

Design for Construction

The detailed design of the scheme has been progressed during 2021, based on the outline design that was shared during Flood Protection Scheme consultation (March - May 2021).

The detailed design phase prepares the package of information needed to build the scheme, including:

- Engineering design calculations
- Landscape design, including alignment of structures, appearance and materials to be used
- Detailed design drawings (based on the FPS outline design drawings)
- A specification of how to build the scheme
- Contract documents to tender for a contractor

It is important that the design process considers how the scheme will be built:

- To ensure the construction process is safe for construction workers and the public
- To achieve a cost effective design ('Value Engineering')
- To ensure climate change adaptability
- To minimise impacts on residents, visitors and the existing built and natural environment
- To minimise waste

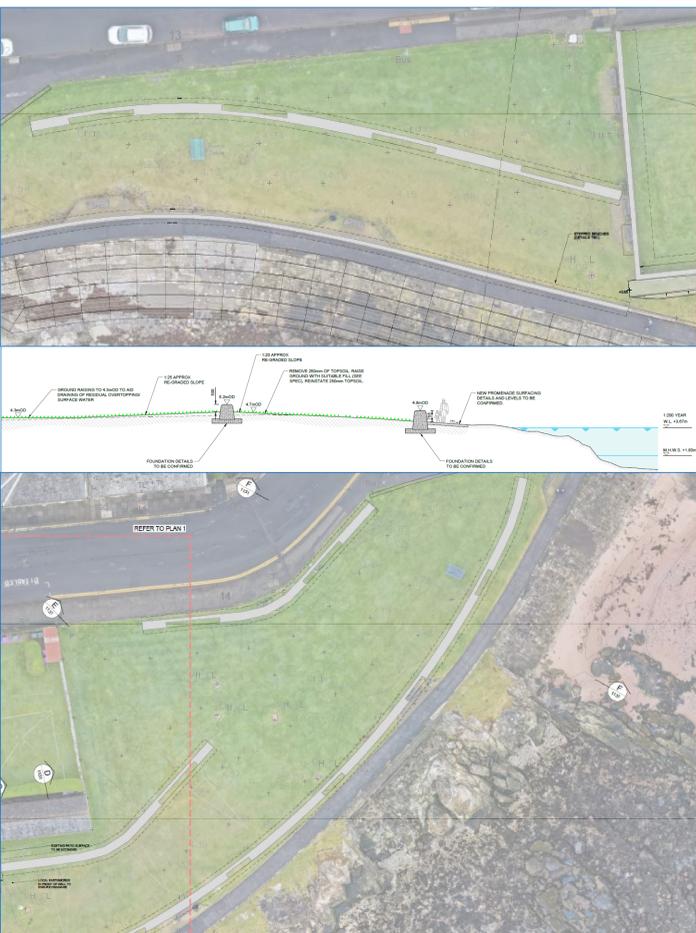
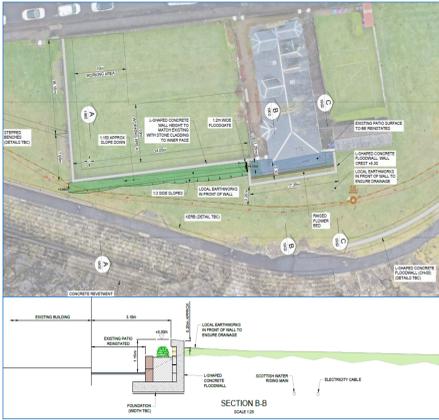
Issues that are being considered include:

- Transport of materials to Millport, aiming to minimise road transport and associated impacts on the ferry and local roads
- Minimising the amount of space required to build the onshore parts of the scheme, and any temporary road closures that might be needed
- Timing of the construction works, e.g. minimising work during the summer (as far as practicable)
- Minimising impacts on navigation and moorings while the offshore works are built

We are asking questions of various construction contractors and materials suppliers to get input on the buildability and safety of the design, options for materials supply and delivery and to inform an update of the cost estimate.

How has the design changed?

- Review of access to the foreshore, and provision for all users of the seafront, including areas where disabled users can sit with their friends and family (further details provided on the Landscape Design display board).
- Detailing of the shape of the stepped revetments proposed for Crichton Street and near to the Cross House, to tie in with the adjacent rock outcrops, in terms of their appearance and for ease of construction (further details provided on the Landscape Design display board).
- Optimising the length of the rock revetment at Clyde Street (reduced length).
- Considering options for improving the appearance and condition of the crest of the Stuart Street sea wall, considering buildability issues, cost and ongoing maintenance.
- **Position and form of structures at the Cross House. We have consulted with Cross House residents and owners about these changes.**
- Considering options for the replacement of the shelter at Kames Bay (further details provided on the Landscape Design display board).
- Minimising the 'clashes' between the design and existing Scottish Water assets and other utilities infrastructure, including reducing the extent of ground raising to the grass areas on Glasgow Street and Kelburn Street.
- **Related to the need to avoid clashes with utilities infrastructure, the relatively high flood walls to the east and west of the Cross House have been replaced with two tiers of lower flood walls, as shown on the images below. Ground levels between these walls would also be modified. We would like your feedback on these changes.**



The information provided here about the expected construction process is based on the design team's understanding of the typical approach to construction for similar coastal flood protection schemes. The exact timing of the works and the methods used will depend on the appointed construction contractor.

Materials delivery and site compound

The Contractor will be required to plan the delivery of construction materials to minimise impacts on ferry users and local traffic.

Rock armour would be delivered by barge, most likely sourced from Glensanda (Loch Linnh, Highlands). Deliveries will be as required for the offshore and foreshore works.

Concrete for the flood walls and stepped revetments: will be delivered as precast units wherever possible and stored at the site compound until needed. Delivery timings will be optimised to minimise traffic impacts, and considering when the units will be installed.

Options for the delivery of construction materials to Cumbrae include:

- Deliveries offloaded at the Calmac ferry slipway, a temporary slipway or Millport Pier.
- Use of the ferry slip would impact regular ferry traffic.
- Millport Pier would need a lot of refurbishment. Deliveries to the Pier would have the greatest impact on traffic and local businesses.

Locating a temporary slipway and site compound for the contractor's offices and materials storage near to the Field Studies Centre may be the least disruptive option.

The location of the site compound and the arrangements for materials delivery will depend various technical issues and cost, and will be at the discretion of the construction contractor. Information about the options and their benefits and constraints will be provided in the tender information, and the contractor's proposals will be considered in the tender assessment.



Construction process and possible impacts

Offshore breakwaters

- Works likely to be in Autumn 2022 (better sea conditions, protection provided ahead of onshore works, avoids seal breeding season).
- Rock armour delivered by barge, constructed from barge / platform.
- Navigation restrictions within Millport Bay during construction, moorings and small vessel anchorages to be relocated.
- Likely to be occasional late working to make the most of low tides.



Onshore rock structures

- Works expected to be in Autumn 2022, planned around tides and weather.
- No change to height / width of structures from outline design.
- Rock armour delivered by barge, built construct from temporary causeway or floating platform.
- Noise levels will be monitored and minimised.
- Occasional late working may be needed to make the most of low tides.

Flood walls and crest walls

- Precast concrete flood wall units, installed by small cranes.
- The height of all walls has been minimised as far as possible.
- Wall units will incorporate timber seating, with spaces for disabled visitors.
- Designs based on local nature will be imprinted into the walls.
- There may be limited road closures or access restrictions. Residents will be informed of the details in advance.

Stepped revetments and Kames Bay terrace

- Existing concrete and masonry slopes will be broken out. Noise and dust levels will be monitored and minimised.
- Precast concrete units will be installed by small cranes, working from the foreshore and the promenade.
- Grass area at Kames Bay to be raised to meet the stepped terrace. The height of the stepped terrace has been reduced compared to the outline design.



Ancillary works

- Lighting columns and fairy lights will be retained or reinstated.
- Existing parapet handrails will be replaced. New handrails will be installed at all stepped access points.
- The promenade will be resurfaced.



For more information about the Millport Coastal FPS please visit the Flooding page on North Ayrshire Council's website: <http://www.north-ayrshire.gov.uk/MillportFPS>