

# South Campshire Flood Protection Project, George's Quay, City Quay & Sir John Rogerson's Quay, Dublin 2

## Environmental Impact Statement

Volume 1 of 4: Non Technical Summary

June 2011



**Preface:**

The structure of the Environmental Impact Statement for the South Campshire Flood Protection Project is laid out in the preface of each volume for clarity. The document consists of the following four volumes:

**Volume 1 – Non Technical Summary**

A non technical summary of information contained in Volume 2.

**Volume 2 – Main Body of Environmental Impact Statement**

This volume is the main part of the EIS. In it the proposed development and the environmental impact of the proposed development is described.

**Volume 3 – Drawings and Illustrations**

A dedicated volume of drawings, maps, illustrations and photomontages that further describes the proposed development and is supplemental to the information set out in Volume 2.

**Volume 4 – Technical Appendices**

Technical data that is supplemental to the information in Volume 2.

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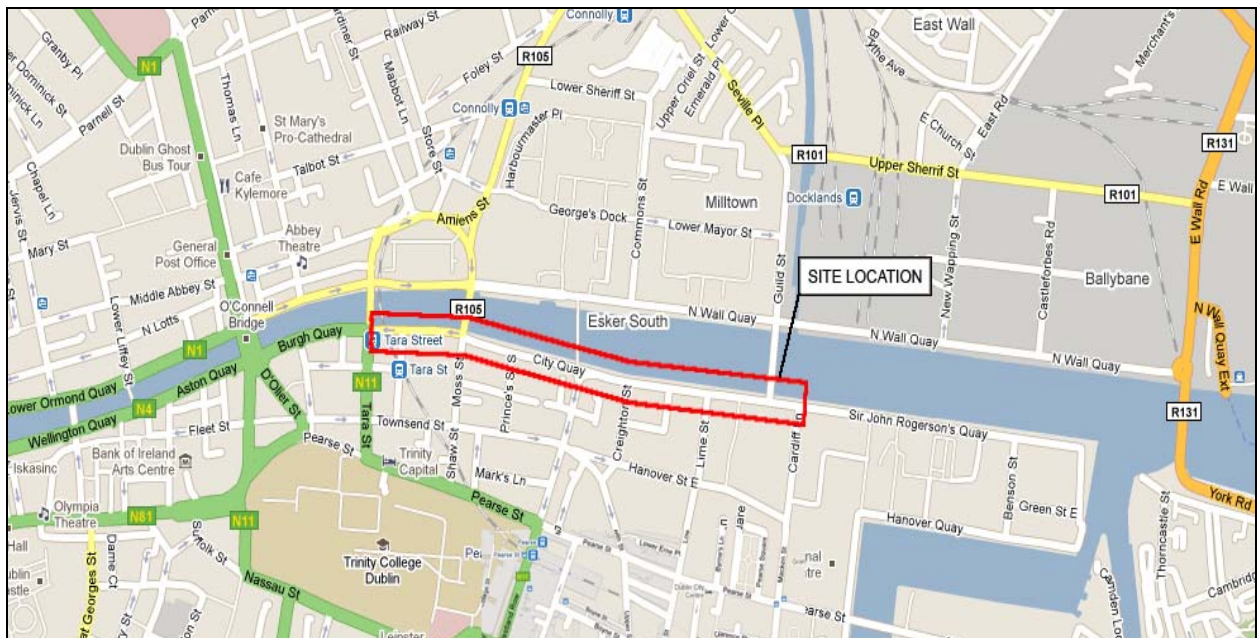
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## 1.0. INTRODUCTION

### 1.1. Context

This Environmental Impact Statement has been prepared by Moylan Consulting Engineers, who were originally procured and briefed by the Dublin Docklands Development Authority (DDDA) and later, on the instructions of Dublin City Council (refer to section 16.0, Volume 4 for novation agreement), to assess the impact of the proposed construction of a flood protection scheme along the south campshires of the River Liffey, between Butt Bridge and the Samuel Becket Bridge on the surrounding environment. A campshire is the stretch of land between the quay and the road which serves and runs parallel to the quay.

Although the scope of the works proposed does not automatically require an EIS to be prepared it was considered that due to the importance of the campshires and Liffey banks in terms of amenity to the City a sub threshold EIS should be prepared in accordance with Section 120 of the Planning and Development Regulations 2001.



### 1.2. Background and Need for the Scheme

Following recent extreme flood events and predictions of a rise in sea levels due to climate change, Dublin City Council has carried out a review of the capacity of the existing coastal flood defences to provide protection against tidal flooding of urban areas resulting from extreme weather conditions in the short and long term. The review was carried out as part of the Dublin Coastal Flooding Protection Project (DCFPP), which was published in 2005.

In addition to the existing probability of flooding, the results of global warming and the consequent rise in sea levels significantly increase the risk of flooding into the future.

Extensive studies on the impact of flooding of the River Liffey on the south quays and the urban hinterland were carried out by Dublin City Council.

These studies identified a flood cell in the area of the city south of the Liffey which is at risk of flooding during a 200 year flood event. A flood cell is the area that would be flooded where a breach of the perimeter of the cell occurs during a flood event. The flood cell includes all the low lying lands which will flood during an extreme storm and/or tidal event.

The above mentioned reports identified a number of unique features to the flood hazard aspects along the south campshires between Butt Bridge and Samuel Becket Bridge. One of these is that, the quay walls at this location are lower than the average wall height along the north or south quays. More significantly, the levels of the hinterland to the south falls away from the quay level to a low point around Pearse Street where the ground level is lower than the quay wall. This potential flood cell extends over a wide area where flood depths can be very significant. In addition the consequence of a flood event at this location would result in extensive property damage and impacts on public health. Risk is represented by a combination of the probability of flooding and the consequence of a flood event. The study identifies the risk to the flood cell south of the Liffey as high.

In order to protect this hinterland south of the River Liffey behind Georges Quay, City Quay and Sir John Rogerson's Quay, Dublin City Council (DCC) in conjunction with the Office of Public Works (OPW) and Dublin Docklands Development Authority (DDDA) are proposing to construct a flood protection system along the south campshires between Butt Bridge and Sir John Rogerson's Quay.

The south campshires between Butt Bridge and Sir John Rogerson's Quay are a section of the original Dublin docklands quay wall which is lower than the average wall height along the north or south quays. This area is vulnerable in the event of exceptionally high tides in this tidal zone of the River Liffey.

The flood cell includes significant business, retail and densely populated residential areas.

### Health and Safety

The studies have highlighted that given the topography of the extremely vulnerable flood cell, with ground levels falling to the south away from the quays, and the densely developed nature of the area which includes a large number of inhabited basement properties, there exists a real and significant risk for loss of life notwithstanding extensive residential property and commercial property damage.

Flooding can cause physical injury, spread disease and in extreme conditions, can result in loss of life. Even shallow flood water flowing at 2 m/sec can cause people to be knocked off their feet and may lead to drowning. The risk at this location is increased by the local topography as outlined above.

Flooding also exposes people to many hidden hazards such as floating debris, hidden obstructions such as open manholes and excavations etc.

In terms of potential health risks flooding will result in the inundation and overflowing of waste water sewers and damage power supplies leading to power outages.

### Damage to Properties

The consequences of flooding in a densely developed urban environment can be very severe. Floodwater will result in damage to building's internal finishes, contents, gas supply, electricity, waste water drainage and can cause structural damage. Sea water flooding can cause more extensive damage due to corrosion and contamination.

In particular, basements in the area would be susceptible to flood damage.

### Damage to Businesses

Notwithstanding physical damage to buildings, flooding in an urban area can result in significant negative impacts on the business community due to loss of customers, long term closure of the business, loss of stock etc. These impacts can lead to long term economic damage, not only locally but regional, and result in significant business closures.

### Damage to Infrastructure

Flooding can result in significant impacts on public infrastructure including:-

- Transportation
- Electricity
- Waste Water Drainage
- Gas
- Telecommunications

In conclusion the construction of a flood protection scheme is required in order to protect human health, properties and services in the city to the south of the Liffey campshires that will result from tidal flooding in Dublin Bay.

## 2.0. Description of the South Campshires

Development along the River Liffey and in the city of Dublin in general, gained pace during the second half of the 17<sup>th</sup> century. During the early 18<sup>th</sup> century several new quays were added to the south bank of the river, including Georges Quay, City Quay and Sir John Rogerson's Quay.

These quays were in use for shipping well into the middle of the 20<sup>th</sup> century, serving as loading and unloading facilities for passengers, goods and cargo. Notably, City Quay was used by Guinness for exporting porter to the United Kingdom; Sir John Rogerson's Quay for importing of coal to serve the gas production facility at Cardiff Lane and Macken Street.

With the introduction of containerisation and the shutting down of local gas production facilities, these quays lost their significance as a part of the working port which moved to the North Wall and Ringsend areas.

These campshires were traditionally used as the loading and unloading facilities of a working port and included travelling cranes and warehouses. The economic function of the campshires has now disappeared. The current use of these lands is for pedestrian and cyclist transportation and for recreational uses which form an important focus and connection with Dublin City.



The campshires are controlled by Dublin Docklands Development Authority which has created an active and vibrant quarter, integrated within the residential and commercial areas of Dublin inner city.

The campshires are currently used for a variety of functions including pedestrian and cyclists through routes, occasional festivals and markets, recreational and boating activities. The quay walls and campshires still perform their original use as a protection against normal tidal flooding of the hinterland behind the quays.

Pedestrian and to a lesser extent cyclist routes along and across the campshires form an important and growing network of linkages in east Dublin city centre. In particular, the north south pedestrian links across Sean O'Casey Bridge and the growing east west links between the Docklands and the heart of Dublin City are of structural importance in the permeability and linkages within the inner city.

Behind the campshires, to the south, are streets which carry local and through traffic which are fronted by a wide variety of buildings and uses to include residential, educational, religious, commercial and retail.

### 3.0 Description of the Flood Protection Scheme

The proposed development consists of a new flood protection system, approximately 1.0km in length located on the southern campshires of the River Liffey. The flood protection will extend from Butt Bridge to Samuel Beckett Bridge and beyond and returns across Sir John Rogerson's Quay just east of the new pedestrian crossing at Cardiff Lane.

The scheme will provide flood protection from extreme high tides to a level of 3.7m above Malin Head datum.

The protection will, for the most part, consist of a new wall which will be approximately 800 to 900mm high, depending on its location, and have a number of openings to allow access to the campshires, pedestrian bridges and walkways.

The flood protection takes different forms at several sections over its length including high quality concrete finish wall, granite wall, raised parapets and waterproofing of existing buildings along the campshires.

The flood protection will also take different alignments over its length. For the majority of its length the new wall will be located within the line of the existing cycle path which runs within the campshire zone. Adjacent to and between the two campshire buildings – known as the B.J. Marine buildings, the wall will run close to the river edge, set back from the existing quay stone. At George's Quay the wall will run along the river edge, similar to the quay parapet wall, west of Butt Bridge.

Lifting flood gates and/or swing gates will be installed at strategic openings along the flood protection. These dams/gates will be activated by Dublin City Drainage Division to seal the openings prior to predicted extreme tide events. Generally, all openings designed for river and berthing access will remain closed and opened only when the relevant authority needs to gain access.

The proposal also incorporates an upgrade of the existing cycle track which is located on the campshires to a new 3m wide on road two-way cycle track from Talbot Memorial Bridge to east of Samuel Beckett Bridge. This will replace the existing cyclist / pedestrian conflicts on the campshires and extend the existing cycle facilities to link into the new proposed cycle network at Samuel Beckett Bridge.

An improvement of pedestrian facilities is also proposed with the provision of a new high quality footpath and additional tree planting along the length of the campshires.

Wall structures proposed will be finished in fairfaced concrete or granite stone to integrate and co-ordinate with existing features depending on the context of the structure and location.

Landscaping features incorporated within the proposed flood protection have been developed and these designs will form an integral part of the project. Sections of the flood protection wall are staggered throughout the length of the campshires to provide pedestrian permeability and integrate and improve the layout and landscape of the campshires.

To ensure that the future use of the two existing B.J. Marine buildings on the campshire is not compromised, it is proposed that the flood protection be provided on the river side of these buildings. Following a structural assessment of the superstructure and substructure of the buildings, it has been decided, in consultation with the owners (the DDDA), that the rear wall of both buildings is adequate in terms of structural integrity to provide the required level of protection (with some surface rendering). It is proposed therefore that the riverside walls of the buildings be rendered and that the existing blocked up openings be made good, reinforced where required and a waterproof rendering system be provided along the outside of the building to the required level of 3.7m above Malin Head Datum (approximately 900mm high).

## **4.0 Alternatives Considered in the Development of the Scheme**

### **4.1. Alternative Locations**

In terms of location, the options for a flood protection scheme are limited by the functional requirement to protect the specific flood cell. In this case the source of the flood hazard is the sea along the tidal zone of the River Liffey. The path of water overtopping the quay is across the south campshires onto Georges Quay, City Quay and Sir John Rogerson's Quay. The receptors (or items that may be harmed by flooding including people, buildings, businesses, infrastructure, heritage, etc.), are located directly along and behind the quays with direct links via the many north/south running streets in the area, which penetrate deep into the flood cell.

It is essential therefore that the flood protection works are located close to the source in order to achieve the desired protection. The location of the protection works is therefore limited to the campshires of the south quays.

The option of providing flood protection on the south side of the road adjacent to the south campshires was considered but was discounted as the impact on businesses, dwellings and infrastructure along the quays was considered unacceptable. This option would fail to prevent the flooding of the roadway and resulting in closure to traffic along a main artery to the city.

Locations for the proposed flood protection structure within the campshires were carefully considered in terms of:-

- Impact on campshire uses
- Impact on pedestrian routes and bridges
- Impact on existing cycle paths and routes
- Interaction with existing buildings
- Interaction with existing walls
- Protection of existing transportation infrastructure
- Protection of existing utility infrastructure
- Impact on protected structures and conservation area
- Impact on archaeology
- Exasperating current anti-social behaviour

In order to meet these requirements, the location of the floodwall varies along its length; its alignment dictated by the physical and utility constraints at each location.

### **4.2. Alternative Design**

The protection of the south campshire flood cell requires the construction of physical flood protection systems which will prevent flood waters from entering the flood cell with sufficient robustness to withstand a height of 900 mm of water height.

Options for the construction of this flood protection have been carefully considered in terms of:-

- Ability to provide flood protection
- Impact on visual appearance
- Impact on surrounding area
- Impact on heritage
- Constructability
- Cost
- Durability
- Maintenance
- Ongoing management of flood protection
- Loitering

Alternative materials were considered and included, but were not limited to:-

- Glass wall
- Steel panel
- Concrete
- Granite
- Other stone types

Due to the sensitive and varying location of the flood defence alignment, a combination of wall types are used, including a granite wall along the quay edge and a high quality concrete wall with granite features along the campshires.

Materials such as glass and steel, while attractive, do result in regular and costly maintenance considering the length of the flood wall.

## 5.0 Likely Significant Impacts

### 5.1 Human Beings

In terms of the impact on human beings, the principle impacts identified are:-

- Reduction of flood risk, including reduction of the risk to life
- Potential severance of pedestrian and cyclist routes
- Potential impact on use during occasional festivals

The reduction of flood risk from tidal flooding is the primary objective of the scheme. This objective is achieved by the construction of a protection of adequate height and robustness to provide long term protection against tidal flooding of the flood cell to the south of the campshires.

Whilst there will be some restrictions on the movement of pedestrians across the campshires, adequate and frequent openings have been provided to mitigate the loss of flexibility. An important design feature of the proposed protection scheme is the staggered nature of the protection which is designed to optimise pedestrian permeability through the wall.



The proposed protection system will restrict the crowd movements across the campshires during festival periods in particular along the existing road way. However, it is considered that these restrictions will be minimal and can be accommodated during the management of the festivals.

## **5.2 Flora and Fauna**

Virtually the entire area is of concrete or stonework and is classified in habitat terms as *Buildings and artificial surfaces BL3*. A study of the existing flora and fauna along the campshires has confirmed that the campshires do not form a significant part of the habitat of any flora or fauna.

The proposed protection scheme will provide the opportunity to increase the tree planting in the area. No significant change to the extent of the hard landscaping is proposed.

## **5.3 Soils, Geology and Hydrology**

A geotechnical site investigation was carried out as part of the base line studies for this EIS. This investigation confirmed that the campshires generally consist of relatively recent fill material overlying river deposits of silts and gravels.

The proposed protection works will generally consist of temporary excavations of a maximum of 1.5m deep and will not impact on any subsoils, geology or hydrology in the area.

## **5.4 Water**

Existing drainage systems both storm and waste water, were reviewed and the proposed protection scheme will have no significant impact on this infrastructure.

As a part of the Flood Protection Project, Dublin City Council Drainage Division is implementing a programme of upgrades to the drainage systems in the area to ensure that the existing drainage pipes do not form a route for flood waters.

## **5.5 Noise and Vibration**

During the construction phase of the development there will be a certain level of noise and vibrations generated by excavations and construction processes. Measures will be taken during construction to mitigate these effects.

The proposed flood protection scheme will not result in any noise and vibrations in the area during the operational phase of the development.

## **5.6 Air Quality and Climate**

During the construction phase of the development there will be a minor impact on the air quality in that there will be an increase use of plant and machinery in the area.

The proposed flood protection scheme will not result in impact on air quality or climate in the area during the operational phase of the development.

## 5.7 Landscape and Visual Appraisal

### 5.7.1 Existing Environment

The quays east from the Butt Bridge remained full of shipping until the cargos began to be shipped in containers. Throughout the following years, the ships gradually disappeared and the cranes that loaded and unloaded them stood idle. Buildings standing at the quay edge along the campshires lost their purpose. The coming of the IFSC in 1990 began the regeneration of the Docklands. This regeneration has brought dramatic change, most of this change occurring in the last 10 years, and the quaysides are now lined with large modern buildings.

The campshires themselves have been remodelled. Nearly all of the buildings that once stood along them have been removed along with the cranes. There are new railings separating the campshires from the water, cycleways, sculpture, new lighting and groves of trees. The once robust dockside has become a public park.

The extent of visual impact of the development during the construction phase is likely to be similar to that for the operational phase. The character of visual impacts during the construction phase is likely to be wholly negative at first, becoming potentially neutral to positive as work proceeds and the Flood Protection Project becomes apparent.

### 5.7.2 Proposed Environment

The proposed Flood Protection Project consists of a series of walls, gates and other barriers running from Butt Bridge to just beyond the Samuel Beckett Bridge. For the most part, walls are constructed of reinforced concrete faced with granite on the side facing the river and with an inserted sinusoidal pattern in the concrete facing towards the roadway. At present, there is a red tarmac cycleway running along the campshires for much of the length of the proposed flood protection works. For much of its length, this cycleway is shared with pedestrians. The proposed development includes the moving of this cycleway on to the road surface running along the Quays and setting it out as a two-way cycleway dedicated solely to cycling and separate entirely from a new pedestrian route running along the campshires. The works involve some realignment of the kerb between the back of the campshires and the road surface. The works also involve the removal of some bollards and a number of trees and the planting of a substantial number of new trees.

It is undoubtedly the case that the provision of a new two-way dedicated cycleway will bring benefits as will the provision of the dedicated pedestrian route. The provision of these facilities is likely to lead to a positive response on the part of those viewing the completed works.

At Georges Quay, a new granite wall is proposed to replace the present railings along the Quay edge. This wall is designed to match in materials and profile the wall running along the Quay in front of the Custom House opposite. It is undoubtedly the case that this wall will be regarded as a wholly positive intervention. From Matt Talbot Bridge as far as Creighton Street, the proposed Flood Protection Scheme takes the form of a wall running close to the road side of the campshire. The walkway runs alongside this wall and the wall steps backwards and forwards so that in some places the wall is between

the walkway and the road and, in others, between the walkway and the campshire. There are gaps in the wall to allow the walkway to run continuously. These gaps will be closed in the event of high water levels by swing / lifting gates. The introduction of the new walls will change the character of the campshires, but it is worth noting that, in recent years, the campshires have undergone dramatic changes from their former industrial character.

While the extensive environmental improvements proposed must bring a positive response, it must always be remembered that the character of visual impact rests entirely with the individual viewer. For instance, the presence of flood protection may alarm people and this may cause some individuals to regard the visual impact of the new flood protection structures as negative.

For most of the distance between Creighton Street and the Samuel Beckett Bridge, the proposed flood protection takes the form of a wall running along the river about approximately 1.5 to 2 metres back from the Quay edge. Since this wall is set at the river side of the Campshire, it is not close to the walkway, cycleway or roadway. From eye level along this section of the walkway, cycleway and roadway, the wall is likely to obscure the view of the water of the river. This is a significant change from the present circumstance, which some people may regard as negative. It must be noted, however, that from Butt Bridge west to Heuston Station and in front of the Custom House, there is a wall running along both sides of the river and that this wall obscures the view of the water for viewers at road level unless these viewers are right beside the wall.

At the Samuel Beckett Bridge, existing new granite walls that have been installed on the Quay edge flanking the bridge will require raising, and the existing black railing on top of these walls will be replaced by railings of the same material and design as those used on the bridge itself. As this treatment is likely to be more in keeping with the bridge than the existing situation, this is likely to be regarded by most observers as a positive visual impact.

## 5.8 Material Assets

Material assets include the built environment, property, transportation and utilities infrastructure within the area of impact of the development.

The proposed flood protection scheme will impact on the campshires only and there will be no direct impact on any adjoining properties other than the provision of protection against future tidal flooding.



The proposed flood protection will make use of the rear walls of the existing B.J. Marine buildings on the campshire. Some external waterproofing and additional structure will be required to the rear walls; however, flood protection will have moderate impact on buildings and the future uses of the buildings.

Some parking will be removed from the north side of Georges Quay and City Quay to provide improved space for pedestrian facilities along the waterfront.

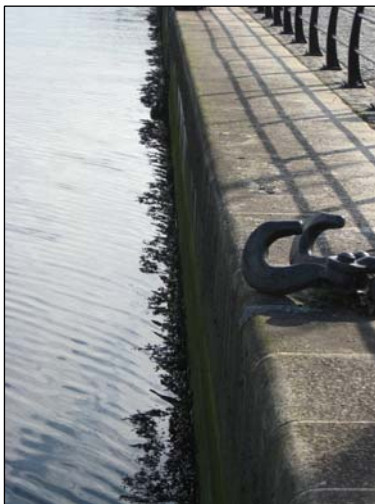
The proposed flood protection will require the relocation of the existing contraflow cycle track on City Quay to a new two way cycle track on the road. This will provide for enhanced and linked facilities for cyclists along the south quays and remove the existing cyclist/pedestrian conflicts which are currently occurring on the campshires.

The scheme will provide protection against tidal flood damage to the ESB substation located on the campshires.

## 5.9 Cultural Heritage

The cultural heritage assessment carried out as part of this EIS includes the archaeology and history of the quay walls, campshires and the surrounding area.

The campshires are located on land reclaimed from the Liffey which would originally have been on the foreshore of the river. Since the medieval period, the Liffey's shores have been gradually walled in, and tracts of land reclaimed from its waters now form the ground upon which much of the modern city centre and the study area itself are built.



Archaeological monitoring of site investigation works was undertaken for the proposed scheme under licence to the National Monuments Service, DoEHLG and the National Museum. The depth of the excavation in the test pits and slit trenches ranged between 1.5m and 2.0m. The trenches contained modern fill and post-medieval reclamation deposits (dated by finds of 18<sup>th</sup> and 19<sup>th</sup> century pottery). The foundations for the flood protection structures will not be deeper than 1.5m and will therefore impact only on the modern fill.

The quay walls at Georges Quay, City Quay and Sir John Rogerson's Quay are recorded monuments in the Industrial Heritage Record. It is not proposed to construct any of the flood protection structures directly on or in contact with the existing quay walls and the proposed flood protection works will not impact on these important structures.

During the construction phase archaeological monitoring will be required during all sub-surface works associated with the proposed development. Archaeological monitoring should be undertaken by an archaeologist licensed by the Department of Environment, Heritage and Local Government

With regard to built heritage, the area lies within a Conservation Area objective within the Dublin City Development Plan 2011-2017. Sir John Rogerson's Quay is a protected structure, which includes the granite ashlar quay walls, stone setts, mooring rings, steps, bollards, lamp standards and machinery. There are also a number of buildings on the south side of the area which are protected structures.

## 6.0 Mitigation Measures

The principle mitigation measures recommended to be included in the detail design and construction of the flood protection project are as follows:-

- Adequate openings will be provided to ensure that the pedestrian permeability of the campshires is maintained while retaining the effectiveness of the scheme as a tidal flood defence.
- The design of the protection structures has been staggered along the campshires to provide longitudinal permeability for pedestrians along the campshires.
- Existing tree planting has been retained where possible and additional tree planting has been incorporated into the scheme
- Additional seating and pedestrian facilities will be provided along Georges Quay, while imputing measures to discourage the current issue of anti-social behaviour along the campshires.
- High quality materials and design ensure the visual impact of the flood protection wall and associated landscaping is acceptable and the quality will endure over time.
- The integrated design of the flood protection scheme ensures the existing amenity, berthing and pedestrian/cycle uses of the campshires and quayside are maintained. Also, the future use of the B.J. Marine buildings is facilitated.
- Improved on-road cycle facilities will be provided to replace the existing contraflow cycle track on the campshire at City Quay, reducing existing pedestrian/cyclists conflicts.
- The design and location of the proposed flood protection structures have been carefully considered to ensure that the structures do not impact directly on the original quay walls.
- Archaeological and Conservation Monitoring during construction
- A Construction Management Plan will be prepared to implement the mitigation measures recommended during the construction phase of the development including traffic management, noise control, dust control and measures to ensure that pedestrian and cyclist movements are accommodate during the construction phase of the development.

## **7.0 Residual Impacts**

If the mitigation measures detailed in the EIS are implemented during the detail design and construction phase of the proposed protection scheme the residual impacts are anticipated to be limited to a visual change on the campshires and Georges Quay.

The detail design of the required structures will ensure that the scheme relates to the campshires and provides improved pedestrian and cyclist facilities, in particular along Georges Quay and City Quay.

A high level of security against the risk of tidal flooding will be provided.

## **8.0 The Do-Nothing Scenario**

In the event that the proposed flood protection works are not constructed there is an increased probability that a significant tidal flood event will result in the flooding of approximately 32 hectares of the south inner city between the Liffey and the railway line, including major streets south of the campshires such as Townsend Street, Lombard Street and Sandwith Street Lower, Pearse Street and Macken Street.

The consequence of flooding of this area is severe with extensive damage to properties and infrastructure and with a risk of personal injury.

In view of the high likelihood of flooding in the future and the significant consequence of a flood event within the flood cell, it is considered that the risk of tidal flooding is now unacceptably high. Should climate change alter mean sea levels, flooding of the flood cell is inevitable.