

**PDZ14. TRWYN CILAN TO CARREG DDU:**

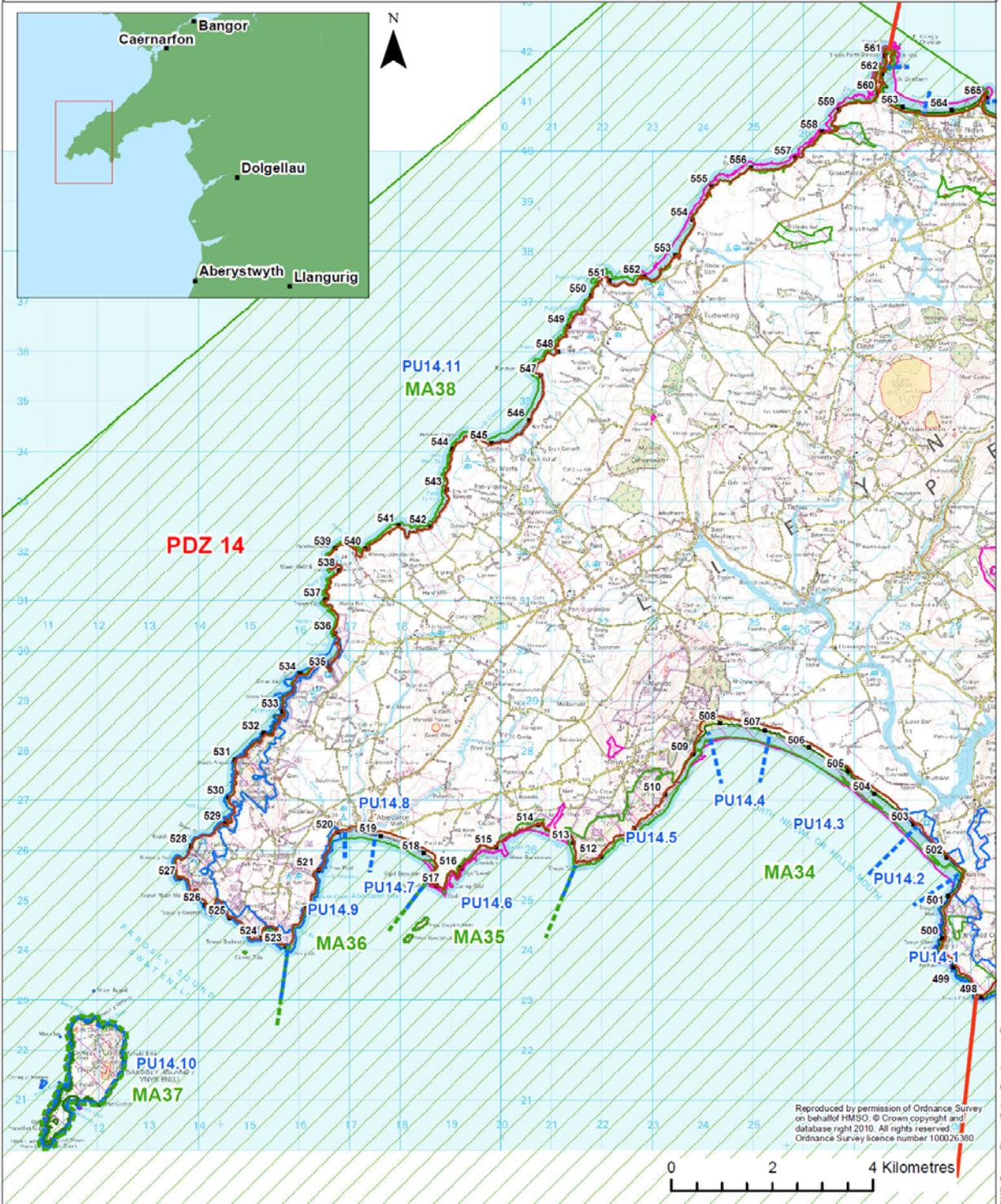


**Trwyn Cilan to Carreg Ddu including Ynys Enlli.**

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Shoreline Management Plan Sub Cell 9 & 10  
 Baseline Location Map  
 Policy Development Zone 14 - Lleyn West



<p><b>Key</b></p> <ul style="list-style-type: none"> <li>Existing Coastline and Chainage</li> <li>100 Year Recession Line with No Active Intervention</li> <li>Policy Development Zone</li> <li>Management Area</li> <li>Policy Unit</li> </ul>	<ul style="list-style-type: none"> <li>Ramsar</li> <li>SAC</li> <li>SPA</li> <li>SSSI</li> <li>NNR</li> </ul>	<ul style="list-style-type: none"> <li>Scheduled Monument</li> <li>EA Flood Zone 3</li> </ul>	
<p>0 2 4 Kilometres</p>			

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## Definitions of Scenarios Considered in Policy Development

This section defines the various scenarios that are used throughout the discussion of the Policy Development Zone.

### Sea Level Rise

It is recognised that there is a continuing uncertainty with respect to Sea Level Rise (SLR). Taking different SLR scenarios may affect the scale of impact or the timing of some changes, either in terms of sustainable management or in terms of impacts. In the discussion below of the baseline and alternative management scenarios, the Defra guidance on SLR has been generally been used. Where, in any specific area, the impact of SLR is felt to be significant and may change the context of management this discussion is held within a separate box, relevant to that section of text.

### Management scenarios;

#### *Unconstrained Scenario*

Under this scenario, the behaviour of the coast is considered as if there were no man made defences, effectively if they were suddenly not there. Although recognised to be a totally theoretical scenario it does provide a better understanding of how we are influencing the coastal behaviour and therefore the stresses and broader scale impact that are introduced. This assists in assessing first how the coast might wish to change, but also in defining the limits of interaction which the SMP should be considering.

#### *Baseline Scenarios*

- **No Active Intervention (NAI) – Scenario 1**, where there would be no further work to maintain or replace defences. At the end of their residual life, structures would fail. There would be no raising of defences to improve standards of protection.
- **With Present Management (WPM)– Scenario 2**. This scenario applies the policies set in the SMP1 or, where relevant, takes updated or clarified policies, if subsequent work has been undertaken e.g. studies or strategies. In many locations, the approach to management defined by SMP1 only covers a 50 year period. Where this is so, the intent of how the coast is being managed has been assumed to apply into the future. It should be noted that WPM does not necessarily imply a Hold The Line approach throughout the zone, in many areas present management may be for a No Active Intervention approach or one of Managed Realignment.

The aim of the No Active Intervention is to identify what is at risk if defences were not maintained. In a similar way, With Present Management aims to examine how the coast may develop, identifying where there are benefits in this management approach or where there may be issues arising in the future.

At the end of this sub-section a brief summary and comparison of the economic risk for each of the baseline scenarios is provided, based on the MDSF analysis undertaken during the SMP (including other study findings where relevant). The baseline scenarios are also assessed in terms of how they address the overall objectives for the Zone. This comparison between the baseline scenarios sets the scene for discussing possible alternative management scenarios which better address all the issues. This discussion is provided in the subsequent sub-section.

## 1 Local Description

PDZ 14 comprises the coast between Trwyn Cilan, the southern most tip of the **Llŷn Peninsula** and Carreg Ddu, the western side of a rocky headland protecting the small coastal hamlet of Porth Dinllaen on the north coast of the Llyn. Effectively, the zone covers the whole of the southwest extent of the **Llŷn Peninsula**. The southwest facing section of the coastline is formed by glacial till, and softer boulder clay deposits have eroded and formed swash aligned beaches backed by high cliffs (notably Porth Neigwl and Aberdaron).



Hells Mouth is a 6km long bay, anchored by the two rocky headlands of Mynydd Cilan and Mynydd Penarfynydd. This exposed bay is retreating landward due to cliff and coastal erosion. The village of Llanengan is situated within the valley of the Afon Soch, which runs typically some 750m to 1km behind the cliffed shoreline of the bay. The cliffs are lowest at Llanengan and this is also the main access point to the shore from the car park and National Trust property at Tai-morfa. The small settlement of Rhiw is situated on the northern-most end of the bay, at the transition between the soft clay cliffs and the harder rock cliffs running through to Mynydd Penarfynydd. The main village is not considered to be at risk, although properties at Plas yn Rhiw and Treheli, together with the road in front have been affected by land movement. The coastal road runs very close to the crest of the cliffs at the northern end of the bay. This road has been re-aligned in the recent past to the back of Treheli and Plas yn Rhiw. Although it is an important local access route, the main B4413 parallels this road much further inland. There are several individual properties along the crest of the cliffs of Hells Mouth Bay, particularly at its northern extent.

The stretch of coastline between Hells Mouth and Aberdaron is mainly rocky cliffs, with a small soft rocky bay of Porth Ysgo. The small islands of Ynys Gwylan-fawr and Ynys Gwylan-bach are formed of the same geological outcropping as that of the larger Ynys Enlli, and although these islands have no human development, they support an important breeding population of Puffins.

Along the coast towards the west is Aberdaron. This is the largest settlement on the coast within this PDZ and it supports the surrounding rural communities. The frontage of Aberdaron Bay can be split into two distinguishable halves, the defended frontage to the west of the bay, including the artificial 'spit' that has been constructed at the mouth of the Daron and the undefended, eroding cliffs to the east of the village. This bay, much like Hells Mouth, is held in place by the two harder rocky headlands at either end, Pen y

Cil and Trwyn y Penrhyn. Over the defended extent of the frontage and at its easternmost portion, defences are in place to protect the rising coastal slope and the coastal road behind it. This slope is also extensively drained. The main town sits within

### **Aberdaron seafront**



the valley and immediately behind the defences are the old church and graveyard, two hotels and the village centre. The slipway provides the main access to the important tourist beach.

The coastal road runs across the bridge over the Afon Daron, joining the B4413. A road then leads out of the village to the west, rising steeply above the defended coastal slope to the west of the Daron.

To the west of Aberdaron Bay, the land steeply rises to the rocky, Precambrian cliffs that form the southern most tip of the **LIŷn Peninsula**.

Ynys Enlli (Bardsey Island) is an offshore igneous rock outcrop approximately 3km southwest of the tip of the **LIŷn Peninsula**, approximately 1km<sup>2</sup> in size. The view of the island from the mainland is dominated by the high cliffs and headland of Mynydd Enlli and belies the lower lying land that occupies much of the island's western side. The southern end of the island is separated from the northern part by a narrow isthmus, with a small sandy beach to the northern side of this neck of land. There is a small landing stage within the southern bay of the isthmus. The lighthouse and helipad are on the southern promontory. Much of the scattered properties and heritage sites are along the central section of the island and well set back from the coastal edge.

The northern stretch of the coastline from Trwyn y Gwyddel to Carreg Ddu on the north coast of the peninsula is characterised by rocky cliffs, outcrops and platforms and inlets



and bays where softer glacial features have been exposed. This stretch of coastline contains no major human development apart from the occasional farm, connected to the larger settlements via inland roads.

The four sandy bays between Trwyn y Gwyddel and Carreg Ddu (Porth Ore, Porth Lago, Porth Colmon and Port Tywyn) are backed by soft clay cliffs with harder rock outcrops. There are no artificial defences present in any of the

bays and the only development present is a beach café and a car park at Porth Oer, highlighting the significance of recreation and tourism for the area. Indeed, Porth Oer, known also as Whistling Sands, has recently been identified as one of the top 50 best beaches in the world<sup>1</sup>. Whilst remote, this section of the coast has strong local and regional importance for the wider area and has an important association with historic settlement, particularly in the area of the southern peninsula and Ynys Enlli.

### ***Northern Llyn Peninsula***



There are several listed buildings identified along this frontage, in particular at Aberdaron where there are many listed cottages and St Hywyn Church. St Marys Church at Trwyn Maen Melyn is a designated SAM.

Ynys Enlli, situated offshore of the south coast of the peninsula has a high heritage value and contains many listed buildings including ruins of many chapels, abbeys, an old school and lime kilns. The island also has six SAMs including St Marys Abbey. Not only is this island important geologically and ornithologically, but it has a significant historical importance.

Moving along the northern, rocky coastline of the peninsula, towards Carreg Ddu, there is little specific historical interest, except for a few listed cottages situated inland and a prehistoric hut circle settlement situated to the north west of Anelog.

This entire coastal area is designated as a Marine Special Area of Conservation (SAC), encompassing a diverse range of sublittoral reefs. Most of this coastline including Ynys Enlli, apart from Aberdaron and the stretch of coast between the north of Porth Oer to Porth Ysglaig is designated as SSSI for its geological significance.

The south east extent of Hells Mouth, Ynys Enlli and the coastline between the north of Aberdaron and Porth Oer are all designated Special Protection Areas for their various bird species.

## 2 Coastal Processes

The southern coastal region of this PDZ is fully exposed to the southern Atlantic swells. Hells Mouth, held in place by the two rocky headlands is eroding landwards due to the southwesterly swells carving away at the soft boulder clay cliffs to form the large expanse of beach.

The Hells Mouth frontage can be quite sensitive to slight variations in wave direction and there is significant variation in patterns of erosion along the backshore as a result. In particular, it has been recorded in the past that there have been periods of local erosion across the southern dune-backed frontage. Overall, however, the strong dominance of the southwesterly wave climate driving into the bay defines the coastal shape and the beach can rebuild in local areas. The shoreline as a whole is in a state of gradual retreat. Cliff failure supplies sediment to the system but this sediment is then



**Hells Mouth cliffs**

redistributed over the whole bay area; so that a state of equilibrium is never achieved. This means that with the slight exception of the southern area, the cliffed backshore is never able to develop a stable slope.

The failure mechanism of the cliff line is also variable and this appears to be linked as much to the drainage pattern of the hinterland as to the actual nature of the material making up the back face of the bay. In some areas, the northern corner of the bay being a good example of this, the cliffs are poorly drained and receive water from the rising hinterland. This results in major slumping and deep seated failure of the cliff such that large volumes of material flow onto and over the shoreline. In other areas, particularly where drainage tends to be away from the coast towards the valley of the Afon Soch, the cliffs are steeper and fail by undercutting and toppling failure.

The lower cliffs at the southern end of the bay benefit from some additional protection from the headland and due to their lower level are less prone to slope failure. Even under the more extreme sea level rise scenarios there seems little possibility of flooding through to the Afon Soch.



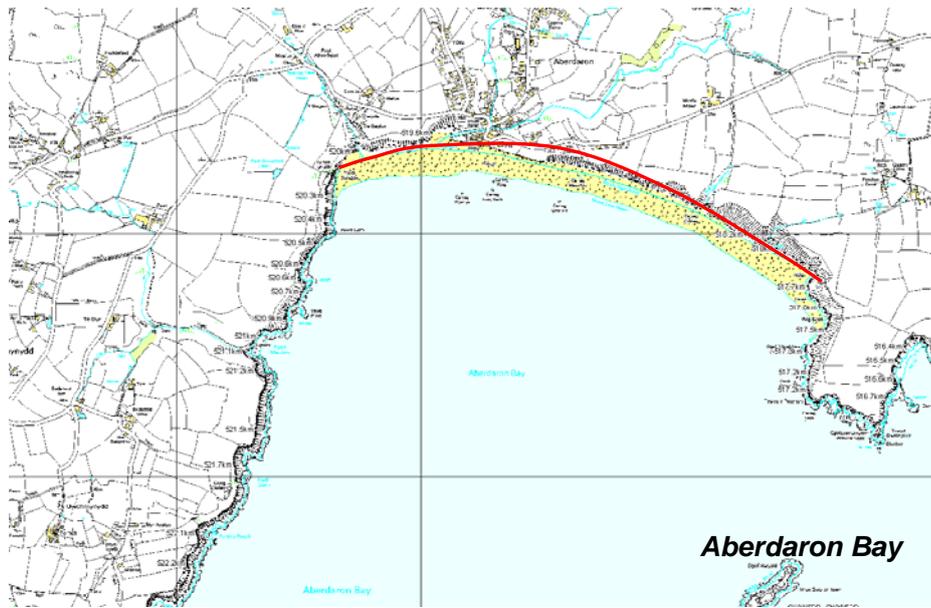
**Hells Mouth**

The coastal processes acting on the shoreline further west along the coast are less dramatic, where the headland is composed of harder steep cliffs, plunging into deep water.

The energy of the southwesterly swells is driven against the harder cliffs, and the deeply inset bays of Porth Ysgo and Aberdaron are a result of the erosion of glacial deposits between the hard rock headlands.

Aberdaron Bay, much like Hells mouth, is exposed to strong southwesterly swells from the Atlantic, although here the window of significant exposure is even smaller due to the extended headland of Uwchmynydd and Ynys Enlli. The study undertaken following the

sudden failure of the wall in front of the church in 1995 demonstrated that the orientation of the bay was quite stable under the predominant wave climate but there can be very specific conditions that give rise to significant draw down and movement of the beaches. The whole length of Aberdaron bay is under pressure to erosion but this has been resisted along the western village frontage, with various coast protection works. This northern end also gains some additional protection from the irregularity of the rock shoreline to the west. In addition the Afon Daron creates a small but significant ebb tide affect within the beach which tends to create a degree of further protection. The river can also, on occasion, reduce beach levels, increasing exposure of the backshore.



The above image highlights this change in beach shape along the frontage, with the red line showing very approximately the natural curve of the bay. As a result the bay is behaving in two ways. The cliffs to the east of the town are continuing to erode, where there is no form of defence. The beaches are relatively healthy and stable, and receive important sediment supply from the cliffs. The western end of the beach gains some additional natural shelter and there is a relatively healthy beach in this area. Between these two areas is the main village, with the hard structures and reinforced spit at the mouth of the Afon Daron, limiting the natural width of the beach. This area in particular is subject to large variation in beach level, although, at present, the beach is able to rebuild. The processes are seen specifically as a drawing down of the beach, rather than a process driven by longshore drift.

The coastline from the headland to the west of Aberdaron Bay along to Braich y Pwll, much like the cliffs between Hells Mouth and Aberdaron Bay, is composed of harder rock and is exposed to slower down-wearing and cliff retreat.

Turning north east along the coast, the dominant wave energy comes from the west, as the south and southwesterly Atlantic swells diffract around the peninsula. From Braich y Pwll to Carreg Ddu, the limit of this coastal area, the coastline is dominated by hard cliffs or platforms above which is overlain by till. The local embayed beaches trap sediment. These bays have generally been formed where the softer lithology is exposed and has been eroded away by the north-easterly swells. There is little human development along this coast, and as a result, no significant coast protection works.

### POTENTIAL BASELINE EROSION RATES

A distinction is made between basic erosion of the shoreline and cliff recession, affecting the crest of cliffs and coastal slopes. This is noted in the table below, together with other relevant factors. In assessing erosion and recession in the future, allowance has been made for sea level rise and this is discussed in Appendix C. This is also discussed briefly following the table below.

Within local bays, sea level rise (SLR) will be a significant factor in future development of the shoreline, however, over much of the zone the very slow erosion of the main hard cliffs would be little affected. Where there are softer cliffs or shorelines suffering erosion, the rate of erosion is likely to increase with SLR. This might be by a factor of 1.7 to 2.5 times the existing base erosion rate, over the 100 years. Where there are more stable features, such as fully developed storm beaches there would be a natural roll back of the beach, potentially in the order of 10m to 40m, depending of the nature of the beach and the coast behind. As the beaches, which at present protect relatively stable coastal slopes, erode or roll back, this could result in re-activating landslides and slope instability.

As in Aberdaron Bay, where the beach is constrained by a hard backshore, both natural or manmade, the backshore will be more influential in interacting with wave action. Where at present the beach face is able to respond and may be rebuilt after a severe storm, in the future there will be less capacity to do so as wave energy is reflected from this hard backshore. This may result in more long term trends of erosion.

Location	NAI Base Rate (m/yr)	Notes	100yr. Erosion range (m)
Porth Neigwl	0.2 – 0.6	Cliff recession in addition to erosion. High recession to west end.	30 - 180
Aberdaron East	0.3	Cliff recession in addition to erosion.	50 - 135
Aberdaron	0.3	Erosion following failure of defences	30 - 80
Aberdaron West	0.3	Cliff instability	30 - 80
Hard Cliffs	0.05	Local instability	5 - 15

Base rates have been assessed from monitoring and historical data. The range of potential erosion is assessed in terms of variation from the base rate and sensitivity in potential sea level rise. Further detail on erosion rates together with erosion maps are provided in Appendix C.

### FLOODING

Only in Aberdaron Bay is there any significant risk of flooding, as well as within the valley of the Afon Daron.

### EXISTING DEFENCES

The only significant defences present in this coastal area are the works at Aberdaron. Elsewhere, there are no major manmade defences. A masonry/ armourstone revetment to the west of the Afon Daron retains the coastal slope and reduces erosion at the toe. A sea wall with a concrete apron (see photograph below), along with further armourstone towards the east acts as the coastal defence for the village. The outlet of the Afon Daron is constrained by a concrete wall, forming the anchor point upon which most of the town sits upon.



#### UNCONSTRAINED SCENARIO

Under this scenario the behaviour of the coast is considered as if there were no man made defences, effectively if they were suddenly not there. Although recognised to be a totally theoretical scenario it does provide a better understanding of how we are influencing coastal behaviour and therefore, the stresses and broader scale impact that are introduced. This assists in assessing first how the coast might wish to change but also in defining the limits of interaction which the SMP should be considering.

In this coastal area, the only defended stretch of coastline, at Aberdaron, would change quite significantly under an unconstrained scenario. This can be seen in the shape the shoreline takes in this bay, with existing defences in place. The shoreline at the western end of the bay protrudes seaward compared to the eroding, undefended shoreline to the east. Under an undefended scenario, the coast at Aberdaron would lie along the same line as the currently eroding coastline.



#### KEY INTERACTION WITH DEFENCES

At present, the defences at Aberdaron prevent the potential for the Bay to behave in a natural way and erode in the same way as the undefended cliffs to the east, however, if this did occur, the town would suffer substantial loss and would further the potential for flooding. The hard spit structure at the mouth of the Daron is ensuring the flow of the river in the existing direction. Removal of this structure could result in significant

movement of the entrance channel. The sea wall which provides protection to the church and cemetery was constructed under emergency procedures, following a sea wall collapse and a subsequent rebuild in 1996. Without this defence the frontage and the church would be at risk from erosion. The sea wall to the east of the village is starting to form a headland, which over time will result in the development of two distinct bays. With sea level rise, the defences will be under greater pressure as the water levels in the bay will rise and the erosion rates in the bay will increase.

### 3 Management Scenarios

#### 3.1 No Active Intervention – Baseline Scenario 1.

The coast in this area is generally eroding. In many areas this erosion is very slow, where hard rock fronts the shoreline. In some areas this erosion is in relative balance with natural beaches rolling back, exposing the softer backshore slopes and cliffs, which then erode providing the width for the natural beaches to be maintained.

The only significant interruption to this process is at Aberdaron, where initially, the existing defence would provide some form of protection from erosion for approximately the next 30 to 50 years. After this the defences are likely to fail, and as a result, a retreat of the shoreline would occur. Much of the centre of the village would be at risk from erosion, with access to the village along the coast road from the east being lost, potentially over the second and third epochs. There would also be increased risk of flooding within the valley of the Daron with sea level rise.

#### Impact of different Sea Level Rise Scenarios

Under current conditions only one property is at risk of direct flooding during an extreme event, although there is risk of flooding due to wave overtopping to the centre of the village. A larger number of properties are affected under the 1m SLR scenario but still only under more extreme water level conditions. Under a 2m SLR scenario there is a steep change in impact, in that many of the properties along the sea front and on the defended spit would be at risk even under normal tide levels. The tidal influence would extend upstream of the road bridge. Depending on the rate of increase in sea level rise this increased risk could occur over the next 100 years.

As defences failed, the shoreline of the bay would retreat generally, and as the shoreline adjusts to a more uniform shape there would be increased instability in the coastal slope both to east and west of Aberdaron. This could potentially result in cutting the road out of the village to the west and would certainly result in loss of the road in to the village from the east. The undefended section of the shoreline would not gain any benefit from the loss of defence to the main village and would continue to erode. Over the 3<sup>rd</sup> epoch the continuing failure of the cliffs to the eastern end of the village would result in loss of the row of properties along the coastal road. Under this baseline scenario the core of Aberdaron would be lost along with the primary facilities along the sea front. The church and grave yard would be lost and in effect the village would be reduced to a collection of residential properties along each of the main roads into the village, with a small beach area somewhere in the vicinity of the bridge.

Access to the scattered communities to the east would be along the road to the ridge behind the village. In terms of the objectives, this scenario would not sustain the important local role of the village, would not protect basic infrastructure to the area and there would be significant impact on the value of Aberaeron in terms of regional tourism. Aberdaron, unless actively allowed to grow in size along the two roads running away

from the coast, would be reduced in significance to that of many of the other small settlements in this part of the **Llŷn Peninsula**.

Of course, with time, the area would take on a more natural appearance and this would enhance the naturalness of the shoreline, but this would be at the expense of the village's important supporting role in providing access and accommodation for enjoyment of the broader natural value of the whole area.

In other areas, there are no significant defences in place and the policy from SMP1 generally is for No Active Intervention.

At Hells Mouth, the whole bay would continue to retreat. At the southern end the dunes would continue to erode back but also develop inland. It is not anticipated that there would be loss of property, although there would be loss of some agricultural land and the camp site would need to be moved back. Further along the bay there would be substantial loss of land as erosion occurs and as the coastal slope sets back. Only to the north of the bay is there anticipated to be loss of property, with cliff recession cutting back as far as the road behind Ty Mawr and even further back in the northern most corner of the bay to the north of Plas-yn-Rhiw. The hamlet around Plas-yn-Rhiw is believed to be underlain by the harder rock of Mynydd Rhiw and may not be at risk. The exposure of the hard rock would tend to slow the erosion in the corner, limiting the failure of the coastal slope and eventually allowing a more stable slope to develop.

The coastal road would be severed by erosion and this would have significant impact on the village of Rhiw. However, under this scenario the road would also be lost at Aberdaron and it would no longer be of such significance to the area as a whole.

Overall, the scenario does allow continued development of the important natural coastline. There would be loss to individual properties and there would be disruption to the transport routes in the area.

Over much of the rest of the frontage, where there is highly resistant rock, the processes of down-wearing of the rock platforms and erosion of the cliffs would continue, but at a slow rate. Even with significantly increased water levels this rate of erosion would be slow. The nominal estimates are potentially some 5m erosion loss over the next 100 years. This would apply for Ynys Enlli as well as the coastline of the Peninsula.

In the till embayments along the north coast, the additional release of beach sediments with cliff erosion should allow the beaches to maintain their level with respect to sea level, and so little change will be seen in the intertidal area, although the shoreline profile will attempt to retreat, with local beach steepening. The car park and beach café at Porth Oer and the slipways and access to these northern bays would become an issue under No Active Intervention and as envisaged in SMP1, there would be the need to manage the retreat of these assets, rather than their protection.

There is the potential for loss of habitat in some areas. For example, the small islands of Ynys Gwylan-fawr and Ynys Gwylan-bach would suffer a loss of land and therefore the reduction of breeding habitat for Puffins. Along the coast, it is likely that that as the coastline rolls back, so too will the designated habitats. However, with the surrounding terrain landwards, there is a possibility of reduction of habitats with sea level rise, as cliffs are more exposed.

Access to and from Ynys Enlli may also become an issue in a No Active Intervention scenario as water levels rise and the coastline and slipways face erosion.

#### Impact of different Sea Level Rise Scenarios

Management of the landing stages to and on Ynys Enlli would clearly be affected purely from the point of view of use. Under a 2m SLR, there would be significant need to adjust the level of landing stage.

### 3.2 With Present Management – Baseline Scenario 2.

The only area where current management policy is to maintain defences is at Aberdaron. In all other areas of the coast the With Present Management scenario would be as discussed above in Baseline Scenario 1.

The Catchment Flood Management Plan (CFMP) for the area only touches briefly on this area of the coast and Aberdaron in particular. The area is defined with Policy Unit 3 – the **Llŷn Peninsula**. The following is abstracted from the North West Wales Catchment Flood Management Plan – Draft Plan, September 2008.

<b>Policy unit 3 Lleyn Peninsula</b>	This unit covers the Lleyn Peninsula from the coastal point from the far western coast to join policy units 2 and 5 on the border of the Snowdonia National Park. The main towns and villages include Aberdaron, Abererch, Abersoch, Chwilog, Criccieth, Llannor and Nefyn.	
	<b>Physical characteristics:</b>	
	<ul style="list-style-type: none"> <li>- The Lleyn Peninsula is drained by a dense network of small rivers and streams flowing and generally north-south direction. The main rivers draining the area are the Afon Soch, Erch, Rhyd-hir and Dwyfach.</li> <li>- The peninsula is predominantly rural with scattered settlements and agricultural land of moderate grade 3-4 and poor quality grade 5 land on the east of the peninsula.</li> <li>- Most of the peninsula is an ESA with Areas of Outstanding Natural Beauty around the coast.</li> <li>- The area is mostly low-lying, except for a few small areas of raised ground on the northern coast. The majority of the rivers in this catchment have moderately gentle slopes and therefore can react relatively slowly to a rainfall event.</li> <li>- Soils are mostly impermeable and prone to prolonged waterlogging. Overland flow is likely following rainfall on saturated soils. Water levels rise quickly in some rivers.</li> </ul>	
	<b>Flood mechanism:</b>	
	<ul style="list-style-type: none"> <li>- Small localised river flooding.</li> <li>- Small areas of surface water flooding.</li> </ul>	
	<b>Receptor:</b>	
	<ul style="list-style-type: none"> <li>- Small villages and settlements scattered across the Peninsula.</li> <li>- Landscape designations – ESA and AONB.</li> <li>- Environmental Designations – SACs, Ramsars and SSSIs.</li> <li>- Historic designations – Listed buildings, Scheduled Monuments, Historical Landscape Areas, Registered Parks and Gardens.</li> </ul>	
	<b>Current flood risk summary</b>	
	Number of residential and commercial properties at risk of flooding from the 1% AEP flood event (using flood zones):	320
	Total damages from a 1% AEP flood event (using flood zones):	£11 million
<b>Future flood risk summary (in 100 years time)</b>		
Climate change is not expected to have a significant affect on the flood risk in all the small villages and settlements across the Lleyn Peninsula.		
Number of residential and commercial properties at risk of flooding from the 1% AEP flood event in the future(using flood zones):	370	
Total damages from a 1% AEP flood event in the future (using flood zones):	£13.5 million	
<b>Policy selected</b>	<b>Policy 2 - Reduce existing flood risk management actions (accepting that flood risk will increase over time).</b> <u>Note:</u> this policy option involves a strategic increase in flooding in allocated areas, but is not intended to adversely affect the risk to individual properties.	

The CFMP also concludes:

*That under a Policy Option 2, the flood risk in villages such as Aberdaron, Abererch, Abersoch, Chwilog, Criccieth, Llannor and Nefyn will not increase.*

At Aberdaron the current SMP policy is for Hold the Line. Although only defined by SMP1 over a 50 year period, this approach is taken in this baseline scenario to extend over the 100 years covered by SMP2.

The current defences, although in relatively good condition, are under pressure if only at present on the more extreme events. At present this pressure is seen as being manageable, with the beach suffering occasional draw down and local erosion where the defences form an angle to the normal wave direction. The more westerly rock defence beneath the coastal slope and road out of the village is relatively stable, and because of its more westerly position, maintains a good level of beach in front of the rock revetment. The easterly defence and the slope drainage measure provide a good level of protection to the coastal slope, the road and the property behind.

There is an increasing separation, however, between this defended frontage and the undefended coast further to the east. As this undefended section retreats, the most prominent area of the east defences is and will act more and more as a headland. In fact, this position of defence is already seen as assisting in maintaining beach levels over the main village frontage and in front of the defences to the west of the Afon Daron. There remains a danger that the eastern wall will become outflanked. Under the current linear approach to defence, it would be envisaged that defence would have to be extended as a return wall or revetment to protect against this threat.

With sea level rise the defences will increasingly be exposed to wave action on a more regular basis. This will, in turn, tend to result in more frequent occasions when the beach in front is eroded and drawn away from the toe of the defence. The natural response to this under the current general approach would be to place rock in front of the toe, gradually with sea level rise increasing the level of the rock to form a full rock revetment. This process of reinforcing the wall would continue and there would be a need to raise the level of the back wall to address increased risk of overtopping and potentially direct flooding.

To the east, with the intent of holding the line under this scenario, and maintaining a sufficient coastal slope to protect the road, works would have to be extended to the undefended section of coast over the length before the road starts to turn further inland. To the landward side of the spit, defences would need to be raised to prevent flooding.

The rock revetment to the west would need to be strengthened under this scenario, but potentially to a lesser degree, as the village defences would act more to retain sediment as a small bay to the western end of the bay. It is recognised that different approaches to defence could be taken and this is discussed in later sections of this document. However, at this stage the discussion purely examines the general intent of holding the line, following a typical and logical extension of current practice.

Within the 100 year period of the SMP, under this current practice, it is envisaged that Aberdaron defences would be reinforced in line with sea level rise. The scenario therefore includes the development of a rock revetment along the whole of the village frontage, extending beyond the existing length to the east. Beach levels would reduce although there would remain a small area of beach at the entrance to the Afon Daron. Although the village would be maintained, its attractiveness as a seaside location would be reduced in the long term. There would be an increasing reliance on defence against sudden failure and the potential loss of a significant part of the village. Furthermore, defences would need to be extended to the east, potentially some 300m over the period of the SMP.

#### Impact of different Sea Level Rise Scenarios

The degree to which Aberdaron defences would need to be raised would very much relate to the rate of sea level rise. As discussed, the current approach, at present, really only requires regular maintenance, the main issues with the existing defences comes about as the frequency of exposure to wave and water levels increases. Under Defra guidance it might be anticipated that toe defences would need to be improved over the next 50 years. The need to improve the overall performance of the sea walls would be as sea levels increase to 1m above present day. With a 1m scenario the existing sea walls would be exposed to wave action every spring tide, with the existing toe actually submerged as might occur now on a 1:100 year extreme event. Under a 2m SLR scenario, the need to increase defences might be brought forward

some 20 to 30 years and with the need to have a full rock revetment in front of the walls well within the lifetime of the SMP2.

The need to extend defence to the east would similarly be advanced in time.

Although this scenario does maintain the overall natural function of the coast over the broader area, and would, therefore, maintain the landscape and important natural values of the area, at Aberdaron there would be loss of character of the village and significantly, loss of much of its beach area, together with loss of boat use and access to watersports. The increase in defence would be an issue in terms of long term sustainability and extending defences to the east would impact on the natural landscape, which is important to the village. It would not, however, directly impact on designated nature conservation areas.

The impacts in terms of objectives for the whole area are summarised in Table 2 below, with potential economic damages set out in Table 1.

#### 4 Summary Comparison and Assessment of Baseline scenarios.

**Table 1. Economic Assessment**

The following table provides a brief summary of erosion damages determined by the SMP2 MDSF analysis for the whole PDZ. Further details are provided in Appendix H. Where further, more detailed information is provided by additional studies, this is highlighted. The table aims to provide an initial high level assessment of potential damages occurring under the two baseline scenarios.

**ASSESSMENT OF EROSION DAMAGES**

Epoch	0 -20 year		20 – 50 years			50 – 100 years		50 – 100 years (2m SLR)				
No Active Intervention	No. of properties:		Value x £k	No. of properties:		Value x £k	No. of properties:		Value x £k	No. of properties		PV Damages (£x1000)
Location	Res.	Com.		Res.	Com.		Res.	Com.		Res.	Com.	
Porth Neigwl	0	0	0	0	0	0	2	0	340	2	0	49
Aberdaron East	0	0	0	0	0	0	4	1	851	4	1	45
Aberdaron	0	0	0	2	5	459	12	4	1,407	16	9	306
<b>Total for PDZ1</b>											<b>399</b>	
With Present Management	No. of properties		Value x £k	No. of properties		Value x £k	No. of properties		Value x £k	No. of properties		PV Damages (£x1000)
Location	Res.	Com.		Res.	Com.		Res.	Com.		Res.	Com.	
Porth Neigwl	0	0	0	0	0	0	2	0	340	2	0	49
Aberdaron East	0	0	0	0	0	0	4	1	851	4	1	45
Aberdaron	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total for PDZ1</b>											<b>82</b>	
Notes: PVD determined for 1m SLR in 100 yrs.												
Other information: The central sea front and core of Aberdaron Village would be lost. Damages do not include for additional value associated with graveyard and church.												

The following flood damages have been determined through use of MDSF. These figures are aimed to indicate the level and impact of flood risk rather than being a detailed economic appraisal. In many areas, substantial numbers of properties would be liable to flooding on the more frequent events both under NAI and WPM. A nominal write off value has been allowed in the table for properties at frequent risk; this generally excludes values at risk at present on a 1:1 year event; in 50 years time for the 1:10 year event; and in 100 years time the 1:50 year event.

#### ASSESSMENT OF POTENTIAL FLOOD RISK

No Active Intervention	Flood risk tidal 2010			Flood risk tidal 2060			Flood risk tidal 2110			tidal risk 2m SLR		PVD (£x1000)
	No. of properties		AAD x £k	No. of properties		AAD x £k	No. of properties		AAD x £k	No. of properties		
	<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr	
Location												
Aberdaron	0	1	0.05	1	1	0.66	2	10	21.57	15	3	74
<b>Total for PDZ3</b>											0.14	
With Present Management	No. of properties		AAD x £k	No. of properties		AAD x £k	No. of properties		AAD x £k	No. of properties		PVD (£x1000)
	<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr		<1:10 yr.	>1:10 yr	
	Location											
Aberdaron	0	1	0.05	0	2	0.26	0	12	0.1	12	6	6
<b>Total for PDZ3</b>											0.14	

**Table 2. General Assessment of Objectives**

The following table provides an overall assessment of how the two baseline scenarios impact upon the overall objectives. Specific objectives are set out in more detail within Appendix E. The table aims to provide an initial high level assessment of the two baseline scenarios, highlighting potential issues which conflict. These issues are discussed in the following section, examining alternative management scenarios from which SMP2 policy is then derived.

STAKEHOLDER OBJECTIVE	NAI			WPM		
	Fails	Neutral	Acceptable	Fails	Neutral	Acceptable
Reduce risk to life.						
Protect properties from flood and erosion loss.						
Minimise the need for increasing effort and management of coastal defences.						
Avoid reliance on defence, particularly where there is a risk of catastrophic failure at Aberdaron.						
Maintain access to village of Aberdaron and connectivity with Abersoch, Nefyn and larger settlements further to the east.						
Maintain Aberdaron as a support centre for the rural communities.						
Maintain recreational use of beaches and bays.						
Maintain access to the coast, including car parking and facilities.						
Maintain access for boat use and associated watersports activity.						
Maintain access to Ynys Enlli.						
Maintain character and integrity of coastal communities.						
Identify risk and reduce risk of loss of heritage features where possible.						
Maintain historic landscape.						
Prevent disturbance or deterioration to historic sites and their setting.						
Maintain or enhance the condition or integrity of the international (SAC, SPA) designated sites and interest features within the context of a dynamic coastal system.						
Maintain or enhance the condition or integrity of the national (SSSI) designated sites and interest features within the context of a dynamic coastal system.						
Maintain and enhance educational and scientific understanding of geology and geomorphology.						
Avoid damage to and enhance the natural landscape.						
Maintain the human landscape and character of communities.						
Maintain access to larger settlements for smaller farming communities.						

## 5 Discussion and Detailed Policy Development

The difference between the two baseline scenarios is at Aberdaron. Here clearly the NAI scenario fails to maintain this important village, while the WPM scenario raises issues over how the village may be sustained while at the same time maintaining the essential values of the community both locally and with respect to its strategic role within the region.

Before discussing this specific area, the issues associated with continuing, in effect, a No Active Intervention policy for the rest of the area are discussed.

The main issues in the broader area are management at Hells Mouth and the local impact of NAI on the various small communities along the coastline.

At Hells Mouth, there is little scope or need for intervention. Local management at the southern end, with the intention to allow roll back of the dunes and to accept continuing slow erosion is sensible in maintaining both the use of the area and the natural coastline which supports that use. Access to the shoreline would need to adapt alongside a natural retreat of the frontage. There is no perceived risk of a breach through to the valley of the Afon Soch and no loss of properties.

Within the central section of the bay, there would be significantly greater loss of agricultural land but no loss of properties anticipated, even with an increase in erosion with sea level rise. There is no realistic justification for defending or even slowing the rate of erosion and here again the policy of No Active Intervention is self-evidently sensible.

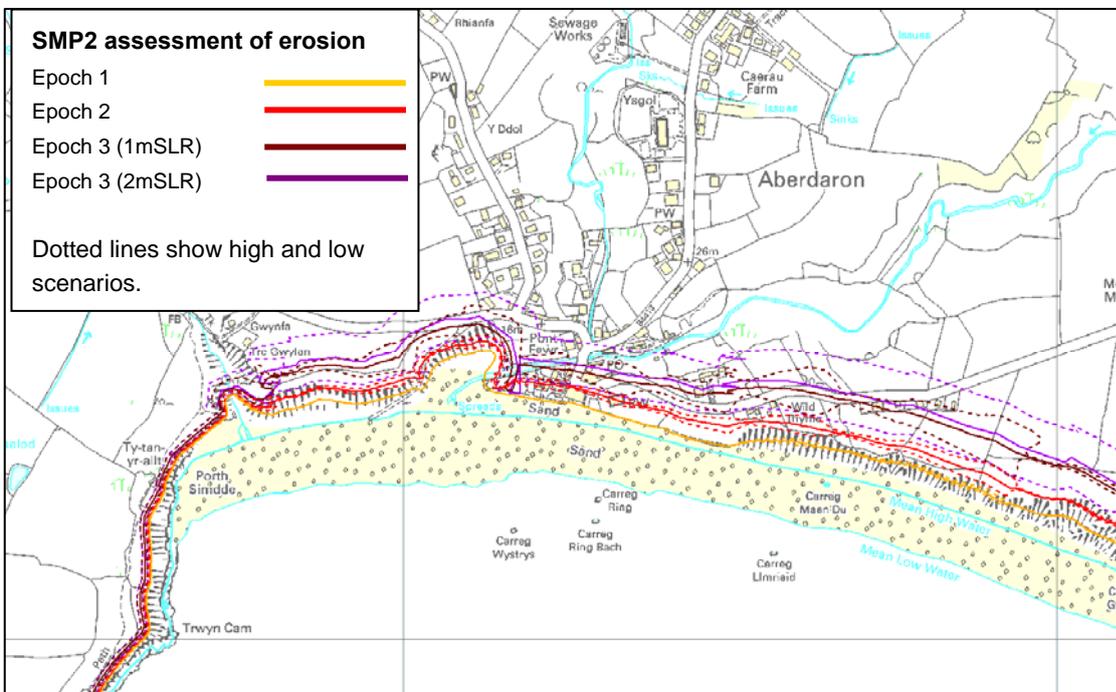
At the northern end of the bay, there are more strategically important issues. The road from the bay through to Rhiw and on to Aberdaron is at risk, potentially towards the end of the first epoch, in some 20 years time. The road has already been realigned over one critical section and further realignment would potentially be possible. However, without moving the road back, possibly as much as 400m between Treheli and Ty Mawr, along a distance in excess of 1km, there would still be the realistic expectation that the road might be lost over the next 100 years. In addition to the road, Siop Penyrallt and possibly Ty Mawr and Treheli could be at risk over the period of the SMP. Making accurate predictions of erosion and cliff recession is quite difficult in this area due to the changing nature of the cliff and with the uncertainty of where the hard underlying rock of the northern headland provides a more secure foundation. The shoreline policy of No Active Intervention is technically sensible, given the difficulty in attempting to stabilise the coastal slope or indeed providing protection against erosion of the toe, and also from the damage any such approach might have on the nature conservation value of the area (SSSI and SAC). The justification for realigning the road would be a decision for the Highway Authority, based on a continuing need to monitor the behaviour of the coastal slope. Maintaining this coastal road would, however, be in question and alternative provision, or upgrading alternative access may be the appropriate solution. There are then implications regarding the value of the continuation of maintaining the road elsewhere along the frontage, particularly to the east of Aberdaron.

In other areas, as suggested in SMP1, a policy of adapting the use of the coastal zone would be more appropriate than attempting to defend local areas. Whether this falls within a generic policy of No Active Intervention or Managed Realignment is somewhat academic. There is no real justification for intervening in coastal processes and to do so in any significant manner would be to impact on the very qualities the coast offer to the

area. The intent of management for all areas, other than at Aberdaron is to allow natural development of the shoreline. This, in this instance, is defined as a policy of No Active Intervention. This might not preclude very local short term management while use of an area is encouraged to adapt. Specifically;

- On Bardsey Island there would need to be adaptation of the boat landing site.
- At Porth Oer the tea rooms and access is in a relatively sheltered position within the bay. There would need to be decisions in the future as how the function of these assets may be maintained while allowing the coastline to retreat.
- At Porth Colmon there might be risk in the future (Epoch 3) to the property Glanmor. In this location there may be scope for enhancing quite locally the protection afforded by the low rock cliff but this would depend critically on future rates of sea level rise.
- There is likely to be increased flooding to the valley of the Afon Geirch although this is unlikely to significantly impact either on the SSSI of SAC, nor on use of the area.
- There would be increased erosion and the potential for landslippage on the western face of the Carreg Du headland and while prediction of erosion and recession is difficult in this area, there may be a need to adjust the golf course to take account of this.

The rest of this discussion relates to Aberdaron Bay. Over the short to medium term the intent is to Hold The Line over the village frontage, through maintenance of existing defences. The real issue is how to manage this into the future, if the important values the village provides for the region are to be sustained. In considering the alternative scenarios for the future, advancing the line is ruled out in that there is no real advantage, opportunity, or desire to create more usable space. The problem is one of width, to allow and sustain a more natural functioning shoreline where the important beach use can be maintained, whilst still maintaining the important shoreline assets such as the church, the hotels and the core services of the lower part of the village, in the face of sea level rise. Advancing the line would exacerbate the problem.



Do Nothing would be unacceptable in that the nature of the village and its value to the surrounding area and the regional tourism would largely be lost.

During consultation, the opportunity to remove or realign the rock revetment to the west of the village was suggested and discussed. This raised the question of what changes might be acceptable, which may provide opportunity to alleviate the current problems without loss of the core values of the area. Change is considered necessary to achieve this.

Realigning or removing defences to the west of the village does offer the opportunity for creating and sustaining a more natural beach area, which would help sustain the attractiveness and use of the area. The main risks associated with this would be to the road running out to the west. This road is important locally, although alternative access would be possible via the top road to the back of the village. The road is not, therefore, seen as a major constraint. The timing of any such loss could be critical and as such it would be necessary to examine the risk in more detail and to potentially look to some form of management of the erosion to the coastal slope in the form of rock groynes.

Management of this western section is closely linked to the management of the main village frontage; in particular the management of the eastern end where the defence is already emerging as a slight headland. This has an important role in anchoring the shoreline along the village frontage and retaining the upper beach to the west. It seems inevitable that if the village frontage is to be sustained that this emerging headland is managed as such. If this eastern wall were allowed to fail or was realigned further inland, then the main pressure point on the coast would be the church wall, effectively creating the same situation as at present but in a less advantageous position. Whichever position is held, there would be in the future an acceptance that the whole bay is going to function more like two sub bays at the backshore.

Rather than allowing or needing to extend defences further to the east as these two sub bays form, it would seem more sensible to actually shape any new headland to create a better transitional zone between the defended length of the village and the naturally developing coast to the east. It would not be proposed to provide direct protection to the east of the existing defence. As a consequence it would be anticipated that in the long term, potentially within Epoch 3 but potentially to the end of the 100 years the coast road would be lost and the four properties just outside the village would be lost. More positive management of the emerging headland to the east of the defences could be used to mitigate this to some degree.

From earlier discussion with respect to Hells Mouth, it is anticipated that the coastal road may be lost in other areas in the future. Whilst important as an access route between Aberdaron and Rhiw, the function of the road as a main through-road all the way along the coast would already have been lost. This would need to be discussed further with the Highway Authority in re-examining access and broader transport networks generally throughout the area.

We have, therefore, a situation developing for future management, where to sustain the village, greater emphasis is put on establishing an upper shore control point at the eastern end of the village and allowing the coastal slope at the western end to realign more naturally (though probably in a controlled manner). It would still be important to allow some movement of beach material along the lower foreshore between the supply of sediment from the eastern cliffs and the area where a beach would be encouraged to develop in the west. This would impose constraints on the size of any new headland works to the east of the village.

Under this management scenario, there would still be loss of the beach along the central section of the village with the need to reinforce and raise defences in this area. To further enhance opportunity for better use of the beach, consideration could also be given to realigning the heavily armoured spit to the river. In effect, what is envisaged is that the whole of the village frontage is adjusted to allow a slightly more defined and deeper sub-bay, between the cliffs to the west and the local headland to the east.

This would require more detailed planning, looking at the implications in terms of adjusting use of the road and the core of the village, as much as just realigning the defences. Taking this further falls beyond the remit of the SMP, in that it would be inappropriate for the SMP to consider specific detail without a far more detailed study. The intent for Aberdaron and the shoreline to the west would be for Managed (and planned) Realignment, with the intent for No Active Intervention for the eastern half of the bay.

In terms of policy this intent would be delivered by Holding The Line to the village during Epoch 1, with Managed Realignment in Epoch 2 and establishing a realigned position to Holding The Line in Epoch 3. The policy for the eastern half of the bay would be No Active Intervention over all three epochs.

## 6 Management Summary.

The Policy Units defined by the discussion above are in reality quite similar to the Management Units defined in SMP1, although divided still further to highlight specific management needs. These Policy Units, however, need to be considered as elements within the broader intent of the SMP for future management of the coast as a whole. As such, the Policy Units are grouped together within Management Areas, recognising the need to consider how policy in specific units interact. The Management Areas are:

### MA34 PORTH NEIGWL: From Trwyn Cilan to Trwyn Talfarach

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.1	Mynydd Cilan west	NAI	NAI	NAI	.
14.2	Porth Neigwl east	NAI	NAI	NAI	Local readjustment and dune management
14.3	Porth Neigwl centre	NAI	NAI	NAI	
14.4	Porth Neigwl west	NAI	NAI	NAI	Future realignment or loss of road
14.5	Rhiw	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

### MA35 PORTH YSGO: From Trwyn Talfarach to Trwyn Penrhyn

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.6	Ysgo	NAI	NAI	NAI	.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

**MA36 ABERDARON: From Trwyn Penrhyn to Pen y Cil**

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.7	Aberdaron East	NAI	NAI	NAI	Consider how the transition between Aberdaron Village frontage and this unit is managed to allow adaptation.
14.8	Aberdaron Village and coastal slope	HTL	MR	HTL	Develop Managed Realignment within a framework for sustainable development of the village. Address transport issues.
14.9	Uwchmynydd	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

**MA37YNYS ENLLI**

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.10	Ynys Enlli	NAI	NAI	NAI	Consider adaptation to landing stage
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

**MA38 NORTH WEST LLEYN: From Pen y Cil to Carreg Du**

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.11	North West Lleyrn	NAI	NAI	NAI	Local management would not be precluded to allow adaptation of use within a principle of allowing natural evolution of the coast.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

The following pages provide a summary statement of intent for management for each Management Area, highlighting the key issues discussed earlier

**PDZ14**  
**Management Area Statements**

**MA 34 Hells Mouth**  
*Trwyn Cilan to Trwyn Talfarach*

**MA 35 Porth Ysgo**  
*Trwyn Talfarach to Trwyn Penrhyn*

**MA 36 Aberdaron**  
*Trwyn Penrhyn to Pen y Cil*

**MA 37 Ynys Enlli**

**MA 38 North West Lleyrn**  
*Pen y Cil to Carreg Du*

<b>Location reference:</b>	<b>Hells Mouth</b>
<b>Management Area reference:</b>	<b>M.A. 34</b>
<b>Policy Development Zone:</b>	<b>PDZ14</b>

\* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.

The following descriptions are provided to assist interpretation of the map shown overleaf.

**100 year shoreline position:**

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of “With Present Management” and under the “Draft Preferred Policy” being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

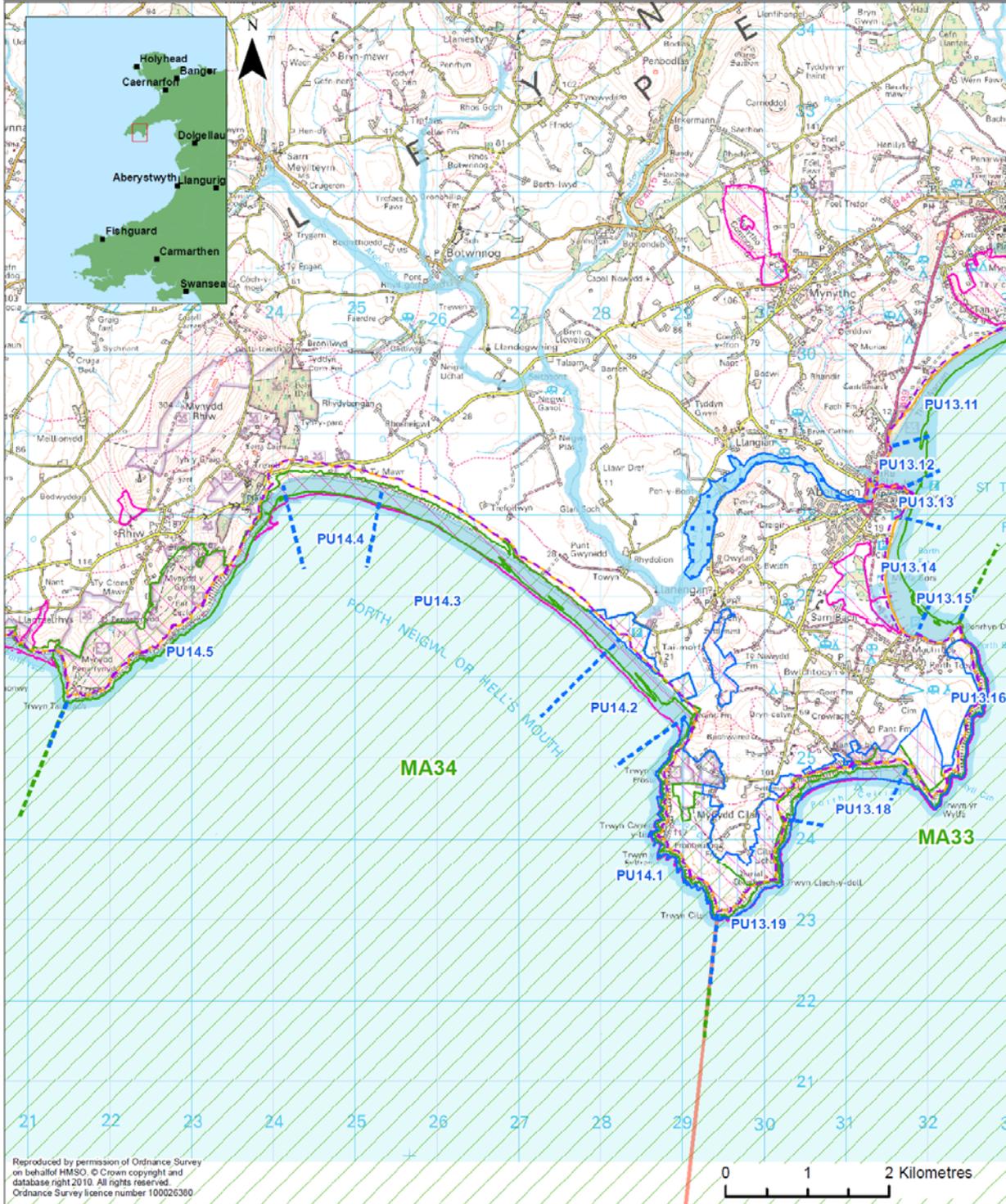
**Flood Risk Zones**

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency’s web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). The maps within this Draft SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP draft policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the Draft SMP document.

**Shoreline Management Plan Sub Cell 10  
Baseline Location Map  
Management Area 33 & 34**

- Management Area
- Policy Unit
- Policy Development Zone
- Scheduled Monument



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Key		
<span style="color: red;">---</span>	100 Year Shoreline Position:	<span style="border: 1px solid orange; padding: 2px;"> </span> Ramsar
<span style="color: blue;">---</span>	Preferred Policy would be the same as With Present Management	<span style="border: 1px solid green; padding: 2px;"> </span> SAC
<span style="color: orange;">---</span>	With Present Management where this differs from the Preferred Policy	<span style="border: 1px solid blue; padding: 2px;"> </span> SPA
<span style="color: purple;">---</span>	Preferred Policy where this differs from the With Present Management	<span style="border: 1px solid pink; padding: 2px;"> </span> SSSI
		<span style="border: 1px solid green; padding: 2px;"> </span> NNR
		<span style="background-color: lightblue; border: 1px solid blue; padding: 2px;"> </span> Existing Indicative EA Flood Zone 3
		<span style="background-color: lightblue; border: 1px dashed blue; padding: 2px;"> </span> EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding



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## SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

### INTENT OF THE PLAN:

The intent of the plan is to allow natural erosion and evolution of the shoreline and backshore cliffs. At the southern end of the bay, there may be scope for local adaptation management to support access, the car park and camp site. This would be subject to normal approvals but is not seen as significantly impacting on shoreline processes. At the northern end there may be a need for future re-routing of the road. There is likely to be loss of property in this area in the future.

### KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of the impacts. It will be important to relate this to national monitoring of sea level rise and more general climate change and shoreline behaviour.

### ACTIONS:

ACTION	PARTNERS
Shoreline monitoring	<b>GC</b>
Adaption planning	<b>Highways</b> <b>NT</b>
	<b>Landowners</b>

## DELIVERY OF THE PLAN

### SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.1	Mynydd Cilan west	NAI	NAI	NAI	.
14.2	Porth Neigwl east	NAI	NAI	NAI	Local readjustment and dune management
14.3	Porth Neigwl centre	NAI	NAI	NAI	
14.4	Porth Neigwl west	NAI	NAI	NAI	Future realignment or loss of road
14.5	Rhiw	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
<b>From present day</b>	No Active Intervention.
<b>Medium term</b>	No Active Intervention.
<b>Long term</b>	No Active Intervention.

## IMPLICATIONS OF THE PLAN

### CHANGES FROM PRESENT MANAGEMENT

No significant change in management.

### ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.0	0.0	49.0	49.0
Preferred Plan Damages	0.0	0.0	49.0	49.0
Benefits	0.0	0.0	0.0	0.0
Costs	0.0	0.0	0.0	0.0

### FLOOD AND EROSION RISK MANAGEMENT

#### POTENTIAL LOSS

There is likely to be loss of 2 properties, potentially not until epoch 3.

#### BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to management of the shoreline.

**SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)**

**PDZ 14**

SEA Objective	Impact of Preferred Policy for each Epoch			
	1	2	3	Mitigation
<b>Policy Units 14.1 to 14.11</b>				
To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species).				
To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition.				
To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats.				
To support natural processes and maintain geological exposures throughout nationally designated geological sites.				
To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives.				
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
To minimise the impact of policies on marine operations and activities.				Monitoring and appropriate design
To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services.				
To minimise coastal flood and erosion risk to agricultural land and horticultural activities.				
To minimise coastal flood and erosion risk to people and residential property.				
To minimise coastal flood and erosion risk to key community, recreational and amenity facilities.				
To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities.				

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

**This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.**

These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.

#### HRA SUMMARY

With the exception of PU 14.8, the entire coastline within PDZ14 is currently undefended and the SMP policy in this PDZ provides for ten NAI policies for all three epochs along the majority of the coastline to provide for natural development (through erosion) of the sea cliffs, with HTL and MR identified as the preferred policies at one PU location (PU 14.8). PDZ 14 includes interest features of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**Implications for the integrity of the Site:** Habitat loss will occur to the SACs and SPAs along the coast of PDZ 14, however, as they are subject to NAI policies the habitat loss to erosion is considered to be in response to natural processes and not the SMP policies and there will be **no adverse effect on the integrity** of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT**

This area was scoped out of the assessment.

<b>Location reference:</b>	<b>Porth Ysgo</b>
<b>Management Area reference:</b>	<b>M.A. 35</b>
<b>Policy Development Zone:</b>	PDZ14

\* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.

The following descriptions are provided to assist interpretation of the map shown overleaf.

### 100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Draft Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

### Flood Risk Zones

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). The maps within this Draft SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP draft policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the Draft SMP document.

**Shoreline Management Plan Sub Cell 10**  
**Baseline Location Map**  
**Management Area 35, 36 & 37**

- — — Management Area
- — — Policy Unit
- — — Policy Development Zone
- Scheduled Monument



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<p><b>Key</b></p> <p>100 Year Shoreline Position:</p> <ul style="list-style-type: none"> <li><span style="color: magenta;">— — —</span> Preferred Policy would be the same as With Present Management</li> <li><span style="color: orange;">— — —</span> With Present Management where this differs from the Preferred Policy</li> <li><span style="color: purple;">— — —</span> Preferred Policy where this differs from the With Present Management</li> </ul>		<ul style="list-style-type: none"> <li><span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span> Ramsar</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> SAC</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> SPA</li> <li><span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span> SSSI</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> NNR</li> </ul>	<ul style="list-style-type: none"> <li><span style="background-color: lightblue; border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> Existing Indicative EA Flood Zone 3</li> <li><span style="background-color: lightblue; border: 1px dotted blue; display: inline-block; width: 15px; height: 10px;"></span> EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding</li> </ul>	
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I:\0710001\Technical\_Data\GIS\Projects\SMP\_Report\_Figures\Management Areas

## SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

### INTENT OF THE PLAN:

The intent of the plan is to allow the natural development of the shoreline.

### KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of changes. It will be important to relate this to national monitoring of sea level rise and more general climate change..

### ACTIONS:

ACTION	PARTNERS
Shoreline monitoring	<b>GC</b>

## DELIVERY OF THE PLAN

### SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			
		2025	2055	2105	Comment
14.6	Ysgo	NAI	NAI	NAI	.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
<b>From present day</b>	No Active Intervention.
<b>Medium term</b>	No Active Intervention.
<b>Long term</b>	No Active Intervention.

## IMPLICATIONS OF THE PLAN

### CHANGES FROM PRESENT MANAGEMENT

No significant change in management.

### ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.0	0.0	0.0	0.0
Preferred Plan Damages	0.0	0.0	0.0	0.0
Benefits	0.0	0.0	0.0	0.0
Costs	0.0	0.0	0.0	0.0

### FLOOD AND EROSION RISK MANAGEMENT

#### POTENTIAL LOSS

No properties are identified as being at risk.

#### BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to management of the shoreline.

**SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)**

**PDZ 14**

SEA Objective	Impact of Preferred Policy for each Epoch			
	1	2	3	Mitigation
<b>Policy Units 14.1 to 14.11</b>				
To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species).				
To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition.				
To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats.				
To support natural processes and maintain geological exposures throughout nationally designated geological sites.				
To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives.				
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
To minimise the impact of policies on marine operations and activities.				Monitoring and appropriate design
To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services.				
To minimise coastal flood and erosion risk to agricultural land and horticultural activities.				
To minimise coastal flood and erosion risk to people and residential property.				
To minimise coastal flood and erosion risk to key community, recreational and amenity facilities.				
To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities.				

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

**This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.**

**These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.**

#### **HRA SUMMARY**

With the exception of PU 14.8, the entire coastline within PDZ14 is currently undefended and the SMP policy in this PDZ provides for ten NAI policies for all three epochs along the majority of the coastline to provide for natural development (through erosion) of the sea cliffs, with HTL and MR identified as the preferred policies at one PU location (PU 14.8). PDZ 14 includes interest features of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

***Implications for the integrity of the Site:*** Habitat loss will occur to the SACs and SPAs along the coast of PDZ 14, however, as they are subject to NAI policies the habitat loss to erosion is considered to be in response to natural processes and not the SMP policies and there will be **no adverse effect on the integrity** of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT**

This area was scoped out of the assessment.

<b>Location reference:</b>	<b>Aberdaron</b>
<b>Management Area reference:</b>	<b>M.A. 36</b>
<b>Policy Development Zone:</b>	<b>PDZ14</b>

\* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.

The following descriptions are provided to assist interpretation of the map shown overleaf.

#### **100 year shoreline position:**

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Draft Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

#### **Flood Risk Zones**



General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). The maps within this Draft SMP document show where SMP policy might influence the management of flood risk.



Indicate areas where the intent of the SMP draft policy is to continue to manage this risk.



Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the Draft SMP document.

**Shoreline Management Plan Sub Cell 10  
Baseline Location Map  
Management Area 35, 36 & 37**

- Management Area
- Policy Unit
- Policy Development Zone
- Scheduled Monument



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<p><b>Key</b></p> <p>100 Year Shoreline Position:</p> <ul style="list-style-type: none"> <li><span style="color: red;">---</span> Preferred Policy would be the same as With Present Management</li> <li><span style="color: orange;">---</span> With Present Management where this differs from the Preferred Policy</li> <li><span style="color: purple;">---</span> Preferred Policy where this differs from the With Present Management</li> </ul>		<ul style="list-style-type: none"> <li><span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span> Ramsar</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> SAC</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> SPA</li> <li><span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span> SSSI</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> NNR</li> </ul>	<ul style="list-style-type: none"> <li><span style="background-color: lightblue; border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> Existing Indicative EA Flood Zone 3</li> <li><span style="background-color: lightblue; border: 1px solid blue; border-style: dotted; display: inline-block; width: 15px; height: 10px;"></span> EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding</li> </ul>	
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## SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

### INTENT OF THE PLAN:

The intent within the plan is to sustain the community of Aberdaron but to enable this to be managed in a manner that will equally sustain the important amenity beach and seafront, without the need to extend defence further along the shoreline to the east.

The defence to the eastern end of the village is already forming a slight headland. The SMP, in outline, proposes that this is managed as such, with the intent to provide a transition between the natural development of the eastern half of the bay. The defence would need to be adapted to control this development at its eastern end. In the long term there would be risk of erosion and landslip, losing the road and some properties in this area. Management of the headland would slow but not stop this.

The main seafront would be defended and existing defences would need to be reinforced and raised. To the western end of the frontage consideration would need to be given as to the possible realignment of the spit and reducing the defence of the western coastal slope. The intent would be to both create and sustain the main amenity beach in this area. The road to the crest of the coastal slope might be lost in the future but there is an alternative access further in land. This, and the overall use and values of the area, need to be examined in more detail to develop an integrated approach to defence looking to establish how the various values of the village may best be sustained through adaption of management of the shoreline.

### KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of the proposed changes. There is also a need for a detailed planned response to change. It will be important to relate this to national monitoring of sea level rise and more general climate change and continued monitoring of shoreline behaviour.

While there are strong socio-economic reasons for maintaining defence, it may not be possible to fund future management solely through FCERM grant in aid. As part of the adaption plan possibility for alternative collaborative funding would need to be sought. Given the important regional value of the village this is a realistic expectation. Without such funding existing defence might only be sustainable through to the end of epoch 2, with a subsequent approach of managed realignment and loss of the sea front and important heritage features.

### ACTIONS:

ACTION	PARTNERS
Shoreline monitoring	<b>GC</b>
Integrated planning for adaption of coastal defence	<b>GC</b> <b>Community</b> <b>EA</b> <b>Church</b> <b>Highways</b> <b>NT</b>

## DELIVERY OF THE PLAN

### SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
14.7	Aberdaron East	NAI	NAI	NAI	Consider how the transition between Aberdaron Village frontage and this unit is managed to allow adaptation.
14.8	Aberdaron Village and coastal slope	HTL	MR	HTL	Develop Managed Realignment within a framework for sustainable development of the village. Address transport issues.
14.9	Uwchmynydd	NAI	NAI	NAI	
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
<b>From present day</b>	Maintain existing defences. Develop adaptation planning. Develop funding plan.
<b>Medium term</b>	Maintain and adapt defences, moving towards more sustainable management.
<b>Long term</b>	Maintain realigned defences.

## IMPLICATIONS OF THE PLAN

### CHANGES FROM PRESENT MANAGEMENT

The intent is substantially as set out within SMP but the approach to sustaining the village changes to include greater adaption.

### ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.6	152.0	261.6	414.2
Preferred Plan Damages	0.6	1.7	48.8	51.1
Benefits	0.0	150.2	212.8	363.1
Costs	6.3	326.4	350.2	682.9

There would be a need for collaborative funding.

### FLOOD AND EROSION RISK MANAGEMENT

#### POTENTIAL LOSS

There is potential loss of up to 4 properties at the eastern end of the village subject to future management of the transition between the village and the eroding cliffs to the east. There is also likely to be loss of the road.

#### BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to defence, maintaining defence to the core community areas. Some 16 properties would continue to be defended and there would be management of the flood risk to 12 properties within the village.

**SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)**

**PDZ 14**

SEA Objective	Impact of Preferred Policy for each Epoch			
	1	2	3	Mitigation
<b>Policy Units 14.1 to 14.11</b>				
To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species).				
To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition.				
To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats.				
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To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives.				
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
To minimise the impact of policies on marine operations and activities.				Monitoring and appropriate design
To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services.				
To minimise coastal flood and erosion risk to agricultural land and horticultural activities.				
To minimise coastal flood and erosion risk to people and residential property.				
To minimise coastal flood and erosion risk to key community, recreational and amenity facilities.				
To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities.				

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

**This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.**

**These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.**

#### **HRA SUMMARY**

With the exception of PU 14.8, the entire coastline within PDZ14 is currently undefended and the SMP policy in this PDZ provides for ten NAI policies for all three epochs along the majority of the coastline to provide for natural development (through erosion) of the sea cliffs, with HTL and MR identified as the preferred policies at one PU location (PU 14.8). PDZ 14 includes interest features of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

***Implications for the integrity of the Site:*** Habitat loss will occur to the SACs and SPAs along the coast of PDZ 14, however, as they are subject to NAI policies the habitat loss to erosion is considered to be in response to natural processes and not the SMP policies and there will be **no adverse effect on the integrity** of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT**

This area was scoped out of the assessment.

<b>Location reference:</b>	<b>Ynys Enlli</b>
<b>Management Area reference:</b>	<b>M.A. 37</b>
<b>Policy Development Zone:</b>	PDZ14

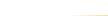
\* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.

The following descriptions are provided to assist interpretation of the map shown overleaf.

### 100 year shoreline position:

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Draft Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
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-  Draft Preferred Policy.

### Flood Risk Zones



General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). The maps within this Draft SMP document show where SMP policy might influence the management of flood risk.



Indicate areas where the intent of the SMP draft policy is to continue to manage this risk.



Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the Draft SMP document.

**Shoreline Management Plan Sub Cell 10  
Baseline Location Map  
Management Area 35, 36 & 37**

- - - Management Area
- - - Policy Unit
- - - Policy Development Zone
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<p><b>Key</b></p> <p>100 Year Shoreline Position:</p> <ul style="list-style-type: none"> <li><span style="color: red;">- - -</span> Preferred Policy would be the same as With Present Management</li> <li><span style="color: orange;">- - -</span> With Present Management where this differs from the Preferred Policy</li> <li><span style="color: purple;">- - -</span> Preferred Policy where this differs from the With Present Management</li> </ul>		<ul style="list-style-type: none"> <li><span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span> Ramsar</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> SAC</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> SPA</li> <li><span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span> SSSI</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px;"></span> NNR</li> </ul>	<ul style="list-style-type: none"> <li><span style="background-color: lightblue; border: 1px solid blue; display: inline-block; width: 15px; height: 10px;"></span> Existing Indicative EA Flood Zone 3</li> <li><span style="background-color: lightblue; border: 1px solid blue; border-style: dotted; display: inline-block; width: 15px; height: 10px;"></span> EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding</li> </ul>	
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## SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

### INTENT OF THE PLAN:

The underpinning intent of the plan is to allow the natural development of the shoreline.

### KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of future changes. It will be important to relate this to national monitoring of sea level rise and more general climate change.

### ACTIONS:

ACTION	PARTNERS
General shoreline monitoring	<b>GC</b>
Assess in detail potential impact on historic environment	

## DELIVERY OF THE PLAN

### SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
14.10	Ynys Enlli	NAI	NAI	NAI	Consider adaptation to landing stage
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
<b>From present day</b>	No Active Intervention.
<b>Medium term</b>	No Active Intervention.
<b>Long term</b>	No Active Intervention.

## IMPLICATIONS OF THE PLAN

### CHANGES FROM PRESENT MANAGEMENT

No significant change

### ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.0	0.0	0.0	0.0
Preferred Plan Damages	0.0	0.0	0.0	0.0
Benefits	0.0	0.0	0.0	0.0
Costs	0.0	0.0	0.0	0.0

### FLOOD AND EROSION RISK MANAGEMENT

#### POTENTIAL LOSS

No properties are identified at risk.

#### BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to shoreline management.

**SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)**

**PDZ 14**

SEA Objective	Impact of Preferred Policy for each Epoch			
	1	2	3	Mitigation
<b>Policy Units 14.1 to 14.11</b>				
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***Implications for the integrity of the Site:*** Habitat loss will occur to the SACs and SPAs along the coast of PDZ 14, however, as they are subject to NAI policies the habitat loss to erosion is considered to be in response to natural processes and not the SMP policies and there will be **no adverse effect on the integrity** of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT**

This area was scoped out of the assessment.

<b>Location reference:</b>	<b>North West Lleyn</b>
<b>Management Area reference:</b>	<b>M.A. 38</b>
<b>Policy Development Zone:</b>	<b>PDZ14</b>

\* Note: Predicted shoreline mapping is based on a combination of monitoring data, analysis of historical maps and geomorphological assessment with allowance for sea level rise. Due to inherent uncertainties in predicting future change, these predictions are necessarily indicative. For use beyond the purpose of the shoreline management plan, reference should be made to the baseline data.

The following descriptions are provided to assist interpretation of the map shown overleaf.

#### **100 year shoreline position:**

The following maps aim to summarise the anticipated position of the shoreline in 100 years under the two scenarios of "With Present Management" and under the "Draft Preferred Policy" being put forward through the Shoreline Management Plan.

-  In some areas the preferred policy does not change from that under the existing management approach. In some areas where there are hard defences this can be accurately identified. In other areas there is greater uncertainty. Even so, where the shoreline is likely to be quite clearly defined by a change such as the crest of a cliff the estimated position is shown as a single line.
- Where there is a difference between With Present Management and the Draft Preferred Policy this distinction is made in showing two different lines:

-  With Present Management.
-  Draft Preferred Policy.

#### **Flood Risk Zones**

-  General Flood Risk Zones. The explanation of these zones is provided on the Environment Agency's web site [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk). The maps within this Draft SMP document show where SMP policy might influence the management of flood risk.
-  Indicate areas where the intent of the SMP draft policy is to continue to manage this risk.
-  Indicate where over the 100 years the policy would allow increased risk of flooding.

The maps should be read in conjunction with the text within the Draft SMP document.

**Shoreline Management Plan Sub Cell 10  
Baseline Location Map  
Management Area 38**

- Management Area
- Policy Unit
- Policy Development Zone
- Scheduled Monument



<p><b>Key</b></p> <p>100 Year Shoreline Position:</p> <ul style="list-style-type: none"> <li><span style="color: red;">—</span> Preferred Policy would be the same as With Present Management</li> <li><span style="color: orange;">—</span> With Present Management where this differs from the Preferred Policy</li> <li><span style="color: purple;">—</span> Preferred Policy where this differs from the With Present Management</li> </ul>	<ul style="list-style-type: none"> <li><span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> Ramsar</li> <li><span style="border: 1px solid green; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> SAC</li> <li><span style="border: 1px solid blue; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> SPA</li> <li><span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> SSSI</li> <li><span style="border: 1px solid lightgreen; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> NNR</li> </ul>	<ul style="list-style-type: none"> <li><span style="background-color: lightblue; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> Existing Indicative EA Flood Zone 3</li> <li><span style="background-color: lightblue; border: 1px dashed black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> EA Flood Risk Zone 2 where under the SMP policy there would be increased probability of flooding</li> </ul>
		<p style="font-size: small; transform: rotate(-90deg); transform-origin: right top;">I:\071001\Technical_Data\GIS\Projects\SMP_Report_Figures\ManagementAreas</p>

## SUMMARY OF PREFERRED PLAN RECOMMENDATIONS AND JUSTIFICATION

### INTENT OF THE PLAN:

There are very local issues in terms of sustaining use and access to the various bays and coves within the area. The aim of the plan is to allow the natural development of the shoreline and slow erosion of the cliffs. The plan would not preclude local management to sustain use of the coast. This would be subject to normal approvals based on an intent not to significantly increase defences.

### KEY ISSUES/RISK AND UNCERTAINTY:

There are uncertainties in terms of timing of change. There is also a need for local adaption to change. It will be important to relate this to national monitoring of sea level rise and more general climate change and general monitoring of the shoreline.

### ACTIONS:

ACTION	PARTNERS
General shoreline monitoring	<b>GC</b>
Local adaption planning	<b>landowners</b> <b>NT</b>
Assess in detail potential impact on historic environment	

## DELIVERY OF THE PLAN

### SUMMARY OF SPECIFIC POLICIES

Policy Unit		Policy Plan			Comment
		2025	2055	2105	
14.11	North West Lleyn	NAI	NAI	NAI	Local management would not be precluded to allow adaptation of use within a principle of allowing natural evolution of the coast.
Key: HTL - Hold the Line, A - Advance the Line, NAI – No Active Intervention MR – Managed Realignment					

PREFERRED POLICY TO IMPLEMENT PLAN:	
<b>From present day</b>	Maintain existing defences. Address safety issues at Aberiddi and develop realignment approach. Develop adaptation planning. Develop funding plan.
<b>Medium term</b>	Maintain defences while moving towards adaptive management.
<b>Long term</b>	Implement community based adaptation.

## IMPLICATIONS OF THE PLAN

### CHANGES FROM PRESENT MANAGEMENT

No substantial change from SMP1

### ECONOMIC SUMMARY

Economics (£k PV)	by 2025	by 2055	by 2105	Total £k PV
NAI Damages	0.0	0.0	0.0	0.0
Preferred Plan Damages	0.0	0.0	0.0	0.0
Benefits	0.0	0.0	0.0	0.0
Costs	0.0	0.0	0.0	0.0

### FLOOD AND EROSION RISK MANAGEMENT

#### POTENTIAL LOSS

No properties are identified at risk.

#### BENEFITS OF THE PLAN

The plan provides a longer term sustainable approach to management of the shoreline.

**SUMMARY OF STRATEGIC ENVIRONMENTAL ASSESSMENT (INCLUDING HRA)**

**PDZ 14**

SEA Objective	Impact of Preferred Policy for each Epoch			
	1	2	3	Mitigation
<b>Policy Units 14.1 to 14.11</b>				
To support natural processes, maintain and enhance the integrity of internationally designated nature conservation sites. Maintain / achieve favourable condition of their interest features (habitats and species).				
To avoid adverse impacts on, conserve and where practical enhance the designated interest of nationally designated nature conservation sites. Maintain/achieve favourable condition.				
To avoid adverse impacts on, conserve and where practical enhance national and local BAP habitats.				
To support natural processes and maintain geological exposures throughout nationally designated geological sites.				
To conserve and enhance nationally designated landscapes in relation to risks from coastal flooding and erosion and avoid conflict with AONB and National Park Management Plan Objectives.				
To minimise coastal flood and erosion risk to scheduled and other internationally and nationally important cultural heritage assets, sites and their setting.				Excavation and recording
To minimise the impact of policies on marine operations and activities.				Monitoring and appropriate design
To minimise coastal flood and erosion risk to critical infrastructure and maintain critical services.				
To minimise coastal flood and erosion risk to agricultural land and horticultural activities.				
To minimise coastal flood and erosion risk to people and residential property.				
To minimise coastal flood and erosion risk to key community, recreational and amenity facilities.				
To minimise coastal flood and erosion risk to industrial, commercial, economic and tourism assets and activities.				

Mitigation associated with the impacted features of the historic environment may include excavation and recording and monitoring of erosion rates.

**This table provides a summary of the SEA (appendix E) and reference should be made to the Appendix for full details of the assessment.**

**These next two sections provide a headline summary of the findings of the HRA (Appendix G) and the WFA (Appendix H). Reference should be made as appropriate to these Appendices for full details.**

#### **HRA SUMMARY**

With the exception of PU 14.8, the entire coastline within PDZ14 is currently undefended and the SMP policy in this PDZ provides for ten NAI policies for all three epochs along the majority of the coastline to provide for natural development (through erosion) of the sea cliffs, with HTL and MR identified as the preferred policies at one PU location (PU 14.8). PDZ 14 includes interest features of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

***Implications for the integrity of the Site:*** Habitat loss will occur to the SACs and SPAs along the coast of PDZ 14, however, as they are subject to NAI policies the habitat loss to erosion is considered to be in response to natural processes and not the SMP policies and there will be **no adverse effect on the integrity** of the South **Llŷn Peninsula** and the Sarnau SAC, the Lleyn Fens SAC, the Seacliffs of Lleyn SAC, the Mynydd Cilan, Trwyn y Wylfa ac Ynysoedd Sant Tudwal SPA, and the Aberdaron Coast and Bardsey Island SPA.

**SUMMARY CONCLUSION FROM THE WATER FRAMEWORK ASSESSMENT**

This area was scoped out of the assessment.