Public Consultation Brochure

East Coast Railway Infrastructure Protection Projects

Preferred Scheme for
WHITEROCK BEACH TO SOUTH KILLINEY

Rialtas na hÉireann Government of Ireland | Tionscadal Éireann Project Ireland 2040

NTA Údarás Náisiúnta Iompair National Transport Authority

Jacobs

ECRIPP Iarnród Éireann Irish Rail

Iarnród Éireann Irish Rail

Co-funded by the European Union

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01 Introduction to the East Coast Railway Infrastructure Protection Projects

The East Coast Railway Infrastructure Protection Projects (ECRIPP) were established to provide improved coastal protection against predicted climate change effects of sea level rise and coastal erosion on the east coast railway corridor between Merrion Gates (Co. Dublin) and Wicklow Harbour (Co. Wicklow).

In recent years Iarnród Éireann has seen an increase in the frequency of storm events as a result of climate change. This necessitates more and more maintenance works to be carried out to respond to the effects of coastal erosion, wave overtopping and coastal flooding on the east coast rail line and supporting infrastructure. These works result in increasing disruption to existing services.

The Dublin to Wicklow section of the East Coast Railway is a critical part of the Iarnród Éireann rail network, with southside DART, Gorey commuter and Rosslare Europort Intercity services operating along this scenic route. ECRIPP will deliver the necessary enhanced coastal protection to the existing railway infrastructure in a number of key locations on this rail network.

Why are Coastal Protection Measures Required?

Iarnród Éireann has first-hand experience of the impacts of climate change on railway infrastructure on the east coast. Some areas of the east coast rail line have seen encroachment through the loss of coast of up to 20-30 metres in the last 10 years alone.

This has resulted in large losses of land, and incursions to such levels that the railway line between Dublin and Wicklow is vulnerable to further loss due to coastal erosion. This rate of loss will increase in line with climate change as storm frequency and intensity increases due to climate change.

These key sections of the coastal railway south of Dublin to Wicklow are particularly vulnerable to the impacts of coastal erosion, coastal flooding, wave overtopping and cliff instability. All of which are expected to increase both in frequency and severity in future years.

Each location is a standalone project as part of ECRIPP to address coastal erosion on the east coast railway corridor. Each project will be taken forward as a separate planning application submission and the programme for delivery may vary between the projects.

ECRIPP is funded by the Department of Transport, through the National Transport Authority under Project Ireland 2040 and is provided for in the Programme for Government and the National Development Plan.

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Figure 1: Seapoint during Storm Emma 2019

Figure 2: ECRIPP Key Locations Map

Five key locations, along a 65 km route have been **identified and assessed as particularly exposed to coastal erosion and climate change effects.**

Key Locations

The locations of the five projects are:

- Merrion Gates to Seapoint Beach
- Whiterock Beach to South Killiney
- Bray Head to Greystones North Beach
- Kilcoole to Newcastle
- Newcastle to Wicklow Murrough

Figure 3: Mount Merrion

Objectives of the East Coast Railway Infrastructure Protection Projects

The objectives of the projects are:

- Support the continued safe operation of rail services.
- Increase railway infrastructure resilience to climate change.
- Provide improved and sustainable coastal protection works against predicted climate change effects such as sea level rise, coastal erosion and storm surges on the east coast railway corridor.
- Secure the railway line for future generations.
- Allow for the long-term efficient management and maintenance of the railway corridor.
- Support sustainable low carbon local, regional, and international connectivity fostering a low carbon and climate resilient society.

Benefits of the East Coast Railway Infrastructure Protection Projects

Iarnród Éireann's role as a sustainable national transport system is recognised in the publication of the All-Island Strategic Rail Review commissioned by the Governments of Ireland/Northern Ireland which proposes a very significant increase in capacity of our existing infrastructure and future expansion of the rail network across the island. ECRIPP will aid Iarnród Éireann increased capacity and expansion ambitions by supporting the development of the DART+ Programme and other improvements to the rail network on the east coast of Ireland.

02 Public Consultation Process

The East Coast Railway Infrastructure Protection Projects includes two non-statutory public consultation phases.

Public Consultation 1 sought feedback on the Emerging Preferred Scheme for the five projects. This input helped refine the designs for Public Consultation 2 where the Preferred Scheme for each project is now presented.

Public consultations are an opportunity for communities and stakeholders to share their views while the design is still in development.

Feedback can be submitted via the project website, email, phone, or post. More details are available in the “How to Engage” section.

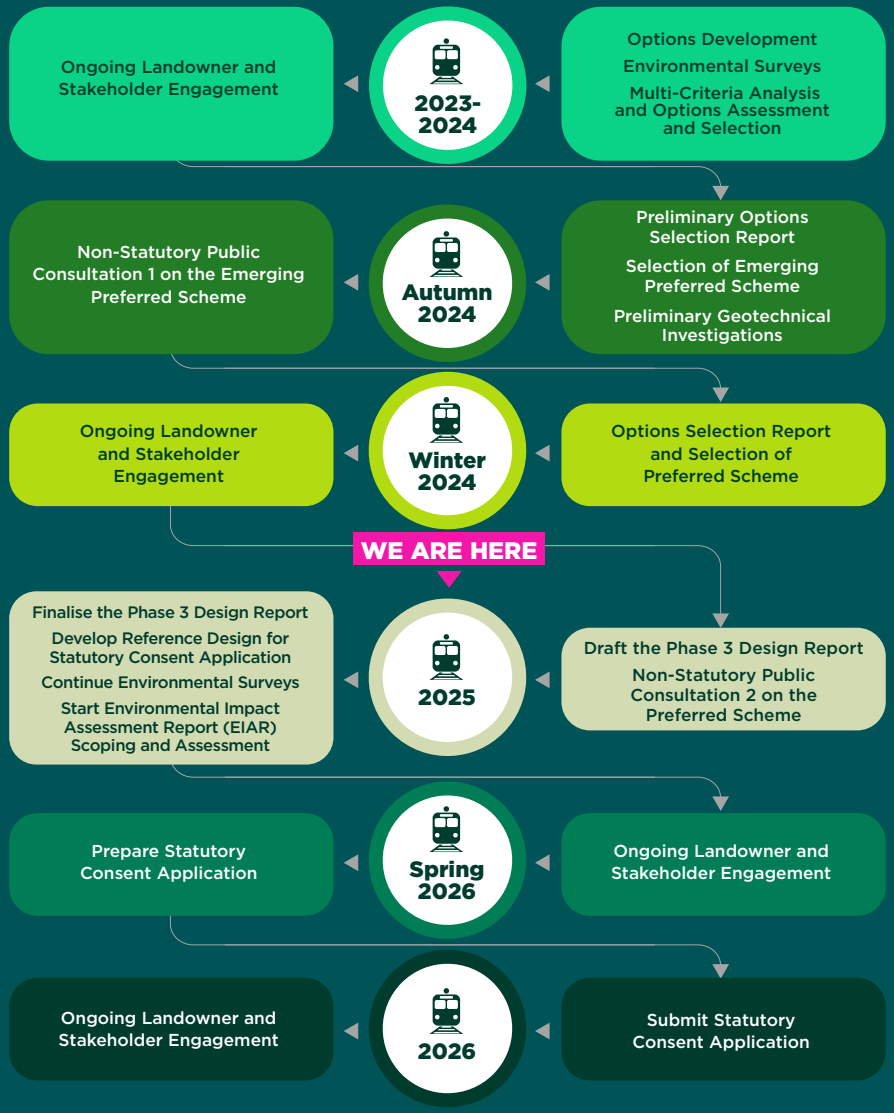

Figure 4: Consultation Roadmap

Figure 5: Bray Tunnels

03 Current Design Status

The project is in the Phase 3 Design Stage of the Preferred Scheme.

This stage refines the concept designs, clarifies structure, geometry and explores construction methods and ways to minimise impacts. Feedback from Public Consultation 1 has also been incorporated.

At Public Consultation 2, stakeholders have another opportunity to provide commentary on the Preferred Scheme, which will be documented and considered in the preliminary design.

Once this information has been reviewed and considered, the Preferred Scheme will be finalised and the preliminary design completed.

This design may be adjusted further based on technical, environmental, and stakeholder input.

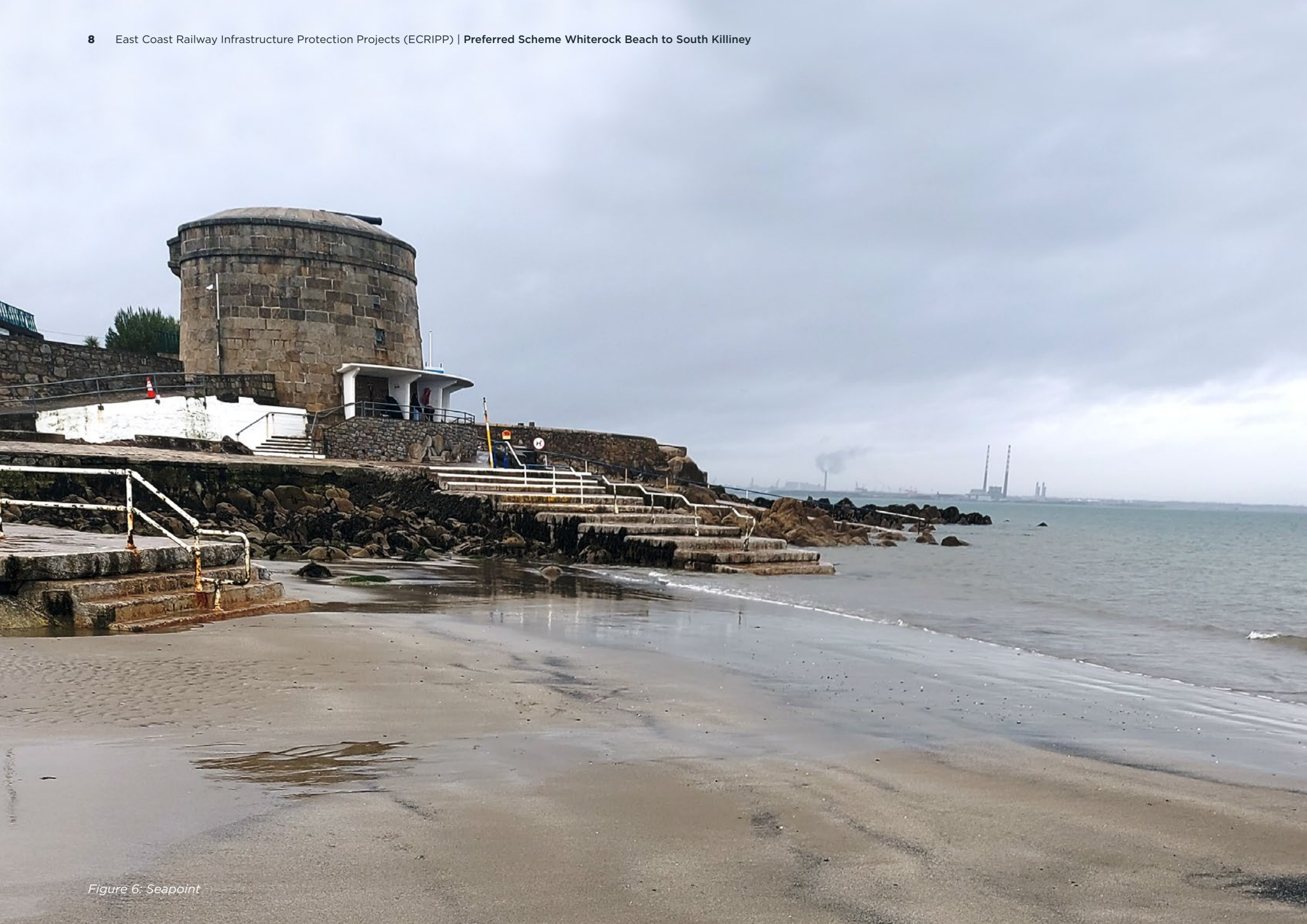

Figure 6: Seapoint

Figure 7: Typical Rock Revetment

04 Key Inputs of ECRIPP

The concept designs for each of the options considered the following:

- Wave climate and extreme water level data has been extracted from hydrodynamic modelling work undertaken during preliminary investigations for ECRIPP.
- Initial rock stability calculations have been undertaken to identify the required rock size to ensure long term stability of the rock armour.
- An assessment of wave overtopping rates during storm events has been undertaken. This includes an allowance for sea level rise. This analysis informs the required geometry of the improved defences to provide the required Standard of Protection (0.5% Annual Exceedance Probability, also known as a 1 in 200-year storm protection level).
- The condition of the existing coastal defences has been informed by condition survey.
- Defence type and material selection have been selected to provide a long design life and to minimise future maintenance requirements.
- Constructability and technical viability have been considered in the design to ensure the options are feasible.
- Within the bounds of each option form, the impact on the environment and community have been considered at a high level through multicriteria assessment (MCA).

05 Option Selection Process

To assist the design development process and to determine the Preferred Scheme for each of the five projects, a structured engineering process has been followed.

STAGE 1

Preliminary Assessment consists of the assessment of a long list of options against engineering, economic, and environmental criteria to evaluate the 'feasibility' of each option to meet the project objectives and requirements.

This approach allowed for the long list of options to be filtered to a shorter list of feasible options. All feasible options were brought forward to Stage 2 where they could be explored in greater detail.

STAGE 2

The Multi-Criteria Analysis process consists of a more detailed multi-disciplinary comparative analysis of the feasible options that passed through Stage 1.

The options for addressing coastal erosion and wave overtopping risks to the railway were evaluated using seven criteria: economy, safety, environment, accessibility and social inclusion, integration, engineering/technical, and planning risk to identify the Emerging Preferred Scheme.

Public Consultation 1 provided the public with the opportunity to provide commentary on the Emerging Preferred Scheme. This information has been reviewed and considered and the Preferred Scheme has been selected to progress to phase 3 design.

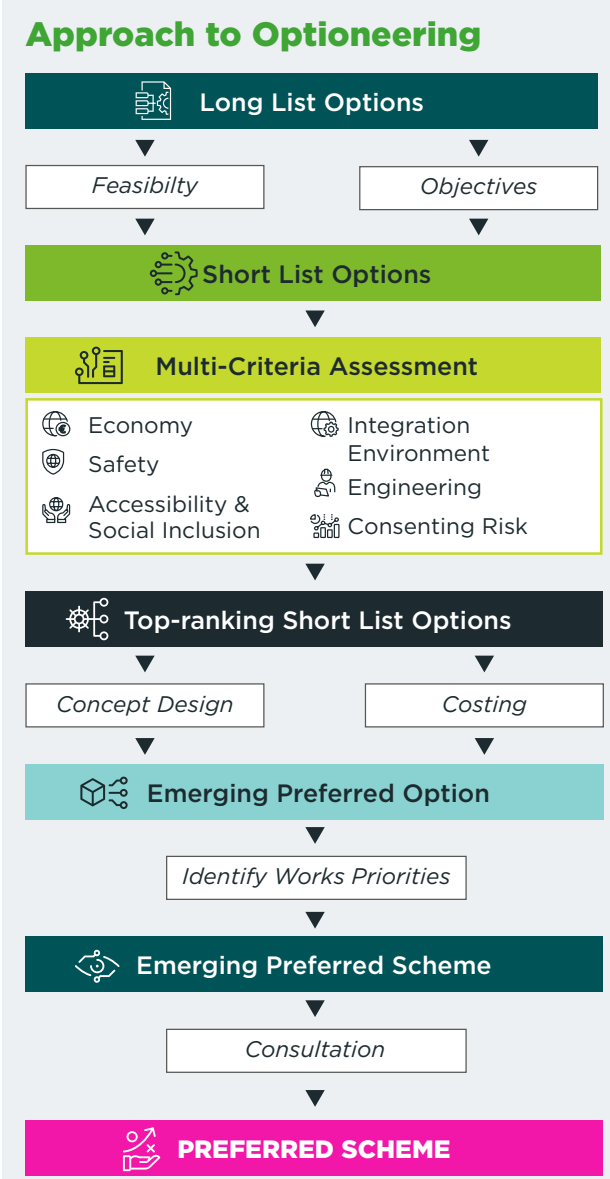

Figure 8: Approach to Optioneering Scheme

Figure 9: View from Blackrock beach

06 The Preferred Scheme – Whiterock Beach to South Killiney

The preferred scheme includes rock revetments at Whiterock and a raised footpath with a rear wall and beach access steps along Killiney. The Phase 3 design builds on the initial Phase 2 concept designs. Key improvements include optimised access to amenity areas compared to the earlier design.

The Whiterock Beach to South Killiney Coastal Project spans a diverse coastal area featuring natural hard cliffs, engineered embankments, and steep natural cliffs ranging from 6 to 12 meters in height.

The area is largely non-urban, with a railway line elevated above the coastline and supported in places by man-made structures. The project is divided into two main sections: Whiterock, which includes a masonry wall along the embankment, and Killiney/South Killiney, which extends from Killiney Beach car park to the Seafield Road underpass.

Key hazards include cliff instability, water run-off, coastal erosion, and shore platform lowering, with evidence of past structural failures due to these risks.

Project Objectives

The objectives of the project between Whiterock Beach and South Killiney are:

- To reduce the impacts of wave overtopping leading to erosion of the embankments that support the railway
- To reduce the risk of coastal erosion undermining the embankments that support the railway

Preferred Scheme

Design at Whiterock

The preferred solution at Whiterock is to construct a rock revetment in front of the existing masonry wall to reduce wave forces and the risk of slope erosion caused by overtopping. The Phase 3 design has focused on narrowing the revetment to lessen its impact on the beach. This was achieved by steepening the slope and reducing how much space the revetment takes up on the beach. Lowering the crest level also eliminated the need to raise the existing wall behind it.

The revetment will consist of two layers of 6-10 tonne armour rock placed over two layers of 0.3-1.0 tonne underlayer rock, with a geotextile beneath to prevent material loss. Where the existing wall is lower the crest width of the revetment will be approximately 5.8 metres (four rocks wide), and where the wall is higher, it will be reduced to about 4.3 metres (three rocks wide).

Design at Killiney and South Killiney

Phase 3 design has been refined to improve beach access and reduce visual impact. The front wave wall was removed and replaced with steps from the footpath to the beach. In northern Killiney, rock toe protection was also removed, but it remains necessary in South Killiney due to expected future beach lowering.

The footpath will be 3.0m wide along the whole of Killiney and South Killiney, providing a shared access path along the back of the beach for the full length. A rear wall, at the back of the footpath will also continue for the full length varying in height from +5.6 mODM at the north to +6.5 mODM in the south. The height of the footpath will also increase in south but this change in level will happen gradually to limit impact on access.

At the northern section of Killiney the new raised footpath will tie into the existing ramp. A new pedestrian ramp will also be incorporated to provide accessible access to the beach. Continuous access steps from the raised footpath to the beach will be included for approximately 50m. These access steps, as well as the ramp, extend below the existing beach level to ensure long-term beach access, even if beach levels drop. The existing access ramp and building south of the station car park will remain and in this location the footpath will extend seaward to maintain the 3.0m wide walkway in front of the existing building.

South of the existing building at Killiney, the access steps transition to wider, taller amenity steps over a 170m stretch, continuing to the existing concrete steps near Killiney station. The existing building and existing concrete steps along this section will be maintained with the footpath extending seaward to maintain the 3.0 m wide footpath in front of the structures.

South of the existing concrete steps and running 360m to the Seafield Road underpass, the beach narrows and wave conditions are stronger. Here, the rear wall height needs to be higher, and the footpath rises gradually to reduce the wall's exposed height. Amenity steps continue along this section with the addition of buried rock at the toe of the steps. At the southern end, the footpath slopes down to +3.5mODM to meet the existing path, and a pedestrian ramp is included to maintain beach access.

Safety features such as handrails and kerbs will be added where needed to prevent the risk of falls.

Future Adaptability:

The designs have been developed with future adaptability in mind. At Whiterock, extra rock armour can be added later if needed to reduce wave overtopping and erosion.
At Killiney and South Killiney, where future beach erosion is expected, structures include a sheet pile toe. This allows for the future addition of rock toe protection to prevent undermining and manage wave energy. In the long term, full rock revetments can also be added in front of the defences if required.

Maintenance

Minimal maintenance is planned for the revetments as they are designed to adapt to natural beach movement and toe scour. However, if a storm exceeds the design conditions during the revetments' lifespan, re-profiling of the rock may be required.

Land Acquisition

The Project Team have been identifying and engaging with landowners in relation to temporary and permanent land take for the project. This information will support the planning application and land acquisition requirements.

Environmental Assessments

Walkover surveys of the project area to inform the environmental baseline are ongoing. The Project Team have applied to MARA for a Marine Usage Licence (MUL) to undertake environmental baseline surveys in the foreshore which will inform the Environmental Impact Assessment Report and the Appropriate Assessment.

Construction

The project's construction approach remains largely unchanged from the Option Selection Report, with consistent materials and methods. Due to limited road access, rock armour will be delivered by sea, while plant and other materials will arrive by road. A main compound and smaller satellite compounds will support site operations.

Large volumes of rock will be stockpiled both on land and in the water, requiring heavy equipment that must be stored on-site. Killiney Beach, adjacent to Shanganagh Wastewater Treatment Plant is proposed as a staging area for equipment assembly and beach access. Rock is likely to be sourced from overseas, particularly Norway, with some local supply delivered by road.

Marine delivery involves self-discharging barges offloading rock at high tide, which is then moved up the beach at low tide using excavators. A temporary causeway may be needed. Precast concrete will be used for walkway sections to improve efficiency, with units delivered by road or rail and transported along the beach.

Figure 10: Preferred Scheme Location Plan

Figure 11: Illustrative view of raised footpath with a rear wall and beach access steps along Killiney Beach

Figure 12: Illustrative view of rock revetments at Whiterock

Figure 13: South of Kilcoole Station

07 Next Steps

Further Design Development

After this consultation, all feedback will be reviewed and used to help finalise the Preferred Scheme. A Consultation Findings Report will be published to document the feedback received.

Next steps include continued design development and option refinement, which will inform the Environmental Impact Assessment and Appropriate Assessment and other documentation in support the statutory planning process for the Project. Stakeholders will be afforded the opportunity to engage on the Project again at this point through the statutory stakeholder engagement process.

Public feedback is welcome throughout the design process and can be submitted via the project website, email, phone, or post.

Figure 14: Greystones

08 How to Engage

The project team is inviting public feedback on the Preferred Scheme. This is an opportunity for communities and stakeholders to share their views on the proposed coastal protection measures.

Local knowledge is essential to help shape and improve the design, ensuring it benefits both local communities and railway users, while also protecting infrastructure for future generations.

The consultation period is now open, and full details, including submission deadlines, are available on the project website.

Please contact us via the following means:

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