

TYWYN COASTAL PROTECTION SCHEME

ARCHAEOLOGICAL ASSESSMENT

GAT Project No. G1860

Report No.555

Prepared for
ABP Marine Environmental Research Ltd

November 2004

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

Ymddiriedolaeth Archaeolegol Gwynedd
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CONTENTS

	Page no.
Summary	2
Introduction	2
Specification and project design	2
Methods and techniques	3
Topographic description	3
Archaeological and historical background	4
The archaeological survey and assessment	7
Summary of recommendations for mitigation	12
Documentary sources	13

Appendix 1 Definitions of Categories of Archaeological importance, Impact, Field evaluation and Mitigation.

Appendix 2 List of historic and archaeological records within 1 km of the survey area.

Appendix 3 Environmental assessment of intertidal peat samples from Tywyn, Meirionnydd, GAT Project No. G1679, by Astrid Caseldine, University of Wales, Lampeter.

LIST OF FIGURES

1. Location of the study area and of Historic Environment Records within 1km
2. Map of the Penllyn Marshes and the Dyfi Estuary by Lewis Morris 1748.
3. Ordnance Survey 1st ed. one inch to one mile map, surveyed 1837, printed 1864 with railway added as overlay.
4. Ordnance Survey 1st edition 1:10,650 (6 inch to the mile) scale map, 1891.
5. Ordnance Survey 2nd ed. 25 inch maps of Tywyn sea front, showing development between 1888 and 1901.
6. The 1889 inauguration stone for Corbett's promenade, Tywyn sea front.
7. Location of recorded survey features (1:10,000 scale).
8. Afon Dysynni entrance wall. Feature 1.
9. Northern Sea Bank, Feature 2 and the Dysynni Low Level outfall, Feature 4.
10. Cambrian Coast Railway embankment and track, Feature 5.
11. Tywyn sea front, the Corbett Promenade.
12. The Late Bronze Age spearhead found at Tywyn, Feature 6 (From Briggs 1979)
13. Location of the intertidal peat exposures in the vicinity of the Afon Dyffryn Gwyn outfall, February 2002 and November 2004.
14. Peat beds with peat-cutting evidence north of the Afon Dyffryn Gwyn outfall, November 2004.
15. Ancient tree trunk *in situ* north of the Afon Dyffryn Gwyn outfall, February 2002.
16. Ancient peat with peat-cutting beds, north of the Afon Dyffryn Gwyn outfall, November 2004.
17. Ancient peat with peat-cutting beds, south of the Afon Dyffryn Gwyn outfall, November 2004.

SUMMARY

An archaeological assessment was carried out as part of an environmental impact assessment in advance of a proposed coastal protection scheme at Tywyn, Meirionnydd, Gwynedd. The assessment involved the consultation of existing documentary records and maps and a field search. Thirteen features were recorded of which six were existing Heritage Environment Records. Recommendations are made for a watching brief during certain phases of construction.

1 INTRODUCTION

Gwynedd Archaeological Trust was asked by ABP Marine Environmental Research Ltd to carry out an archaeological assessment in advance of a proposed coastal protection scheme along the sea front of the town of Tywyn and a further area extending north from Tywyn to the mouth of the Afon Dysynni (Fig. 1).

Most of the area is low-lying marshy land that has been extensively drained in the 19th century. The drainage is managed by a series of sluices and tidal outfalls along the coast edge, which also has a natural shingle storm bank in places and man-made sea-wall in others. The older, central part of Tywyn town lies upon a low promontory that is raised above the coastal plain but newer parts of the town extend onto the lower-lying land where they are at risk from flooding. The lower land is also crossed by a main railway line that runs over the coastal plain and along the coast edge north of Tywyn before crossing the Afon Dysynni.

The area lies just outside the Snowdonia National Park. The area around the entrance to the Afon Dysynni, including The Broadwater is a SSSI and is also part of the (marine) Pen Llyn a'r Sarnau Special Area of Conservation (SAC) of which the main area of interest is The Broadwater (Morfa Gwyllt) lagoon. The Dysynni Valley is also recognised as a landscape of historic importance in Wales (HLW (Gw) 17, Cadw 1998).

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. The survey area covers three areas of interest for Network Rail, for Cyngor Gwynedd Council and for the Environment Agency Wales, the latter two of which overlapped (Fig. 7). It was agreed that the report would identify the recommendations relevant to each area of interest.

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) for north-west Wales, 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 and on-line information provided by the Countryside Council for Wales, Snowdonia National Park, the Joint Nature Conservation Committee and Gwynedd County Council.

The wider archaeological and historical background was considered. In addition, archaeological or historic features that might comprise 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 two zones:

1. Those physically within the area that might be directly affected by the proposed works.
2. Those outside the scheme but which might provide 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 coast-edge and the foreshore itself were walked. Features were noted, described and photographed. Conditions were good for visibility. All the area was accessible as the coast edge is a public space. All records are archived in Gwynedd Archaeological Trust under the project number G1860.

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 TOPOGRAPHIC DESCRIPTION

This is all low-lying coastal plateau except immediately west of Tywyn town where a very slight rise in the ground, Bryn-y-mor, meets the coast edge. The flat coastal plain along the Meirionnydd coast is likely to have originated as a wave-cut platform, exposed and grown over following a fall in sea-level after it had reached its maximum height sometime during the prehistoric period. On the other hand it is possible that the silting of The Broadwater may have resulted from gradual accumulation of shingle by longshore drift, blocking up the mouth of the estuary. Almost identical topographical situations to the Dysynni are to be seen at the mouths of the Dyfi and Mawddach estuaries. This is made evident even in the last 200 years by comparison of the northward movement of the mouth of the Afon Dysynni shown on successive Ordnance Survey maps (Figs 3, 4 and 1).

To the south of Tywyn the coast edge is fringed by a narrow line of dunes and a shingle bank revetted in places by a loose-laid stone sea-wall. At the south side of the town the coast edge is protected by boulders revetted with sheet piling. Alongside the town itself is a massive 19th century promenade of slate, topped by a brick wall. To the north of this promenade is a modern concrete sea-wall and promenade. North of the concrete sea-wall is a line of dumped large rubble and beyond this, where the railway meets the coast edge, is a short stretch

of completely unprotected coast edge (Fig. 10, below). The northern part of the coast alongside the railway line is protected by a crude bank of massive rubble. Inland, beyond the built-up areas the fields are now level grassland apart from very slight undulations. Before drainage the area was marsh with lagoons (Fig. 3) and there must have been much work draining and enclosing the area. The dunes to the south of the town are the northernmost tail 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 and encroachment by the sea wall and the two main outfalls. One drains the lowland to the north of Tywyn town and is the Low Level Dysynni Outfall. The other drains the lowlands to the south of the town and is the canalised River Dyffryn Gwyn. There are numerous timber post and plank groynes protecting the land edge alongside the town and where the railway runs along the coast edge, north of the town. These are 20th century additions.

5 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

At the southern edge of the area of investigation, north and south of the Afon Dyffryn Gwyn outfall the intertidal area is notable for the presence of an ancient submerged peat and forest bed. This lies beneath the sands and shingle bank and is hidden at most times, being exposed occasionally after particular tidal and wind conditions, which seem to occur during the winter period. The presence of similar intertidal peat has been recognised for several centuries around the coast of Wales, the earliest evidence being that of Gerald of Wales, who noted 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 conflicts 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 Innumerable 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-Bwlch which lay off Tywyn. These *sarns* are genuine geological features, probably glacial moraines (JNCC 2004), visible at times of very low tides, but the tales of submerged lands seem to be just fanciful rather than genuine folk memories since they were only terrestrial long before the Medieval period. Finds and scientific dates show that the 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. At Arthog on the south side of the Afon Mawddach, 15km to the north of Tywyn a rare type of bronze urn of Late Bronze Age type (c. 1000-750 BC) was found in the estuarine peat in the 19th century (Hawkes and Smith 1957, Hemp 1960). Recent scientific dating of preserved wood from the peat near to the find has produced a date of 1740-1420 Cal BC (Beta 193840) (Smith 2004).

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, six on the north Caernarfon coast and two in Meirionnydd. 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 that 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 sea-levels 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 sea-levels between about 7500-4000 radiocarbon years BP being about 2m above those of south Wales and southern England (*ibid.* 110) 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 microlith flint points, 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 archaeological 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 from this site was used to construct 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 the river would have provided access for boats. There is a concentration of finds of Neolithic stone axes around the Dysynni as there is also around the Afon Mawddach (Smith 2000). It has previously been suggested that The Broadwater may have been an important sheltered landing place in prehistory, before silting up, and that a major prehistoric trackway led from there around the hills towards the Cregennan Lakes, a focus for prehistoric funerary and ritual activity, and on towards Dolgellau (Bowen and Gresham 1967). The trackway is identifiable on the high ground above Llwyngwrl but not in the lowland to south if it did come down towards the Afon Dysynni. However, there is a standing stone at Waun Fach, 1km from the Dysynni and 4km north of Tywyn and this could lie on the suggested route.

Most recorded prehistoric activity in this area was on the upland where there are numerous burial mounds, cairns and standing stones of the second millennium BC as well as hillforts and settlement remains of the first millennium BC and perhaps into the Roman period. This is not to say that the lowland was not inhabited, just that archaeological evidence there is much sparser because of the effects of centuries of agriculture. The best agricultural land was in the lowland and it can be expected to have been exploited. There is some evidence of prehistoric activity in the lowlands around Tywyn. Crop marks were recorded during aerial survey at Bryn Crug, on the valley floor 2km east of Tywyn. These include ring ditches and rectangular ditched features and were suggested to be part of an Iron Age or Early Christian cemetery (Crew and Musson 1996, 12-13). In the same area is also a tall standing stone, Croes Faen but this may be of medieval date.

The topographic situation of Tywyn would not obviously suggest itself as likely to be a focal place in prehistory. It was neither in a defensible or prominent position nor very close to a good harbour or rich agricultural land. Nevertheless it did attract settlement from at least the Early Medieval period, which suggests that it had some value. There are also a few prehistoric finds from Tywyn. One of these falls within the survey area and was a Late Bronze Age spearhead, reported as found during excavations for the new promenade along the sea-front around 1970 (Briggs 1979, 310-11). The other comes from about 1.5km to the east of the survey

area, on the edge of the town, and was a notable group of Early bronze Age burials and burial urns. These were found during removal of a hedge at Pantyneuadd at the edge of the town. The presence of the latter finds shows that there was a funerary area here and it is very likely that there was also a settlement nearby, perhaps supported by the presence of the spearhead.

The medieval settlement of Tywyn was focussed on the slightly higher ground, about 1km from the sea. This position may have had some defensive attraction since it would have been surrounded by the sea on one side and by marshes on two others. On the other hand it may simply have been useful for its proximity to food resources such as fishing. Its chief known origins lie in the establishment of a monastic community, Bryn yr Eglwys, about 516 AD by Cadfan, a Breton monk. The location of this earliest monastic settlement is not known although it would probably have been centred around the church. However, the ecclesiastical community thrived and Tywyn had its own abbot by 1147. It became a place of pilgrimage and in 1190 a bard, Llywelyn Fardd extolled the magnificence of the shrine of St. Cadfan there. The church, parts of which are of 12th century date, became the mother church for the whole of Meirionnydd (Price 2001). Tywyn parish was large, extending as far as Aberdyfi and was recorded as having 209 taxpayers in the Merioneth Lay Subsidy Roll of 1292, while the town itself had 9, so was an established settlement with a prosperous hinterland.

Little is known about the layout of medieval Tywyn but a farm just south of the town is called Faenol (maenol or manor) and this may have been the site of the main ecclesiastical residence. The marshes around Tywyn had not been drained in the medieval period and there was a large lake south of Faenol called Llyn y Borth or Penllyn Pool, which may have been valuable for its fish. 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 Dysynni may have still been navigable for some way inland in the medieval period, prior to drainage and land reclamation in the 18th and 19th centuries, perhaps accounting for the location of the early Welsh castle of Castell-y-Bere at the head of the valley. However, a survey of ports, creeks and landing places in 1569 stated ‘Dessyine being a creek having no habitacion nor resorte and there is nother shippe, nor boote that belongeth there unto’ (Whatley 1990, 12). The earliest detailed map of the area in 1748 by Lewis Morris shows the area south of Tywyn as ‘Low Marshes’. The area north of Tywyn (the Morfa) 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 intertidal area of the beach just south of Tywyn and Whatley (1990, 9) says that ... ‘Records exist of people retrieving peat at low tide (1808)’ although the reference for these records is not given.

The earliest edition Ordnance Survey map of 1837/1864 (Fig. 3) shows the area before extensive drainage was carried out. North of Tywyn with a much larger tidal pool than exists now at The Broadwater and a sinuous channel or creek leading from it towards the town. A description of early 19th century Tywyn said that ‘At this time Towyn was a harbour or it may not inappropriately be called a sea port because the tide did not ebb or flow at Gwalia. Ships not only came there, but there was a shipbuilding yard on the eastern bank of the Pill ditch, opposite where the Calvinistic Methodists built a chapel’ (Anon, 1886) (Fig. 3).

The 1837/164 map shows the area south of Tywyn 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 1841 also showed Llyn y Borth, but there called Penllyn Pool. The Afon Dyffryn Gwyn in 1837 then 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 (Fig. 4), the river seems to have been put into a culvert under the shingle bank, probably with a tidal sluice gate.

Although the marshes were not productive agricultural land before drainage they may still have been valuable for summer pasture, fishing and peat cutting. Peat cutting in the Common of the Morfa, which was about 600 acres, must have been important for the town. The earliest drainage of the marshes was actually begun in the Dysynni Valley in 1807 by Edward Corbett of Ynysmaengwyn. It appears that the people of Tywyn were cheated of their common rights by Corbett. It was stated spuriously, that coal had been found locally and that Corbett would supply free coal to the townspeople if they would give up their rights to the Common (for peat-cutting). They were persuaded to sign an Enclosure Act in 1805 for enclosing, embanking, draining and improving certain lands in the township of Vaenol in the Parish of Tywyn. The land was allotted in 1809 and soon enclosed. It was said that ‘... at about this time the Embankment known as “Clawdd Swnd” was constructed, which prevented the tide from coming to Gwalia (i.e. to Tywyn creek)’ (Anon. 1886). However, at the time of the Tithe Apportionment of 1841 a portion of the land south of Tywyn was still listed as belonging to the ‘Poor of Dolgelly’ – possibly to allow peat cutting. Even after enclosure the townspeople benefited from the improvements by use of the pasture as shown by the Tithe Apportionment Survey of 1841, which lists 17 fields as ‘Allotments in Tywyn Marsh’ under several different names, although now, of course they would be tenants of Corbett and pay for the use. Corbett was lover of horse racing and established a racecourse just south of The Broadwater (Fig. 3). Tywyn races were well known and were said to last for a week, perhaps helping to placate the townspeople. The racecourse had disappeared by the time of the 1891 map, possibly a victim of Puritanism and is now only faintly visible on aerial photographs in the rough land of the Morfa edge.

The field pattern was reorganised after drainage as can be seen by comparison of the 1837/1864 and the 1891 maps. On the 1891 map (Fig. 4) the former lake of Llyn y Borth (Penllyn Pool) was then shown as just a marshy patch and Tywyn creek had largely disappeared. Further drainage had taken place around 1862 and the Aberystwyth and Welch Coast railway was opened on 24th October 1864. The field pattern shows that it had been established before the railway was constructed. The drained fields would have provided better pasture and perhaps hay-cutting although its margins were still shown as ‘Liable to floods’ and left as rough land as shown on the 1891 map (Fig. 4). Aerial photographs show a number of irregular features in these coastal areas, perhaps the remains of old channels or of peat cutting.

In the 20th century the main changes were a result of the Second World War. An airfield was created on Morfa Tywyn with accompanying camp buildings. The RAF base was an army co-operation unit that towed targets for artillery practice. The base was operational between 1941 and 1945 when it was taken over by the army (Sloan 1991). The runways have disappeared from view but the buildings are still extant. There seem to have been no local defensive works on the coast edge alongside the airfield but there was a line of concrete pillboxes along the front of the beach south of Tywyn. 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. It would seem possible that the line of defence would originally have continued to the north along the Tywyn sea-front in front of Morfa 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.

6 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 (ABP Mer, Fig.1, Nov. 2004). Each feature is described below with recommendations for further assessment and mitigatory measures, where appropriate. A summary of the recommendations at the end groups them into Areas of Interest for Network Rail, Gwynedd Council and the Environment Agency Wales.

Feature 1 Afon Dysynni Entrance Wall

SH 5614 0320

Period: 20th century

Category: C. Impact: Unlikely

A massive wall of laid slate slabs provides a protective wall on the south side of the entrance to the Dysynni channel (Fig. 8). This doesn't look like modern work but doesn't appear on the 1888 or 1901 maps and seems

to belong with the changed shape of the river entrance seen on more recent maps, where the entrance has been canalised and a flood bank built further upstream (Fig. 7).

Recommendations for further assessment: None

Recommendations for mitigatory measures: Basic recording

Feature 2 Dysynni Marshes Sea Bank

SH 5724 0160 to SH 5670 0260 (Approx.)

Period: 19th – 20th century

Category: C. Impact: Unlikely

A large bank of massive rubble protects the coast edge north of the Dysynni Low Level outfall (Fig. 9). This post-dates the railway construction and the drainage of the marshes since it does not appear on the Ordnance Survey maps of 1891 or 1901. Neither do other flood banks present now around the mouth of the river and immediately upstream of the railway bridge.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Basic recording

Feature 3 Afon Dysynni Low Level Tidal Gate and Culvert

SH 5718 0188

Period: 19th century

Category: C. Impact: Likely

Part of the drainage scheme for the marshes carried out in 1862. The drainage channel runs into a culvert beneath the railway embankment. There may be elements of the original 19th century work remaining.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Watching brief and basic recording

Feature 4 The Afon Dysynni Low Level Outfall

SH 5706 0185

Period: 19th century

Category: C. Impact: Significant

The construction of the Cambrian Coast Railway was preceded by drainage of the marshes north and south of Tywyn in 1862. This was achieved by construction of drainage channels, tidal gates and outfalls.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Watching brief and basic recording

Feature 5 Cambrian Coast railway embankment

SH 5734 0154 to 5670 0270

Period: 19th century

Category: C. Impact: Unlikely

The Cambrian Coast line was opened in 1864. It runs on its original embankment and bridge across the Dysynni. The railway line runs close to the coast edge for about 1.5km of the northern part of the study area. It seems to have made use of a pre-existing shingle storm bank along some of this route. At the south it is protected by a concrete sea-wall and to the north by a rubble bank. In the central part however, it has no protection, possibly because the rubble bank has been eroded by the sea and recent highest tides have come within a few centimetres height and a few metres distance of the railway line.

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

Feature 6 Bronze spearhead findspot, Tywyn sea-front, (GAT PRN 4813)

SH 5770 0095

Period: Early first millennium BC

Category: B. Impact: Unlikely

This spearhead (Fig. 12) was reported to have been found during excavation for the new promenade along Tywyn sea-front in 1978 (Briggs 1979, 310-11). However, the current survey has contacted the original finder, Mr E. G. Williams, who reports that it was found while digging drains for a new toilet block at the caravan site at Bryn-y-mor and therefore about 100m from the sea-front. He reports that it was found 'about 2 1/2 to 3 feet down in sandy soil' and so did not come from buried peat beds as at first seemed a possibility. It was complete at the time of discovery and in very good condition. This suggests that it was not a discarded broken item and that it had lain undisturbed since its deposition. The exact location, depth and type of context of its deposition are not known but the good condition of the spearhead suggests that even though not in peat it lay in a waterlogged or at least air-free horizon which prevented its oxidation. This may have been a more extensive buried horizon that could occur elsewhere, or it could have been in an isolated pit, such as might have been made for a burial. The depth of the buried object means that it was considerably above the absolute level of that which the coastal protection scheme will affect so any impact on related soil levels is unlikely.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Watching brief in the vicinity of the find

Feature 7 Bronze Age Cremation urn, Tywyn sea front, (GAT PRN 4806)

SH 5800 0000 (Approximate)

Period: Early Second millennium BC

Category: B. Impact: None

The findspot of this urn has almost certainly been wrongly ascribed to the sea-front at Tywyn. In fact it was recorded only as coming from 'near Towyn' (Bowen and Gresham 1967, 69). It is a strong possibility that it is one of the group of urns found at Pantyneuadd about 1.5m to the east in about 1885. This group included a decorated miniature accessory vessel (a type formerly called a pygmy cup or incense cup) (*ibid* 68), other accessory vessels and several urns with cremations. All but the first vessel were dispersed locally and have never been located. The owner of Pantyneuadd was reported as saying – 'It was discovered, together with a number of other urns containing human ashes, some twenty five years ago at Pantyneuadd. I ought to say that another cup or two, besides the one I have, were found at the time and given to friends' (Anwyl 1909, 162).

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 8 Promenade, Tywyn sea-front (GAT PRN 7285)

SH 5792 0010 to 5775 0058

Period: 19th century

Category: B. Impact: Unlikely

The Tywyn sea-front between Pier Road and Neptune Road was gentrified by the construction of the Marine Parade and Promenade, inaugurated in 1889 (Fig. 5). It was to have been supplemented by the construction of a pier at the end of what is still Pier Road. The promenade has been more recently improved in 1977. A plaque recording the inauguration of the original promenade has been preserved in a wall (Fig. 6).

Recommendations for further assessment: None

Recommendations for mitigatory measures: None

Feature 9 Ancient peat-beds (GAT PRN 16601)

SN 5810 9960 (Centre)

Period: Prehistoric

Category: B. Impact: Likely

The peat beds have been discussed as part of the background, above. They extend for about a kilometre along the shore here (Fig. 13). North of the outfall they are more eroded than south of the outfall. Previous visits only identified isolated patches north of the outfall. However, during the recent visit in November 2004 for the current study, the area north of the outfall happened to be better exposed than previously. The peat surface was seen to extend further north than previously seen and almost certainly still continues further north under the sand because in three places *in situ* pieces of ancient trees were seen protruding through the sand (Fig. 13). The creation of the promenade wall probably means that the foreshore in front of the promenade has probably been subjected to greater erosion than it might otherwise and it is possible that any peat beds have been eroded away. There are patches of eroded cemented shingle and occasional glacial erratic boulders close to the low water mark, but no evidence of any peat or ancient timbers. This is almost certain to be true around the slight rise in ground around Bryn-y-mor. However, there is still a possibility of peat surviving below the sand in the intertidal area north of Bryn-y-mor.

In the exposure as a whole there are, in places, large *in situ* tree stumps (Fig. 15) and in others large fallen trunks that have been exposed by the peat cutting. 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 to the east. 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 of intertidal remains and these showed the presence of charcoal, which is taken to be a good indicator of human activity nearby (Caseldine in Smith 2002 and Appendix 3). There have been datable finds elsewhere not far away. At Borth, just south of the Dyfi estuary Mesolithic flints and an antler tool have been found (Sambrook and Williams 1996, 26) and from Llanaber, Barmouth, have come red deer antlers, deer and cattle bones (Kelly 1982) and a medieval timber trackway has been excavated (Musson *et al* 1989). Another medieval trackway has recently been discovered and excavated at Borth, south of the Dyfi (Hughes 2004).

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 and are only exposed occasionally. 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 good potential for research and deserves monitoring during any development that might affect it.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Continuous watching brief and Detailed recording. (This recommendation will not be required in areas where pre-construction geological test drilling shows the absence of peat deposits). The detailed recording would comprise photography and measured survey of any areas that might be damaged or destroyed directly by development or indirectly during access for machinery. It would include sampling for pollen analysis and radiocarbon dating of the deposits. There would be a presumption in favour of measures to avoid or protect such areas from damage.

Feature 10 Turbary (GAT PRN 7286)

SN 5818 9932 (Centre)

Period: 18th-19th century

Category: B. Impact: Likely

Beneath the beach shingle and dunes is a buried ancient peat-bed, discussed above and Feature 14, below. This is frequently hidden by sand and only visible after particular tide and wind conditions. However, it has been visited previously when 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 (Figs 16 & 17). These are so well preserved that spade marks are still visible in some faces. 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 at which time the construction of the railways meant that cheap coal became available (the Cambrian Coast railway through Tywyn was opened in 1863). 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 neat separate features, probably 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 extends from just south of the outfall of the Afon Dyffryn Gwyn for some 200m. However, the recent visit showed that the area of peat-cutting also extends some way north of the outfall (Figs 13 & 14) and are likely to extend further, where the peat bed is hidden beneath the sand. The peat beds can also be seen to extend eastwards under the shingle bank but it is uncertain if the peat-cutting pits do also although they approach quite closely to it. Clearly if they did then the shingle storm bank must have formed since the peat-beds were cut.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Watching brief and Detailed recording. The detailed recording would include photography and measured survey of any features within areas that might be damaged or destroyed directly by development or indirectly during access for machinery. There would be a presumption in favour of measures to avoid or protect such areas from damage.

Feature 11 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 in 1862 (Anon 1886) and this must have included construction of drainage channels and tidal gates and outfalls for the Afon Dyffryn Gwyn and Afon Dysynni marshes. The outfall originally exited onto the beach, as seen in the 1891 map (Fig. 4). 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.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Basic recording

Feature 12 Afon Dyffryn Gwyn Tidal Gate and Culvert

SN 5835 9940

Period: 19th-20th century

Category: C. Impact: Likely

The river has been canalised and runs into a cutting as it approaches the tidal gate and culvert. 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 although all visible seem to be of recent date.

Recommendations for further assessment: None

Recommendations for mitigatory measures: Basic recording

Feature 13 Second World War coastal defences, Tywyn - Pill-box (GAT PRN 1839)

SN 5853 9886

Period: 20th century
 Category: B. Impact: Unlikely

This pill-box lies about 150m to the south of the study area. However, it forms the northernmost of a line of such pillboxes that start at the mouth of the Dyfi Estuary (RCAHMW NPRNs 270343, 270342, 270341, 270340, 270339) and these decline in condition from south to north. The southernmost of those alongside the Penllyn Marshes is intact while the northernmost has collapsed and now consists of just a group of horizontal concrete slabs lying on the beach. It would seem possible that this defensive line once continued further north along the Tywyn sea-front. Traces of other pillboxes may therefore occur within the survey area as tumbled masonry. Remains of such defences have been recognised to be of value and were recently the subject of a national study, The Defence of Britain Project, organised by the Council for British Archaeology and funded by the Heritage Lottery Fund.

Recommendations for further assessment: None
Recommendations for mitigatory measures: Watching brief and basic recording

7 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 much was mainly marshland until the 19th century, while the coast edge alongside the town has been built over for sea-defences and promenade. The main features of value are the ancient peat-beds and the unusual 18th to 19th century peat workings in their surface. The discovery of a Late Bronze Age spearhead close to the sea-front shows that there are buried horizons of archaeological value in this area and any fresh exposures deserve observation and recording.

Table 1 Summary of assessment and recommended mitigation for features within Network Rail Area of Interest

Feature No.	Type	Category	Impact	Proposed mitigation
1	Afon Dysynni Entrance Wall	C	Unlikely	Basic recording
2	Dysynni Marshes Sea Bank	C	Unlikely	Basic recording
5	Cambrian Coast railway embankment	C	Unlikely	None

Table 2 Summary of assessment and recommended mitigation for features within Environment Agency Wales Area of Interest

2	Dysynni Marshes Sea Bank	C	Unlikely	Basic recording
3	Afon Dysynni Low Level Tidal Gate and Culvert	C	Likely	Basic recording
4	Afon Dysynni Low Level Outfall	C	Significant	Basic recording
5	Cambrian Coast railway embankment	C	Unlikely	None
6	Bronze spearhead findspot, Tywyn sea-front	B	Unlikely	Watching brief
7	Bronze Age Cremation urn,	B	None	None

	Tywyn sea front			
8	Promenade, Tywyn sea-front	B	Unlikely	None
9	Ancient peat-beds	B	Likely	Watching brief. Detailed recording. Scientific sampling, analysis and dating
10	Turbary	B	Likely	Watching brief and Detailed recording
11	Afon Dyffryn Gwyn Outfall	C	Significant	Basic recording
12	Afon Dyffryn Gwyn Tidal Gate and Culvert	C	Likely	Basic recording
13	Second World War coastal defences, Tywyn	B	Unlikely	Watching brief and basic recording

Table 3 Summary of assessment and recommended mitigation for features within Gwynedd Council Area of Interest

6	Bronze spearhead findspot, Tywyn sea-front	B	Unlikely	Watching brief
7	Bronze Age Cremation urn, Tywyn sea front	B	None	None
8	Bronze spearhead findspot, Tywyn sea-front	B	Unlikely	Watching brief
9	Ancient peat-beds	B	Likely	Watching brief and Detailed recording
10	Turbary	B	Likely	Watching brief and Detailed recording

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- Tithe map for the parish of Tywyn, c. 1841.

8.4 Aerial Photographic sources

www.multi-map.com

APPENDIX 2

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

1. Records listed by GAT

PRN	SITENAME	NGR	STATUS_	SITETYPE	PERIOD
1777	LLECHLWYD PROMONTORY FORT,	SH57230316	M124	PROMONTORY FORT	Roman
1779	BRONZE TOOLS (HALBERD) -	SH57200330A		FINDSPOT	Prehistoric
3197	TYWYN MEDIEVAL TOWN	SH58800080		TOWN	Medieval
3900	BRONZE TOOLS (PALSTAVES) -	SH58000000A		FINDSPOT	Prehistoric
4797	CLAS MONASTERY - UNLOCATED,	SH59000000A		MONASTERY	Early-Medieval
4800	STONE SETTING, TYWYN CHURCHYARD	SH58770094		STONE SETTING	Unknown
4801	ST CADFAN'S WELLS - HOLY WELL, SITE	SH58600102		HOLY WELL	Unknown
4806	BRONZE AGE CREMATION URN -	SH58000000A		FINDSPOT	Prehistoric
4807	BUILDING + FINDS - FINDSPOT, TYWYN	SH58100060A		BUILDING	Unknown
4813	BRONZE SPEAR HEAD - FINDSPOT,	SH58000000A		FINDSPOT	Prehistoric
4815	FIELD SYSTEM, AROUND	SH57000370C		CULTIVATION	Unknown
4816	BRONZE SPEAR HEAD - FINDSPOT,	SH57900020A		FINDSPOT	Prehistoric
7282	FARM AT TONFANAU	SH56220370		FARM	Post-Medieval
7283	RAILWAY BRIDGE OVER AFON DYSINNI	SH56600296		BRIDGE	Modern
7284	ROAD BRIDGE OVER AFON DYSINNI	SH56670292		BRIDGE	Modern
7285	TYWYN FRONT	SH57700003		HOTEL	Modern
7286	TURBARY, TYWYN	SN58189932		PEAT CUTTING	Modern
7287	RIFLE RANGE, TYWYN	SN58659878		MILITARY TRAINING	Modern
7288	RAF TYWYN	SH58000150		AIRFIELD	Modern
9962	MAENOL GADFAN MEDIEVAL TOWNSHIP	SH58600080		TOWNSHIP	Medieval
12408	MAENGWYN STREET 5,6,7	SH580000000	GII	BUILDING	Post-Medieval
12419	NATIONAL STREET TAN Y BRYN	SH580000000	GII	BUILDING	Post-Medieval
12461	RED LION STREET 5 AND 6	SH580000000	GII	BUILDING	Post-Medieval
16601	PEAT EXPOSURES AT TYWYN	SN58559853C		PEAT DEPOSIT	Prehistoric
16976	PENLLYN MEDIEVAL TOWNSHIP	SN58409990		TOWNSHIP	Medieval
18385	AFON DYFFRYN GWYN OUTFALL,	SN58259935		OUTFALL SEWER	Post-Medieval
18386	AFON DYFFRYN GWYN TIDAL GATE AND	SN58359940		TIDAL DOOR	Post-Medieval
18387	AFON DYFFRYN CHANNEL, FLOOD	SN58709945C		FLOOD DEFENCE	Post-Medieval
18388	CLEARANCE BANK, TYWYN	SN58459925C		BANK (EARTHWORK)	Post-Medieval
18389	AFON DYFFRYN GWYN BRIDGE	SN58459945		BRIDGE	Modern
18390	TRACKWAY, TYWYN	SN58609900		TRACKWAY	Post-Medieval
18394	PILL-BOX, TYWYN	SN58719846		PILL BOX	Modern
18395	PILL-BOX, TYWYN	SN58539886		PILL BOX	Modern
20492	GRANITE QUARRY, TONFANAU	SH57200330		GRANITE QUARRY	Modern
20495	GRANITE QUARRY, BACH Y SIL NR	SH57000350		GRANITE QUARRY	Post-Medieval
20496	GRANITE QUARRY, LLECHLWYD NR	SH57200300		GRANITE QUARRY	Post-Medieval

B. Records listed by RCAHMW

NPRN	NAME	NGR	SITE_STAT
8609	BETHESDA WELSH INDEPENDENT CHAPEL, HIGH STREET, TYWYN	SH585008	
8613	TYWYN BAPTIST CHURCH, HIGH STREET, TYWYN	SH58480075	
8615	BETHEL CHAPEL (WELSH CALVINISTIC METHODIST), NEPTUNE ROAD, TYWYN	SH58670068	
8619	BETHANY CHAPEL (ENGLISH PRESBYTERIAN/CALVINISTIC METHODIST), HIGH STREET,	SH58710089	
8624	EBENEZER (2) METHODIST CHAPEL (WESLEYAN), HIGH STREET, TYWYN	SH58390073	
28394	FRANKWELL STREET; TAN-Y-BRYN, FRANKWELL STREET	SH5800	
28551	MAENGWYN STREET 5,6,7	SH5800	LB2
28592	NATIONAL STREET, TAN-Y-BRYN	SH5800	LB2
28706	RED LION STREET 5 AND 6	SH5800	LB2

28768	TONFANAU FARM	SH56200370		
31940	MARKET HALL	SH58750091		
32397	ST CADVANS WELL	SH58710098		
34946	TAL-Y-LLYN RAILWAY	SH58620051		
41335	TON-FANAU STATION	SH56320388		
41339	TOWYN WHARF TERMINUS	SH58610047		
41340	TOWYN STATION	SH58270069		
41620	CORBETT ARMS HOTEL - COACH HSE	SH58770085		
97196	EBENEZER (1) METHODIST CHAPEL (WESLEYAN), TYWYN	SH58430072		
270339	PILLBOX, TOWYN	SN58539886		
270340	PILLBOX (TYPE FW3/23), TOWYN	SN58719846		
272714	ST. ANTONIO E ALMAS	SH57000000		
302649	TAL-Y-GAREG, HILL FORT	SH57230316		
302689	TOWYN CHURCH, STONES	SH58770094		
307074	PLAS EDWARDS	SH57820070		
308469	FORMER STABLE BLOCK, HIGH STREET, TYWYN	SH58390070		

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12408	MAENGWYN STREET 5,6,7	SH580000000	GII	BUILDING	Post-Medieval
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18387	AFON DYFFRYN CHANNEL, FLOOD	SN58709945C		FLOOD DEFENCE	Post-Medieval
18388	CLEARANCE BANK, TYWYN	SN58459925C		BANK (EARTHWORK)	Post-Medieval
18389	AFON DYFFRYN GWYN BRIDGE	SN58459945		BRIDGE	Modern
18390	TRACKWAY, TYWYN	SN58609900		TRACKWAY	Post-Medieval
18394	PILL-BOX, TYWYN	SN58719846		PILL BOX	Modern
18395	PILL-BOX, TYWYN	SN58539886		PILL BOX	Modern
20492	GRANITE QUARRY, TONFANAU	SH57200330		GRANITE QUARRY	Modern
20495	GRANITE QUARRY, BACH Y SIL NR	SH57000350		GRANITE QUARRY	Post-Medieval
20496	GRANITE QUARRY, LLECHLWYD NR	SH57200300		GRANITE QUARRY	Post-Medieval

B. Records listed by RCAHMW

NPRN	NAME	NGR	SITE_STAT
8609	BETHESDA WELSH INDEPENDENT CHAPEL, HIGH STREET, TYWYN	SH585008	
8613	TYWYN BAPTIST CHURCH, HIGH STREET, TYWYN	SH58480075	
8615	BETHEL CHAPEL (WELSH CALVINISTIC METHODIST), NEPTUNE ROAD, TYWYN	SH58670068	
8619	BETHANY CHAPEL (ENGLISH PRESBYTERIAN/CALVINISTIC METHODIST), HIGH STREET,	SH58710089	
8624	EBENEZER (2) METHODIST CHAPEL (WESLEYAN), HIGH STREET, TYWYN	SH58390073	
28394	FRANKWELL STREET; TAN-Y-BRYN, FRANKWELL STREET	SH5800	
28551	MAENGWYN STREET 5,6,7	SH5800	LB2
28592	NATIONAL STREET, TAN-Y-BRYN	SH5800	LB2
28706	RED LION STREET 5 AND 6	SH5800	LB2

28768	TONFANAU FARM	SH56200370		
31940	MARKET HALL	SH58750091		
32397	ST CADVANS WELL	SH58710098		
34946	TAL-Y-LLYN RAILWAY	SH58620051		
41335	TON-FANAU STATION	SH56320388		
41339	TOWYN WHARF TERMINUS	SH58610047		
41340	TOWYN STATION	SH58270069		
41620	CORBETT ARMS HOTEL - COACH HSE	SH58770085		
97196	EBENEZER (1) METHODIST CHAPEL (WESLEYAN), TYWYN	SH58430072		
270339	PILLBOX, TOWYN	SN58539886		
270340	PILLBOX (TYPE FW3/23), TOWYN	SN58719846		
272714	ST. ANTONIO E ALMAS	SH57000000		
302649	TAL-Y-GAREG, HILL FORT	SH57230316		
302689	TOWYN CHURCH, STONES	SH58770094		
307074	PLAS EDWARDS	SH57820070		
308469	FORMER STABLE BLOCK, HIGH STREET, TYWYN	SH58390070		

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 cm

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.

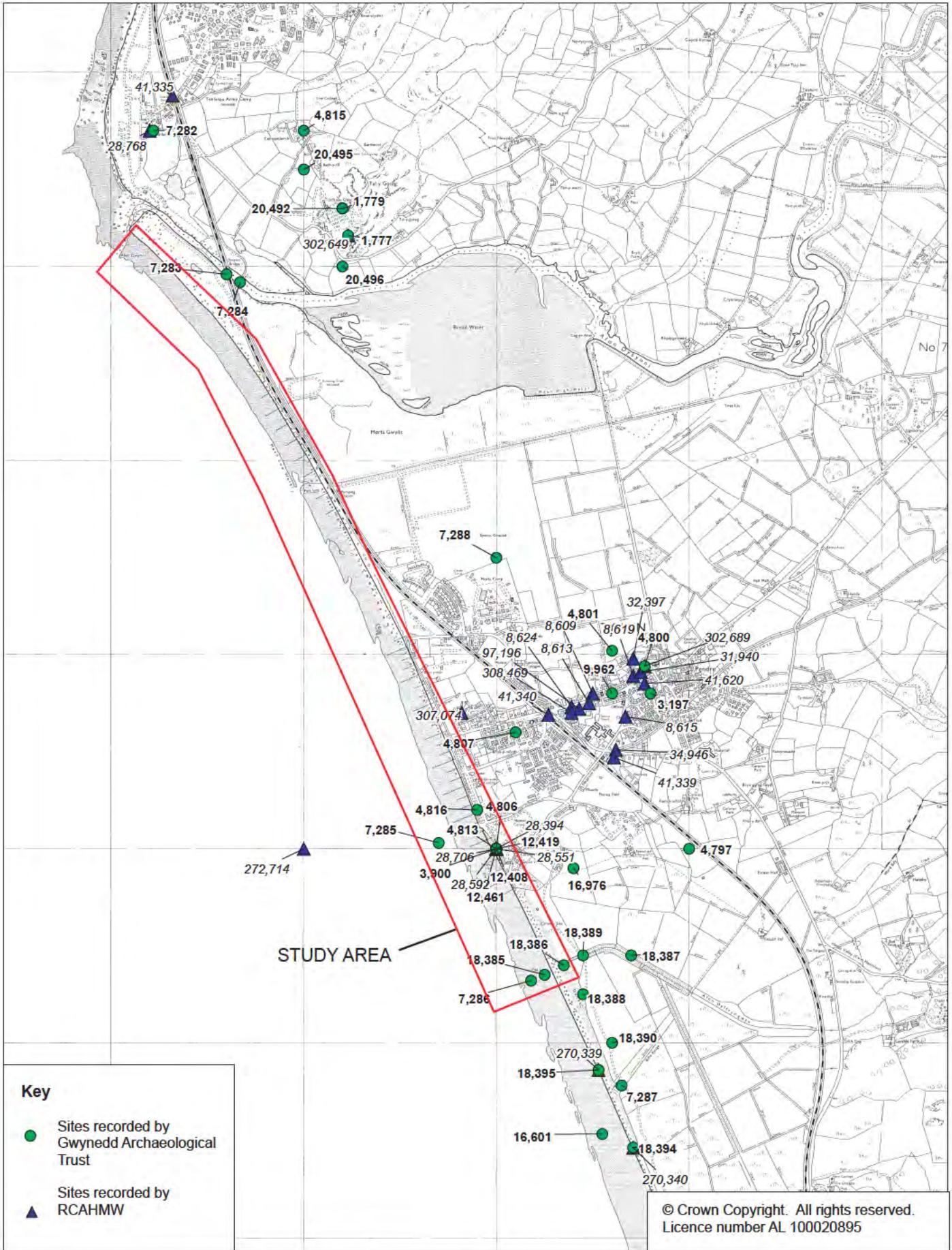
Woody peat

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*.

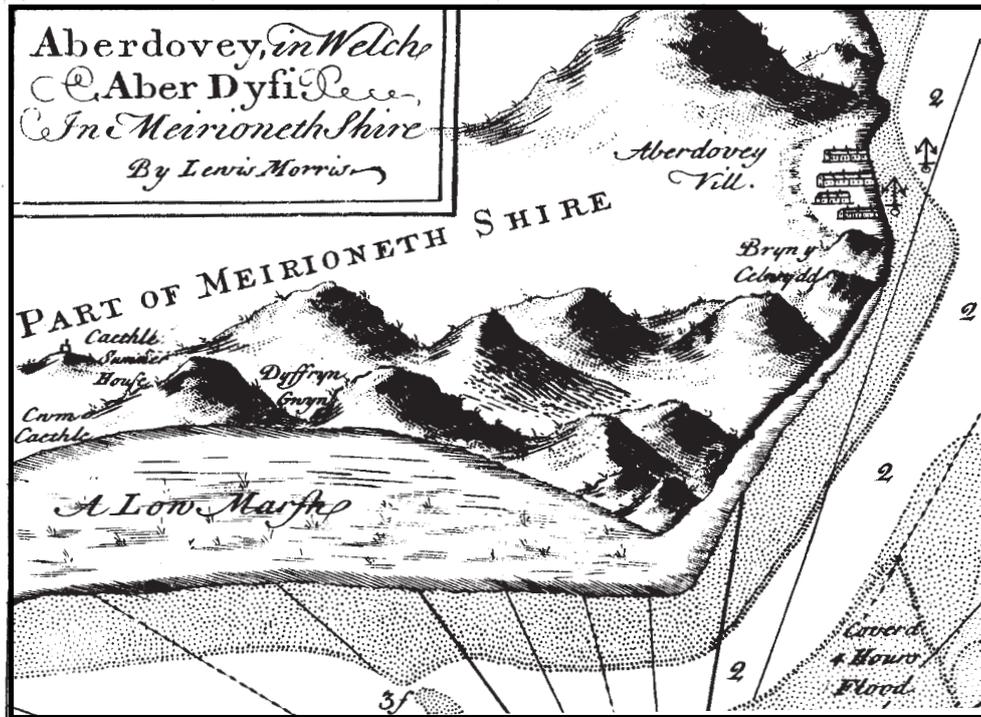
The evidence from the sequence suggests woodland giving way to reed swamp. Further evidence for woodland is provided by the separate sample, which indicates the presence of alder carr. Preservation was good

Conclusions

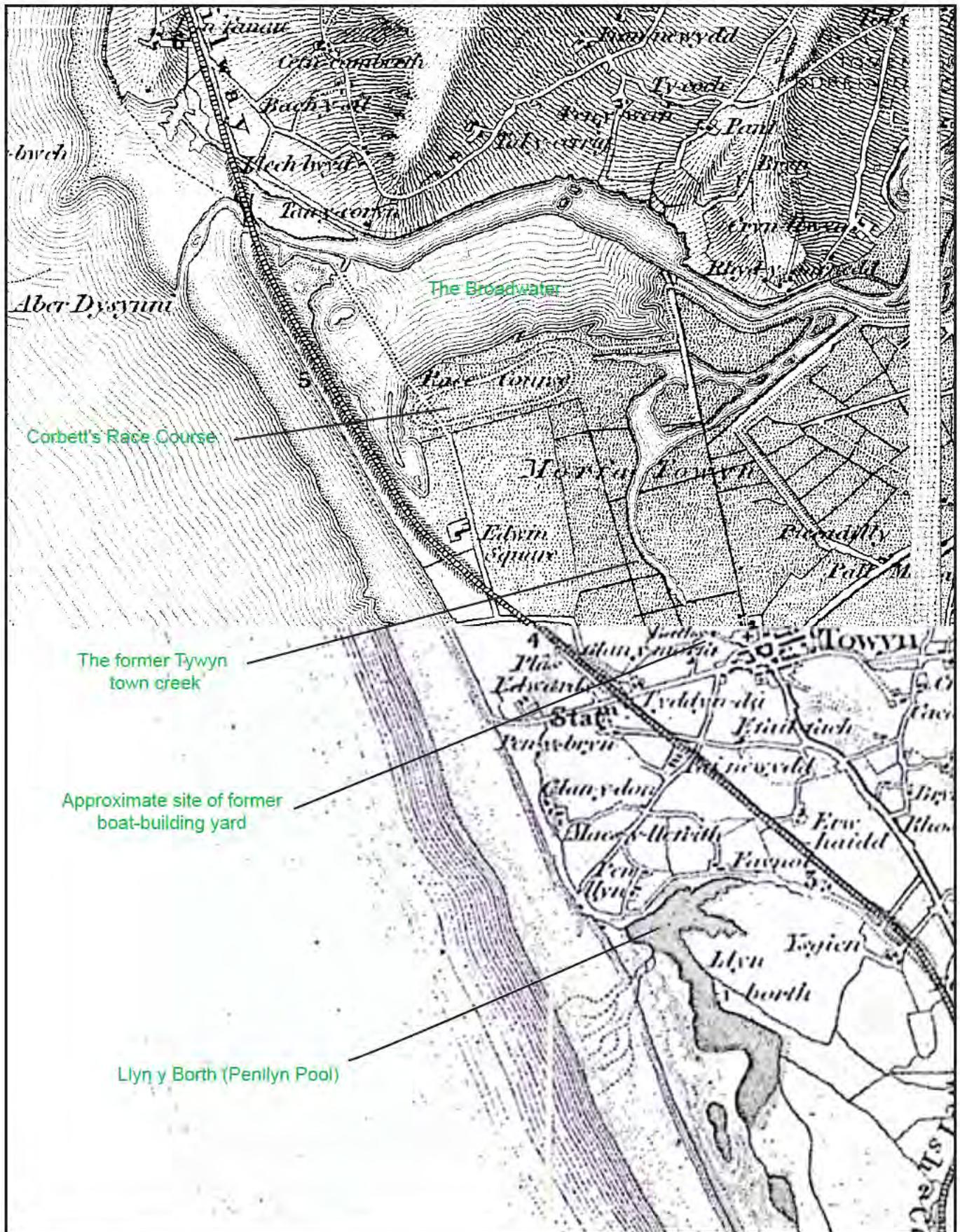
Of note is the occurrence of charcoal (wood or monocot.) in a number of the samples which may be simply due to 'natural' fires or could possibly indicate anthropogenic activity in the area and some deliberate attempt at management or manipulation of the environment. Alternatively, the presence of wood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



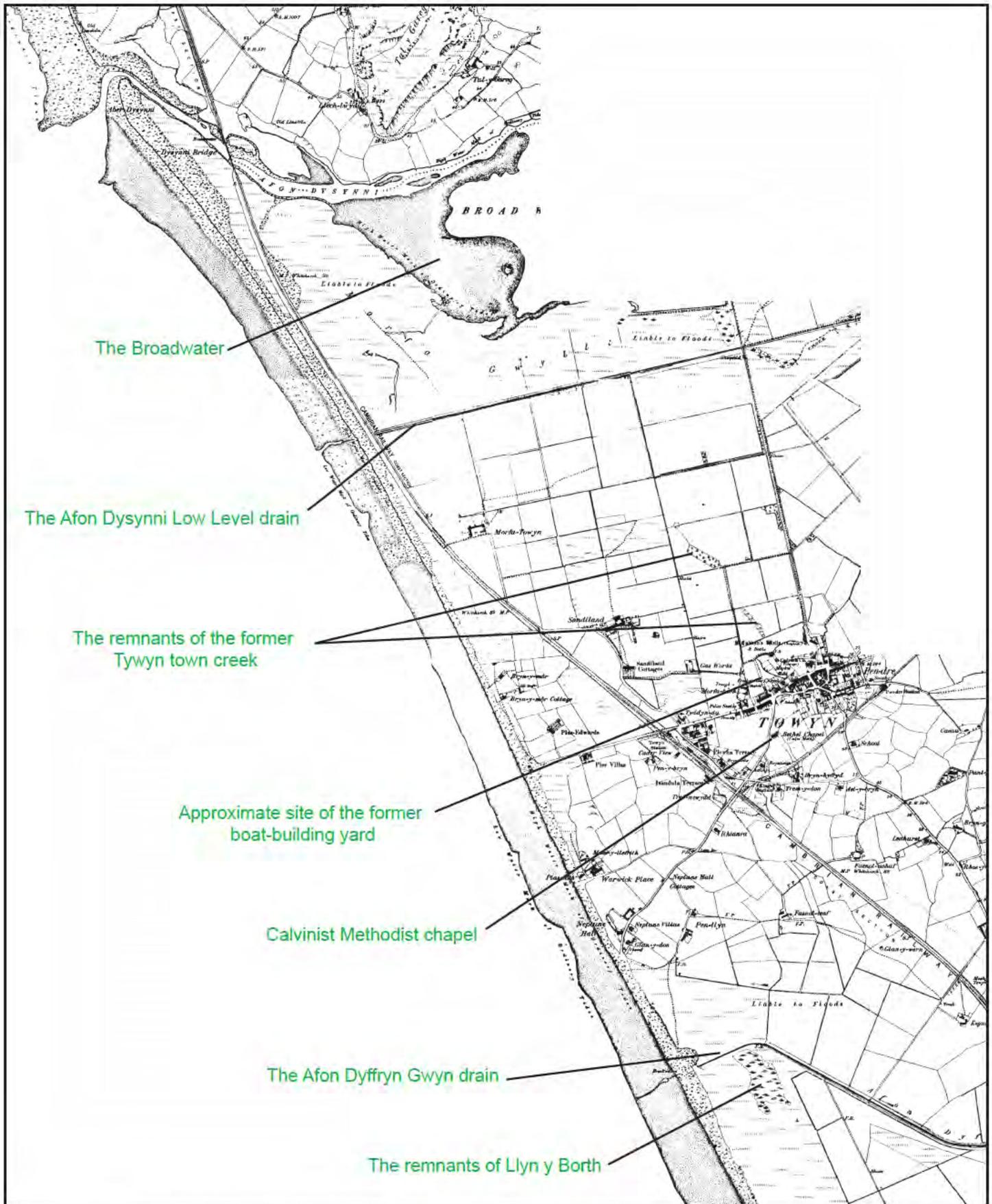
Tywyn Coastal Protection Scheme Fig. 1 Location of study area and of Historic Environment Records within 1km



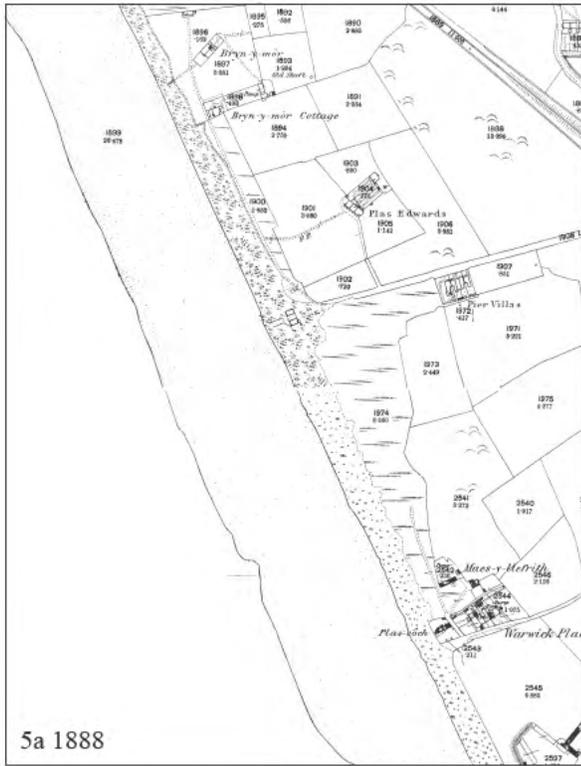
Tywyn Coastal Protection Scheme Fig. 2 Penllyn Marshes, Tywyn and the mouth of the Dyfi:
Part of a map by Lewis Morris, 1748. North to the left



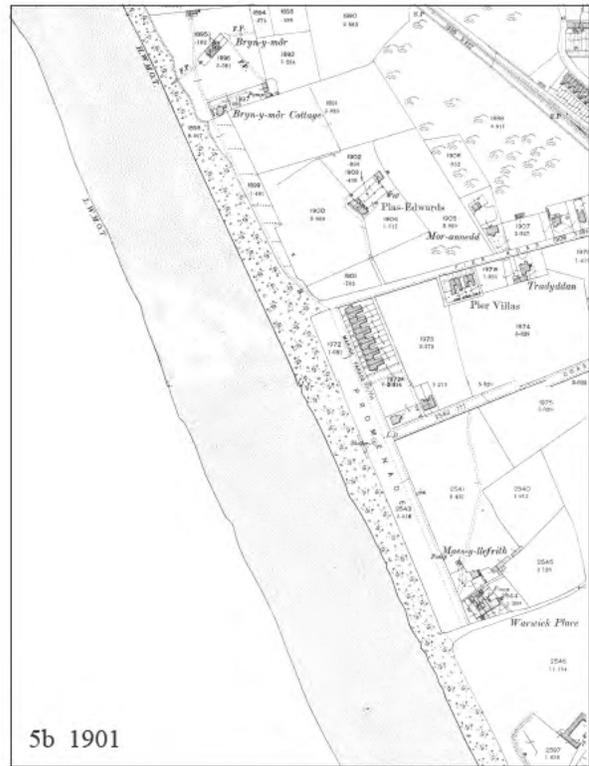
Tywyn Coastal Protection Scheme Fig. 3 Ordnance Survey One Inch to one mile map 1837 with additions 1864.
 Enlarged to twice size showing the former larger size of The Broadwater,
 Corbett's racecourse, the former Tywyn town creek, boat-building yard and Llyn y Borth, south of Penilyn



Tywyn Coastal Protection Scheme Fig. 4 Ordnance Survey 1:10,560 (6ins to the mile) scale map, 1891, after drainage of the marshes showing the Dysynni and Dyffryn Gwyn drainage channels, the reduced size of The Broadwater, the disappearance of Tywyn town creek and of Llyn y Borth.



5a 1888

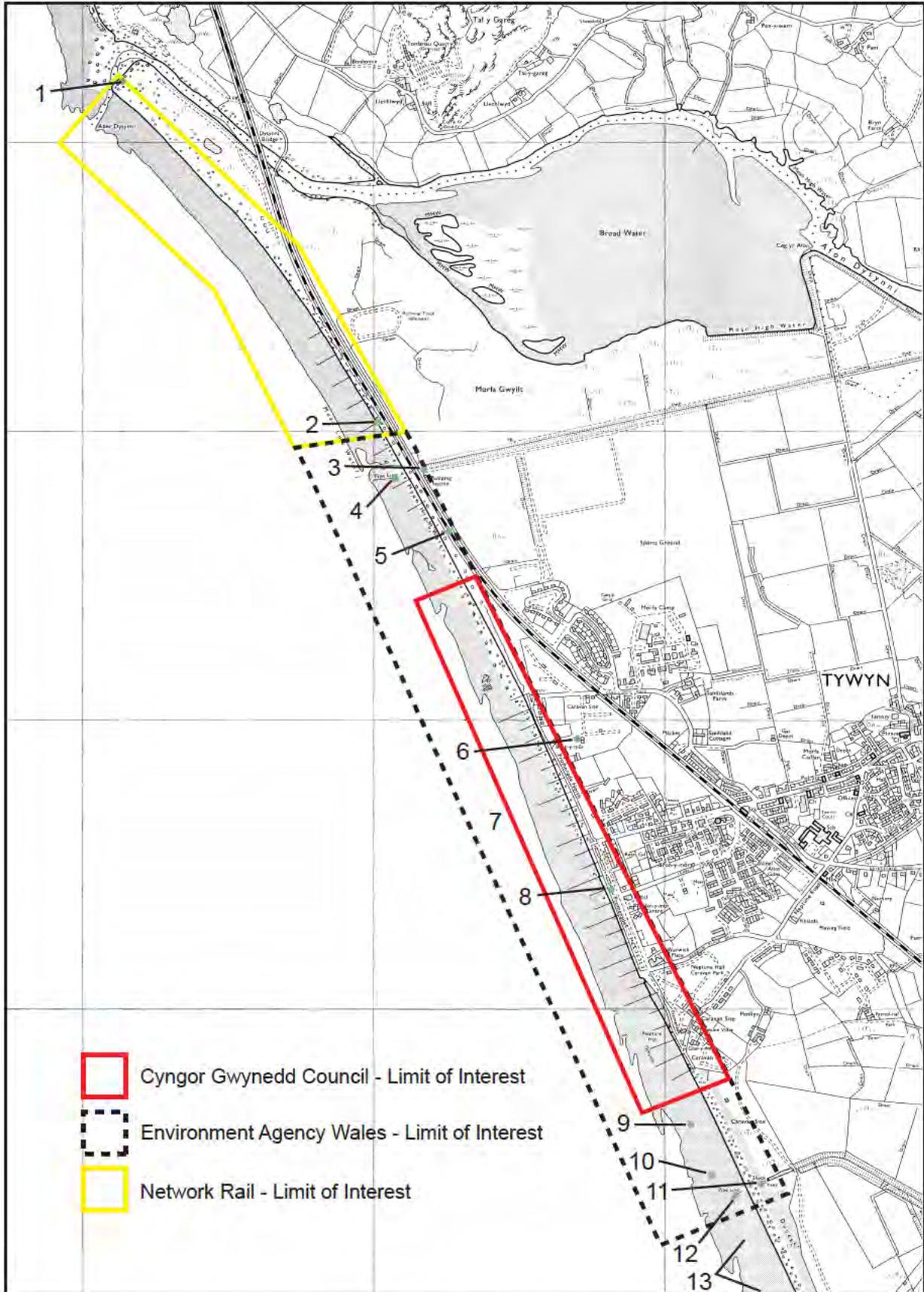


5b 1901

Tywyn Coastal Protection Scheme Fig. 5 Ordnance Survey 1:2500 scale maps of 1888 and 1901 showing Tywyn front before and after construction of Corbett's promenade



Tywyn Coastal Defences Scheme Fig. 6 The inaugural stone on Tywyn promenade



Tywyn Coastal Protection Scheme Fig. 7 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.



Tywyn Coastal Protection Scheme Fig. 8 Afon Dysynni entrance wall. Feature 1, from the east



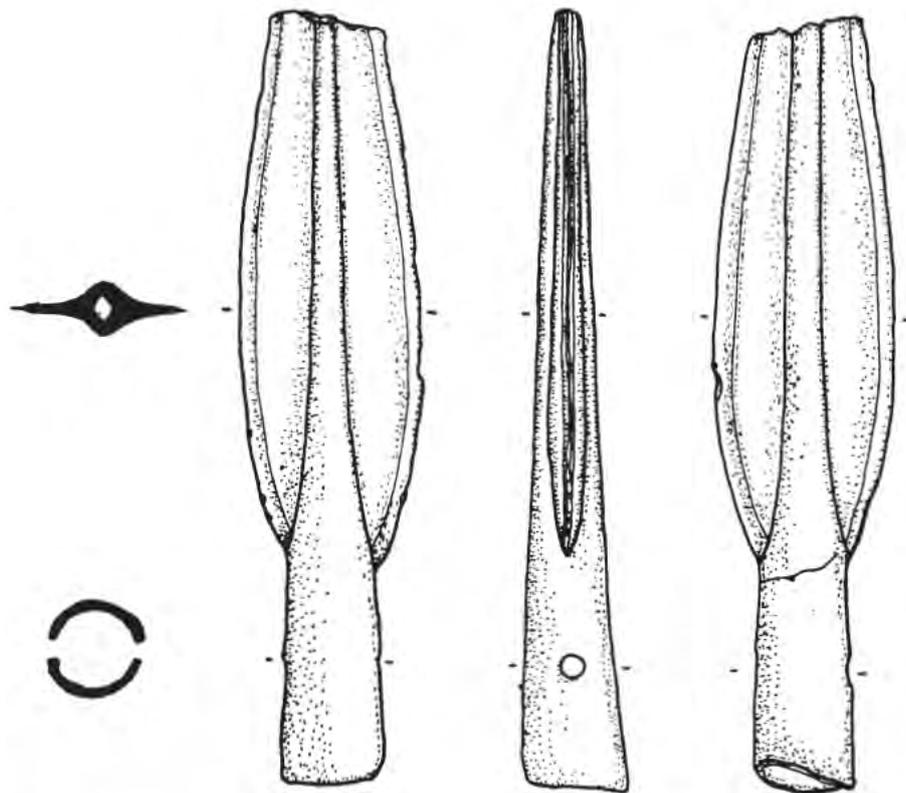
Tywyn Coastal Protection Scheme
Fig. 9 The northern sea bank, Feature 2 and the Dysynni Low Level outfall, Feature 4, from the south-east.



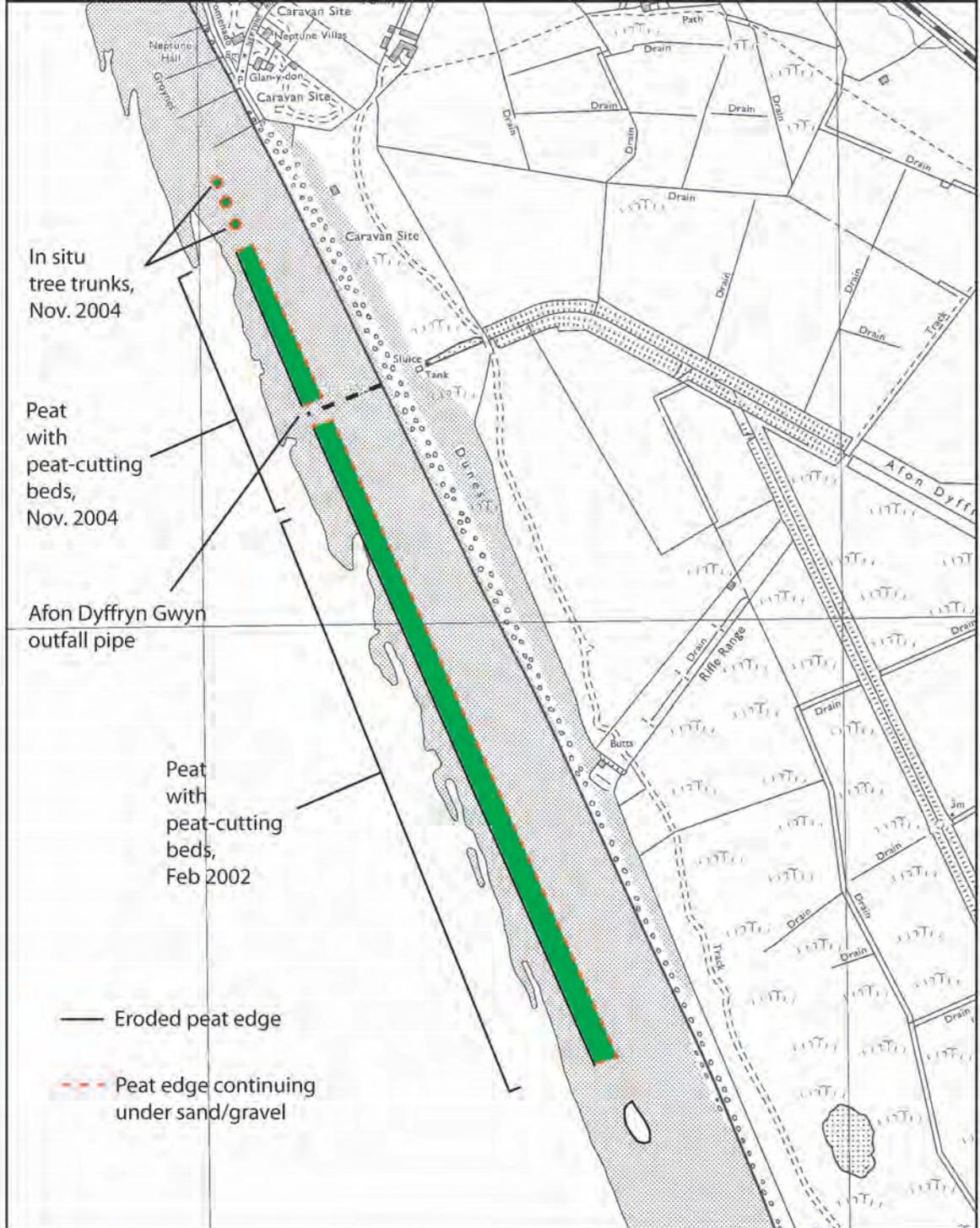
Tywyn Coastal Protection Scheme Fig. 10 The Cambrian Coast Railway embankment and track, Feature 5, showing the tide line close to the track. From the south-east, 1m scale



Tywyn Coastal Protection Scheme Fig. 11 Tywyn sea front, the Corbett Promenade, from the south-west. 1m scale



Tywyn Coastal Protection Scheme Fig. 12 The Late Bronze Age spearhead from Tywyn, PRN 4813, Feature 6. Scale 1:2



Tywyn Coastal Protection Scheme

Fig. 13 Location of intertidal peat exposures in the vicinity of the Afon Dyffryn Gwyn outfall, Feb. 2002 (sketch plot) and Nov. 2004 (tape and aerial photograph plot).

Scale 1:10,000. Based on Ordnance Survey maps. © Crown copyright. All rights reserved. Licence number AL 100020895.



Tywyn Coastal Protection Scheme
Fig. 14. Peat beds with peat-cutting evidence north of the Afon Dyffryn Gwyn outfall.
General view, from the south-east, November 2004.



Tywyn Coastal Protection Scheme Fig.15. Ancient tree trunk *in situ* north of the Afon Dyffryn Gwyn outfall. From the north, February 2002. 1m scale



Twyn Coastal Protection Scheme
Fig. 16. Ancient peat with peat-cutting beds, north of the Afon Dyffryn Gwyn outfall, from the south-east, November 2004. 1m scale



Twyn Coastal Protection Scheme
Fig. 17. Ancient peat with peat-cutting beds, south of the Afon Dyffryn Gwyn outfall, November 2004, from the south-east. 1m scale



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