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Ynys Enlli Coastal Erosion Survey

March 2014

Ymddiriedolaeth Archaeolegol Gwynedd
Gwynedd Archaeological Trust

Ynys Enlli Coastal ErosionSurvey March 2014

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1. INTRODUCTION

Ynys Enlli or Bardsey Island (centred on SH11322106) is located off the end of the Llŷn Peninsula, surrounded by famously strong tidal currents (figure 1). The archaeology of the island is considerable and varied. Mesolithic flints have been found in many areas of the island and excavations undertaken in 2003 revealed a dense scatter of flints towards the north end of the island. There is a possible Bronze Age round barrow on the top of the mountain, and there are round houses of unknown date, but thought to be prehistoric, on the lower slopes of the mountain. There are also scheduled sites of medieval date, including the former Augustinian abbey, and several longhouses. There are many post-medieval structures of significance.

Discussions with Cadw and the Bardsey Island Trust took place during 2013-14 regarding the production of a Heritage Management Plan to accompany a wider Conservation Management Plan. Concern was also expressed about areas of erosion, one of coastal erosion, and the other of a scheduled ancient monument. The main area of coastal erosion was in the bay on the south-east side of the island, Henllwyn. However erosion is also evident in the other main bay on the opposite side of the island, Porth Solfach. The scheduled ancient monument is a possible Bronze Age barrow (SAM Cn 140, PRN 1589) on top of Mynydd Enlli, which is being eroded by shearwater burrowing.

Preliminary work was carried out in March 2014 to survey the eroding coast of Porth Solfach and Henllwyn. A start was also made on the Heritage Management Plan. This included inspection of sites, the clarification of some confusions that have arisen in the records and providing more accurate grid references by the use of a hand held Global Positioning System (GPS).

Further work will be carried out in 2014-2015, including geophysical surveys and small excavations, and a full report will be produced at the end of that season of work. The present report aims to be a basic summary of the work done in March 2014.

The project has been funded by Cadw and undertaken in partnership with Bardsey Island Trust Limited. We are grateful to Ian Halfpenny (Cadw) and to Richard Farmer (Bardsey Island Trust) for their help and advice, and to the Trust for providing accommodation on the island.

2. NATURE OF THREAT

Ynys Enlli is divided into a smaller south portion and larger north portion by a narrow neck of land. The coast edge which forms this neck of land is eroding on both sides, though more actively on the east side. There has been a report of burnt bone from the eastern side, which may represent a cremation burial.

On the top of the mountain is a scheduled site interpreted as a round barrow (SAM Cn 140) which is being actively eroded by Manx shearwaters who nest within burrows in the barrow. There is some question about the nature of this site and its character and date need to be established so that an appropriate management strategy can be designed.

The research objectives of the project are therefore:-

- to make a baseline record of coastal erosion at the narrows between Porth Solfach and Henllwyn and to compare this to previous mapping.
- to determine whether there is evidence of prehistoric burials or other buried archaeology within the vicinity of the eroding coast edge.
- to characterise the potential barrow on the mountain and determine whether a strategy of protecting it from nesting birds is appropriate.
- gathering of data to inform the Heritage Management Plan, survey and excavation of the damaged

3. METHODOLOGY

It was intended to carry out geophysical surveys in 2013-14 to inform the management plan but personal family issues meant that this was not possible and surveys will be carried out later in 2014.

Background information for the Heritage Management Plan was located and pulled together to start a database of sites in preparation for fieldwork later in the year. Most of the sites previously recorded on the island were visited, and their condition and threats recorded. Further work will be undertaken on investigating and assessing these sites and the data base and conclusions will be presented in the final report.

A survey was carried out using a total station theodolite (TST) of the eroding shorelines of Porth Solfach and Henllwyn with an extension up the west coast north of Porth Solfach. This was undertaken as an independent survey then located on the OS digital data using surveyed hard detail. The survey could then be corrected to OS grid coordinates.

Where features of potential interest were seen in the eroding sections these were recorded by cleaning and drawing the sections by hand and locating the drawn section using the TST. Photographs were taken of the cleaned sections and of other representative eroded faces. These sections will be drawn up and the detailed descriptions presented in the final report.

Three low mounds were identified as possible burnt mounds. Small test pits were dug in the tops of these involving a spade dug hole measuring 0.4m by 0.4m allowing the removal of the turf only to expose the deposits immediately beneath. This showed that there was burnt stone immediately below the turf and in one case a flint flake was recovered. This was sufficient to identify these mounds as potential brunt mounds and they were recorded photographically and surveyed with the TST.

4. RESULTS

4.1. Coastal erosion

While most of the shore of Ynys Enlli is very rocky and erosion is relatively slight it was clear that active erosion was occurring along part of the west coast just north of Porth Solfach, around that bay and around the head of the bay of Henllwyn. The tops of erosion faces were surveyed and this was compared to earlier maps (figures 2 and 3). The 1918 25 inch map is sufficiently accurate to allow a direct comparison with the present survey and this shows that erosion has been most severe in Henllwyn where the coast has receded by up to about 8m since 1918. Coastal defences have been built to try and halt the erosion but these are now largely washed away (plates 1 and 2). The erosion in Porth Solfach has been slightly less at a maximum of about 7m, despite this bay being on the west coast and open to the worst storms.

Erosion also appears quite dramatic up the west coast of the island just north of Porth Solfach. Here parts of a track (PRN 38270) running along the coast have been eaten away by the sea, which has also in places breached the field bank on the landward side of the track (plate 3). The 1918 map shows a loss of up to about 8m in this area (figure 2). However erosion is probably slower than it appears. Hope Jones (1988, 15), whose book was based on work done in 1984 and 1985, mentions that the track was eroded “almost across its width in places”. This suggests that there is not much more erosion now than in the early 1980s. The erosion is focussed on areas of weakness, in the case of the track these are culverts running under it, which have enabled the erosion to extend inland. Between culverts erosion is much less dramatic. A similar process has also happened at Henllwyn where a track (PRN 16855) to the lighthouse also runs along the shore edge and has culverts running under it. The 1918 map shows the line of the track slightly further south, but as the coast eroded it has been moved to its present position. The track surface is consolidated by a layer of gravel overlying the earlier soil. It is not clear whether the well-built culverts that outcrop in the coastal section were built specifically to take drainage under the road or whether the full lengths of the drainage channels are stone-lined like the visible culverts (plate 4).

Some years ago burnt bone was found by Tom Dawson of St Andrews University in the eroding face at Henllwyn. This comprised a small number of bone fragments in what appeared to be a cut feature, and it was interpreted as possibly the remains of a cremation burial. Tom Dawson has been contacted and will forward all available details about this discovery so that these can be included in the final report.

In the current survey few archaeological features or deposits were seen in the erosion faces but some buried soils were noted. In Henllwyn a layer of buried soil (PRN 38677) runs for about 58m from SH 11434 21080 to SH 11491 21095. This layer was recorded at SH 11442 21080 as section 4 (figure 3, plate 5). This is a dark grey loamy clay mottled with iron staining. The layer is about 0.15m thick and in places outcrops as a shelf at the base of the erosion face. The layer contains only a few stones and a patch of charcoal was noted on its surface

where it was drawn in section, but no other cultural material was identified. The stones and gravel of a storm beach overlie this layer at the head of the bay but under the buried soil there is also a layer of stones and gravel that appears to be an earlier storm beach.

A buried soil has previously been noted at the access to Porth Solfach beach (PRN 16822). This was still visible and was also recorded at SH 11496 21230 as section 3 (figure 2, plate 6). This buried soil is up to 0.12m thick and is a dark grey sandy clay with occasional stones. Some animal bone was found eroding out of the buried soil at this location. The bone was from cattle and included pieces of tibia from a rear leg but also a carpal from a front leg (Sian James, GAT, pers. comm.).

Just north of Porth Solfach a dark layer was seen in the cliff section at SH 11492 21284 (PRN 38294). This was recorded as section 2 (figure 2, plate 7). This layer was a very dark brown in colour and composed of a loamy sand. It contained some charcoal and had a layer of stones along its upper interface. These stones were fairly large, many were flat, and some were burnt. While they did not appear to be part of a structure they may have slipped from one located further inland. Layers of stones were seen in erosion sections at several places and these were clearly stones thrown up by storms (plate 8). However the stones seen in section 2 were larger, not accompanied by gravel, and seem likely to be related to archaeological activity. No artefacts or bones were found at this location.

Another section (section 1) was recorded on the west coast at SH 11482 21485 (PRN 38293, plate 9). This was recorded to show the deep build-up of soil visible in places. This soil was a friable brown loamy sand with occasional stones and was up to 0.65m deep. It had presumably developed over millennia with wind-blown sand being incorporated into the organic A horizon. Elsewhere the soil was only 0.1-0.2m deep. This section also cut through a coastal track (PRN 38270) and this could be seen to be composed of gravel and stones in a sandy clay matrix.

4.2. Burnt mounds

In the area between Porth Solfach and Henllwyn there are occasional low mounds and knolls within the otherwise level landscape. One of these is listed on the HER (PRN 16821, figure 3) but it appears fairly natural in character and others to the north of Porth Solfach have some bedrock outcropping (figure 2). It seems likely that most of these mounds are caused by outcropping bedrock covered by glacial till. However while surveying the coastal erosion it was noticed that there was burnt stone incorporated in a clawdd just north of Porth Solfach. The burnt stone is typical of that found in burnt mounds. Burnt mounds are sites where water was heated using hot stones and they are generally of Bronze Age date, although they can be both slightly earlier and considerably later. Where not reduced by ploughing they can appear as low mounds, often roughly horseshoe-shaped. The burnt stone in the clawdd had clearly originated from elsewhere, probably nearby, and there were four low mounds in the immediate vicinity, arranged in a line immediately adjacent to the only significant stream on the island (figure 4, plate 10). As the availability of water is critical for the use of burnt mounds this location supported the possibility that these mounds were indeed burnt mounds. Turf was removed from a very small square about 0.4m by 0.4m on the top of each mound. Immediately below the turf on the largest three mounds there were angular red-coloured burnt stones, generally in pieces no more than 0.1m long. Quartz was quite common amongst these heat-shattered pieces. Charcoal would be expected in a burnt mound but none was seen, however this may be due to only the surface being inspected and charcoal could have been washed down into the body of the mounds. A flint blade (plate 11) was also recovered from the eastern mound (PRN 39569). The western-most mound had small broken stone but this was sub-rounded rather than angular, comprised only the local rock type and no quartz with no evidence of burning. This mound was much smaller than the others and had bedrock visibly outcropping. After photographing the deposits the turf was immediately put back in place.

The results of these small tests strongly suggest that three of the four mounds are burnt mounds but that the fourth small mound is natural. The outlines of the mounds were surveyed (figure 4) and they were recorded photographically. The three large mounds are all roughly oval and have the following measurements:-

Mound 1 (PRN 39569; SH11582135): length c.10m; breadth c.5m; height c.0.5m
Mound 2 (PRN 39570): length c.7.5m; breadth c.6m; height c.0.6m
Mound 3 (PRN 39571): length c.16.5m; breadth c.7.5m; height c.0.7m

The south-eastern corner of mound 3 is disturbed by a shallow sub-rectangular hollow and this may have been a borrow pit providing material for the clawdd, which would explain how burnt stone came to be incorporated into the clawdd.

No burnt mounds have previously been identified on Ynys Enlli and the implications of their discovery are of some significance. Although these sites used to be considered to be cooking sites for roving bands of hunters this view is now out-dated and the sheer numbers of these sites suggests that they were frequently used and probably related to activity close to settlements. Although the precise relationship of burnt mounds to settlements has been hard to establish they generally seem to be in wet areas on the edge of settled landscapes (Kenney 2012). In the case of Ynys Enlli this suggests settlement probably of a Bronze Age date and probably of a fairly long term nature. The location of the burnt mounds may provide a clue as to where to look for this settlement. It might be expected that settlement would be in a more sheltered, well-drained location somewhere in the vicinity of the mounds, possibly no more than a couple of hundred metres away. In this particular case it would be worth looking inland, as this would be more sheltered than right on the coast and at less risk from storm damage. The area immediately inland from the mounds is currently very boggy, but this may largely be due recent changes in the drainage regime. This area is enclosed by field banks like much of the rest of the island suggesting that these were fairly dry productive fields in the 19th century. There are also rocky knolls and flat drier areas within this zone that could provide some shelter or a good base for a settlement.

However it is possible that settlement or other related activity may have been closer to the mounds next to the coast; considering that the coastline was probably a little further out in the Bronze Age than today. Flints have been found eroding out of the coast close to the burnt mounds (PRN 16823). While these included a Mesolithic microlith there were also later flakes that could be Bronze Age. The dark layer and related stones seen in section and recorded as section 2 (PRN 38294) is undated but to it not impossible that this may be part of a Bronze Age settlement site or possibly another burnt mound. No mound is visible on the ground surface, but most may have been removed by either the sea or the hollow-way to the east.

With this potential for locating other Bronze Age archaeology and even unlocking an understanding of the landscape use of the island in that period it is important that the interpretation of these features is confirmed and that they are dated. A small trial trench, which could be dug by hand, would be sufficient to confirm the features as burnt mounds and with luck this would produce material suitable for radiocarbon dating to confirm the date. Although a Bronze Age date would be most likely many burnt mounds in north-west Wales have been proved to date to the late Neolithic from about 2500 BC or slightly earlier, and one as early as about 3300 BC (Kenney 2012). A single example has been dated to the early medieval period, from the 7th century AD, and occasional other sites hint at a similar date (Kenney 2013). If these mounds proved to be earlier or later than the Bronze Age the nature of settlement that might be associated with them would be expected to be different, and this knowledge would greatly help in a search for this settlement.

A single trench would be adequate for an initial investigation, although it is likely that the mounds are of different dates and future investigation might aim to establish the full, date range. The potential for using geophysical survey to search for related settlement should be explored, although the wet conditions in the most likely area could reduce its effectiveness. Future investigation might also include trial trenching or test pitting to search for settlement activity.

4.3. Coastal tracks

Lockley (1938, 122) describes a track along the west coast of the island that was specifically constructed to aid the collection of seaweed for use as a fertiliser on the fields. This track (PRN 38270, figure 2, plate 12) is still clearly visible, although grassed over and runs from SH 11470 21634 south to Porth Solfach, where it originally must have run down onto the beach at SH 11493 21278. Erosion has now caused a drop of about 1m at the end of the track, which at some time has been blocked off with a now collapsed stone wall. The cross wall is shown in the 1889 25 inch map, but the track was still used when Lockley was on the island in the 1934, so presumably it could still be used to obtain seaweed from the west coast even if it no longer provided access to Porth Solfach beach. Where the track originally ran down to the beach it is visible as a fairly clear hollow-way up to 0.5m deep (figure 4, plate 13). The 1918 map shows this track and shows it ending at SH 11470 21634, although the track starts again further north and it seems likely that it was originally continuous up the west coast.

As this track has been severely hit by coastal erosion it was surveyed for much of its length to record the degree of erosion. Another track (PRN 38359) can be seen on the ground running from the main road up the island down to Porth Solfach (SH 11682 21174 to SH 11492 21229). This was not surveyed as it does not appear to be under threat of erosion but it is clearly marked on the 1918 map (figure 2). It runs around the edge of the fields and down onto the beach at Porth Solfach in a narrow gully. While this would have provided access to the beach for boats it is likely that this was also mainly used for bringing seaweed from the beach directly to the fields.

The map also shows another track running along the edge of the field to the south (PRN 38360, figure 2). Although the first two tracks are shown on the maps from 1889 the third track only appears from 1901, showing that this was a latter addition, and it is not clearly visible on the ground.

Inspection of the erosion faces on the west coast showed that the western track (PRN 38270) was well-made. The gravel used to for its surface was in many places built-up over a layer of flat stones to provide a foundation and culverts took drains under the track (plate 14). These well-built tracks must have been constructed by the Newborough estate but the 1840 1 inch Ordnance Survey map (reproduced in Arnold 1994, figure 9) shows an earlier track running on a similar line up the west coast before turning inland past Carreg Fawr to Carreg Bach. No evidence of this earlier track was seen in the eroding sections.

5. CONCLUSIONS

The current work has provided an indication of the degree of erosion occurring in the Porth Solfach and Henllwyn areas. While this often appears quite dramatic the map evidence suggests that erosion has resulted in the loss of no more than 8m of land since 1918. Up the west coast the underlying rock seems to be checking extensive loss of land so that although some patches are eroding and probably re-eroding the coast does not seem to have receded very much. Some areas of possible archaeological interest were noted in the eroding sections; that at Porth Solfach had been identified previously. The extensive buried soil at Henllwyn could well contain archaeological artefacts and have features built on it or cut through it but no cultural material was identified. If there are cremations in this area it is likely that they were cut into this buried soil.

The dark layer and stones recorded in section 2 (PRN 38294) appeared most likely to be directly related to an archaeological site. This location is under considerable threat of further erosion and would be a high priority for further investigation by excavation before the site is lost.

The discovery of possible burnt mounds opens new areas of potential research. Further work on this site would be valuable and a method statement for an initial investigation will be produced separately to allow for discussion by all interested parties. A method statement will also be produced for investigation of the barrow on top of Ynys Enlli which has already been proposed to the Bardsey Island Trust and Cadw.

6. REFERENCES

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Hope Jones, P., 1988. *The Natural History of Bardsey*, National Museum of Wales, Cardiff

Kenney, J., 2012. 'Burnt mounds in north-west Wales: are these ubiquitous features really so dull?', in W. J. Britnell and R. Silvester (eds) *Reflections on the Past. Essays in honour of Frances Lynch*, Cambrian Archaeological Association

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Lockley, R.M, 1938. *I Know an Island*. London

7. GAZETTEER OF SITES INCLUDED IN THIS REPORT

PRN	SITENAME	NGR	Summary description
16821	Mound, SW Ynys Enlli	SH11392110	A rounded flat-topped mound, probably natural
16822	Old Ground Surface, SW Ynys Enlli	SH11502123	Buried ground surface exposed in eroded section on north side of ramp onto Solfach. Some cattle bones were found eroding out of the buried soil.
16855	Road, Harbour to Lighthouse, Ynys Enlli	SH11292093	Road constructed between 1884 and 1887 from harbour to lighthouse.
38270	Seaweed track, W coast Ynys Enlli	SH11482150	A track used to gather seaweed from the west coast of Ynys Enlli for use as fertilizer on the fields.
38293	Section drawn to record deposits, west coast of Ynys Enlli	SH11482148	A section of cliff edge was recorded to show the deep build-up of soil visible in places.
38294	Buried soil and possible structural remains, west coast of Ynys Enlli	SH11492128	A dark layer was seen in the cliff section. It contained some charcoal and had a layer of stones along its upper interface. These stones were fairly large, many were flat, and some were burnt, and may have collapsed from a structure. No artefacts or bones were found at this location.
38359	Track to Porth Solfach, Ynys Enlli	SH11582121	Track used to collect seaweed from Porth Solfach for use as fertilizer on the fields.
38360	Field track near Porth Solfach, Ynys Enlli	SH11582116	Track running along edge of field near Porth Solfach. Shown on 1918 25 inch map.
38677	Buried soil, Henllwyn, Ynys Enlli	SH11442108	A layer of buried soil running for about 58m from SH 11434 21080 to SH 11491 21095. The layer contains only a few stones and a patch of charcoal was noted on its surface. It underlies a storm beach but also seals a layer of stones and gravel that appears to be an earlier storm beach.
39569	Burnt mound 1, Ynys Enlli	SH11582135	Sub-oval mound measuring: length c.10m; breadth c.5m; height c.0.5m. Small test pit in top showed burnt stone with a high proportion of quartz suggesting that it is a burnt mound. A flint blade was also found.
39570	Burnt mound 2, Ynys Enlli	SH11562134	Sub-oval mound measuring: length c.7.5m; breadth c.6m; height c.0.6m. Small test pit in top showed burnt stone with a high proportion of quartz suggesting that it is a burnt mound.
39571	Burnt mound 3, Ynys Enlli	SH11542134	Sub-oval mound measuring: length c.16.5m; breadth c.7.5m; height c.0.7m. Small test pit in top showed burnt stone with a high proportion of quartz suggesting that it is a burnt mound.

8. FIGURES AND PLATES

Figures

Plates

Figure 1. Ynys Enlli and its location. Sites registered in Historic Environment Record are shown.

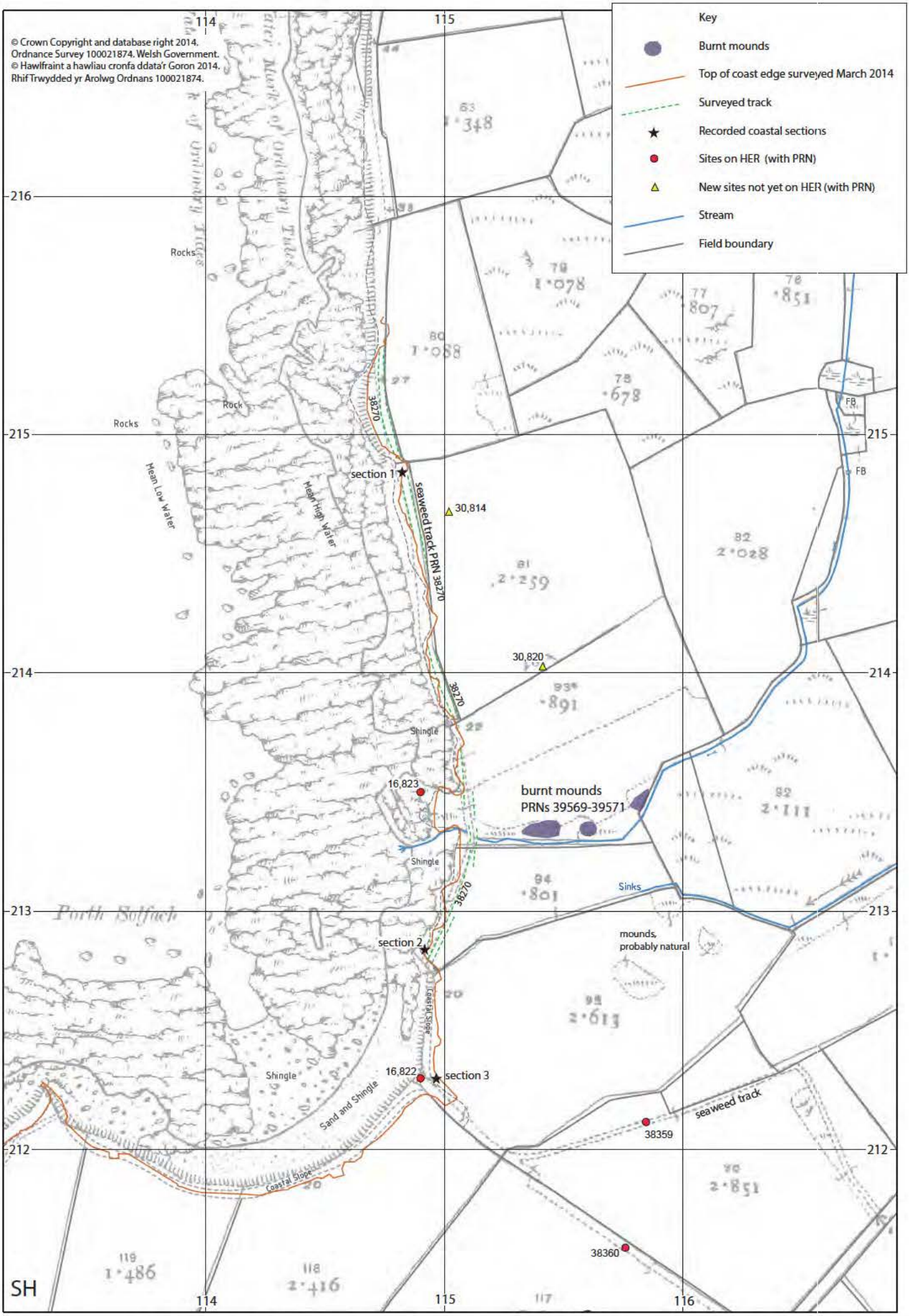

Figure 2. Survey of coastline around and to the north of Porth Solfach, overlaid on 1918 25 inch map

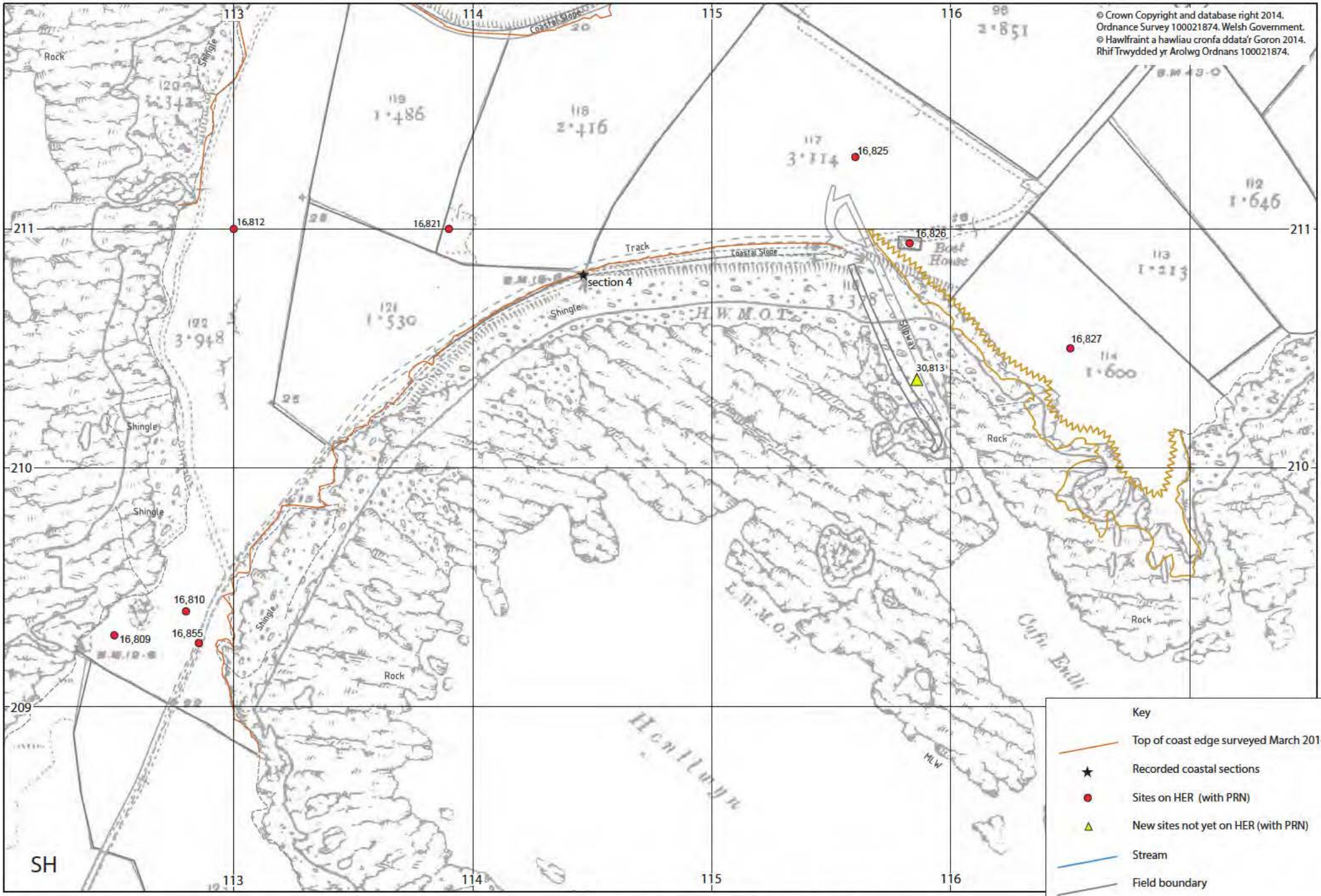

Figure 3. Survey of coastline around Henllwyn, overlaid on 1918 25 inch map

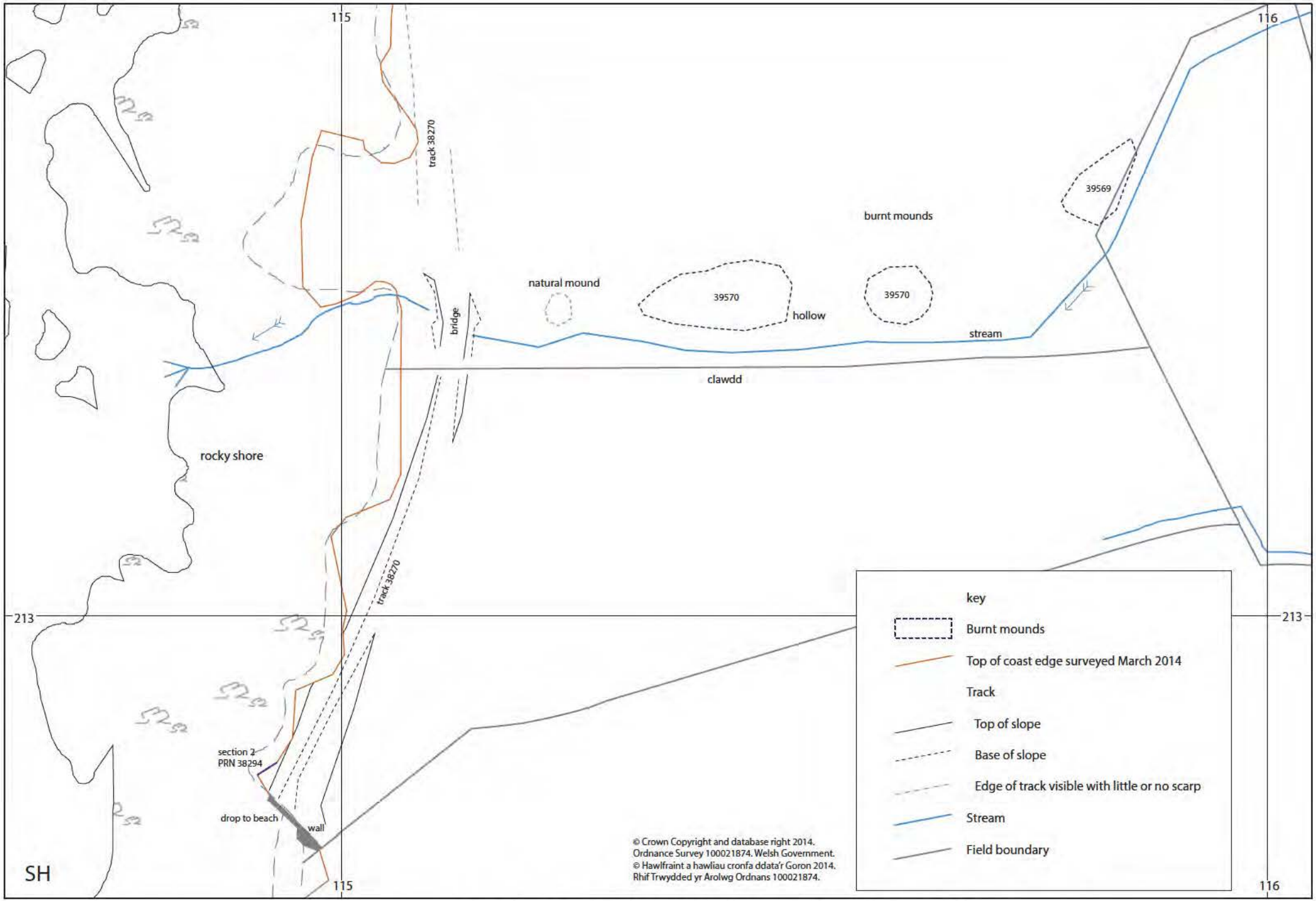

Figure 4. Location of possible burnt mounds and southern end of seaweed track

Plate 1. Erosion at eastern end of Henllwyn, view from E

Plate 2. Collapsed sea defences at Henllwyn, view from E

Plate 3. Erosion on west coast of Ynys Enlli just north of Porth Solfach, view from S

Plate 4. Culvert under the track at Henllwyn, view from S

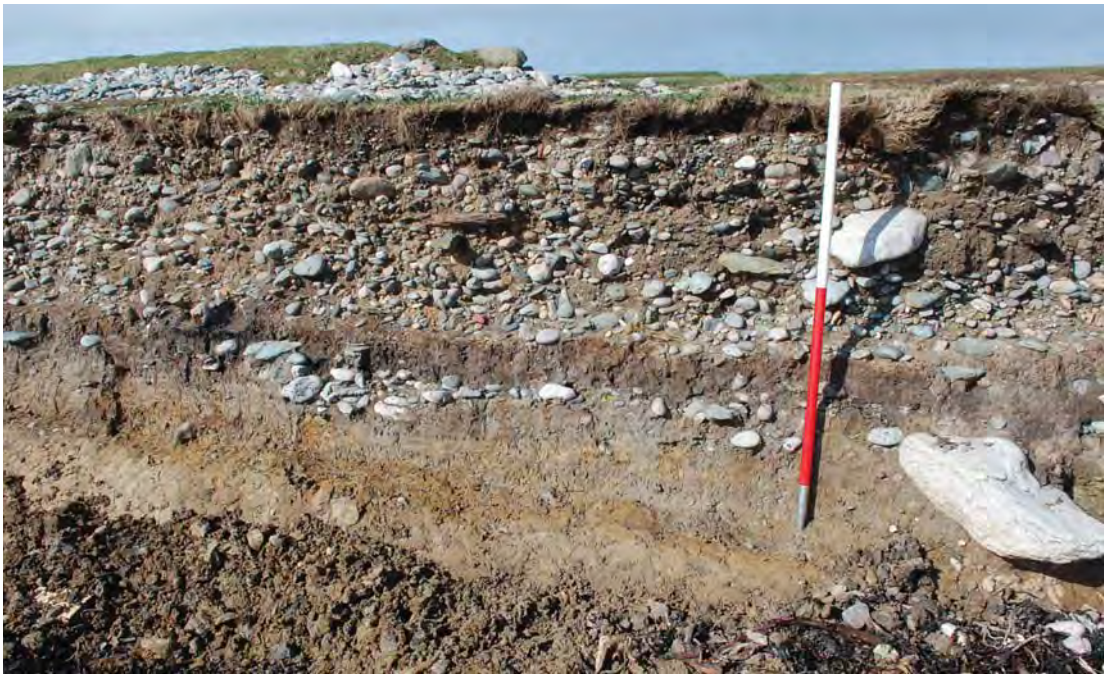

Plate 5. Section 4 showing buried soil and pebbles of a storm beach underneath at Henllwyn, view from SE

Plate 6. Section 3 showing buried soil containing animal bone at Porth Solfach, view from S

Plate 7. Section 2 showing dark layer with flat stones along the top, view from N

Plate 8. Layer of stones in eroded section, probably storm debris

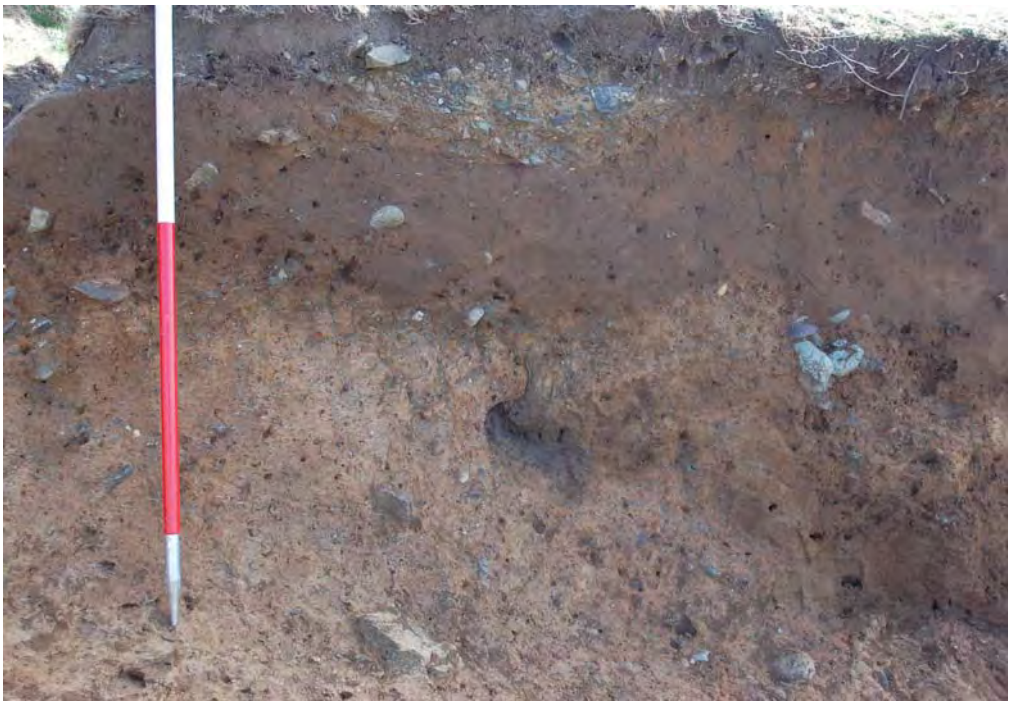

Plate 9. Section 1 showing depth of soil and track make-up on top, view from N

Plate 10. Mounds PRN 39570 and 39571, view from NW

Plate 11. Flint blade from mound PRN 39569

Plate 11. Track on west coast (PRN 38270), view from S

Plate 13. Track (PRN 38270) where it entered Porth Solfach, view from N

Plate 14. Track (PRN 38270) with erosion face showing construction, view from N

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