ABERDYFI TO DYSYNNI FLOOD ALLEVIATION SCHEME - PENLLYN MARSHES, TYWYN

ARCHAEOLOGICAL ASSESSMENT

Report No. 516



Peat-cutting beds in prehistoric land surface, Penllyn Marshes, Tywyn foreshore

Prepared for Black and Veatch Consulting Ltd

February 2004

By George Smith, M.A., M.I.F.A.



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SUMMARY

An archaeological assessment was carried out in advance of a flood alleviation and managed coastal retreat scheme in the Penllyn marshes south of Tywyn, Gwynedd. The assessment involved the consultation of existing documentary records and maps and a field search. Fourteen features were recorded of which seven were existing Heritage Environment Records.

1 INTRODUCTION

Gwynedd Archaeological Trust was asked by Black and Veatch to carry out an archaeological assessment in advance of the a proposed flood alleviation and managed coastal retreat scheme in Penllyn marshes, south of Tywyn, centred on SN 588986 (Fig. 1).

The area is low-lying drained and improved pasture with a high shingle bank currently separating it from the sea. The whole of the area lies within the Snowdonia National Park and much of the area is an SSSI and the coastal part is a Special Area of Conservation (SAC). The SSSI is mainly managed under the Tir Cymen scheme at present although a renewed application will soon be necessary under the Tir Gofal scheme.

2 SPECIFICATION AND PROJECT DESIGN

The basic requirement was for a desk-top survey and field search of the proposed area, in order to assess the impact of the proposals on the archaeological features within the area concerned. The importance and condition of known archaeological remains were to be assessed, and areas of archaeological potential and new sites to be identified. Measures to mitigate the effects of the construction work on the archaeological resource were to be suggested.

Gwynedd Archaeological Trust's proposals for filling these requirements were as follows:

- To identify and record the cultural heritage within the defined study area.
- To evaluate the importance of what has been identified
- To recommend ways in which the impact on the cultural heritage can be avoided or minimised.

The archaeological assessment consists of

- Desktop study of records and historical documents
- Field walkover
- Initial report

This report covers these three stages.

This might be followed by a field evaluation if it is considered that there might be features that cannot be assessed just by a field walkover. The field evaluation might take the form of geophysical survey or trial excavation. Such an evaluation would then be followed by a further report stage.

3 METHODS AND TECHNIQUES

3.1 Desk top study

This comprised the consultation of maps, documents, computer records, written records and reference works, which form part of the Sites and Monuments Record (SMR), located at GAT, Bangor. The archives held by the Meirionnydd Record Office, Dolgellau were also consulted. Further information, particularly concerning standing buildings was consulted by means of the CARN (Core Archaeological Index) which is the online index of the Royal Commission on Ancient and Historic Monuments, Wales.

Sites, buildings and find spots listed in the GAT SMR and RCAHMW CARN were identified within 1km of the survey area (Fig. 1 and Appendix 2). They were divided into three zones:

1. Those within the area that will be directly affected by sea encroachment and might be destroyed.

2. Those within the overall area of the scheme, which might be indirectly affected by flooding and changes in land management.

3. Those within the nearby area, which would give background information relevant to understanding the historical landscape of the area.

3.2 Field search

The area was surveyed on Wednesday 28th January 2004. The area east of the coast edge and the coast-edge itself were walked. Features were noted, described and photographed. Conditions were good for visibility. All the area was accessible and the inland area is closely grazed grassland. All records are archived in Gwynedd Archaeological Trust under the project number G1820.

3.3 Report

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

The criteria used for assessing the value of features was based upon those used by the Secretary of State for Wales when considering sites for protection as scheduled ancient monuments, as set out in the Welsh Office circular 60/96. The features were then assigned to one of five categories of importance, A-E, A: National Importance, B: Regional or County Importance, C: District or local importance, D: Minor or damaged sites, E: Sites needing further investigation. The definitions of these categories and those used for Impact, Field evaluation and Mitigation are set out in Appendix 1.

4 ARCHAEOLOGICAL RESULTS

4.1 Topographic description

This is all low-lying coastal plateau fringed by a line of dunes and a shingle bank revetted in places by a looselaid stone sea-wall. The fields are now level apart from very slight undulations. Before drainage the area was marsh with lagoons (Figs 2 and 3) and so there must have been much work levelling the ground. The dunes form part of a system that stretches from Aberdyfi in quite a narrow strip along the coast gradually decreasing in width northwards. They have suffered badly from trampling, encroachment from the east and disturbance from construction of a rifle range, sea wall and river outfall. The shingle storm bank is mainly held back by the sea wall but there are breaks.

4.2 Archaeological and historical background

The foreshore south of Tywyn is notable for the presence of an ancient submerged peat and forest bed. This lies beneath the sands and shingle bank and is exposed occasionally after particular tidal and wind conditions. The presence of similar features around the coast of Wales has been recognised for several centuries, the earliest recorded evidence being that of Gerald of Wales, who recorded the exposure of a submerged forest at Newgale, South Wales, in 1172. The earliest references to submergence in north-west Wales are those contained in folklore in the story of the Cantref y Gwaelod (the Lowland Hundred) in a manuscript supposed to be by Sir John Wynn of Gwydir, Conwy, written, 'before 1627', recording the history of 'Helig ap Glannog, great grandson of Cadog, called by the Saxons Cadog the Strong ... afterwards king of North Wales, who had many great conflictes with the Romanes (sic)...This Helig ap Glannog was Lord of Abergele, Rhos, Arllechwedd, Llyn, Cantred Gwaylod and Earl of Hereford. In his time happened the great inundacion which surrounded Cantred Gwaylod ... from Bangor to Gogarth (Great Orme) ... and to the point of Flintshire that came up from Ruthlan to Priestholme (Puffin Island or Ynys Seiriol)' (Williams 2001). Lewis Morris in the eighteenth century also mentioned that farmers who dug in Dulas Bay, Anglesey for organic material to improve their land 'find in digging about a foot deep, an Inumerable quantity of Nut shells, and I have seen fir trees dugg up there ...' (Morris 1725). There are similar tales of drowned lands in Cardigan Bay including Sarn Padrig, which ran west from near Harlech and Sarn-y-Bwch which lay off Tywyn. These tales seem to be just fanciful explanations for

the submerged forests beds rather than genuine folk memories. Finds and scientific dates show that these submerged forests and land surfaces can date back as far as the Early Mesolithic period, *c*. 7000 BC, but finds of more recent prehistoric periods have also been found in or on them.

The background to sea-level changes since the last glaciation in north-west Wales has been reviewed by Whittow (1965). The main evidence is provided by the intertidal peat or submerged tree remains, including ten reported locations around Anglesey, three on the Llyn peninsula and six on the north Caernarfon coast and two in Meirionnydd. There have been further identifications in recent years as a result of the observations of local historians Margaret Griffith, Cecil Jones (University of Wales, Dept. of Ocean Sciences, Bangor), Nigel Bannerman and Terry Williams. Some of these intertidal deposits have been visible only at extreme low tide while others are visible relatively high on the beach. The present dating evidence suggests that the last inundation occurred several thousand years ago. The nearest detailed studies of sea-level changes are those carried out in north-west England (Tooley 1974, 1978 and 1985) and in mid-Wales (Heyworth and Kidson 1982). The latter suggest a rapid rise in sea-level to about 5m below the present by about 5500BC followed by a gradual increase to the present. Tooley's work in the north of England shows where the land had been covered by an ice sheet the sea encroached further inland than the present day levels. This is because isostatic uplift of the land, after removal of the ice, meant that the shoreline was also uplifted, giving the appearance that sealevels had retreated. Moreover, actual sea-levels rose and fell within the general sequence and this scenario would fit a situation where a number of peat levels and silt levels would accumulate over time. This latter pattern of a period of oscillating sea levels and of a period of apparent transgression above present levels is one that should also fit north Wales, which was also affected by an ice sheet cover. Heyworth and Kidson suggested a sea-level curve for north Wales, based on the two dates then available (from Rhyl and Llandudno) with sealevels between about 7500-4000 radiocarbon years BP being about 2m above those of south Wales and southern England (ibid. 110, fig. 5) although they rule out Whittow's idea that there were post-glacial raised beaches in north Wales. However, the main observation still stands, that the main, rapid inundation was completed some time at or before the Early Neolithic period. Areas of preserved land surfaces seem to be fairly uniformly areas of coastal regression: low-lying level areas of silts deposited as sea-levels rise, that then become colonised by marsh or even wet woodland, which is then lost as sea-level rises again.

The archaeological background would suggest that these areas of marshy foreshore would be areas of special, perhaps seasonal activities, such as hunting and fishing, Thus at Lydstep Haven, Pembrokeshire two microliths, probably from an arrow or spear, were found in close association with a pig skeleton in intertidal peat (Jacobi 1980, 171-5). However, there may have been seasonal settlement on the marshes, as shown by the lightly built rectangular buildings of the second and first millennia BC found at Redwick and Goldcliff in the Severn Estuary. In other cases the associated settlement might be just nearby, overlooking or easily accessible to these productive hunting and fishing areas. Around the coast of Gwynedd evidence of flint working on several coastal or estuarine promontories provides possible evidence of such settlement of Early Mesolithic date at Trwyn Du, Aberffraw, Anglesey and Pencilan Head, Llyn, of Later Mesolithic date at several locations around the coast of south Llyn, of Early Neolithic date at Bryn Glas, Penrhos Bay, Holyhead, Anglesey and of the Beaker period at Bryn Llwyd, Newborough, Anglesey. All of these are close to known intertidal deposits and there is potential for associated evidence to be found there.

A peat exposure only 5km south of Tywyn has been the subject of study. This is at Borth and Ynyslas, Ceredigion, on the south side of the Afon Dyfi. It is so close to Tywyn and in an identical coastal location that it provides a good parallel for the sake of assessment. There, intertidal peats are exposed for some 5km along the shore. They appear as outcrops on the beach from beneath the adjoining Borth raised bog, under which they must extend, and consist of fen, alder carr and forest beds overlying salt marsh clay (Heyworth and Kidson 1982, 102). Radiocarbon dates give a date of c. 6000 BP for the underlying salt marsh and dates of c. 5400 BP to 3900 BP, at its lowest for the forest bed (*ibid*.). A number of casual archaeological finds have been made from these peats including a Mesolithic flint pick, flint flakes, an antler tool and a hearth which produced a date of c. 4000 BP from the surrounding peat (Sambrook and Williams 1996, 26) as well as bones of red deer and bos primigenius. A series of radiocarbon dates were used to reconstruct a sea-level curve for Cardigan Bay, which was found to be not significantly different to curves from the Bristol Channel, Somerset Levels and English Channel (Heyworth and Kidson 1982, 110). As discussed above, an attempt to construct a curve for the north Wales coast indicated that sea level was once about 2m higher, possibly because the coast itself had risen because of isostatic recovery. Fortunately, as a long-term gradual event, isostatic recovery might affect the absolute levels of individual coastal events but should not affect the overall stratigraphic sequence. However, the types of deposits could vary somewhat depending on local geomorphology. For instance a stabilising coast in north Wales might be equivalent in time to one still flooding further south.

The valley of the Afon Dysynni may have been attractive for prehistoric settlement and river would have provided access for boats and there is a concentration of finds of Neolithic stone axes around the Dysynni as there is around the Mawddach (Smith 2000). It has been suggested that the Broadwater may have been an important landing place before silting up and that a major prehistoric trackway led from there around the hills towards Dolgellau (Bowen and Gresham 1967). Tywyn itself does not seem to have been a focal place in prehistory, although there are several Bronze Age finds from close to the sea-front about 1km north of the present study area. These comprise urn burials, two bronze spearheads and bronze axes. This concentration of rich finds suggests that there was a settlement or at least burial area of some status here that has, perhaps been eroded by the sea.

Tywyn itself may have long been a small fishing settlement but its chief origins lie in the establishment of a monastic community, Bryn yr Eglwys, about 516 AD by Cadfan, a Breton monk. The ecclesiastical community thrived and Tywyn had its own abbot by 1147 and it became a place of pilgrimage. In 1190 a bard, Llywelyn Fardd extolled the magnificence of the shrine of St. Cadfan. It seems to have become the mother church for the whole of Meirionnydd (Price 2001). The settlement at Tywyn was recorded as having 209 taxpayers in the Merioneth Lay Subsidy Roll of 1292. One of these was at Penllyn, the farm at the north side of the present study area so the Penllyn Marshes must have seen some activity during this period. The lake of Penllyn (Head or Top of the lake) may have been a valuable property for its fish. Perhaps more significantly the next farm to the east of Penllyn is that of Faenol (Maenol or Manor), which may well have been the site of the main ecclesiastical residence of Tywyn, although virtually nothing is known of the medieval layout of Tywyn.

The Dysynni may have remained navigable into the medieval period, perhaps accounting for the location of the early Welsh castle of Castell-y-Bere at the head of the valley. The flat coastal plain along the Meirionnydd coast is likely to have been a wave-cut platform exposed and grown over after a regression of sea-level after it had reached its maximum height, during the prehistoric period. The silting of the Broadwater may have resulted from gradual accumulation of shingle by longshore drift or from a single exceptional storm, which threw up the shingle bank in the same way as that at Chesil Beach, Dorset. However, such a dramatic change should have left historical records. The earliest detailed map of the area of 1748 by Lewis Morris, shows the study area as 'low marshes' (Fig. 2). The area north of Tywyn (the Morfa) was also marsh and was common land used for peat cutting. In 1793 it was described as 'a low, dreary, damp marsh watered by the river Dysynni and productive of nothing but peat' (anon. in Whatley 1990, 15). There are also peat-cutting beds exposed in the coastal peat south of Tywyn but there are no specific mentions of these although probably also used communally.

The earliest Ordnance Survey map of 1837 (Fig. 3) shows the study area with a large sinuous lake called Llyn y Borth, which reached almost as far as Penllyn farm, and several smaller pools behind the shingle bank and coastal belt of sand dunes (Fig. 3). To the south was a large marshy area called Gwerglodd Rhowniar. The map accompanying the Tithe Apportionment of 1841also showed Llyn y Borth, but called Penllyn Pool (Fig. 4). In 1886 it was said – 'The state of the marshes between Towyn and Aberdovey was very different prior to 1862 to what it is now. There was big pool below Penllyn, extending as far as Glanywern, upon which I spent many days boating. The Caethle Brook and Llyn y Borth were the best trout waters in the county before the Melinllyn Mining Company began, in 1851 to pollute them with lead washings, and fill up the bed of the brook with refuse, which proved, not only deadly to the fish but also to the ducks, geese and horses. These marshes, as well as the marshes of the Dysynni Valley were scientifically drained in 1862. The Dovey Marshes at a cost of £7,000 and the Dysynni Marshes at a cost of £30,000. The sound of a railway locomotive was first re-echoed by the hills and vales of the district about the same time as the marshes were drained. On the advent of these changes, and I call them changes advisedly, the charming seclusion, the primitive habits of the inhabitants, the wildfowl and the ague disappeared.' (Anon. 1886, 9).

The Afon Dyffryn Gwyn in 1837 followed a more sinuous route than that after drainage when it was straightened and bordered with flood banks. It formerly drained into the lake, which then overflowed through the shingle bank. After drainage of the marshes, and by the time of the 1891 Ordnance Survey map, the river seems to have been put into a culvert under the shingle bank, probably with a tidal sluice gate (Fig. 5). The former lake was then shown as just a marshy patch. Although the marshes were not productive agricultural land before drainage they may still have been valuable for summer pasture, fishing and peat cutting. The land was not 'waste' therefore and the 1841 Tithe Apportionment shows that they were in divided tenancy, between the farms of Penllyn, Esguan, Caethle, Rhawniar, all belonging to Athelstan Corbet (of Ynysmaengwyn). A small part was even listed as belonging to the 'Poor of Dolgelly' – possibly to allow peat cutting. Peat cutting in the Common of the Morfa, which was about 600 acres, must have been important for the town and there were disturbances when Corbet tried to enclose the common to improve it in the 19th century.

The field pattern was reorganised after drainage. Although the drainage was said to have taken place in 1862 and the Aberystwyth and Welch Coast railway was opened on 24th October 1864 the field pattern seems to show that it had been established before the railway was constructed. The drained fields would have provided better pasture and perhaps hav-cutting although the former area of lakes was still shown as 'Liable to floods' and left as a strip of rough land as shown on the 1891 map (Fig. 5). Aerial photographs show a number of irregular features in this coastal strip, perhaps the remains of old channels or of peat cutting. The only major feature that appeared in this period was a rifle range, which is not present on the 1891 map (Fig. 5) but is present on the 1901map (Fig. 6). This therefore belongs with the period between the Boer Wars of 1880-1 and 1899-1902 but it seems likely to have been a private range in origin. The range was clearly set up in line with a long field boundary and trackway leading to Esguan Hall, one mile to the north-east and reached via a bridge over the railway. This may have been designed to allow the range to be viewed by telescope from the hall. In 1901 the range consisted of just a line of targets with shooting butts set out at every 100 yards from 100 to 800 vards, thus continuing onto the east side of the Afon Dyffryn Gwyn. Some of the butts can be seen on aerial photographs in the rough coastal strip but those to the north-east in improved fields have been ploughed away. The targets still survive but with a flat-roofed brick building adjoining, probably a command post and this shows the range was used again in the 20th century. Whenever this was, it was at this time that the dunes behind the targets were bulldozed and built up to a substantial height behind the targets, to protect the beach from stray shot.

The area seems to have gone unaltered in the 20th century although the coastal strip was levelled and part of the east edge of the dunes was spread over the adjoining pasture. The tidal gates have been rebuilt and the river sides and flood banks improved. The main change was the addition of a line of concrete pillboxes along the front of the beach during World War II. There are six pillboxes set about every 500m from south of the outfall of the Afon Dyffryn Gwyn to the entrance to the Afon Dyfi. The flat area of the Penllyn Marshes must have been regarded as a possible landing place. It would seem possible that the line of defence would originally have continued to the north along the Tywyn sea-front in front of Tywyn RAF base and on the other side of the Dysynni in front of the Tonfannau army base although no evidence has been found for further pillboxes (Gwyn and Dutton 1995). It seems unlikely that they would all have been demolished or eroded by the sea although the latter possibility is supported by the decline in condition of the existing pillboxes from north to south. Alternatively, the line of defence may have been an unfinished project. The pillboxes will be discussed in the fieldwork section, below.

4.3 The Archaeological Survey

13 archaeological or historic features were identified within the overall survey area (Fig. 7), defined as the scheme area shown on the map supplied (Black and Veatch Fig. No. 1, Jan 02). The features are listed in two groups as described above, firstly within the area that might be destroyed by coastal incursion and secondly, those that might be affected indirectly by flooding or changes in land management. Each feature is described below with recommendations for further assessment and mitigatory measures, where appropriate.

Feature 1 Afon Dyffryn Gwyn Outfall

SN 5825 9935 Period: 19th-20th century Category: C. Impact: Significant

On the beach at the north edge of the survey area is the piped outfall of the river. This stands on concrete supports exposed at a high level above the beach. This allows water to exit at all but highest tides. The marshes were drained and the first tidal gate installed about 1862. The outfall originally exited onto the beach, as seen in the 1891 and 1901 OS maps (Figs. 5 and 6). It appears to have become exposed because of coastal erosion, which has either reduced the width of the shingle bank or driven it back further east. However, it is possible that the original outfall exit was deliberately extended seaward in its present elevated position. The outfall is now in a precarious exposed position and needs replacement, for safety and because it probably cannot be maintained in its present position.

Recommendations for further assessment: None **Recommendations for mitigatory measures:** Basic recording

Feature 2 Afon Dyffryn Gwyn Tidal Gate and Culvert

SN 5835 9940 Period: 19th-20th century Category: C. Impact: Significant

The river has been canalised and runs into a cutting as it approaches the tidal gate and culvert (Fig. 8). The whole area must have been dug out when these were constructed. The area of the tidal gate has been much modified and repaired but there may be elements of the original 19th century work, including the culvert or pipe. Photographic recording is needed during replacement.

Recommendations for further assessment: None **Recommendations for mitigatory measures:** Basic recording

Feature 3 Afon Dyffryn Channel, Flood banks and main drain

SN 5870 9945 (Centre) Period: 19th-20th century Category: C. Impact: Likely

The channel, flood banks and drains are still more or less as they were designed and constructed in the 19th century although regularly re-cut. The main drain forms the east edge of the managed retreat area. These will continue to be a functioning part of the system and so will be maintained and survive although the future impact is difficult to assess because it depends on long term changes as a result of the coastal erosion.

Recommendations for further assessment: None *Recommendations for mitigatory measures:* Basic recording

Feature 4 Clearance bank

SN 5845 9925 (Centre) Period: 19th-20th century Category: D. Impact: Significant

The fields within the Penllyn Marshes are level and improved grassland. The east edge of the dunes has been bulldozed and spread out over a strip about 100m wide at the west edge of the fields. The belt of dunes was probably once rather wider than that seen now as suggested on the OS map of 1837, before drainage and improvement took place about 1862. The former Llyn-y-borth must have been infilled and levelled at this time. At the west edge of this area is a slight bank between the improved land and the (disturbed) dunes but it is of only minor interest (Fig. 9).

Recommendations for further assessment: None **Recommendations for mitigatory measures:** None

Feature 5 Afon Dyffryn Gwyn Bridge

SN 5845 9945 Period: 20th century Category: D. Impact: Unlikely

The river is crossed by a modern concrete bridge, which provides access for stock and farm machinery. The first bridge here was built as part of the 19th century drainage scheme and is shown on the 1901 OS map (Fig. 6). It was probably a wood and iron construction that was destroyed when the modern bridge was constructed.

Recommendations for further assessment: None **Recommendations for mitigatory measures:** None

Feature 6 Trackway

SN 5860 9900 (Centre) Period: 19th-20th century Category: D. Impact: Significant

A trackway runs across the fields here, parallel to the coast, crossing the Afon Dyffryn Gwyn by the modern concrete bridge. It is mainly a modern construction of hardcore chippings raised slightly above the field surface. It provides farm access to the fields but is also a public right of way footpath that continues all the way to Aberdyfi and so must be an old route skirting the side of the former lagoons. As a PROW some provision will need to be made for its diversion around the coastal retreat area.

Recommendations for further assessment: None **Recommendations for mitigatory measures:** None

Feature 7 Rifle Range (GAT PRN 7287)

SN 5865 9878 Period: 19th-20th century Category: C. Impact: Considerable

The target area of a rifle range survives on the east edge of the dunes. It consists of two parts. First a long target area with brick wall fronted by a bank and a pentice-roofed protected walkway at the rear. Second a rectangular brick-built command post with a concrete flat roof (Fig. 10). The dunes at this point have been dug out around the targets and built up into a high bank at the west to provide a protective screen at the seaward side. The area is currently used as a cattle feeding point and is very trampled. The rifle range dates to between 1891and 1901 but in 1901 was just a line of targets, probably that still present The additional building seems to have been added during a period of re-use in about 1940. The survival of a 19th century military feature is unusual and is certainly of local and probably of regional importance and is worthy of recording.

Recommendations for further assessment: Desktop study of military records *Recommendations for mitigatory measures:* Detailed recording

Feature 8 Terrace

SN 5920 9800 (Centre) Period: 19th century Category: D. Impact: Considerable

At the south end of the survey area is a sudden dip of about 1.5m in the ground level, edged by a long curving terrace (Fig. 11). This dip marks the edge of an area marked on the 1837 OS map as *Gwerglodd Rhowniar* – Meadow (belonging to) Rhowniar (farm). The sharp terrace at its edge must have been created when the area to the north-west was drained and levelled. The lower area south of the terrace must be prone to flooding and is still unimproved of rougher vegetation and with several small pools.

Recommendations for further assessment: None **Recommendations for mitigatory measures:** None

Feature 9 Pill-box (RCAHMW NPRN 270343)

SN 5900 9776 Period: 20th century Category: C. Impact: Considerable

A line of seven World War II machine gun emplacement pillboxes has been recorded along the sea-front here by GAT (Gwyn and Dutton 1995) and the RCAHMW Defence of Britain Project of which three fall within the

survey area (Fig. 7). The Defence of Britain project has been started because of the realisation that there are relatively few surviving examples of military architecture and that those that do survive have not been recorded. These pill-boxes were probably built on the top of the shingle bank as then existed but the bank has been eroded by the sea and all are now collapsed or collapsing. Their position is now within the high tide line, which suggests that the shingle bank has retreated by at least 20m since their construction. That at the south is complete and roofed but has been undermined by the sea and is now set at an angle on the upper beach (Fig. 12). It has been recorded by the Defence of Britain Project but needs a full photographic record because the proposed coastal retreat poses an immediate threat to its survival.

Recommendations for further assessment: Desktop study of military records **Recommendations for mitigatory measures:** Basic recording

Feature 10 Pill-box (RCAHMW NPRN 270341)

SN 5886 9810 Period: 20th century Category: D. Impact: Considerable

This pill-box was not visible at the time of the visit although listed in the SMR and previously described by Gwyn and Dutton (1995) and the RCAHMW Defence of Britain Project as in good condition. It is assumed to have now collapsed like the pill-box Feature 12, below, and the substantial remains hidden by the high tide.

Recommendations for further assessment: Desktop study of military records *Recommendations for mitigatory measures:* Basic recording.

Feature 11 Pill-box (RCAHMW NPRN 270340)

SN 5871 9846 Period: 20th century Category: C. Impact: Considerable

This pill-box, listed in the SMR and described by Gwyn and Dutton (1995) and the RCAHMW Defence of Britain Project as in good condition is now in a damaged condition with the roof missing, within the tidal reach and constantly being eroded (Fig. 13).

Recommendations for further assessment: Desktop study of military records *Recommendations for mitigatory measures:* Basic recording.

Feature 12 Pill-box (RCAHMW NPRN 270339)

SN 5853 9886 Period: 20th century Category: D. Impact: Considerable

This pill-box has collapsed and now consists of just a group of horizontal concrete slabs lying on the beach.

Recommendations for further assessment: Desktop study of military records **Recommendations for mitigatory measures:** Basic recording

Feature 13 Turbary (GAT PRN 7286)

SN 5818 9932 (Centre) Period: 18th-19th century Category: B. Impact: Considerable Beneath the beach shingle and dunes is a buried ancient peat-bed, discussed above and Feature 13, below. This was not visible during the visit on 28th January 2004 because of a near high tide but is in any case frequently hidden by sand and only visible after particular tide and wind conditions. However, it has been visited previously when it was exposed (Gwyn and Dutton 1995 and Smith 2002). The peat bed is at least 1m deep and in its surface are many neatly cut rectangular pits, the remains of peat cutting for fuel (Fig. 14). These are so well preserved that spade marks are still visible in some faces (Fig. 15). There have been no artefacts to date the pits and no specific historical records of their cutting. However, there are general mentions of exploitation of peat around Tywyn in the 18th century and like other parts of north Wales this probably continued into the mid-19th century when the construction of the railways meant that cheap coal became available. Peat cutting in moorland usually manifests as long advancing faces, which are sometimes visible as slight terraces. The pits here seem to have been cut as separate features in order to avoid water-logging so that each pit was separated by a peat 'wall' from its neighbour which would have been filled with water between tides. Some of the pits are even provided with neat drainage channels.

The best-preserved area of pits runs for some 200m south of the outfall of the Afon Dyffryn Gwyn. The peat beds can be seen to run back under the shingle bank but is uncertain if the peat-cutting pits do also. However, they approach quite closely to it. This causes a problem of interpretation as it has been suggested that the exposure of the outfall and the erosion of the pill-boxes shows that the coastline has eroded back come way over the last hundred years. If it is assumed that the outfall was once near the upper beach, as show on the 1901 map then the peat-cutting beds would have been hidden under the beach sand and shingle, suggesting that the beach had advanced not retreated since their excavation. However, as suggested above, it may be that the river outfall was modified to extend it further out to sea, beyond where it was shown on the 1901 map. Even so the position of the pits would indicate that the coastline had not retreated at all since their use.

Recommendations for further assessment: None *Recommendations for mitigatory measures:* Detailed recording

Feature 14 Ancient peat-beds (GAT PRN 16601)

SN 5855 9853 (Centre) Period: Prehistoric Category: B. Impact: Considerable

The peat beds have been discussed as part of the background, above. They extend for about a kilometre along the shore here (Fig. 16, from Smith 2002). North of the outfall they are badly eroded and occur as isolated patches. In places there are large in situ tree stumps (Fig. 17) and in others large fallen trunks that have been exposed by the peat cutting (Fig. 18). The peat is at least a metre deep and consists of more than one horizon, some of it woody and fibrous, other much finer. The peat beds can be seen to run back under the shingle bank and may continue under the Penllyn marshes. This might be confirmed if a bore-hole study is carried out prior to start of the managed retreat scheme. The peat represents a buried and preserved ancient landscape in which well-preserved archaeological remains may occur. Sometimes objects are discovered by chance that show the presence of human activity but there are none reported from here. However, samples were taken as part of a previous survey and these showed the presence of charcoal, taken to be a good indicator of probable human activity nearby (Caseldine in Smith 2002). There have been datable finds elsewhere not far away, at Borth, just south of the Dyfi Mesolithic flints and an antler tool (Sambrook and Williams 1996, 26) and from Llanaber, Barmouth, red deer antlers, deer and cattle bones (Kelly 1982) and a medieval timber trackway (Musson *et al* 1989).

The peat beds in themselves are very fragile but are currently protected to some extent by the build-up of sand on the foreshore against the shingle bank. Erosion may therefore happen quite rapidly if the single bank is breached. This area of submerged ancient land surface is the largest in extent and the best preserved of the thirty-one known or reported such exposures in north-west Wales (Smith 2002). It therefore has the greatest potential for research and deserves a programme of sampling and dating before the deposits are eroded away during the managed retreat scheme. The deposits would also need long term observation as the coast edge erodes and new areas of peat become exposed.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Detailed recording, to include scientific sampling and dating

5 SUMMARY OF RECOMMENDATIONS FOR MITIGATORY MEASURES

The assessment is summarised in Table 1. There are relatively few archaeological or historic features in this area because it was, until the late 19th century, mainly marshland and coast edge, of little use for agriculture or settlement. The main features of value are the ancient peat-beds, the unusual 18th-19th century peat workings, the 19th century rifle range and the World War II pill-boxes. All are threatened with destruction and require adequate recording in advance of the managed coastal retreat.

Feature	Туре	Category	Impact	Proposed mitigation
INO.				
1	Outfall	С	Significant	Basic recording
2	Tidal gate	С	Significant	Basic recording
3	Channel and flood banks	С	Likely	Basic recording
4	Clearance bank	D	Significant	None
5	Bridge	D	Unlikely	None
6	Trackway	D	Significant	None
7	Rifle range	С	Considerable	Detailed recording
8	Terrace	D	Considerable	None
9	Pill-box	С	Considerable	Basic recording
10	Pill-box	D	Considerable	Basic recording
11	Pill-box	С	Considerable	Basic recording
12	Pill-box	D	Considerable	Basic recording
13	Turbary	В	Considerable	Detailed recording
14	Peat-beds	В	Considerable	Detailed recording

Table 1 Summary of assessment and recommended mitigation

6 DOCUMENTARY SOURCES

6.1 Published sources

Ashton, W. 1920. The evolution of a coastline, Barrow to Aberystwyth and the Isle of Man, with notes on lost towns, submarine discoveries &c., Stanford, London.

Beverley Smith J. and Beverley Smith, L. eds 2001. *History of Merioneth Vol. II, The Middle Ages*, Merioneth Historical and Record Society, Univ. of Wales Press, Cardiff.

Bowen E.C. and Gresham, C.A. 1967. *History of Merioneth, Vol. 1*, Merioneth Historical and Record Society. Cymmrodorion 1959. *The dictionary of Welsh bibliography down to 1940*, The Honourable Society of Cymmrodorion, Blackwell, London..

Guilbert, G. 1981. A perforated antler 'hammer-head' from Mochras, *Journ. of the Merioneth Hist. and Rec. Soc.* IX pt 1, 106-9.

Heyworth, A. 1978. Submerged forests around the British Isles, their dating and relevance as indicators of postglacial land and sea-level changes. In J. Fletcher, ed. 1978, *Dendrochronology in Europe*, BAR Internat. Ser. 56, 279-88.

Heyworth, A. and Kidson, C. 1982. Sea-level changes in south-west England and Wales, *Proc. Geol. Assoc.* 73, 91-111.

Jacobi, R.M. 1980. The early Holocene in Wales. In Taylor, J.A. ed. 1980. *Culture and Environment in Prehistoric Wales*, BAR Brit. Ser. 76, 131-206.

Kelly, R.S. 1982. Recent discoveries in the Morfa Dyffryn submerged forest, *Journ. of the Merioneth Hist. and Rec. Soc.* 9, 262-3.

Morris, L. 1725. Llythyr Lewis Morris ac Owen Meurig, Cwmdeithas Morrisiaid Môn, 5, April 1999,

Morris, L. 1748. Plans in St. George's Channel, Reprinted 1987, Lewis Morris Productions, Beaumaris.

Musson, C.R., Taylor J.A. and Heyworth, A. 1989. Peat deposits and a medieval trackway at Llanaber, near Barmouth, Gwynedd, *Archaeology in Wales* 29, CBA Wales, 22-6.

Tooley, M.J. 1974. Sea-level changes during the last 9000 years in north-west England, *Geographical Journal*, 140, 18-42.

Price, H. 2001. The Medieval Church. In Beverley Smith 2001, 254-296.

Tooley, M.J. 1978. *Sea-level changes in North-west England during the Flandrian stage*, Oxford, Clarendon Press.

Tooley, M.J. 1985. Sea-level changes and coastal morphology in North-west England. In R.H. Johnson (ed.), *The geomorphology of North-West England*, Manchester, 94-121.

Whittow, J.B. 1965. The interglacial and post-glacial strandlines of North Wales. In J.B. Whittow and P.D. Wood, eds, *Essays in geography for Austin Miller*, Reading, 94-117.

6.2 Non-published sources

Anon. 1886. *The History of Ystumaner, Copy of a paper read at a meeting of the Towyn Debating Society in March 1886*, Dolgellau Record Office, Ms. no. Z/M/4475.

Gwyn, D.G. and Dutton, A. 1995. *Coastal Survey: Aberdaron to Aberdyfi, Project No. G1315*, GAT Report No. 198.

Sambrook, R.P. and Williams, G. 1996. *Cardigan Bay Coastal Survey*, Dyfed Archaeological Trust, Rep. No. PRN 30751.

Smith, G.H. 2000. *Gwynedd Lithic Scatters Project: Evaluation of the Early Prehistoric Landscape through Lithic Finds*, GAT Report no. 357.

Smith, G.H. 2002. *Coastal peat and intertidal survey*, *Project No. G1679*, GAT Report no. 450. Whatley, A. 1990. *Tywyn: A short history*, private print., Dolgellau Record Office, Tywyn Parish File.

6.3 Cartographic sources

Ordnance Survey 1st ed. 1inch to 1mile, 1837, Sheet LIX S.E. Ordnance Survey 1st ed. 1inch to 1mile, 1837, printed with additions 1864. Sheet LIX S.E. Ordnance Survey 1st ed. 6 inches to 1 mile, 1891. Ordnance Survey 2nd ed. 1:2500, 1901, Sheet XLVIII.1. Saxton, Map of Caernarfonshire and Anglesey 1578. Tithe map for the parish of Tywyn, *c*. 1841.

6.4 Aerial Photographic sources

<u>www.multi-map.com</u>

APPENDIX 1

DEFINITIONS OF CATEGORIES OF ARCHAEOLOGICAL IMPORTANCE, IMPACT, FIELD EVALUATION AND MITIGATION

1. Categories of importance

The following categories were used to define the value 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. By the end of the assessment there should be no sites remaining in this category.

2. Definition of Impact

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

None:

There is no construction impact on this particular site.

Slight:

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

Unlikely:

This category indicates sites that fall 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 road.

3. Definition of field evaluation techniques

Field evaluation is necessary to fully understand and assess 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.

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. Geophysical survey is not thought to be suitable for the feature and subsoil types expected at Fairbourne/Arthog.

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.

4. Definition of Mitigatory Recommendations

None:

No impact and therefore no requirement for mitigation measures.

Avoidance

Where possible, features that may be affected should be avoided. Sometimes this could mean a change in layout, design or route. More usually it refers to the need for care during construction to avoid accidental damage to a feature. This may be achieved by marking features or areas, for example with warning tape, before work starts, or in sensitive cases carrying out a watching brief.

Detailed recording:

Detailed recording requires a photographic record, surveying and the production of a measured drawing prior to the commencement of the works on site.

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

Basic Recording:

A photographic record and full description, and limited measured survey where applicable.

Watching brief:

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

APPENDIX 2

List of Historic Environment Records within 1km of the survey area

1. Records within the survey area

A. Records listed by GAT

PRN	SITENAME	NGR	STATUS	SITETYPE	PERIOD
7286	TURBARY AT TYWYN	SN58189932		PEAT	Modern
7287	SHOOTING BUTTS AT	SN58649879		MILITARY	Modern
16601	PEAT EXPOSURES AT	SN58559853		PEAT	Prehistoric

B. Records listed by RCAHMW

NPRN	NAME	NGR	STATUS	TYPE	PERIOD
270339	PILLBOX, TOWYN	SN58539886		PILL BOX	Post Medieval
270340	PILLBOX (TYPE FW3/23),	SN58719846		PILLBOX	Post Medieval
270341	PILLBOX (TYPE FW3/23),	SN58869810		PILLBOX	Post Medieval
270342	PILLBOX (TYPE FW3/23),	SN59349680		PILLBOX	Post Medieval
270343	PILLBOX (TYPE FW3/23),	SN59009776		PILLBOX	Post Medieval
270344	PILLBOX, TOWYN	SN59159729		PILL BOX	Post Medieval

2. Records outside the survey area but within the overall area of the scheme

Nil.

3. Records outside the area of the scheme but within 1km.

A. Records listed by GAT

PRN	SITENAME	NGR	STATUS	SITETYPE	PERIOD
888	MARCONI WIRELESS	SH59500010A		TELEGRAPH	Modern
3415	BODTALOG (PLACE	SN60109960		PLACENAME	Early-Medieval
3900	BRONZE TOOLS	SH58000000A		FINDSPOT	Prehistoric
4797	CLAS MONASTERY -	SH5900000A		MONASTERY	Early-Medieval
4806	BRONZE AGE	SH5800000A		FINDSPOT	Prehistoric
4813	BRONZE SPEAR HEAD -	SH5800000A		FINDSPOT	Prehistoric
4928	FLINT AXE - FINDSPOT	SN59509988		FINDSPOT	Prehistoric
4929	HOUSE - RHOWNIAR	SN59739826		HOUSE	Medieval
7285	TYWYN FRONT	SH57700003		HOTEL	Modern
9869	BOTALOG (BOTALOC)	SN59809940		TOWNSHIP	Medieval
12408	MAENGWYN STREET	SH58000000	GII	BUILDING	Post-Medieval
12419	NATIONAL STREET TAN	SH58000000	GII	BUILDING	Post-Medieval
12461	RED LION STREET 5 AND	SH58000000	GII	BUILDING	Post-Medieval
12463	RHOWNIAR, CRUCK	SN59729824	GII*	BUILDING	Post-Medieval
16976	PENLLYN MEDIEVAL	SN58409990		TOWNSHIP	Medieval
20397	SLATE QUARRY,	SN60009980		SLATE	Post-Medieval
21136	LEVEL, ESGUAN	SN59709990		LEVEL	Post-Medieval
21137	QUARRY, FRON HEULOG	SN59809980		QUARRY	Post-Medieval

B. Records listed by RCAHMW

NPRN	NAME	NGR	STATUS	TYPE	PERIOD
15002	CAE'R BRENIN	SN59709900		FIELD	Medieval?
28394	FRANKWELL	SH5800		TOWN	Post
28551	MAENGWYN STREET	SH5800	LB2	DWELLING	Post
28592	NATIONAL STREET, TAN-	SH5800	LB2	DWELLING	Post
28706	RED LION STREET 5 AND	SH5800	LB2	DWELLING	Post
28714	RHOWNIAR, CRUCK	SN59729824	LB2*	HOUSE	Medieval
28715	RHOWNIAR	SN59739826		DWELLING	Post
28716	RHOWNIAR (MANSION)	SN59919822		MANSION	Post
32849	BRYN-YR-ORSEDD	SN60099786		PLACE NAME	Unknown
40913	CAETHLE MILL	SN59729935		WOOLLEN	Post Medieval
96023	COTTAGE RHOWNIAR	SN59729824		COTTAGE	Post Medieval
270342	PILLBOX (TYPE FW3/23),	SN59349680		PILLBOX	Post Medieval
270344	PILLBOX, TOWYN	SN59159729		PILL BOX	Post Medieval

APPENDIX 3

PRELIMINARY ENVIRONMENTAL ASSESSMENT OF SAMPLES FROM TYWYN AS PART OF THE COASTAL PEAT SURVEY, GAT PROJECT G1679

By Astrid Caseldine, University of Wales, Lampeter

Tywyn

A sequence of samples at 20cm intervals was taken down an exposed face in one of the peat cuts. 50 ml samples were examined. A spot sample (250 ml) from a woody basal peat from an area where a number of tree stumps and tree trunks were present was also examined.

0-5 cm

The sample contained frequent monocot. remains, a few charcoal fragments and the occasional wood fragment. Seeds of *Betula sp.*, *Potentilla* sp. (cinquefoils), *Carex* sp. and *Ranunculus* sp. were also present.

20-25 ст

Monocot remains were frequent. Charcoal was rare. *Ranunculus* spp., *Hydrocotyle vulgaris* (marsh pennywort) *Apium* sp. (marshworts) and *Lycopus europaeus* seeds occurred.

40-45 cm

The sample was dominated by monocot. remains, including *Phragmites*. Wood fragments were rare but charcoal fragments were frequent. *Ranunculus* sp. and *Hydrocotyle vulgaris* occurred.

60-65 cm

Wood fragments were relatively frequent and monocot remains, including *Phragmites*, were occasional. Bud scales and leaf scars were also present. *Betula* sp. and *Carex* sp. seeds occurred. A few very small charcoal fragments were present.

Woody peat

Wood fragments were abundant and monocot. remains occasional. A leaf bud and bud scales were also present as well as minerogenic material and moss. *Rubus fruticosus* (bramble) seeds occurred. Two pieces of wood were identified as *Alnus*.

The evidence from the sequence suggests woodland giving way to reed swamp. Further evidence for woodland is provided by the separate sample, which indicates the presence of alder carr. Preservation was good

Conclusions

Of note is the occurrence of charcoal (wood or monocot.) in a number of the samples which may be simply due to 'natural' fires or could possibly indicate anthropogenic activity in the area and some deliberate attempt at management or manipulation of the environment. Alternatively, the presence of wood charcoal could perhaps indicate occupation not too far away. This requires further investigation.



Fig. 1 Penllyn Marshes, Tywyn: Extent of the survey area and location of Historic Environment Records



Fig. 2 Penllyn Marshes, Tywyn: Part of a map by Lewis Morris, 1748 showing the Penllyn marshes and Aberdyfi (North to the left)



Fig. 3 Penllyn Marshes, Tywyn: Ordnance Survey 1st ed. 1 inch map 1837, printed in 1864, with line of railway (Opened 1864) added as overlay



Fig. 4 Penllyn Marshes, Tywyn: Tithe map c. 1841, showing former lake, 'Penllyn Pool'



Fig. 5 Penllyn Marshes, Tywyn: Ordnance Survey 1st ed. 6 inch map, 1891, showing the tidal gate, outfall, canalised river and absence of rifle range



Fig. 6 Penllyn Marshes, Tywyn: Ordnance Survey 2nd ed. 25 inch map, 1901 showing tidal gate, outfall, canalised river, bridge and rifle range



Fig. 7 Penllyn Marshes, Tywyn: Location of survey area and of recorded features. Based on OS 1:10,000 scale maps. © Crown copyright. All rights reserved. Licence number AL 100020895.



Fig. 8 Penllyn Marshes, Tywyn: Afon Dyffryn Gwyn tidal gate (Feature 2)



Fig. 9 Penllyn Marshes, Tywyn: Agricultural clearance bank (Feature 4)



Fig. 10 Penllyn Marshes, Tywyn: Rifle range butts and command building (Feature 7), from the west. 1m scale



Fig. 11 Penllyn Marshes, Tywyn: Agricultural clearance terrace (Feature 8), from the west. 1m scale



Fig. 12 Penllyn Marshes, Tywyn: Pill-box (Feature 9), from the north-east. 1m scale



Fig. 13 Penllyn Marshes, Tywyn: Pill-box (Feature 11), from the north-east. 1m scale



Fig. 14 Penllyn Marshes, Tywyn: Peat cutting beds (Feature 13), general view, from the north-east.



Fig. 15 Penllyn Marshes, Tywyn: Peat cutting beds (Feature 13), showing spade-marks, from the north-west. 1m scale



Fig. 16 Penllyn Marshes, Tywyn: Sketch location of intertidal peat exposures, PRN 16601. Scale 1:10,000. Based on OS 1:10,000 scale maps. © Crown copyright. All rights reserved. Licence number AL 100020895.



Fig. 17 Penllyn Marshes, Tywyn: Peat beds (Feature 14), ancient tree stump in situ, from the north-west. 1m scale



Fig. 18 Penllyn Marshes, Tywyn: Peat beds (Feature 14), ancient fallen tree trunk in situ, from the west. 1m scale





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