



River Suir Sustainable Transport Bridge

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Environmental Impact Assessment Report
Volume 1 Non-Technical Summary | December 2018
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Volume 1
Non-Technical Summary of the
Environmental Impact Assessment Report

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1.0 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared in respect of the construction and operation of the River Suir Sustainable Transport Bridge, hereafter referred to the 'proposed development', by Roughan & O'Donovan (ROD) consulting engineers and a team of specialist sub-consultants, with the assistance of Waterford City and County Council.

The EIAR is presented in three volumes; this standalone Non-Technical Summary is Volume 1, Volume 2 contains the main text and Volume 3 contains the associated Figures.

It should be noted that surveys, assessments and information that form the basis of this EIAR are based on the current design of the proposed development which has been developed to a stage that permits a fully informed EIA. While some developments and refinements of the current design may occur during the detailed design stage, any such iterations of the development, if approved, will not include any significant adverse impacts on the environment not dealt with within this EIAR.

1.1. Overview

The proposed development comprises a sustainable transport bridge crossing the River Suir in Waterford City and includes a paved and landscaped plaza at the landing point on the South Quay, in direct proximity to the Clock Tower. It is anticipated that the proposed bridge will provide a new pedestrian, cycle and courtesy electric bus link between the North Quays and South Quays, promoting the further development of Waterford City and facilitating the development of the North Quays Strategic Development Zone (SDZ) lands. The proposed development is termed a 'Sustainable Transport Bridge' as it will support sustainable modes of transport including pedestrians, cyclists and electric bus users. The bridge will be approximately 207m in length and will allow the extension of the retail spine from Waterford City across to the North Quays SDZ.

On the South Quay the proposed bridge will land in the vicinity of the Clock Tower on Meagher's Quays. The North Quays at present comprise an assembly of wharves consisting of disused open spaces following the demolition of disused industrial buildings in 2016 and the Hennebique grain store building in July 2018. The Rosslare to Waterford (via Belview) rail line terminates to the east of the North Quay landing point.

Rice Bridge is currently the only crossing of the River Suir within Waterford City centre and the current pedestrian access from the north quays to the south quays entails walking upriver along Dock Road, crossing Rice Bridge to the south quays and walking along Merchant's Quay (R680). While there are cycle lanes along Merchant's Quay in both directions, there are no cycle facilities provided along Dock Road or Rice Bridge and it is a hostile environment for cyclists. The Ferrybank and Bellfield areas are residential areas to the north of Waterford City with limited connectivity to Waterford City other than by car or bus.

1.2. Requirement for an EIAR

This EIAR has been prepared in full accordance with the relevant provisions of Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment as amended by Directive 2014/52/EU. Regard has also

been had to the current provisions of the relative Irish legislative codes including the Roads Act 1993, as amended, as they continue to apply at this time.

Section 50 of the Roads Act (1993 - 2015), as amended, sets out provisions for the preparation of an EIAR. The prescribed type of proposed road development, as defined by paragraph 8 of the Roads Regulations (S.I. No.119 of 1994), for the purpose of subsection (1) (a) (iv) of Section 50 of the Act is as follows:

- “(a) the construction of a new road of four or more lanes, or the realignment or widening of an existing road so as to provide four or more lanes, where such new, realigned or widened road would be eight kilometres or more in length in a rural area, or 500 metres or more in length in an urban area;*
- (b) the construction of a new bridge or tunnel which would be 100m or more in length.”***

Taking this legislation into account, the proposed River Suir Sustainable Transport Bridge requires that an Environmental Impact Assessment Report is prepared under the Roads Regulations (SI. No. 119 of 1994) subsection (1) (a) (iv) (b) of Section 50, as the proposed development comprises the construction of a new bridge of 207m in length, exceeding the prescribed length of 100m. Therefore, the proposed development exceeds the threshold for which an EIA is automatically required.

2.0 Need for the Proposed Development

The need for the River Suir Sustainable Transport Bridge has been identified in and / or is consistent with the following European, national, regional and local planning policy documents:

European Policy Context

- EU Cycling Strategy, 2017; and
- EuroVelo.

National Policy Context

- Ireland 2040 Our Plan, National Planning Framework, 2018;
- The National Spatial Strategy, 2002 – 2020;
- Smarter Travel: A Sustainable Transport Future, 2009 – 2020;
- National Cycle Policy Framework, 2009-2020;
- Building on Recovery - Infrastructure and Capital Investment, 2016 – 2021;
- Investing In Our Transport Future: A Strategic Framework For Investment in Land Transport; and
- Project Ireland 2040, National Development Plan, 2018-2027.

Regional Policy Context

- Regional Planning Guidelines for the South East Region, 2010-2022;
- The Southern and Eastern Regional Operational Programme, 2014-2020; and
- The South East Economic Development Strategy (SEEDS), 2013-2023.

Local Policy Context

- Waterford North Quays Strategic Development Zone Planning Scheme, 2018;

- Waterford City Development Plan, 2013-2019;
- Waterford County Development Plan, 2011-2017;
- Waterford Planning, Land Use and Transportation Study (PLUTS) 2004;
- Waterford North Quays Urban Design Framework Plan, 2008;
- Ferrybank – Bellview Local Area Plan, 2017;
- Kilkenny County Development Plan, 2014-2020;
- Waterford City Centre Urban Renewal Scheme, 2015;
- Economic Strategy for Waterford City and County, 2013; and
- One Waterford: Local Economic & Community Plan, 2015-2020.

3.0 Alternatives Considered

3.1 Bridge Options Considered

The following five options were assessed for the proposed bridge:

- Bridge Option 1 – Functional Opening Bridge;
- Bridge Option 2 – Aesthetic Opening Bridge;
- Bridge Option 3 – Functional Fixed Bridge;
- Bridge Option 4 – Aesthetic Fixed Bridge; and
- Bridge Option 5 – Alternative Aesthetic Fixed Bridge.

Bridge Option 1 – Functional Opening Bridge

The proposed bridge is 217m in length with a constant deck footway/cycleway width of 6m over its length. The bridge deck layout consists of 7 spans; a 38m long central span (opening) and four interior and two end fixed spans of 33m and 26m length respectively. The opening span is a single leaf bascule (fixed trunnion type) with approximately 30m of its length lifted about the pivot and the remaining length accommodating the lifting device/ machinery and counterweight. This arrangement provides the required 25m wide navigation clearance.

Bridge Option 2 – Aesthetic Opening Bridge

The proposal for this option is an architecturally designed bridge with structural and aesthetic features designed to enhance the user experience of the crossing as well as enhancing the long views from the length of both quays. The perceived length of the 6m wide x 217m long crossing has been reduced with the introduction of feature arches/viewing points at approximately the bridge third points in conjunction with a varying footway vertical profile which forms a smooth curve in elevation. The 7-span bridge deck has been laid out symmetrically and comprises a 70m long central span (14m wide opening section), interior spans of 35m and 25m, and end spans of 12.245m length. The opening section of the central span is detailed as a hydraulically operated twin leaf bascule bridge with all hydraulics located within the depth of the bridge deck. A proposed navigational clearance of 25m has been agreed.

Bridge Option 3 – Functional Fixed Bridge

The proposed bridge is 217m in length with a constant deck footway/cycleway width of 6m over its length. The bridge deck layout consists of 7 spans; five interior spans of 33m and two end spans of 26m. The bridge deck layout consists of 7 spans; five interior spans of 33m and two end spans of 26m. The bridge piers will be supported

on pile caps located below the low water mark. 750mm diameter vertical and inclined steel cased bored concrete piles are proposed with the number of piles varying at each substructure to suit the loading requirements. Based on the available ground investigation data at the constraints stage, piles will have an average length of 17 to 18m assuming a bedrock level of 17.7mOD. The proposed fixed bridge has a maximum vertical navigation clearance of 5.1m at daily low water over a 25m navigation channel, allowing the passage of small crafts.

Bridge Option 4 – Aesthetic Fixed Bridge

This option is as per Option 2 except the central span is fixed (i.e. not opening to allow the passage of larger vessels). The proposed fixed bridge has a maximum vertical navigation clearance of 7.8m at daily low water over a 25m navigation channel, allowing the passage of small vessels.

Bridge Option 5 – Alternative Aesthetic Fixed Bridge

Bridge Option 5 is an alternative simplified aesthetic fixed bridge with a more conventional deck and pier supports in comparison to Option 4. The perceived length of the 6m wide x 217m long crossing has been reduced with the introduction of a feature flat arch located centrally in the deck at the bridge central span location. The 5-span steel bridge deck has been laid out symmetrically and comprises of an 80m long central span with two interior spans and two end spans of 40m and 28.5m lengths respectively. The 7m deck structural width is made up of a 2.5m wide main trapezoidal shaped box girder with varying depth transverse cantilevers extended 2.25m either side to the deck edges.

Options 2 and 3 are the most preferential options for the opening and fixed bridges respectively. Following consultation with river users during the option evaluation process, it was agreed with Waterford City and County Council, that an opening bridge should be considered at the bridge site to allow unrestricted passage for navigational vessels. As a result, Option 2 was selected by WCCC in January 2017 as the preferred option to progress to the preliminary design stage. In conclusion, the Multi-Criteria Assessment has identified Option 2 as the preferred bridge option for the River Suir Sustainable Transport Bridge.

3.2 Multi-Analysis Criteria Applied

Each of the five bridge options proposed were rated based on the following criteria.

- Aesthetic Merit and Appropriateness;
- Environmental Impact;
- Durability and Future Maintenance Needs;
- Buildability;
- Construction and Whole Life Costs;
- Hydrology and Hydraulics;
- Navigation Considerations;
- Integration with Flood Defence Scheme;
- Disruption/Impact during Construction; and
- Safety.

Following consultation with river users and a number of Consultees during the option evaluation process, it was agreed with Waterford City and County Council, that navigation on the river could not be eliminated and therefore an opening bridge

should be selected to allow unrestricted passage for vessels. As a result, Option 2 was therefore selected as the preferred bridge option for the River Suir Sustainable Transport Bridge as it is the preferred option on all grounds (with the exception of navigation) including most critically from an Environmental perspective.

3.3 Bus Route Options Considered

Three alternative bus routes for the public transport vehicle were considered and assessed. The 3 route options assessed included:

- a route which crosses the proposed bridge, travels up Barronstrand Street and Broad Street, turns left onto Peter Street, turns right into Bakehouse Lane, turns right into Lady Lane, turns right onto Michael Street and reconnects to Broad Street/Barronstrand Street;
- a route which crosses the proposed bridge, travels up Barronstrand Street, Broad Street and Michael Street and turns at the junction of Michael Street and New Street;
- a route which travels over and back across the bridge only, with the future ability to turn left onto Merchant's Quay from the bridge and to turn left onto the bridge from Merchant's Quay.

The route which travels over and back across the bridge emerged as the preferred electric shuttle bus route option. However, there is potential for the bus route to be extended to service a wider catchment area in the future, for example to the Viking Triangle tourist attraction to the south and to schools, houses and community facilities in Ferrybank to the north. The proposed bus route will connect Waterford City centre with the North Quays Strategic Development Zone (SDZ).

The following seven bus types were considered as options for the mode of public transport crossing back and forth across the proposed bridge:

- MotoEV Electro Transit Buddy 15 passenger hard door ADA shuttle;
- MotoEV Electro Transit Buddy 12 passenger hard door shuttle-short;
- MotoEV Electro Transit Buddy 15 passenger XE hard door shuttle;
- A CitEcar Electro Transit Buddy 15 passenger hard door ADA Shuttle;
- Bintelli ADA Enclosed Shuttle 11P 1WC;
- Phoenix Zeus Electric Shuttle Bus; and
- EasyMile EZ10.

Following assessment of the different options, the 15 passenger MotoEV Electro Transit Buddy 15 Passenger Hard Door ADA Shuttle emerged as the preferred option as it is wheelchair accessible, aesthetically pleasing, manual and accommodates a sufficient number of passengers.

4.0 Description of the Proposed Development

Chapter 04 of the EIAR provides a description of the proposed River Suir Sustainable Transport Bridge which is summarised below. It is based on the design and includes details of the engineering features, land requirements and construction and operation requirements. The primary elements of the design are presented in the following sections.

The bridge site location is approximately in line with Barronstrand Street and in front of the existing Clock Tower, as presented in Figure NTS1. The bridge is a sustainable transport bridge which accommodates pedestrians, cyclists and an electric bus shuttle service between the north and south quays. The bridge also accommodates an opening section which facilitates navigation of vessels along the River Suir.

The proposed 5-span, 8m wide bridge (inside of parapet to inside of parapet) will accommodate pedestrians, cyclists and an electric shuttle bus service. The bridge is also locally widened in two locations (approximately located at third points across the bridge) to facilitate repose and look out areas, as presented in Figure NTS2. Cyclists and the electric shuttle bus will be facilitated through a shared-space lane, whilst pedestrians will be provided with a primarily segregated area of the deck cross-section. There are some locations at the centre of the span and the south plaza where all the spaces are shared spaces between pedestrians, cyclists and the electric bus. The proposed development also comprises a plaza at the South Quay landing point. This plaza will be a paved and landscaped space for the streetscape around the Clock Tower. Approximately 143 car parking spaces will be removed from the existing car parks along Merchant's Quay for the construction of the South Quay Plaza.

The sustainable transport bridge crossing point is approximately 550m downriver of Rice Bridge. The river is in the region of 207m wide at this location, measured between the edge of the south quay and the shore edge of the north side wharf and is part of the Lower River Suir Special Area of Conservation (SAC). The south quays area at the proposed bridge location currently consists of the Clock Tower and car park spaces whilst the north quays is a former industrial brownfield site which shall be developed as a Strategic Development Zone (SDZ). There is also an existing marina located on the south quays which will be directly impacted by the proposed bridge.

The proposed main site compound on the South Quay, will include offices, materials storage areas, plant storage and parking for site and staff vehicles. The site is likely to remain in place for the duration of the contract but may be scaled up or down during particular activities on site. The compound(s) may be used either in full, in part, not at all, or another location could be selected, in agreement with the client subject to compliance with all environmental, planning and legal requirements. It is also envisaged that raw material, particularly steel bridge sections for bridge construction will be moved by barges along the River Suir to the site.

A number of Outline Environmental Management Plans have been drafted as part of this EIAR which will be finalised by the successful contractor prior to any demolition, excavation or construction phase to ensure commitments included in the statutory approvals are adhered to.

5.0 Traffic and Transport

It is anticipated that the proposed development will encourage modal shift from cars towards more sustainable means of transport (i.e. walking, cycling, and electric shuttle bus), for people travelling from the suburbs to the north of the River Suir towards Waterford City Centre. This should also reduce the amount of traffic using Rice Bridge and therefore improve the pinch point situation that currently exists.

During construction, a large portion of the Clock Tower Car Park area will be closed for the duration of the works to facilitate the construction of the proposed bridge, southern plaza area, and connection to the adjoining road network.

During operation, the provision of a sustainable transport bridge will greatly benefit commuters and will likely encourage people to swap to active transport modes for their commute. It is anticipated that with the provision of the proposed bridge, the overall travel distances for pedestrians and cyclists between the City Centre and these residential areas will be reduced by up to 1km or equivalent to 12-14 minutes' walk or 5 minutes cycle.

6.0 Population and Human Health

The EIAR has considered and assessed the likely significant effects with regard to population and human health associated with both the construction and operational phases of the proposed River Suir Sustainable Transport Bridge. The proposed development is located in the two Electoral Divisions (EDs) (Ferrybank and Centre A). In 2016 census, the total combined population residing within these EDs was 1,649 persons. The primary land uses are commercial uses along the south quays with some residential including hotel uses located within the study area. Human health of the population in the area is reported as very good (census 2016).

The assessment has found that the construction phase is likely to interrupt journey characteristics and general amenity deemed to result in moderate, negative short-term impacts. The loss of parking on the south quays, construction activities and site compound may negatively impact on the business environment and residential amenity land uses in this area. However, the construction stage is also likely to result in positive impacts on the local economy due to employment and local expenditure by construction workers, purchases of local materials and services. Emissions from the construction activities such as noise, air and risk of accidents were found to be potential short-term negative impacts. It was found that noise emissions from construction activities, plant and machinery on site is likely to have a significant noise impact within the immediate area during distinct construction phases (i.e. piling and excavation activities) of the development. However, with the application of various best practice working methods to control noise the impact is reduced to moderate, negative short-term. All impacts will be short-term in nature and reduced and managed by CEMP and associated TMP, EOP and CWDP and the range of mitigation measures detailed in Chapter 6 of this EIAR.

Overall, the operation of the proposed development is expected to have positive, long-term impacts on the population and human health of the City and South East region. The assessment found that the proposed development is likely to result in positive long-term change to land use intensity and the nature of activities in Waterford City and for the population's journey characteristics, journey amenity and general amenity due to the improvement in transportation infrastructure and improved connectivity to existing and future developments in the City (i.e. Greenways, future transport hub, regeneration of the NQ SDZ). Journeys by foot and bike are likely to become safer and more pleasant. The bridge will provide relief from existing severance currently experienced north and south of the river.

Improvements are also likely to the population and visitors with regards to general amenity, safety and quality of life issues associated with the sustainable transport bridge and also improved connectivity between cultural, commercial and residential quarters across the City. The proposed development will result in direct employment

of a minimum of 2 bus drivers, resulting in direct positive impacts to the local economy. There will be improvements to the public realm due to a new South Plaza and look out areas as part of the bridge structure which are likely to result in positive indirect impacts for the local economy. It was found that the risk of suicide death due to the construction of a new bridge structure in the City has the potential to have a profound human health impact. The provision of combined structure / parapets and wind-shielding on the proposed development will make the bridge more difficult to climb than for example the existing Rice Bridge and hence act, somewhat, as a deterrent to potential suicide deaths occurring at this location. Overall, impacts are likely to be positive in terms of supporting improvements in the populations health and well-being due to the provision of safe, affordable, sustainable travel modes that conform with existing and future planning policy and support a change in travel behaviour and sustainable development in city centre locations.

7.0 Biodiversity

The Key Ecological Receptors likely to be impacted upon by the proposed development include the River Suir, Migratory Fish, Otter, Bats and Invasive Alien Species. Each Key Ecological Receptor has been characterised in terms of their conservation value on a geographical scale. The assessment analyses the potential impacts of the proposed development on these Key Ecological Receptors and characterises their likely effects in terms of their magnitude, extent, duration, frequency and reversibility, thereby determining the significance of effects on a geographical scale.

One Key Ecological Receptor (River Suir) will be permanently affected by the proposed development relating to direct habitat loss within the footprint of the proposed development. However, given the small area of loss this impact is not considered to be significant. There will be slight to imperceptible impacts to water quality in the River Suir arising from the proposed development.

The Natura Impact Statement (NIS) concluded, in view of best scientific knowledge and the Conservation Objectives of European sites, that the River Suir Sustainable Transport Bridge, either individually or in combination with other plans or projects, will not adversely affect the integrity of the Lower River Suir Special Area of Conservation (SAC) or the River Barrow and River Nore SAC or any other European site.

Provided that the River Suir Sustainable Transport Bridge is constructed and operated in accordance with best practice guidelines and the mitigation measures described, there will be no likely significant effects on the ecology within the Zone of Influence at an International, national, county or local level. There are no other residual effects likely to be significant at the local, county, national or International level, and furthermore, the assessment found no likely significant effects arising from the cumulation of the impacts from the River Suir Sustainable Transport Bridge with the impacts from other past, present or reasonably foreseeable developments. Following consideration of the residual (post-mitigation) impacts, it is noted that the River Suir Sustainable Transport Bridge will not result in any significant impacts on any of the identified Key Ecological Receptors.

8.0 Soils and Geology

The EIAR has considered and assessed the likely significant effects with regard to Soils and Geology associated with both the construction and operational phases of

the proposed River Suir Sustainable Transport Bridge. Geophysical surveys, Ground Investigations and contamination assessment were all carried out to inform the Soils and Geology assessment. The results of the geophysical investigation indicate the area is characterised by thin sediments over shallow weathered – fresh rock in the northern area with thicker sediments present in the south. The Tier 3 Risk Assessment for contaminated soils found that all samples recovered were classified as non-hazardous.

The construction of the proposed development will require a combi-wall (combination of steel tubular piles and sheet pile panels) at the south abutment location in front of the existing quay wall to form the abutment foundations. Tubular piles will be installed using impact hammer while sheet pile panels will be vibrated. A new sheet pile wall will be installed immediately in front of the existing quay wall at each side of the south abutment for a length of approximately 35m in order to retain the increased levels at the south plaza and approach to the bridge.

The raising of the levels at the South Quays for the purposes of the south plaza ramp will require the importation of a small amount of general fill. The fill's weight will induce the settlements in the underlying soft soils. If untreated, this would cause a significant long-term negative impact. The mitigation measures for this may include surcharging, (with or without vertical wick drains) or piling. The surcharging will include the handling and temporary placing of a reasonably small quantity of general fill (approximately 1m height) on the ramp footprint, causing a slight temporary negative impact, for a period of up to 14 months. The piling option will be specified as Continuous Flight Auger (CFA) piles, which will minimise noise and vibration and introduce a need for disposal of a small quantity of arisings (less than 50 m³), causing a slight short-term impact. The existing floating jetty located at the south abutment will be removed at the bridge footprint. The impact associated with this operation is minor and adverse. The north abutment construction will be performed in front of the existing north quay and will not require demolition of the existing wharf to execute piling. The north abutment will tie into the proposed north quays development which is located approximately 5.00m above the existing level of the north wharf. The impacts on soils associated with this location are likely to be negligible.

Cofferdams are required for construction of the foundation supports to the bridge piers within the river. Cofferdams will be constructed using vibratory driven sheet piles. During piling construction operations within the river, there is the potential for contamination of the river due to sediments and runoff associated with construction works or fuel spills entering the river.

In general, the temporary and permanent impacts on soils and geology are considered minimal and will be managed by a number of best practice control measures.

No significant residual impacts of soils and geology are anticipated as a result of the proposed development.

9.0 Hydrogeology

Excavation of made ground will take place during the construction of the proposed development. The excavation of any localised areas of ground contamination will be a Permanent Positive impact on the soils environment due to the requirement to remove the material off-site and dispose or treat it in accordance with relevant

legislation. Any improvement to the quality of soils will have a corresponding benefit to the underlying groundwater resources due to the removal of a potential source of contamination for percolating water. Therefore, the magnitude of this impact is Minor Beneficial due to a minor improvement to the attributes quality.

There is a potential risk of localised contamination from construction materials leeching into the underlying soils by exposure, dewatering or construction related spillages resulting in a Permanent Negative impact on the soils. In the case of soils, the magnitude of this impact is Small Adverse as the requirement of good construction practices will necessitate the immediate excavation/remediation of any such spillage resulting in a very low risk of pollution to the soils and consequently the underlying aquifers. The significance of this impact is Imperceptible.

There is a potential risk of localised contamination of the groundwater due to construction activities i.e. construction spillages, leaks from construction plant and material etc. resulting in a Permanent Negative impact on groundwater. The presence of this low permeability alluvium (and tills) will limit the potential for contamination to infiltrate into the underlying aquifer.

However, the requirement to construct piles through the overlying soils, which have been shown to be slightly contaminated at discrete locations, could potentially create a preferential flowpath through the subsoils directly into the bedrock allowing some of these contaminants to mobilise. Expected construction practice will involve the piling to take place in the dry within temporary cofferdams. A base concrete slab will be constructed prior to pile installation to seal the potential pollution source. All foundation piles will be filled with concrete immediately after excavation preventing contamination of the bedrock aquifer. For these reasons, the impact is Negligible on the groundwater contained within the bedrock aquifer. The significance of this impact is Imperceptible.

The operational phase of the proposed development is predicted to have an overall Neutral long-term impact on hydrogeology within the study area. During the operational phase runoff from the proposed development which may be polluted with either sediment or hydrocarbons/metals may enter the River Suir and degrade water quality.

A project-specific Environmental Operating Plan (EOP) and Outline Construction Environmental Management Plan (OCEMP) have been prepared for the proposed development. The EOP will cover all potentially polluting activities and include an emergency response procedure. As a minimum, the EOP for the proposed development will be formulated in consideration of the standard best practice. Once the relevant mitigation measures are implemented, the significance of all residual impacts has been found to be imperceptible.

10.0 Hydrology

The proposed River Suir Sustainable Transport Bridge crosses the River Suir in Waterford City from the Waterford North Quays SDZ to the clock tower on the South Quays. The main potential for contaminants to enter into the hydrology environment arising from construction runoff include:

- Elevated silt/sediment loading in construction site runoff;
- Spillage of concrete, grout and other cement-based products;

- Accidental Spillage of hydrocarbons from construction plant and at storage depots / construction compounds; and
- Faecal contamination arising from inadequate treatment of on-site toilets and washing facilities.

A hydrodynamic model was undertaken to assess the existing hydrodynamics of the Suir Estuary and the effects of the proposed bridge on the circulation patterns of the estuary. The predicted scour depth in the channel between the cofferdams is 4 to 4.5m after a 24 day simulation with the sediment deposited locally in the channel within 150m upstream and 300m downstream. The potential impact is moderate to significant. The hydraulic model was also undertaken to predict the impact on flood levels both locally upstream and downstream. Impacts were found to be extremely small and less than the modelling tolerance.

A section of the existing flood defences on the south quays will be altered at the southern abutment and two smaller sections replaced with flood gates to provide access to the new jetties. The potential impact is slight.

The hydrodynamic model was run to simulate the effect of the proposed bridge crossing. The simulation indicates that the proposed bridge results in localised erosion at the structure principally away from the piles with the deposition of the eroded material occurring local to the site both upstream and downstream of the bridge. The extent of deposition from the scouring is located within 150m upstream of the bridge and 300m downstream. The scour depth at the bridge after a 24day simulation period is 1.5m and it likely to double to 3m over time after which an armouring layer of the heavier fractions left behind will prevent further scouring of the channel at the bridge. The hydrodynamic modelling indicates that erosion and deposition of the river bed will remain local to bridge structure (within 150m upstream of the bridge and 300m downstream).

The volumes displaced by the proposed bridge piers, abutments and cofferdams during construction phase is extremely small relative to the volumes of the receiving waterbodies and will result in an imperceptible.

The existing flood defences on the south quays will have to be removed to allow for the integration of the bridge abutment. Tide level and weather forecasts shall be monitored for potential flood events. Temporary flood defences shall be provided during construction at this location to maintain the south quays flood defences to a level of 3.7mOD.

The south quays plaza and the southern half of the bridge will drain to the existing surface water drainage system. This is treated at the Waterford City Water Treatment Plant before discharge to the River Suir. On completion of the SDZ development the north section of the bridge will discharge to the North Quays surface water drainage network, this will incorporate pollution control measures including silt traps, petrol interceptors and SuDS components treating all runoff prior to discharging to the River Suir. The potential impact is slight to imperceptible.

The risk of pollution to both surface and groundwater resulting from accidental spillage is an issue considered in the development to be negligible. The bridge traffic is limited to pedestrians and an electric shuttle bus. It is not anticipated that any chemicals or hydrocarbons will ever be transported across this bridge. Therefore, it is not anticipated that the risk of spillage will occur. There was therefore no spillage risk identified as part of the spillage risk assessment

All potential impacts have been identified as imperceptible to slight in the operational phase and as such no long-term mitigation measures are proposed. Construction shall be undertaken in accordance with the measures outlined in the Environmental Operation Plan. There will therefore be a slight residual impact during the construction of the River Suir Sustainable Transportation Bridge. No negative residual impacts on flood risk due to loss of conveyance or storage are anticipated at the river crossing. The design for the River Suir Sustainable Transportation Bridge is considered to be conservative and therefore avoids any conveyance capacity issues. The recommended mitigation measures will negate potential risk of flooding at the north and south quays.

11.0 Landscape and Visual

The effect of the proposed bridge on the erosion and sediment regime will be small and highly localised, the effective change in scour patterns will be insignificant in comparison to the existing erosion and sediment transport patterns. The residual impact to surface water morphology is anticipated to be slight as all practicable mitigation measures are to be implemented.

The site of the proposed bridge spans from Waterford's North Quays to the South Quays where it will land on Meagher's Quay near the Clock Tower. This is a city centre site, with a strong urban character on the south side. The buildings facing onto the south quays are generally commercial and of 3 to 4-storey height, occasionally reaching 6-storey.

The northern side was an industrialised port until the 1990s and is now predominantly disused and semi-derelict in visual terms. The disused industrial buildings and wharves have been demolished while the rail lines remain on the waterfront, with dual carriageway road (Dock Road) above retaining walls to the north, with the land rising steeply up from the river level. Residential developments of a suburban character are located to the north and east of the North Quays, and Waterford (Plunkett) Railway Station is to the west of the North Quays SDZ lands. Such developments are elevated above the roadway and the North Quays.

The width of the bridge deck is constant over the bridge extents with the exception of the portions over the two central pier support locations where resting/viewing points have been introduced and the bridge widens out locally over the arches. These are asymmetrical in form, with one facing northwest towards Rice Bridge and the other looking south-east towards the quays and estuary downriver. The five span bridge deck has been laid out symmetrically and comprises a 70m long central span (32.5m wide opening section with a 25m wide navigable channel), two intermediate spans of 41m and two end spans of 27.5m length. There are four piers in total, which provides a symmetrical arrangement across the river channel. The proposed bridge will be relatively low to the water and will not block any existing views but will form a new element in the landscape and views along the river from the city, quays and surrounding residential areas. Due to the quality of design and materials of the proposed bridge, and the fact that bridges, both new and old, are often perceived positively in the landscape (such as the N25 Waterford Suir Bridge, the M1 Boyne Bridge, etc.), it is considered that the bridge will create a positive element in views of the river Suir and the cityscape.

New views from the bridge will also be opened up to pedestrians and users of sustainable transport. It will also add to the pedestrian permeability of the city and therefore enhance the experience of the city's landscape. A new public open space

on the South Quays is also proposed which centres on the Clock Tower and provides a more suitable space for the tower than the existing car parking which will be removed and replaced with paved areas and green open space with trees and planting. This is also considered to be a positive impact of the scheme.

During construction stage, the effects on the receptors during construction will be associated with the visibility of the construction activities, cofferdams, piling rigs, cranes and other plant and machinery. The visual impacts are considered to be moderate and negative for all receptors due to the visibility of construction activities however the duration will be short term.

12.0 Noise and Vibration

A variety of items of plant will be in use for the purposes of site clearance and construction of the proposed development. There will be vehicular movements to and from the site that will make use of existing roads, and due to the nature of construction activities, there is potential for the generation of elevated levels of noise. Excavator mounted breakers will be employed to remove existing concrete and rock and then standard construction tools and methods will be employed for general construction and landscaping.

Indicative noise levels have been predicted using guidance set out in BS 5228-1:2009+A1:2014 for the main phases of the proposed construction works. The calculations assume common equipment used for each activity along with estimates of percentage on times for which the equipment will operate during the 12-hour working day.

The predicted exceedances are due to noise emissions from concrete breaking and piling activities. Piling is expected to take place at a range of distances from the sensitive receptors with the noisiest part of the piling process only occurring for a relatively short period in comparison with the entire programme. Giving consideration to the predicted construction noise levels, it is recommended that the various best practice working methods used to control noise and vibration are adopted by the contractor during all works.

Vibratory piling works will be carried out at the south abutment and at the sheet piling for the temporary cofferdams. The closest receptor to the vibratory piling works is estimated to be approximately 50m distance and the Clock Tower is estimated to be approximately 30m from the vibratory piling works. It is expected that the contractor will ensure that all best practice noise and vibration control methods will be used as necessary in order to ensure impacts to nearby residential noise sensitive locations are not significant. Noise-related mitigation methods will be implemented for the project in accordance with best practice. Vibration monitoring will be undertaken at the Clock Tower during construction works in order to ensure compliance with thresholds.

During the operational phase of the development, the potential sources of noise and vibration are limited to occasional use of mechanical plant required to operate the bridge opening mechanism and the movement of cyclists, pedestrians and an electric bus across the bridge. The mechanical plant required to open the bridge will be controlled in accordance with BS 4142 such that the existing noise environment is not increased.

During the construction phase of the project there is the potential for impacts on nearby noise sensitive properties due to noise emissions from site activities. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impacts will be reduced as far as is reasonably practicable. The resultant residual noise impact from this source will be of negative, significant, short-term impact.

During the operational phase it is expected that noise emissions from the Sustainable Transport Bridge will not be perceptible above the existing noise environment resulting in a neutral, imperceptible, long-term impact.

13.0 Air Quality and Climate

The Institute of Air Quality Management (IAQM) guidelines (IAQM 2014) for assessing the impact of dust emissions from construction and demolition activities have been used in this assessment based on the scale and nature of the works and the sensitivity of the area to dust impacts. In terms of receptor sensitivity, the area is characterised as having mostly medium sensitivity receptors with a small number of high sensitivity receptors within the area of the site. In terms of the south-westerly prevailing wind, the area downwind of the site is a high sensitivity environment (residential properties on Dock Road). However, as these receptors are situated up a hill from the proposed site the potential impact is reduced. The results of the construction phase air quality and climate assessment have shown that, with appropriate mitigation measures in place, residual impacts of the proposed development on air quality and climate for the long- and short-term will be negligible.

Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling the site and landscaping. Dust emission magnitude from earthworks can be classified as small, medium and large and are described below.

The dust emission magnitude for the proposed earthwork activities can be classified as small. This results in an overall negligible risk of temporary dust soiling impacts, low risk of ecological impact and an overall negligible risk of temporary human health impacts as a result of the proposed earthworks activities. The dust emission magnitude from trackout activities is classified as medium. This results in an overall low risk of temporary dust soiling impacts, low risk of ecological impact and an overall low risk of temporary human health impacts as a result of the proposed trackout activities. Overall, in order to ensure that no dust nuisance occurs during the earthworks and trackout activities, a range of dust mitigation measures associated with a medium risk of dust impacts will be implemented. When the dust mitigation measures outlined for the proposed development are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

The nature of the development is such that there is no predicted impact on traffic, beneficial or adverse. Therefore, using the DMRB screening criteria, no road links can be classed as 'affected' by the proposed development and do not require inclusion in the local air quality assessment.

The overall results of the air quality and climate assessment have shown that, with appropriate mitigation measures in place, short and long-term residual air quality and climate impacts of the proposed development will be negligible.

14.0 Archaeological and Cultural Heritage

Waterford has a rich cultural heritage associated with the River Suir, with the foundation of Waterford as a city dating back to the Viking Age and the earliest date for the city itself being generally accepted around AD 912-33. Waterford began as a defended Viking longphort or ship-fortress and became Ireland's second city after Dublin.

The proposed bridge is to be located to the north west of the 'Viking Triangle' (as now defined). No direct or indirect impacts to any recorded features of terrestrial or underwater archaeological or historic significance are anticipated as part of the proposed development. However, groundworks may have a direct negative impact on any previously unrecorded archaeological features, deposits or artefacts which have the potential to survive beneath the modern quay structures or in the estuarine silts of the riverbed. This would be caused by excavation and removal of materials to facilitate the construction of bridge piers/landings etc.

It is recommended that removal of any quayside masonry or furniture should be carried out under archaeological monitoring to facilitate further recording. It may be deemed appropriate to retain and reuse any elements of particular cultural heritage significance as part of the development and these can be identified during archaeological monitoring.

The riverbed surrounding Piers D and E will be enclosed within cofferdams as part of the construction process. The cofferdams are to be dewatered as part of that process; it is recommended that an additional archaeological inspection of the riverbed within the footprint of the cofferdam is undertaken prior to construction.

Photogrammetry of the stone quay at the North Quay landing point of the proposed development should also be undertaken in advance of the commencement of construction works. The photogrammetry survey should be annotated and a record should be made of the section of quay wall being removed.

15.0 Architectural Heritage

All excavation works should be archaeologically monitored by experienced, licensed underwater archaeologists with a proven track record in equivalent, similar type work. Should archaeological material, wreckage, timbers or other artefacts be recorded in the course of the monitoring, the archaeologist will be empowered to recover and record the material. This may involve the temporary suspension of the work to recover the material. In the event that excavation works impact on an archaeological site, the standby archaeological dive team, in place for such eventualities, should be mobilised to undertake a dive inspection of the impacted site which may lead to further investigations and / or potentially full excavation.

The city of Waterford has its origins in Viking times, when the city stretched along the waterfront between Barronstrand Street and The Mall. Following the arrival of the Normans the city expanded westwards, presenting a longer frontage to the river. By the mid-eighteenth century the quays stretched along the full length of the city's river frontage, from Reginald's Tower and The Mall in the east, to the Graving Bank in the west, around the site of the present Grattan Quay.

Protected structures within the vicinity of the bridge have been identified as part of the assessment of Architectural Heritage. These include the Clock Tower and

bollards on the South Quays, where the proposed bridge will tie in. The potential for direct and indirect impacts on the architectural heritage of the Waterford Quays has been assessed and mitigation measures proposed for construction stage.

There will likely be positive impacts arising from the facility afforded by the proposed bridge for viewing the significant architectural heritage. In particular, the bridge will provide a good vantage point for views of Edmund Rice Bridge and the approach towards the south quays will highlight the Clock Tower direction in front of the viewer walking on the bridge. The bridge will also provide good views of the buildings along the frontage of the quays.

Any cut stone removed from the quay wall or the surface of the quay is to be reused in a similar manner or, where this is not possible or appropriate, the stone is to be salvaged and stored for future use elsewhere along the quays. Following mitigation, the expected impact on the character of the quay would be slight.

Mitigation will be required to safeguard the clock tower during the works. The clock tower is to be excluded from the working area and the hoarding surrounding the working area is to be located outside the ring of post-and-chain fencing around the northern, eastern and western sides of the tower.

Prior to the commencement of works and prior to the erection of the site hoarding a detailed photographic record of the clock tower is to be made showing both the interior and the exterior of the tower. A report based on this photographic survey is to be prepared and lodged with the Conservation Officer, with a copy also lodged with the Waterford City and County Libraries Central Library.

Prior to the commencement of the works on the quays a vibration monitor is to be set up within the clock tower and this is to have the facility to send an alarm to a designated engineer in the event of the vibrations within the tower exceeding a predetermined limit to be set by the engineer at a level below which any damage to the tower through vibration is likely to occur.

16.0 Material Assets and Land

Waterford City is the largest urban area in the South East of Ireland and is an important tourism centre with good transport linkages for both public and private transport. The construction of the proposed sustainable transport bridge will potentially increase the walking catchment from the City Centre to the areas north of the River Suir to include a population of approximately 4,000 people, and the cycling catchment to include 7,400 people, in line with the NPF which predicts a future population of 30, 000 people on north side of the River Suir. It is expected that the proposed bridge may carry approximately 4 million users annually.

It is considered that the proposal will have limited adverse impacts during the construction phase which is, by its nature, temporary. The permanent removal of 150 car parking spaces from the South Quay and the removal of approximately 140m² of berthing facility from Pontoon C are considered the most significant permanent impacts associated with the project. In contrast, the operation of the development will provide many significant positive impacts to the city and wider region. Specific significant positive impacts relating to the operational phase of the proposal include:

- Providing alternative sustainable transport options including cycling, walking and public transportation along a safe and secure route which is segregated from private vehicles;
- Providing indirect health benefits through the provision of safer facilities for recreational users which will increase and encourage the opportunity for physical exercise;
- Providing connectivity to the proposed transport hub on the north quay, including the relocated train station;
- Providing a new amenity for Waterford City, thereby enhancing the attractiveness of the city to tourism and increasing the economic potential of the city;
- Providing linkages and connectivity, thereby enabling the concentric development of the city which, when realised, will act as an economic driver for the region. Aiding integration of the SDZ with Waterford City and the integration of the North Quay and the South Quay. Aiding integration of the existing Waterford Greenway and the proposed New Ross to Waterford Greenway and aiding integration of the Ferrybank area, particularly schools on Abbey Road, with Waterford City; and
- Providing positive impacts on material assets due to enhanced accessibility and attractiveness of the area which in turn will maintain commercial and residential rents and property values.

17.0 Major Accidents, Interrelationships and Cumulative Impacts

The EIAR has assessed the vulnerability of the proposed development to risks of major accidents and/or disasters, in addition to identifying any interrelationships that may occur between individual topics, and cumulative impacts which may occur as a result of other projects within the area. These are summarised below.

Major Accidents and Natural Disasters

There are no “Seveso” sites (establishments within the meaning of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015) in close proximity to the proposed development. The closest establishment is at least 1km east of the proposed development. The design of the proposed development has taken account of the potential for flooding and it is considered that there is minimal flood risk as a result of the proposed development. In relation to accidents resulting in a spillage of polluting material, the risk of these occurring will be significantly reduced and if a spillage should occur the proposed development incorporates drainage to allow the spilled material to be contained and treated prior to discharge.

Interrelationships

The interrelationships between the individual environmental disciplines have been considered and assessed. It is concluded that once relevant mitigation measures are implemented, no residual likely significant effects will exist as a result of the construction or operation of the River Suir Sustainable Transport Bridge.

Cumulative Impacts

It is considered that the scale of the works and implementation of effective environmental control measures will avoid all likely significant effects on environmental parameters. There is no potential for cumulative impacts arising in

combination with any other plans or projects and therefore no potential for in-combination effects on environmental parameters.

Based on the above, it can be objectively concluded, in view of best scientific knowledge, on the basis of objective information and provided effective mitigation is in place, that the Project, individually or in combination with other plans and projects, will not have a significant adverse effect on the receiving environment.

18.0 Further Information & What Happens Next

The Environmental Impact Assessment Report (EIAR) will be available for inspection at the following locations as detailed in the published newspaper notices:

- Waterford City and County Council, Customer Care Desk, Baileys New Street, Waterford City (Office Hours 9:30am-4:00pm Monday to Friday) and
- Waterford City and County Council, Civic Offices, Davitt's Quay, Dungarvan, Co. Waterford (Office Hours 9:30am-4:00pm Monday to Friday).

A copy of the EIAR and/ or the Natura Impact Statement (NIS) may be purchased on payment of the following fees:

Document	Title	Printed	Electronic (DVD)
EIAR Volume 1	Non-Technical Summary	€5	€5
EIAR Volume 2	EIAR Text	€25	
EIAR Volume 3	EIAR Figures	€50	
NIS	Natura Impact Statement	€25	

A copy of the EIAR and NIS may also be accessed free of charge on the Council's website at www.waterfordcoco.ie

Submissions may be made in writing to:

An Bord Pleanála,
Strategic Infrastructure Division,
64 Marlborough Street,
Dublin 1, D01 V902.

Submissions may be made prior to the dates specified in the published newspaper notices, in relation to:

- the likely effects on the environment as a result of the River Suir Sustainable Transport Bridge;
- the implications of the River Suir Sustainable Transport Bridge for proper planning and sustainable development in the area which it is proposed to situate the proposed development; and
- the likely significant effects of the River Suir Sustainable Transport Bridge on a European Site.

An Oral Hearing may be held, should the statutory requirements for one be met. Written submissions, together with any representations made at any oral hearing, will be considered by An Bord Pleanála in making its decision on whether or not to

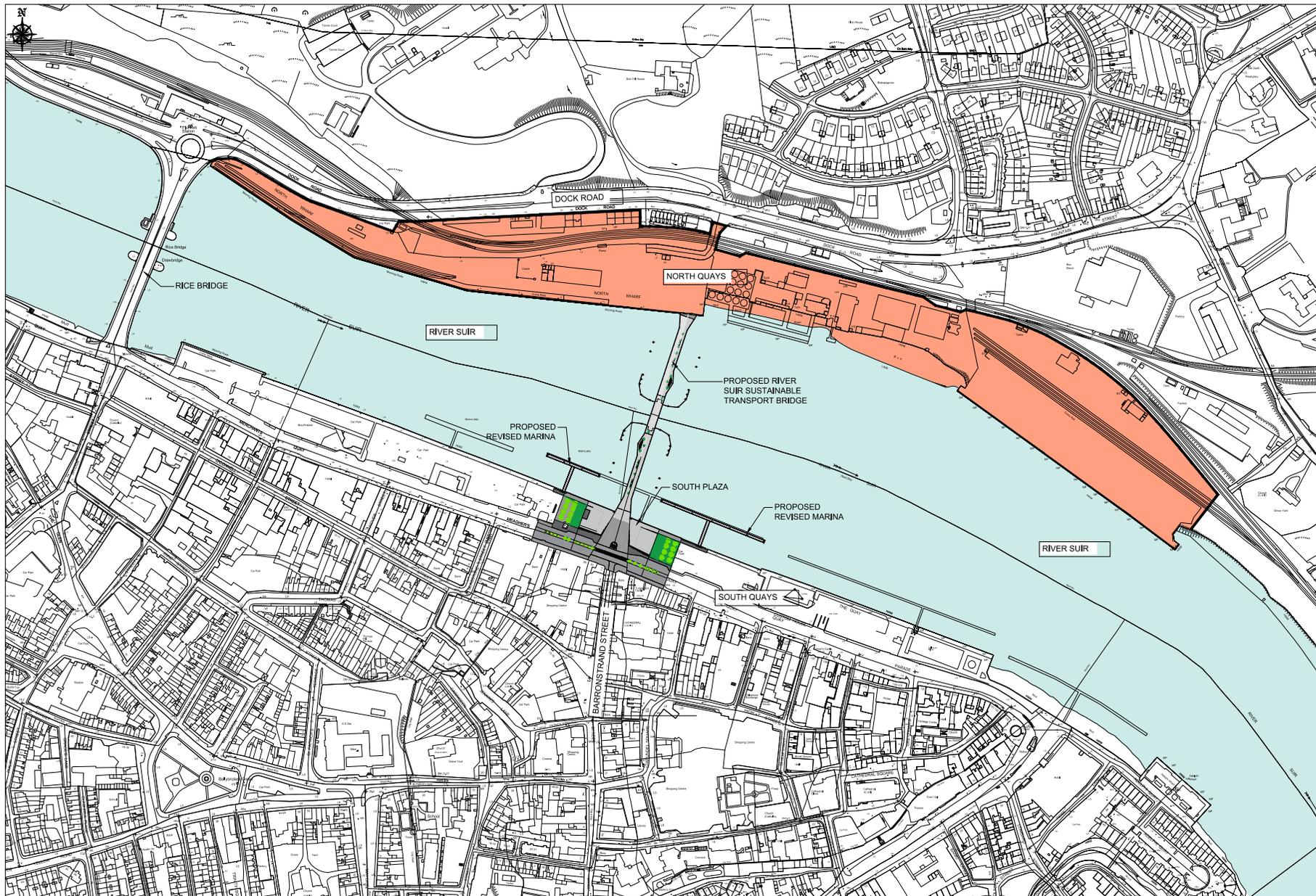
approve the River Suir Sustainable Transport Bridge with or without modifications. An Bord Pleanála's decision will be published in one or more newspapers circulating in the area, including where appropriate, particulars of any modifications to the River Suir Sustainable Transport Bridge.

NON-TECHNICAL SUMMARY

Figures

LEGEND:

STRATEGIC DEVELOPMENT ZONE



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No.	Revision	Date	By	Chkd	App'd
	Stage	Date			
	PRELIMINARY				
	APPROVAL				
	TENDER				
	CONSTRUCTION				



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Drawing Title: EXTENT OF SITE			
Drawn: OB	Job No: 16.169	Drawing No: NTS 1	Rev: -
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