

CABINET MEETING: 15 MARCH 2018

COASTAL RISK MANAGEMENT PROGRAMME

**CLEAN STREETS, RECYCLING & ENVIRONMENT
(COUNCILLOR MICHAEL MICHAEL)**

AGENDA ITEM: 6

REPORT OF DIRECTOR OF CITY OPERATIONS

Reasons for this Report

1. To provide a briefing to cabinet on the current state of Cardiff's Coastal Defences and the Welsh Government Coastal Risk Management Programme.
2. To seek Cabinet approval for the commitment to procure the detailed design and construction of the coastal defences valued at £11M.

Background

3. A report undertaken by Mott MacDonald, *Rover Way Foreshore Coastal Defence Assessment, 2009*; completed an assessment of the conditions of the foreshore along Rover Way to the southeast of Cardiff City Centre. The report concluded that the ad hoc defences in position along Rover Way were in a very poor condition and under established guidelines would not have a residual life beyond the short to medium term. The report recommends a detailed condition survey and upgrading of the existing defences.
4. A report undertaken by Atkins, *Cardiff Council Coastal Erosion Risk Assessment, 2013*, identified that the coastal erosion rates at Rover Way are comparable to the highest coastal erosion rates in Europe. The report recommended that a more detailed engineering and design of rock armouring and revetment is undertaken. The report also recommends consideration of the coast in front of the Dwr Cymru Welsh Water sewage works.

Welsh Government's Coastal Risk Management Programme

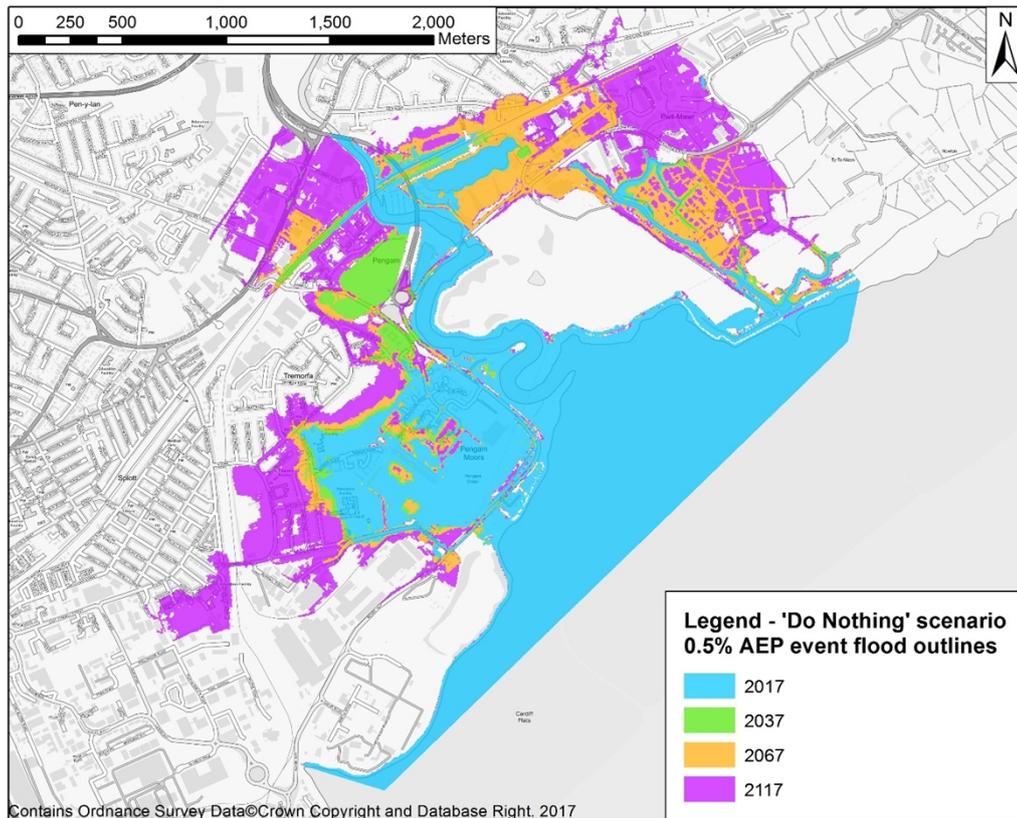
5. Welsh Government Coastal Risk Management Programme (CRMP) made a commitment by making £150 million available for borrowing to assist local authorities to meet financial pressures.

6. The CRMP provides a one-off opportunity for local authorities to implement transformational projects for coastal communities with Welsh Government contributing 75% of project costs.
7. Following the Programmes identification of candidate projects, Cardiff Council was successful in obtaining 100% funding from Welsh Government for the development of an Outline Business Case. The application needed to demonstrate how the Council would accelerate the delivery of Welsh Government's National Strategy for Flooding and Coastal Erosion Management in Wales, encourage innovative solutions that deliver multiple benefits and deliver social benefits by raising awareness and increasing community resilience.

Cardiff Council's Outline Business Case

8. The Outline Business Case (OBC) presents the business case and implementation plan for Cardiff Coastal Defences between Rover Way in the west and Lamby way in the east. The project aims to improve the existing coastal and fluvial defences to provide improved protection to people and property from coastal erosion and flood risk, and prevent the erosion of two decommissioned landfill sites; The Frag Tip and Lamby Way Tip
9. The project area includes the coastline along Rover Way, beginning at the eastern end of the privately owned Dwr Cymru Welsh Water (DCWW) defences, extending along the coast along Rover Way and up the west bank of the river as far as the railway line. The extent continues down the east bank of the river and along the coast around Lamby Way Tip to the location of the recently constructed Natural Resources Wales (NRW) defences
10. If no works are undertaken to maintain or improve the existing coastal defences, there will be significant erosion and flood risk across the study area and this will increase over time as asset condition deteriorates and sea levels rise with predicted climate change. Figure 1 shows the predicted flood extents for the Do Nothing scenario for present day and up to 100 years into the future.

Figure 1: Predicted flood extents for a 0.5% AEP event in 2017, 2037, 2067 and 2117



Implications

11. To the west of the River Rhymney, the coast will continue to erode, with approximately 30m of retreat predicted by 2036, 50m by 2067 and 170m by 2117, based on predicted erosion rates and taking into account predicted sea level rise. This will lead to loss of the Rover Way Travellers site and the adjacent electrical substation within 5 years and further release of large volumes of unknown tip material from the Frag tip into the Severn Estuary. Under present day conditions this erosion is quickly establishing a breach of the coastal defences to the east of the Rover Way Travellers site, resulting in flood risk to significant areas of land behind, including Rover Way, a key arterial route that runs parallel to the defence, Tremorfa industrial estate, areas of residential properties, local amenities and a large supermarket.
12. Along the west bank of the river there are number of sections of embankment with lower crest heights than the surrounding defence. These lower sections will start to overtop as sea levels rise, leading to potential breaches in the unmaintained defences and flooding of the land behind.
13. Along the outside of the river meander close to Lamby Way roundabout, also along the west bank, the embankment is at greater risk of erosion than overtopping. It is estimated that should the bank continue to erode it would be likely to lead to undermining and loss of the Lamby Way Roundabout and sections of Rover Way.

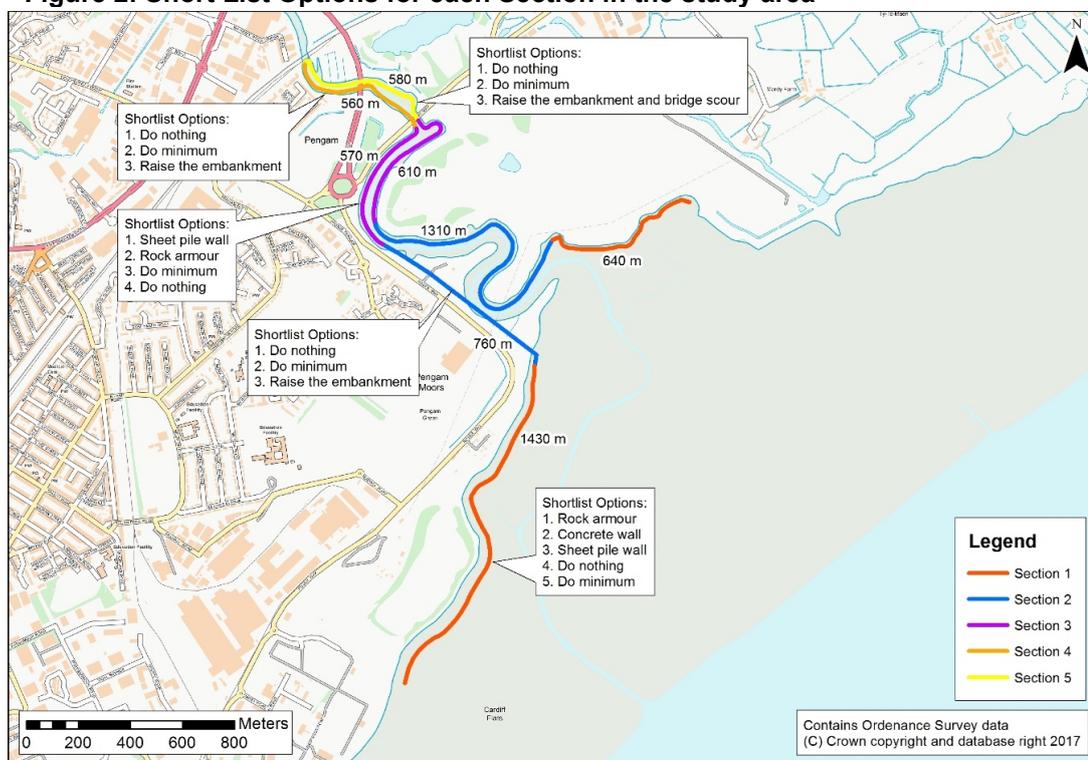
14. Under this Do Nothing Scenario 249 residential properties and 3 non-residential properties are currently at risk of flooding under a 0.5% AEP event, increasing to 1212 residential and 209 non-residential properties by 2117 with sea level rise.
15. At the Lamby Way road bridge, the bridge structure is constricting the river and high flow velocities are leading to exposure of the foundations. If no works are undertaken, this erosion will continue and the foundations could be undermined. In the longer term this would lead to the requirement of significant and costly improvement works to the bridge and potential failure of the bridge and loss of Lamby Way, which provides a key transport link.
16. Along the eastern river bank the soft banks are eroding and a large slip has recently occurred. Work has begun to try to stabilise the bank in this location. However, without significant further improvement works erosion is likely to continue. Although there is no flood risk should the defence fail due to the topography of Lamby Way Tip, there is significant risk from erosion of Lamby Way Tip material into the river and Severn Estuary should erosion continue.
17. The coastal frontage of Lamby Way tip, to the immediate east of the River Rhymney, is predicted to continue to erode. This will lead to erosion of the Lamby Way tip and release of contaminated tip material into the Severn Estuary within 20 years which would be likely to have significant environmental impacts on this designated estuary.
18. The project set out to achieve seven key project objectives:

Table 1: Project Objectives

No	Objective
1	Reduce and manage coastal flood risk to people and assets within part of south east Cardiff for the next 100 years, taking into account predicted future climate change.
2	Manage erosion along the coast to reduce the risk of failing coastal flood defences and the release of contaminated landfill material into the Severn Estuary from Lamby Way Tip and the Rover Way Frag Tip, in the immediate future and over the next 100 years.
3	To achieve wider benefits alongside coastal erosion and flood risk management, aligned with WG's 7 Wellbeing Goals and with WG and CCC's vision for development and economic growth of the area.
5	Implement a coastal flood and erosion risk management option which is affordable over the next 100 years.
6	Protect existing features of nature conservation value and seek opportunities to improve biodiversity through the enhancements of existing habitats.
7	Produce technically feasible and buildable engineering options

19. The coastal defences in the study area are owned and maintained by Cardiff Council but there is no current maintenance plan in place and no regular condition surveys or maintenance works are undertaken. As such there are no current investments or revenue costs to report.
20. The OBC assessed a range of options for the area but due to the variation in existing defences and geomorphological process through the study area mean that different options are appropriate for different sections of the defence in the study area.
21. Whilst assessing the options it was found that several of the asset sections could be merged into five sections to enable simpler assessment of the shortlisted options. Figure 2 presents the merged shortlist sections and lists the shortlisted options for each section.

Figure 2: Short List Options for each Section in the study area



22. To assess the most appropriate holistic option across the whole study frontage the options were combined to form eight scheme options, which are presented in Table 2. The economic analysis and preferred option assessment are based on these options.

Table 2: Shortlist Options

Option	Name	Description
1	Do Nothing	No works undertaken. Allow natural coastal and fluvial processes to continue.
2	Do Minimum	Maintenance works along existing earth embankments. Add small rock toe to the eroding coastal defences to slow erosion.
3	Improve 1	Rock revetment along the coast to manage erosion and wave overtopping (Section 1) Rock scour protection along Lamby Way Roundabout (Section 3) Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk. Scour protection added to Lamby Way Bridge.
4	Improve 2	Sheet piling along the coast to manage erosion and wave overtopping (Section 1) Rock scour protection along Lamby Way Roundabout (Section 3) Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk. Rock scour protection added to Lamby Way Bridge.
5	Improve 3	Concrete sea wall along the coast to manage erosion and wave overtopping (Section 1) Rock scour protection along Lamby Way Roundabout (Section 3) Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk. Rock scour protection added to Lamby Way Bridge.
6	Improve 4	Rock revetment along the coast to manage erosion and wave overtopping (Section 1) Sheet piling along Lamby Way Roundabout (Section 3) Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk. Rock scour protection added to Lamby Way Bridge.
7	Improve 5	Sheet piling along the coast to manage erosion and wave overtopping (Section 1) Sheet piling along Lamby Way Roundabout (Section 3) Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk. Rock scour protection added to Lamby Way Bridge.
8	Improve 6	Concrete wall along the coast to manage erosion and wave overtopping (Section 1) Sheet piling along Lamby Way Roundabout (Section 3) Maintain earth embankment elsewhere and raise low points in earth embankments where required to reduce flood risk. Rock scour protection added to Lamby Way Bridge.

23. Based on the assessments undertaken the overall preferred option is Option 6: Improve 4:

- Section 1: Rock revetment along the coast to manage erosion and wave overtopping
- Section 3: Sheet piling along Lamby Way Roundabout
- Section 2, 4 and 5: Maintain earth embankments elsewhere and raise low points in earth embankments where required to reduce flood risk.
- Rock scour protection added to Lamby Way Bridge.

24. The proposed scheme will manage flood risk to 1,116 residential and 72 non-residential properties over 100 years, as well as preventing erosion of landfill material, key road infrastructure and the Rover Way Travellers Site.

Issues

25. If the Coastal Protection works are not implemented the coastline will continue to erode presenting significant risk to the area.
26. The Design Stages (including ECI) will be carried out under the terms and conditions of the ECC3 Professional Services Contract (June 2005) (with amendments 2006 & 2011), or similar. The Construction works will be carried out under terms and conditions of the Engineering and Construction Contract (June 2005) (with amendments 2006 & 2011) Option C Target Contract.
27. The NEC Suite of contracts is designed to promote a collaborative team working approach and is well suited to this kind of project. Several 'main options' are available within the NEC contract suite, with selection largely driven by the allocation of out-turn financial risk ownership between the project team. Option C is a target cost contract with an activity schedule. In this contract, the out-turn financial risks are shared between the client and the contractor in an agreed proportion, leading to its colloquial name of the 'pain-gain share' option. This approach has proven to be commercially attractive to Civil Engineering Contractors, as this it encourages proactive engagement with project risks by the whole project team. It sits well with general partnership approach of the NEC Suite, and the application of the NEC Suite to this project, where key project risk ownership would be anticipated to be shared.
28. Delivery of the project will require subsequent procurement exercises being undertaken for both the Design and Construction Stages, with the latter being substantially larger. The consultancy services for the Outline Business Case were procured under the Construction Consultancy Framework (ref. NPS-PS-0027-15) managed by the National Project Service (NPS), using the relevant 'Water Management' Lot under the framework. It is envisaged that the detailed design stage of the project would be procured using a similar arrangement. The construction procurement exercise will be completed following detailed design.
29. The Wales Coast Path and cycleway will be included within any design and construction for the Coastal Defences and the Council will work with Welsh Government to ensure there are no concerns for future phases of the Eastern Bay Link. Multiple benefits are a key consideration in the Welsh Government Coastal Risk Management Programme. Any additional requirements and costs associated with multiple benefits will be assessed following detailed design.
30. The liabilities in relation to contamination of the environmentally designated estuary from the erosion of the tip has not been determined. There will be a need to establish these contamination liabilities prior to

undertaking excavation within the foreshore. It is currently understood that Welsh Government provided a general indemnity to the Council in regard to any pollution incident arising on the land. However, if any such problem arises from activities carried out or permitted by the council after the date of the agreement, then the indemnity is reversed and the Council becomes liable to Welsh Government.

Local Member consultation

31. The Flood and Coastal Risk Management team are in the process of consulting the relevant local members from Rumney, Splott, Trowbridge, Adamsdown and Penylan. These wards are impacted by the extent of flooding, if a scheme did not proceed.

Reason for Recommendations

32. To commit to the funding and deliver the coastal defence scheme.

Financial Implications

33. Welsh Government have grant funded the development of an outline business case as indicated in this report. This has indicated indicative costs for design (£1 million) and construction (£10 million) totalling approximately £11 million (inclusive of VAT). The Coastal Risk Management Programme assumes that the WG would support 75% of design and construction costs (£8 million) whilst the Council will have to find the balance of 25% of the estimated cost (£3 million). Whilst Council's highlighted the affordability issues of such an approach, WG are unlikely to change the initial approach.
34. These infrastructure schemes can be subject to significant variations in costs unless risks are properly identified and mitigated. The next phase will be detailed design and costing which the directorate will use to assess risks and costs in construction prior to any procurement exercise. Accordingly any commitment towards completing construction works will need to be subject to final affordability of the expected construction costs and impact on the Council.
35. Subject to the approval of WG funding, the Council's Capital Programme for 2018/19 to approved by Council in February 2018 includes a capital allocation of £2.220 million with an additional £0.5 million assumed in the Lamby Way landfill provision set up for the aftercare of the site.
36. The costs associated with the design, ECI and construction phases have been estimated and include contingency and inflation allowance. The total value for Coastal Risk Management Plan Approval is approximately **£11,000,000;** The total value of the Welsh Government cost apportionment would be approximately **£8,000,000;** The total value of the CCC cost apportionment would be approximately **£3,000,000.**

Legal Implications

37. Cardiff Council has a discretionary power for managing coastal erosion under the Coast Protection Act (CPA) 1949. The CPA is intended to allow the Coast Protection Authority to carry out capital works. The powers given in respect of such works are generally permissive, thereby recognising the rights and obligations of riparian owners and other relevant parties, together with funding priorities
38. Cardiff Council are the landowners for the area subject to the OBC. The CPA sets out a procedure in regard to proposals for carrying out coastal protection works which includes consultation and possible consents from other affected bodies

RECOMMENDATIONS

Cabinet is recommended to:

1. procure the detailed design and construction of the coastal defences valued at £11M. The funding to be provided on an apportionment of 75% funded by Welsh Government and 25% by Cardiff Council.
2. commit to the 25% funding required to deliver the coastal defences in line with the Welsh Government Coastal Risk Management Programme.
3. Agree that a reassessment of the scheme is undertaken following the completion of the detailed design to confirm financial implications of construction and viability.

ANDREW GREGORY
Director City Operations
9 March 2018