NO. w2281-9205			REV A00

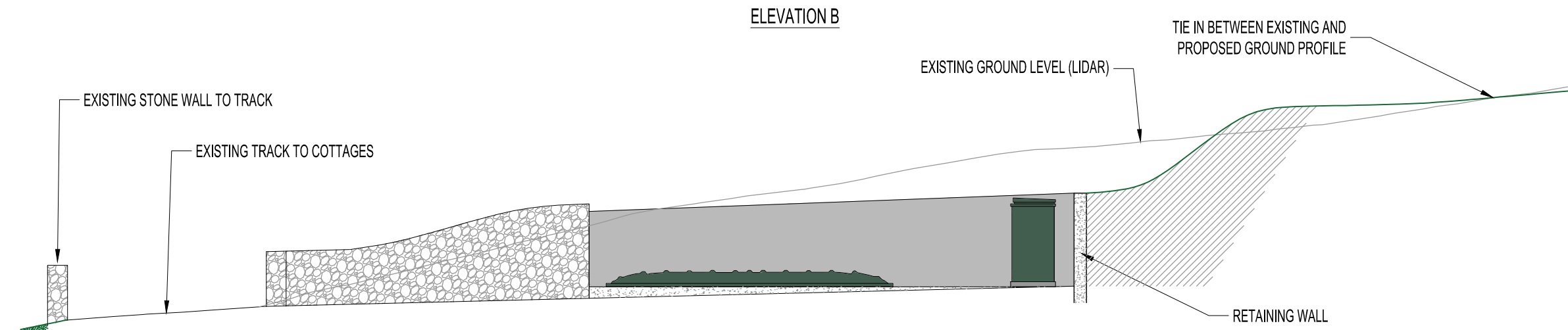




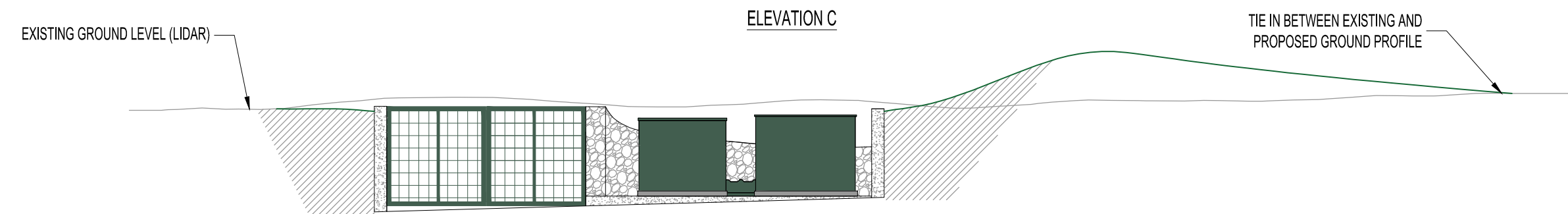
ELEVATION A



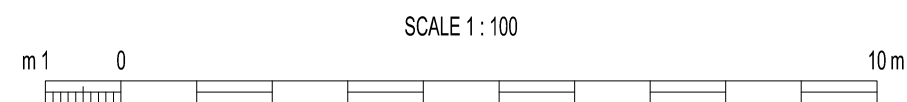
ELEVATION B



ELEVATION C



ELEVATION D



## NOTES

- REFER TO DRAWING NO. w2281-9205 FOR ELEVATION ARROWS.

## KEY

	CONCRETE RETAINING WALLS
	KIOSK, WASHWATER CABINETS & BIODISC PLANT
	MASONRY WALLS TO MATCH EXISTING "LOCAL STONE"

A00	19-12-16	FIRST ISSUE	EO	KJP	TM
REV.	DATE	DESCRIPTION	DSGND	CHKD	APP'D

CLIENT	
--------	--

PRINCIPAL DESIGNER	DŴR CYMRU WELSH WATER
--------------------	-----------------------

	
Waterco Ltd., Eden Court, Lon Parcwr Business Park, Ruthin LL15 1NJ	tel (+44) 1824 702220 <a href="http://www.waterco.co.uk">www.waterco.co.uk</a>

SCHEME	DINORWIG CHAPEL WwTW
--------	----------------------

TITLE	PROPOSED ELEVATIONS
-------	---------------------

STATUS	PLANNING APPLICATION
--------	----------------------

DESIGNED EO	CHECKED KJP	APPROVED TM	SCALE / SHEET SIZE 1 : 100 / A3
----------------	----------------	----------------	------------------------------------

DRAWING NO. w2281-9206	REV A00
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**Plate 01: View east of assessment area/location of proposed wastewater treatment works;  
scale: 1.0m (archive image: G2492\_001)**



**Plate 02: View west of assessment area/location of proposed wastewater treatment works;  
scale: 1.0m (archive image: G2492\_008)**





**Plate 03: View south of assessment area/location of proposed wastewater treatment works detailing southern boundary wall; scale: 1.0m (archive image: G2492\_010)**



**Plate 04: View east of assessment area/location of proposed wastewater treatment works detailing southern boundary wall (Assessment Feature 5); scale: 1.0m (archive image: G2492\_010)**





Plate 05: View southwest of assessment area/location of proposed wastewater treatment works with southern boundary wall in the background and surface water channels in the foreground; scale: 1.0m (archive image: G2492\_011)



Plate 06: View southeast of assessment area/location of proposed wastewater treatment works; scale: 1.0m (archive image: G2492\_012)





Plate 07: Assessment Feature 3 (former farmstead of Tynyrardd) as viewed from the southwest;  
scale: 1.0m (archive image: G2492\_013)



Plate 08: Assessment Feature 3 (former farmstead of Tynyrardd) as viewed from the southeast;  
scale: 1.0m (archive image: G2492\_014)

## **APPENDIX I**

**Reproduction of Gwynedd Archaeological Trust project design for an archaeological assessment (January 2016).**

# DINORWIG WASTEWATER TREATMENT WORKS (G2487)

## PROJECT DESIGN FOR ARCHAEOLOGICAL ASSESSMENT


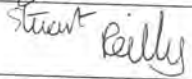

*Prepared for*

*Waterco Ltd*

***January 2017***

Ymddiriedolaeth Archaeolegol Gwynedd  
Gwynedd Archaeological Trust



Approvals Table				
	Role	Printed Name	Signature	Date
Originated by	Document Author	JOHN ROBERTS		11/01/17
Reviewed by	Document Reviewer	STUART REILLY		11/01/17
Approved by	Principal Archaeologist	JOHN ROBERTS		11/01/17

Revision History			
Rev No.	Summary of Changes	Ref Section	Purpose of Issue

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



# DINORWIG WASTEWATER TREATMENT WORKS

## PROJECT DESIGN FOR ARCHAEOLOGICAL ASSESSMENT

Prepared for *Waterco Ltd*, January 2017

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	Location map detailing WWTW assessment area. Based on Ordnance Survey 1:10000 County Series (Sheet SH56). Scale: 1:5000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.....	15
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# 1 INTRODUCTION

Gwynedd Archaeological Trust (GAT) has been asked by *Waterco Ltd* to prepare a project design for an archaeological assessment in advance of a proposed wastewater treatment works (WWTW) at Dinorwig, Gwynedd (NGR SH58746145; Figure 01). The designated area measures 1080m<sup>2</sup> and is located across two fields close to Capel Dinorwig. The specific design of the WWTW has not been confirmed, but the assessment will include the scheme location as detailed in DCWW Drawing No. w2236-2300 (Figure 02).

The assessment will conform to the guidelines specified in the Chartered Institute for Archaeologists *Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014). The format of this design corresponds to the requirements of section 2.3 of MoRPHE (English Heritage 2015) and to MAP2 (English Heritage, 1991, *Management of Archaeological Projects*). The assessment is scheduled to be completed in November/December 2016.

The assessment will be monitored by the Gwynedd Archaeological Planning Services (GAPS); the content of this design and all subsequent reporting by GAT must be approved by GAPS prior to final issue.

Gwynedd Archaeological Trust is certified to ISO 9001:2008 and ISO 14001:2004 (Cert. No. 74180/A/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).

## **2 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND**

The WWTW scheme is located within an area characterised by post-medieval agricultural and industrial activity as represented by local slate quarries and the settlement of Dinorwig. The assessment will consider these in relation to the local industry and landscape and how this is reflected in the archaeological record.

A brief examination of the regional Historic Environment Record has confirmed that there are a limited number of known archaeological receptors within the immediate area. These include Capel Dinorwic located in the immediate vicinity of the scheme, Chwarel Fawr slate quarry (disused), 213m to the northeast and Allt-ddu slate quarry (disused), 500m to the southeast. The site is located within the Historic Landscape Characterisation area of Gwaen Gynfi (Area 42). This landscape area is characterised by industrial settlement for Dinorwic quarry workers, regulated by the Vaynol estate and represented by small parciau (enclosures) each supporting a cottage, and some larger sheepfolds.

The first to third edition Ordnance Survey 1-inch to 25-mile County Series maps of the area published in 1889/90, 1900 and 1914 respectively (Sheets XVI.04, XVI.08, XVII.05 and XVII.01; Figures 03 to 05) detail a field system and industrial layout similar to the present day map (Figure 01), reflecting the well-established nature of the Vaynol Estate lands and industry by this time. The specific fields encompassed by the proposed WWTW are the same layout as the present day.

The assessment will review the location and distribution of all known and suspected archaeological activity within proximity to the scheme and assess the impact of the scheme on this activity using the methodology outlined in para. 3.0.

### 3 METHODOLOGY

#### 3.1 Assessment (Desktop Study)

A desk-based assessment is defined as “a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage....Significance is to be judged in a local, regional, national or international context as appropriate” (ClfA 2014, 4).

The desk-based assessment will involve a study of the following resources:

1. The regional Historic Environment Register (HER, Gwynedd Archaeological Trust, Craig Beuno, Garth Road, Bangor, Gwynedd LL57 2RT) will be examined for information concerning the study area. This will include an examination of the core HER, the 1:2500 County Series Ordnance Survey maps and any secondary information held within the HER. A list of archaeological assets will be prepared for the report using information from the HER; this will include information sourced from within a **50m assessment buffer** surrounding the designated area, to examine any potential impact. The location and impact of the proposals on statutory and non-statutory designated areas will be examined. This information will be used to prepare a gazetteer and incorporate information from the walkover survey if any previously unidentified receptors are also located;
2. The National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be checked for sites additional to the HER, and if required additional supporting information will be examined at the NMR.
3. On-line catalogue search of the National Library of Wales; and
4. Archive data, including primary and secondary sources, historic maps and estate maps will be examined at the regional archives (Gwasanaeth Archifau Gwynedd, Cyngor Gwynedd, Caernarfon LL55 1SH) and at the Bangor University Department of Manuscripts (Bangor University, Bangor, Gwynedd, LL57 2DG).
5. Aerial photographs from the National Monuments Record (NMR RCAHMW, National Monuments Record of Wales, Plas Crug, Aberystwyth SY23 1NJ) will be examined for potential features;

6. Light Detection and Ranging (LiDAR) data will be examined from the Lle Geo-Portal at <http://lle.gov.wales/home> digital terrain modelling and information on potential surface features.

Part of the assessment will involve a walkover of the study; the aim of this stage of the work is to:

- verify the results of the desktop study.
- identify any further archaeological sites which may exist as above ground features
- photograph and record the present condition of all sites noted.

The walkover survey will target the area defined in DCWW Drawing No. w2236-2300 (Figure 02). A photographic record will be maintained in RAW format using a digital SLR set to maximum resolution (Nikon D3000; resolution: 3,872 × 2,592 [10.2 effective megapixels]) and photographic metadata table will be completed and included in the report. Photographic images will be archived in TIFF format; the archive numbering system will start from **G2492\_001**. It is noted that the portions of the scheme are within wooded areas, which may restrict the extent of visibility across the local landscape.

A gazetteer will be compiled for any identified sites within and within proximity to the specified route based on information sourced from the regional HER and the walkover survey; the gazetteer will include:

1. Feature Number
2. Site name
3. PRN number
4. Grid reference
5. Period
6. Site type
7. Assessment category
8. Description
9. Impact
10. Recommendation for further assessment/evaluation
11. Recommendation for mitigatory measures

## 3.2 Data processing and report compilation

Following completion of the stages outlined above, a report will be produced incorporating the following:

1. Front cover;
2. Inner cover;
3. Figures and Plates List
4. Non-technical summary;
5. Introduction;
6. Methodology
  - i. Desk-based assessment
  - ii. Walkover survey;
7. Results
  - a. Desk based assessment
    - i. Location and geological summary
    - ii. Statutory and non-statutory designations
    - iii. Environmental remains and soil morphology
    - iv. Historical and archaeological background
    - v. Cartographic evidence
    - vi. Artefact potential
    - vii. Aerial photographs and LiDAR;
  - b. Walkover survey
  - c. Gazetteer of features
8. Conclusions and recommendations
  - a. Conclusion
  - b. Table of sites and recommendations
9. Acknowledgements
10. Bibliography
  - a. Primary sources
  - b. Secondary sources
11. Figures; inc.:
  - location plan;
  - historic mapping;
  - location plan with identified features
12. Plates: illustrative examples from walkover survey
13. Appendix I (approved project design)
14. Appendix II (Photographic metadata);
15. Appendix III (Sites listed on Gwynedd Historic Environment Record)
16. Appendix IV (Definition of terms)
17. Back cover

Illustrations will include plans of the location of the study area and archaeological sites. Historical maps, when appropriate and if copyright permissions allow, will be included.

A draft copy of the report will be completed by February 2017 and will be sent to Gwynedd Archaeological Planning Services and Waterco Ltd. Once approved, a copy of the report will immediately be submitted to Gwynedd Archaeological Planning Services and Waterco Ltd and to the Historic Environment Record located at the Gwynedd Archaeological Trust.

Submission of digital information to the Royal Commission on the Ancient and Historical Monuments of Wales will be undertaken in accordance with the RCAHMW Guidelines for Digital Archives Version 1 (2015). Digital information will include the photographic archive and associated metadata.

## **4 PERSONNEL**

The project will be managed by John Roberts, Principal Archaeologist GAT Contracts Section. The assessment will be completed by a project archaeologist who will have responsibility for completing the desk based assessment, completing the walkover survey, maintaining the site archive, liaising with GAPS and Waterco Ltd and submitting the draft report and final report. The project manager will be responsible for reviewing and approving the report prior to submission.



## **5 HEALTH AND SAFETY**

The GAT project archaeologist will be CSCS certified. A site specific risk assessment will be prepared prior to the start of fieldwork. The site archaeologist will be issued with required personal safety equipment appropriate for the walkover survey.

## **6 INSURANCE**

### **Public 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/000405

EXPIRY DATE 22/06/2017

### **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 24765101CHC/000405

EXPIRY DATE 22/06/2017

### **Professional Indemnity**

Limit of Indemnity- £5,000,000 in respect of each and every claim

INSURER Hiscox Insurance Company Limited

POLICY TYPE Professional Indemnity

POLICY NUMBER

HU PI 9129989/1208

EXPIRY DATE 23/07/2017

## 7 SOURCES CONSULTED

DCWW Drawing No. w2236-2300

English Heritage, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*.

English Heritage, 1991, *Management of Archaeological Projects*

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889 & 1890)

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Second Edition (1900)

Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914)

Royal Commission on Ancient and Historic Monuments of Wales 2015 *Guidelines for digital archives*

*Standard and Guidance for Historic Environment Desk-Based Assessment* (Chartered Institute for Archaeologists, 2014).

## **FIGURE 01**

**Location map detailing WWTW assessment area. Based on Ordnance Survey 1:10000 County Series (Sheet SH56). Scale: 1:5000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.**



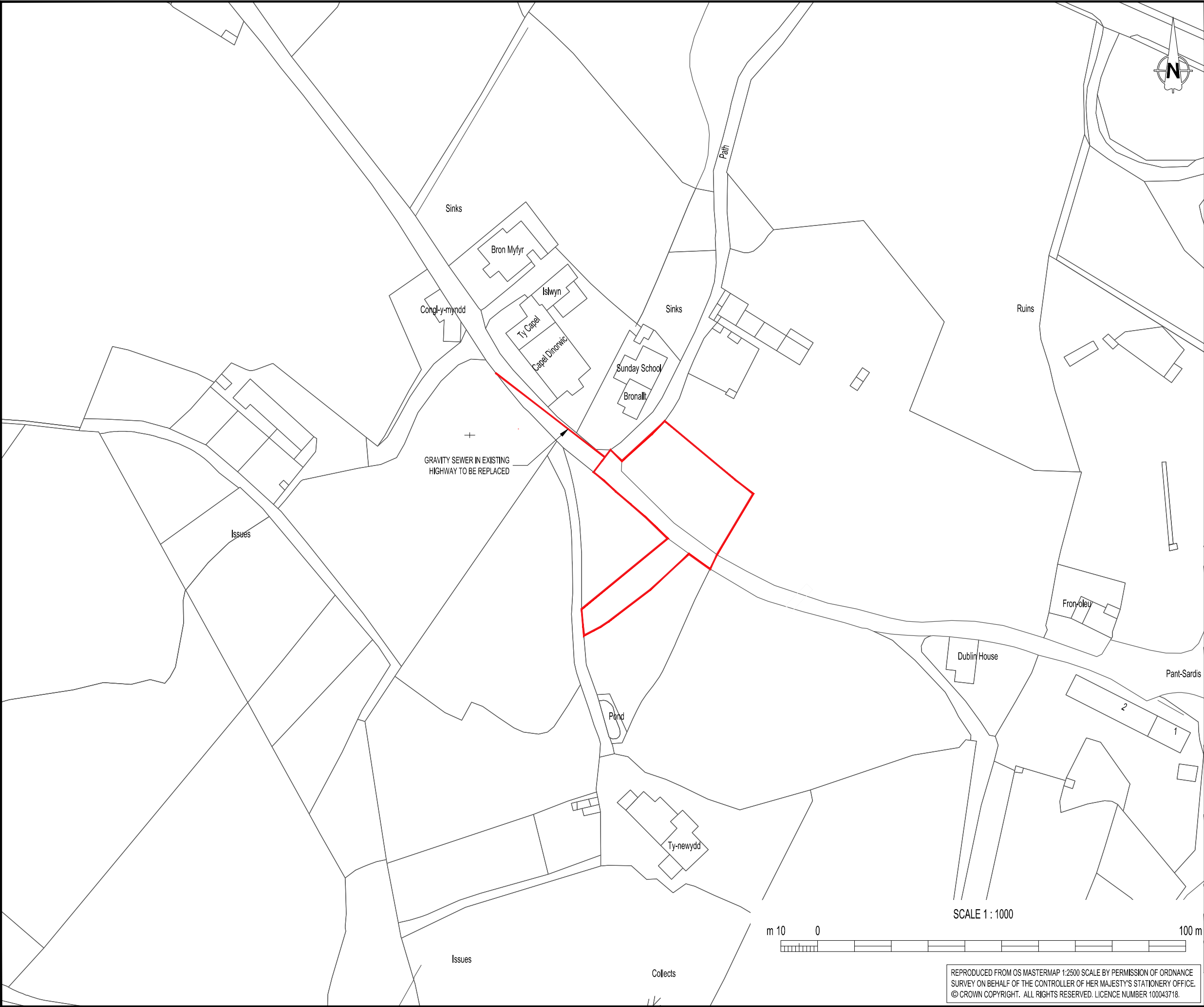
FIGURE 01: Location map detailing WWTW assessment area (outline red).

Based on Ordnance Survey 1:10000 County Series (Sheet SH56).

Scale: 1:5000@A4. Crown Copyright. All Rights Reserved. License number AL100020895.

## **FIGURE 02**

**Reproduction of DCWW Drawing No. w2236-2300, detailing the assessment area. Scale: 1:1000@A3.**



### NOTES

1. ALL DIMENSIONS IN MILLIMETRES AND ALL LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS SHOWN OTHERWISE.

### KEY

SURVEY AREA

### REFERENCES

GRID REFERENCE: 258749 , 361451

CAUTION: THE MANAGEMENT AND DESIGN OF ANY AND ALL TEMPORARY WORKS REQUIRED TO EXECUTE THIS DESIGN ARE THE RESPONSIBILITY OF THE CONTRACTOR.

REV.	DATE	DESCRIPTION	DSGND	CHK'D	APP'D
CLIENT					
SCHEME					
DINORWIC CHAPEL WWTW					
TITLE					
REVISED AREA OF INTEREST FOR ARCHAEOLOGICAL DESK STUDY					
STATUS					
INFORMATION					
DESIGNED GRO	CHECKED KJP	APPROVED DRD	SCALE / SHEET SIZE 1 : 1000 / A3		
CLIENT REFERENCE -		DATE 21/06/2016			
DRAWING NO. w2236-2300			REV		

FIGURE 02: Reproduction of DCWW Drawing No. w2236-2300, detailing the assessment area. Scale: 1:1000@A3.

### **FIGURE 03**

**Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889 & 1890), including WWTW assessment area. Scale: 1:5000@A4.**



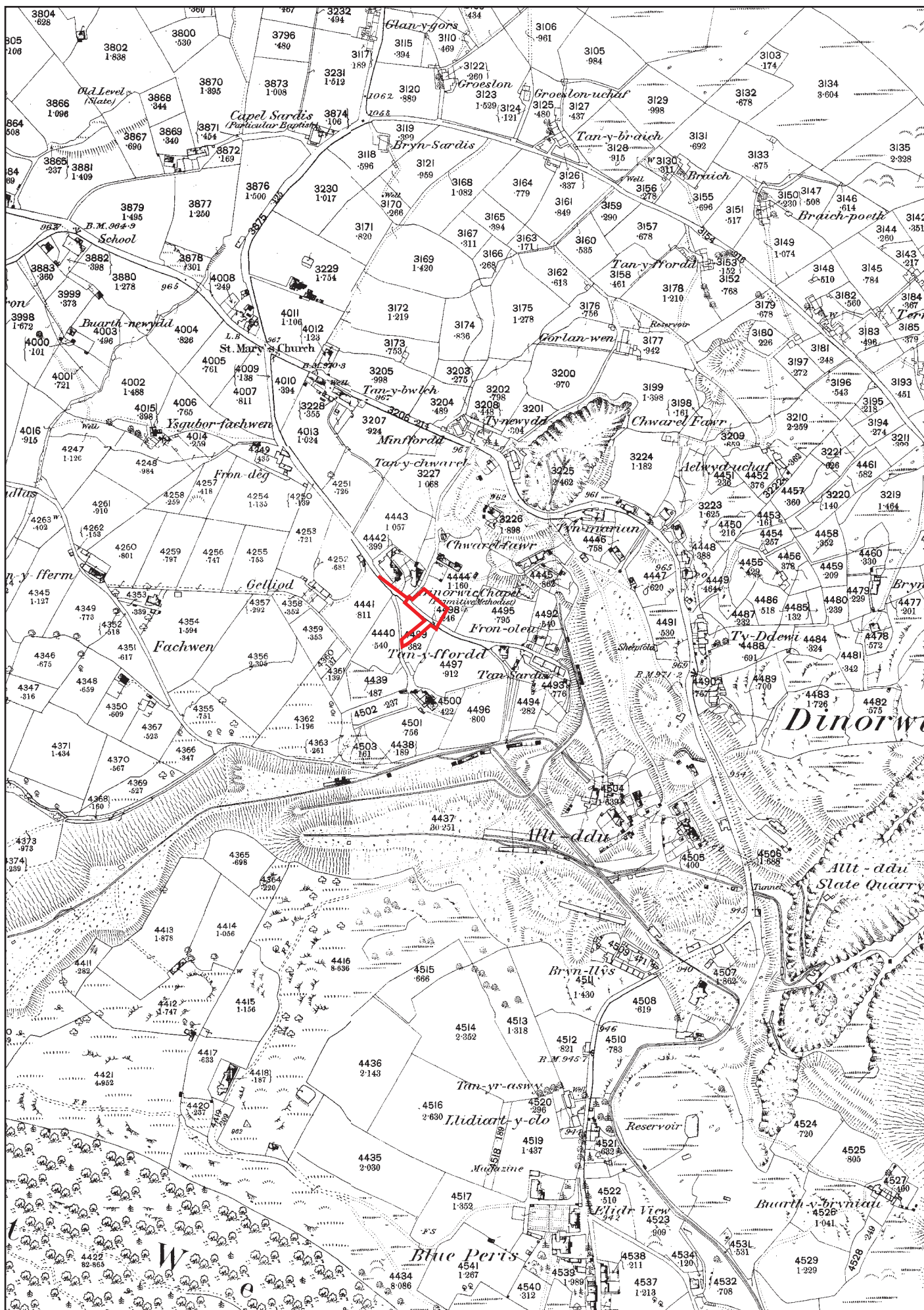
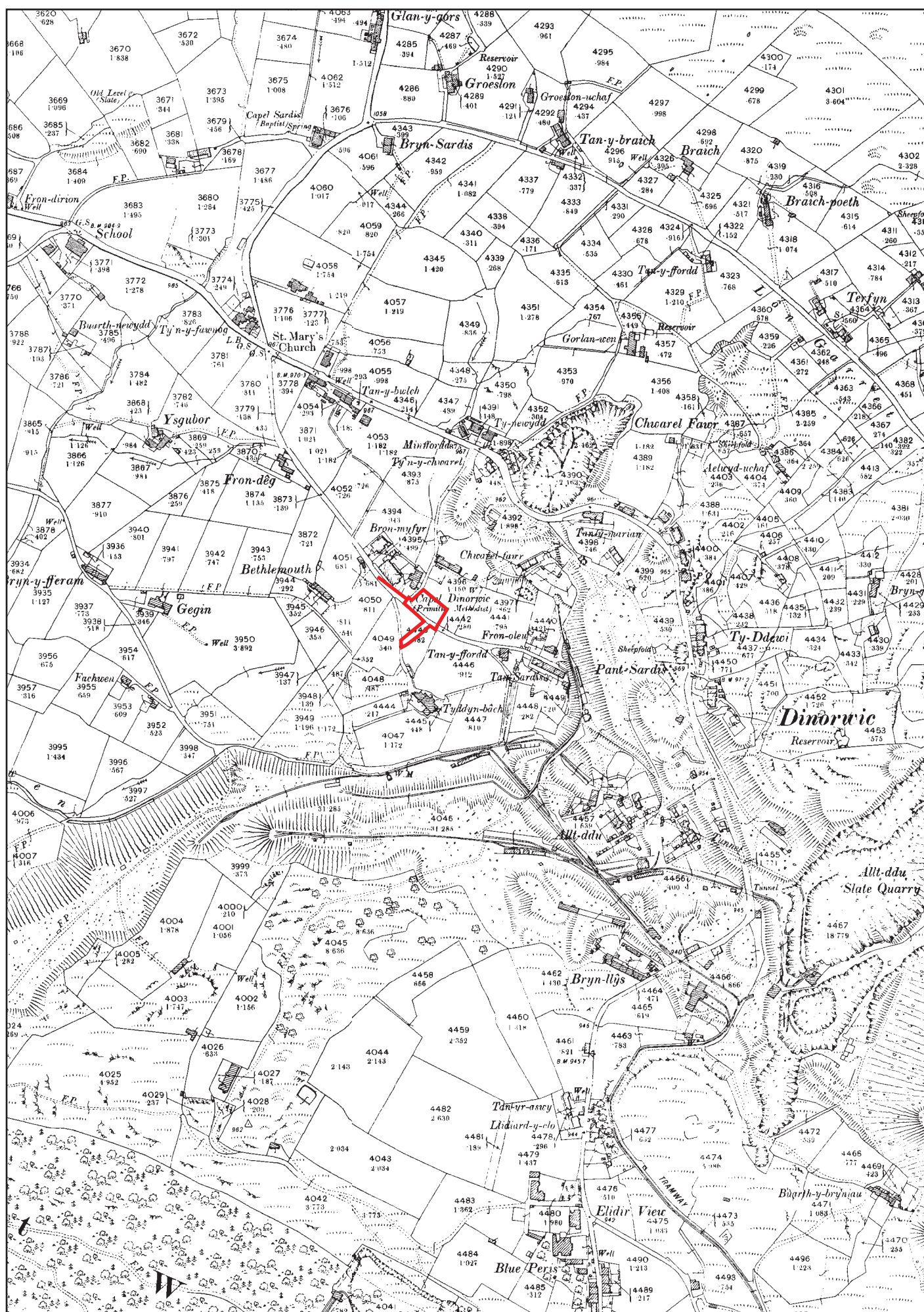


FIGURE 03: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 First Edition (1889/90), including WWTW assessment area (outlined in red). Scale: 1:5000@A4.

## **FIGURE 04**

**Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Second Edition (1900), including WWTW assessment area. Scale: 1:5000@A4.**





## **FIGURE 05**

**Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914), including WWTW assessment area. Scale: 1:5000 @A4.**

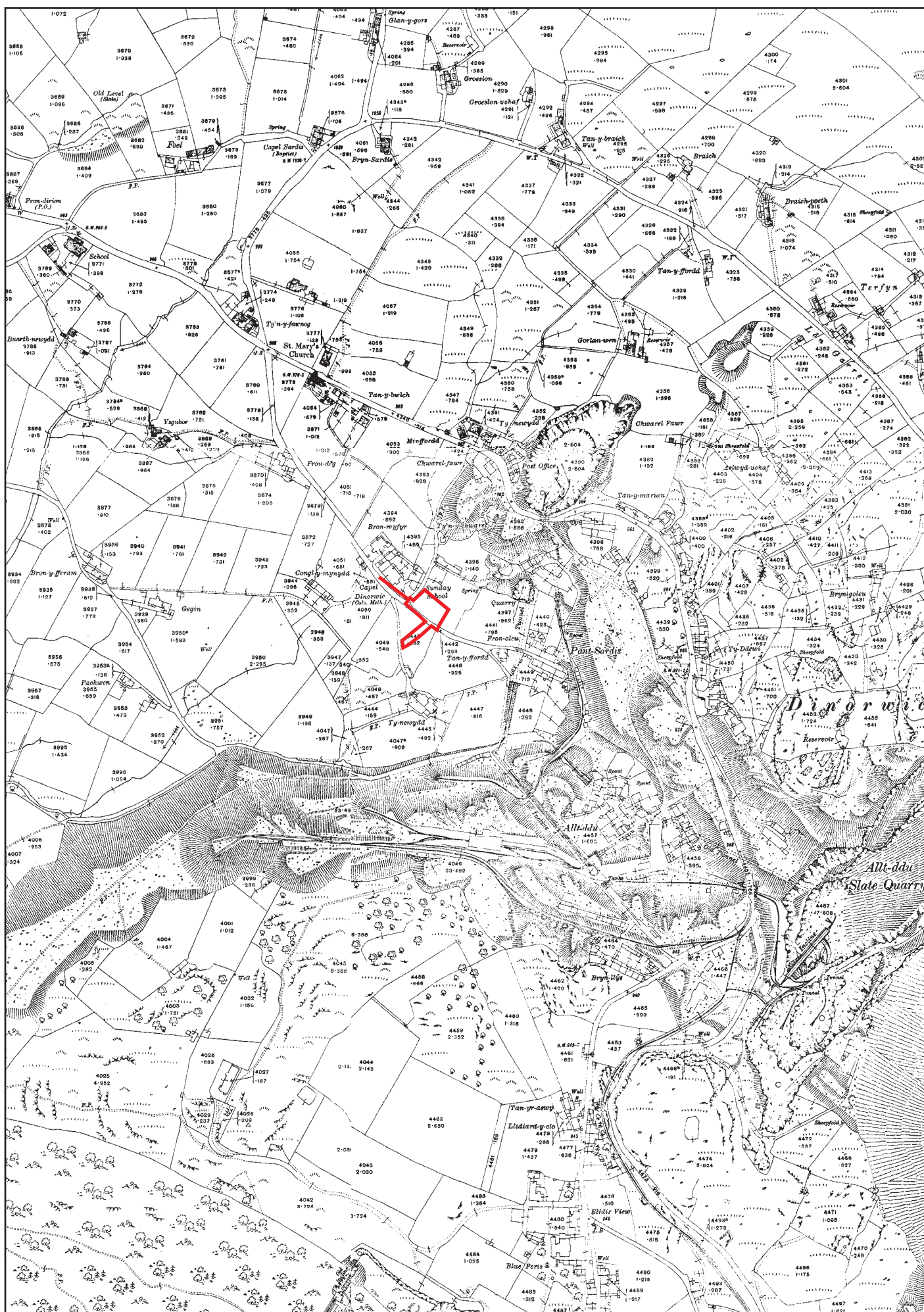


FIGURE 05: Reproduction of Ordnance Survey 1-inch to 25-mile County Series Map Sheets XVI.04, XVI.08, XVII.05 and XVII.01 Third Edition (1914), including WWTW assessment area (outlined in red).  
Scale: 1:5000@A4.

<b>File reference</b>	<b>Project name</b>	<b>Project phase</b>	<b>Description</b>	<b>View from</b>	<b>Scale (s)</b>	<b>Date</b>	<b>Originating person</b>	<b>Originating organisation</b>	<b>Plate</b>
G2492_001	DCWW Dinorwig	Walkover	View of main (northern) field from the road.	W	1m	23/01/17	Stuart Reilly	GAT	01
G2492_002	DCWW Dinorwig	Walkover	View along private lane that divides the proposed site.	NW	1m	23/01/17	Stuart Reilly	GAT	
G2492_003	DCWW Dinorwig	Walkover	View of the second (southern) field from the road.	N	1m	23/01/17	Stuart Reilly	GAT	
G2492_004	DCWW Dinorwig	Walkover	View of the whole of the second (southern) field.	E	-	23/01/17	Stuart Reilly	GAT	
G2492_005	DCWW Dinorwig	Walkover	Partially ruined stone wall along eastern boundary of second (southern) field	NE	-	23/01/17	Stuart Reilly	GAT	
G2492_006	DCWW Dinorwig	Walkover	View of second (southern) field taken from private lane to Ty Newydd.	NW	-	23/01/17	Stuart Reilly	GAT	
G2492_007	DCWW Dinorwig	Walkover	Example of dry stone wall at entrance to main (northern) field.	SW	1m	23/01/17	Stuart Reilly	GAT	
G2492_008	DCWW Dinorwig	Walkover	View of the main (northern) field to show steepness of slope and undulating form.	E	1m	23/01/17	Stuart Reilly	GAT	02
G2492_009	DCWW Dinorwig	Walkover	Main (northern field) southern boundary wall, with fence.	N	1m	23/01/17	Stuart Reilly	GAT	03

<b>File reference</b>	<b>Project name</b>	<b>Project phase</b>	<b>Description</b>	<b>View from</b>	<b>Scale (s)</b>	<b>Date</b>	<b>Originating person</b>	<b>Originating organisation</b>	<b>Plate</b>
G2492_010	DCWW Dinorwig	Walkover	Main (northern field) eastern boundary wall (with tree).	W	1m	23/01/17	Stuart Reilly	GAT	04
G2492_011	DCWW Dinorwig	Walkover	View of main (northern) field showing natural ripples of the land and channels (concentration of rushes).	E	1m	23/01/17	Stuart Reilly	GAT	05
G2492_012	DCWW Dinorwig	Walkover	View of the whole of the main (northern) field.	N	1m	23/01/17	Stuart Reilly	GAT	06
G2492_013	DCWW Dinorwig	Walkover	Derelict slate/stone building.	SW	1m	23/01/17	Stuart Reilly	GAT	07
G2492_014	DCWW Dinorwig	Walkover	Range of derelict slate/stone buildings.	SE	1m	23/01/17	Stuart Reilly	GAT	08

## **APPENDIX II**

### **Photographic Metadata**



## **Appendix III**

### **Definition of terms**

## Categories of importance

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

### *Category A - Sites of National Importance.*

Scheduled Ancient Monuments, Listed Buildings of grade II\* and above, as well as those that would meet the requirements for scheduling (ancient monuments) or listing (buildings) or both.

Sites that are scheduled or listed have legal protection, and it is recommended that all Category A sites remain preserved and protected *in situ*.

### *Category B - Sites of regional or county importance.*

Grade II listed buildings and sites which would not fulfil the criteria for scheduling or listing, but which are nevertheless of particular importance within the region.

Preservation *in situ* is the preferred option for Category B sites, but if damage or destruction cannot be avoided, appropriate detailed recording might be an acceptable alternative.

### *Category C - Sites of district or local importance.*

Sites which are not of sufficient importance to justify a recommendation for preservation if threatened.

Category C sites nevertheless merit adequate recording in advance of damage or destruction.

### *Category D - Minor and damaged sites.*

Sites that are of minor importance or are so badly damaged that too little remains to justify their inclusion in a higher category.

For Category D sites, rapid recording, either in advance of or during destruction, should be sufficient.

### *Category E - Sites needing further investigation.*

Sites, the importance of which is as yet undetermined and which will require further work before they can be allocated to categories A - D are temporarily placed in this category, with specific recommendations for further evaluation. In this report several sites of unknown potential have been allocated to this category.

## Definition of Impact

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

### *None:*

There is no construction impact on this particular site.

### *Slight:*

This has generally been used where the impact is marginal and would not by the nature of the site cause irreversible damage to the remainder of the feature, e.g. part of a trackway or field bank.

*Unlikely:*

This category indicates sites that fall within the band of interest but are unlikely to be directly affected. This includes sites such as standing and occupied buildings at the margins of the band of interest.

*Likely:*

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

*Significant:*

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

*Considerable:*

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

*Unknown:*

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

## **Definition of field evaluation techniques**

Field evaluation is necessary to fully understand and assess most class E sites and to allow the evaluation of areas of land where there are no visible features but for which there is potential for sites to exist. Two principal techniques can be used for carrying out the evaluation: geophysical survey and trial trenching. Topographic survey may also be employed where sites are thought to survive as earthworks.

Geophysical survey most often involves the use of a magnetometer, which allows detection of some underground features, depending on their composition and the nature of the subsoil. Other forms of geophysical survey, including resistivity survey and ground penetrating radar might also be of use.

Trial trenching allows a representative sample of the development area to be investigated at depth. Trenches of appropriate size can also be excavated to evaluate category E sites. Trenching is typically carried out with trenches of between 20 to 30m length and 2m width. The topsoil is removed by machine and the resulting surface is cleaned by hand, recording features. Depending on the stratigraphy encountered the machine may be used to remove stratigraphy to deeper levels.

## **Definition of Mitigatory Recommendations**

Below are the measures that may be recommended to mitigate the impact of the development on the archaeology.

*None:*

No impact so no requirement for mitigatory measures.

*Detailed recording:*

This requires a full photographic record and measured survey prior to commencement of works.

Archaeological excavation may also be required depending on the particular feature and the extent and effect of the impact.

*Basic recording:*

Requiring a photographic record and full description prior to commencement of works.

*Strip, Map and Sample:*

The technique of Strip, Map and Sample involves the examination of machine-stripped surfaces to identify archaeological remains. The stripping is undertaken under the supervision of an archaeologist. Stripping and removal of the overburden is undertaken in such a manner as to ensure damage does not take place to surfaces that have already been stripped, nor to archaeological surfaces that have not yet been revealed.

Stripping is undertaken in as careful a manner as possible, to allow for good identification of archaeological features. A small team of archaeologists will be responsible for subsequently further cleaning defined areas where necessary. Complex sites which cannot be avoided will need to be fully excavated.

*Watching brief:*

This is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

*Avoidance:*

Features, which may be affected directly by the scheme, or during the construction, should be avoided. Occasionally a minor change to the proposed plan is recommended, but more usually it refers to the need for care to be taken during construction to avoid accidental damage to a feature. This is often best achieved by clearly marking features prior to the start of work.

*Reinstatement:*

The feature should be re-instated with archaeological advice and supervision.



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