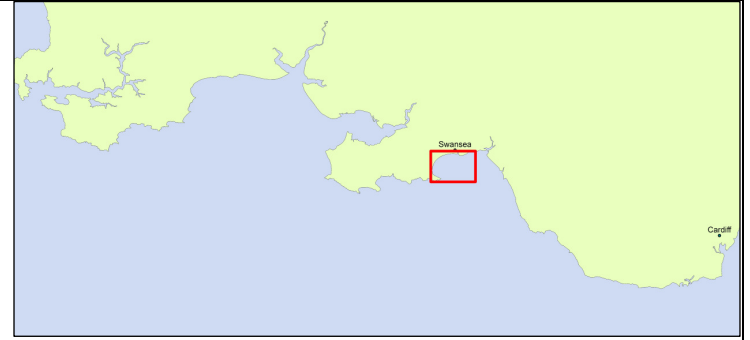


Swansea Bay (9)



Recommendations:

Long Term Plan

This frontage comprises the western half of Swansea Bay, which includes Swansea Docks, Swansea marina and SA1 development, Swansea city centre and the promenade which sweeps around the bay to Mumbles. The coastal frontage has been heavily developed (typically residential, non-residential, commercial and amenity development and infrastructure with industrial development at Swansea Docks), and there are defences along much of the shoreline, as well as the various structures associated with Swansea Docks at the eastern extent. The plan is to continue to manage the risk of coastal erosion and flooding to the hinterland by maintaining and upgrading existing defences, subject to the future availability of public funding for coastal erosion and flood risk management. It may become necessary to construct defences, or consider alternative management techniques, such as dune management, along currently undefended sections of the frontage.

Location (Policy Unit)		Preferred SMP2 policy and proposed approach to implementing the Plan		
		0-20 years	20-50 years	50-100 years
9.1	Swansea Docks and Channel	<p>The policy is to continue to hold the line, through maintenance and upgrading of existing structures, and continued maintenance dredging of the navigation channel, to ensure Swansea Docks, Swansea marina and the Tawe Barrage remain operational.</p> <p>The dock structures themselves are not covered by the SMP, as they are not coastal defence structures, and their maintenance and upgrade is the responsibility of the port authority. The structures do, however, provide a defence function by reducing the risk of coastal erosion and flooding to the hinterland and reducing the risk of coastal erosion of potentially contaminated material into Swansea Bay.</p>		
9.2	Swansea Docks to Singleton Park	<p>In order to manage the risk of coastal erosion and flooding to the promenade, A4067 highway and development inshore the policy is to hold the line through maintenance and upgrading of existing defences, subject to the future availability of public funding for coastal erosion and flood risk management and to retain the tourist/ amenity facilities between Swansea and Mumbles. This may involve constructing defences along currently undefended sections of the frontage.</p>		
9.3	Singleton Park to Norton	<p>In order to manage the risk of coastal erosion and flooding to the promenade, A4067 highway and development inshore, the policy is to hold the line through maintenance and upgrading of existing defences, subject to the future availability of public funding for coastal erosion and flood risk management and to retain the tourist/ amenity facilities between Swansea and Mumbles.. This may involve constructing defences along currently undefended sections of the frontage.</p>		
9.4	Norton to Mumbles Head	<p>In order to manage the risk of coastal erosion and flooding to the promenade, A4067 and B4433 highways and development inshore, the policy is to hold the line through maintenance and upgrading of existing defences, subject to the future availability of public funding for coastal erosion and flood risk management and to retain the tourist/ amenity facilities between Swansea and Mumbles.</p>		

A review of the impacts of the preferred SMP2 policies on coastal evolution and behaviour is provided in Appendix E: Policy Development and Appraisal, Section E1.3.

Policy sensitivities and key uncertainties (further detail is included in Appendix K)

Policy unit 9.1 - this policy is sensitive to the future management strategy and development of Swansea Docks, since it has been assumed that existing dock structures would be maintained, which is the responsibility of the port authority. Should this policy change, there would be significant impacts on the adjacent shoreline and further studies would be required in order to inform future shoreline management. However, even without maintenance, the structures would be expected to remain for the time-scale of this SMP although the impacts of cessation of maintenance dredging of the navigation channel are uncertain.

Policy units 9.2, 9.3 and 9.4 - although these policy options are considered to have low sensitivity, the cost of implementing them will be affected by the rate of beach lowering, which in turn will be dependent upon future climate change, sea level rise, increased storminess and the potential for periodic onshore movement of sediment. The standard of future flood protection provided by the defences would also be sensitive to availability of public funds. Therefore there is a risk that a policy of hold the line will not maintain the existing standard of protection in line with sea level rise, resulting in an increased risk of overtopping and flooding, whilst continuing to manage the risk of coastal erosion. There are potential surface water drainage issues along these frontages both currently and as a result of future sea level rise. Along PU 9.2 and 9.3 it is expected that defences would need to be constructed along currently undefended sections of these frontages, as sea level rises and trends of beach lowering continue. These policies may have a negative impact on the small areas of dune habitat and intertidal squeeze as a result of sea level rise is likely. Beach narrowing would also impact on beach, possibly affecting their amenity value.

Changes from present management / SMP1 policy¹

There is no change from either present management or SMP1 policy.

¹ The SMP1 documents should be referred to for more details as unit boundaries do not always align with SMP2 policy units and the policies refer to different time periods.

Swansea Bay (9) (this is a summary of impacts, for full details see Appendix G SEA Report)	
Issue	Appraisal
Receptor: Property, population and human health This frontage encompasses a number of existing residential developments which extend from Swansea city centre/ marina around the bay to Mumbles. Due to the developed nature of the frontage the majority of the shoreline is defended.	
Will SMP policy maintain coastal settlements and manage the impact of coastal flood and erosion?	+ The Plan would continue to manage the risk of coastal erosion and flooding to a number of existing residential developments between Swansea (town centre, Swansea marina and SA1 development) and Mumbles. Existing defences would be maintained and upgraded (which may involve constructing defences along currently undefended sections of the frontage) subject to the future availability of public funding for coastal erosion and flood risk management and to retain tourist/ amenity facilities.
Will SMP policy directly increase the actual or potential coastal erosion or flood risk to communities?	+ Coastal erosion and flood risk would continue to be managed through maintenance and upgrading of defences, subject to the future availability of public funding for coastal erosion and flood risk management and to retain tourist/ amenity facilities.
Is SMP policy sufficiently flexible to take account of dynamic coastal change?	- Maintenance of the defences, and any provision of new defences, would fix shoreline position along the vast majority of the frontage, preventing dynamic coastal change of this highly developed coastal region.
Could there be a detrimental impact on the fabric of coastal communities?	+ Continuation of coastal erosion and flood risk management would maintain the coastal communities, and associated infrastructure, around the bay between Swansea and Mumbles.
Receptor: Land use, infrastructure and material assets The frontage is heavily developed, including the A4067 and B4433 locally important highways, the Swansea to Mumbles promenade, Swansea Docks, SA1 residential and commercial development, Swansea marina, Swansea city centre, National Waterfront Museum, LC2 (leisure centre), Swansea Museum, Swansea University, Singleton hospital as well as various other non-residential, commercial, tourist/ amenity and industrial assets.	
Will SMP policy maintain key industrial, commercial and economic assets and manage the impact of coastal flooding and erosion?	+ The risk of coastal erosion and flooding to key assets would be managed through continued defence maintenance and upgrading, subject to the future availability of public funding.
Will the SMP policy ensure critical services and infrastructure remain operational, for as long as required?	+ There would be no significant impact on critical services and infrastructure due to continued maintenance/ upgrading of existing defences, subject to the future availability of public funding. + The risk of coastal erosion and flooding to key transport linkages, including the M4, A4067 and B4433 highways which run adjacent to the shoreline, would continue to be managed.
Will there be an impact on marine operations and activities?	+ It is assumed that the dock structures would be maintained and therefore marine operations and activities would continue.
Will SMP policy impact coastal flooding or erosion on agricultural activities?	x There are no agricultural activities along this shoreline.
Will the SMP policy ensure that MoD (Qinetiq) ranges remain operational?	x There are no MoD (Qinetiq) assets along this shoreline.
Receptor: Amenity and recreational use Swansea is not only a large city whose inhabitants use the frontage for amenity and recreational use, but it is a popular tourist destination. There is a promenade and cycle path along the shoreline between Swansea marina and Mumbles Head, various recreation/ amenity facilities and a beach.	
Could the SMP policy have an impact on tourism in the area?	+ Continuing maintenance and upgrading of defences would manage the risk of flooding and coastal erosion to the promenade and cycle path and associated facilities such as cafés. + The risk of coastal erosion and flooding to leisure, recreation and amenity facilities within Swansea, including the new LC2 leisure centre would continue to be managed. - Existing defences would need to be upgraded to provide a suitable standard of protection with respect to coastal flood risk in response to future climate change and sea level rise. Raising existing defences has potential to adversely affect views of Swansea Bay from the promenade/ cycle path and adjacent properties.
Will SMP policy affect coastal access along, or to, the coast?	+ The risk of coastal erosion and flooding to the promenade (which comprises a coastal footpath and cycleway) would be managed through maintenance/ upgrading of existing defences.
Receptor: Historic environment There are a range of nationally important archaeology within Swansea, including Scheduled Monuments and Grade I and II listed buildings. Locally important archaeology on the foreshore includes fish traps, a submerged forest and wreck sites.	
Will SMP policy maintain the fabric and setting of key historic listed buildings, cultural heritage assets and conservation areas?	- There is a potential risk of erosion or submergence of locally important archaeology on the foreshore, including fish traps, a submerged forest and wreck sites. The level of risk is dependent on erosion rates and rates of sea level rise. + The risk of coastal erosion and flooding to assets within the city of Swansea, and associated with the docks, would continue to be managed.
Will the SMP provide sustainable protection of archaeological and palaeo-environmental features or ensure adequate time for monitoring, assessment and mitigation measures to be devised in response to ongoing and future erosion.	+ Assets within the city of Swansea would continue to be protected. ● Archaeological assets on the foreshore would be at risk from coastal erosion and flooding, although rates would be dependent on foreshore evolution and climate change/ the rate of sea level rise

Swansea Bay (9) (this is a summary of impacts, for full details see Appendix G SEA Report)	
Issue	Appraisal
	and would not be affected by SMP policy.
Receptor: Landscape character and visual amenity The frontage is heavily developed, although offering expansive views across Swansea Bay.	
Will SMP policy maintain a range of key natural, cultural and social features critical to the integrity of the coastal landscape?	<ul style="list-style-type: none"> + The Plan is to continue with existing coastal erosion and flood risk management, therefore minimal change to the landscape. - As a result of future climate change/ sea level rise, existing defences will need to be upgraded to continue to provide a suitable standard of coastal erosion and flood risk protection. This may affect visual amenity, particularly from the promenade/ cycle way and adjacent properties.
Could SMP policy lead to the introduction of features which could be unsympathetic to the character of the landscape?	<ul style="list-style-type: none"> + The majority of the frontage is currently defended and thus maintaining/ upgrading these defences would not affect the existing character of the landscape. - Where defences need to be constructed along currently undefended frontages which comprise small localised dune systems, local landscape character may be adversely affected. However, since the majority of this frontage is already defended, impacts would be minimal.
Receptor: Biodiversity, flora and fauna Blackpill SSSI extends from Brynmill to Mumbles.	
Will SMP policy enable a sustainable approach to habitat management?	<ul style="list-style-type: none"> - The designated foreshore would not be directly affected by SMP policy. However, maintaining/ upgrading existing defences would not be considered sustainable habitat management.
Will SMP policy maintain or enhance any international, national or local sites of natural conservation interest?	<ul style="list-style-type: none"> - As sea level rises, the defences would prevent natural shoreline retreat, and thus there may be a reduction in intertidal habitat for wading birds. This will depend upon the rate of future climate change/ sea level rise.
Will SMP policy <u>accelerate</u> intertidal narrowing (coastal squeeze) and will this affect designated habitats?	<ul style="list-style-type: none"> - There is likely to be intertidal narrowing, i.e. coastal squeeze, along the majority of the frontage due to continued maintenance/ upgrading of existing defences.
Will there be a net loss of BAP habitat within the SMP timespan as a result of SMP policy?	<ul style="list-style-type: none"> - Loss of intertidal habitat in the short, medium and long term due to coastal narrowing through the provision of defences. - Narrowing of blue mussel beds due to coastal narrowing in the short, medium and long term. - Loss of <i>Sabellaria alveolata</i> reefs due to coastal narrowing in the short, medium and long term. - Loss of clay exposure with and without piddock evidence in the short, medium and long term due to sea level rise.
Receptor: Earth heritage, soils and geology There are no specific earth heritage designations along this frontage, and the frontage is heavily modified. However, there are significant sand and mud flats on the foreshore and peat exposures. There are also small areas of sand dunes which are currently undefended.	
Does SMP policy work with natural processes and enhance or maintain natural features?	<ul style="list-style-type: none"> - Should existing defences be extended to continue managing flood and erosion risk, the extent and integrity of the dune systems would be affected. - Coastal squeeze, as sea level rises and the defences prevent retreat, would lead to narrowing of the intertidal sand and mud flats.
Will SMP policy maintain or enhance the visibility of coastal geological exposures, where designated?	<ul style="list-style-type: none"> X There are no designated geological exposures along this shoreline.
Receptor: Water There are numerous coastal, freshwater, transitional (areas of water near river mouths, which are partially saltwater but are influenced by freshwater) and groundwater bodies in the SMP2 area that have the potential to be affected by SMP2 policies.	
Will SMP policy manage the risk of pollution from contaminated sources?	<ul style="list-style-type: none"> + Maintenance of defences would manage the risk of pollution from contaminated sources which may be associated with Swansea Docks, or elsewhere in the city.
Will SMP policy adversely affect water bodies in the coastal zone?	<ul style="list-style-type: none"> - HTL is likely to result in loss of intertidal habitats with sea level rise, and may have consequences for biological quality elements and risk failure of the WFD objective related to the future achievement of good potential in the Swansea Bay water body (currently bad potential), although not the Tawe water body which is already at good potential. • The Swansea Carboniferous Coal Measures, Carmarthen Carboniferous Coal Measures and Gower Carboniferous Limestone groundwater bodies and river water bodies will be unaffected.

Impact colour key	+ Positive	• Neutral	- Negative	X Not applicable
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Swansea Bay (9)						
ACTION PLAN						
Action	Action Ref	Policy Unit	Action Description (to be approved)	Potential source for funding (subject to approval)	Responsibility Lead partner * (supporting partners)	When by (subject to funding)
1. Studies for Scenario Area	1.1	All	A study is currently underway to investigate flood risk within Swansea Bay. Flood risk from the tide, main rivers Tawe and Clyne and a series of ordinary watercourses that drain into the bay will be quantified. Recommendations for proposed improvement works will follow.	WAG	EAW (City and County of Swansea)	Due to be complete by Sept 2010.
	1.2	All	Develop a holistic plan for the coastline of Swansea Bay which takes into account a wide range of issues. This assessment should include: <ul style="list-style-type: none"> - Detailed assessment of the condition, overtopping performance (existing and future performance under a range of future climate change scenarios), potential risk of undermining/failure and therefore the residual life of existing defences along this frontage; - technical, environmental and socio-economic appraisal of alternative options which will identify a preferred long term flood risk and coastal erosion risk management plan which takes full account of other potential sources of flooding such as surface water and ground water and a range of potential future climate change scenarios; - socio-economic appraisal of the impacts of flooding to the A4067/ B443 critical infrastructure and services; - consider alternative funding options where it is not possible to justify public investment in coastal erosion and flood risk management; - an assessment of the wider tourist/ amenity value of the Swansea to Mumbles promenade/ cycleway and associated coastal defences; - identify alternative funding options; - develop a future affordable investment plan; - tie in with the existing Swansea Bay Strategy; - take account of flood consequences assessments which have previously been undertaken along Swansea Bay. 	WAG	City and County of Swansea (EAW)	0 to 20 years
2. Studies for Policy Units	2.1	9.1 to 9.4	Undertake a scoping assessment to identify when a feasibility study of the upgrading/improvement options to existing defences needs to be carried out and/or identify the criteria/factors that would trigger this feasibility study. The timing of this feasibility study will be influenced by factors such as: existing frequency of flooding, type of receptors at risk, depths and velocity of flooding and residual asset life. Consider alternative funding options where it is not possible to justify public investment in coastal erosion and flood risk management.	WAG	City and County of Swansea (EAW)	0 to 20 years
	2.2	9.1	Engage with and encourage the Port of Swansea to undertake a study to identify the current and future risk of coastal erosion and flooding to the Port of Swansea and associated infrastructure to enable a long term sustainable flood and coastal erosion risk management plan to be developed and implemented for the site.	ABP	ABP	0 to 20 years
	2.3	9.1	Ensure that any future management plans for Swansea Docks including maintenance dredging of the navigation channel are monitored and used to inform and, where appropriate, update the SMP.	WAG	City and County of Swansea (ABP)	Ongoing
3. Strategy			-			
4. Scheme work			-			
5. Monitoring (data collection)	5.1	All	Undertake beach and coastal defence asset monitoring to inform further studies and future SMP reviews. In particular, rates of beach lowering should be monitored. This information should not only be used in future coastal management, but also to assist in stakeholder liaison by use of data in public education campaigns.	WAG	City and County of Swansea (Wales Coastal Monitoring Centre)	0 to 100 years
	5.2	All	Continue with existing beach profile monitoring programme and provide information to the Wales Coastal Monitoring Programme for analysis and storage. Use beach profile data to identify the future risk of undermining and overtopping of existing defences.	WAG	Coastal Group/ Wales Coastal Monitoring Centre	0 to 100 years
	5.3	All	Undertake periodic defence inspection, including condition assessment of condition and photographs, Confirm defence crest levels.	WAG	City and County of Swansea (Wales Coastal Monitoring Centre)	0 to 100 years

					Monitoring Centre)	
	5.4	All	Undertake further studies, and associated modelling, to better understand sediment regimes in the SMP area and inform future coastal management.	WAG	Coastal Group	0 to 20 years
	5.6	All	Monitor risk to the coastal footpath and investigate potential re-routing of the path where appropriate.	WAG	City and County of Swansea	
6. Asset management	6.1	All	Ensure that the extent of public and privately owned defences are defined and mapped to inform future management decisions.	WAG	Coastal Group/ Wales Coastal Monitoring Centre	0 to 20 years
	6.2	All	Undertake an appraisal of asset inspection and beach profile monitoring data to assess the existing and future risk of undermining and overtopping of existing structures.	WAG	City and County of Swansea (Wales Coastal Monitoring Centre)	0 to 20 years
7. Communication	7.1	All	Undertake consultation with the local community, key stakeholders and general public during the development of suitable coastal erosion and flood risk management options and whenever appropriate to ensure an acceptable approach is developed and adopted.	WAG	City and County of Swansea (EAW)	0 to 20 years
	7.2	All	Undertake monitoring and management of Action Plans to ensure SMP policies are put into practice.	WAG	Coastal Group	0 to 100 years
8. Interface with planning and land management	8.1	All	Continue with risk-based improvements to flood risk maps to provide an appraisal of likely future projected sea level rise.	WAG	EAW	0 to 20 years
	8.2	All	Ensure SMP policies and flood and erosion risks are accounted for in the next revisions of land use plans in order to help manage residual risks from coastal erosion and flooding, and to inform future planning decisions.	WAG	CCS planning	0 to 20 years
9. Emergency response	9.1	All	Development, monitoring and review of emergency response plans to prepare for storm events which are likely to exceed existing defence standards of protection or lead to failure of existing defences (for example following breach or overtopping).	WAG	CCS	0 to 20 years
10. Adaptation / resilience			-			
11. Flood forecasting and warning	11.1	All	Continue with risk-based improvements to flood risk maps and inundation modelling to provide improved flood warning services.	WAG	EAW	0 to 20 years
12. Habitat creation and environmental mitigation			-			

* Note: It is recommended that the lead partner/s investigate the potential for local partnerships and alternative sources of funding.