

Appraisal of Coastal Defence Options SMU2

SMU 2. Freshwater Bay		Medium to steep, storm beach flint cobbles with massive chalky accretions at western end of the Bay.		SMU2		
<p>Do Nothing Option: Flooding from Yarmouth along River Yar over Causeway. Causeway is consistent with high land levels so offers a defence level of +2.0m ODN (1:100 years SOP). Freshwater coastal defences have a height of +4.0m ODN and so SOP >1:500, but with a residual life of 15 years and an existing probability of breach of 0.01. Pre-breach, all flooding comes from Yarmouth as the coastal defences at Freshwater have a high SOP. Year 15 – coastal defences fail. Post-breach, all properties suffer from Freshwater levels, except for those at risk from the Yar (area 1), which will have Yarmouth levels if greater than +2.0m ODN. Present Value Damages are estimated at approximately £1.75M for property plus £12.6M amenity value for the beach.</p>						
Option 1 (Maintain)		Option 2 (Improve Flood Protection)		Option 3 (Managed Retreat)		
Description of Option	Hold the line policy: The sea wall is to be maintained at 4.0m, causeway maintained at 2.0m. Year 20: Refurbish existing sea walls (572/2842 & 2843). The defence will be maintained to last 100 years.		The Causeway Road would be upgraded to form a flood defence. This would provide improved protection from tidal flooding in the Western Yar. Also improve overtopping performance of the sea wall at Freshwater by increasing the beach crest width and height of the rear upstand wall.		Remove existing seawall to allow flooding of Afton Marsh. Two areas are formed: Area 2 with no protection and levels adopted from Freshwater and Area 1 has a retreated line of defence through upgrading the Causeway Road to +2.4m ODN (to further be raised to +2.7m ODN in year 50). There are only 3 undefended properties collecting damages, 2 of which are capped in year 100. This option would continue to protect houses in Freshwater Village.	
Comments About Option	Breach probabilities: Year 0 – 0.01, Year 19 – 0.05, Year 20 – 0.01, Year 100 – 0.05. It is assumed repair costs are £0.5M per breach.		As the existing standard of protection is within the indicative range, this scheme could be considered in 5 to 10 years time. Breach probabilities: Year 0 – 0.005, Year 49 – 0.01, Year 50 – 0.005, Year 100 – 0.01. It is assumed repair costs are £0.5M per breach.		This proposal would completely change the character and nature of Freshwater Bay Village. Four houses would be written-off and would have to be compensated. Breach probabilities: Year 0 – 0.05, Year 100 – 0.05. It is assumed repair costs are £0.5M per breach.	
Indicative Standard of Defence	1 in 100 flooding from Yarmouth, < 1 in 10 Overtopping		1 in 100 to 1 in 300		1 in 100 to 1 in 300	
Influence upon Coastal Processes	No affect on existing coastal processes. The width of the beach would be maintained as sea level rises by additional beach feeding.		As option 2.		There would be a significant change to the regime of the bay, but with very little impact on adjacent areas. This option would be regarded as allowing natural coastal change.	
Environmental Impacts	Continuing to maintain would not have any significant environmental impacts and in this location would not exacerbate coastal squeeze.		As option 2.		Loss of Afton Marsh and the conversion of a freshwater SSSI to tidal inundation. Afton Marsh is a valuable fresh water habitat and has grazing marsh and reed beds which would be lost.	
Economic Assessments and BCR	Damages Avoided (PVb)	£0M +£12.6M amenity	Damages Avoided (PV)	£1.3M + £12.6M	Damages Avoided (PV)	£1.30M + £0M amenity
	PV cost (over 100 years)	£1.5M	PV cost (over 100 years)	£2.0M	PV cost (over 100 years)	£ 7M
	Benefit Cost Ratio	8.4	Benefit Cost Ratio	6.8	Benefit Cost Ratio	0.2
Risk Assessment	This option would maintain the existing flood protection from Freshwater Bay, but the risk and frequency of flooding would increase with rising sea levels.		This option would improve flood protection.		This option would increase the risk of flooding to many properties.	
Preliminary option Appraisal	Engineering ✓	OBJECTIVES	Engineering ✓	OBJECTIVES	Engineering ✓	OBJECTIVES
	Environment ✓		Environment ✓		Environment ✗	
	Economics ✓		Economics ✓		Economics ✗	
	Consultees		Consultees		Consultees	
	DISCARD SHORTLIST		DISCARD SHORTLIST		DISCARD -SHORTLIST	

Appraisal of Coastal Defence Options SMU6a

		SMU 6a. Widdick Chine to Holmes Court Hotel, Totland Gently sloping sandy (and in parts clay) foreshore.				SMU6a	
		<p>Do Nothing Option: With the exception of Totland Bay wall, the remaining walls are likely to be subject to rapid deterioration and complete collapse by year 10. Some of the walls may have a life of less than 10 years (from south-west of the Waterfront Cafe to Widdick Chine and north-east of Totland pier to Colwell Bay). Residual life of defences is estimated to be approximately 10 years, and current probability of failure of 0.2. Present Value Damages are estimated at approximately £5.6M, plus £9M for the beach amenity.</p>					
		Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)	
Description of Option	The walls will be maintained to extend their life by 10 years to ensure a remaining life of 20 years. Thereafter, the walls would be allowed to collapse, reverting to a 'Do-Nothing' scenario.		The existing walls would be maintained and significant refurbishment undertaken to sustain the existing protection for 100 years and 'hold the line'. The residual life would be sustained for 100 years, with an initial probability of failure of 0.01.		At present there is no particular need to improve the current standard of protection or coast defences.		
Comments About Option	Breach probabilities: Year 0 – 0.05, Year 10 – 0.2, Year 20 – 1 The significant loss of assets means that this option is little different from a 'Do-Nothing' scenario.		Proposed works include the refurbishment of existing walls in front of the Waterfront Café in the next five years to prevent their collapse. Thereafter, the existing vertical and stepped seawalls along this frontage would be refurbished as required. The existing groynes will be maintained. As a result of climate change it may be necessary to either import or recycle beach material in small quantities, in the future. It is assumed repair costs are £0.5M per breach.				
Indicative Standard of Defence	N/A		N/A		N/A		
Influence upon Coastal Processes	There would be a reversion to a 'natural' cliff line retreat and reactivation of cliff instability. This might benefit adjacent areas by providing sediment input.		The rate of sediment movement along this frontage is very slow. Continuing to 'hold the line' will not change the existing situation. As described above, some beach feeding and recycling may be required to mitigate for the effects of sea level rise and climate change.				
Environmental Impacts							
Economic Assessments and BCR	Damages Avoided (PV)	£1.75M	Damages Avoided (PV)	£5.44M +£9M amenity	Damages Avoided (PV)		
	PV cost (over 100 years)	£89k	PV cost (over 100 years)	£4.1M	PV cost (over 100 years)		
	Benefit Cost Ratio	19.5	Benefit Cost Ratio	3.6	Benefit Cost Ratio		
Risk Assessment	There would be a significant loss of assets.						
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	Engineering ✗ Environment Economics Consultees DISCARD SHORTLIST	OBJECTIVES	

Appraisal of Coastal Defence Options SMU6b

SMU 6b. Holmes Court Hotel to Fort Albert Gently sloping sandy beach backed by eroding cliffs. Beach movement controlled by rock groynes.		SMU6b																																																													
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)																																																											
Do Nothing Option: A field of timber groynes with rock stubs have now been rendered ineffective through cliff retreat. There are no hard defences and therefore no breach probability. The Present Value Damages are £0.95M and is based on erosion lines, plus £0.64M from recreation losses.																																																															
Description of Option	If the existing groynes are maintained they will prevent some beach movement and will have the effect of delaying erosion of the cliffs temporarily. Properties which are now at risk in years 20-50 are now at risk between years 30-50. Properties which are at risk in years 50-100 are still at risk during the same period as defence measures will have a limited life span.	In this location the groynes will be extended backwards to slow erosion and delay this by 10 years.		Implementing a beach management scheme along the entire frontage could protect the assets in this management unit.																																																											
Comments About Option	This has only a small benefit over 'Do-Nothing'.	This option is feasible but its effect may be limited.		This scheme would comprise the construction of rock groynes as beach control structures together with slope stabilisation measures. The cost of such a scheme would be positively expensive compared with the value of the assets protected. The residual life of the defence would be increased to 100 years with a breach probability of 0.002.																																																											
Indicative Standard of Defence	N/A	NA		NA																																																											
Influence upon Coastal Processes	Slowing the processes of coastal erosion will have a minor impact on coastal processes.	Slowing the processes of coastal erosion will have a minor impact on coastal processes.		This option would prevent the natural retreat of this shoreline and reduce sediment inputs. As the cliff line in this location is unprotected, this option could have a detrimental impact on the sediment input to adjacent coastal areas.																																																											
Environmental Impacts	As 'Do-Nothing'.	There are no anticipated adverse impacts.		The site is designated and permanent protection would be likely to have an adverse impact.																																																											
Economic Assessments and BCR	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PV)</td> <td style="width: 40%; text-align: right;">£251k</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£60k</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">4.2</td> </tr> </table>	Damages Avoided (PV)	£251k	PV cost (over 100 years)	£60k	Benefit Cost Ratio	4.2	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PV)</td> <td style="width: 40%; text-align: right;">£872k</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£362k</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">2.4</td> </tr> </table>	Damages Avoided (PV)	£872k	PV cost (over 100 years)	£362k	Benefit Cost Ratio	2.4		<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PV)</td> <td style="width: 40%; text-align: right;">£1.5M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">>£1.5M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">< 1.0</td> </tr> </table>	Damages Avoided (PV)	£1.5M	PV cost (over 100 years)	>£1.5M	Benefit Cost Ratio	< 1.0																																									
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Risk Assessment	This option will result in the loss of residential houses to coastal erosion.	This option will result in the loss of residential houses to coastal erosion.		This option would provide a high standard of protection.																																																											
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Appraisal of Coastal Defence Options SMU6c

SMU 6c. Fort Albert frontage		SMU6c			
Gently sloping sandy beach.					
<p>Do Nothing Option: There will be continued deterioration of defences with complete break-up of parts of the sea wall by year 50. The Fort will be relatively unaffected throughout the 100 years. Residual life of defences is estimated to be approximately 20 years, with a breach probability of 0.05. There are a series of new flats at risk from erosion in 50-100 years time, protected by beach with rock revetment. The revetment has a breach probability of 0.05. The Present Value Damages are estimated at approximately £2.5M.</p>					
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)	
Description of Option	Maintaining the existing seawalls and structures will not have any significant effect as the existing walls along element 2856 will continue to collapse.	The existing walls would be sustained for 100 years, with a residual life of 100 years and a breach probability of 0.01. A 70m length of revetment would be upgraded in year 5 to year 10. An existing concrete sea wall will require refurbishment in about 20 years time.	There is no need to improve the current coast protection.		
Comments About Option	The collapse of walls by year 10 is assumed, leading to the loss of the road in year 30. There is therefore no significant advantage over Do Nothing with the same breach probability and residual life.	Exponential deterioration is assumed that could be improved with a regular maintenance programme to reduce the Present Value Damages. The existing walls comprise sloping mass concrete with sheetpile toe. Alternative construction forms such as rock revetment may be appropriate in this location. It is assumed repair costs are £0.5M per breach.			
Indicative Standard of Defence	N/A	N/A	N/A		
Influence upon Coastal Processes	Collapse of the walls and reversion to a natural soft cliff would be a major change. The headland protection provided by the Fort would be lost. This would have a significant impact on the rate and extent of erosion to the south in Colwell Bay.	This option would not change the existing coastal regime.			
Environmental Impacts					
Economic Assessments and BCR	Damages Avoided (PV) £ nil PV cost (over 100 years) £73k Benefit Cost Ratio < 1.0	Damages Avoided (PV) £2.31M PV cost (over 100 years) £1.3M Benefit Cost Ratio 1.8	Damages Avoided (PV) PV cost (over 100 years) Benefit Cost Ratio		
Risk Assessment	Loss of the headland protection would increase erosion in Colwell Bay resulting in additional loss of 30-50 properties over 100 years.				
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✗ Consultees DISCARD SHORTLIST_	OBJECTIVES Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD SHORTLIST	OBJECTIVES Engineering ✗ Environment Economics Consultees DISCARD SHORTLIST	OBJECTIVES	

Appraisal of Coastal Defence Options SMU8a

SMU 8a. Fort Victoria to Sandhard, Yarmouth Sloping beach in fine sand west of Yarmouth Harbour.		SMU8a				
Do Nothing Option: This would result in the erosion of property and recreation beach. Many of the coastal defences can be expected to deteriorate within the next 20 years. Fort Victoria wall will be completely broken up by year 10. Collapse of remaining structures is expected by year 20. Residual life of defences is estimated to be approximately 10 years, with a breach probability of 0.1. Present Value Damages are estimated at approximately £1.0M property plus £1.0M recreation.						
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)		
Description of Option	Maintain assets for 10 years until they collapse and then do-nothing. The existing wall around Fort Victoria may collapse in the next 10 – 20 years due to undermining, even if maintained. Thereafter the area will be allowed to erode. The walls to the east of Fort Victoria have a considerable residual life if maintained and will prevent the erosion of assets.	Replacing and refurbishing the existing walls as they decay will sustain the existing defences around Fort Victoria, for the next 100 years. The residual life of the defences will be 100 years. The PVd can be reduced by including a regular maintenance programme. The vertical wall at Fort Victoria would be refurbished using rock armour placed in front of the existing line. In addition, the existing gabions in units 572/5862 & 2863 will be refurbished when required and the defences in units 572/2865 & 2866 will be maintained until the end of their residual life.	An option to improve the current coast defences would not realise any more benefits than the sustain option.			
Comments About Option	It is assumed that maintaining the current sea wall at Fort Victoria may reduce the risk of collapse. The breach probability will be reduced to 0.02, but the residual life of the defence will be limited to 10 years.	The defence along the front of Yarmouth chalet would not be renewed at the end of its design life, since erosion here would not result in the loss of any assets. Assumed cost of £0.5M to repair any breach.				
Indicative Standard of Defence	N/A		N/A			
Influence upon Coastal Processes	The eventual erosion of this area may release shingle material into the system and could have a beneficial effect on Norton Spit.	Refurbishing the existing sea walls would not have any significant impact on coastal processes.				
Environmental Impacts						
Economic Assessments and BCR	Damages Avoided (PV) PV cost (over 100 years) Benefit Cost Ratio	£184k £292k 0.63	Damages Avoided (PV) PV cost (over 100 years) Benefit Cost Ratio	£1.92M £0.8M 2.45	Damages Avoided (PV) PV cost (over 100 years) Benefit Cost Ratio	
Risk Assessment	Loss of residential housing and Fort Victoria within 20 years.					
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✗ Consultees DISCARD SHORTLIST	OBJECTIVES	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD SHORTLIST	OBJECTIVES	Engineering Environment Economics ✗ Consultees DISCARD SHORTLIST	OBJECTIVES

Appraisal of Coastal Defence Options SMU8b

SMU 8b. Sandhard to Yarmouth Pier Narrow sandy foreshore and estuary mouth.		SMU8b																																																
<p>Do Nothing Option: By year 10 the timber boarded breastwork fronting Yarmouth Harbour is expected to be in a state of collapse. Rising sea levels will lead to steepening of the beach and erosion, which will undermine the wall and result in the potential collapse of parts of it. Many of the coastal defences can be expected to deteriorate within the next 20 years. The breakwater has a residual life of 15 years and a current breach probability of 0.10. Once breached, wave heights are such that flood levels increase by 0.15m for all events (not propagated in Freshwater). The sea wall has a height of +1.7m ODN, the same elevation as the land behind. The ferry terminal will become unstable and so unsafe by year 20. Passengers will have to travel to Cowes to take an alternative route. These additional costs are estimated at £2.2M/year, £68.4M PVd. The total present value damages for this SMU are £73.5M.</p>																																																		
Option 1 (Maintain)		Option 2 (Do Minimum)		Option 3 (Sustain Flood Defence, Upgrade Breakwater)																																														
Description of Option	Maintain the existing breakwater. This option would not reduce the present risk of flooding to Yarmouth Town centre.	The breakwater would be upgraded to prevent collapse. All other assets would be maintained and refurbished over the next 100 years.		Upgrade and maintain the breakwater. Raise the seawalls to +2.2m ODN now and raise to +2.5m ODN in year 50. Significant areas of Yarmouth town centre are currently at risk of flooding. This option would comprise the construction of flood protection walls around the town in addition to the harbour breakwater upgrading (option 2). Ferry Terminal would remain operational.																																														
Comments About Option	As the breakwater contains many steel components, maintenance will become impossible once these elements have corroded away. The actual residual life of the breakwater is estimated at 20 years with maintenance.	Residual life of breakwater would be 100 years; with a breach probability of 0.01. Assessment of an appropriate structural form requires detailed investigation.		Residual life of breakwater would be 100 years, with a breach probability of 0.01. The flood defence would be maintained and have a minimum standard of defence of 1:20 throughout the scheme life.																																														
Indicative Standard of Defence	1 in 20 (now) against flooding	1 in 20 (now) against flooding		1 in 20 minimum																																														
Influence upon Coastal Processes	Potentially significant changes to coastal regime if the breakwater collapses.	No significant change provided that the existing alignment of the breakwater is followed.		As option 2.																																														
Environmental Impacts	Potential impact on the tidal prism and dynamics of the whole estuary due to changes to the estuary entrance following collapse of the breakwater.	Potential impact on the tidal prism and dynamics of the whole estuary due to changes to the estuary entrance.		No change from the existing processes.																																														
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Risk Assessment	This option would maintain the current usage of the harbour in the short term.	As option 2		This option would maintain the current usage of the harbour. This benefit has not been included in the Defra assessment given above.																																														
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Appraisal of Coastal Defence Options SMU8b

SMU 8b. Sandhard to Yarmouth Pier (cont.) Narrow sandy foreshore and estuary mouth.		SMU8b		
<p>Do Nothing Option: By year 10 the timber boarded breastwork fronting Yarmouth Harbour is expected to be in a state of collapse. Rising sea levels will lead to steepening of the beach and erosion, which will undermine the wall and result in the potential collapse of parts of it. Many of the coastal defences can be expected to deteriorate within the next 20 years. The breakwater has a residual life of 15 years and a current breach probability of 0.10. Once breached wave heights are such that flood levels increase by 0.15m for all events (not propagated in Freshwater). The sea wall has a height of +1.7m ODN, the same elevation as the land behind. The ferry terminal will become unstable and so unsafe by year 20. Passengers will have to travel to Cowes to take an alternative route. These additional costs are estimated at £2.2M/year, £68.4M PVd. The total present value damages for this SMU are £73.5M.</p>				
Option 4 (Improve)		Option 5 (Improve without breakwater)		
Description of Option	Upgrade the existing breakwater. Build new flood defences. Elevation raised to +2.4m ODN now and to +2.7m ODN in year 50. SOP = 1 in 200. Significant areas of Yarmouth town centre are currently at risk of flooding. This option would comprise the construction of flood protection walls around the town in addition to the harbour breakwater upgrading (option 3).	The existing timber and steel breakwater protects Yarmouth Harbour. This structure would be allowed to collapse. The existing harbour quay walls would also be maintained and refurbished with rock revetment for the next 100 years to prevent their collapse under the increased wave loading post collapse of the harbour arm.		
Comments About Option	Residual life of breakwater would be 100 years, with a breach probability of 0.01. The flood defence would have a minimum indicative SOP of 1 in 100 to 1 in 300 standard of defence over 100 years.	Residual life of breakwater is 15 years, with a breach probability of 0.1. The sea defences would be raised to +2.55m ODN now and then to +2.85m ODN in year 50. Ferry terminal is likely to become unusable due to greater exposure to waves, and mobilisation of sediment reducing draft.		
Indicative Standard of Defence	1 in 100 – 1 in 300 minimum		1 in 200 minimum against flooding	
Influence upon Coastal Processes	As option 2.		Allowing the harbour arm to collapse would have a significant impact on the entire estuarine regime. The increased entrance width would change the tidal dynamics in terms of tidal heights and sediment erosion and deposition. Further study would be required to quantify these changes.	
Environmental Impacts	No change		Potential impact on the tidal prism and dynamics of the whole estuary of any changes to estuary entrance.	
Economic Assessments and BCR	Damages Avoided (PVb)	£73.3M	Damages Avoided (PVb)	£3.7M
	PV cost (over 100 years)	£8.2M	PV cost (over 100 years)	£4.9M
	Benefit Cost Ratio	8.9	Benefit Cost Ratio	0.75
Risk Assessment	This option would maintain the current usage of the harbour.		Loss of protection to the harbour would have significant economic consequences for local businesses.	
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	Engineering ✓ Environment ✓ Economics ✗ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES

Appraisal of Coastal Defence Options SMU8c

SMU 8c. Yarmouth Pier to Port La Salle (east end)		SMU8c																																				
Boulder-strewn foreshore on clay sub-base with gentle profile east of Yarmouth Harbour.																																						
<p>Do Nothing Option: Many of the coastal defences can be expected to deteriorate within the next 10 years. Collapse of remaining structures is expected by year 10. Residual life of defences is estimated to be approximately 10 years, with a breach probability of 0.1. Properties are at risk from erosion in 20-50 and 50-100 years time. Local traffic would be disrupted following any breach event. If traffic is diverted, this comes to £167M PVd over 100 years. It is cheaper to build a new road, estimated to cost £4.6M, £3.95M over 100 years Do Nothing. Total Do Nothing Present Value Damages are estimated at approximately £7.4M.</p>																																						
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)																																		
Description of Option	Maintain existing walls and structures. The life of the existing seawalls is limited by the sheetpile toe and is estimated at 20 years. Thereafter, the wall would be allowed to collapse.	The existing walls would be maintained over the next 20 years and then replaced or refurbished to a similar standard following its collapse, allowing for sea level rise.	This option comprises the replacement of the existing walls now. This is a benefit as it may reduce the risk of failure of the existing structures in the period before they are refurbished.																																			
Comments About Option	The residual life of the existing defence is 20 years with a breach probability of 0.02. Collapse of walls by year 20 is assumed, leading to the loss of the road soon after.	The residual life of the walls would be 100 years, with a breach probability of 0.02 for Years 0 – 20. This would reduce to 0.01 between Years 20 – 100. The existing walls comprise sloping mass concrete with sheetpile toe. Alternative construction forms such as rock revetment may be appropriate in this location.	The residual life of the defence would be 100 years, with a breach probability of 0.01 between Years 0 – 100.																																			
Indicative Standard of Defence	N/A	N/A	N/A																																			
Influence upon Coastal Processes	Collapse of the walls and reversion to a natural soft cliff would be a major change, but would not be detrimental to adjacent management units.	This option would not change the existing coastal regime.	This option would not change the existing coastal regime.																																			
Environmental Impacts	t.b.a	t.ba	t.b.a																																			
Economic Assessments and BCR	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£1.8M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£414k</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">4.4</td> </tr> </table>	Damages Avoided (PVb)	£1.8M	PV cost (over 100 years)	£414k	Benefit Cost Ratio	4.4	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£7.0M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£2.6M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">2.7</td> </tr> </table>	Damages Avoided (PVb)	£7.0M	PV cost (over 100 years)	£2.6M	Benefit Cost Ratio	2.7	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£7.3M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£3.8M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">1.9</td> </tr> </table>	Damages Avoided (PVb)	£7.3M	PV cost (over 100 years)	£3.8M	Benefit Cost Ratio	1.9																	
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Risk Assessment	Loss of road and many houses.	This option may be justified on IBCR.																																				
Preliminary option Appraisal	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">✓</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">OBJECTIVES</td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Consultees</td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> </tr> </table>	Engineering	✓	OBJECTIVES	Environment	✓	Economics	✓	Consultees		DISCARD	<u>SHORTLIST</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">✓</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">OBJECTIVES</td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Consultees</td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> </tr> </table>	Engineering	✓	OBJECTIVES	Environment	✓	Economics	✓	Consultees		DISCARD	<u>SHORTLIST</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">✓</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">OBJECTIVES</td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> </tr> <tr> <td>Consultees</td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> </tr> </table>	Engineering	✓	OBJECTIVES	Environment	✓	Economics	✓	Consultees		DISCARD	<u>SHORTLIST</u>		
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DISCARD	<u>SHORTLIST</u>																																					

Appraisal of Coastal Defence Options SMU10

		SMU 10. Gurnard Luck to Gurnard Cliffs						SMU10	
		Shingle, silt and sand.							
		Do Nothing Option: Mass concrete and concrete block walls which will fail and collapse completely by year 20. Some seawalls have collapsed already. Breach probability being considered as 0.1 and residual life is 10 years (some seawalls are collapsed already). Present Value Damages are estimated at approximately £4.8M.							
		Option 1 Do Minimum (Sustain)		Option 2 (Improve to Indicative Standard)		Option 3 (Improve to Indicative Standard now and regulated tidal exchange)		Option 4 (Managed Realignment)	
Description of Option		The existing defences are collapsed in places and 'maintain' is not a realistic option. Sustaining the existing flood defence SOP would involve constructing new flood defences adjacent to the Yacht Club where they have failed. These defences would be built to the same level and then upgraded in 50 years time.		Improve the standard of flood protection to the indicative standard of protection by constructing new flood defences along the existing line of defences to a level of +2.93m ODN, and raised again in year 50 to +3.2m ODN. Flood defences would be raised across the culvert bridge.		Improve the standard of flood protection to the indicative standard of protection by constructing new revetment seawalls and an earth bund to the back of Marsh Road, all to a level of +2.93m ODN, then to +3.2m ODN in Year 50. The culvert flap valves would be removed to allow tidal inundation of Gurnard luck.		All properties on shingle ridge, to east of Gurnard Luck on Marsh Road would be purchased and removed. The tidal flaps on the Marsh Road bridge would be removed allowing regulated tidal exchange.	
Comments About Option		The new flood defences will be constructed along the line of the existing sea walls to a level of +2.3m ODN. Fluvial flooding is still a risk but has recently been reduced due to the refurbishment of the culvert and the use of new flap gates. All the defences would be replaced and raised in height in Year 50. The existing beach would be nourished with imported shingle.		The residual risk of fluvial flooding is small. The existing beach would be nourished with imported shingle.		The existing beach would be nourished with imported shingle. The benefit of this scheme would be the creation of new marine habitats in Gurnard Luck. This cannot be valued under Defra rules.		Freshwater marsh would turn brackish and possible creation of vegetated shingle.	
Indicative Standard of Defence		1 in 10 now		Minimum 1 in 100.		Minimum 1 in 100.		NA	
Influence upon Coastal Processes		A 'hold the line' policy would not change the existing regime. Preferable, new walls should be non-reflective. There is no evidence of historic coastal erosion at Gurnard Luck.		As option 1.		As options 1 and 2.		Change in sediment regime as shingle ridge is allowed to mobilise.	
Environmental Impacts						Creation of inter tidal habitat in this location would be an environmental gain. Estimated habitat creation of mudflat and salt marsh (total of 14 hectares).		Change in habitat, and creation of vegetated shingle. As option 3	
Economic Assessments BCR		Damages Avoided (PVb)	£0.6M	Damages Avoided (PVb)	£4.5M	Damages Avoided (PVb)	£4.53M	Damages Avoided (PVb)	£ NIL
		PV cost (over 100 years)	£2.6M	PV cost (over 100 years)	£2.9M	PV cost (over 100 years)	£3.3M	PV cost (over 100 years)	£5.5M
		Benefit Cost Ratio	0.2	Benefit Cost Ratio	1.5	Benefit Cost Ratio	1.4	Benefit Cost Ratio	< 1.0
Risk Assessment		This option still has a high residual risk of flood inundation and impact on people and property including possible loss of life during extreme flood events when the flood defences would be overtopped.		Future development would still be restricted as the flood risk would still be considered as 'high'.		Future development would still be restricted, as the flood risk would still be considered as 'high'. Some set back of existing line may be controversial.		Requires a value to be placed on the creation of marine habitats. Under present guidance this has not been possible.	
Preliminary option Appraisal		Engineering	✓	Engineering	✓	Engineering	✓	Engineering	✓
		Environment	✓	Environment	✓	Environment	✓	Environment	✓
		Economics	✗	Economics	✓	Economics	✓	Economics	✗
		Consultees		Consultees		Consultees		Consultees	
		DISCARD	SHORTLIST	DISCARD	SHORTLIST	DISCARD	SHORTLIST	DISCARD	SHORTLIST

Appraisal of Coastal Defence Options SMU11

SMU 11. Gurnard Cliffs to Cowes Castle Medium to shallow profile shingle on sand and silt in the Gurnard Bay frontage and limestone boulders on sand and shingle towards Egypt Point. Boulder covered foreshore with pitched stone revetment fronting Royal Yacht Squadron parapet. Good shingle storm beach on Queens Road frontage.						SMU11	
Do Nothing Option: Increased ground movement combined with beach steepening and scour will accelerate the deterioration and collapse of many existing sea walls along this frontage over the next 20 to 50 years leading to the reactivation of the coastal slope. Present Value Damages are estimated at approximately £14.9M.							
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)			
Description of Option	Maintaining the existing walls will extend their residual life and eventual collapse in approximately twenty years. Thereafter, the existing defences would not be renewed and there would be a reversion to 'Do-Nothing'.		The existing coast protection would be sustained by maintaining and replacing the existing seawalls. Significant refurbishment works may be required in 5 – 10 years time. Some slope stabilisation may be required in the future as well.		Continuing to sustain the present defences realises almost all the benefits. Therefore, improve is not a worthwhile option.		
Comments About Option	The residual life of the defence is 20 years with maintenance, with a breach probability of 0.05.		Continue to maintain for the next five years and then upgrade walls with rock revetment or refurbish. Beach recharge would be beneficial along the Gurnard Bay Frontage. Egypt Point and West Cowes Esplanade have a healthy shingle beach already.				
Indicative Standard of Defence	N/A		N/A		N/A		
Influence upon Coastal Processes	A reversion to 'Do-Nothing' would result in allowing natural coastal evolution.		No change over the existing regime. Beach recharge would introduce more sediment into the system and is probably beneficial.				
Environmental Impacts	t.b.a.		t.b.a.		t.b.a.		
Economic Assessments and BCR	Damages Avoided (PVb)	£3.4M	Damages Avoided (PVb)	£14.8M	Damages Avoided (PVb)	£14.8M	
	PV cost (over 100 years)	£471k	PV cost (over 100 years)	£3.5M	PV cost (over 100 years)		
	Benefit Cost Ratio	7.2	Benefit Cost Ratio	4.2	Benefit Cost Ratio		
Risk Assessment	Significant loss of assets.		No assessment of amenity benefits included at this stage. The need for future cliff stability measures is uncertain.				
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	Engineering Environment Economics × Consultees DISCARD <u>SHORTLIST</u>	OBJECTIVES	

Appraisal of Coastal Defence Options SMU12a

	SMU 12a. Cowes Castle to south of Floating Bridge		SMU12a	
	This frontage comprises the western mouth of the River Medina. For most of the frontage vertical walls rise from the silt of the river bed.			
	Do Nothing Option: The existing walls are privately owned and some are in poor condition and will collapse over the next 10 – 20 years. Rising sea levels will significantly increase flood risk. For the purpose of economic analysis, SMU12a has been divided into two sub-units. SMU12a-1 is mainly at risk from erosion and extends from Cowes Castle to the two slip-ways. SMU12a-2 comprises the rest of SMU12a and is at risk from flooding and coastal erosion. SMU12a-1 assumes a residual life of 20 years and an initial probability of failure of 0.05. Present value damages are estimated at approximately £6.4M. SMU12a-2 assumes a residual life of 10 years and an initial probability of failure of 0.05. Present value damages are estimated at approximately £19.4M. Total Present Value Damages for SMU12a is £25.8M.			
	Option 1 (Maintain)		Option 2 (Sustain)	
Description of Option	Maintain the existing sea walls without improving the current (average) standard of protection. This will prevent breach of the existing flood defences. Undertake minor works to close off low slipways etc. Maintain and refurbish the existing walls around Cowes Parade (erosion risk area).		This option would comprise a minimum upgrade to raise some of the existing walls up to the average level of adjacent walls and then to undertake more substantial upgrading in 50 years time to maintain the SOP.	
Comments About Option	The existing walls are in a low energy environment and with maintenance their residual life can be extended with regular refurbishment. The existing average height of walls is approximately +2.4m ODN (1 in 20 SOP). The minimum level is +2.2m ODN which is a 1 in 5 SOP. The coastal erosion defences would be maintained to last for 100 years with an initial breach probability of 0.05.		Raise the defence level to +2.6m ODN in Year 0 and then raise to +2.9m ODN in Year 50. This means that many of the existing walls could be raised in height where appropriate. However, the private ownership and varying construction forms make this option impossible, because the structural stability of many existing walls are unknown and because they would not be suitable to form a flood defence.	
Indicative Standard of Defence	1 in 20 (average now) but declining with sea level rise.		1 in 100 now, maintained at 1 in 100 in 50 years, declining to 1 in 10 in year 100.	
Influence upon Coastal Processes	No change to the existing coastal regime. Continuing the use of vertical walls in this location is acceptable because of the low energy wave climate.			
Environmental Impacts	Maintaining the line will exacerbate coastal squeeze. However, the intertidal habitat is very limited and of poor quality.			
Economic Assessments and BCR	Damages Avoided (PVb)	£13.7M	Damages Avoided (PVb)	£22.8M
	PV cost (over 100 years)	£4.2M	PV cost (over 100 years)	Not Assessed
	Benefit Cost Ratio	3.3	Benefit Cost Ratio	Not Assessed
Risk Assessment	This option provides a low standard of protection and there would be a considerable residual flood risk. This would limit the consent of any new developments as this area would still be classed as high flood risk.			
Preliminary option Appraisal	Engineering ✓ Environment ✓ Economics ✓ Consultees DISCARD SHORTLIST	OBJECTIVES	Engineering ✗ Environment Economics Consultees DISCARD SHORTLIST	OBJECTIVES

Appraisal of Coastal Defence Options SMU12a

	SMU 12a. Cowes Castle to south of Floating Bridge This frontage comprises the western mouth of the River Medina. For most of the frontage vertical walls rise from the silt of the river bed.						SMU12a
	Do Nothing Option: Refer to Sheet 1.						
	Option 3: Do Minimum + Demountable Flood Defences		Option 4: Do Minimum + Flood Proofing		Option 5: Do Minimum + Demountable flood defences and flood proofing.		
Description of Option	Install demountable flood defences along Cowes High Street and along Medina Road and Bridge Road. Otherwise Do Minimum and maintain existing sea walls to prevent their collapse.		Flood proofing of all at risk properties in West Cowes. This would be installed as a flood defence scheme. Do minimum in terms of continuing to maintain coast defences.		A combination of options 3 and 4.		
Comments About Option	No protection to properties seaward of this line. Scheme relies on accurate flood warning. Demountable defences will divide the high street and are impracticable.		Very difficult to reach agreement with landowners concerning flood proofing requirements. May not qualify for Defra funding, particularly commercial properties.		As Option 3 and Option 4.		
Indicative Standard of Defence	1 in 200 where protected other properties < 1 in 20		< 1 in 20 years		< 1 in 20 years		
Influence upon Coastal Processes	No change to the existing coastal regime.		No change to the existing coastal regime.		Impact on business during flood events. This will become frequent with sea level rise.		
Environmental Impacts	Residual impact on business during flood events. This will become frequent with sea level rise. Will prevent further development.		Residual impact on business during flood events. This will become frequent with sea level rise. Will prevent further development.		Residual impact on business during flood events. This will become frequent with sea level rise. Will prevent further development.		
Economic Assessments and BCR	Damages Avoided (PVb)	£20.6 M	Damages Avoided (PVb)	£25.5M	Damages Avoided (PVb)	£25.5M	
	PV cost (over 100 years)	£8.55M	PV cost (over 100 years)	£36.9M	PV cost (over 100 years)	£18.4M	
	Benefit Cost Ratio	2.4	Benefit Cost Ratio	0.7	Benefit Cost Ratio	1.4	
Risk Assessment	Residual flood risk if not installed. Residual risk of collapse of harbour side walls not in public ownership.		Residual flood damage will occur even with flood proofing. This may be high for retail outlets that can't respond to flood warnings. Residual risk of collapse of harbour side walls not in public ownership.		As Option 3 and Option 4.		
Preliminary option Appraisal	Engineering	X	OBJECTIVES	Engineering	✓	OBJECTIVES	
	Environment	✓		Environment	✓		
	Economics	✓		Economics	X		
	Consultees			Consultees			
	DISCARD	SHORTLIST		DISCARD	SHORTLIST		

Appraisal of Coastal Defence Options SMU12a

SMU 12a. Cowes Castle to south of Floating Bridge		SMU12a																																																														
This frontage comprises the western mouth of the River Medina. For most of the frontage vertical walls rise from the silt of the river bed.																																																																
Do Nothing Option: Refer to Sheet 1.																																																																
Option 6 (Improve along existing line)		Option 7 (Improve along new line)		Option 8 (Improve along set back line)																																																												
Description of Option	Improve the current standard of protection by improving the existing sea walls where appropriate and building new flood defences over much of the frontage.	Improve the current standard of protection by improving the existing sea walls where appropriate and building new flood defences over much of the frontage. Along Cowes high street the new line of defence would be in front of the existing line and would be used to create a new public open space area and regeneration of West Cowes waterfront.	Improve and realign defences: Setback flood wall north of the floating bridge; flood proofing of warehouses; defend the line in front of residential properties; keep the existing defences that belong to the marina; retreat the line to the High Street, and create and broad beach with a crest; and finally, maintain the Parade.																																																													
Comments About Option	Raise defence height to +2.95m ODN in Year 0 and +3.25m ODN in Year 50. Many of the existing walls could not be raised in height by a substantial amount and would be replaced by new flood defence walls, constructed just in front of the existing walls. Existing slipways would be maintained and flood gates may have to be constructed at some locations. The coastal erosion defences would be maintained to last for 100 years with an initial breach probability of 0.05.	Raise defence height to +2.95m ODN in Year 0 and +3.25m ODN in Year 50. Many of the existing walls could not be raised in height by a substantial amount and would be replaced by new flood defence walls, constructed just in front of the existing walls. Existing slipways would be maintained and flood gates may have to be constructed at some locations. The coastal erosion defences would be maintained to last for 100 years with an initial breach probability of 0.05.	Designed for a short, easy to maintain defence for sustainability. This would lead to a change in the feel of the High Street with retail properties on one side and a promenade on the other. However, Cowes High Street is located within the Cowes Conservation Area. No demolition is permitted in this area and it contains 20 listed buildings.																																																													
Indicative Standard of Defence	1 in 200 minimum	1 in 200 minimum	1 in 200 minimum																																																													
Influence upon Coastal Processes	No change to the existing coastal regime. Continuing the use of vertical walls in this location is acceptable because of the low energy wave climate.	No change to the existing coastal regime. The increased encroachment would have no impact on the overall estuarine regime as tidal prism is constrained by the width of the estuary mouth at the location of the chain ferry.	May be a release of sediment from new High Street beach, though likely to be of little impact due to low energy environment.																																																													
Environmental Impacts	There would be a small loss of foreshore footprint as the new walls would be located about 3 to 4m in front of the existing walls. This impact is not considered to be significant.	There would be a loss of foreshore footprint as the new walls would be located in front of the existing walls. This impact is not considered to be significant in this location.	New wide beach created, opportunities for recreation, and new habitats. Loss of a number of listed buildings.																																																													
Economic Assessments and BCR	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£25.6M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£11.7M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">2.2</td> </tr> </table>	Damages Avoided (PVb)	£25.6M	PV cost (over 100 years)	£11.7M	Benefit Cost Ratio	2.2	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£25.6M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£8.6M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">3.0</td> </tr> </table>	Damages Avoided (PVb)	£25.6M	PV cost (over 100 years)	£8.6M	Benefit Cost Ratio	3.0	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">Damages Avoided (PVb)</td> <td style="text-align: right;">£25.6M</td> </tr> <tr> <td>PV cost (over 100 years)</td> <td style="text-align: right;">£15.5M</td> </tr> <tr> <td>Benefit Cost Ratio</td> <td style="text-align: right;">1.6</td> </tr> </table>	Damages Avoided (PVb)	£25.6M	PV cost (over 100 years)	£15.5M	Benefit Cost Ratio	1.6																																											
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Risk Assessment	The many privately owned frontages make this scheme difficult to negotiate and to achieve agreement.	This provides a lower risk construction option but may require some compulsory land purchase or compensation to private landowners.	Would require the removal of listed properties in Cowes Conservation Area, and careful sensitive design of beach required, would require further study. Not all building material will be recycled to make up the new beach.																																																													
Preliminary option Appraisal	<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">✓</td> <td style="width: 30%;">OBJECTIVES</td> <td></td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Consultees</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> <td></td> <td></td> </tr> </table>	Engineering	✓	OBJECTIVES		Environment	✓			Economics	✓			Consultees				DISCARD	<u>SHORTLIST</u>			<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">✓</td> <td style="width: 30%;">OBJECTIVES</td> <td></td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Consultees</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> <td></td> <td></td> </tr> </table>	Engineering	✓	OBJECTIVES		Environment	✓			Economics	✓			Consultees				DISCARD	<u>SHORTLIST</u>			<table border="0" style="width: 100%;"> <tr> <td style="width: 30%;">Engineering</td> <td style="text-align: center;">X</td> <td style="width: 30%;">OBJECTIVES</td> <td></td> </tr> <tr> <td>Environment</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Economics</td> <td style="text-align: center;">✓</td> <td></td> <td></td> </tr> <tr> <td>Consultees</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DISCARD</td> <td style="text-align: center;"><u>SHORTLIST</u></td> <td></td> <td></td> </tr> </table>	Engineering	X	OBJECTIVES		Environment	✓			Economics	✓			Consultees				DISCARD	<u>SHORTLIST</u>			
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Appraisal of Coastal Defence Options SMU12b

SMU12b. Shrape Breakwater, East Cowes to south of Floating Bridge		SMU12b																																	
This frontage comprises the eastern mouth of the River Medina. For most of the frontage vertical walls rise from the silt of the river bed.																																			
Do Nothing Option: Reconstruction of sections of the existing wall will be required before Year 20. Walls in the eastern side of Cowes Harbour will fail by Year 20 under a 'Do-Nothing' scenario. The residual life of the defences is estimated at 20 years with a breach probability of 0.05. Do-Nothing damages are estimated to be approximately £15.7M.																																			
Option 1 (Maintain)		Option 2 (Sustain)		Option 3 (Improve)																															
Description of Option	Maintain the existing sea walls without improving the current standard of protection. This will prevent breach of the existing flood defences. The existing walls have a minimum height of +2.8m ODN (1 in 500 now). Maintaining the Shrape breakwater will prevent wave overtopping of these walls. Significant refurbishment of the existing walls and the Shrape breakwater will be required in 20 to 50 years time.	The existing walls would be upgraded to have an indicative minimum SOP of 1 in 100 to 1 in 300 over the next 50 – 100 years.		This option reflects the proposals for the development of East Cowes being promoted by SEEDA. These proposals include flood protection to most properties at risk. Within the FRA prepared as part of the development an option is proposed to build a new flood wall to a height of +3.25m ODN.																															
Comments About Option	There is no defence height information for the area to the south of the chain ferry.	Raise the defence level and replace the existing defences in 50 years time (+3.0m ODN). These proposals terminate at the Chain Link Ferry where the defence link would run inland to tie into higher ground.		Raise the defence level to a height of +3.25m ODN in year 0 and refurbish in year 50.																															
Indicative Standard of Defence	>1 in 200 (now) but declining to 1 in 50 in 50 years.	A minimum of 1 in 200 over the next 100 years.		A minimum of 1 in 200 over the next 100 years.																															
Influence upon Coastal Processes	No change to the existing coastal regime.	No change to the existing coastal regime.		No change to the existing coastal regime.																															
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