

Cumbria Coastal Strategy

Marine Conservation Zone Assessment

July 2020



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Contents

Section	Page
1	Introduction..... 1
1.1	The Marine Conservation Zone assessment process1
1.2	The proposal..... 3
2	Screening 16
2.1	Screening of MCZs16
2.2	Screening of policy units16
3	Assessment of significant effects 21
4	Conclusions..... 34
5	References..... 35

1 Introduction

Type of PPP:	Coastal Flood and Erosion Risk Management Strategy
National grid reference:	Cumbria Coast (Arnside (NGR SD455756) to Scottish border, Sark (NGR NY327669))
Site name or reference:	Cumbria Coastal Strategy

This is a Marine Conservation Zone (MCZ) Assessment for the Cumbria Coastal Strategy (the ‘Strategy’).

It presents an assessment of the potential of the Cumbria Coastal Strategy to affect the protected features of Marine Conservation Zones (MCZs), and any ecological or geomorphological process on which the protected feature is dependent on. The assessment has been carried out in line with Cumbria County Council’s duties to help protect and conserve MCZs under the Marine and Coastal Access Act 2009. It has been prepared in parallel to a Habitat Regulations screening assessment for the Cumbria Coastal Strategy. A draft template for this MCZ assessment was shared with Natural England (NE) and Scottish Natural Heritage (SNH) in February 2019.

The report provides the basis for the assessment of future schemes and/or activities originating from the Strategy that will require marine licensing approval from the Marine Management Organisation (MMO), as one of the regulatory bodies for MCZs. A MCZ assessment is required for developing and implementing coastal strategies and should aim to identify any high level coastal management decisions and activities that are capable of affecting the MCZ’s conservation objectives and the processes upon which they rely. The information provided to inform this MCZ assessment is proportional to the available detail at strategy-level, prior to further detailed MCZ assessment at scheme level to support marine licence applications.

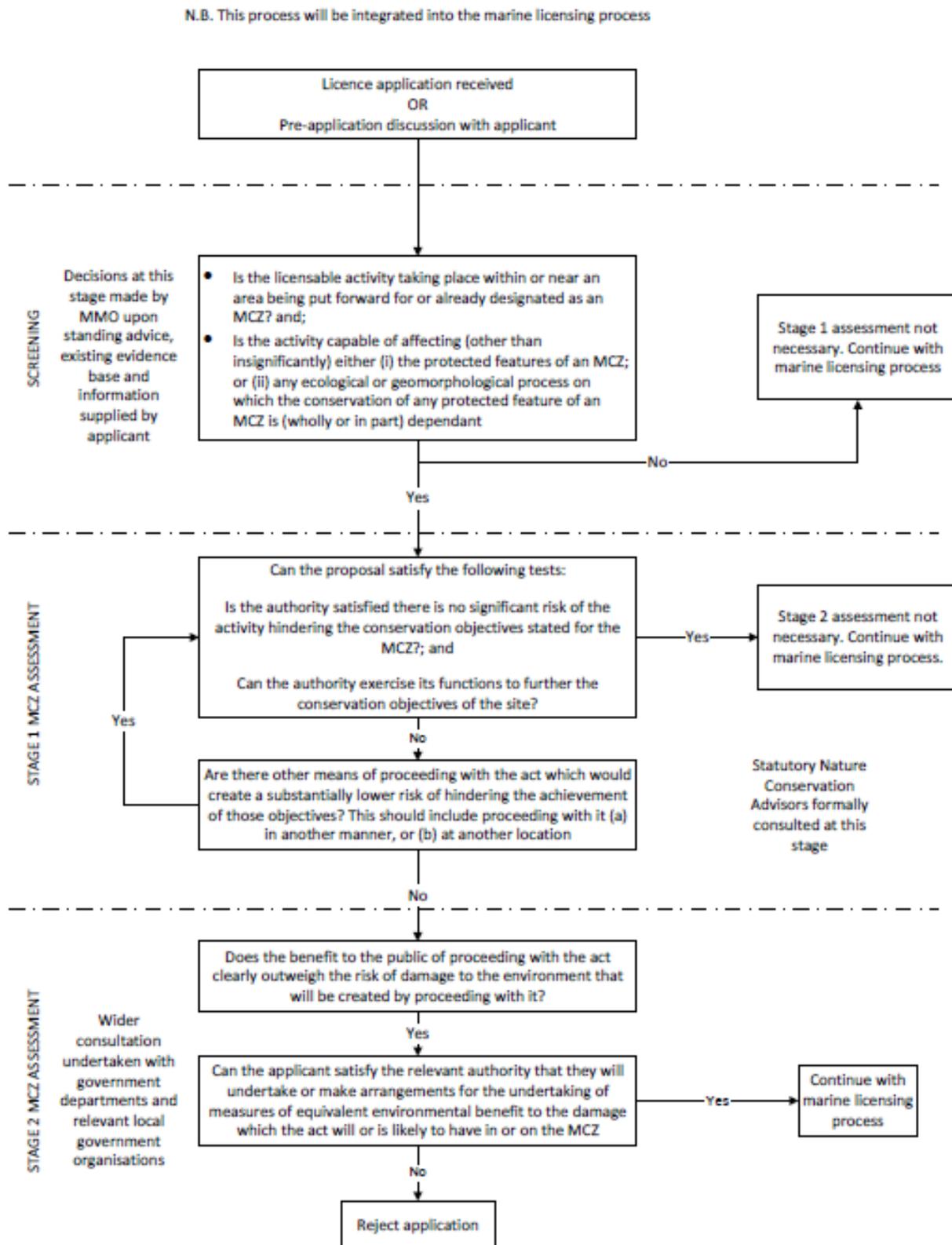
1.1 The Marine Conservation Zone assessment process

The Marine and Coastal Access Act 2009 places a duty on Government to establish a network of conservation sites, which contributes to the conservation or improvement of the marine environment in the UK marine area. The network includes Marine Protected Areas designated under European legislation comprising Special Areas of Conservation, Special Protection Areas, marine components of Ramsar sites, Sites of Special Scientific Interest and Marine Conservation Zones (MCZs). Defra have consulted on the establishment of a series of MCZs, designated under the Marine and Coastal Access Act 2009, around England and Wales.

A summary of the MCZ assessment process used by the MMO in marine licence decision-making process is outlined on Figure 1.1 (MMO 2013).

This report documents the **Screening stage** and **Stage 1 MCZ assessment**.

Figure 1.1: MCZ Process (modified from MMO 2013)



1.2 The proposal

Cumbria County Council has worked with the Cumbria Coast Protection Authorities, the Environment Agency and other organisations to develop a strategy for the future management of the coast from Arnside to the Scottish Border.

The requirement for a more detailed strategy to cover the smaller interacting policy areas of the Cumbrian coast was identified in the North West England and North Wales Shoreline Management Plan (SMP), which was completed in 2010. Coastal strategies form the second tier in the shoreline management planning hierarchy; below the high level non-statutory Shoreline Management Plans and above the local level scheme design documents.

Having a detailed coastal strategy to assess coastal flood and erosion risk will allow infrastructure providers and the coastal protection authorities to comprehensively quantify the risks and associated damages of coastal flooding and erosion and plan long-term future investment.

The coastline of the Strategy area (see Figure 1) extends 420 km and lies within three of the North West England and North Wales Shoreline Management Plan (SMP) sub-cells as follows (see 1.2):

- Sub-cell 11c (part) – Arnside to Hodbarrow Point (Millom, Cumbria) including the Kent, Leven and Duddon estuaries
- Sub-cell 11d – Hodbarrow Point to St Bees Head including Ravenglass estuary complex; and
- Sub-cell 11e - St Bees Head to Scottish Border including the Moricambe Bay and the Eden

The SMP2 divided the Cumbria coast into 25 policy areas, with each policy area including a number of policy units. These units have been used in the Strategy.

The 420km length of coastline covered by the Strategy is significantly more extensive than would usually be considered at strategy-level. For this reason, focus has been on developing measures for stretches of coast (**priority units**) which have coastal defence management needs in the short term. This may be where:

- there are key assets at possible risk from coastal flooding or erosion,
- the current Shoreline Management Plan policy has been questioned, or
- there are opportunities to improve the environment and bring benefits to an area.

For these priority units the Strategy has looked at different implementation options for dealing with future risks. Along the rest of the coast, the Strategy has considered the current Shoreline Management Plan policy and identified future actions. This proportional approach does not, however, negate the need to consider wider scale impacts and benefits nor to consider whether other areas of the Strategy coastline could present opportunities for environmental improvements or mitigation measures. This MCZ assessment has therefore considered both the priority and non-priority units.

The Strategy considers alternative approaches under four Shoreline Management Plan headline policies: implementation of these involves a range of different management activities as described in Table 1.2. The



Figure 1.2 The area covered by the SMP is shown, indicating the three sub-cells. The area covered by the Strategy is shown by the two red dots.

MCZ assessment considers the preferred strategic approach in those relevant priority and non-priority units in both the short term (up to 10 years) and future works (> 10 years). Note that any proposed works beyond 10 years will be subject to future review as part of the Strategy review process.

The preferred strategic approach for each policy unit are shown in Table 1.1, with further details shown in main strategy reports. The priority units are shown in bold and the non-priority units are not in bold.

Where no change in management policy is proposed from the SMP, and no active intervention through doing nothing is proposed in the first ten years in non-priority units, those policy units have been screened out of the MCZ assessment and have been excluded from Table 1.1.

Due to the limited detail on the nature and extent of schemes available at this strategy-level, an additional, more detailed MCZ appraisal would be required for each scheme.

Table 1.1 Shoreline Management Plan policies and activities considered by the Strategy

Policy	Description	Activities considered by the Strategy
No active intervention (NAI)	No further investment in coastal defences or operations.	<ul style="list-style-type: none"> Do nothing
Hold the line (HTL)	An aspiration to hold the shoreline in its current position. This might involve maintaining current defences or constructing new defences in the future.	<ul style="list-style-type: none"> Maintain defences – this could involve patch and repair works or more proactive measures Improve defences, which could involve toe protection or other reinforcements measures, raising the defence crest or widening the defence Build new defences, this could involve alongshore structures, such as a revetment or seawall, cross-shore structures such as rock or timber groynes, or offshore structures such as reefs.
Managed realignment (MR)	Allowing the shoreline to move backwards or forwards, with management to control to limit movement. This could involve introducing measures to reduce erosion or building new defences on the landward side of the original defences in low-lying areas.	<ul style="list-style-type: none"> Build new set back defences, such as raised embankments or walls Remove defences and allowing retreat to naturally higher land Build defences to slow erosion – this could involve low cost measures such as gabions or rock toe works
Advance the line (ATL)	New defences are built on the seaward side of current defences.	Not used for the Cumbria coast in SMP2

Table 1.2 Preferred strategic approach for each policy unit (priority units shown in bold)

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
c8 Heald Brow to Humphrey Head	11c8.4 Meadow to the Kent viaduct (Arnside)	No	Hold the Line: Continue to monitor and maintain coastal defences as necessary. Potential capital works required to replace assets when they reach end-of life (20-50 years) or if fronting marsh erodes. Could include new sea wall and sheet pile toe, full height rock revetment or modification to existing structures.
	11c8.5 Kent viaduct to Holme Island	No	Hold the Line: Continue to monitor and maintain coastal defences as necessary. In the short term this is likely to involve minor repairs and maintenance of existing defence structures and culverts. Potential capital works required in longer term to replace assets when they reach end-of life (20-50 years) or if fronting marsh erodes. Could include new sea wall and sheet pile toe, full height rock revetment or modification to existing structures. Also potential site for regulated tidal exchange scheme.
	11c8.6 Holme Island to Humphrey Head (Grange-over-Sands)	No	Hold the line: Continue to maintain coastal defences and monitor shoreline change. In the short term this is likely to involve minor repairs and maintenance of existing defence structures and culverts. Potential capital works required in longer term to replace assets when they reach end-of life (20-50 years) or if fronting marsh erodes. Could include new sea wall and sheet pile toe, full height rock revetment or modification to existing structures.
c9 Kent Estuary	11c9.1 Kent viaduct to Dick Fell Road (Sandside)	Possibly, subject to further studies	Hold the line, whilst a long term solution is developed. In the short term proactive maintenance of the existing defence, is the recommended approach. This will allow time for a catchment-wide approach to be developed and also for funding to be sought, by extending defence life by 10 to 20 years. In the longer term improving existing defences would be the most efficient solution for future management of increased flood risk due to sea level rise, but would be unlikely to attract sufficient funding at the present time. This could include localised habitat creation through a regulated tidal exchange (RTE) if impacts on the designated habitats of Morecambe Bay need to be mitigated or compensated for. A number of further studies are required to confirm the feasibility of regulated tidal exchange for this purpose along the frontage and how it could be incorporated in the long term and there may be other locations in the inner estuary where compensatory habitat could be provided more cost effectively and where there is less infrastructure at risk.
	11c9.2 Sandside (Dick Feel Road to Hollins Well Road)	No	Hold the line, whilst a long term solution is developed. In the short term proactive maintenance of the existing defence, is the recommended approach. This will allow time for an catchment-wide approach to be developed and also for funding to be sought, by extending defence life by 10 to 20 years.
	11c9.3.1 Hollins Well Road north to Levens Bridge (east bank)	Possibly split existing policy unit, subject to further studies	There are several alternative approaches to Hold the line in the long term, although the most suitable approach technical approach is to provide a formal revetment and crest wall when justified due to increasing risk from climate change or channel migration. In some parts of the frontage that may need to be higher than the current defence levels to appropriately manage risks from flooding in the future.
	11c9.3.2 Levens Bridge (east bank) & Levens Bridge to Kent viaduct (west bank)	Possibly split existing policy unit, subject to further studies	Hold the line, whilst a long term solution is developed. In the short term proactive maintenance of the existing defence, is the recommended approach. This will allow time for an catchment-wide approach to be developed and also for funding to be sought, by extending defence life by 10 to 20 years. In the longer term, improving existing defences would provide for the most efficient solution for future management of increased flood risk due to sea level rise, but would be unlikely to attract sufficient funding at the present time. This could include localised habitat creation through managed realignment of embankments if impacts on the designated habitats of Morecambe Bay need to be mitigated or compensated for. A number of further studies are required to confirm the feasibility of MR within this unit.

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
c10 Humphrey Head to Cark	11c10.2 Humphrey Head to Cowpren Point	Possibly to take account of saline lagoon scheme	The preferred approach in the short term is to continue to hold the line through proactive management. This will allow time for longer term options, such as partial realignment of the defences, to be considered. It would also enable the success of the proposed saline lagoon scheme to be appraised, as there may be potential to extend the scheme.
c11 Outer Leven Estuary	11c11.1 Cark to Leven viaduct	Consider change to HTL to be consistent with policy units in 11e	No Active intervention for majority of the policy unit, but hold the line along the existing railway embankment and viaduct, which may require rock armouring if fronting marsh erodes. If the fronting marsh erodes, further rock armouring extending along railway embankment could be required in the longer term. Also potential site for regulated tidal exchange scheme.
	11c11.2 Leven viaduct to Canal Foot cottages	Studies are required to look at potential for contamination in longer term.	No Active intervention for majority of the policy unit, but hold the line along the existing railway embankment and viaduct, which may require rock armouring if fronting marsh erodes.
	11c11.3 Canal Foot	No	Hold the line - repair or upgrade existing defences to consistently manage flood risk to south Ulverston.
	11c11.4 Glaxo Factory Site (south)	Dependent on development of GSK site	In the short term, a do nothing approach remains appropriate, subject to further monitoring of the situation. The long term Strategy depends upon future plans for the hinterland. Currently a slag (spoil) bank fronting the existing defences provides protection, but this is showing signs of erosion. Further erosion could result in a breach and flooding of the hinterland, with potential to have wider reaching effects. If the former GSK is developed, there could be a need to change policy to hold the line and under a hold the line policy the preferred approach would be to construct a new revetment or embankment, subject to funding.
	11c11.5 Sandhall to Conishead Priory	No	Consider need for future set-back defences to wider south Ulverston flood cell in medium or long term.
c12 Leven Estuary	11c12.1 Leven viaduct to Haverthwaite (left bank) and Haverthwaite to Greenodd (right bank)	Possible boundary change	The long term approach is to move towards a more naturally functioning coastline. In the short term this would involve reactive maintenance of defences, whilst looking for opportunities to realign or remove defences to enable habitats creation and reduce the need to continued investment in their maintenance.
	11c12.2 Greenodd to Barrow End Rocks (A590)	Possible boundary change	Hold the Line - into the long term. An existing scheme involving a rock armour revetment and existing retaining wall and platform structure repairs is awaiting final approvals.
	11c12.3.1 Old Railway Embankment	New policy unit and new policy proposed	Hold the Line - in the short term improving existing defences could be sufficient whilst a funding strategy and a longer term solution are developed. To provide long term protection, new defences will need to be constructed. This could either be along existing alignments, most likely through construction of a rock revetment, or involve setback defences, although this would require further study to assess potential impacts on rest of estuary, particularly the potential for worsening erosion risk at the railway viaduct and the A590 Greenodd embankment. Note that EA has recently undertaken several emergency repairs to breaches in the embankment which is in poor condition.
	11c12.3 Barrow End Rocks (A590) to Leven viaduct	New unit boundary. Possible change to NAI in short or medium term.	As there are limited assets at risk a Do nothing option could be a suitable approach for this frontage from the short term. Due to the location and size, impacts on the tidal prism and potential for significant impacts elsewhere in the estuary are lower risk but should be investigated alongside recommended actions for 11c12.1
c13 Bardsea to Piel Island	11c13.2 Newbiggin to Rampside	Possibly - change in medium term to HTL	Hold the Line - in the short term proactive management could be sufficient whilst a funding strategy and a longer term solution are developed. To provide long term protection, the existing defences would need to be improved through reinforcing with rock armour or concrete overlays. It may also be necessary to increase the crest level. Although the SMP considered the possibility of realigning the road, the length or detour required is unlikely to be more cost-effective than improving the

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
			current defences. There is the possibility of a small scale regulated tidal exchange scheme, to provide compensatory habitat, but this would require further study.
	11c13.3 Rampside	Possible change to HTL in short term	In the short to medium term, the shoreline is anticipated to remain sheltered by the fringing saltmarsh, the Foulney embankment and Roa Island causeway, therefore no works are likely to be needed apart from minor repairs. No Active intervention is therefore the preferred approach, although risks will need to be monitored. In the long term if the fringing marsh diminishes there may be a need to improve defences through raising defences. This could be in the form of low wall slightly set back from the current defences and so not impacting on the designated sites, but will depend upon the future management of Roa Island, Shorelink (Roa Island causeway) and Foulney Embankment.
	11c13.4 Roa Island	No	Hold the line - there are various options that would maintain the standard of defence into the long term, but further studies are required, particularly regarding defence of the Shorelink, due to foundation issues, and the impact of the deterioration of the Foulney causeway resulting in additional exposure and habitat changes. Therefore in the immediate term, ongoing maintenance of the defences would be required until a decision can be made on the best approach in the medium to longer term.
c14 Walney Island	(11c14.7 part) Strategy Benefit Area 2: West Shore park	No	Since the Walney Island Strategy, new rock armour defence has been installed along the frontage. This defence is intended to be temporary and is due to be removed after 20 years, therefore the approach is in line with the current Walney Island Strategy preferred option and SMP Policy of Managed realignment. Continuing to maintain the defence here in the short term may, however, be affected by decisions along adjacent frontages to the south. It is assumed that this defence will be maintained over the 20 year period - concerns have been raised regarding design - therefore monitoring may indicate a need for redesigning within the 20 years.
	(11c14.7 part) Strategy Benefit Area 3: Earnse Point to Walk Haw Scar	Yes	Recent beach monitoring and asset inspection data indicate that although there are local fluctuations in beach level at the toe, the sloping revetment is generally in fair state, such that ongoing maintenance could be sufficient to sustain it for a number of years, beyond the No active intervention approach. Subject to funding being available, this could be a more viable short term option than simply allowing the current defence to fail, which could have an impact on both the viability of the fishtail groyne at Earnse Point and temporary defences at West Shore Park. Once defences at West Shore Park are removed, then a more feasible realignment of the coast may be achieved, by allowing erosion and retreat of the larger frontage.
	11c14.5, 11c14.2 (part), 11c14.1 (part) Strategy Benefit Area 5: Nanny Point Scar to Hillock Whins (unit 5) and Biggar to Tummer Hill (unit 8)	Yes	Along Unit 8, given the current condition of defences along this stretch and low exposure conditions, Do minimum is likely to sustain defences for some time. Any increase in risk and the acceptance of risk will need to be reviewed on a regular basis. Along Unit 5, the recent asset inspection indicates that the current defences are already being overtopped, with retreat of the cliffs having occurred behind them. The Walney Strategy proposed that the Do minimum option in Unit 5 should include creation of a rock stockpile to be used for maintaining and repairing the defences as and when failures occur. For this option to remain viable the storm damage that has occurred since the Strategy needs to be repaired.
	11c14.4 Strategy Benefit Area 6: Hillock Whins to Hare Hill	Yes	Since the Walney Island Strategy, there has been storm erosion of historical landfill sites. There have been recent works along this frontage undertaken by Cumbria County Council (March and April 2018 and ongoing) that include reprofiling and capping of the bund with clay. Cumbria County Council are currently seeking a longer term permanent solution to the problem, to mitigate the impacts of coastal erosion along the frontage, beyond the current approach of reactive maintenance. The first two phases are due to be completed by winter 2018 to 2019. The

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			outcome is likely to require a revision of the preferred option, reverting to the existing SMP2 policy for this frontage of Hold the line.
	11c14.2 (part) Strategy Benefit Area 8: Vickerstown and North Scale	Yes	Given the risk of coastal flooding and erosion to the main link road, the current Strategy is questioned. Given the low exposure conditions along the frontage continued maintenance is likely to be sufficient to hold the line for some time, with possible consideration of temporary flood defences as an alternative to raising the crest level. This would allow time for consideration of potential funding streams to support continued maintenance or future raising of the existing defences.
c15 Walney Channel (mainland)	11c15.2 Westfield Point to Hindpool (Barrow in Furness)	No	Hold the line - continue to maintain existing defences. Longer term improvements are likely to be required, such as rock toe works or sheet piling to extend life of existing defences (various ownerships).
c16 Duddon Estuary	11c16.2 Askam-in-Furness	Possibly boundary change to include sewage works	Hold the line - along much of the frontage works are unlikely to be required in the short to medium term, depending upon future rates of erosion, as properties are generally set back from the shoreline. A short length of defences at Marsh Lane may require continued maintenance and there may be a need for works to address outflanking.
	11c16.3 Askam to Dunnerholme	Possibly boundary change to exclude sewage works	There is a stretch of railway line which may become increasingly exposed if erosion continues - therefore works to maintain the embankment may be required. Minimal erosion is predicted for the southern side of Dunnerholme and therefore a do nothing approach remains appropriate. However, some ongoing erosion is predicted at the Askam-in-Furness caravan park frontage. The likely solution is for adaptation in the longer term through roll back or relocation of this park. However, in order for relocation to be planned some short-term ongoing maintenance of the frontage may be required (Do minimum).
	11c16.4 Dunnerholme to Sand Side	No	Hold the line - there are various approaches possible but the preferred approach is to improve existing defences -along much of the length this may be simply raising crest levels, but where erosion is an issue would involve adding erosion protection (probably rock) along the toe of the embankment. This option would enhance the flood protection resilience of the railway embankment and potentially provide long term protection to the frontage. Should erosion become more severe and the embankment shows signs of critical failure, there may be a need for extended works along the whole railway embankment such as constructing a new rock revetment, to provide more substantial protection.
	11c16.5 Kirkby-in-Furness	No	The railway line runs parallel to the shoreline along the length of 11c16.5 and at some locations the width of fronting land between the shoreline and the railway line is extremely narrow. Maintaining existing defences is unlikely to be effective for many years, therefore a more sustainable solution would be to improve the defences or construct new embankments. Both options would involve a larger defence footprint. The final decision would be made by Network Rail as they are responsible for the embankments within this unit.
	11c16.7 Galloper Pool to viaduct	No	Hold the line by continuing to maintain the defences to the railway. In the longer term potential for need to reinforce railway embankment should the existing wall start to fail.
	11c16.8 Duddon Estuary (inner)	No	Reactive patch and repair (Do Minimum) may be sufficient, given the longer term intent for managed realignment. This would allow time for further investigations. MR options require further studies to consider viable locations and potential impacts on the wider estuary. In the longer term potential for need to reinforce a short length of railway embankment within this unit.
	11c16.9 Millom Marshes	No	Reactive patch and repair (Do Minimum) may be sufficient, given the longer term intent for managed realignment. This would allow time for further investigations. MR options require further studies to consider viable locations and potential impacts on the wider estuary.

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
	11c16.10.1 Millom (old railway embankment)	New policy unit and new policy (HTL) recommended	To manage coastal flood risk to the wider flood area of South Millom, the preferred approach is to formalise the existing high ground along the line of the former railway embankment as a coastal defence in the short term and consider a SMP Policy change to HTL. In the longer term the defence may need to be improved through construction of a new flood revetment along the former railway embankment.
	11c16.10 Millom Iron Works (industrial area)	New policy unit and new policy (NAI) recommended	Assuming a new policy unit is created for 11c16.10.1, the preferred approach for flood and coastal risk management is for do nothing, recognising planned private development at Port Millom subject to consents and whilst monitoring levels of risk from coastal erosion and flooding.
	11c16.11 Hodbarrow Mains	No	The preferred approach is Do Nothing in the short term, but undertaking studies including flood risk modelling, to improve understanding of flood links to the wider South Millom area. This may identify a need to construct set back flood embankments to manage flood risk to properties in Millom.
d1 Hodbarrow Point to Selker	11d1.1 Hodbarrow Point to Haverigg	Possibly defer MR until long term	Given the current good condition and the substantial nature of the armouring the defences may be sustainable beyond 50 years with only minor maintenance (Do minimum) and therefore the need for realignment to a set back defence could potentially be deferred into the 50 to 100 year epoch.
	11d1.2 Haverigg	Possible change to MR in long term - depending on risk	Hold the line - maintain existing defences, reviewing standard of protection provided as part of Haverigg and Millom flood risk modelling study to determine timing of possible future raising of defences. Should the dune system to the west of the rock revetment erode, realigning the defence to prevent outflanking but to maintain the current level of protection to Haverigg against flooding may be considered.
	11d1.4 Silecroft (Hartress Hill)	Possible change to MR in long term - depending on risk	Hold the line, subject to defences causing no adverse effects on sediment movement or coastal processes and sustainable to do - there is currently no justification for changing the policy within this unit as there is no substantive evidence that current defences are significantly impacting adjacent sites. Should erosion rates accelerate in the future, the defences may become increasingly exposed and difficult to retain. At this time, the potential for setting back the defences should be considered.
d2 Selker to Eskmeals	11d2.2 Stubb Place to Eskmeals Dunes	Possible change in short term to HTL	In the short term, the preferred approach to holding the existing line is to improve the existing defence (along its current alignment), through reusing the Pendine blocks. This should extend the life of defences 5 to 10 years, whilst medium or long term managed realignment adaptation approaches are investigated. Along the stretch of coast north of the MoD boundary to Eskmeals Range it is assumed that QinetiQ will continue to manage risk to the Eskmeals Range, through reprofiling of the shingle ridge when required, for example, following storm damage.
d3 Ravenglass Estuary Complex	11d3.1 Eskmeals Dunes to Ravenglass	No	Localised HTL - works to railway embankment in longer term.
	11d3.2 Ravenglass	No	Hold the line - maintain existing defences, with refurbishments within current footprints to avoid impacts on the designated sites. Improvements or modifications to current defences are likely to require consent from Natural England, LDNPA and HE and may require a habitat regulations assessment (HRA) and AA (Appropriate Assessment) to appraise possible effects on the designations within the estuary.
d5 Seascale to St Bees	11d5.1 Seascale	No	Hold the current defence line - in the short term a do-minimum approach to Hold the line is all that can be economically justified. This would not sustain protection into the long term and so further investigations are needed to better identify the risks related to defence failure and timing of economic impacts before an improve options can be identified as preferred.
	11d5.2 Seascale to Sellafield	Consider change to HTL to be consistent with	In the short term, improving existing defences should be sufficient to extend the life of the existing embankment. However, if the risk of erosion increases more substantial measures, e.g. extending the length

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
		policy units in 11e	of existing defences, would be required, through constructing a new revetment or seawall).
	11d5.3 Sellafield	Possible boundary change if Moorside site progresses in the future	Hold the current defence line - in the short and medium term proactive repair and maintenance of the existing rock revetment, which currently protects the railway line, should be sufficient to provide protection beyond 50 years. This would not protect properties that lie along the seaward toe of the railway embankment and there is unlikely to be any funding available for their protection. In the long term, there may be a need to improve defences, with construction of a new revetment the preferred approach. The timing of this may depend on several factors, in particular any future development of the proposed Moorside site (located in unit 11d5.4) and long term plans for the coastal railway.
	11d5.4 Sellafield to Braystones	Possible boundary change if Moorside site progresses in the future. Consider change to HTL to be consistent with 11e	Hold the current defence line at the railway. Currently the railway line is not at high risk, therefore the preferred approach in the short term is to continue to monitor and undertake proactive maintenance as required. Should the beach deteriorate (not anticipated within next 20 years), more substantial works could be required to continue to protect the railway. Constructing a new rock armour revetment, is likely to be most cost effective solution, in the long term, but the decision will rest with Network Rail, who are responsible for maintaining defences along this frontage. These measures will not protect the beach front properties. The Strategy has considered the justification for defending beach front properties, but the additional cost and potential wider environmental impacts means that such an option could not be justified and it is unlikely that any national funding could be sought to provide defences here.
	11d5.5 Braystones, Nethertown and Couderton	Consider change to HTL to be consistent with 11e	Hold the current defence line at the railway - currently the railway line is not at high risk, therefore the preferred approach in the short term is to continue to monitor and undertake proactive maintenance as required. Should the beach deteriorate (not anticipated within next 20 years), more substantial works could be required to continue to protect the railway. Constructing a new rock armour revetment, is likely to be most cost effective solution, in the long term. The final decision will rest with Network Rail, who are responsible for maintaining defences along this frontage. These measures will not protect the beach front properties. The Strategy has considered the justification for defending beach front properties, but the additional cost and potential wider environmental impacts means that such an option could not be justified and it is unlikely that any national funding could be sought to provide defences here.
	11d5.6 Couderton to Seamill	Consider change to HTL to be consistent with 11e	Hold the current defence line - currently the railway line is not at high risk, therefore the preferred approach in the short term is to continue to monitor and undertake proactive maintenance as required. Should the beach deteriorate (not anticipated within next 20 years), more substantial works could be required to continue to protect the railway. In the long term constructing a new rock armour revetment is likely to be most cost effective solution, this may involve both replacing existing defences and building defences along currently undefended stretches. The final decision will rest with Network Rail, who are responsible for maintaining defences along this frontage.
	11d5.7 Seamill to Pow Beck	No	Hold the current defence line - currently the railway line is not at high risk, therefore the preferred approach is for proactive maintenance, which should be sufficient to provide protection to the railway and properties beyond 50 years. This option would involve maintaining the existing defences until they reach the end of their effective life span then replace them in their current locations, with Sea Mill defences replaced in front of the car park rather than constructing new defences adjacent to the railway. This would allow time for development of a long term solution of

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
			improving the defence by constructing a new revetment, with rock armour likely to be most cost effective solution, in the long term.
d6 St Bees	11d6.2 St Bees Promenade	No	Hold the existing defence line in the short to medium term (50 years) - the preferred approach is for works to prolong the life of the promenade, such as additional rock toe works, and possibly maintaining the existing groynes. Toe works may need to extend south to address outflanking at the transition with 11d6.1. In the long term (beyond 50 years) it is likely to become increasingly difficult to retain a beach and more substantial works would be required to hold the promenade in its existing position. The preferred approach is therefore to realign the defences to a set-back position. The position would need to be determined through additional studies.
e1 St Bees Head to Whitehaven	11e1.2 Saltom Pit	Possibly - further to further studies	Hold the line - to protect of the Scheduled Monument of Saltom Pit for as long as technically and economically viable and safe to do so. Consider viability of the short and medium term HTL policy and potentially bring forward the long term no active intervention policy.
	11e1.4 Whitehaven South Beach	Possible - depends on contamination risk	The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks from erosion of industrial spoil. Assuming there is no change in requirement to introduce defences in the immediate future to prevent further erosion, then erosion will be allowed to continue and works will be limited to maintaining the harbour arm in the adjacent policy unit to ensure its integrity. If it is found that there is a long term need to Hold the line to prevent erosion of contaminated landfill, and there are no other options for its removal, then a number of options to HTL should be reconsidered at that time to identify the most suitable approach to prevent contamination but perhaps also to support any other regeneration proposals in the area.
e2 Whitehaven To Workington	11e2.1 Whitehaven Harbour and north beach	No	Hold the line - by maintaining and repairing harbour walls and gates. It is assumed that maintenance of the harbour structures remains the responsibility of Whitehaven Harbour Commissioners, but rock armour to the north side is maintained by CBC. Works may be required to address movement of the defence toe, such as the placement of additional rock along the toe to bolster the defence.
	11e2.2 Bransty to Parton	No	Hold the current defence line - In the short term, modifying the existing structure (toe protection, raising, repairing) may be adequate for some years. In the longer term it is likely that there will be a need to construct a new defence. That might take the form of a replacement seawall, or alternatively a seaward rock berm may offer a much more cost effective and less disruptive option. The decision regarding which option will depend upon Network Rail, as they currently are responsible for defences along this unit. Given the exposed location of the railway along this frontage, realignment could be considered in the future. If this is a possibility beyond the next 10 to 20 years, then a more suitable approach would be to continue to carry out remedial works on the current defences. In addition to proactive maintenance and timely patch and repairs to the masonry, it is also possible that additional toe protection may be required, which would most probably take the form of rock armour.
	11e2.3 Parton	No	Hold the current defence line - In the short term, modifying the existing structure (toe protection, raising, repairing) may be adequate for some years. Under this option, the possibility of reducing flood risk through the railway arches should be considered. In the longer term it is likely that there will be a need to construct a new defence. That might take the form of a replacement seawall, or alternatively a seaward rock berm may offer a much more cost effective and less disruptive option. The decision regarding which option will depend upon Network Rail, as they currently are responsible for defences along much of this unit. At Parton, there needs to be joint working between Network Rail and the community in order to find the best solution to protect the railway and the village from flooding.

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
			Given the exposed location of the railway along this frontage, realignment could be considered in the future. If this is a possibility beyond the next 10 to 20 years, then a more suitable approach would be to continue to carry out remedial works on the current defences. In addition to proactive maintenance and timely patch and repairs to the masonry, it is also possible that additional toe protection may be required, which would most probably take the form of rock armour. Even with realignment, there would remain a flood risk to people and property at Parton, but this might be addressed through a setback seawall.
	11e2.4 Parton to Harrington Parks	No	To Hold the line to maintain the railway in the long term, the preferred approach is to provide a formal rock revetment. It is recommended that this is done well in advance of the risk to the railway becoming critical, which it possibly already is in places. However, the decision regarding the approach will depend upon Network Rail, as they currently are responsible for defences along much of this unit.
	11e2.5 Harrington Parks to Harrington Harbour	Possible - depends on contamination risk	The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks from erosion of the former industrial sites. If there is a long term need to Hold the line for large parts of this policy unit, then the most suitable technical approach is to provide a formal rock revetment both along the currently undefended length and over the existing structures. Assuming that the contamination risk is low, the recommended approach here is to continue to maintain defences through pro-active management and monitor erosion to establish if other assets (for example the railway line and Harrington Harbour) might become at risk and revisit policy to intervene if necessary in the medium or long term.
	11e2.6 Harrington Harbour	Possible - depends on contamination risk	The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks from erosion of the former industrial sites. If there is a long term need to Hold the line for large parts of this policy unit, then the most suitable technical approach is to provide a formal rock revetment both along the currently undefended length and over the existing structures. Assuming that the contamination risk is low, the recommended approach here is to continue to maintain defences through pro-active management and monitor erosion to establish if other assets (for example the railway line and Harrington Harbour) might become at risk and revisit policy to intervene if necessary in the medium or long term.
	11e2.7 Harrington to Steel Works Site	No	Hold the line - the socio-economic justification of the SMP2 policy to continue to maintain the existing defences will be enhanced by any future regeneration of the area.
	11e2.8 Steel Works Site	No	Hold the current line, before risk to railway become critical, enabling a buffer to be created. The preferred approach to provide a formal rock revetment along the artificial shoreline of mine waste (slag) to prevent any further erosion. Any final decision will be depend upon Network Rail, as their assets are primarily at risk.
	11e2.9 Steel Works to The Howe	Possible boundary change	Hold the line - the preferred approach (which includes part of 11e2.9) is to construct a formal rock revetment along the undefended lengths of this policy unit where there is a risk to assets, and to replace the existing defences, which are inadequate, with a similar design.
	11e2.10 The Howe to Workington Harbour south breakwater	Possible depending on contamination risk	Unless a contamination risk is identified, then the preferred approach would be to stop any maintenance of current structures and consider reuse of materials elsewhere. Some works to the harbour arm may however be required to ensure its stability and limit any erosion and overtopping risks - this should be considered as part of 11e2.11. If there are contaminant risks identified, then a further assessment of potential options and a review of the SMP policy would need to be considered ahead of implementing measures to Hold the line.
	11e2.11 Workington Harbour	No	Hold the line - maintain and refurbish or upgrade defences when required. It is assumed that maintenance of the harbour structures remains the responsibility of Port of Workington (CCC).

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
e3 Workington to Maryport	11e3.1 Workington Harbour to Siddick	Possible - depends on contamination risk	The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks from erosion of the former industrial sites. Based on existing assets (excluding contamination) at risk there is insufficient justification for contributions from national FCERM funding (BCR <1). If there is a long term need and funding available to Hold the line for large parts of this policy unit (due to contamination or regeneration), then the most suitable technical approach is to replace many of the existing defences with formal rock revetment. If there is a need to maintain protection in places along the current line for only the next 10 to 20 years, then subject to funding the most suitable approach would maintenance and remedial works on the current defences but along much of the frontage there would need to be introduction of additional rock to bolster cliff protection and low tech solutions such as gabions to provide some temporary resistance.
	11e3.2 Siddick to Risehow	No	Hold the current defence line - There are various approaches possible but the preferred approach is to provide a formal rock revetment. This may however need to be higher than the current low bank level to appropriately manage risks from wave overtopping and flooding in the future. It is possible that a phased approach could be applicable, addressing areas of concern as they occur. From the short term, works will be required to maintain the existing defences to allow time for schemes and funding to be developed for the longer term solutions. Beach management may be required to address risk to a United Utilities rising main and to reduce issue of fluvial outfalls becoming blocked.
	11e3.4 Maryport Harbour and Marina	No	Hold the line - continue to maintain the defences and repair as necessary. Monitor beach changes following construction of the refurbished outfall groyne.
e4 Maryport to Dubmill Point	11e4.1 Maryport Harbour to Roman Fort	No	Hold the line - continue to maintain the defences and repair as necessary. In the longer term there may be improvements needed to address any increase in overtopping. There may also been a need for works to address outflanking at junction with 11e4.2. This could involve the construction of a rock revetment constructed along a line further back as the shoreline erodes.
	11e4.2 Roman Fort to Bank End	Possible extension of HTL	Hold the line in short term, with do minimum approach. Consideration of a policy change for extending HTL into the medium term, due to importance of the promenade as part of English coastal path and cycleway, subject to funding and SMP change process.
	11e4.3 Maryport Golf Course to Allonby	No	In the short term, the preferred approach is to do minimum, which will involve reactive works where formal defences currently exist. This should allow time for medium or long term managed realignment adaptation approaches to be investigated and implemented.
	11e4.4 Allonby	No	Do minimum - there are no formal defences present. The dunes and wide shingle beach currently provide sufficient protection to Allonby; whilst this remains the case no intervention is required and the preferred approach is to simply monitor the situation. Should the beach start to reduce in size in the future, works will be required to manage risks to Allonby. Initially, small scale or low cost measures to slow erosion of the dunes and retain them as the primary protection, may be sufficient. If erosion is more extensive, more substantial structures may need to be considered, particularly those that might help retain a beach.
	11e4.5 Allonby to Seacroft Farm	Boundary change, with policy change to MR to allow temporary works in short term	Managed realignment - at the southern end of the frontage, the dune and beach provide sufficient protection; whilst this remain the case no intervention is required and the preferred approach is to monitor the situation. Along the northern 400 m stretch, where the highway and United Utility assets lies close to the shore, the preferred approach would be for localised works to temporarily bolster existing defences, such as rock armour or rock gabions, whilst a longer term solution for this and adjacent units is considered. This could involve extension of the defences at Oldkiln. The intention is that these defences will eventually be removed or allowed to fail once long term plans are in place.

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
	11e4.6 Seacroft Farm to Dubmill Point	Boundary change to include part of 11e4.5	In the short term, the preferred approach to holding the existing line is to improve the existing defence (along its current alignment), through reusing the existing limestone blocks (and new material) to construct a new revetment. This should extend the life of defences 5 to 10 years to manage risk to B5300, whilst medium or long term managed realignment adaptation approaches are investigated. The intention is that these defences will eventually be removed or allowed to fail once long term plans are in place.
e5 Dubmill Point to Silloth	11e5.1 Dubmill Point to Silloth	Possible change to ST policy to HTL	In the short term, the preferred approach to holding the existing line is through localised works to temporary bolster existing defences along two short lengths of the frontage. The intention is that these defences will eventually be removed or allowed to fail once long term plans are in place.
e6 Silloth to The Grune	11e6.1 Silloth Harbour	No	Hold the line by maintaining and refurbishing defences within current footprints.
	11e6.2 Silloth to Skinburness (open coast)	No	Hold the current defence line - In the short term this is likely to involve patch and repair or more proactive management, with no increase in footprint. In longer term, works may be required to the toe if the low water channel continue to move landwards. This would be subject to funding and the precise nature of works would be for scheme appraisal stage. If beaches deteriorate in the longer term the preferred approach, as it would provide the greater chance of realising wider benefits for the community, would be to improve the existing timber groynes or construct new rock groynes to retain a beach. Some renourishment is likely to be required as part of this.
e7 Moricambe Bay	11e7.1 Skinburness (east)	No	Hold the line by maintaining and refurbishing flood embankments within current footprints.
	11e7.2 Skinburness to Wath Farm	No	Hold the line in short term by maintaining and refurbishing flood embankments within current footprints. Monitor changes to extents of marsh and intertidal areas to allow future assessment of the impacts of the existing defence on natural behaviour of the marsh and consider options for future realignment.
	11e7.3 Wath Farm to Saltcoates	No	There are no formal defences on the frontage, with the wide marsh giving natural protection. Environmental opportunities under the MR policy could allow potential for habitat enhancements here to mitigate impacts of defences elsewhere in the designated site.
	11e7.4 Newton Marsh	No	There are no formal defences on the frontage, with the wide marsh giving natural protection. Environmental opportunities under the MR policy could allow potential for habitat enhancements here to mitigate impacts of defences elsewhere in the designated site. Consider opportunities to allow natural expansion of the saltmarsh alongside increasing the flood resilience of the B5307 road in future.
	11e7.5 Newton Marsh to Anthorn including Wampool to NTL	No	Managed realignment through natural defence management - consider opportunities to allow natural expansion of the saltmarsh alongside increasing the flood resilience of the road in future.
	11e7.6 Anthorn	No	Hold the line through natural defence management - there are no formal defences present but the SMP policy allowed for the potential need to introduce defences if the narrow marsh protecting the road and adjacent properties were eroded. If the erosion risk changes, enhancement of the marsh through "green" low cost shoreline stabilisation techniques should be considered first.
	11e7.7 Anthorn to Cardurnock	No	Managed realignment - there are no formal flood defences present along this coast, but earth embankments are present and for much of this stretch the road is on slightly raised ground. - consider opportunities to allow natural expansion of the saltmarsh alongside increasing the flood resilience of the road in future.
e8 Cardurnock to Scottish Border	11e8.1 Cardurnock to Bowness-on-Solway	No	Managed realignment - there are no formal flood defences present along this coast, but earth embankments are present. Consider opportunities to allow natural expansion of the saltmarsh alongside increasing the flood resilience of the road in future.

Unit Area	Policy Unit	Policy change proposed?	Preferred Strategic Approach
	11e8.2 Bowness-on-Solway	Yes to HTL	Hold the current defence line - In the short term this is likely to involve patch and repair of existing defences, with no increase in footprint. In the longer term, works may be required to the toe if the low water channel continues to move landwards. This would be subject to funding and the precise nature of works would be for scheme appraisal stage. It is most likely that it will involve either shoreface works to bolster existing defences or a new larger structure. There may also be a need to extend the defence eastwards alongshore to provide protection to United Utilities assets and coastal road in 11e8.3
	11e8.3 Bowness-on-Solway to Drumburgh	Yes - change in boundary	Managed realignment - there may be a need to move the SMP boundary with 11e8.2 to the east to include protection to the coastal road and United Utilities assets. Green solutions and natural defence management to be considered if erosion protection is required to the road.
	11e8.4 Drumburgh to Dykesfield	No	Managed realignment - manage risks due to increasing frequency of flooding to coastal road with warning signage. Consider green solutions to erosion protection and enhancement of the natural protection provided by the marsh alongside potential environmental enhancements to create more wetland.
	11e8.5 Dykesfield to Kingmoor (Eden NTL)	No	Managed realignment - no formal coastal or flood defences present but private earth embankments are present in places. Environmental opportunities under the MR policy could allow potential for habitat enhancements here to mitigate impacts of defences elsewhere in the designated site.
	11e8.6 Kingmoor to Rockcliffe	No	Managed realignment - no formal coastal or flood defences present but private earth embankments are present in places. Environmental opportunities under the MR policy could allow potential for habitat enhancements here to mitigate impacts of defences elsewhere in the designated site.
	11e8.7 Rockcliffe	No	Given the limited properties at risk from flooding, there is limited economic justification for construction of new embankments and a more suitable approach is the introduction of temporary defences or individual adaptation measures to minimise flood risk. Should residents wish to finance a more permanent solution, the preferred approach would be a set embankment (either earth or low flood wall) adjacent to the road. It is not anticipated that this would be undertaken in next 10 years
	11e8.8 Rockcliffe to Demesne Farm	No	Managed realignment - monitoring and management of risk to the minor road, with closure when becomes unsafe.
	11e8.9 Demesne Farm to Metal Bridge (Esk)	No	Managed realignment - there are privately managed embankments protected by extensive saltmarsh. Environmental opportunities under the MR policy could allow potential for habitat enhancements here to mitigate impacts of defences elsewhere in the designated site.
	11e8.10 Metal Bridge (Esk) to the River Sark	No	Managed realignment -with potential to hold the line at a set back location in future to manage flood risk to the railway and roads. Environmental opportunities under the MR policy could allow potential for habitat creation here to mitigate impacts of defences elsewhere in the designated site.

2 Screening

2.1 Screening of MCZs

The following MCZs and possible candidate/proposed MCZ sites lie within or adjacent to the Strategy area, or which are potentially capable of being affected by the Strategy:

- Ribble Estuary
- Fylde
- Wyre-Lune
- West of Walney
- Cumbria Coast
- Allonby Bay
- Solway Firth

A precautionary approach has been taken within this report by considering all of the potential designated features of the relevant MCZs, and the processes upon which they rely, prior to any screening out of MCZ sites or their protected features.

Table 2.1 presents the MCZs considered in this assessment, summarising the qualifying features that have the potential to be affected by the Strategy and identifying whether a MCZ has been screened out of further assessment. These are where no potential connectivity or pathway for a likely significant effect to occur has been identified.

2.2 Screening of policy units

Non-priority policy units where the SMP policy is no active intervention, and the Strategy does not propose a change in this policy, have been screened out.

The following policy areas (and associated policy units) have been screened out of the assessment as they lie over 20 km from any MCZ and there is no known pathway for connectivity:

- Policy unit 11c8 Heald Brow to Humphrey Head (Grange over Sands)
- Policy unit 11c9 – Kent Estuary
- Policy unit 11c10 - Humphrey Head to Cark
- Policy unit 11c11 – Outer Leven Estuary
- Policy unit 11c12 – Leven Estuary
- Policy unit 11c13.1 – Bardsea to Newbiggin
- Policy unit 11c15.1 – 11c15.2– Rampside to Hindpool

We have also screened out additional policy units, which lie outside the direct zone of connectivity with particular MCZs, as follows:-

- West of Walney Island MCZ – policy units in the inner Duddon Estuary and eastern side of Walney Island have been screened out of further assessment (despite being located within 20km) as there is not considered to be any connectivity with the MCZ. Those policy units that have been screened out comprise:
 - Policy units on the eastern side of Walney Island – 11c14.1 and 11c14.2

- Policy units in the inner Duddon Estuary – 11c16.2, 11c16.3, 11c16.4, 11c16.5, 11c16.7, 11c16.8, 11c16.9 and 11c16.10
- Allonby Bay MCZ – policy units lying to the south of this MCZ (within 20 km) have been screened out of further assessment as there is no potential for effects on wave exposure or coastal processes further south, and those units to the north of Dubmill Point, where there is no potential for connectivity. Those policy units that have been screened out comprise:
 - Policy units to the south of the MCZ - 11e2.3, 11e2.4, 11e2.6, 11e2.7, 11e2.8, 11e2.9, 11e2.10, 11e2.11, 11e3.1, 11e3.2, 11e3.4.
 - Policy units to the north of Dubmill Point – 11e6.1, 11e6.2, 11e7.1, 11e7.2, 11e7.3
- Solway Firth MCZ – policy units along the open coast to the south of this MCZ (within 20 km) have been screened out of the further assessment. Works along these frontage are unlikely to either directly or indirectly affect the presence or condition of potential spawning smelt habitat within the MCZ, which tends to be within the lower reaches of rivers on gravels, macrophytes and mosses in the area immediately above the tidal limit. Nor are works expected to impact on the coastal feeding habitat of smelt. Those policy units that have been screened out comprise:
 - Policy units to the south of the MCZ - 11e4.3, 11e4.4, 11e4.5, 11e4.6, 11e5.1, 11e6.1 and 11e6.2.

Figure 3.1 MCZ sites within the Strategy area that have been screened in for further assessment.

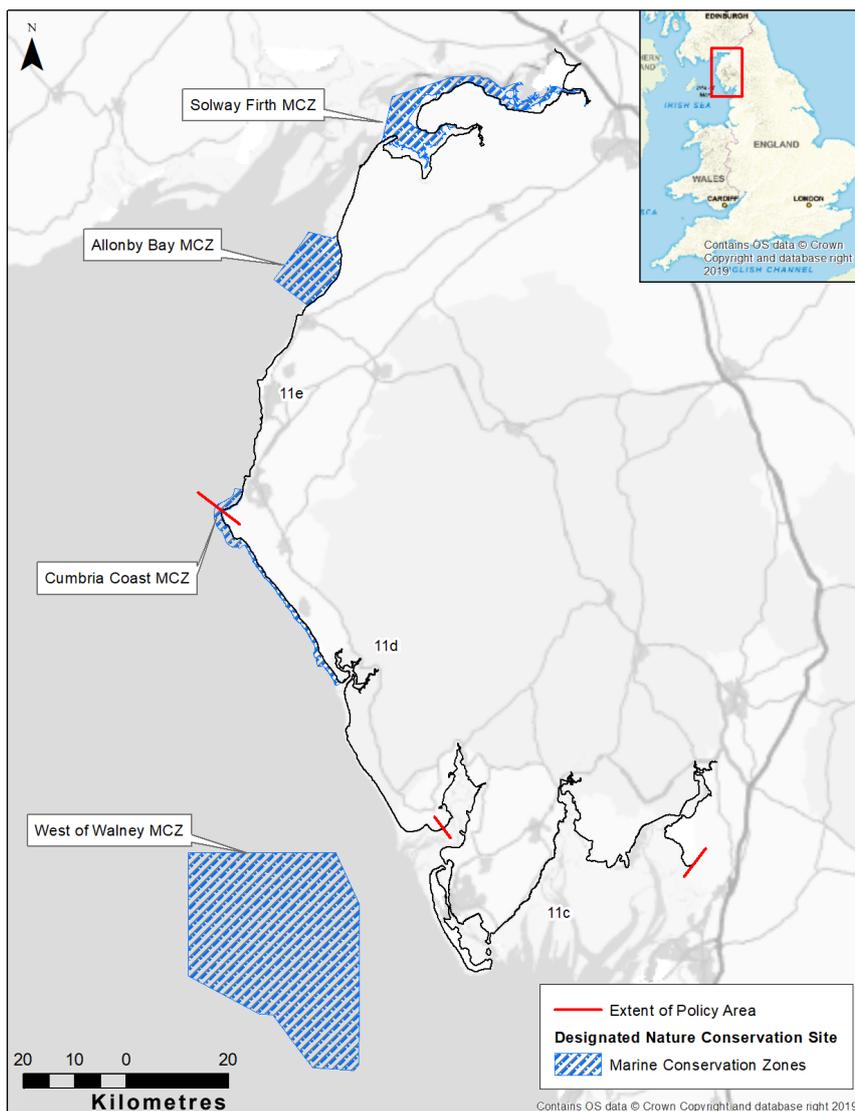


Table 2.1 Screening of Marine Conservation Zones

Marine Conservation Zone name	Qualifying features likely to be sensitive to the Cumbria Coastal Strategy being assessed	Management approach/conservation objectives	Screening In (✓) or Out (x)	Decision for screening out (where applicable)
Fylde	Subtidal sand	Maintain in favourable condition	x	Located over 20 km to the south of the site and no potential for the subtidal features to be affected by the Strategy proposals.
	Subtidal mud	Maintain in favourable condition	x	
Ribble Estuary	Smelt (<i>Osmerus eperlanus</i>)	Recover to favourable condition.	x	This site has been screened out. Flood and coastal erosion risk management activities have been stated to not be damaging the features to be protected, based on current levels of intensity (Defra 2018). Smelt are known to congregate in large shoals in lower estuaries and migrate into freshwater where they spawn in spring. However, due to distance from the site the Strategy proposals therefore have no potential to impact on the critical habitat.
Wyre Lune	Smelt (<i>Osmerus eperlanus</i>)	Recover to favourable condition.	x	This site has been screened out. Flood and coastal erosion risk management activities have been stated to not be damaging the features to be protected, based on current levels of intensity (Defra 2018). Smelt are known to congregate in large shoals in lower estuaries and migrate into freshwater where they spawn in spring. However, due to distance from the site the Strategy proposals therefore have no potential to impact on the critical habitat.
West of Walney	Seapens and burrowing megafauna	Maintain in favourable condition if already in favourable condition. Or bring into favourable condition if not already, such that: 1. extent is stable or increasing, 2. structure and functions, quality, and the composition of characteristic biological communities (including diversity and abundance of species forming part or inhabiting the habitat) are sufficient to ensure that condition remains healthy and does not deteriorate.	✓	Within or adjacent to the Strategy area and coastal development, flood and erosion risk management schemes and beach management are operations listed as having the potential to affect this MCZ.
	Subtidal sand		✓	
	Subtidal mud		✓	
Cumbria Coast	Intertidal biogenic reefs	Maintain in favourable condition.	✓	

Marine Conservation Zone name	Qualifying features likely to be sensitive to the Cumbria Coastal Strategy being assessed	Management approach/conservation objectives	Screening In (✓) or Out (x)	Decision for screening out (where applicable)
	Intertidal sand and muddy sand		✓	Within or adjacent to the Strategy area and coastal development, flood and erosion risk management schemes and beach management are operations listed as having the potential to affect this MCZ.
	High energy intertidal rock		✓	
	Moderate energy infralittoral rock		✓	
	Honeycomb worm (<i>Sabellaria alveolate</i>) reef		✓	
	Intertidal underboulder communities		✓	
	Peat and clay exposures		✓	
Allonby Bay	Low energy intertidal rock	Maintain in favourable condition.	✓	This inshore site lies within the Strategy area and therefore has been screened into the assessment. Although coastal defence activities have been stated by Defra as unlikely to be damaging to the features to be protected, based on current levels of intensity (Defra 2018), there is potential for the Strategy to change coastal management policy interventions at this location.
	Moderate energy intertidal rock		✓	
	High energy intertidal rock		✓	
	Intertidal biogenic reefs		✓	
	Intertidal coarse sediment		✓	
	Intertidal sand and muddy sand		✓	
	Moderate energy infralittoral rock		✓	
	Subtidal biogenic reefs		✓	
	Subtidal coarse sediment		✓	
	Subtidal mixed sediments		✓	
	Subtidal sand		✓	
	Peat and clay exposures		✓	
	Blue mussel (<i>Mytilus edulis</i>) beds		✓	
	Honeycomb worm (<i>Sabellaria alveolate</i>) reefs		✓	

Marine Conservation Zone name	Qualifying features likely to be sensitive to the Cumbria Coastal Strategy being assessed	Management approach/conservation objectives	Screening In (✓) or Out (x)	Decision for screening out (where applicable)
Solway Firth	Smelt (<i>Osmerus eperlanus</i>)	Recover to favourable condition.	✓	<p>This inshore site lies within the Strategy area and therefore has been screened into the assessment.</p> <p>Although coastal defence activities have been stated by Defra as unlikely to be damaging to the features to be protected, based on current levels of intensity (Defra 2018), there is potential for the Strategy to change coastal management policy interventions at this location. Smelt has been recorded at locations near Bowness on Solway and Glasson.</p>

3 Assessment of significant effects

The tables below present for each screened in MCZ:

- the preferred strategic approaches (and relevant screened in policy units) that could impact the MCZ;
- the relevant MCZ features and what processes they are reliant on;
- the location of the features relative to where works could be undertaken as a result of the preferred strategic approaches;
- the potential impact of the preferred strategic approaches;
- where a potential impact has been recognised, recommended management, mitigation and measures of equivalent environmental benefit

Table 3.1 West of Walney MCZ

West of Walney MCZ			
<p>11c13.2 Newbiggin to Rampside: Hold the line through proactive management (<10 years). Hold the line - improve through reinforcing with rock armour or concrete overlays and possibly by increasing crest level (>10 years). Possible small scale regulated tidal exchange scheme, to provide compensatory habitat, but this would require further study.</p> <p>11c13.3 Rampside: NAI - unless exposure of defence increases, then maintain through reinforcing existing defences (<10yrs); HTL: improve existing defences if fringing marsh diminishes (>10yrs).</p> <p>11c13.4 Roa Island: HTL (<10yrs) until a decision can be made on the best approach in the medium to longer term, based on impact on designated sites and further studies.</p> <p>11c14.4 Hillock Whins to Hare Hill, Walney Island: Works to repair bund if subject to storm damage (<10 years). Cumbria County Council developing a long term solution - options not known at this stage (>10 years).</p> <p>11c14.5 Nanny Point Scar to Hillock Whins/ Biggar to Tummer Hill, Walney Island: Do minimum involving the relocation of landfill site and creation of a stockpile to be used for maintaining and repairing the defences (<10 years)</p> <p>11c14.7 Earnse Point to Walk Haw Scar, Walney Island: Maintenance of defences north of the fishtail groyne and maintenance of remaining defences to extend life (<10 years); possible need to revisit design of groyne at Earnse Point to the south of frontage and replace existing rock in different configuration. Prior to removal of the temporary defences at West Shore Park, review future of Earnse Point fishtail groyne as part of future managed realignment policy for the frontage to the north. (>10 years). After 20 years, remove temporary defences at West Shore Park.</p> <p>11c16.11 Hodbarrow Mains: Do nothing (<10 years), but undertake studies to improve understanding of flood links to the wider South Millom area. This may identify a need to construct set back flood embankments to manage flood risk to flood assets in Millom (>10 years).</p> <p>11d1.1 Hodbarrow Point to Haverigg: Do minimum through minor repairs (<10 years); Hold the line - maintain through proactive maintenance (>10 years) but consider potential for managed realignment of the Outer Barrier in the longer term.</p> <p>11d1.2 Haverigg: Repairs/remedial works to existing defences (<10 years); Continue to HTL (>10yrs) to protect Haverigg unless the dune system to the west of the rock revetment erodes, in which case realign the defence landwards (i.e. MR) to reduce erosion of the dunes from outflanking (to maintain the current level of protection against flooding).</p> <p>11d1.4 Silecroft (Hartrees Hill): Repairs/remedial works to existing private defences (<10 years); Should erosion rates accelerate in the future, these may become increasingly exposed and difficult to retain. At this time, the potential for setting back the defences should be considered (>10 years).</p> <p>11d2.2 Stubb Place to Eskmeals Dunes: Hold the line by improving existing defence (along its current alignment), through reusing Pendine blocks (<10 years), with possible relocation of the road in the longer term (>10 years). Along the stretch of coast north of the MoD boundary to Eskmeals Range it is assumed that QinetiQ will continue to manage risk to the Eskmeals Range, through localised reprofiling of the shingle ridge when required.</p>			
MCZ feature	Location relative to Strategy	Potential to affect MCZ features/ processes	Management, mitigation and measures of equivalent environmental benefit
Seapens and burrowing megafauna	The seapens and burrowing megafauna are not present within the immediate Strategy area but occur on the subtidal mud habitats, 8 km offshore from Walney Island.	<p>No works are proposed offshore and therefore would not impact directly on these mounds and burrows on the seabed.</p> <p>In the short-term (<10 years), minimal works will be undertaken with general maintenance and repair works, which will have no impact on subtidal mud habitats.</p> <p>In the longer term, managed realignment may be considered in some areas, with the intention of habitat improvement. This habitat has not been identified to be sensitive to managed realignment by Natural England in their 'advice on operations'.</p> <p>No known impacts on seapens and burrowing megafauna nor their MCZ conservation objectives.</p>	N/A

Subtidal sand and mud	These subtidal habitat types do not occur in the immediate Strategy area but are located approximately 8 km offshore from Walney island.	<p>No works are proposed offshore and therefore would not impact directly on subtidal sand and mud or its biological communities.</p> <p>In the short-term (<10 years), minimal works will be undertaken with general maintenance and repair works, which will have no impact on subtidal sand and mud habitats.</p> <p>In the longer term, managed realignment may be considered in some areas, with the intention of habitat improvement. The scale of managed realignment considered along the open coast is not anticipated to affect subtidal habitats as minimal changes to the coastal dynamics are expected with no impact on the existing sediment-rich and turbid environment.</p> <p>No known impacts on subtidal sand and mud nor their MCZ conservation objectives</p>	N/A
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Table 3.2 Cumbria Coast MCZ

Cumbria Coast MCZ
<i>11d1.4 Silecroft (Hartrees Hill): Hold the line through remedial works to existing defences, subject to defences causing no adverse effects on sediment movement or coastal processes</i>
11d2.2 Stubb Place to Eskmeals Dunes: <i>Hold the line by improving existing defence (along its current alignment), through reusing Pendine blocks (<10 years), with possible relocation of the road in the longer term (>10 years). Along the stretch of coast north of the MoD boundary to Eskmeals Range it is assumed that QinetiQ will continue to manage risk to the Eskmeals Range, through localised reprofiling of the shingle ridge when required.</i>
<i>11d3.1 Eskmeals Dunes to Ravenglass: Localised HTL - works to railway embankment in longer term.</i>
<i>11d3.2 Ravenglass: Hold the line by maintaining existing defences, with refurbishments within current footprints.</i>
11d5.1 Seascale: <i>Maintain defence line (<10 years); improve existing defences (>10 years)</i>
11d5.2 Seascale to Sellafield: <i>Hold the line through improving existing defences (<10 years). Hold the line - improve through constructing new revetments or seawalls (>10 years)</i>
11d5.3 Sellafield: <i>Hold the line through proactive maintenance (<10 years). Hold the line - improve through constructing new revetments or seawalls (>10 years)</i>
11d5.4 Sellafield to Braystones: <i>Hold the line through proactive maintenance (<10 years). Hold the line - improve through constructing new revetments or seawalls behind the beach crest properties (protect railway only) (>10 years)</i>
11d5.5 Braystones, Nethertown and Couderton: <i>Hold the line through proactive maintenance (<10 years). Hold the line - improve through constructing new revetments or seawalls behind the beach crest properties (protect railway only) (>10 years)</i>
11d5.6 Couderton to Seamill: <i>Hold the line through proactive maintenance (<10 years). Hold the line - improve through constructing new revetments or seawalls (>10 years)</i>
11d5.7 Seamill to Pow Beck: <i>Hold the line - upgrade existing defences (<10 years). Hold the line - improve through construction of new revetment (rock armour) (>10 years)</i>
11d6.2 St Bees Promenade: <i>Hold the line (<50 years) by prolonging life of the promenade (e.g. additional rock toe works, and possibly maintaining existing groynes. Toe works may be needed. Realign defences to a set-back position (>50 years).</i>
<i>11e1.2 Saltom Pit: HTL to protect Scheduled Monument of Saltom Pit for as long as technically and economically viable (short to medium-term). It is unlikely that this will be possible long term.</i>
11e1.4 Whitehaven South Beach: <i>Hold the line (<10 years), but longer term approach dependent on outcome of studies to investigate potential contamination risks from erosion of industrial spoil.</i>
11e2.2 Bransty to Parton: <i>Hold the line by modifying the existing structure (toe protection, raising, repairing) (<10 years). In the longer term it is likely that there will be a need by Network Rail to construct a new defence; possibly a replacement seawall or seaward rock berm.</i>
11e2.3 Parton: <i>Hold the line by modifying the existing structure (toe protection, raising, repairing) (<10 years). In the longer term it is likely that there will be a need by Network Rail to construct a new defence; possibly a replacement seawall or seaward rock berm.</i>
11e2.4 Parton to Harrington Parks: <i>Hold the line to maintain the railway in the long term by a rock revetment. Approach and timing will depend upon Network Rail, as they currently are responsible for defences along much of this unit.</i>
11e2.5 Harrington Parks to Harrington Harbour: <i>The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks from erosion of the former industrial sites. If there is a long term need to Hold the line for large parts of this policy unit, then likely rock revetment along the currently undefended length and over the existing structures. Assuming that the contamination risk is low, the recommended approach here is to continue to maintain defences through pro-active management and monitor erosion.</i>
<i>11e2.6 Harrington Harbour: Hold the line by maintaining the existing defences (<10 years). Hold the line by maintaining and upgrading the existing defences (>10 years). Harbour works are the responsibility of Harrington Harbour.</i>
11e2.7 Harrington to Steel Works Site: <i>Hold the line before risk to railway becomes critical, enabling a buffer to be created. Provision of a rock revetment along the artificial shoreline of mine waste (slag) to prevent further erosion. Any final decision will depend upon Network Rail, as their assets are primarily at risk.</i>
11e2.8 Steel Works Site: <i>Hold the line by constructing a formal rock revetment along the undefended lengths of this policy unit where there is a risk to assets, and to replace the existing defences, which are inadequate, with a similar design.</i>

11e2.9 Steel Works to The Howe: See above for southern part of this unit. Unless a contamination risk is identified, then cease maintenance of current structures. If there are contaminant risks, further assessment of options will be required prior to Hold the line.

11e2.10 The Howe to Workington Harbour south breakwater: Unless a contamination risk is identified, cease maintenance of current structures. Some works to harbour arm may be required to ensure its stability and limit erosion and overtopping risks. If there are contaminant risks, further assessment of options will be required prior to Hold the line.

11e2.11 Workington Harbour: Hold the line by maintaining the existing defences (<10 years). Hold the line by maintaining and upgrading the existing defences (>10 years).

11e3.1 Workington Harbour to Siddick: Hold the line by maintaining the existing defences (<10 years). The approach from the medium term depends upon the outcome of studies to investigate potential contamination risks.

11e3.2 Siddick to Risehow: Hold the line the existing defences to allow time for schemes to be developed for the longer term solutions (<10 years). Hold the line by providing a formal rock revetment (>10 years): this may need to be higher than the current low bank level. A phased approach could be applicable, addressing areas of concern as they occur.

11e3.4 Maryport Harbour and Marina: Hold the line (<10 years) by maintaining the defences and repair as necessary. Monitor risk after the construction of the refurbished outfall groyne (ongoing at time of Strategy).

MCZ feature	Location relative to Strategy	Potential to affect MCZ features/ processes	Management, mitigation and measures of equivalent environmental benefit
Intertidal biogenic reefs Honeycomb worm (<i>Sabellaria alveolate</i>) reef	Ross worm (<i>Sabellaria spinulosa</i>) is not known to be present within the immediate Strategy area although they are present offshore between Drigg and Seascale and (11e.4.1 and 11e5.1) South of St Bees Head (11e4.1, 11e5.1 – 11e5.7, 11e6.1, 11e6.2), the intertidal boulder and cobble reef ‘scars’ support honeycomb worm (<i>Sabellaria alveolate</i>) reefs along the coastal frontage of the Strategy area within the MCZ. There are particular aggregations around the southern part of St Bees Head down to Nethertown, and also at Barn Scar near Drigg.	Both <i>Sabellaria spinulosa</i> and <i>Sabellaria alveolate</i> are particularly sensitive to substratum loss, as once dislodged, the individual worms cannot rebuild their tubes. Within the next 10 years, along much of the frontage ‘hold the line’ will be implemented through maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to ‘hold the line’, new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward at some locations. This has the potential to directly impact on <i>Sabellaria alveolate</i> reefs that extend into the intertidal and is particularly the case along the coastline south of St Bees Head. The <i>Sabellaria spinulosa</i> reefs are understood to lie further offshore, so are unlikely to be directly impacted. Potential impacts on biogenic reefs in Cumbria Coast MCZ in the medium to long-term from implementation of HTL NAI will allow the coastline to evolve under natural processes which will not affect the condition of these dynamic marine habitats. Neither NAI nor MR are anticipated to affect water quality nor sediment distribution and dispersion. No known impacts on reefs in Cumbria Coast MCZ from implementation of NAI/MR	Implementation of the Strategy, which involves works that extend the footprint of the defences seaward will be designed to avoid encroachment on the reef habitats. Mapping of the features to enable avoidance should be undertaken as part of the preliminary design stage. Additionally, works will only be implemented where it can be demonstrated that they will not affect sediment deposition at the reefs nor reduce water quality, which may affect the extent, spatial distribution, supporting habitat and species of the reef communities.
Intertidal sand and muddy sand	These habitats are present along the Strategy frontage within the MCZ.	It should be noted that the location of intertidal sand and muddy sand is variable from year to year due to the mobility of beach sand resulting in sediment veneers which intermittently cover and expose intertidal rock. Within the next 10 years, along much of the frontage, ‘hold the line’ will be implemented through maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to ‘hold the line’ new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to directly impact on some intertidal sand and mud habitats but generally on the upper beaches where	Any intertidal sand and muddy sand losses that occur in the longer term will be small and only occur where the defence footprint extends seaward a few metres and where this habitat is present. As there is some uncertainty in how the long-term strategy will be implemented and the exact location of this MCZ habitat, avoidance measures,

		<p>the works will be undertaken, the habitat is shingle. As these defences will be linear, there is not expected to be a significant impact on the mobility of the sand across the beach. The key exception is at 11e6.2, where cross-shore structures may be maintained (subject to further studies), which would continue to impact on sediment transport and may result in additional sediment build up.</p> <p>Potential impacts on intertidal sand and mud in Cumbria Coast MCZ in the medium to longer-term.</p>	<p>as well as mitigation and management measures will require re-assessment and consideration at the next Strategy review and at project level, if and when the longer-term schemes are progressed.</p>
High energy intertidal rock	<p>Largely found offshore from Drigg at Barn Scar (11d4.1 and at St Bees (11d7.1, 11e1.1), but also present in variable quantities all along the coast.</p>	<p>11d4.1, 11d7.1 and 11e1.1 have been screened out of appraisal as the Strategy approach of do nothing implements the current SMP policy of no active intervention; therefore there are no known significant impacts at these locations.</p> <p>Elsewhere along the frontage, high-energy intertidal rock may be occasionally exposed. Exposure is naturally variable from year to year due to the mobility of beach sand resulting in sediment veneers which intermittently cover and expose intertidal rock.</p> <p>Within the next 10 years, along much of the frontage, 'hold the line' will be implemented through maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line' new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to directly impact on some intertidal rock habitats but generally on the upper beaches where the works will be undertaken, the habitat is shingle. As these defences will be linear, there is not expected to be a significant impact on the mobility of the sand across the beach. The key exception is at 11e6.2, where cross-shore structures may be maintained (subject to further studies), which would continue to impact on sediment transport and may result in additional sediment build up.</p> <p>Potential impacts on high energy intertidal rock in Cumbria Coast MCZ in the medium to longer-term.</p>	<p>Any impact on high energy intertidal rock that occur in the longer term will be small and only occur where the defence footprint extends seaward a few metres and where this habitat is present. As there is some uncertainty in how the long-term strategy will be implemented and the exact location of this MCZ habitat, avoidance measures, as well as mitigation and management measures will require re-assessment and consideration at the next Strategy review and at project level, if and when the longer-term schemes are progressed.</p>
Moderate energy infralittoral rock	<p>Good examples are found around St Bees Head (11d7.1 and 11e1.1) on the red sandstone rock platforms and boulders, and also offshore at Kokoarrah Rocks (offshore of 11d4.1) on the boulders and cobble reef</p>	<p>No works are proposed offshore or at St Bees Head (11d7.1 and 11e1.1) (these policy units have been screened out) and there will be no direct impacts on infralittoral rock.</p> <p>No known impacts on moderate energy infralittoral rock in Cumbria Coast MCZ</p>	N/A
Intertidal under boulder communities	<p>St Bees Head (11d7.1 and 11e1.1) supports the best examples of rocky shore and important intertidal boulder communities. Natural England has also confirmed that this feature is found at Barn Scar and Kokoarrah Rocks (11d4.1).</p>	<p>No works are proposed at St Bees Head (11d7.1 and 11e1.1) or at 11d4.1 (these policy units have been screened out). Therefore there will be no direct impacts on this habitat.</p> <p>No known impacts on intertidal under boulder communities in Cumbria Coast MCZ</p>	N/A

Peat and clay exposures	Small exposures on the upper shore occur across the MCZ.	<p>Exposure is naturally variable from year to year due to the mobility of beach sand resulting in sediment veneers which intermittently cover and expose peat and clay exposures.</p> <p>Within the next 10 years, along much of the frontage, 'hold the line' will be implemented through maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line' new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to directly impact on some peat and clay exposures but generally on the upper beaches where the works will be undertaken, the habitat is shingle. As these defences will be linear, there is not expected to be a significant impact on the mobility of the sand across the beach. The key exception is at 11e6.2, where cross-shore structures may be maintained (subject to further studies), which would continue to impact on sediment transport and may result in additional sediment build up locally.</p> <p>Potential impacts on peat and clay exposures in Cumbria Coast MCZ in the medium to longer-term.</p>	<p>As there is some uncertainty in how the long-term strategy will be implemented and the exact location of this MCZ habitat, avoidance measures, as well as mitigation and management measures will require re-assessment and consideration at the next Strategy review and at project level, if and when the longer-term schemes are progressed.</p> <p>This needs to specifically focus on how any new defences could affect the movement and accretion of sediment on the foreshore, with further assessment of how these changes could affect peat and clay exposures.</p>
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Table 3.3 Allonby Bay MCZ

Allonby Bay MCZ			
<p>11e4.1 Maryport Harbour to Roman Fort: Hold the line by maintaining the defences and repair as necessary (<10 years). Works to address any increase in overtopping risk may be required in the longer term (>10 years).</p> <p>11e4.2 Roman Fort to Bank End: HTL through do minimum (<10yrs). Longer term approach will depend upon plans for the cycleway, but it is unlikely that substantial works would be economically justified.</p> <p>11e4.3 Maryport Golf Course to Allonby: Do minimum (<10yrs), with reactive works where formal defences currently exist. This should allow time for managed realignment and associated adaptation measures required to be investigated and implemented (>10yrs).</p> <p>11e4.4 Allonby: HTL but through do nothing and monitoring (<10yrs); MR construct erosion slowing defences, but possible need for set back structures if risk increases (>10yrs).</p> <p>11e4.5 Allonby to Seacroft Farm: Managed realignment at the southern end of the frontage, here the dune and beach provide sufficient protection; whilst this remain the case no intervention is required and the preferred approach is to monitor the situation. Along the northern 400 m stretch, where the highway and United Utilities assets lies close to the shore, localised works to temporarily bolster existing defences, such as rock armour or rock gabions, whilst a longer term solution for this and adjacent units is considered. Possible extension of the defences at Oldkiln.</p> <p>11e4.6 Seacroft Farm to Dubmill Point: Hold the line by improving the existing defence (along its current alignment), through reusing the existing limestone blocks (and new material) to construct a new revetment (<10yrs). This should extend the life of defences 5 to 10 years, whilst longer term realignment options (and relocation of road) are considered.</p> <p>11e5.1 Dubmill Point to Silloth: Hold the line by improving defence (along its current alignment), through construction of a new revetment (<10yrs). This will allow time for longer term realignment options (and relocation of road) to be considered.</p>			
MCZ feature	Location relative to Strategy	Potential to affect MCZ features/ processes	Management, mitigation and measures of equivalent environmental benefit
Low, medium and high energy intertidal rock	Exposures occur throughout MCZ, offshore from Allonby (11e4.4)	No direct impacts on rocky intertidal habitat are anticipated as any works along the Allonby frontage would be along the back of the beach or setback from the existing shoreline. No known impacts on intertidal rock in Allonby Bay MCZ.	N/A
Intertidal biogenic reefs Subtidal biogenic reefs	Throughout the intertidal area of the MCZ, which extends from just north of Maryport to Dubmill Point.	Both <i>Sabellaria spinulosa</i> and <i>Sabellaria alveate</i> are particularly sensitive to substratum loss, as once dislodged, the individual worms cannot rebuild their tubes. Within the next 10 years, along much of the frontage 'hold the line' will be implemented by maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line', new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to directly impact on reefs that extend into the intertidal, but reefs that lie further offshore are unlikely to be directly impacted. As these defences will be linear, there is not expected to be a significant impact on the mobility of the beach sediments. The potential for longer term realignment of the coast around Dubmill Point has potential to improve the habitat. Potential impacts on intertidal reefs in Allonby Bay MCZ	Implementation of the Strategy, which involve works that extend the footprint of the defences seaward will be designed to avoid encroachment on the reef habitats. This will include construction activities that may require beach access. Additionally, works will only be implemented where it can be demonstrated that they will not affect sediment deposition at the reefs nor reduce water quality, which may affect the extent, spatial distribution, supporting habitat and species of the reef communities. This needs to specifically focus on how any new

			<p>defences could affect the movement and accretion of sediment on the foreshore.</p> <p>It is also recommended that survey/mapping of this habitat on a good spring tide should be undertaken as part of the preliminary design stage.</p>
Intertidal coarse sediment, sand and muddy sand	There are scattered areas at the northern (adjacent to 11e4.4 to 4.6) and southern extremities (11e4.2) of the MCZ intertidal areas.	<p>At the southern end of the MCZ (11e4.2) the defences are constructed on bedrock. In the next 10 years, works are likely to be within the footprint of the existing defences. In the longer term works may be required to address overtopping risk, such as crest raising of existing defences, but these may not extend the footprint.</p> <p>At Allonby, works would only be undertaken if there is loss of the fronting dunes – this is not anticipated to be the situation within the next 10 years. Any works undertaken would be at the back of the beach and therefore impacts on these habitats would be minimised.</p> <p>Around Dubmill Point, works in the next 10 years to ‘hold the line’ may involve increasing the footprint of defences or constructing new defences, which has the potential to directly impact on intertidal coarse sediment, sand and mud habitats. But as these defences will be linear, there is not expected to be a significant impact on the mobility of the beach sediments. At Dubmill Point investigations are underway to consider longer term managed realignment, which would involve relocation of the road. This would have potential benefits for this MCZ qualifying feature (as well as other MCZ habitats).</p> <p>Potential impacts on intertidal coarse sediments, sand and muddy sand in Allonby Bay MCZ in the short term to long-term from HTL around Dubmill Point. Potential improvements in longer term.</p>	<p>Any intertidal sediment, sand and muddy sand losses that occur in the longer term will be small and only occur where the defence footprint extends seaward a few metres and where this habitat is present.</p> <p>As there is some uncertainty in how the long-term strategy will be implemented and the exact location of this MCZ habitat, avoidance measures, as well as mitigation and management measures will require re-assessment and consideration at the next Strategy review and at project level, if and when the longer-term schemes are progressed. This needs to specifically focus on how any new defences could affect the movement and accretion of sediment on the foreshore.</p> <p>It is also recommended that survey/mapping of this habitat on a good spring tide should be undertaken as part of the preliminary design stage.</p>
Moderate energy infralittoral rock	There are is an area of this habitat at the southern extremity (11e4.2) of the MCZ intertidal areas.	<p>Although the policy at 11e4.2 is hold the line, the Strategy recommends that this is through maintaining and repairing the existing seawall. Longer term plans are uncertain but it is unlikely that substantial works along this frontage would be economically justified.</p> <p>No known impacts on moderate energy infralittoral rock in Allonby Bay MCZ</p>	N/A
Subtidal coarse sediment, mixed sediments and sand	Location unknown.	No works are proposed offshore and therefore no direct impacts on subtidal sediments are anticipated.	N/A

		<p>No works are proposed that are anticipated to affect subtidal habitats as these would be along the toe of existing defences and therefore are not expected to affect wider coastal dynamics of this sediment-rich and turbid system (which exhibits natural variability).</p> <p>No known impacts on subtidal sediments in Allonby Bay MCZ</p>	
Peat and clay exposures	Small scattered areas along the frontage of the MCZ.	<p>Within the next 10 years, along much of the frontage 'hold the line' will be implemented by maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line', new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to impact on these exposures directly. However, as the defences will be linear, there is not expected to be a significant impact on the mobility of the beach sediments.</p> <p>Potential impacts on exposures in Allonby Bay MCZ.</p>	<p>Any works to HTL where improvement works extend to the intertidal area will be designed to avoid encroachment on peat and clay exposures. This needs to specifically focus on how any new defences could affect the movement and accretion of sediment on the foreshore.</p> <p>It is also recommended that survey/mapping of this habitat on a good spring tide should be undertaken as part of the preliminary design stage.</p>
Blue mussel (<i>Mytilus edulis</i>) beds	Continuous beds extending throughout much of the northern and central part of the intertidal area of the MCZ, and scattered beds along the southern frontage.	<p>Within the next 10 years, along much of the frontage 'hold the line' will be implemented by maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line', new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to result in the physical loss of this habitat and direct removal of part of the mussel beds. However, it is not envisaged that the disturbance from the proposed coastal management activities will have negative effects on mussel stocks, which may potentially benefit from new rock structures and new voids to occupy. It should also be noted that mussel scars are quite ephemeral, with highly variable extent and location (and they are affected by storm events).</p> <p>Potential impacts on mussel beds in Allonby Bay MCZ.</p>	<p>Any works to implement hold the line which extend to the intertidal area will be designed to avoid the loss of extensive mussel beds and to avoid any damage that could affect their function or provision of ecosystem services. This needs to specifically focus on how any new defences could affect the movement and accretion of sediment on the foreshore.</p> <p>It is also recommended that survey/mapping of this habitat on a good spring tide should be undertaken as part of the preliminary design stage.</p> <p>Opportunities for habitat improvement should be sought at scheme stage.</p>
Honeycomb worm (<i>Sabellaria alveolata</i>) reefs	Scattered along the frontage	<p>Within the next 10 years, along much of the frontage 'hold the line' will be implemented by maintaining the existing defences along the current footprint. However, in many areas where the Strategy proposes to continue to 'hold the line', new revetment/rock armour may be required in the longer term, which would extend the existing footprint a few metres seaward. This has the potential to directly impact on these reefs that extend into the intertidal. However, as these defences will be</p>	<p>Implementation of the Strategy, which involve works that extend the footprint of the defences seaward will be designed to avoid encroachment on the reef habitats.</p>

		<p>linear, there is not expected to be a significant impact on the mobility of the beach sediments.</p> <p>The potential for longer term realignment of the coast around Dubmill Point has potential to improve the habitat.</p> <p>Potential impacts on honeycomb worm in Allonby Bay MCZ</p>	<p>Additionally, works will only be implemented where it can be demonstrated that they will not affect sediment deposition around the reefs nor reduce water quality, which may affect the extent, spatial distribution, supporting habitat and species of the reef communities. This needs to specifically focus on how any new defences could affect the movement and accretion of sediment on the foreshore.</p> <p>It is also recommended that survey/ mapping of this habitat on a good spring tide should be undertaken as part of the preliminary design stage.</p>
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Table 3.4 Solway Firth MCZ

Solway Firth MCZ			
<i>11e7.1 Skinburness (east) – HTL: Repairs/remedial works to existing embankments within existing defence footprint</i>			
<i>11e7.2 Skinburness to Wath Farm HTL: Repairs/remedial works to existing embankments within existing defence footprint (<10yrs); consider long-term realignment options</i>			
<i>11e7.3 (Wath Farm) There are no formal defences on the frontage, with the wide marsh giving natural protection. Environmental opportunities under the MR policy could allow potential for habitat enhancements.</i>			
<i>11e7.4 Newton Marsh - There are no formal defences on the frontage, with the wide marsh giving natural protection. Environmental opportunities under the MR policy could allow potential for habitat enhancements.</i>			
<i>11e7.5 Anthorn including Wampool to NTL - MR through natural defence management - consider opportunities to allow natural expansion of the saltmarsh increasing the flood resilience of the road in future</i>			
<i>11e7.6 Anthorn - HTL through natural defence management - there are no formal defences present but the SMP policy allowed for new defences if the narrow marsh protecting the road and adjacent properties erodes. If the erosion risk changes, enhancement of the marsh through "green" low cost shoreline stabilisation techniques should be considered.</i>			
<i>11e7.7 Anthorn to Cardurnock - MR through natural defence management - consider opportunities to allow natural expansion of the saltmarsh increasing the flood resilience of the road in future.</i>			
<i>11e8.1 (Cardurnock) - MR through natural defence management - consider opportunities to allow natural expansion of the saltmarsh increasing the flood resilience of the road in future.</i>			
11e8.2 Bowness-on-Solway – HTL by patch and repair, with no increase in footprint (<5yrs). Works to defence toe if the low water channel continue to move landwards, subject to funding, possibly by shoreface works to bolster existing defences or new larger structure. Both of which may encroach directly on foreshore but would not affect longshore transport (>10yrs). There may also be a need to extend the defence eastwards alongshore to include defences that protect the coastal road and UU assets in 11e8.3.			
<i>11e8.3 Bowness-on-Solway to Drumburgh - MR - there may be a need to move the SMP boundary with 11e 8.2 to the east to include defences that protect the coastal road and UU assets.</i>			
<i>11e8.4 (Drumburgh to Dykesfield) - MR - manage risks due to increasing frequency of flooding to coastal road with signage. Consider "green" solutions to erosion protection and enhancement of natural protection from the marsh and opportunities for wetland creation.</i>			
<i>11e8.5 - Dykesfield to Kingmoor (Eden NTL): MR policy could allow potential for habitat enhancements to mitigate impacts of defences elsewhere in the designated site.</i>			
<i>11e8.6 - Kingmoor to Rockcliffe – as 11e8.5</i>			
11e8.7 – Rockcliffe - introduction of temporary defences or individual adaptation measures to minimise flood risk (<10yrs). Should residents wish to finance a more permanent solution, the preferred approach would be a set embankment (either earth or low flood wall) adjacent to the road (>10yrs)			
<i>11e8.8 - Rockcliffe to Demesne Farm - MR - monitoring and management of risk to the minor road, with closure when becomes unsafe.</i>			
<i>11e8.10 Metal Bridge (Esk) to the River Sark - MR with potential to HTL at a set back location in future to manage flood risk to railway and roads. Potential for habitat creation to mitigate impacts of defences elsewhere in the designated site</i>			
MCZ feature	Location relative to Strategy	Potential to affect MCZ features/ processes	Management, mitigation and measures of equivalent environmental benefit
Smelt (<i>Osmerus eperlanus</i>)	Entire MCZ used for feeding, spawning in lower river reaches on gravels, macrophytes and mosses in area immediately above tidal limit.	In the longer term, HTL works at 11e8.2 (and includes possible revision of boundary to include adjacent existing defences in 11e8.3) could result in the direct loss of potential spawning and feeding habitat in the footprint of new and modified defences as well as potential changes in habitat condition.	Implementation of the Strategy at 11e8.2/ 11e8.3, which involve works that extend the footprint of the defences seaward will be designed to avoid encroachment on smelt spawning and feeding habitats. There will need to

		<p>Elsewhere the Strategy recommends repairs and works to existing embankments within existing defence footprints, which is not anticipated to affect spawning or feeding habitat for smelt.</p> <p>No works are proposed offshore and therefore no direct impacts on feeding habitat are anticipated.</p> <p>Implementation of MR within Moricambe Bay, along the Solway Firth shoreline and along the River Eden will provide habitat improvement/ creation and allow the estuary to evolve under natural processes. There is therefore potential to create and improve spawning and coastal feeding habitat in the medium to long term.</p> <p>Potential impacts on smelt spawning habitats, in Solway Firth MCZ in the medium to long-term from HTL at Bowness on Solway.</p> <p>Potential improvements across the MCZ in longer term through MR.</p>	<p>be consideration of wider geomorphological changes that could impact on adjacent spawning sites.</p> <p>It is also recommended that survey/ mapping of spawning and feeding habitat should be undertaken as part of the preliminary design stage.</p>
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4 Conclusions

This assessment has concluded that the proposed Cumbria Coastal Strategy is not anticipated to affect the qualifying features of the West of Walney Island MCZ or the processes upon which its features rely.

However, some of the strategic options in some areas are capable of affecting the features of the following MCZs and will require further management: -

- Cumbria Coast MCZ – Potential for impacts on intertidal biogenic reefs, honeycomb worm (*Sabellaria alveolate*) reef and intertidal sand and muddy sand habitats through direct loss, due to the improvement of defences in the longer term.
- Allonby Bay MCZ - Potential for impacts on intertidal biogenic reefs, intertidal coarse sediment, sand and muddy sand, peat and clay exposures, blue mussel (*Mytilus edulis*) beds and honeycomb worm (*Sabellaria alveolate*) reefs through direct loss and/or changes to sediment regime, due to the improvement of defences in the longer term. There is, however, potential for improvements to MCZ qualifying features should managed realignment be undertaken in the longer term in the vicinity of Dubmill Point.
- Solway Firth MCZ – Potential for impacts on smelt spawning habitats through direct loss and/or changes to sediment regime, due to the improvement of defences in the longer term. There is, however, potential for improvements to MCZ qualifying features should managed realignment be undertaken in the longer term in Moricambe Bay, Solway Firth and River Eden.

The potential impacts will depend upon the details of schemes undertaken to implement the Strategy. Further assessment is therefore required at scheme stage and as part of the design of any future works.

Impacts should be avoided through appropriate design and construction and should ensure that any scheme level works do not directly encroach on any vulnerable qualifying features. The potential for geomorphological change and effects on sediment mobility, transport and deposition should also be considered, as many of the qualifying features of these MCZs are sensitive to smothering by sediment, such as intertidal rock features, peat and clay exposures, biogenic reefs and smelt spawning grounds.

It is recommended that survey/ mapping of qualifying habitat should be undertaken as part of the preliminary design stage to fully understand the potential risks and how these can be mitigated through careful design.

There may also be potential for improvements to habitat, for example through providing additional rock surfaces, which should be integrated into the design of future schemes.

5 References

Defra (2018): Solway Firth Recommended Marine Conservation Zone

Defra (2010): Guidance on the duties on public authorities in relation to Marine Coastal Zones (Note 2), London, Defra

Marine Management Organisation (2013): Marine Conservation Zones and Marine Licensing