Cork City Flood Relief Scheme

m Deck 1 A **Presentation to Cork City Council**



the paulhogarth company ARUP

Process and Timeline

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Lee CFRAI	MS Study												
Lower Lee	e Flood Reli	ef Scheme											
July 2013 Farly PID at outset													
July 2013 to July 2014 Options Development and Appraisal													
July 2014 Emerging Preferred Option PID													
July 2014 to Dec 2016 Refinement and detailing of scheme													
Dec 2016 to April 2017 Statutory Public Exhibition of the Scheme													
April 2017 to Nov 2017 Consideration of Public Submissions													
Nov 2017 to June 2018 Part 8 Planning App & tendering for Morrison's Island													
July 2018 to July 2019 Morrison's Island Construction Works													
December 2018 Statutory Confirmation of Overall Flood Scheme													
Mid 2019 Construction of First Phase of Overall Scheme commences													

Ongoing Consultation



- One to one meetings (e.g. ICOMOS, Cork Chamber)
- Presentation to Joint Oireachtas Committee
- Today's Presentation
- Website Upgrade to be launched shortly
- Review of information dissemination processes ongoing
- Public Engagement Day for Morrison's Island
 Public Realm (display project plans and visuals at key points around the City)



Alternatives Considered Tidal Barrier



Tidal Barrier



Key Considerations are:

- Navigation & Navigational Safety
- Environmental Impact on Designated Sites
- Resilience, Reliability & Risks
- Climate Change Adaptability
- Cost

Tidal Barrier Location

Little Island Tidal Barrier Location

Tidal barrier Location

Great Island Barrier

Navigation and Navigational Safety

- Concept Barrier at Little Island would increase peak velocities by a factor of 3 resulting in potentially unsafe conditions for significant periods - Circa 1m/s to over 3m/s
- Extremely Unlikely to be acceptable to Port of Cork Company and/or other users of harbour
- Potential for increased ongoing dredging requirement



Environmental Impacts



- Little Island Concept Barrier would significantly alter velocities in and adjoining SAC and SPA and therefore potentially significant risk of adverse effect on designated sites
- Works to bypass route also in SAC
- Could thus trigger IROPI protocol, which would be very unlikely to succeed



Environmental Impacts



	Barrier Location					
Criteria	Little Island & North Channel	Great Island – Monkstown & Marlogue				
Upstream Storage Capacity (Present Day)	Sufficient	Sufficient				
Upstream Storage Capacity (MRFS)	Marginal	Sufficient				
Upstream Storage Capacity (HEFS)	Insufficient	Sufficient				
Areas defended	Excludes Midleton, Ballincurra and Passage West	Includes Midleton, Ballincurra and Passage West				
Road Works Required to National Route	500m road raising on N25	None required.				
Road Works Required to railway line	embankment construction required along railway	None required.				
Environmental	Effects SPA/SAC. Significant risk to designated zones.	Located considerable distance outside of the designated sites with significantly less risk to environmental receptors				

Great Island likely to represent optimum <u>future</u> Barrier Location



Navigation is seen as a right. It cannot be significantly restricted (Without incurring large compensation at least) Barriers require a high level of redundancy due to the high risk associated with their failure. More navigation gates is safer.

North Channel Bypass

A barrier at Little
 Island will require
 significant ancillary
 works due to a possible
 overland flow route to
 the North of Little
 Island

Environmental Impacts – Little Island Barrier located in or adjacent to SCA/SPA. Significant assessments would be required. Likely to have very long lead in time.

Deep Harbour – Increased risk and cost

Almost all International Tidal Barriers that facilitate inland navigation have 2 or more Navigation Gates

Barriers of this scale require significant maintenance

Reduced storage capabilities at Little Island – Barrier at this location will not be sufficient for High End Future Scenarios for Climate Change.



Navigation is seen as a right. It cannot be significantly restricted (Without incurring large

level of redundancy

due to the high risk associated with their failure. More navigation gates is safer.

North Channel Bypass

A barrier at Little
 Island will require
 significant ancillary
 works due to a possible
 overland flow route to
 the North of Little
 Island

Environmental Impacts

Little Island Barrier
 located in or adjacent
 to SCA/SPA. Significant
 assessments would be
 required. Likely to have
 very long lead in time.

Deep Harbour – Increased risk and cos

Almost all Internationa Tidal Barriers that facilitate inland navigation have 2 or more Navigation Gates

Barriers of this scale require significant maintenance

Reduced storage capabilities at Little Island -

Barrier at this location will not be sufficient for High End Future Scenarios for Climate Change. Walls still needed in city – To protect against fluvial flooding. And to reduce the number of possible barrier closures



	Not considered technically viable		
	Little Island Option Submitted at exhibition	Little Island Option Technically Amended Version	Great Island
Estimated Minimum Project Construction Cost (Barrier Only)	€291m	€656m	€1,206m.
Estimated NPV Total Cost including Fluvial Defences, Maintenance, Ancillaries and Contingency/Optimism Bias	€519m	€1,074m	€1,868m

Wallingford Cost Estimate Report

High level cost estimate of a concept barrier (not a feasibility report)

It notes sensitivity of cost to gate sizes Costs



Alternatives Considered Upstream Storage Options



Natural Flood Management





- Detailed review of NFM potential in the Lee catchment completed.
- Modelling indicates that 4,900 potential measures combined would only reduce the 100 year flow at Cork by 1-4%, i.e will not remove need for direct defences
- Potential for delayed peak flows on
 Shournagh to actually increase flood
 risk at Cork





Cork City Flood Relief Scheme

Existing Dam Storage



Submissions which suggest that the existing dams have sufficient storage to avoid defences entirely are flawed.

These assertions are premised on a number of incorrect assumptions and are based on a proposed operating regime which would jeopardise dam safety (significant increase in risk of overtopping)



Potential Raising of Existing Dams



Multiple options to increase storage by raising existing dams have now been assessed, taking account of real-world constraints.

All technically viable options have:

- Impact on Gearagh SPA/SAC
- Require displacement of a minimum of 80 properties
- Require raising or relocation of a minimum of 8km of national/regional roads
- Effectively sterilise a minimum 5km² of land
- Negative cost-benefit ratios
- No benefit in the tidal reach in Cork City so defence walls still needed



Management of Groundwater Flood Risk



Management of Groundwater Flood Risk

- Concerns about whether the scheme could increase groundwater beneath the island and cause flooding/damage
- This issue is recognised and well understood and is being assessed in detail
- Groundwater monitoring, pump testing and seepage analysis is ongoing





- Preliminary assessment to date confirms that groundwater flood risk will be manageable
- The scheme will not significantly impact the normal groundwater regime

North Mall Proposed Changes



North Mall – Existing

T

F

f

E

11 11

1

Pat M Dornell Paints

North Mall – Exhibited Scheme

TE

H

TI

H

. .

E

i i

5

Pat MEDormell Paints

1

H

Currently proposed alternative - Demountable Barrier





Final Design being developed with landscape and conservation architect in close collaboration with CCC



Sullivan's Quay Proposed Changes



Sullivan's Quay – Existing

 \mathbb{H}

MANSHER HER

Sullivan's Quay – Exhibited Scheme

READ

H TH THE ! O

+1

Ê

Currently proposed alternative - Demountable Barrier





Exhibition Report and Responses



Exhibition Report and Responses

The report addresses all issues raised including; potential alternatives, technical concerns, potential impacts, project delivery and site specific issues.



It will also set out proposed changes to the Scheme on foot of the submissions



Cork City Flood Relief Scheme

including Morrison's Island Public Realm Project





ARUP