Millport Coastal Flood Protection Scheme **Protecting the people of Millport**

Glasgow Street - Newtown Beach

What is the hazard?

- Water levels during an extreme storm event could be close to the promenade level.
- This part of Millport is sheltered by the Eileans, but large waves from the south can reach the sea walls and overtop the low defences.
- A dangerous level of wave overtopping can occur during severe storms.

What is at risk?

- Wave overtopping along this part of Glasgow Street is dangerous for people and vehicles during storm events with a return period of 10 years or more (10% probability).
- Properties to the east of College Street could be flooded due to storms with a return period of 50 years or more (2% probability).

Estimated cost of 1m high flood wall (Options 1 and 2) = £1,262,000

Estimated cost of 0.8m high flood wall (Option 3a) = £1,122,000

Proposed solution

The wave modelling results shows that offshore breakwaters (Options 2, 3a and 3b) would improve the nearshore wave conditions to this part of Glasgow Street compared with Option 1 (Pier Breakwater Extension).

Options 1 and 2

Option 3A

- significant risk of flooding and danger to pedestrians and vehicles.
- A 0.8m high concrete wave return flood wall would be needed to reduce residual overtopping to a safe level.

Option 3B

• Residual overtopping rates are reduced to a safe level without a flood wall.



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• A 1m high concrete wave return flood wall is needed to reduce residual overtopping to safe levels. • The location of the flood wall would be constrained in places by the position of sewer pipes.

 The offshore breakwaters would reduce overtopping rates by about 25% compared with Options 1 and 2. However, due to the very high water levels on a severe storm there would still be







Millport Coastal Flood Protection Scheme Protecting the people of Millport

Glasgow Street - Cross House

What is the hazard?

- Water levels during an extreme storm event could be above the promenade level near to the Cross House.
- This part of Millport is not sheltered by the Eileans so is directly exposed to the worst wave conditions from the south.
- A dangerous level of wave overtopping can occur during severe storms.

What is at risk?

- The Cross House is at risk of flooding every year on average.
- Properties from Mountstuart Street to the eastern end of Glasgow Street are at risk of flooding during storm events with a return period of 10 years or more (10% probability).
- Glasgow Street is located 10-30m inland of the coastal defences in this area, so there is not a direct safety risk to pedestrians and vehicles on the footpath and road.

Option 3b

An offshore breakwater extending 300m east of the northern Eilean would protect most of this area from overtopping and flooding.

The length of a breakwater here would need to be minimised to avoid changing wave conditions in the Kames Bay SSSI. This means that waves would be able to pass around the end of the breakwater.

Whilst Option 3B reduces flood risk to the west of the Cross House, overtopping would still occur at the Cross House headland.

> Estimated cost of 300m offshore breakwater (Option 3B):

> > £17,000,000



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Option 3B is not considered to be an appropriate flood protection solution for Millport because of the:

- very high cost
- possible impacts on the Kames Bay SSSI
- continued flood risks to the Cross House

Wave modelling results for Option 3b (storms occurring every 200 years on average, 0.5% probability)







Millport Coastal Flood Protection Scheme **Protecting the people of Millport**

Glasgow Street - Cross House

Options 1, 2 and 3a

Options 1, 2 and 3a do not affect the nearshore wave conditions to this part of **Glasgow Street.**

A rock revetment is not an appropriate solution in this area because of the low level of the promenade and the shallow slope of the foreshore. So for all of these options a flood wall would be required to reduce overtopping and flooding risks.

The flood wall would be constructed in the form of a wave return wall, with a curved profile to give the greatest reduction in overtopping.

A wave return wall constructed along the landward side of the promenade (C2 and D2) or set back along the seaward side of the footpath (C1 and D1) would significantly reduce overtopping risks in the vicinity of the Cross House for all options.

For both flood wall alignments, there would be a residual risk of overtopping during the most severe storms. For a wall along the rear of the promenade, residual overtopping would not have a direct safety implication as the footpath and road are up to 30m inshore of the promenade.

Drainage improvements to the area between the promenade and the footpath would minimise the residual risk of flooding to properties.

For a set back wall (C1 and D1), the residual flood risk could also be reduced by improving drainage to the road and the grassed area. However, with this option the Cross House would require additional flood protection.

The flood walls would be positioned and designed to maintain access between the road, the promenade and the beach, considering how the area is used. The shape of the wall and the construction materials will be selected to be appropriate to the local setting.

A flood wall along alignments C1 and D2 and drainage improvements are recommended for this area.

The flood wall alignment is not yet confirmed. Which do you prefer?

Estimated cost of 235m long, 1.2m high flood wall = £1,191,000



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Potential flood wall alignments at the eastern end of **Glasgow Street**

The visualisation is scaled to show a wave return crest wall approximately 1.2m (3ft 11in) high adjacent to the Cross House.



