



Clontarf Promenade Interim Flood Defence Considerations

Options Assessment & Recommended Solution for
Interim Flood Defence Entity along Clontarf Promenade
(near Alfie Byrne Road)

Environmental Protection Division, Dublin City Council
October 2025



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1. Background

Like many countries, Ireland's coastal areas are increasingly vulnerable to tidal surges, storm events, and the long-term impacts of climate change, with associated difficulties for impacted Residents and Businesses. While the process continues for designing, planning and establishing an enduring flood defence system throughout the Clontarf coastal area, in a certain area of particular exposure near Alfie Byrne Road, an interim flood defence system has been deployed (circa 300 metres, comprising over 350 one-tonne sandbags).

Though serving the required defence functionality to a certain degree, the current system is recognised as having poor visual impact on the public realm at this part of the Clontarf Promenade. This has been an ongoing concern leading to engagement between Dublin City Council (DCC), the Office of Public Works (OPW), City Councillors, Oireachtas Representatives and Local Residents and Business Representatives.



Above: the 300 metres section of coastline (adjacent to the Clontarf Road) which his currently protected to a degree by the in-situ sandbags.

Having listened carefully to all of the views expressed at an on-site Clontarf Promenade meeting of key stakeholders with Minister Kevin Moran (OPW) in attendance (June 2025), the following was agreed;

DCC would undertake a thorough assessment and evaluation of the existing interim flood defence system along with a number of alternative solutions and DCC would return by Autumn 2025 with a recommendation for two/three preferred alternative solutions. To this end, a total of twelve possible options were identified and assessed across a comprehensive set of criteria, including technical performance, cost, environmental impact, operational feasibility, durability, and visual acceptability.

These considerations are laid out in this report and it is planned to present all options considered and to seek agreement and support from stakeholders, for the preferred solutions at a further onsite meeting planned for Tue Oct 14th at the Promenade.

During further meetings with DCC over the summer of 2025, the Minister encouraged the Council to use this assessment as an opportunity to explore whether any preferred solution could be replicated elsewhere and serve as a model for a more rapid response to flood risks nationwide. This would complement the longer-term measures currently being developed by the OPW and local authorities. If an interim solution is successfully implemented in Clontarf, it could deliver significant benefits and positive outcomes for communities across the country while more permanent solutions progress through design and planning stages.

2. Assessment Criteria - Description

It must be emphasised that interim flood defence systems are, by definition, less effective than a comprehensively considered permanent system. Nevertheless, significant protection can be delivered relative quickly to affected Communities in some circumstances.

The assessment framework of the options under consideration here, was designed to ensure transparency, objectivity, and alignment with national and international best practices. Each option was assessed and reviewed for its ability to aspire towards being versatile in mitigating negative impact at critical times, while also considering other criteria including deployment/response logistics, costs, together with community and amenity impact.

Following this assessment and evaluation, various interim interventions have been ranked as laid out in this report. As indicated above, any intervention that will be agreed with stakeholders, is not an enduring solution to the overall existing flood defence challenges, whether at this location or further afield in the wider Clontarf area. The permanent fully considered and modelled solution throughout the Clontarf coastline is a much more elaborate and lengthy process that needs to go through a rigorous planning process before conclusion.

As shown on Table 1, the options are scored according to;

1. Coastal Flood Protection Performance
The system's ability to withstand tidal surges, wave action, and high winds, ensuring effective defence during extreme events.
2. Durability & Maintenance Demands
Resistance to wear, weathering, and degradation over time, along with the frequency and cost of ongoing maintenance.
3. Deployment & Operational Feasibility
The ease and speed of installation, removal, and storage, including labour and equipment requirements – bringing in and out the entire 300 metre solution for each threat of flooding is impractical.

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4. Aesthetic/Amenity Impact

The aesthetic integration of the system into the promenade environment and its effect on public access and amenity.

5. Planning & Regulatory Requirements

Whether the solution requires formal planning permission (e.g. Part 8) or other statutory approvals, which can significantly affect timelines and feasibility.

6. Cost Magnitude

The estimated capital and lifecycle costs, and the likelihood of securing funding through local or national sources.

Note; While it is important to illustrate the completeness of option development in this report, it must be stated that those options requiring planning consent, are identified in the report as not viable short term solutions (due to the need for planning consent) and therefore, cannot be progressed at this time.

3 12no. Options Considered ('A' to 'L')

The following is a brief overview of the shortlisted solutions:

Option A - Retain the existing 350 no. 1-tonne sandbags



- Traditional method using 1-tonne sandbags.
- Bulky.
- Currently deployed along the site and generally serving their purpose adequately.
- Good response time logistics.
- Reasonable maintenance, low aesthetic value, and limited reusability with sporadic challenges.
- Low material cost; approximate average €5,000 annually.

Option B - Beaver Dam



- Modular, water-filled barrier system.
- Must deploy and remove, but lengthy response time to flood event.
- Suitable for temporary use but may have stability concerns in high-flow/wave conditions.
- Puncture risk/vandalism.
- Resource demanding for each time deployment and removal.
- Storage and transportation considerations.
- High cost, approx. €750,000 initially plus annual maintenance.

Option C - Low (Semi-Permanent) Concrete Wall at roadside as a continuation of wall in image.



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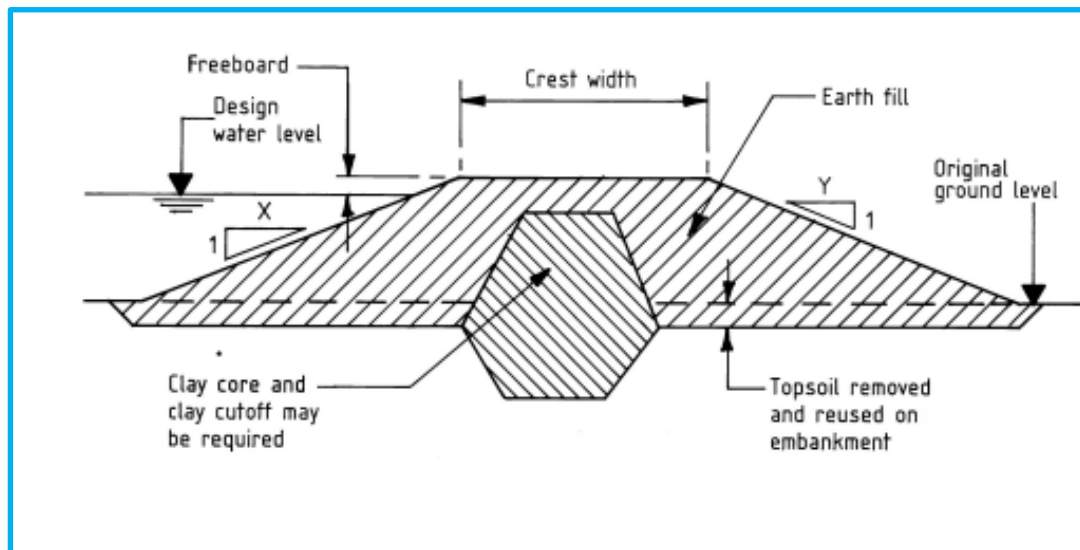
- Low wall (approximately 400mm in height and up to 300 metres in length), to integrate with existing low-level wall along Clontarf Road.
- The reduced wall height would not be as effective as the existing sandbags.
- Durable and less visually obtrusive, low maintenance.
- More than a 'temporary' installation, albeit removable if required when any new enduring solution delivered.
- Likely necessitating a planning application which would present considerable delays.
- Requires intermittent openings which additionally need to be closed when potential flood events are expected.
- Less flexibility for temporary use along with some more substantial work if removal needed as a result of the permanent scheme.
- Cost estimate €250,000 - €300,000 initially.

Option D - NOAQ box wall barrier



- Lightweight and portable.
- Fast deployment but may require anchoring and careful surface preparation.
- Anti - social behaviour risk – theft.
- Limited defence against tidal, high wind, wave action.
- Relatively low cost circa €80,000.

Option E - Earth Embankment



- Semi-temporary bunds formed from compacted soil or fill.
- Lower material cost and good flood resistance.
- Large footprint, natural materials (12 metres wide approximately).
- Higher amenity value, the crest may be designed to facilitate raised footpath/cycleway/seating area.
- More conducive to supporting biodiversity and amenity value
- Likely to require planning permission and associated environmental impact processes (1yr plus to deliver if successful).
- Higher estimated costs €750,000 to €1m.

Option F – Temporary Precast Interlocking Barrier – Seaside

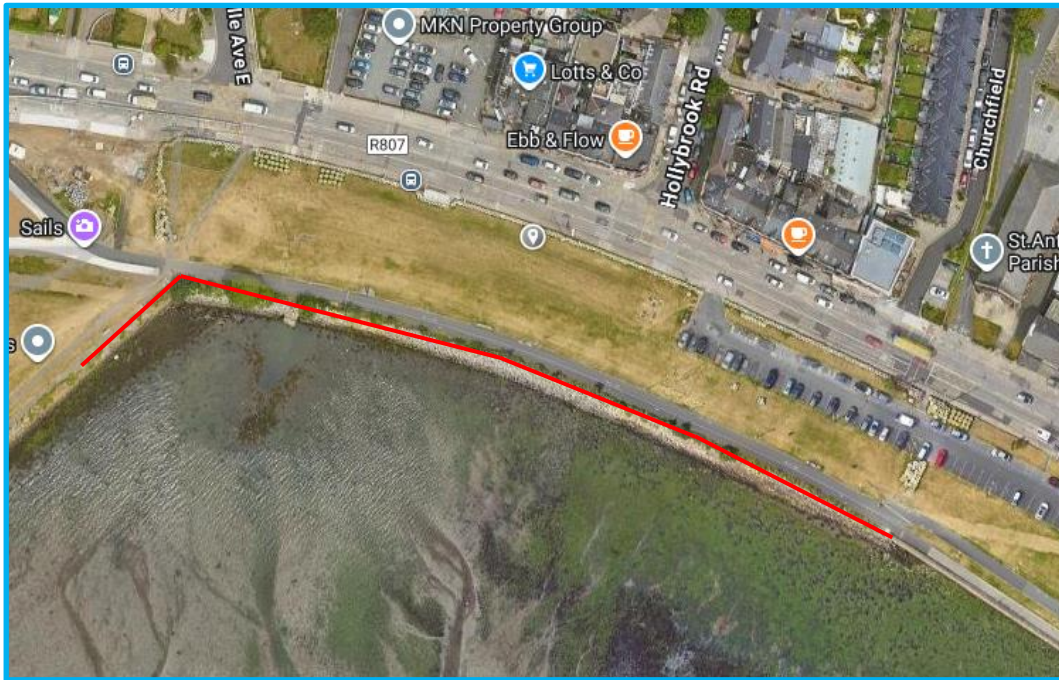


- Pre-fabricated interlocking concrete units (850 mm in height).
- High durability and stability, but marginally less than 'Option G', where the barrier would be placed along the roadside.
- Requires machinery for installation, however, essentially is a once off installation.
- Readily available for purchase, estimated costs €100,000.
- Green area and cycle area flooding less significant in a storm event.
- Minimal maintenance costs.
- Can be painted with aesthetically pleasing murals/visual art with appropriate planters attached and conducive to bench placement as demonstrated in visualisations.



Additional Seating and Decorative Features may be Considered

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Approximate alignment for Option F

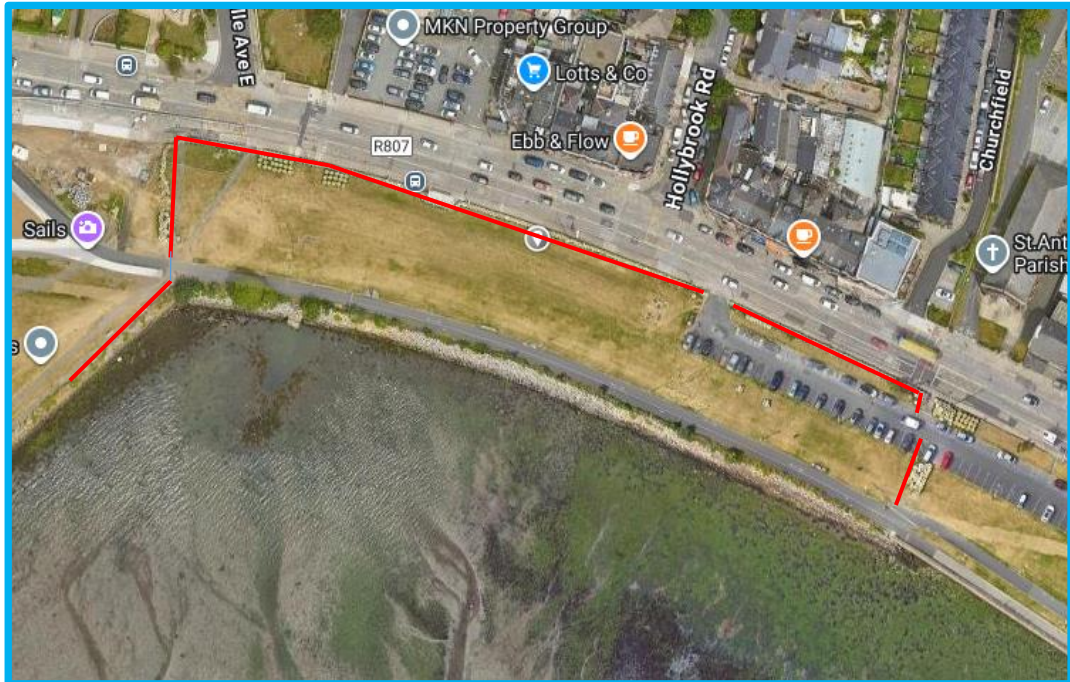
Option G – Temporary Precast Interlocking Barrier - Roadside



- Similar to Option 'F' but with an additional 50 metre length – including, pre-fabricated concrete units with pedestrian/bicycle openings required at various intervals (which will require additional flood defences deployment ahead of potential flood events).
- High durability and stability, which greater than that of 'Option F' (estimated costs €120,000).
- Heavy and requires machinery for initial installation, and additionally, to close/open pedestrian/cycling openings for every event.
- Green area and cycleway area flooding likely during a storm event.

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- Mural/Visual art-friendly also as with 'Option F'.
- Minimal maintenance costs.



Approximate alignment for Option G above – There would be four openings on that alignment to facilitate through movement.



Additional Seating and Decorative Features may be Considered

Option H - Hesco Floodline



- Sand filled units.
- Bulky.
- High durability and stability.
- Estimated cost of approximately €150,000 – 200,000, plus annual maintenance (€5k/annum).
- Similar benefits and challenges to the existing sandbags and options 'I - Rapid Dam' & 'J - Trap Bag' below.

Option I - Rapid Dam



- Bulky.
- Susceptible to anti - social behaviour.
- Not significantly different, either aesthetically or functionally to the status quo.
- Approximate cost of €100,000 + maintenance + storage of 'gap-filling' sections.
- Similar Challenges to options 'H' and 'J'

Option J - Trap Bag



- Sand or gravel filled units.
- High durability and stability.
- Similar challenges to the existing sandbags and the 'Rapid Dam' & 'Hesco Floodline' options, but this is a bulkier, more robust option.
- Approximate cost of €150,000 + maintenance.

Option K - Demountable Flood Barriers



- Modular panels mounted on fixed ground sockets, making this option a semi-permanent option.
- High performance and reusability.
- Requires permanent foundations and trained personnel for setup, on site storage required.
- Likely to require a planning process due to permanent nature of the foundations required.
- Cost estimated approximately €450,000, plus €50,000 per annum maintenance.

Option L - Concrete bench to the roadside of the existing footpath/cycleway



- Pre-fabricated concrete or composite units similar in effect to the images above, but semi-permanent in nature of installation.
- High durability and stability, but likely too elaborate as a temporary solution.
- Heavy and requires machinery for installation and removal.
- Cost estimated approximately €600,000.
- Planning permission is necessary which would add substantial delay to deployment.

4 Temporary Flood Defence Options Ranking Matrix

Matrix 1

Option	Coastal Flood Protection Performance	Durability & Maintenance Demands	Deployment / Operational Feasibility	Aesthetic/ Amenity Impact/Potential	Planning & Regulatory Requirement	Cost Magnitude	Points
A. Retain Existing Sandbags	8	5	7	1	9	6	36
B. Beaver Dam	7	4	2	2	7	2	24
C. Low Concrete Wall Roadside	6	10	4	8	3	4	35
D. NOAQ Box Wall Barrier	0	0	9	3	10	9	31
E. Earth Embankment	10	10	0	10	0	5	35
F. Precast Interlocking Barrier – Seaside	7	9	5	7	9	8	45
G. Precast Interlocking Barrier – Roadside	9	9	6	7	9	7	47
H. Hesco Floodline	6	5	4	0	6	5	26
I. Rapid Dam	5	5	9	5	9	5	38
J. Trap Bag	5	5	4	0	6	5	25
K. Demountable Flood Barriers	9	6	4	6	0	3	28
L. Pre-Fab Concrete Bench (Roadside)	9	9	5	6	0	3	32

Table 1

-  Positive solution - (Ranging 6- 10)
-  Neutral (Some challenges, but possible to deliver) - (Ranging 1- 5)
-  Negative (Considerable concerns, incl. cost and/or time required to deliver) - (0)

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The Order of Merit from the numerical analysis of the matrix has ranked the options 1 to 12 as follows.

Ranking

- | | | |
|---|--|--------|
| 1 | Option G - Precast Interlocking Barrier – Roadside | 47 pts |
| 2 | Option F - Precast Interlocking Barrier – Seaside | 45 pts |

Less desirable options:

- | | | |
|----|--|--------|
| 3 | Option I - Rapid Dam | 38 pts |
| 4 | Option A - Retain the existing 350 no. 1-tonne sandbags | 36 pts |
| 5 | Option C - Low (Semi-Permanent) Concrete Wall at roadside | 35 pts |
| 6 | Option H - HESCO Floodline | 26 pts |
| 7 | Option J - Trap Bag | 25 pts |
| 8 | Option B - Beaver Dam | 24 pts |
| 9 | Option E - Earth Embankment | 35 pts |
| 10 | Option D - NOAQ box wall barrier | 31 pts |
| 11 | Option L - Concrete bench to the roadside of the footpath/cycleway | 32 pts |
| 12 | Option K - Demountable Flood Barriers | 28 pts |

Note: The interim defence solutions presented in Matrix 1 above have been assessed and scored by a panel of experts from Dublin City Council's Environmental Protection Division. The panel comprises professionals with extensive experience in both the planning and operational aspects of flood management and emergency response. The Assessment panel members include the Executive Manager (Engineering), Senior Engineer from the Protection of Waterbodies Office, Senior Engineer from the Flood Projects Office, and the Senior Executive Engineer from the Flood Response & Asset Management Section.

5. Preferred Option

Following a comprehensive technical and professional analysis and evaluation, to consider twelve interim flood defence options. The **Option G –Precast Interlocking Barrier – Roadside**, has emerged as the top ranked solution as an alternative to the existing sandbag system along the Clontarf Promenade. This recommendation is based on its stronger performance across key assessment criteria:

- **Flood Protection Performance:** Provides robust defence against tidal surges and wave action, with proven structural integrity.
- **Durability & Maintenance:** Offers appropriate lifespan with minimal degradation, requiring significantly less maintenance than sandbags or soft-engineered alternatives.
- **Deployment & Operational Feasibility:** While heavy and requiring machinery for installation, this solution would be deployed on site continuously (from Autumn 2025) if agreement is reached with stakeholders to proceed.
- **Aesthetic/Amenity Impact/Potential:** Aesthetically, with artwork, planting, more appealing than sandbags.
- **Planning & Regulatory Requirements:** This temporary barrier can be installed without triggering planning procedures, offering flexibility and faster lead times to establish (Autumn 2025).
- **Cost Magnitude:** The proposed solution offers strong cost-effectiveness and aligns well with funding criteria for climate adaptation and resilience initiatives and is likely to be eligible for support from the Office of Public Works (OPW).

This report has outlined interim infrastructure options and associated considerations required to replace the existing 300 metre sandbag flood protection system, along the Clontarf Promenade, with an effective and more publicly acceptable solution. Through a robust professional and technical evaluation of twelve systems, the Precast Interlocking Barrier - Roadside (Option G) has emerged as the preferred option, primarily due to its strong technical performance, durability, and ability to defend nearby properties, also due to its more aesthetic/amenity impact (mural/planter friendly), and the feasibility/likelihood of being in place by Autumn 2025.

Although the preferred barrier system requires mechanical handling and careful site coordination during initial installation, its low maintenance requirements make it a highly practical and cost-effective choice for deployment. This option does require mechanical interventions to close/open cycling/pedestrian openings, ahead of and following significant events, but this is manageable as required.

Additionally, once the barriers are no longer needed at Clontarf, they can be repurposed for use elsewhere by the Council, further enhancing their long-term value.

6. Recommendation

An agreement on the top-ranked solution (**Option G: Precast Interlocking Barrier-Roadside**), would ideally to be reached at the upcoming Promenade site meeting (Tue October 14th from 10am), with a target implementation date of Nov 2025.

Should consensus not be achieved on this option, the 2nd ranked alternative **Option F: Precast Interlocking Barrier (Seaside)**, shares many of the advantages of Option G.

With thanks to all contributors, including OPW Colleagues and DCC's Roy O'Connor Senior Engineer, Gerry O'Connell Senior Engineer, Kevin Vallely Senior Executive Engineer, Sharon Galligan, Administration.

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The Environmental Protection Division of Dublin City Council

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