



11c15 Walney Channel (mainland)

(Technical report by Jacobs)

Policy area: 11c15 Walney Channel (mainland)

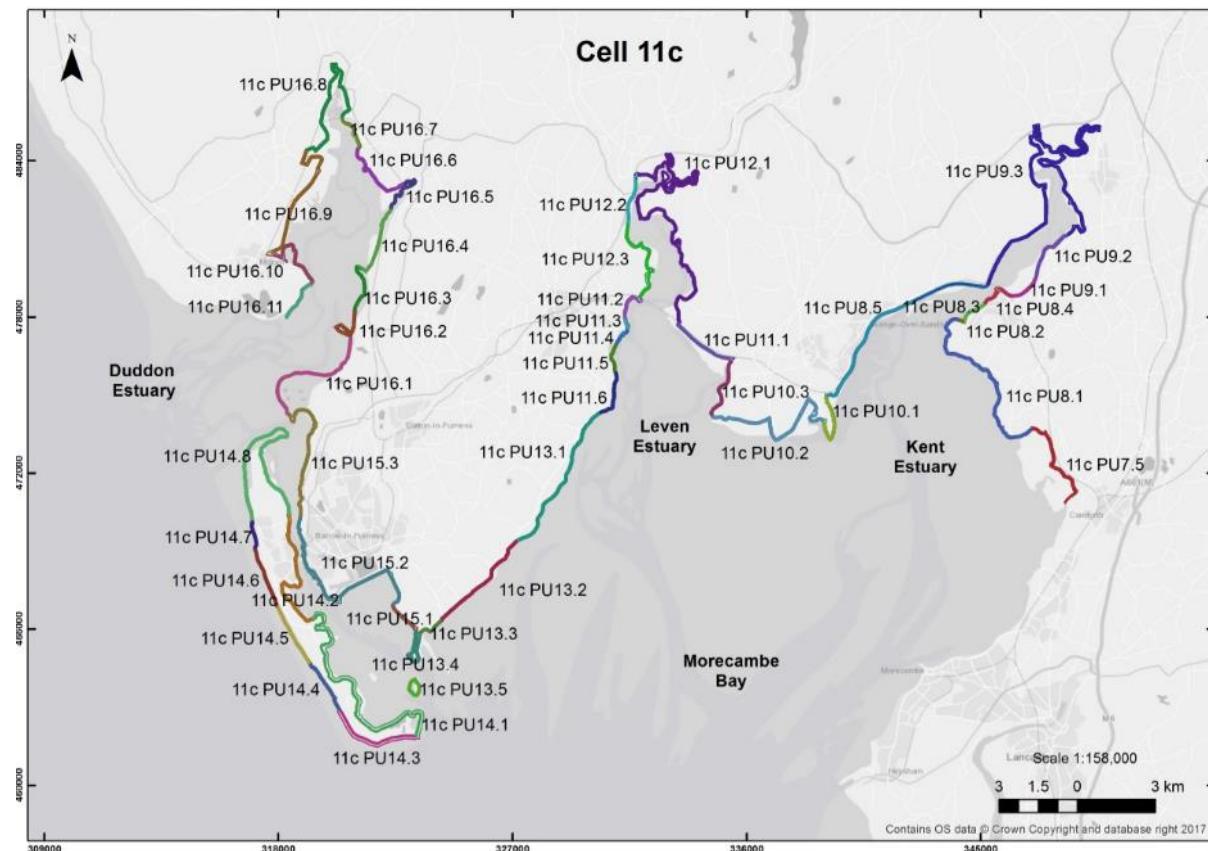


Figure 1 Sub Cell 11c Arnside to Hodbarrow Point Location Plan of policy units. Baseline mapping © Ordnance Survey: licence number 100026791

1 Introduction

1.1 Location and site description

Policy units:	11c15.1 Rampside to Westfield Point 11c15.2 Westfield Point to Hindpool (Barrow in Furness) 11c15.3 Hindpool to Lowsy Point
Responsibilities:	Barrow Borough Council Cumbria County Council United Utilities ABP BAE National Trust Private landowners
Location:	The SMP policy area falls within Sub cell 11c and extends along the mainland shoreline of Walney Channel, behind Walney Island. It covers the frontage from Rampside, at the outer mouth of Morecambe Bay, to Lowsy Point, which is the start of Sandscale Hawes dune system at the mouth of the Duddon Estuary. Roa Island and causeway is included within a separate policy area: 11c13.
Site Overview:	<p>Lying behind Walney Island, this frontage is relatively sheltered compared to the open coast, with only locally generated wave action affecting the frontages, although tidal flows are strong. At the northern end of the unit, the entrance of Scarth Channel into Walney Channel is constricted by the presence of spits: North End Hawes, which forms the northern extent of Walney Island, and Sandscale Hawes at the mouth of the Duddon Estuary.</p> <p>The frontage along Walney Channel Mainland is largely industrial comprising a variety of hard defences, in varying condition. There is a short section of undefended coast in the south, approximately 1 km long, between Roa Island causeway and the start of defences for the gas terminal at Westfield Point. North of the main industrial frontage, between Hindpool and Lowsy Point the shoreline is mainly undefended.</p> <p>There is a wide intertidal sand or mudflat at the southern and northern ends of this unit, but along the central frontage from Barrow dock gates to Hindpool the intertidal mudflat or beach fronting defences is narrow or non-existent. In places, marsh has developed in the shelter of defence structures. The natural geology of the mainland consisted of glacial sands and gravels which overlies sandstone bedrock, with the dune system of Sandscale Hawes extending beyond the northern limit of this unit. There has, however, been significant man made changes to the landscape, through creation of docks and historical dumping of waste from iron and steel works, which has artificially pushed the shoreline into the Walney Channel.</p> <p>Backshore change along much of this unit is limited by the presence of defences, but in places some lowering of the fronting mudflat has been noted (Barrow Borough Council, 2016). There has also been a loss of sediment along the mainland bank as Walney channel has migrated landwards. This has happened at differing rates throughout time but there have not been any significant periods of accretion to counter this net erosion.</p> <p>Barrow-in-Furness is the principal settlement within this policy area, with suburbs, Roose, Barrow Island, Beacon Hill, Hindpool, and Ormsgill fronting the coast. To the south Rampside (considered in policy area 13.3) lies behind Beacon Hill and in the north, Roanhead (considered in policy area 16.1) lies</p>

	<p>behind the dunes at Sandscale Haws. There are a number of isolated properties and roads between these settlements.</p> <p>The coastal environment has considerable environmental value with designations including Duddon Estuary and Morecambe Bay Ramsar sites, Duddon Estuary, South Walney and Piel Channel Flats, Morecambe Bay Sites of Special Scientific Interest, and Morecambe Bay Special Area of Conservation. These designations predominately cover the intertidal areas, but their buffer zones extend into the hinterland. At the northern boundary lies Sandscale Haws National Nature reserve (NNR), whilst possible impacts on North Haws NNR, Walney Island and extending into the intertidal area of Walney Channel, also need consideration.</p> <p>The area has a diverse history, from the monks of Furness Abbey in the 13th Century to the rapid growth of Barrow-in-Furness from a tiny 19th Century hamlet to the biggest iron and steel centre in the world, and a major ship building force. Reflecting this history, there are a number of listed properties, concentrated in Barrow-on-Furness and Barrow Island, within the docks area.</p>
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1.2 Current SMP policy

The policy details for this policy area are shown in the table below, taken directly from the SMP2 (Halcrow, 2011).

Table 1 Current SMP Policy for policy area 11c15

Location		Policy and Approach (from 2010)		
		0-20 years	20-50 years	50-100 years
11c15.1	Rampside to Westfield Point	No active intervention – Allow shoreline to continue to evolve under natural processes.	No active intervention – Allow shoreline to continue to evolve under natural processes.	No active intervention – Allow shoreline to continue to evolve under natural processes.
11c15.2	Westfield Point to Hindpool (Barrow in Furness)	Hold the line – Manage flood and erosion risk by maintaining existing defences to an adequate standard.	Hold the line – Manage flood and erosion risk by maintaining existing defences to an adequate standard.	Hold the line – Manage flood and erosion risk by maintaining existing defences to an adequate standard.
11c15.3	Hindpool to Lowsy Point	No active intervention – Allow shoreline to continue to evolve under natural processes.	No active intervention – Allow shoreline to continue to evolve under natural processes.	No active intervention – Allow shoreline to continue to evolve under natural processes.

2 Appraisal of non priority units

All three policy units included in this policy area have been defined as non priority units:

- 11c15.1 Rampside to Westfield Point
- 11c15.2 Westfield Point to Hindpool (Barrow in Furness)
- 11c15.3 Hindpool to Lowsy Point

A light touch review has been undertaken of current SMP recommendations, taking into account conclusions from option appraisals for the adjacent frontages, where appropriate.

2.1 11c15.1 Rampside to Westfield Point

2.1.1 Existing approach to flood and coastal erosion risk management

The existing SMP2 policy along policy unit 11c15.1 is No active intervention for the next 100 years. The primary justifications of this policy are that there are limited assets at risk, that the policy will result in a naturally functioning sustainable coastline and that therefore there is no justification for intervention.

There are no man-made defences present along this coast.

2.1.2 Strategy considerations

The policy unit starts to the west of Roa Island Causeway and extends to the headland of Westfield Point; it is assumed the unit boundary lies at the start of the defences at Westfield Point (Figure 2). The adjacent units are: 11c13.3 Rampside, where the SMP2 policy is No active intervention, with Hold the line potentially from the medium term (dependent upon the level of risk) and 11c13.4 Roa Island, where the SMP2 policy is Hold the line from the short term.

The cliffs are cut into glaciofluvial sands and gravels, with raised beach deposits (gravels) also exposed in places. There is only one monitoring point appraised as part of the North West Regional Monitoring Programme. Data from this point, for 2012 to 2016, indicate little discernible change in either cliff position or beach level. There is, however, some evidence that the intertidal flat may be starting to experience some narrowing, with changes at the seaward edge of the flat, possibly suggesting landward movement of the channel and resultant steepening of the landward bank of the channel. This trend would need to be confirmed through further monitoring. At present, the channel lies around a kilometre away from the cliffs; therefore, there is currently not an issue, but if there is a progressive migration of the low water channel, this could have implications for the longer term. No predictions of future change were provided as part of NCERM.

There are limited assets at risk from erosion: most of the cliff top land is used for agriculture, but there are a couple of properties at the eastern end of the unit.

The intertidal area is designated as part of South Walney and Piel Channel Flats Site of Special Scientific Interest (SSSI), Morecambe Bay Ramsar, Morecambe Bay and Duddon Estuary SPA and Morecambe Bay SAC. The cliffs and hinterland are not specifically included, but do lie within the SSSI buffer zone. Key habitats along this stretch are vegetated shingle and the intertidal mud and sand flats. Additionally, Natural England has highlighted that there are especially sensitive habitats in the intertidal zone near Roa Island, including rare eel grass (*Zostera*) beds, that need careful consideration. Walney Channel is a Classified Bivalve Mollusc Harvesting Area and a Shellfish Water Protected Area.

There are no specific heritage features at risk, but the area may include undiscovered finds.

The route of the England Coast Path is still to be confirmed; the SMP2 identified a potential erosion risk to the Cumbrian Coastal Way between Rampside and Westfield Point; however, since 2010 the

route has not been endorsed by Cumbria County Council and the route is no longer shown on Ordnance Survey maps. The public footpath and cycle route (NCN 700) from Barrow to Rampside mostly follows the old railway track but runs adjacent to the coast around Westfield Point and could be at risk if erosion occurs.



Figure 2 Clifffed frontage between Rampside and Westfield Point. 2015 aerial photograph (c) North West Regional Monitoring Programme.

2.1.3 Discussion

Based on (limited) data available, there appears to have been no significant changes to coastal risks since the SMP2 and therefore there is no justification for any change in policy, which supports the environmental designations for this frontage. Based on this, the recommendation is for the policy to remain.

Further actions include:

- Continued monitoring of cliff and intertidal change, as part of the North West Regional Monitoring Programme, to identify any changes in observed trends and any possible increase in risk level. At this stage it is not thought necessary to add any additional profiles, but should the profile data available indicate significant change, in particular ongoing shoreward migration of the low water channel, further profiles or use of remote sensing, such as LiDAR, could be beneficial.
- Defence inspections covering the revetment at Westfield Point should monitor for signs of outflanking where it abuts the undefended cliffs. Any extension of the revetment here may require consent from Natural England due to the designation of the intertidal zone and a scheme level HRA and AA may need to be undertaken.
- Safe siting of the England Coast Path; Natural England is working on proposals to improve public access to the coast between Silecroft and Silverdale, which includes this section (see <https://www.gov.uk/government/publications/england-coast-path-in-the-north-west-of-england>).

2.2 11c15.2 Westfield Point to Hindpool (Barrow in Furness)

2.2.1 Existing approach to flood and coastal erosion risk management

The existing SMP2 policy along policy unit 11c15.2 is Hold the line for the next 100 years. The primary justification of this policy is for continued protection of critical infrastructure, including gas terminals, power station and dockyards, and to minimise risk of flooding and erosion to Barrow-in-Furness. It is assumed that the unit covers the frontage from the start of the defences at Westfield Point, to the end of the Cumbria County Council defences at Ormsgill: this does not exactly correspond with the SMP2 mapping.

There are various defence structures along this frontage, which fall under the responsibility of several operators, namely: Cumbria County Council, Barrow Borough Council, United Utilities, BAE Systems and Associated British Ports (ABP).

Barrow Island is low lying and largely made up of reclaimed land. A significant proportion of the Island is at risk from coastal flooding, with most of the port potentially impacted by tidal inundation in the case of an extreme, 1 in 1000 year event (Royal Haskoning, 2009). Flood risk elsewhere in Barrow-in-Furness is mainly around the area of Roose Gate and there is combined fluvial or tidal flood risk adjacent to Mill Beck and Cavendish Dock with the sewage treatment works and site of the former Roosecote power station at potential flood risk. The area north of Jubilee Bridge adjacent to the Dock Museum is also at tidal flood risk. The main economic assets at risk include a section of A590, industrial site and associated businesses and museum.

At Westfield Point, there is a rock revetment, which is currently maintained by United Utilities, with embedded outfall. The latest asset inspection (Barrow Borough Council, 2016) estimated a residual life of 10 to 20 years and noted that the armour was in Good condition. The cliffs behind were recorded as being heavily vegetated, although some subsidence was noted at the crest, which could be indicative of overtopping.



*Figure 3 Westfield Point rock armour revetment.
Photograph taken from latest asset inspection report
(Barrow Borough Council, 2016).*

At Cavendish and Ramsden Docks, there are various dock structures (see Table 2); these were noted to be generally in Fair condition, but with defences at Ramsden Dock Boat Club in poor condition. At many locations little or no change has been observed since the previous inspection, and some repairs have been observed. Although not specifically a coastal defence concern, issues have been noted at Belfast Berth, where there has been severe fracturing of the wall.

*Table 2 Defence asset data for Cavendish and Ramsden Docks. Information from latest asset inspection report
(Barrow Borough Council, 2016).*

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
Eastern wall	011KC902302 01C05 (210/8012)	Sloping Concrete Revetment	10-20	Fair	ABP	Sandstone blocks and mortar wearing were exposed, with blocks displaced in small areas, however no repairs are required. Some small shrubs and vegetation towards top of revetment. Coping stones have been replaced since the last inspection.
Sluice gate (set in asset 011KC90230 201C05)	011KC902302 01C05 (210/8012a)	Sluice	10-20	Fair	ABP	Water flowing freely through gate at time of inspection.
Dock Basin	011KC902302 01C05 (210/8013)	Revetment	10-20	Fair	ABP	No visible deterioration since previous inspection.
Dock Basin Gate 1	011KC902302 01C05 (210/8014a)	Quay Wall (Steel Sheet Piling)	10-20	Fair	ABP	No visible deterioration since previous inspection
Dock Basin Gate 1	011KC902302 01C05 (210/8014b)	Masonry Quay Wall	10-20	Fair	ABP	Spalling, cracking and open jointed sections of masonry blocks.

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
Dock Basin Gate 1	011KC902302 01C05 (210/8014c)	Rock Revetment	10-20	Fair	ABP	No substantive deterioration since previous inspection.
Dock Basin Gate 1	011KC902302 01C05 (210/8014d)	Masonry Quay Wall	10-20	Fair	ABP	Approximately 15-20% sandstone masonry block spalling and open jointed, with minor cracking in masonry visible.
Belfast Berth	011KC902302 01C05 (210/8014e)	Masonry Quay Wall	10-20	Fair	ABP	Severe fracturing of wall through full width at northernmost point of asset. Failure will not affect sea defence but there may be stability issues and consequent safety of persons in the vicinity.
Deep Water Berth	011KC902302 01C05 (210/8015a)	Rock Revetment	10	Fair	ABP	Rock revetment covered in places by poured concrete and has been added to by tipped masonry or rubble. No visible signs of deterioration from previous inspection.
Flood gate - set in asset 210/8015a	011KC902302 01C05 (210/8015a-1)	Flood Gate - Flap Valve	20	Very Good	ABP	Flood gate remains in good state of repair, no corrosion and water flowing freely.
Deep Water Berth	011KC902302 01C05 (210/8015b)	Rock Revetment	10	Fair	ABP	Revetment breaking up in places. Has been added to by tipped masonry or blocks. No visible signs of deterioration since last inspection.
Ramsden Dock	011KC902302 01C05 (210/8015c)	Revetment	-	Fair	ABP	Sandstone masonry is open jointed with some blocks perished or missing. Repointing still required to prevent further loss.
Ramsden Dock Boat Club	011KC902302 01C05 (210/8015d)	Revetment	5	Poor	ABP	Block work held in place by vertical lengths of angle iron set in concrete bed. Some angle irons are displaced or leaning and supported by scaffold bars set into foreshore. Some sections of the wall have had to be rebuilt in recent years as a result of storm damage.
Ramsden Dock Boat Club	011KC902302 01C05 (210/8015e)	Revetment	10	Fair	ABP	Revetment heavily vegetated with area of stone work missing. At the southern end of the revetment (adjacent to access ramp), a temporary defence erected in front of the revetment to prevent further damage from erosion remains in place.
Ramsden Dock	011KC902302 01C05 (210/8016)	Revetment	-	Fair	ABP	Areas of open jointed masonry where there is no concrete covering and minor areas of stone loss. No visible signs of deterioration since previous inspection.

Along the BAE Systems shipbuilding frontage, there are several defence types (see Table 3); these are all in Fair condition.

Table 3 Defence asset data for BAE Systems frontage. Information from latest asset inspection report (Barrow Borough Council, 2016).

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
BAE Docks	011KC902302 01C05 (210/8017)	Revetment	-	Fair	BAE	Central 70% of length of asset is not a defence asset. There appears to have been no visible deterioration to the asset since the previous inspection.
BAE	011KC902302 01C05 (210/8018)	Gabion Baskets	-	Fair	BAE	50% of length of asset is not a defence asset. Some stone loss from gabion baskets - but no visible signs of further deterioration since the previous inspection. Spalling and cracking to concrete wall in front of gabion baskets.
BAE	011KC902302 01C05 (210/8019)	Revetment	-	Fair	BAE	50% of length of asset is not a defence asset. No visible sign of deterioration since previous inspection.
BAE	011KC902302 01C05 (210/8020a)	Gabion baskets	-	Fair	BAE	Plastic mesh gabion baskets showing some broken mesh and minor stone loss. No visible signs of deterioration since previous inspection.
BAE	011KC902302 01C05 (210/8020b)	Revetment	-	Fair	BAE	Grouted stone revetment is generally condition 3 but an area approx. 5 to 6 m long is missing together with substantial erosion of earth behind; unknown whether this area has been excavated or a previous structure removed. The southern end of the revetment is showing signs of minor undercutting at the toe.

To the north of the BAE Systems frontage, the defences either side of the Jubilee Bridge are mainly the responsibility of Barrow Borough Council (

Table 4), with a short stretch of private defences at the Boat Club. These are generally in Fair condition, with a residual life of 10 to 20 years. The key exception is the revetment to the south of the bridge, which is considered to be in Poor condition (in 2016), with a 5 to 10 year residual life (Figure 4).



Figure 4 Barrow Borough Council defences south of the Jubilee Bridge, adjacent to the BAE site. Photograph taken from latest asset inspection report (Barrow Borough Council, 2016).

Table 4 Defences assets north and south of Jubilee Bridge. Information from latest asset inspection report (Barrow Borough Council, 2016).

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
Former BAE West Shop	011KC90230 201C05 (210/8021)	Revetment	5 - 10	Poor	Barrow Borough Council	Built 1950. Toe constructed of rubble rock and consolidated slag. Some pitching missing to limestone revetment mainly towards top of slope. The top of the revetment has lost significant stone which is now laying on the foreshore in front of the revetment toe. There are increased areas of subsidence of the embankment due to lack of stability at the top of the cliff.
North of Jubilee Bridge	011KD90250 101C07 (210/8022)	Vertical Concrete Sea Wall	10-20	Fair	Barrow Borough Council	Built in 1986. There is some undercutting of a connecting ramp or revetment and also what appears to be a significant land tip of bricks. The primary structure of concrete wall is in generally good condition apart from some spalling at the toe. However, there are areas of transverse and longitudinal cracking within the concrete wall.
Boat Club	011KD9025 0101C07 210/8022a	Patchwork Revetment and Vertical Sea Wall	10-20	Fair	Boat Club	Repairs required. This is a low erosion area but slow deterioration of small sections of the patchwork construction is evident, however there has been no increase in deterioration since the previous inspection.
Fishing trawler site	011KD9025 0101C07 210/8022b	Vertical Masonry Sea Wall	10-20	Fair	Barrow Borough Council	This is a low erosion area. There are no visible signs of deterioration since the previous inspection. The toe is heavily vegetated making thorough investigation difficult and there is some spalling of the sandstone. All joints appear in good order with only a few minor cracks at corners. There is some minor spalling to the copings on the top of the sea wall.
Warping Pier	011KD9025 0101C07 210/8022c	Revetment (Reno Mattress)	10-20	Fair	Barrow Borough Council	Deterioration since this asset was first inspected appears to be minimal. There is some undercutting to the side of the mattress but this has not deteriorated since the previous

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
						inspection. The toe is heavily corroded and the cages appear deflated leading to the conclusion that there has been significant settling and loss of material even though the wire is in good condition.

Further west, the defences are mainly the responsibility of Cumbria County Council. Based on the latest asset inspection (2016), their condition is Fair and the defences have an estimated residual life to 10 to 20 years (Barrow Borough Council, 2016) (Table 5).

Table 5 Cumbria County Council defences between Jubilee Bridge and Hindpool. Information from latest asset inspection report (Barrow Borough Council, 2016).

Location	EA Asset Ref.	Structure Type	Estimated residual life (years)	Overall condition	Responsibility	Additional notes
Jubilee Bridge to Crook Scar	011KD9025 0101C08 (210/8023)	Vertical Masonry Sea Wall	10-20	Fair	Cumbria County Council	Built in 1920. The wall is in generally good condition overall, however there is spalling of the masonry and missing pointing in places. At the northern corner of the wall there is an approximate 2m ² section where the masonry facing has broken away.
Crook Scar	011KD9025 0101C08 (210/8024)	Vertical Masonry Sea Wall	10-20	Fair	Cumbria County Council	The wall is largely clear of vegetation and only small sections of mortar lost. The flap valve is heavily pitted but the hinges are new and free moving. There is some evidence that water is penetrating behind the wall at high tide and the water then flows out through cracks in the mortar as the tide goes out.
Hindpool	011KD9025 0101C10 (210/8025)	Gabion Baskets	10-20	Fair	Cumbria County Council	Some of the gabion baskets have collapsed. Evidence that baskets do submerge at high tides. Work to refill them is recommended. Appears no remedial work has been carried out to date.
Hindpool North	011KD9025 0101C11 (210/8026)	Gabion Baskets	10-20	Fair	Cumbria County Council	Gabion baskets remain heavily covered in vegetation. Condition assessment difficult but cage shape and condition of visible wire is generally good. Flap valve is pitted but the hinge remains clean and moves freely. There is a sapling above the flap valve that continues to grow.
Ormsgill	011KD9025 0101C11 (210/8027)	Rock Revetment	10-20	Fair	Cumbria County Council	Some subsidence on the cliffs above the revetment but the revetment structure itself remains sound.

2.2.2 Strategy considerations

The Port of Barrow is currently owned and operated by Associated British Ports Holdings, but some land is shared with BAE Systems Submarine Solutions. The Port of Barrow also plays a key role in

serving the offshore energy industry, as the location of operations and maintenance bases supporting offshore wind power and offshore gas developments. In addition, the Port is used to handle specialist vessels for the shipping of nuclear products.

It has been estimated that the port contributes £107 million to the UK economy, including £89 million to the town of Barrow-in-Furness, and economic activity there supports 1,200 jobs across the UK. A recent study by Edge Economics (<http://www.abports.co.uk/newsarticle/544/>) has proposed that its annual contribution to the UK economy could be set to grow by £30 million in the next decade. There has been recent investment in the area, including a new £23 million base for BAE Systems shipyard and Barrow Waterfront Development. A Port of Barrow Masterplan has recently been completed by ABP, but this has not been reviewed as part of this strategy.

A new tunnel head is also planned for Roosecote (North West Connection project, planned for 2020). Tunnel spoil may be exported via Ramsden Dock, using Cavendish Dock outer barrier as transport route.

The intertidal area is designated as part of South Walney and Piel Channel Flats Site of Special Scientific Interest (SSSI), Morecambe Bay Ramsar, Morecambe Bay SAC and Morecambe Bay and Duddon Estuary SPA. The South Walney Spit, to the south of this frontage, is the principal grey seal haulout site on the Cumbrian coast, whilst the intertidal mudflats and sandflats of Roosecote Sands comprise a significant feeding ground for many bird species.

There are no commercial fisheries in Walney Channel but there is some recreational sea angling in the channel, which is also used for transit by commercial fishing boats based in Barrow (Royal Haskoning, 2009). Walney Channel is a Classified Bivalve Mollusc Harvesting Area and a Shellfish Water Protected Area.

Tourism in the area is understood to be currently limited, although there is potential for numbers to continue to increase due to the creation of attractions, such as the Dock Museum and Barrow Waterfront development.

The Barrow Island Conservation Area includes streets of listed tenements and various listed buildings and there are several listed properties within Barrow-in-Furness and Roose Gate. There are also various features throughout the area relating to the site's industrial and shipbuilding heritage.

The route of the England Coast Path is still to be confirmed, but a number of tracks and paths cross the frontage.

No beach monitoring data are collected as part of the North West Regional Monitoring Programme for this location but generally this is a low energy environment so risks are likely to be low. Also, no predictions of future change were provided as part of NCERM, with flooding recognised as the key risk.



Figure 5 Walney Channel, illustrating the industrial importance of the Barrow in Furness and Barrow Island frontages, including the BAE Systems sit, shown in the top left of the photo. 2015 aerial photo © North West Regional Monitoring Programme.

2.2.3 Discussion

Given the strategic importance of this area and continued investment since the SMP2, there is no justification for any change in policy from Hold the line therefore, the recommendation would be for the policy to remain. The policy manages the risk to the A590 road, industrial sites including gas terminal, power station and dockyards. It is anticipated that the Waterfront development and investment in the BAE systems site and Port of Barrow would incorporate the necessary structures to ensure continued protection in these areas. Along these frontages defences will remain the responsibility of ABP and BAE.

Further west, there is a stretch of defence predominately the responsibility of Barrow Borough Council, whilst beyond Crook Scar, the defences are mainly the responsibility of Cumbria County Council. Many these defences will require attention in the short to medium term. In particular, south of the Jubilee Bridge is a short stretch of Barrow Borough Council maintained defence, which is recorded as being in poor condition (Barrow Borough Council, 2016). Failure of this defence could have consequences for the adjacent BAE defences and there are also commercial buildings within 15 m of the cliff line at this location.

Future actions include:

- Continued annual asset inspections, as part of the North West Regional Monitoring Programme, to advise of any change in condition and issues to be addressed, with repairs and remedial works undertaken by the responsible operators as necessary. Based on the latest asset inspection report, specific issues that need to be addressed in the short term are as follows:
 - **South of Jubilee Bridge** (Barrow Borough Council) - works are likely to be required shortly to address the poor condition of the defence here. The latest asset inspection report (Barrow Borough Council, 2016) recommend more detailed investigations of the defence condition, including ground investigations be undertaken to ascertain the appropriate measures required to stabilise the cliff.

- **North of Jubilee Bridge** (Barrow Borough Council) – There is undercutting of the revetment and also cracking observed within the concrete wall – continued monitoring recommended.
- **Boat Club** (Private) – Repairs are required to address deterioration of revetment and sea wall.
- **Warping Pier** (Barrow Borough Council) – warping of the cages has been observed - continued monitoring recommended.
- **Jubilee Bridge to Crook Scar** (Cumbria County Council) - spalling of the masonry and missing pointing in places - continued monitoring recommended.
- **Crook Scar** (Cumbria County Council) - some evidence that water is penetrating behind the wall with water then flowing out through cracks in the mortar as the tide goes out - continued monitoring recommended.
- **Hindpool** (Cumbria County Council) – repair works to gabions required.
- **Hindpool North** (Cumbria County Council) – a sapling above the flap valve should be removed to avoid damage from root growth.
- Liaison between BAE, ABP, CCC and BBC to continue to develop future regeneration plans and ensure integrated approach to considering coastal erosion and flooding risks along adjacent frontages and to identify potential funding opportunities.
- Safe siting of the England Coast Path; Natural England is working on proposals to improve public access to the coast between Silecroft and Silverdale, which includes this section. (see <https://www.gov.uk/government/publications/england-coast-path-in-the-north-west-of-england>).

2.3 11c15.3 Hindpool to Lowsy Point

2.3.1 Existing approach to flood and coastal erosion risk management

The existing SMP2 policy along policy unit 11c15.3 is No active intervention for the next 100 years. The primary justification of this policy was that there are limited assets at risk and therefore no justification for intervention and that the policy will result in a naturally functioning sustainable coastline. It is assumed that the unit covers from the end of the Cumbria County Council defences at Ormsgill: note that this does not directly correspond with the SMP2 mapping, but the unit boundary location was not clearly defined.

Along the majority of the frontage there are no formal defences, apart from a short stretch of rock toe work at Lowsy Point (Asset ref: 011KD90250401C02 (210/8038)) – see Figure 6). This believed to have been constructed in 1990 and is the responsibility of Barrow Borough Council. Previous overtopping of structure has caused erosion of low dunes behind, increasing the risk to the properties at the Point. The latest asset inspection considered the defence to be in Poor condition, with an estimated residual life of 10 to 20 years. Although the inspection also reported that the condition of the revetment has not deteriorated since the previous inspection.

There is also a stretch of defence north of the Industrial Waste Recovery Site – but this is not mentioned in the recent asset inspection report by Barrow Borough Council (2016).



Figure 6 Rock toe at Lowsy Point. Photograph taken from latest asset inspection report (Barrow Borough Council, 2016).

2.3.2 Strategy considerations

The intertidal area is designated as part of Duddon Estuary SSSI and Ramsar, Morecambe Bay and Duddon Estuary SPA and Morecambe Bay SAC. Much of the intertidal area is included within the North Walney National Nature Reserve, whilst the sand dunes to the north of the unit are covered by Sandscale Haws National Nature Reserve. The intertidal unit between Sandscale and Sowerby does not have a condition status, but Sandscale Haws unit to the north is in favourable condition (last assessed 2009, last site visit 2015). The latest SSSI unit assessment notes that National Trust site management continues to follow actions set out in the NNR Management Plan (not reviewed as part of this appraisal) with habitat extent only subject to natural changes due to coastal processes.

Walney Channel is a Classified Bivalve Mollusc Harvesting Area and a Shellfish Water Protected Area.

In addition to the Second World War features along the coastline, there are listed properties at Sowerby Lodge and Ormsgill Farm.

At the southern end of this unit (north of the defences at Ormsgill), the backshore consists of cliffs cut into slag deposits, formed of waste from Barrow iron and steel works (Figure 7 and Figure 8). The first works were founded in 1859 and ceased operation in the 1980s. The northern and southern parts were reclaimed in the 1990s; the southern section of the site has been redeveloped and forms a business park and public open space, whilst the northern part is less accessible and is mainly open space. The central slag bank was operated for the extraction of secondary aggregate until 2008, with a reclamation programme in place since. The site is one of the most prominent land marks on the Furness Peninsula and is a popular area for walkers, with a path running along the top of the bank. There have, however, been incidents of people falling down the steep face of the bank and becoming stranded on the narrow beach below.

There is no monitoring data for this stretch, but this is a low energy environment so erosion rates due to coastal processes are also likely to be low. The aerial photographs do, however, show that cliff falls do occur, although from these images it is not possible to identify any evidence of undercutting at the toe of the slag cliffs.



Figure 7 View from the Ormsgill Slag Bank in 2007. Image reproduced under Commons Copyright (geograph.org.uk - 485043.jpg Rosalind Mitchell CC BY-SA 2.0.)



Figure 8 Ormsgill frontage, showing defended frontage to the south, the slag bank and lower lying cliff cliffs beyond, with Lowsy Point and Sandscale Haws dune system to the north.

Further north, the slag cliffs are replaced by low till cliffs (Figure 8). The immediate hinterland is mainly used for agricultural purposes, although some of this land is currently used for a solar farm, but further inland the landscape becomes more industrial again.

There are a number of Second World War pill boxes along this stretch, some of which have been eroded out of the cliffs (Figure 9 and Figure 10). There is no monitoring data for this stretch, but as this is a low energy environment erosion rates due to coastal processes are anticipated to be low. However, the pill boxes indicate that erosion does occur along this frontage, although the cause of this erosion is uncertain. There is also a short stretch of defence (presumably private owned) along this stretch - no data is available for this, but it appears to be sloping revetment, possibly associated with an outfall (Figure 10). Recent aerial images (available from www.magic.gov.uk) indicate this defence may be starting to fail, with the photographs indicating some upheaval between units (although this requires confirmation).



Figure 9 Erosion of a Second World War pill box between Hindpool and Lowsy Point (2009). Taken from: www.derelictplaces.co.uk/



Figure 10 Low till cliffs between Hindpool and Lowsy Point. Also shows the erosion of a pill box (far right) and presence of a short length of revetment defence (presumably privately owned). 2015 aerial photograph © North West Regional Monitoring Programme.

The northern end of this unit lies within the dune system of Sandscale Haws, with Lowsy Point forming the tip of a sand spit feature at the entrance to the Walney Channel. At Lowsy Point there are military remains including Second World War pill boxes and decoy site. There is also a collection of beach huts, known locally as the Black Huts, which have been there many years, but are now believed to be used as more permanent residences. The earliest appearance of properties, indicated by Ordnance Survey mapping, is from 1910, but most appear to postdate the 1950s.

Rock has been placed here, presumably to reduce erosion risk to these properties (Figure 11); the defence is believed to have been constructed by Barrow Borough Council and maintained by National Trust.



Figure 11 Lowsy Point, showing the rock armour. 2015 aerial photograph © North West Regional Monitoring Programme.

The latest asset inspection report (Barrow Borough Council, 2016) reported that there is currently a scheme drafted by the National Trust, the landowners, to reinstate marram grass following the significant erosion close to the properties as a result of the overtopping of the revetment prior to the 2014 survey (Barrow Borough Council, 2016). (Note: This has not been made available to this study).

There is a single beach monitoring profile at Lowsy Point, with data available for this location since 2012 (as part of the North West Regional Monitoring Programme). This data set indicates that there has been recession of the low dune ridge behind the rock revetment at this location, with further erosion between 2015 and October 2016.

No predictions of future change were provided for this frontage as part of NCERM.

2.3.3 Discussion

Based on available, albeit limited, information, there does not appear to have been significant changes to coastal risks and therefore at the current time there is no justification for any change in policy, which supports the environmental designations for this frontage. Based on this, the recommendation would be for the policy to remain. However, there are private defences along this stretch (at Lowsy Point and north of Industrial Waste Recovery Site), which are not referred to within SMP2.

No information is available for the defences north of the Industrial Waste Recovery Site; neither the purpose of the defences nor whether these are currently being maintained are known. It is therefore not possible to advise, at this stage, whether these defences should be permitted to remain.

At Lowsy Point, the short stretch of rock revetment appears to be providing limited protection to the collection of properties here. Due to proximity of properties to the shoreline there is little opportunity to realign the defences without first relocating properties landwards. There is limited economic justification for maintaining defences here, but it is possible they could be privately funded; but this would require consent from both Natural England and the landowners, the National Trust. There does not appear to be a significant impact of the defences on adjacent shorelines, which might be expected given the short length of defence present and the net accretion trend along the dune system as a whole; but this is based on observations from aerial photographs alone and further investigation may be required.

Future actions are:

- Continued monitoring of coastal change - currently only one location is monitored, as part of the North West Regional Monitoring programme. Although risks are low, having an additional monitoring point between Hindpool and Lowsy Point would inform changes in risk along this frontage. Visual observations of change along the face of the slag bank should also be considered, particularly given recent safety issues along the coastal edge path here.
- Discussion between Cumbria County Council, National Trust, Natural England, Barrow Borough Council and local property owners to consider further management of Lowsy Point. There may also need to be a slight amendment to the SMP2 to cover any future works.
- Further investigation into short length of defences between Hindpool and Lowsy Point to determine ownership and purpose of defence. Any further works are likely to require consent from Natural England, given the environmental designations covering the intertidal zone and associated buffer zones. There may also need to be a slight amendment to the SMP2 to cover any future works.
- Safe siting of the England Coast Path; Natural England is working on proposals to improve public access to the coast between Silecroft and Silverdale, which includes this section. (see <https://www.gov.uk/government/publications/england-coast-path-in-the-north-west-of-england>).

3 References

Barrow Borough Council (2016). Barrow Coastal Inspections. Barrow Borough Council. December 2016.

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For comment