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Blackrock Dart – Park Active Travel Scheme

Flood Risk Assessment

Dún Laoghaire-Rathdown County Council

June 2024

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1. Introduction

Dún Laoghaire-Rathdown County Council intends to apply for Part 8 planning permission to carry out a proposed scheme comprising the construction of Active Travel Facilities in Blackrock, Dún Laoghaire-Rathdown County.

The Active Travel Scheme will improve connectivity between Blackrock DART Station and Blackrock Park as well as providing a safe and attractive pedestrian and cycle link catering for all pedestrian and cycle users including, commuter, leisure, and family cycling groups.

The proposed project is located immediately to the west of Blackrock DART Station between Bath Place and Blackrock Park.

WS Atkins Ireland Limited (Atkins) was commissioned by Dún Laoghaire-Rathdown County Council (DLRCC) to prepare a Stage 2 Flood Risk Assessment (FRA) report for the Blackrock Dart-Park Active Travel Scheme.

1.1. Project Details

The proposed development commences at Bath Place (in the location of Blackrock Dart Station) passing through the grounds of the existing Deepwell House (protected structure: RPS No. 110). It includes the provision of 130m of a two-way cycle track varying in width from 3m to 3.65m, a 2m wide footpath and associated 1m and 3m grass verges, linking into the existing pedestrian and cycle path facilities in Blackrock Park by means of a new prefabricated bridge over the Priory Stream which is proposed to replace the existing narrow pedestrian bridge. A new sustainable urban drainage system will collect surface water run-off from the proposed development and will regulate discharge into the Priory Stream. The proposed development includes for a new public lighting system and landscaping which will be located within the proposed grass verges. The proposed development includes the retention of the existing masonry wall along the northern boundary and its extension at both ends to close off access to the existing laneway, whilst removing two sections of the existing wall to form openings for the proposed route. Where required, the height of the existing masonry wall will be raised to maintain a minimum height of 2.0m in relation to the finished scheme levels. The southern boundary of the proposed development includes the construction of a new boundary wall which will replicate the style of the existing boundary wall to the north and will be constructed at a height of 3.0m above the proposed back of verge level or existing private garden level, whichever is higher. Landscaping will be included as part of the route which will be inclusive of 2No. pillars located at the Bath Place entrance of the scheme. Ancillary works include but are not limited to landscaping and removal for future relocation of the existing folly.

Figures 1-1 and 1-2 below illustrate the project location.

Figure 1-1 - Scheme Location

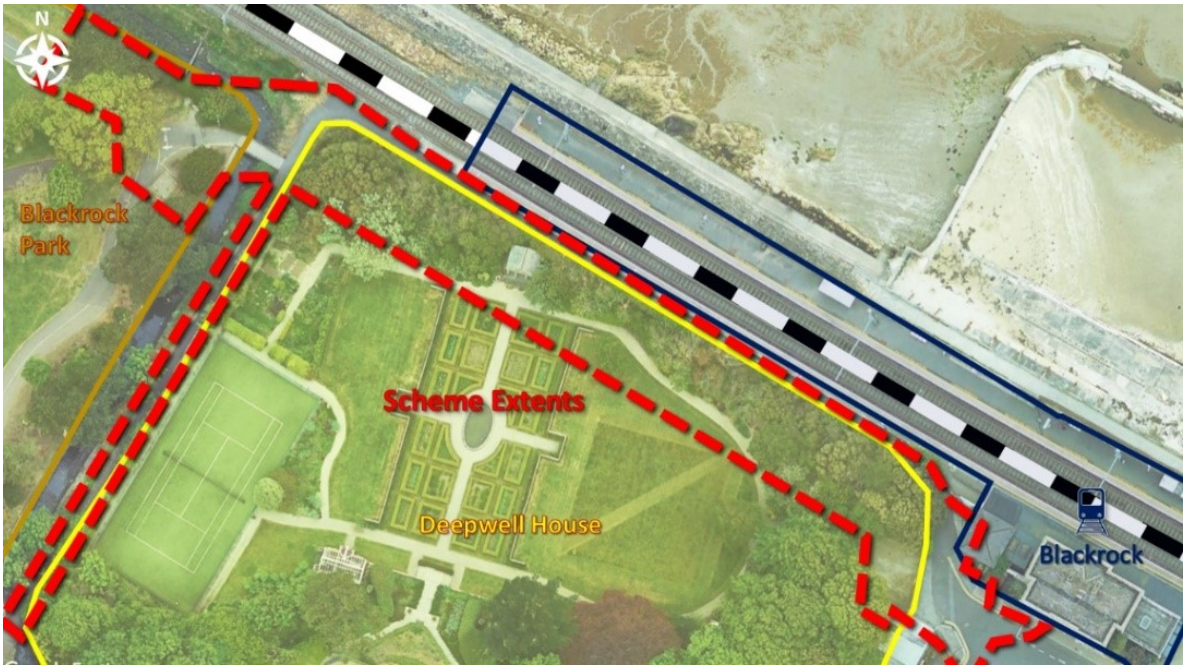


Figure 1-2 – Scheme Extents

1.2. Relevant Guidance

This FRA has been undertaken in consideration with '*The Planning System and Flood Risk Management – Guidelines for Planning Authorities'* DOEHLG November 2009, which is the latest guidance document.

The guidance has been issued to ensure that flood risk is a key consideration for developers, planning and regional authorities, and the public in preparing and submitting development proposals. The principles of the guidance are as follows:

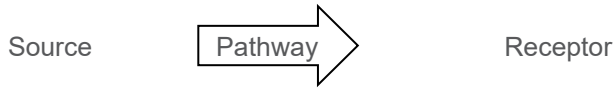
- Avoid the risk, where possible
- Substitute less vulnerable users, where avoidance is not possible, and
- Mitigate and manage the risk, where avoidance and substitution are not possible

A staged approach is recommended within the guidance document in relation to identifying and assessing flood risk. The three stages of appraisal and assessment are as follows:

- Stage 1 Flood risk identification
- Stage 2 Initial flood risk assessment
- Stage 3 Detailed flood risk assessment

1.3. Flood Risk

Flood risk can be quantified by relating the probability of the flood event occurring to the consequence of the flood. Probability, in flood event terms, is gauged by potential annual occurrence/return period and flood consequence is dependent on the nature of the flood hazard and the vulnerability of the inundated area. The source-pathway-receptor model considers the components of flood risk.



The source is the hazard with the potential to cause harm through flooding (e.g., rainfall, high sea levels). The pathway is the mechanism by which the source can affect the receptor (e.g., inadequate drainage, overtopping of coastal defences) and finally, the receptor is anything which is affected by the flood event (e.g., people, infrastructure, property).

1.4. Causes of Flooding

The Planning System and Flood Risk Management Guidelines requires an FRA to consider all potential causes of flooding including the following:

- Coastal flooding
- Inland flooding
  - Overland flow
  - River flooding
  - Flooding from artificial drainage systems
  - Groundwater flooding
  - Estuarial flooding
  - Failure of infrastructure

1.5. Floodplains

A river flood plain is a low-lying area which receives excess flood water when the flow within the watercourse exceeds the capacity of the channel. A coastal flood plain is an area which, during high tide or increased sea levels, becomes inundated with sea water.

1.6. Assessing Flood Risk

In the context of the 'Planning System and Flood Risk Management Guidelines, DOEHLG, 2009' three flood zones are designated in the consideration of flood risk to a particular site. The three flood zones are described in Table 1-1 below.

Table 1-1 - Flood Zone Description

Flood Zone	Description
Flood 'Zone A'	where the probability of flooding is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone B'	where the probability of flooding is moderate (between 0.1% or 1 in 1000 year and 1% or 1 in 100 year for watercourse flooding, and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).
Flood 'Zone C'	where the probability of flooding is low or negligible (less than 0.1% or 1 in 1000 year for both watercourse and coastal flooding). Flood Zone 'C' covers all areas which are not in Zones 'A' or 'B'.

The planning implications for each of the flood zones are:

Zone A - High probability of flooding. Most types of development would be considered inappropriate in this zone. Development in this zone should be avoided and/or only considered in exceptional circumstances, such as in city and town centres, or in the case of essential infrastructure that cannot be located elsewhere, and where the Justification Test has been applied. Only water-compatible development, such as docks and marinas, dockside activities that require a waterside location, amenity open space, outdoor sports, and recreation, would be considered appropriate in this zone.

Zone B - Moderate probability of flooding. Highly vulnerable development, such as hospitals, residential care homes, Garda, fire, and ambulance stations, dwelling houses and primary strategic transport and utilities infrastructure, would generally be considered inappropriate in this zone, unless the requirements of the Justification Test can be met. Less vulnerable development, such as retail, commercial and industrial uses, sites used for short-let for caravans and camping and secondary strategic transport and utilities infrastructure, and water-compatible development might be considered appropriate in this zone. In general, however, a less vulnerable development should only be considered in this zone if adequate lands or sites are not available in Zone C and subject to a flood risk assessment to the appropriate level of detail to demonstrate that flood risk to and from the development can or will adequately be managed.

Zone C - Low probability of flooding. Development in this zone is appropriate from a flood risk perspective (subject to assessment of flood hazard from sources other than rivers and the coast) but would need to meet the normal range of other proper planning and sustainable development considerations.

2. Site Description

2.1. Existing Site Conditions

The study area is generally comprised of the following existing site conditions:

- Blackrock Park which consists of formal pathways, cycleways and amenity grassland areas
- A bituminous paved laneway which is bounded to the north by the northbound platform of Blackrock DART Station and to the south by the existing stone boundary wall to private lands known as “Deepwell House”
- A section of the private gardens to “Deepwell House” which consists of formal gardens.
- An existing bridge which spans the Priory Stream

2.2. Topography

The topography of the scheme extents ranges between 0.8mOD (meters above ordinance datum) and 5.4mOD (OSI, 2022) within the study area. The proposed scheme runs parallel to the Dart line and the shore of South Dublin Bay.

2.3. Local Hydrology & Existing Drainage

The Priory Stream (IE_EA_09B130400) is located within Water Framework Directive (WFD) Catchment 09 /Liffey and South Dublin Bay Catchment. It flows through the western extents of the proposed active travel scheme. The priory stream within Blackrock Park is canalised with old stone vertical walls and banks within the proposed site and outfalls to South Dublin Bay.

Figure 2-1 below displays the local hydrology and water features adjacent to the proposed active travel scheme, the base map has been extracted from the Envision website which is the EPA’s interactive map viewer.

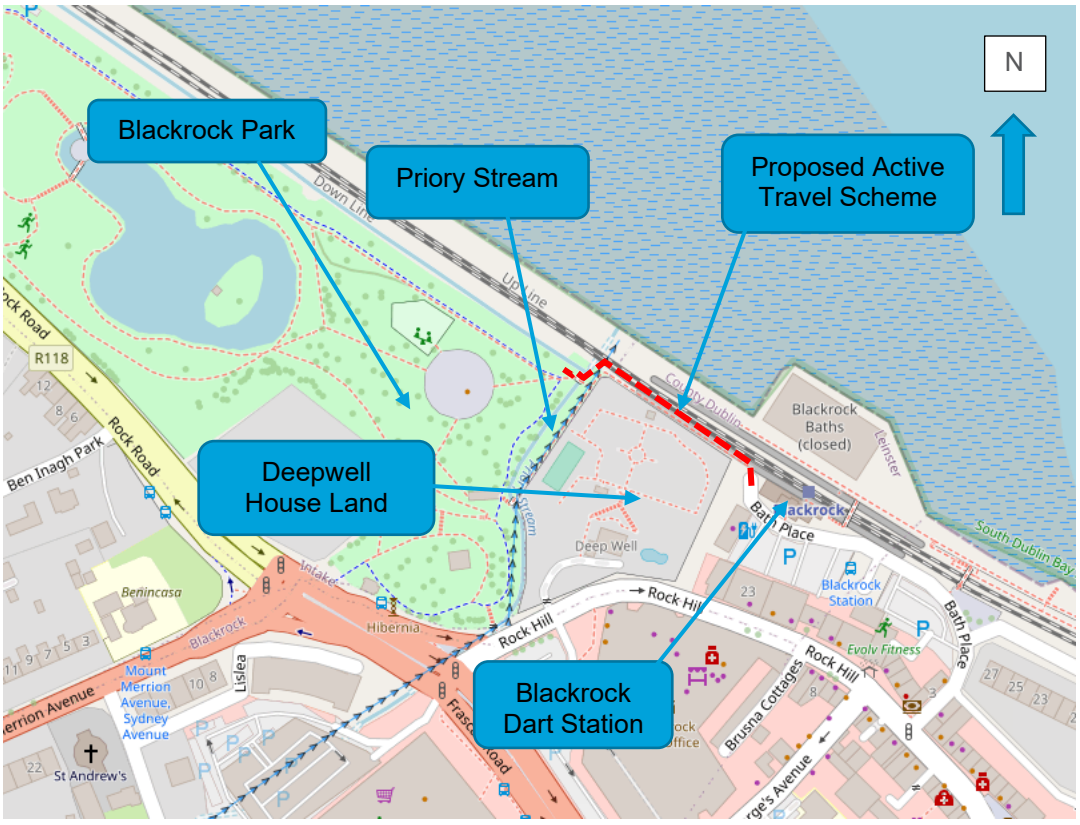


Figure 2-1 - Local Hydrology (EPA Envision)

3. Flood Risk Identification

3.1. Flood Risk Investigation

In accordance with the document "The Planning System and Flood Risk Management Guidelines for Planning Authorities" a Stage 1 Flood Risk Identification is required to be undertaken to identify if there are any flooding or surface water management issues related to the proposed development that may warrant further investigation. Initially, the following possible flood mechanisms for the proposed Active Travel Scheme have been identified:

Table 3-1 - Possible Flooding Mechanisms

Source/Pathway	Significant?	Comment/Reason
Tidal/Coastal flooding	Possible	The proposed site is located circa. 20m from the South Dublin Bay which has flood defence walls along it. The risk of tidal/Coastal flooding is deemed possible as indicated within coastal flood mapping.
Overland flow	No	The proposed travel scheme will be provided with a conventional drainage system. The risk of overland flow flooding along the proposed route is deemed to be low.
River flooding	Possible	The Priory Stream is adjacent to the proposed site. There is risk of flooding west of the proposed active travel scheme.
Flooding from artificial drainage systems	No	There are currently no existing artificial drainage systems along the proposed route.
Groundwater flooding	No	According to the OPW floodmaps (*floodinfo.ie*) there are no significant springs or groundwater discharges recorded in the immediate vicinity of the site
Estuarial flooding	Possible	The proposed site is located circa. 20m from Dublin Bay.
Failure of infrastructure	Possible	An existing pedestrian bridge located west of the proposed route has been identified, the current proposal is for the bridge to be replaced as part of this project.

Table 3-1 above indicates that there is a possible risk of coastal flooding and estuarial flooding due to the proximity to the South Dublin Bay and the possibility of fluvial flooding from the Priory Stream.

3.1.1. OPW Flood Maps

The Office of Public Works (OPW) interactive map viewer (http://www.floodinfo.ie/map/floodmaps) was consulted in relation to the proposed site to indicate the predicted flood extents for both rivers and coastal areas over various return periods. A Fluvial flood extents map (drawing No. e09car_exfcd_f2_07), Pluvial flood extents map (drawing No. e09dcc_expcd_f0_03), and Tidal flood extent map (drawing No. e09car_exccd_f2_07), specific to the site have been included in Appendix A, B and C respectively of this report.

The above maps provide an overview of the flood risk zones around the proposed site area. It can be observed based on the Fluvial and Tidal flood maps that the Priory Stream has not be modelled within the extents of the flood risk study. Furthermore the pluvial flood map does not extend to the proposed travel scheme area.

3.1.2. Irish Coastal Protection Strategy Study Flood Maps

The maps from Irish Coastal Protection Strategy Study (ICPSS), completed in 2013 were studied to review the risk of flooding to the proposed travel scheme area. The maps based on the current day, mid-range future and high end future scenarios are included within Appendix D and illustrate that the scheme area lies within the 1 in 200 year tidal flood extents.

3.1.3. Dún Laoghaire-Rathdown County Development Plan 2022 – 2028

The Dún Laoghaire-Rathdown County Development plan was consulted to review the Strategic Flood Risk Assessment for the proposed site. The Dun Laoghaire-Rathdown County Development Plan Strategic Flood Risk Assessment Map (SFRA) was consistent with findings from the ICPSS flood maps as it indicated that the site is located within Flood Zone A where the probability of flooding is the highest (greater than 1% or 1 in 100 year for watercourse flooding or 0.5% or 1 in 200 for coastal flooding). The extracted map from the development plan also shows that there is a potential of wave overtopping but it should be noted that there are flood defence walls along the South Dublin Bay which would prevent any waves from affecting the proposed active travel scheme. An extract from the Dun Laoghaire-Rathdown County Development Plan SFRA Map is shown in Figure 3-1 below.

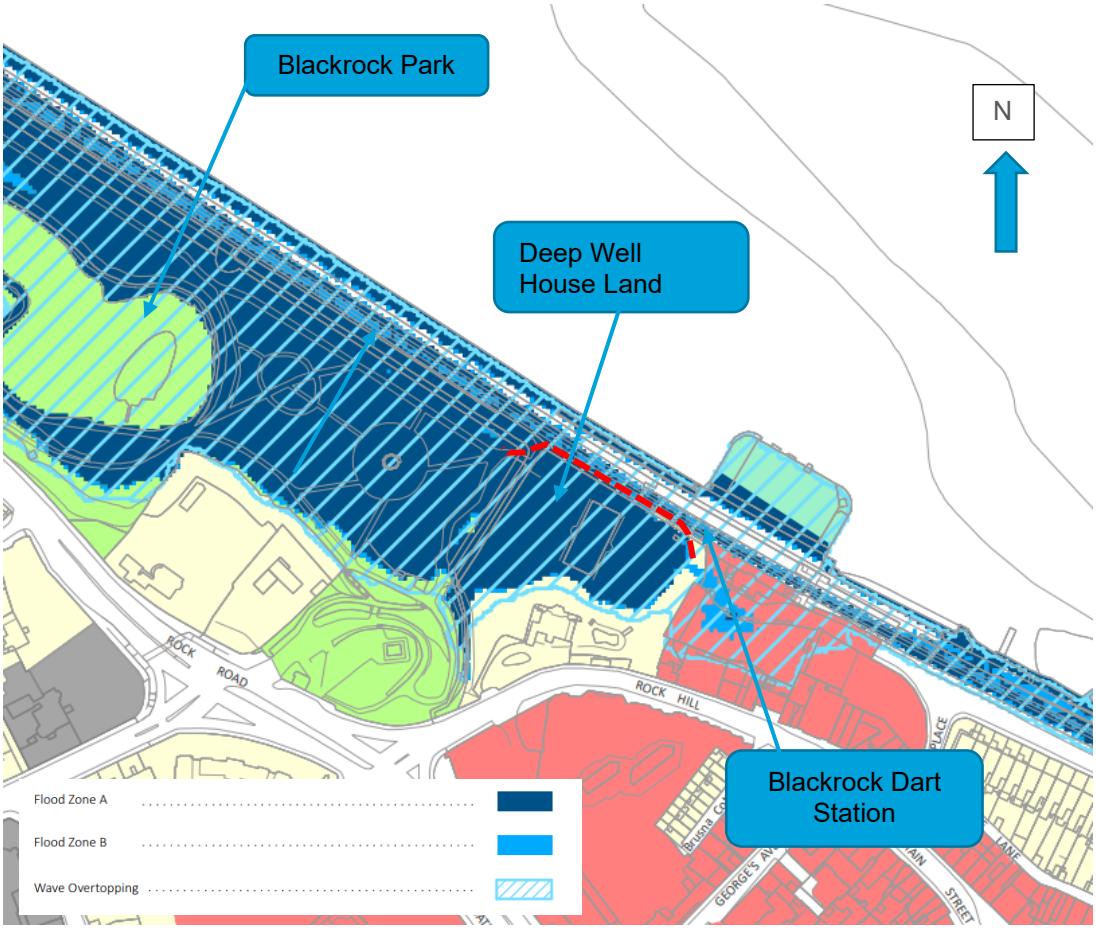


Figure 3-1 - Dun Laoghaire Rathdown County SFRA Map

3.1.4. Groundwater Flooding

Groundwater flooding occurs when the level of water stored in the ground rises as a result of prolonged rainfall to meet the ground surface and flows over it. Groundwater flooding tends to be very local and results from interactions of site-specific factors such as tidal variations. While water level may rise slowly, it may be in place for extended periods of time.

Groundwater flooding can occur during lengthy periods of heavy rainfall, typically during late winter/early spring when the groundwater table is already high. If the groundwater level rises above ground level, it can pond at local low points and cause periods of flooding.

As shown in Figure 3-2 below the groundwater vulnerability at the proposed site location is indicated as extreme. The maps indicate the groundwater vulnerability to an area when the groundwater table may be high. However, this map is only indicative of groundwater vulnerability and does not reflect the risk of groundwater flooding of the proposed site.

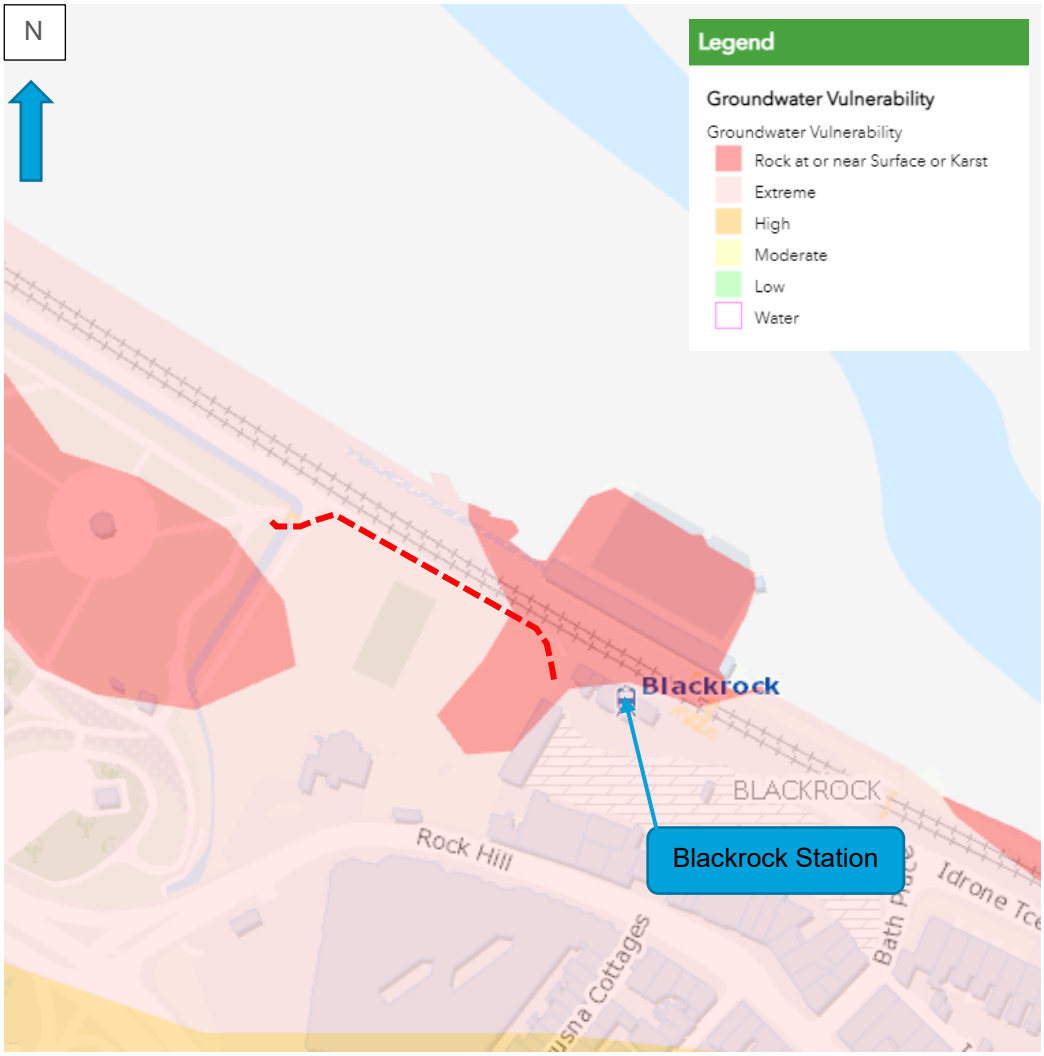


Figure 3-2 - Groundwater Vulnerability Map

3.1.5. Ordnance Survey Historic Mapping

The GeoHive map viewer (http://map.geohive.ie/mapviewer.html) was consulted to review available historic mapping for the proposed scheme which can contain evidence of historical flooding incidences or occurrences. The maps consulted were the pre-1900's historic 6-inch colour and 25-inch maps. The maps did not show any evidence of historic flooding along the Priory stream. The historic 6-inch maps and 25-inch maps are shown below in Figure 3-3 and Figure 3-4 respectively.

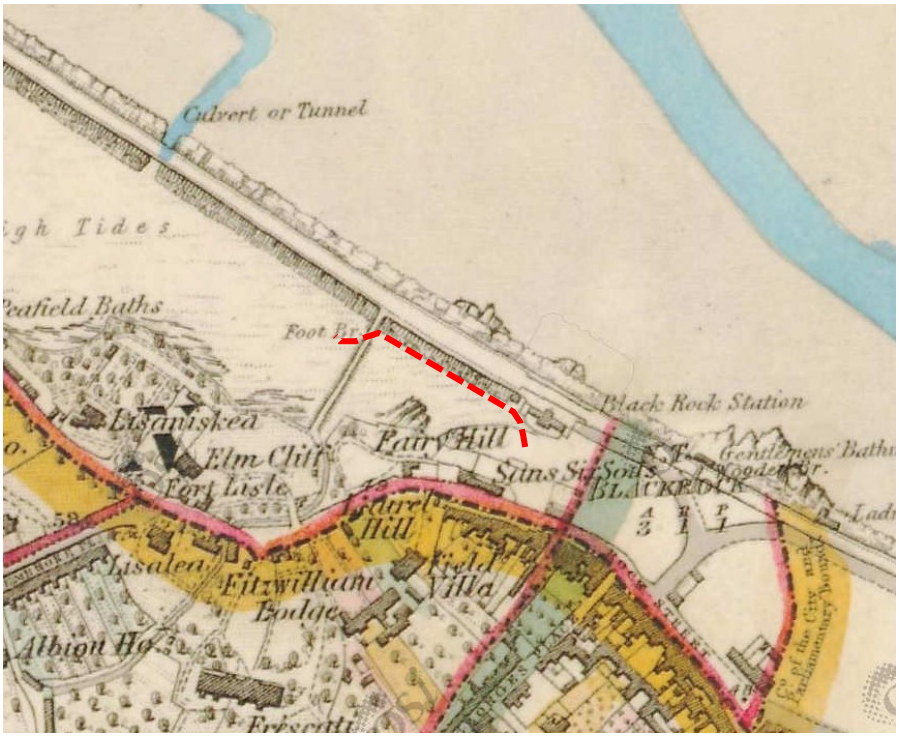


Figure 3-3 - Historic 6-inch Colour Map

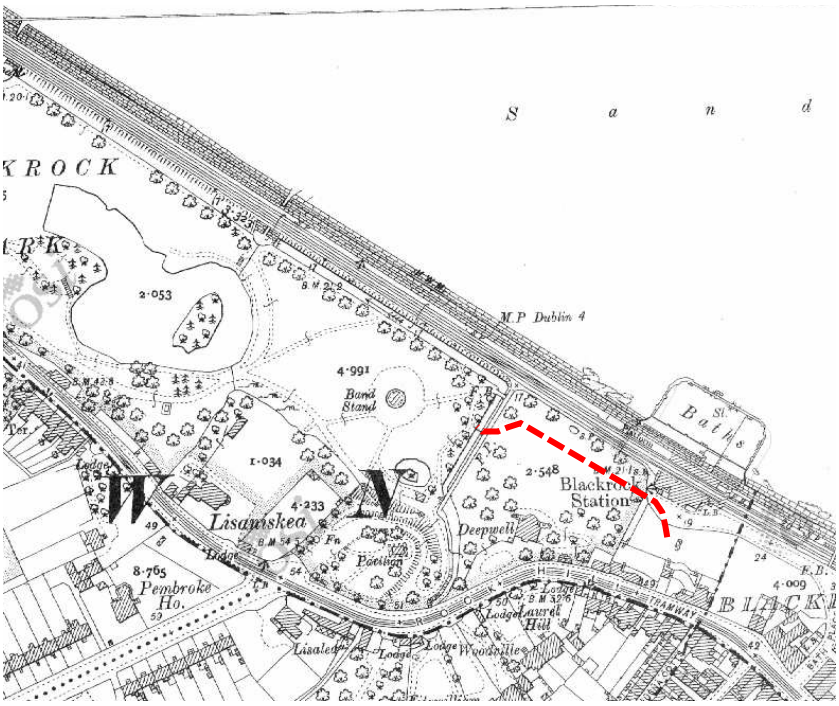


Figure 3-4 - Historic 25-inch B & W Map

3.1.6. Historic Flood Events

The Office of Public Works (OPW) interactive map viewer http://www.floodinfo.ie/map/floodmaps was consulted to view any historic flood events located within the proposed site. Flood events identified fell outside the proposed active travel scheme route. Refer to extract in Figure 3-5 below.

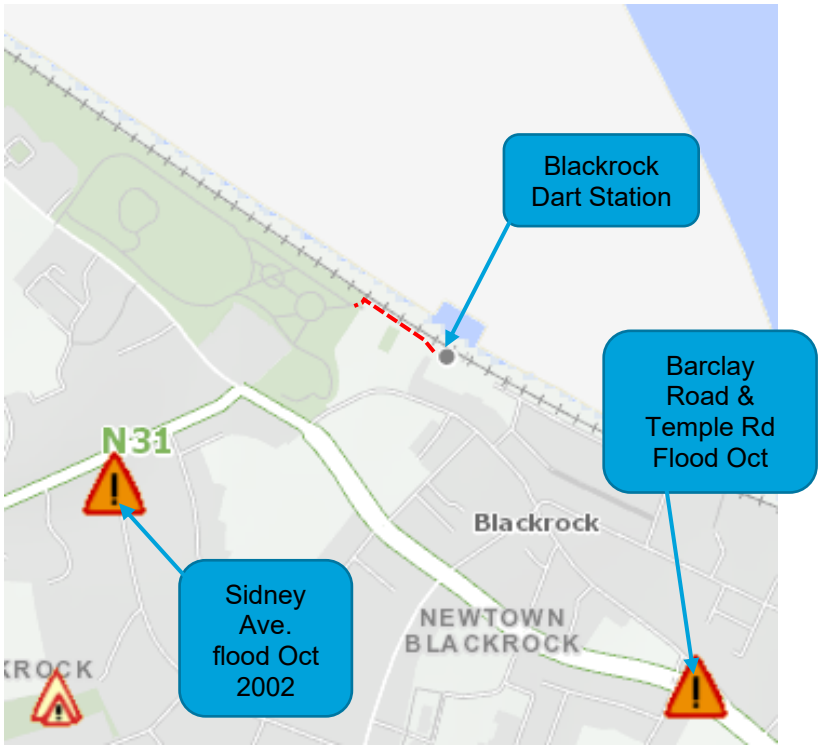


Figure 3-5 - Historic Flood Events

3.1.7. Potential receptors

A receptor of flooding can include people, their property, and the environment. The vulnerability of a potential receptor must be identified and reviewed for all sites which are at risk of flooding.

In accordance with the planning guidelines, it is deemed that the proposed active travel scheme should be classified as “water compatible”.

3.2. Conclusion of Flood Risk Identification

The purpose of the Stage 1 Flood Risk Identification process is to establish whether a flood risk issue currently exists or may exist in the future. If a potential flood risk issue is identified the risk will be investigated in further detail by undertaking a Stage 2 – Initial Flood Risk Assessment. However, if no potential flood risk is identified then the overall assessment can conclude at this point.

In relation to the proposed Blackrock Dart - Park Active Travel Scheme the basis of this Stage 1 - Flood Risk Identification findings discussed above in this report have identified that proposed site location is within Flood Zone A & B and at risk from Coastal/Tidal flooding.

3.3. Recommendations

The volume of displaced water due to the construction of the proposed new Active Travel Scheme and its associated boundary wall should be investigated further.

While the proposed active travel scheme is deemed to be “water compatible”, the possible displacement of water due to raised levels and associated boundary wall will require a Stage 2 Flood Risk Assessment to be carried out to determine any potential impact on the surrounding areas.

4. Stage 2 - Initial Flood Risk Assessment

In accordance with the planning guidelines, a *Stage 2 - Initial Flood Risk Assessment* is required to be undertaken to confirm the sources of flooding to the development site, to review the adequacy of existing information and to estimate the extents of possible flooding. The potential source identified to the Blackrock Dart – Park Active Travel Scheme at the initial flood risk stage is coastal/Tidal flooding from the Irish Sea (South Dublin Bay).

4.1. Assessment of Flood Levels

4.1.1. Coastal Flooding

The maps from Irish Coastal Protection Strategy Study (ICPSS), completed in 2013 were studied to estimate the flood extents. The closest node to the travel scheme is Point 24, approximately 1,250m from the proposed travel scheme, refer to Appendix D maps.

An existing built wall will preserve the Dart lines and the proposed travel scheme from the tidal spills and protect up to a limit from coastal flooding. The levels of flooding from the ICPSS maps for Point 24 can be seen in Table 4-1.

Table 4-1-Coastal Flood Level 0.5% AEP

Scenario	Water Level (OD) 10% AEP	Water Level (OD) 0.5% AEP	Water Level (OD) 0.1% AEP
Current Day	2.58	2.98	3.19
Mid-Range Future (+500mm sea level rise)	3.08	3.48	3.69
High End Future (+1000mm sea level rise)	3.58	3.98	4.19

Upon comparison with the flood levels above, the existing bridge with a soffit level of 2.34mOD and bridge deck level of 2.51mOD, refer to Appendix E, is at a risk of flooding from a 1 in 10-year event (high probability) based on the current day scenario (2.58mOD) and all other scenarios. In order to ensure that there is no displacement or change to flood water levels from the existing conditions, it is recommended that the soffit level of the proposed bridge deck should be either set at the existing level or higher than the existing.

4.2. Surface Runoff Investigation

4.2.1. Surface Runoff over Active Travel Scheme

The proposed development finished levels indicate that the levels will be higher than the existing levels from chainage 90.00 to 115.00 (25m) which can be seen in Appendix F. This provides the surface water a chance to percolate into the ground surface. The amount of water percolating can be calculated and can be discharged to the existing streams.

According to Long section (Appendix F), the level difference of the existing and proposed surface was calculated to get the area. These levels are assumed to be consistent for the whole width of the travel scheme which gives the volume under the cycle & pedestrian track, calculated as being **52.5 cu.m.** This volume is considered for water that can seep into the ground and will need relocation.

This kind of surface runoff should be captured using suitable Sustainable Urban Drainage Systems (SuDS) where feasible and designed in accordance with CIRIA report C753 ‘The SuDS Manual V-6’. The runoff can then be diverted and discharged into the Priory stream.

4.2.2. Surface Runoff behind Boundary Wall

The area behind the proposed boundary wall can be classified as a garden which can be seen in Error! Reference s ource not found.. The garden also contains concrete walking paths which runs along and diverts to the southeast of the proposed wall. The diverted walking paths slope down towards a small water pond.

Based on the topographical survey levels, it can be observed that all the surface runoffs will flow into and be contained in the pond. The rest of the area being an open garden is capable enough to infiltrate the surface runoff and no additional treatment is needed.

4.3. Application of Flood Risk Management Guidelines

4.3.1. Classification of proposed development

The proposed development is classified as a 'water compatible development' as per the vulnerability classification in the planning guidelines in Figure 4-1.

Table 4-2 illustrates the types of development that would be appropriate to each flood zone and those that would be required to meet the justification test.

Vulnerability class	Land uses and types of development which include*:
Highly vulnerable development (including essential infrastructure)	Garda, ambulance and fire stations and command centres required to be operational during flooding; Hospitals; Emergency access and egress points; Schools; Dwelling houses, student halls of residence and hostels; Residential institutions such as residential care homes, children's homes and social services homes; Caravans and mobile home parks; Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding.
Less vulnerable development	Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions; Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans; Land and buildings used for agriculture and forestry; Waste treatment (except landfill and hazardous waste); Mineral working and processing; and Local transport infrastructure.
Water-compatible development	Flood control infrastructure; Docks, marinas and wharves; Navigation facilities; Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location; Water-based recreation and tourism (excluding sleeping accommodation); Lifeguard and coastguard stations; Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan).
*Uses not listed here should be considered on their own merits	

Figure 4-1-Vulnerability Classification

Table 4-2-Matrix of Development Vulnerability and Flood Zone

	Flood Zone A	Flood Zone B	Flood Zone C
Highly vulnerable development	Justification Test	Justification Test	Appropriate
Less vulnerable development	Justification Test	Appropriate	Appropriate
Water-compatible development	Appropriate	Appropriate	Appropriate

4.4. Conclusion of Initial Flood Risk Assessment

In relation to the Irish sea and the proposed travel scheme, the proposed levels for the development were compared against the 1 in 200-year flood event. Based on the stage 2-*Initial flood risk assessment* findings discussed above in section 4.3, it is noted that the proposed development is an Amenity open space which fall under the water compatible development vulnerability class. According to Table 4-2, the flood risk study shall not require a justification test.

5. Conclusion and Recommendations

5.1. Conclusion

Atkins were commissioned by Dún Laoghaire-Rathdown County Council to prepare a Flood Risk Assessment (FRA) as part of providing Engineering-led Multi-disciplinary Consultancy and Design services for the concept development and option selection, preliminary design and statutory processes of active travel provisions and associated works on the Blackrock Dart-Park Active Travel Scheme.

The Blackrock Dart-Travel Active Travel Scheme is classified as a 'water compatible development' as per the planning guidelines.

The travel scheme as outlined to in section 3.1.2 is determined to be at a risk of flooding. Based on the Stage 1-*Flood risk identification* findings, the flood risk study identified the proposed site location within Flood Zone A & B due to Coastal/Tidal flooding which requires a Stage 2-*Initial Flood Risk Assessment*.For the Stage 2 – Initial Flood Risk Assessment, in relation to the travel scheme, the proposed levels for the development were compared against the 1 in 100-year flood event. It is noted that the levels within the proposed development are above the 1 in 100-year flood event and no justification test is required.

5.2. Recommendations

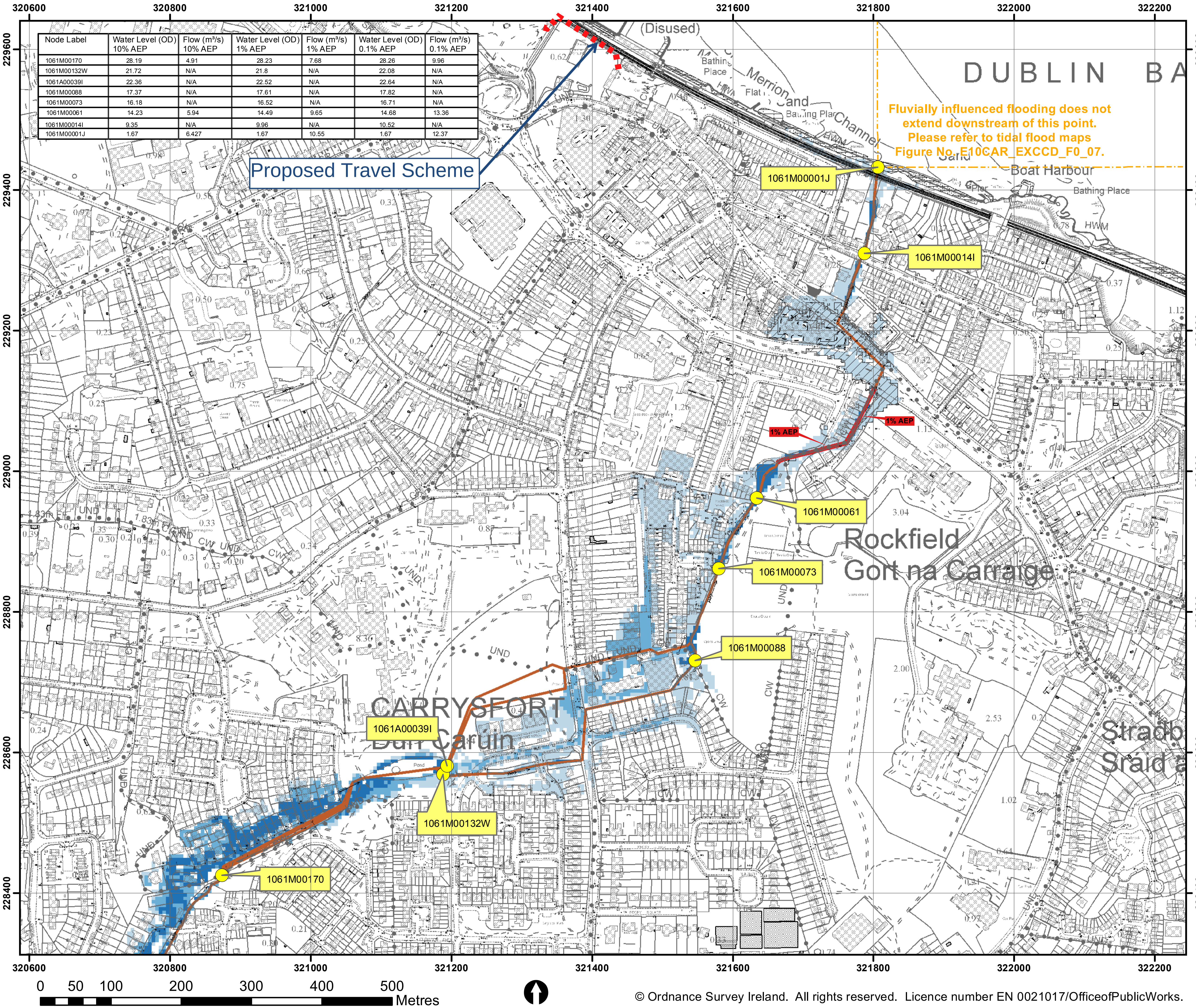
The following recommendations should be considered;

- The design for the proposed storm-water drainage is to take into consideration all other standards for drainage design, from the '*Greater Dublin Strategic Drainage Study Volume 2 – New Developments*.'
- Suitable Sustainable Urban Drainage systems (SUDs) are to be used within the proposed development to reduce surface water runoff from the site where feasible and designed in accordance with CIRIA report C753 'The SuDS Manual V-6'.

Appendices

Appendix A. Fluvial Flooding Extent Maps

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 1% AEP	Flow (m³/s) 1% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
1061M00170	28.19	4.91	28.23	7.68	28.26	9.96
1061M00132W	21.72	N/A	21.8	N/A	22.08	N/A
1061A00039I	22.36	N/A	22.52	N/A	22.64	N/A
1061M00088	17.37	N/A	17.61	N/A	17.82	N/A
1061M00073	16.18	N/A	16.52	N/A	16.71	N/A
1061M00061	14.23	5.94	14.49	9.65	14.68	13.36
1061M00014I	9.35	N/A	9.96	N/A	10.52	N/A
1061M00001J	1.67	6.427	1.67	10.55	1.67	12.37



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Fluvial AEP Event
- 1% Fluvial AEP Event
- 0.1% Fluvial AEP Event
- Modelled River Centreline
- AFA Extents
- Embankment
- Wall
- Defended Area
- 1% AEP / 1% AEP — Standard of Protection of Flood Defence (Walls / Embankments)
- Node Point
- Node ID — Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW — Oifig na nOibreacha Poiblí / The Office of Public Works
RPS

The Office of Public Works
Jonathan Swift Street
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F +44(0) 28 90 668286
W www.rpsgroup.com
E ireland@rpsgroup.com

Map:
Carysfort Maretimo Fluvial Flood Extents

Map Type:	EXTENT
Source:	FLUVIAL
Map Area:	HPW
Scenario:	CURRENT
Drawn By : C.C.	Date : 27 October 2017
Checked By : A.S.	Date : 27 October 2017
Approved By : S.P.	Date : 27 October 2017

Drawing No. :
E09CAR_EXFCD_F2_07

Map Series : Page 7 of 7

Drawing Scale : 1:5,000 @ A3

Appendix B. Pluvial Flood Extents

309000 312000 315000 318000 321000

234000

231000

228000

225000

Proposed Travel Scheme

1000 0 1000 2000 3000 4000 Meters

Location Plan:

LEGEND

- 10% AEP Pluvial
- 1% AEP Pluvial
- 0.5% AEP Pluvial

IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

The Office Of Public Works
Jonathan Swift Street
Trim
Co. Meath

Comhairle Cathrach Bhaile Átha Cliath
Dublin City Council

Dublin City Council
Civic Offices
Wood Quay
Dublin 8

Project:

DUBLIN PLUVIAL STUDY (FloodResilienCity)

Map: **DUBLIN CITY - PLUVIAL FLOOD EXTENT MAP**

Map Type:	EXTENT - 180min Rainfall		
Source:	PLUVIAL		
Map Area:	URBAN		
Scenario:	CURRENT		
Drawn by:	IH	Date:	Aug - 2016
Checked by:	MC	Date:	Aug - 2016
Approved by:	JM	Date:	Aug - 2016

Map No.:
E09DCC_EXPCD_F0_03

Revision: F0

Map Scale: 1:50,000 Plot Scale: 1:1 @ A3

Appendix C. Tidal Flood Extents

Node Label	Water Level (OD) 10% AEP	Flow (m³/s) 10% AEP	Water Level (OD) 0.5% AEP	Flow (m³/s) 0.5% AEP	Water Level (OD) 0.1% AEP	Flow (m³/s) 0.1% AEP
1061M00001J	2.64	3.86	3.04	3.86	3.25	3.86

Proposed Travel Scheme

1061M00001J

Tidally influenced flooding does not extend upstream of this point. Please refer to fluvial flood maps Figure No. E10CAR_EXFCD_F0_07.

320600 320800 321000 321200 321400 321600 321800 322000 322200

229600 229400 229200 229000 228800 228600 228400

(Disused)

Bathing Place

Merrion Strand

Bathing Place

Channel

Sand

Boat Harbour

Pier

Bathing Place

HWM

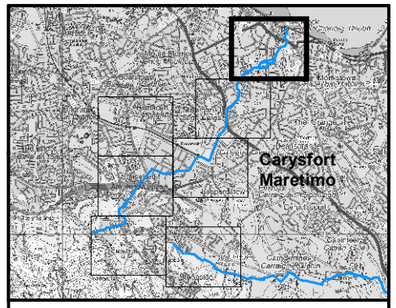
DUBLIN BA

Rockfield
Gort na Carraige

CARRYSFORT
Dún Caruin

Straid
Sráid a

0 50 100 200 300 400 500 Metres



IMPORTANT USER NOTE:
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

Legend

- 10% Tidal AEP Event
- 0.5% Tidal AEP Event
- 0.1% Tidal AEP Event
- Modelled River Centreline
- Node Point
- Node ID Node Label

FINAL

REV:	NOTE:	DATE:

EASTERN CFRAM STUDY
CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT

OPW Oifig na nOibreacha Poiblí The Office of Public Works
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E ireland@rpsgroup.com

Map:
Carysfort Maretimo Tidal Flood Extents

Map Type:	EXTENT	
Source:	TIDAL	
Map Area:	COASTAL	
Scenario:	CURRENT	
Drawn By :	C.C.	Date : 27 October 2017
Checked By :	A.S.	Date : 27 October 2017
Approved By :	S.P.	Date : 27 October 2017

Drawing No. :
E09CAR_EXCCD_F2_07

Map Series : Page 7 of 7

Drawing Scale : 1:5,000 @ A3

Appendix D. Irish Coastal Protection Study Maps

NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR PART OF THIS AREA (DODDER CATCHMENT ONLY) HAVE BEEN PREPARED UNDER THE RIVER DODDER CATCHMENT FRAM STUDY. PLEASE REFER TO WWW.DUBLINCITY.IE/PAGES/DODDERFLOODINGSTUDY.ASPX FOR MORE INFORMATION

Point 23

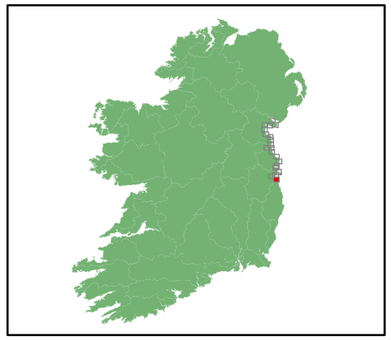
Point 24

Point 25

	Water Level (mOD Malin) per AEP		
Node Label	WL 10%	WL 0.5 %	WL 0.1 %
Point 23	2.64	3.04	3.25
Point 24	2.58	2.98	3.19

0.5 0.25 0 0.5 1 1.5 2 Kilometers

Location Plan :



EXTENT MAP

Legend:

- 0.5% AEP FLOOD EXTENT (1 in 200 chance in any given year)
- 0.1% AEP FLOOD EXTENT (1 in 1000 chance in any given year)
- Very High Confidence (0.1% AEP)
- High Confidence (0.1% AEP)
- Medium Confidence (0.1% AEP)
- Low Confidence (0.1% AEP)
- Very Low Confidence (0.1% AEP)
- Very High Confidence (0.5% AEP)
- High Confidence (0.5% AEP)
- Medium Confidence (0.5% AEP)
- Low Confidence (0.5% AEP)
- Very Low Confidence (0.5% AEP)
- High Water Mark (HWM)
- Node Point
- Point 34 Node Label (refer to table)

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

RPS
Elmwood House
74 Boucher Road
Belfast
BT 12 6RZ
Northern Ireland

OPW
Office of Public Works
17-19 Lower Hatch Street
Dublin 2
Ireland

Project :
IRISH COASTAL PROTECTION STRATEGY STUDY - PHASE III

Map :
NORTH EAST COAST FLOOD EXTENT MAP

Map Type :	FLOOD EXTENT		
Source :	TIDAL FLOODING		
Map area :	RURAL AREA		
Scenario :	CURRENT		
Figure By :	PJW	Date :	**Jan 2010**
Checked By :	JMC	Date :	Jan 2010

Figure No. : NE / RA / EXT / 20

Revision 1

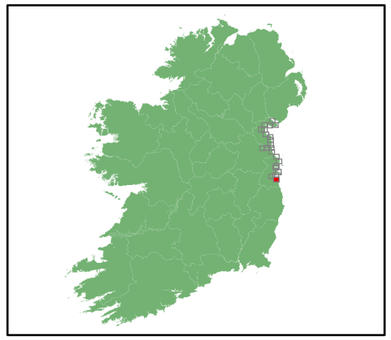
Drawing Scale : 1:25,000 Plot Scale : 1:1 @ A3

NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR PART OF THIS AREA (DODDER CATCHMENT ONLY) HAVE BEEN PREPARED UNDER THE RIVER DODDER CATCHMENT FRAM STUDY. PLEASE REFER TO WWW.DUBLINCITY.IE/PAGES/DODDERFLOODINGSTUDY.ASPX FOR MORE INFORMATION

	Water Level (mOD Malin) per AEP		
Node Label	WL 10%	WL 0.5%	WL 0.1%
Point 23	3.14	3.54	3.75
Point 24	3.08	3.48	3.69
Point 25	3.08	3.49	3.72

0.5 0.25 0 0.5 1 1.5 2 Kilometers

Location Plan :



EXTENT MAP

Legend:

- 0.5% AEP FLOOD EXTENT (1 in 200 chance in any given year)
- 0.1% AEP FLOOD EXTENT (1 in 1000 chance in any given year)
- High Water Mark (HWM)
- Node Point
- Point 34 — Node Label (refer to table)

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

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Northern Ireland

OPW
Office of Public Works
17-19 Lower Hatch Street
Dublin 2
Ireland

Project :
IRISH COASTAL PROTECTION STRATEGY STUDY - PHASE III

Map :
NORTH EAST COAST FLOOD EXTENT MAP

Map Type :	FLOOD EXTENT		
Source :	TIDAL FLOODING		
Map area :	RURAL AREA		
Scenario :	MID RANGE FUTURE SCENARIO		
Figure By :	PJW	Date :	Aug 2012
Checked By :	JMC & JR	Date :	Aug 2012

Figure No. : NE / RA / EXT / MRFS / 20
Revision : 1

Drawing Scale : 1:25,000 Plot Scale : 1:1 @ A3

NOTE: MORE DETAILED MAPS SHOWING COMBINED TIDAL AND FLUVIAL FLOOD HAZARD FOR PART OF THIS AREA (DODDER CATCHMENT ONLY) HAVE BEEN PREPARED UNDER THE RIVER DODDER CATCHMENT FRAM STUDY. PLEASE REFER TO WWW.DUBLINCITY.IE/PAGES/DODDERFLOODINGSTUDY.ASPX FOR MORE INFORMATION

Point 23

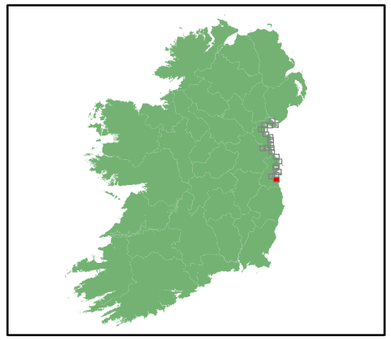
Point 24

Point 25

	Water Level (mOD Malin) per AEP		
Node Label	WL 10%	WL 0.5%	WL 0.1%
~~Point 23~~	~~3.31~~	~~4.04~~	~~4.25~~
Point 24	3.58	3.98	4.19
~~Point 25~~	~~3.58~~	~~3.99~~	~~4.22~~

0.5 0.25 0 0.5 1 1.5 2 Kilometers

Location Plan :



EXTENT MAP

Legend:

- 0.5% AEP FLOOD EXTENT (1 in 200 chance in any given year)
- 0.1% AEP FLOOD EXTENT (1 in 1000 chance in any given year)
- High Water Mark (HWM)
- Node Point
- Point 34 — Node Label (refer to table)

USER NOTE :

USERS OF THESE MAPS SHOULD REFER TO THE DETAILED DESCRIPTION OF THEIR DERIVATION, LIMITATIONS IN ACCURACY AND GUIDANCE AND CONDITIONS OF USE PROVIDED AT THE FRONT OF THIS BOUND VOLUME. IF THIS MAP DOES NOT FORM PART OF A BOUND VOLUME, IT SHOULD NOT BE USED FOR ANY PURPOSE.

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BT 12 6RZ
Northern Ireland

OPW
Office of Public Works
17-19 Lower Hatch Street
Dublin 2
Ireland

Project :
IRISH COASTAL PROTECTION STRATEGY STUDY - PHASE III

Map :
NORTH EAST COAST FLOOD EXTENT MAP

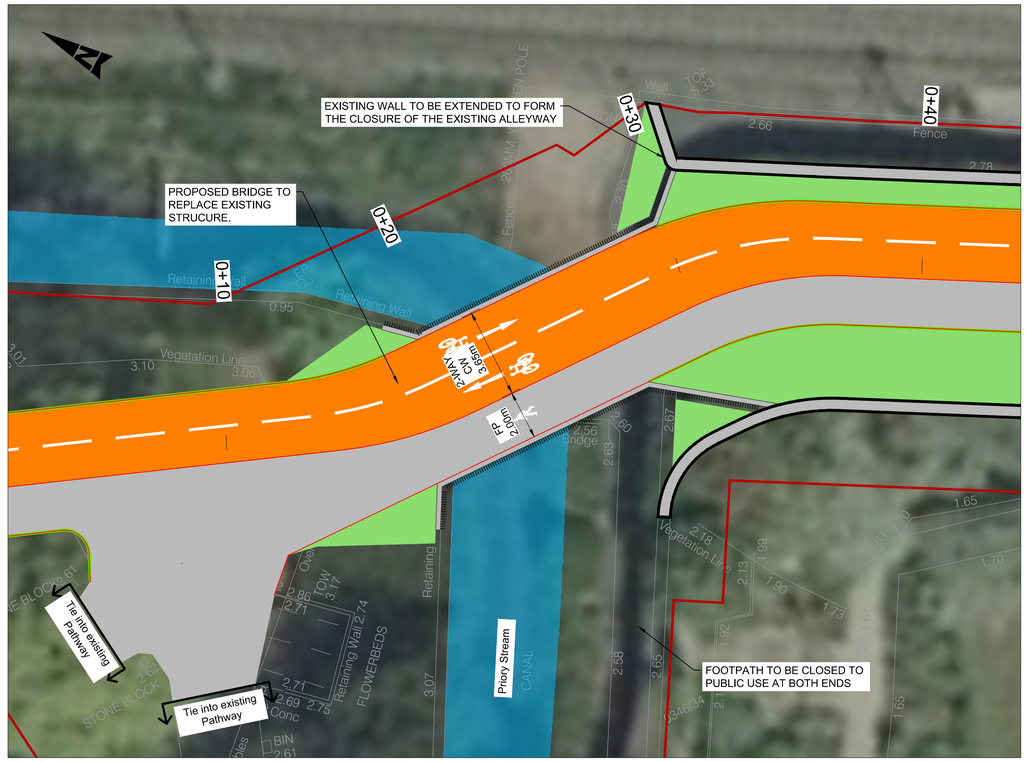
Map Type :	FLOOD EXTENT		
Source :	TIDAL FLOODING		
Map area :	RURAL AREA		
Scenario :	HIGH END FUTURE SCENARIO		
Figure By :	PJW	Date :	Sept 2012
Checked By :	JMC & JR	Date :	Sept 2012

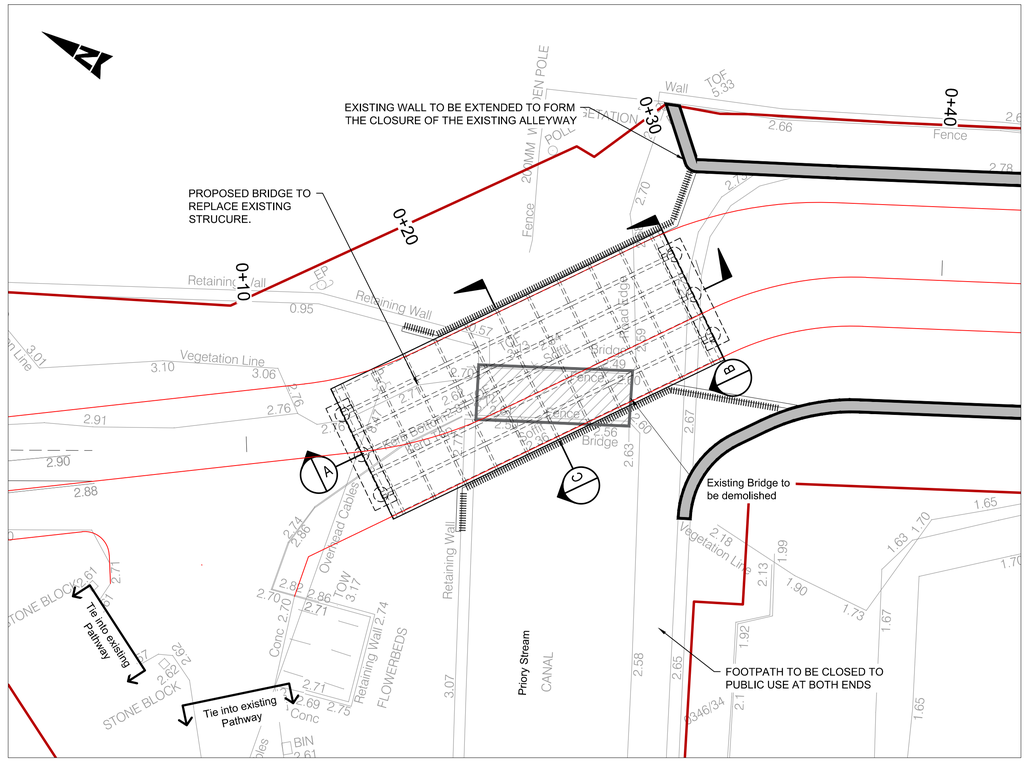
Figure No. : NE / RA / EXT / HEFS / 20

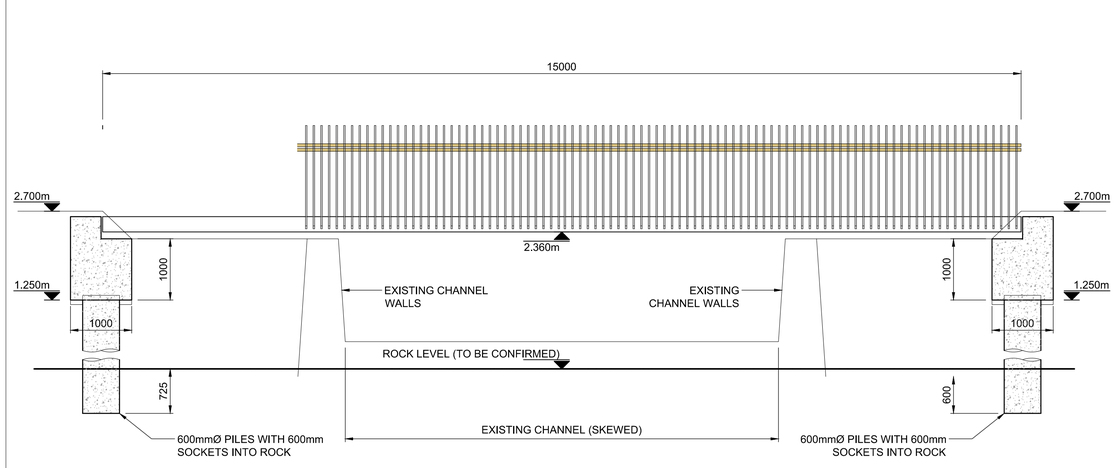
Revision 0

Drawing Scale : 1:25,000 Plot Scale : 1:1 @ A3

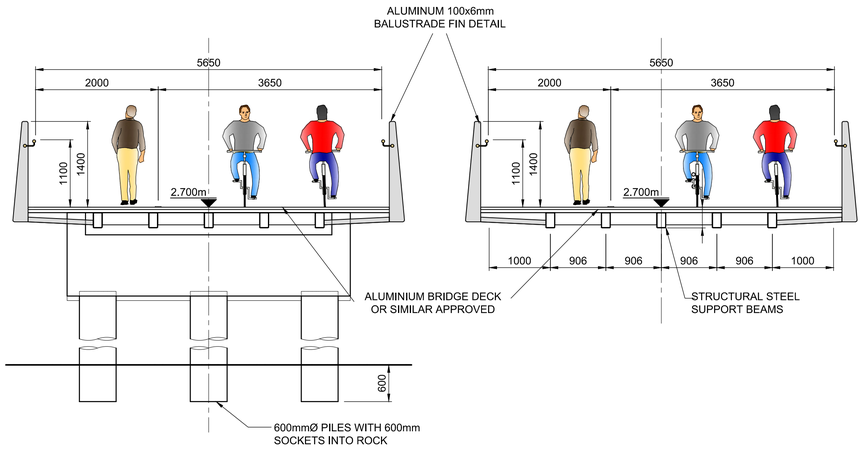
Appendix E. Existing Bridge Levels







SECTION A-A
SCALE 1:50 @ A1
SCALE 1:100 @ A3



SECTION B-B
SCALE 1:50 @ A1
SCALE 1:100 @ A3

SECTION C-C
SCALE 1:50 @ A1
SCALE 1:100 @ A3

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

LEGEND:

- SITE BOUNDARY
- BEVELLED ENTRANCE KERB
- 100mm CONCRETE KERB
- EDGING KERB
- CYCLEWAY DEMARCATION KERB
- CARRIAGEWAY
- PROPOSED FOOTPATH
- PROPOSED SHARED SPACE
- PROPOSED CYCLE TRACK
- PROPOSED TACTILE PAVING (CORDUROY)
- PROPOSED GRASS VERGE
- BOLLARD
- CW CYCLEWAY
- FP FOOTPATH
- RD ROAD
- SA SHARED AREA

NOTES :

1. PROPOSED CYCLE TRACKS, CYCLE LANES TO BE 3.0m WIDE UNLESS NOTED OTHERWISE.
2. PROPOSED FOOTWAYS SHALL BE 2.0m MIN WIDE UNLESS NOTED OTHERWISE.
3. FOUNDATION DESIGN IS BASED ON PRELIMINARY INFORMATION AND IS SUBJECT TO FURTHER DEVELOPMENT DURING THE DETAIL DESIGN STAGE

Risk Level		
	X	Atkins Base Line - Low Risk
		Atkins Sensitive - Medium Risk
		Atkins Private - High Risk
		Client Critical - Already Marked

dlr Comhairle Contae County Council

Rev	Description	By	Date	Chk'd	Rev'd	Auth
-	PART 8 PLANNING SUBMISSION	RG	15.05.24	YS	JMC	UOH

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Client: DÚN LAOGHAIRE-RATHDOWN

Project: BLACKROCK DART-PARK ACTIVE TRAVEL SCHEME
-

Purpose: FOR PLANNING

Title: PROPOSED BRIDGE DETAILS

Original Scale	Drawn	Checked	Reviewed	Authorised
1:200 @ A1 1:400 @ A3	AOS Date 15.05.24	YS Date 15.05.24	JMC Date 15.05.24	UOH Date 15.05.24

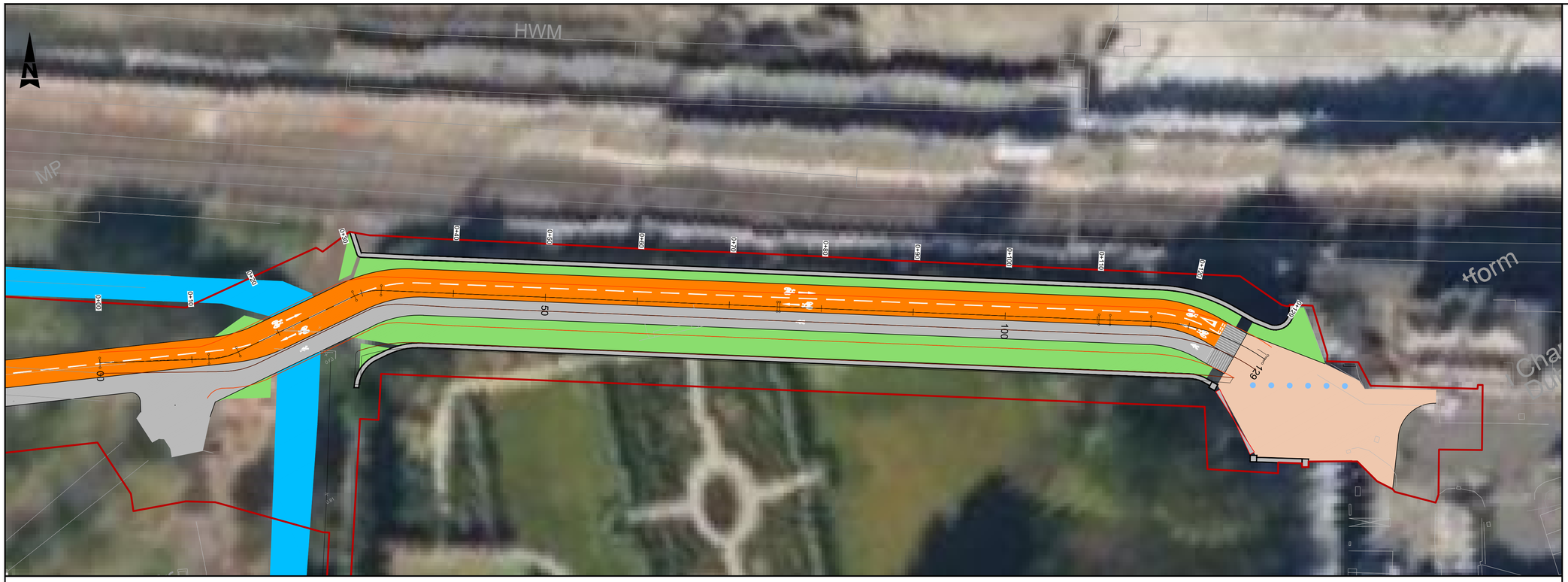
Status	Drawing Number	Rev
P	5217648 / HTR / DR / 0113	-

100 10 0 A1 DO NOT SCALE

File: 5217648-HTR-DR-0113.dwg Date: May 17, 2024 - 10:31am Plotted by: Jmatthewscrompton

U:\5217648\6 Dwgs-Graphics\61 AutoCad\5217648-HTR-DR-0113.dwg

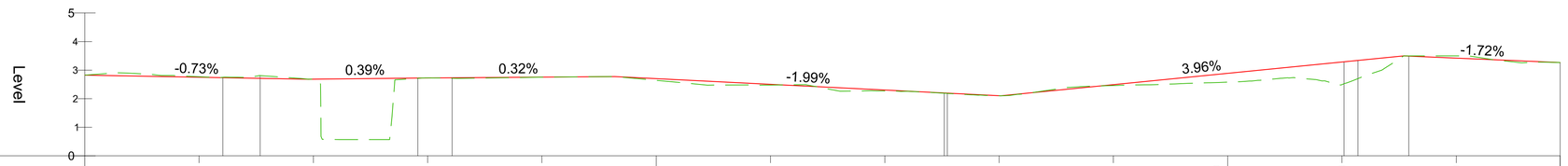
Appendix F. Blackrock Travel Scheme - Longsection



GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2. ONLY WRITTEN DIMENSIONS SHALL BE USED. NO DIMENSIONS SHALL BE SCALED FROM THE DRAWINGS
3. ALL LEVELS ARE IN METRES AND ARE TO MALIN HEAD DATUM
4. ALL COORDINATES ARE IN METRES AND ARE TO IRISH TRANSVERSE MERCATOR
5. DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SPECIFICATION

BLACKROCK ACTIVE TRAVEL SCHEME - LONGSECTION
SCALE: H 1:500,V 1:200. DATUM: 0.000



Chainage	00.000	10.000	20.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	100.000	110.000	120.000	129.091
Proposed Levels	2.826	2.769	2.687	2.727	2.754	2.641	2.477	2.271	2.102	2.462	2.579	2.493	3.500	3.264
Existing Levels	2.826	2.769	2.687	2.727	2.754	2.641	2.477	2.271	2.102	2.462	2.579	2.493	3.500	3.264
Level Difference	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Horizontal Geometry		L =12.088	R: 8.023 L: 3.258	L =13.797	R: 6.117 L: 2.992	L =43.063		R: 200.000 L: 0.271	L =34.711		R: 200.000 L: 1.2144.452		R: 23.000 L: 13.247	

Risk Level	
	Atkins Base Line - Low Risk
	Atkins Sensitive - Medium Risk
	Atkins Private - High Risk
	Client Critical - Already Marked

dlr Comhairle Contae County Council

Rev	Description	By	Date	Chk'd	Rev'd	Auth
-	FOR INFORMATION	DG	12.04.23		----	

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1st Floor Technology House Parkmore Technology Park, Galway
Tel (+353) 091 786 050
Fax (+353) 091 779 830

Client: DÚN LAOGHAIRE-RATHDOWN

Project: BLACKROCK DART-PARK ACTIVE TRAVEL SCHEME
-

Purpose: FOR INFORMATION

Title: LONGSECTION

Original Scale	Drawn	Checked	Reviewed	Authorised
AS SHOWN	DG Date 12.04.23	Date	Date ----	Date

Status: I

Drawing Number: XXXXXXXXXXXXX

Rev: -

A1

DO NOT SCALE

File: BLACKROCK 3D MODEL REV 3.dwg
Date: Nov 07, 2023 - 9:20am
Plotted by: jmatthewscrampton

U:\5217648\6 Dwgs-Graphics\694 C3D\BLACKROCK 3D MODEL REV 3.dwg

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