Chapter 13
Water

Contents

13. Water

13.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the Clongriffin to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme) on the surface water environment during both the Construction and Operational Phases. The following attributes of each surface water body (receptor) are considered: hydrology, hydromorphology and water quality. Hydrogeology is dealt with specifically in Chapter 14 Land, Soils, Geology and Hydrogeology.

During the Construction Phase, the potential surface water impacts associated with the development of the Proposed Scheme have been assessed (see Section 13.4.4), including potential impacts from construction runoff and watercourse disturbance due to utility diversions, road resurfacing and road realignments.

During the Operational Phase, the potential surface water impacts associated with changes in surface water runoff, increased hardstanding and watercourse disturbance have been assessed (see Section 13.4.5).

The assessment has been carried out according to best practice and guidelines relating to surface water assessment, and in the context of similar large-scale infrastructure projects.

An assessment of Proposed Scheme compliance with the Water Framework Directive (WFD) (Directive 2000/60/EC) requirements is provided in Appendix A13.1 WFD Assessment in Volume 4 of this EIAR; the status of WFD water bodies and protected areas within the Study Area are provided in Section 13.3 and a summary of the conclusions of the WFD assessment is provided in Section 13.6.1.

Flooding has been assessed within a scheme specific Flood Risk Assessment (FRA) report (Appendix A13.2 in Volume 4 of this EIAR). The results of this assessment have been summarised in Sections 13.3.10 and 13.4.7 of this chapter.

The aim of the Proposed Scheme when in operation is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the Proposed Scheme are described in Chapter 1 (Introduction). The Proposed Scheme which is described in Chapter 4 (Proposed Scheme Description) has been designed to meet these objectives.

The design of the Proposed Scheme has evolved through comprehensive design iteration, with particular emphasis on minimising the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Scheme are attained. In addition, feedback received from the comprehensive consultation programme undertaken throughout the option selection and design development process have been incorporated, where appropriate.

13.2 Methodology

13.2.1 Study Area

The baseline study area for this assessment is 500m from the boundary of the Proposed Scheme. It is anticipated that any likely significant impacts from the Proposed Scheme would occur at local water bodies, and given the nature and extent of the Proposed Scheme, the 500m study area is considered appropriate to encompass all those water bodies that may be susceptible to significant impacts.water bodieswater bodies Therefore, any identified surface water bodies within that area have been considered as receptors, including those classified under the Water Framework Directive (WFD) including riverine, transitional water bodies, lake (water) bodies and coastal water bodies, and also non-WFD classified water bodies. Artificial drainage features, such as existing Sustainable Drainage Systems (SuDS), have not been considered as receptors within the baseline assessment.

The nearest surface water abstraction point is Leixlip Reservoir, which is approximately 15km (kilometres) west of the Proposed Scheme. This is a major public water supply abstraction point (approximately 195,000 m^3/day (cubic metres per day)) which supplies approximately 600,000 people, serving Fingal, Kildare and North Dublin. However, due to separation from the Proposed Scheme and the fact that it is not downstream of the study area, there is considered to be no potential for the Proposed Scheme to interact with this abstraction point and, accordingly, this abstraction point has not been considered further in the assessment.

13.2.2 Relevant Guidelines, Policy and Legislation

13.2.2.1 Water Framework Directive (WFD)

The WFD established a framework for the protection of both surface and groundwaters. The WFD provides a vehicle for establishing a system to improve and / or maintain the quality of water bodies across the European Union (EU). The Directive requires all water bodies (river, lakes, groundwater, transitional, coastal) to attain 'Good Water Status' (qualitative and quantitative) by 2027.

There are a number of WFD objectives under which the quality of water is protected. The key objectives at EU level are the general protection of aquatic ecology, specific protection of unique and valuable habitats, the protection of drinking water resources, and the protection of bathing water. The objective is to achieve this through a system of river basin management planning and extensive monitoring. 'Good Status' means both 'Good Ecological Status' and 'Good Chemical Status'.

The WFD was initially transposed into Irish law by S.I. No. 722/2003 – European Communities (Water Policy) Regulations 2003, as amended (hereafter referred to as the Water Policy Regulations). The Water Policy Regulations outline the water protection and water management measures required to maintain high status of waters where it exists, prevent any deterioration in existing water status and achieve at least 'Good' status for all waters.

Subsequently, S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended (hereafter referred to as the Surface Waters Regulations), and S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010, as amended (hereafter referred to as the Groundwater Regulations), were promulgated to regulate WFD characterisation, monitoring and status assessment programmes, in terms of assigning responsibilities for the monitoring of different water categories, determining the quality elements and undertaking the characterisation and classification assessments.

The Water Policy Regulations require the assessment of permanent impacts of a scheme / project on WFD water bodies, (rivers, lakes, estuaries, coastal waters and groundwater). Typically, the permanent impacts include all operational impacts, but can also include impacts from construction depending on the length and / or nature of the works, etc. of the Proposed Scheme, as some potential construction impacts could be considered permanent in the absence of mitigation. An assessment of the compliance of the Proposed Scheme with WFD requirements is provided in Appendix A13.1 WFD Assessment; a statement of the status of WFD water bodies and protected areas within the Study Area are provided in Section 13.3 and a summary of the conclusions of the WFD assessment is provided in Section 13.6.1.

In the absence of WFD assessment guidance specific to Ireland, the assessment has been carried out using the UK Environment Agency's 'Water Framework Directive assessment: Estuarine and Coastal waters' 2016 (updated 2017) (Environment Agency 2016). No specific guidance exists for freshwater water bodies, however this guidance was used as the basis of the UK's Planning Inspectorate (PINS) Advisory Note 18 'Water Framework Directive' June 2017 (PINS 2017) in which it sets out the stages of an assessment. On this basis it is considered appropriate to use for the assessment of the Proposed Scheme.

13.2.2.2 River Basin Management Plans

River Basin Management Plans (RBMPs) provide the mechanism for implementing an integrated approach to the protection, improvement and sustainable management of the water environment and are published every six years.

The second cycle RBMP 2018 - 2021 was published by the Department of Housing, Planning and Local Government (DHPLG) in April 2018 and covers Ireland as a whole (DHPLG 2018). For the second cycle, the original (2009) Eastern, South-Eastern, South-Western, Western and Shannon River Basin Districts were merged to form one national River Basin District (RBD). For those water bodies 'At Risk' of failing to meet the objectives of WFD, the RBMP 2018 - 2021 identified the most significant pressures as follows: agriculture (53%), hydromorphology (24%), urban wastewater (20%), forestry (16%), domestic wastewater (11%), urban runoff (9%), peat (8%), extractive industry (7%) and mines and quarries (6%).

In September 2021, the Minister for Housing, Local Government and Heritage, published the draft River Basin Management Plan for Ireland 2022-2027 for public consultation (DHLGH 2021). The consultation period closes March 2022. The draft RBMP sets out at the outset that it is published in the context of a rapidly changing policy landscape at European and International levels and against a backdrop of 'widespread, rapid and intensifying climate change'. In addition, Ireland is now experiencing a sustained decline in water quality following many years of improvements, therefore stronger measures are now required to achieve sustainable water management in order to address and adapt to the impacts of climate change and achieve the desired outcomes for biodiversity.

Image 13.1 presents the ecological status of water bodies in Ireland over the past two cycles of the RBMP and illustrates the reduction in water quality, particularly in relation to the reduced percentage of water bodies achieving high status and increased percentage achieving bad status. The reductions in water quality are especially notable for rivers; for other water bodies the changes are more mixed; some reductions, some improvements. The draft RBMP cites a 4.4% net decline in the status of water bodies, and notes that this is mostly driven by a decline in the status of river water bodies.

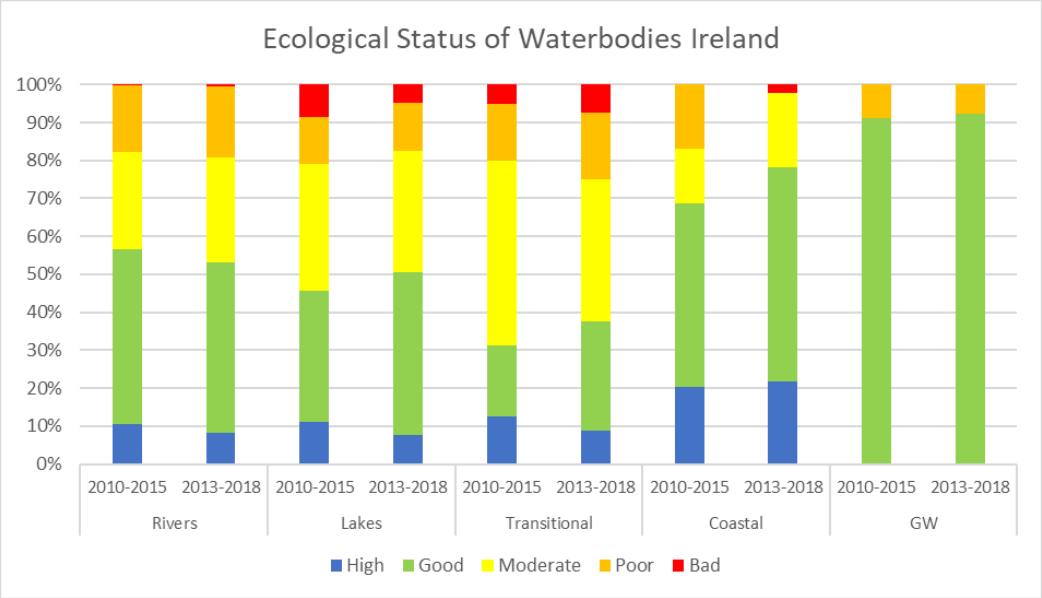

Image 13.1: Ecological Status of Water bodies in Ireland

The characterisation and risk assessments carried out for the third cycle show that 33% of water bodies are at risk of not meeting their environmental objective of good or high status. Of these, 46% are impacted by a single significant pressure. Agriculture remains the most common pressure, followed by hydromorphology, forestry and urban wastewater. There has been an increase in water bodies impacted by agriculture since the second cycle RBMP.

The draft RBMP sets out a Programme of Measures (PoMs) necessary to deliver the objectives of the WFD in full and to contribute to other environmental priorities.

13.2.2.3 Guidelines

The following guidance detailed in Table 13.1 has also been consulted during the preparation of this Chapter, where relevant.

Table 13.1: Guidelines

EIA Topic	Guidance
EIA / General	• Environmental Protection Agency (EPA) Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the Draft EPA Guidelines) (EPA 2017); and • European Commission (EU) Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report, 2017 (EU 2017).
Water	• Transport Infrastructure Ireland (TII) Road Drainage and the Water Environment guidance document (TII 2015). • National Road Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005)*; • NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (hereafter referred to as the TII Assessment Guidelines) (NRA 2009)*; and • The Department of the Environment, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management Guidelines for Planning Authorities (hereafter referred to as the FRM Guidelines) (DEHLG and OPW 2009).

*The NRA merged with the Railway Procurement Agency and was effectively dissolved on 1 August 2015. The merger of the two agencies is called Transport Infrastructure Ireland (TII). As a result, all previous NRA documents are now referred to as TII documents.

13.2.3 Data Collection and Collation

Information on the baseline environment including hydrology, hydromorphology and water quality of the receptors within the study area has been collected and collated by undertaking both a desk study and field surveys.

13.2.3.1 Data Sources used to Undertake Desk Study

Table 13.2 details the data sources consulted during the assessment.

Table 13.2: Data Sources used to Undertake Desk Study

Assessment Attribute	Title
General	• Ordnance Survey of Ireland (OSI) - current and historic mapping; and • Aerial photography (i.e. Google Earth).
Surface Water Quality and Hydromorphology	• WFD Ireland Database; • EPA - water quality monitoring database and reports. EPA Water Environment Maps (EPA 2021); • EPA Environmental Data Maps; • National Parks and Wildlife Service (NPWS) - designated sites; and • Inland Fisheries Ireland (IFI) - fishery resources.
Hydrology	• Catchment Summaries; • RBMP 2018-2021; and • EPA - flow and water level measurements.
Water / Flood Risk	• OPW National Flood Information Portal (OPW 2020).

13.2.3.2 Field Surveys

Field walkover assessments were carried out in March 2020. All watercourse crossings within the study area were visited to inform the determination of baseline conditions in order to identify the likely impacts of the Proposed Scheme.

Water quality sampling data was obtained from the EPA's water quality monitoring programme. Specifically, all culvert and bridge crossing locations and fluvial flood inundation extents were visited. Observations were made from bridges and from the top of riverbanks. The following observations were recorded at each survey location:

- Flow conditions (recording observations such as homogenous flow, low flow or high flow);
- Riverbed (recording observations such as the sediment type and whether there was any deposition);
- Water quality (recording any potential sources of pollution as well as visual indicators of poor quality (e.g., presence of sewage fungus, litter or foam lines);
- Bank stability (recording any instances of erosion and aggradation);
- Natural and manmade features of the river (including modifications, examples of structures could include culverts, weirs or bridges);
- Runoff pathway and runoff risk (recording the pathway for any surface runoff to the watercourse and the likelihood of surface runoff to the river;
- Riparian vegetation (recording the surrounding vegetation); and
- Outfalls and discharges (recording any outfalls and discharges and whether these were active at the time of the survey).

Information gathered during the field surveys undertaken in March 2020 is summarised in Section 13.3.4 of this Chapter.

13.2.4 Methodology for the Assessment of Impacts

13.2.4.1 General Approach

The following method for the assessment of impacts has been adapted from the TII Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (hereafter referred to as the TII Guidelines) (NRA 2009), specifically Section 5.6. The assessment also took account of the guidance set out in the Environmental Protection Agency (EPA) Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2017). In addition, the relevant provisions of the EU's Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (EU 2017) have been considered in preparing this chapter of the EIAR.

The surface water environment is intrinsically linked to flood risk, ecological receptors and groundwater, considered in the FRA Report (Appendix A13.2 in Volume 4 of this EIAR), Chapter 12 (Biodiversity) and Chapter 14 (Land, Soils, Geology & Hydrogeology) respectively. Commercial and recreational use of the water environment is not included in the scope of this Chapter, as commercial and recreational interests are considered and assessed in Chapter 19 (Material Assets) and Chapter 10 (Population).

The TII Assessment Guidelines outline how impact type, magnitude, and duration should be considered relative to the importance of the hydrological receptor and its sensitivity to change in order to determine significance of the impacts.

The overall impact on surface water receptors (i.e., rivers, canals, transitional water bodies, coastal water bodies and lakes) because of the Proposed Scheme will be determined based on two parameters:

1. The sensitivity of the water body attributes (hydrology, water quality and geomorphology) to change; and
2. The magnitude of the impacts on water body attributes.

13.2.4.2 Sensitivity of Receptors

The sensitivity of surface water attributes to changes as a result of the Proposed Scheme is determined by a set of criteria including their relative importance or 'value' (e.g. whether features are of national, regional or local value). Table 13.3 outlines the criteria for estimating the sensitivity of receptors and their attributes.

Table 13.3: Criteria Used to Evaluate the Sensitivity of Surface Water Receptors (NRA 2009 adapted to include WFD Assessment Guidelines (Environment Agency 2016))

Sensitivity	Criteria	Typical Example
Extremely High	Receptor (or receptor attribute) has a very high quality or value on an international scale	• Any water body which is protected by EU legislation (e.g. Designated European Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) or 'Salmonid Waters'; and • A water body that appears to be in natural equilibrium and exhibits a natural range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, free from any modification or anthropogenic influence.
Very High	Receptor (or receptor attribute) has a high quality or value on an international scale or very high quality or value at a national scale	• Any water body (specific EPA segment) which has a direct hydrological connection of <2km to European Sites or protected ecosystems of international status (Special Areas of Conservation (SAC) / Special Protected Areas (SPA) or Salmonid Waters); • water body ecosystem protected by national legislation (Natural Heritage Area (NHA) status); • A water body that appears to be largely in natural equilibrium and exhibits a diverse range of morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited modifications; and • Nutrient Sensitive Areas.
High	Receptor (or receptor attribute) has a moderate value at an international scale or high quality or value on a national scale	• A WFD water body with High or Good WFD Status; • A Moderate WFD Status (2013 - 2018) water body with some hydrological connection (<2km) to European Sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters) further downstream; • water body which has a direct hydrological connection to sites/ecosystems protected by national legislation (NHA status); • A water body that appears to be in some natural equilibrium and exhibits some morphological features (such as pools and riffles). There is a diverse range of fluvial processes present, with very limited signs of modification or other anthropogenic influences; and • Direct hydrological connectivity to Nutrient Sensitive Areas.
Medium	Receptor (or receptor attribute) has some limited value at a national scale	• WFD water body with Moderate WFD Status (2013 - 2018); • WFD water body with limited (>2km <5km) hydrological importance for sensitive or protected ecosystems (much further downstream); • A water body showing signs of modification or culverting, recovering to a natural equilibrium, and exhibiting a limited range of morphological features (such as pools and riffles). The watercourse is one with a limited range of fluvial processes and is affected by modification or other anthropogenic influences; • Evidence of historical channel change through artificial channel straightening and re-profiling; and • Some hydrological connection downstream Nutrient Sensitive Areas.
Low	Receptor (or receptor attribute) has a low quality or value on a local scale	• Water body with Bad to Poor WFD Status (2013 - 2018) A water body with >5km (or no) hydrological connection to European Sites or national designated sites; or • A non-WFD water feature with minimal hydrological importance to sensitive or protected ecosystems; and / or economic and social uses; • A highly modified watercourse that has been changed by channel modification, culverting or other anthropogenic pressures. The watercourse exhibits no morphological diversity and has a uniform channel, showing no evidence of active fluvial processes and not likely to be affected by modification. Highly likely to be affected by anthropogenic factors. Heavily engineered or artificially modified and could dry up during summer months; and • Many existing pressures which are adversely affecting biodiversity.

13.2.4.3 Magnitude of Impact

The scale or magnitude of potential impacts (both beneficial and adverse) depends on both the degree and extent to which the Proposed Scheme may impact the surface water receptors during the Construction and Operational Phases.

Factors that have been considered to determine the magnitude of potential impacts include the following (EPA 2017):

- Nature of the impacts;
- Intensity and complexity of the impacts;
- Expected onset, duration, frequency and reversibility of the impacts;
- Cumulation of the impacts with other existing and / or approved projects impacts; and
- Possibility of effectively reducing the impacts.

Table 13.4 outlines the criteria for determining the magnitude of impact on surface water receptors.

Table 13.4: Criteria for Determining the Magnitude of Impact on Surface Water Receptors (NRA 2009)

Nature of Impact	Description	Scale and Nature of Impacts
High Adverse	Results in loss of attribute and/or quality and integrity of the attribute	• Loss or extensive change to a fishery; • Loss of regionally important public water supply; • Loss or extensive change to a designated nature conservation site; • Reduction in water body WFD classification or quality elements; • Results in loss of receptor and/or quality and integrity of receptor; or • An impact, which has a high likelihood of occurrence and that has the potential to alter the character of a small part or element of the receptor in the medium-long term. This could be frequent or consistent in occurrence, and result impact which may alter the existing or emerging trends.
Medium Adverse	Results in effect on attribute and/or quality and integrity of the attribute	• Partial loss in productivity of a fishery; • Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies; • Contribution to reduction in water body WFD classification;. • Results in impact on integrity of receptor or loss of part of receptor;. or • An impact, which has reasonable likelihood of occurrence and that has the potential to alter the character of a small part or element of the receptor in the medium term. This could be intermittently or occasionally, and result impact which may be consistent with existing or emerging trends.
Low Adverse	Results in some measurable change in attributes, quality or vulnerability	• Measurable impact but with no change in overall WFD classification or the status of supporting quality elements; • Minor impacts on water supplies; • Results in minor impact on integrity of receptor or loss of small part of receptor; or • An impact, which has low likelihood of occurrence and that has some potential to alter the character of a small part or element of the receptor in the short term. This could be on a once-off occasion or rare occurrence, and result impact which may be consistent with existing or emerging trends.
Negligible	Results in effect on attribute, but of insufficient magnitude to affect the use or integrity	• No measurable impact on integrity of the attribute; or. • Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.
Low Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring	• Has some potential to results in minor improvement WFD quality element(s)
Medium Beneficial	Results in moderate improvement of attribute quality	• Contribution to improvement in water body WFD classification.

Nature of Impact	Description	Scale and Nature of Impacts
High Beneficial	Results in major improvement of attribute quality	• Improvement in water body WFD classification.

13.2.4.4 Significance of Impacts

The significance of an impact is determined by combining the sensitivity of the receptor with the predicted magnitude of impact, as shown in Table 13.5.

Table 13.5: Categories of Environmental Impacts (EPA 2017)

Importance of Attribute	Magnitude of Impact			
	Negligible	Small	Medium	Large
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
High	Imperceptible	Moderate / Slight	Significant / Moderate	Profound / Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

13.2.4.5 Traffic Impact Assessment Method

Traffic modelling (see Chapter 6 (Traffic & Transport)) has been carried out for two scenarios; the Do Minimum and Do Something (i.e. respectively without and with the Proposed Scheme) for 2028 and 2043. In addition to predicting how traffic on the main route of the Proposed Scheme could change, it also includes modelling for predicted traffic on side roads. This allows an understanding of whether the Proposed Scheme could result in increased traffic on those side roads via displacement.

This is important from a surface water perspective because, whilst the main route will continue to discharge to the same catchment as existing, there is the potential for displaced traffic on side roads which discharge to a different water body. This could lead to a change in pollutant loadings and consequent impacts on that water body.

To help determine the level of traffic required to cause a potentially significant impact, TII's guidance document, Road Drainage and the Water Environment (TII 2015) was consulted. It states that roads carrying less than 10,000 Annual Average Daily Traffic (AADT) are lightly trafficked and therefore pollutants occur in lower concentrations. As such, no significant impacts on receptors are considered likely. This figure, therefore, was used as a threshold point to determine whether there was the potential for impacts on water bodies.

The threshold was built into a 'decision tree' approach (see Diagram 13.1) for the assessment of impacts from displaced traffic.

In order to determine which water body the drainage from side roads carrying displaced traffic would discharge to, the Proposed Scheme Catchment Plans were consulted (see Proposed Surface Water Drainage Works (BCIDA-ACM-DNG_RD-0001_XX_00-DR-CD-9001) in Volume 3 of this EIAR).

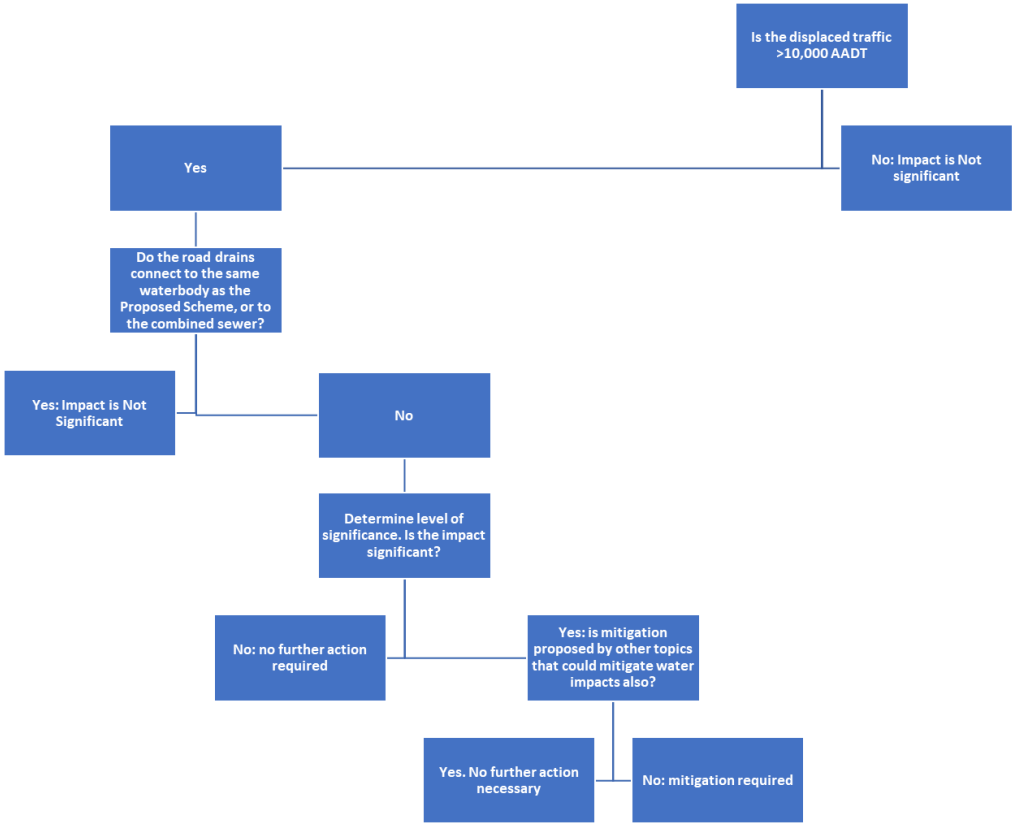

Diagram 13.1: Traffic Assessment Decision Tree

13.3 Baseline Environment

13.3.1 WFD Catchment Overview

The study area lies within Hydrometric Area (HA) 09 (Liffey and Dublin Bay) and is within the River Liffey catchment. The Liffey and Dublin Bay Catchment Summary (Liffey Catchment Assessment 2010 – 2015 HA 09) (EPA 2018) describes this catchment as including the area drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point in County Dublin, draining a total area of 1,616km^2. There are three main water bodies within the study area in this catchment; the River Santry, River Mayne and Tolka Estuary (refer to Figure 13.1 in Volume 3 of this EIAR), as well as one non WFD surface water feature; the Wad River. The largest urban centre in the catchment is Dublin City. The other main urban centres, relevant to the study area, are Donnycarney, Artane, Coolock, Edenmore, Darndale, Donaghmede and Clongriffin. The Liffey and Dublin Bay catchment contains the largest population (approximately 1,255,000) of any catchment in Ireland and is characterised by a sparsely populated, upland south-eastern area underlain by granites and a densely populated flat, low lying limestone area over the remainder of the catchment basin. The catchment area is heavily urbanised and industrialised.

13.3.2 EPA Surface Water Monitoring

The EPA assesses the water quality of rivers and streams across Ireland using a biological assessment method (EPA 2018). The EPA assigns biological river quality (biotic index) ratings from Q5 to Q1 to watercourse sections (refer to Table 13.6). Q5 denotes a watercourse with high water quality and high community diversity, whereas Q1 denotes very low community diversity and bad water quality. This data will be used to inform baseline receptor importance.

The WFD also considers highly modified water bodies (HMWB) and artificial surface water bodies (AWB). The WFD requires HMWB and AWB to achieve good ecological potential rather than Good Status.

Table 13.6: EPA Scheme of Biotic Indices or Quality (Q) Values (EPA 2018)

Biotic Index 'Q' Value	WFD Status	Pollution Status	Condition	Quality Class
Q5, Q4 - Q5	High	Unpolluted	Satisfactory	Class A
Q4	Good	Unpolluted	Satisfactory	Class A
Q3 - Q4	Moderate	Slightly Polluted	Unsatisfactory	Class B
Q3, Q2 - Q3	Poor	Moderately Polluted	Unsatisfactory	Class C
Q2, Q1 - Q2, Q1	Bad	Seriously Polluted	Unsatisfactory	Class D

13.3.3 Surface Water WFD Status

The EPA river dataset is designed as a geometric river network for monitoring, management and reporting purposes. The EPA has split up rivers and streams into smaller sections to allow areas to be easily distinguished. These segments are assigned segment codes (estuaries and canals are not assigned segment codes). The EPA's segmented coding and naming system has been applied throughout this Chapter.

Water bodies within the study area included in this assessment are (refer to Figure 13.1 in Volume 3 of this EIAR):

- Mayne_010;
- Mayne Estuary;
- Santry_020; and
- Tolka Estuary.

The WFD Status of the rivers and streams within the study area of the Proposed Scheme are detailed in Table 13.7.

Table 13.7: Surface Water WFD Status

WFD Sub-catchment	Water bodyWater body ID	Heavily Modified?	Type	Status (2013 to 2018)	Key Pressures: Elements Causing or with Potential to Cause Less Than Good Status	Risk Categorisation
Mayne_SC_010	Mayne_010	Unknown	River	Poor	Urban runoff	At Risk
N/A	Mayne Estuary	No	Transitional	Unassigned	Anthropogenic pressures (unknown sources)	Review
N/A	North Bull Island	No	Transitional	Unassigned	Anthropogenic pressures (unknown sources)	At Risk
Mayne_SC_010	Santry_020	Yes	River	Unassigned	Urban wastewater, urban runoff and other anthropogenic pressures	At Risk
Tolka_SC_020	Tolka Estuary	Unknown	Transitional	Moderate	Urban wastewater	At Risk

13.3.3.1 Non WFD Water bodies

Non-WFD water bodies within the study area are included in the assessment due to their importance as a local water feature for biodiversity or public realm. Only one non-WFD water body has been included within the study area; the Wad River.

13.3.4 Field Survey

The Proposed Scheme was surveyed in March 2020. The watercourse surveyed was Santry_020. Weather conditions were recorded as dry.

The results of the field survey are detailed in Table 13.8.

Table 13.8: Survey Information for Sites along the Proposed Scheme

Survey Attribute	Survey Location 1
Location	Santry_020
Visual Flow	Homogenous
Visual Water Quality	Appears good but close to the road so there is potential for pollution from road runoff
Bed Observation	Flat, different grain sizes of sediment with some being large. Evidence of deposition near culvert exit on left bank. Generally, gravel with sediment size of at least 40mm (millimetres) along the length
Bank Stability	Banks are concrete (canalised), upstream banks are more natural although there is some sporadic rock reinforcement at the base of the channel
Features	Two culverts
Modifications	Heavily modified channel - watercourse is noticeably narrower downstream (approximately 25% smaller downstream
Runoff Pathway	Pathway is possible from both banks and potentially from surrounding highways. Gullies and outfalls noted next to road
Runoff Risk	Risk is considered to be high as banks are steep
Riparian Detail	No riparian detail in channel, a few trees and grass in surrounding area
Natural Barriers	Two culverts. Downstream culvert is showing some blockage, as is upstream culvert. Small weir at upstream culvert
Discharges	Multiple outfalls, inactive at time of survey but consider there is a potential likely link to roadside gullies.
Culverted	Yes – two culverts present

13.3.5 Designated Sites

The designated sites that are considered in Section 13.3.9 as part of the determination of sensitivity for each water body are located within the Liffey and Dublin Bay catchment. The sites described comprise Nutrient Sensitive Areas, shellfish areas, coastal bathing waters, Special Area of Conservation (SAC), Special Protection Areas (SPA), proposed Natural Heritage Area (pNHA), Nutrient Sensitive Areas, salmonid rivers, shellfish areas and marine bathing waters.

A review of the Natura 2000 network was conducted to determine those European sites which are within the study area and / or hydrologically connected to the water bodies listed in section 13.3.3. A full assessment of potential impacts on designated European Sites, including hydrological links and water dependent species or habitats, is contained within Chapter 12 (Biodiversity) and Figure 12.2 in Volume 3 of this EIAR shows the hydrological connectivity to the Proposed Scheme. The following European sites were identified to be relevant to this assessment:

- Baldoyle Bay SAC (site code: 000199);
- North Dublin Bay SAC (site code: 000206);
- South Dublin Bay SAC (site code: 000210);
- North Bull Island SPA (site code: 004006);
- Baldoyle Bay SPA (site code: 004016); and
- South Dublin Bay and River Tolka Estuary SPA (site code: 004024).

In addition, the following Natural Heritage Areas proposed for designation under Irish national legislation [pNHAs} located within the study area / hydrologically connected are:

- Baldoyle Bay pNHA (site code: 000199);
- North Dublin Bay pNHA (site code: 000206); and
- Royal Canal pNHA (site code: 002103).

There are two Nutrient Sensitive Areas in the study area. These are the Tolka Estuary and the Santry_010 designated under the UWWT Directive (refer to Figure 13.2 in Volume 3 of this EIAR).

There is one designated shellfish area, in Malahide. The shellfish area is compliant with the relevant standards and there are no water quality issues of concern (as per the Sea Fisheries Protection Authority (SFPA) and Marine Institute Monitoring Programme).

There are three designated marine bathing waters downstream of the Proposed Scheme (Dollymount Strand, Burrow Beach and Claremont Beach). The website for beaches in Ireland was consulted to determine the most recent (2015 to 2018) Annual Water Quality Rating (AWQR) for these designated areas (EPA 2020b). Dollymount Strand currently has a Good Quality Status. Burrow Beach has been assigned a 2015 to 2018 AWQR of Excellent whilst Claremont Beach was assigned a 2015 to 2018 AWQR of Sufficient.

There are two Nature Reserves hydrologically connected to WFD water bodies within the study area: North Bull Island via Santry_020 and Baldoyle Estuary via Mayne_010.

No designated salmonid rivers or shellfish areas were identified within the study area during the desk study.

13.3.6 Drinking Water Supply (Surface Water)

There are no Geological Survey Ireland (GSI) Public Supply Source Protection Areas or National Federation of Group Water Schemes (NFGWS) Source Protection Areas within the study area. None of the river segments within the study area is designated as a Drinking Water River.

13.3.7 Known Pressures

The EPA online interactive map and database for water (EPA 2021) was reviewed to identify the pressures on water bodies and the presence of point source discharges from EPA licenced activities within the study area. Pressures common to all water bodies in the study area are discharges from urban wastewater systems (via

Storm Water Overflows (SWOs) and urban surface runoff. Further details on these for each water body are provided in Section 13.3.9.

The following IE / IPC licensed sites were identified in the study area:

- IE Licensed Facility Everlac Paints Limited, Windsor Works, Dublin 3, Reg No: P0220-01;
- IE Licensed Facility Mondelez Ireland, Malahide Road, Dublin 5, Reg No: P0809-01;
- IE Licensed Facility Crown Paints Ireland, Malahide Road, Dublin 17, Reg No: P0248-01; and
- IPC Licensed Facility Wood-Printcraft Limited, Greencastle Parade, Dublin 17, Reg No: P0143-01.

13.3.8 Existing Drainage

A desk study of the existing road drainage system within the study area, using online mapping tools (Google Street View and OpenStreetMap) and historical sewer network information, was conducted to determine the existing road drainage and level of treatment and attenuation provided currently. Based on this assessment, the existing road and bridge network consists primarily of curb and gully, with no treatment or attenuation within the network. No SUDS were identified within the study area.

The pressures identified for the water bodies in the study area include diffuse pollution and discharges from SWOs. These pressures result from failures in the drainage system, either as a result of insufficient capacity, poor maintenance or incorrectly connected wastewater from domestic or commercial properties. It is likely that some or all of these issues are present within the study area.

Surface water runoff from the Proposed Scheme will discharge directly to each of the water bodies; discharges to the Tolka Estuary will also be via the Wad River, which is a culverted water bodywater body outfalling to the Tolka Estuary. There are no direct or indirect discharges to the Mayne Estuary. It is included in the study area because it is hydrologically connected to the Proposed Scheme via the Mayne_010. There are no combined sewers on the route of the Proposed Scheme.

The Proposed Scheme runs along the existing R107 Malahide Road (R107) from Mayne River Avenue to Marino Mart/Fairview (R105) and is described in the following geographical sections:

- Section 1: Mayne River Avenue to Gracefield Road – Malahide Road; and
- Section 2: Gracefield Road to Marino Mart / Fairview – Malahide Road.

Table 13.9 provides the existing drainage along the Proposed Scheme.

Table 13.9 Existing Drainage

Catchment	Existing Network Type	Proposed Scheme Section ID	Water bodyWater body
R01-01.3	Surface water (Storm)	1	Mayne_010
R01-02	Surface water (Storm)		Mayne_010
R01-03	Surface water (Storm)		North Bull Island
R01-04	Surface water (Storm)		Santry_010
R01-05	Surface water (Storm)	1 and 2	Santry_010 (Naniken River segment)
R01-06	Surface water (Storm)	2	Tolka Estuary (via Wad River and surface water system)

13.3.9 Surface Water Features

The three main water bodies within the study area flow into the Mayne Estuary, North Bull Island Transitional Water body and Liffey Estuary Lower Transitional Water body (Refer to Figure 13.1 in Volume 3 of this EIAR). The Santry_010 is the only water body included in the RBMP 2018 - 2021 'Priority Areas for Action' (EPA 2018). The desk study identified one other surface water feature within the study area which is not classified as a WFD water body: the Wad River, which is considered further below.

The overarching hydromorphology of the study area includes highly modified straight planform water bodies with walled or artificial riparian zones. A summary of the baseline condition of each of these WFD water bodies and

their associated flood risk within the study area is detailed below. Table 13.10 details the distances and number of crossings of each water body within the Study Area.

Table 13.10: Distance of the Water bodies within the Study Area to the Proposed Scheme and the Individual Sections of the Proposed Scheme

WFD Water body Name	Nearest Scheme Section	Approx. Distance from Proposed Scheme (m)	Number of Crossings
Mayne_010	Mayne River Avenue to Gracefield Road	300	0
Mayne Estuary	Mayne River Avenue to Gracefield Road	3300	0
North Bull Island	Mayne River Avenue to Gracefield Road	3000 (via surface water drains)	0
Santry_020	Mayne River Avenue to Gracefield Road – Malahide Road	0	1
Santry_020 (Naniken river segment)	Mayne River Avenue to Gracefield Road and Gracefield Road to Marino Mart / Fairview – Malahide Road	1180	0
Tolka Estuary	Gracefield Road to Marino Mart / Fairview – Malahide Road	700 (via surface water drains)	0
Wad River	Malahide Road at Collins Road Junction.	0	1

13.3.9.1 Mayne_010

The Mayne_010 is made up of two main tributaries (EPA Name: the Cuckoo Stream and EPA Name: Mayne 09) and one smaller tributary (EPA Name: Snugborough 09) which is outside of the study area.

Cuckoo Stream begins at Dublin Airport, flows under the M1 Motorway at Toberbunny until the confluence of the two streams at Balgriffin Park in Castlemoyne, just upstream of Wellfield Bridge. Mayne_09 commences at Dardistown (west of the M50 / M1 Motorway interchange) and flows under this interchange, along the R139 Road, north of Northern Cross to the confluence.

The Mayne_010 then flows east, under the Dublin / Belfast railway line, and flows north through the former Baldoyle Racecourse where Snugborough 09 which begins at Red Arches Park and flows into Mayne_010.

The Mayne_010 then discharges to the unassigned WFD status Mayne Estuary transitional water body. This Estuary is the European and nationally designated site Baldoyle Bay Special Area of Conservation (SAC) and Special Protection Area (SPA) and Baldoyle Estuary Nature Reserve.

There is a relatively large floodplain around the confluence of Cuckoo Stream and Mayne 09 and the further downstream extents of the Mayne_010 at Snugborough 09, which provides essential storage during high tides.

The Mayne_010 has a total length of 16.52km and has a catchment area of approximately 20.3km^2. Land use to the north of the watercourse is for agricultural purposes whilst to the south, land use is predominantly urban. It is heavily modified and is largely culverted.

The Proposed Scheme will not cross the Mayne_010, however the water body is within the study area, located approximately 300m north of the proposed new junction at R107 Malahide Road.

The Mayne_010 has a Poor WFD Status and is At Risk of not achieving Good Status by 2027. Significant pressures have been identified including urban runoff from diffuse sources causing nutrient and organic pollution.

The most recent Biological Q Value assessment of the River Mayne was in 2019. Only one station is located on this watercourse which gave a recorded Q Value of Q2 to Q3.

The EPA River Quality Surveys: Biological (EPA 2020a) reported that:

'*Ecological conditions at Wellfield Bridge (0500) remains poor (Q2-3) with an impoverished pollution tolerant fauna evident in low numbers*'.

As noted above, the Mayne_010 has Poor WFD Status, and would be assigned a Low sensitivity except that it has a direct and hydrological connection to the Baldoyle Bay SPA and SAC; however, at the point at which the Proposed Scheme interacts with Mayne_010 it is approximately 3km from the SAC/SPA. As a result, it is assigned Medium sensitivity.

13.3.9.1.1 Mayne Estuary

The Mayne Estuary is included in the study Area, despite being 3.3km away from the Proposed Scheme because of its direct hydrological connection to Mayne_010, to which surface water systems at the northern extent of the Proposed Scheme discharge.

The Mayne Estuary is a transitional water body. It is also designated as an SAC and SPA (Baldoyle Bay) and a pNHA. It has unassigned WFD status.

In terms of assigning sensitivity, the water body is a European designated site and so is considered to be Extremely High sensitivity.

13.3.9.1.2 North Bull Island

North Bull Island is a transitional water body which lies between the Howth/Dublin road in Kilbarrack and Dollymount Strand. It is part of the North Dublin Bay SAC and the North Bull Island SPA. It has unassigned WFD status. It is At Risk of not achieving Good Ecological Status by 2027. Anthropogenic pressures are cited as the cause of its At Risk status but the source of these is not known. There is no monitoring data available for it.

In terms of assigning sensitivity, it is within two European designated sites and so, even without a WFD status is considered to be Extremely High sensitivity.

13.3.9.2 Santry_020

The Santry_020 begins at Northside Shopping Centre in Coolock and flows through Raheny before discharging into the North Bull Island transitional water body (which is designated as an SPA under the EU Birds Directive) and North Dublin Bay (designated SAC under the Habitats Directive). Note, the Santry_020 water body includes the Naniken River (EPA name), which is referenced in Chapter 4 Proposed Scheme Description as receiving surface water from a catchment within the Proposed Scheme.

The Santry_020 will be crossed by the Proposed Scheme at the R107 Malahide Road / Greencastle Road Junction.

The Santry_020 has an unassigned WFD Status and is at risk of not achieving Good Status by 2027. Significant pressures have been identified including urban wastewater from Combined Sewer Overflows (CSOs) and urban runoff from diffuse sources, such as wrongly connected wastewater from domestic properties, causing nutrient and organic pollution as well as anthropogenic pressures from golf courses. Upstream, the Santry_010 has poor status; downstream North Bull Island has unassigned WFD status and is At Risk of not achieving Good status for similar reasons to the Santry_010. The physico-chemical quality of Santry_020 ranges from Poor (Orthophosphate), through Moderate (Ammonia) to Good (Nitrogen); the trend for Orthophosphate is improving however for Ammonia and Nitrogen the trend is downwards.

The most recent Biological Q Value assessment of the River Santry was in 2019. There is only one monitoring station on the river, located on the Santry_020 segment upstream of the study area and proposed crossing. The Q value registered was Q2 to Q3, equivalent to Poor Status as detailed in Table 13.7. The last assessment undertaken on Santry_010 was in 1998 with Q2/0 being the Q value.

The EPA River Quality Surveys: Biological (EPA 2020a) reported that:

'*Ecological conditions at Clonshaugh Road Bridge remain Poor, declining very slightly on 2016 results*'.

In terms of assigning sensitivity to this receptor, without a WFD status, consideration is given to all of the factors outlined above. In addition, the Santry_020 flows into North Bull Island (approximately 2km downstream) which is an SPA and the confluence of these two is immediately upstream of Dublin Bay SAC. Despite the likelihood that the Santry_010 is of poor to moderate status, the direct and relatively close hydrological connection to Dublin Bay SAC, means it is assigned Very High Sensitivity.

13.3.9.3 Tolka Estuary

The Tolka Estuary is a transitional water body within the 09 Liffey and Dublin Bay Catchment and is within the protected areas of South Dublin Bay and River Tolka Estuary SPA, and Tolka Estuary Nutrient Sensitive Area. It is also hydrologically connected to a number of other protected areas including North Dublin Bay SAC, North Bull Island SAC and Liffey Estuary Nutrient Sensitive Area. It is fed by Tolka_060 and Santry_020 and flows into Liffey Estuary Lower before reaching Dublin Bay.

The Tolka Estuary is Moderate Status and is At Risk of not achieving Good Status by 2027 due to urban wastewater (wastewater treatment plant (WwTP) discharges) and CSOs causing nutrient pollution and altered habitat from morphological changes.

In terms of assigning sensitivity to this receptor, its Moderate WFD status would normally result in a Medium sensitivity, however as it is within the South Dublin and Tolka Estuary SPA, it is assigned Extremely High sensitivity.

13.3.9.4 Wad River

The Wad River is a culverted water body, for its entire length. It drains the area to the south of Dublin Airport and flows south and east before outfalling to the Tolka Estuary at Clontarf.

This receptor is a highly modified watercourse, being culverted along its length. Its physico-chemical quality is unknown but is likely to be of poor to moderate status as a result of diffuse urban runoff.

In terms of assigning its sensitivity, it would be of Low sensitivity except that it has relatively close (approximately 2.5km) from the South Dublin Bay and Tolka Estuary SPA. As a result, it is assigned a Medium sensitivity.

13.3.9.5 Summary of Baseline Receptor Sensitivity

Table 13.11 provides a summary of the baseline receptor importance along the Proposed Scheme.

Table 13.11: Baseline Receptor Importance

Water body	Attributes	Indicator / Feature	Sensitivity
Mayne_010	Partially culverted river; densely vegetated in parts	Hydrologically connected to Baldoyle SAC and SPA	Medium
Mayne Estuary	Transitional	Designated Baldoyle Bay SAC and SPA	Extremely High
North Bull Island	Transitional	Designated SAC and SPA	Extremely High
Santry_020	Partially culverted, heavily modified river	Hydrologically connected to North Dublin Bay SAC and North Bull Island SPA	Very High
Tolka Estuary	Heavily modified, stone-walled, transitional water body	Designated SPA site	Extremely High
Wad River	Culverted watercourse	Hydrologically connected to South Dublin and Tolka estuary SPA.	Low

13.3.10 Flood Risk

Flood Risk is not considered as part of the impact assessment in this Chapter; a separate Site Specific FRA has been completed for the Proposed Scheme. However, given the connectivity between this assessment and the FRA, a summary of the baseline flood risk and the assessment of future risk from the FRA is provided here for ease of reference.

The FRA has been prepared for the in accordance with the Department of the Environmental, Heritage and Local Government (DEHLG) and the Office of Public Works (OPW) Planning System and Flood Risk Management Guidelines for Planning Authorities (hereafter referred to as the FRM Guidelines) (DEHLG and OPW 2009). A copy of the FRA Report is included in Appendix A13.2 in Volume 4 of this EIAR.

The FRM Guidelines define three Flood Zones, namely:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 year for river flooding or 0.5% AEP or 1 in 200 for coastal flooding);
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1,000 year and 1% AEP or 1 in 100 year for river flooding and between 0.1% AEP or 1 in 1,000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1,000 for both river and coastal flooding).

Flood Zone C covers all areas which are not in Flood Zone A and Zone B.

13.3.10.1 Coastal Flood Risk

There are two points on the route which are located close to coastal boundaries. At Fairview, the route is located approx. 0.5km from the coastal boundary of Dublin Bay, and from Fairview to the end of the route, the Proposed Scheme is near the coastal boundaries of either the Tolka River, the Royal Canal, or the River Liffey. According to the Dublin City Development Plan 2016-2022 Strategic Flood Risk Assessment Vol.7, there are two areas of the scheme, between Fairview and the route end, that are at risk of coastal flooding. These are:

- Fairview (junction between R105 and R107) – This area is in Flood Zone B; and
- R105, between the Tolka River and the Royal Canal – This area is in Flood Zone A.

13.3.10.2 Groundwater Flood Risk

The groundwater vulnerability varies along the Proposed Scheme. Most of the Proposed Scheme falls into the ‘Low’ groundwater vulnerability categories with a portion of the site around Donnycarney to Fairview is assigned ‘Extreme’, ‘High’, and ‘Moderate’ groundwater vulnerability classification.

13.3.10.3 Pluvial Flood Risk

The 10% AEP Pluvial Flood Risk Map indicates that there is a significant percentage of the route which is identified as being at risk of flooding following a 1 in 10-year rainfall event. There are multiple locations where there is a continuous section of the scheme which is indicated as being flooded on the OPW Flood Maps.

Pluvial flood risks have been identified on:

- R107 near the junction with the R104;
- R107 near the junction with the R103; and
- at the location where the Proposed Scheme crosses over the M50 (Port Tunnel).

13.3.10.4 Fluvial Flood Risk

There is a section of the Proposed Scheme which has been identified as being at risk from fluvial flooding. This is at Donnycarney, located at the junction between the R103 and the R107. The Dublin City Development Plan SFRA suggests that the flood extents for the area generally indicate flow paths coming directly out of the river culvert through manholes and gullies, and this is compounded with pluvial flooding if heavy rainfall coincides with high river culvert flows.

The culverted section of the Wad River extends from Collins Park, crosses the Malahide Road near the Topaz garage, and onto Collins Avenue East. There is a residual flood risk here due to any potential blockages of this culvert.

13.4 Potential Impacts

This section presents potential impacts that may occur due to the Proposed Scheme, taking into account the proposed drainage design as set out in Section 13.4.1, but in the absence of any further mitigation. This informs the need for mitigation or monitoring to be proposed (refer to Section 13.5). Predicted 'residual' impacts taking into account any proposed mitigation is then presented in Section 13.6.

13.4.1 Characteristics of the Proposed Scheme

Full details of the Proposed Scheme are provided in Chapter 4 (Proposed Scheme Description) but elements of relevance to the surface water impact assessment are provided below.

13.4.1.1 Impermeable Areas and Drainage Design

The drainage design is based on a number of general principles, which are set out in the document 'BusConnects Core Bus Corridor Drainage Design Basis' (NTA 2020). This includes principles relating to SuDS: a SuDS drainage design has been developed as a first preference and in accordance with the SuDS hierarchy as described in the CIRIA SuDS manual (CIRIA 2015). The CIRIA SUDS Manual recommends that when considering SuDS solutions, the preferred approach is a hierarchy whereby runoff using source control solutions (e.g. pervious surfacing) are considered first; where source control is not possible or cannot fully address an increase in runoff from a development, residual flows are then managed using site controls (e.g. bioretention/infiltration basins); if this is not practical or residual flows remain above existing runoff rates, regional controls (e.g. attenuation ponds or tanks) are used. SuDS provide the dual benefits of controlling flows and treating water quality. In areas where the catchment is proposed to remain unchanged as no additional impermeable areas are proposed, the design consists of relocating existing gullies (where possible) to new locations.

The drainage design principles have informed the drainage design (see Chapter 4 Project Description and Appendix A4.1 in Volume 4 of this EIAR) which will ensure no net increase in the surface water flow discharged to these receptors.

The proposed drainage design includes the relocation and addition of drainage gullies. Attenuation will be in the form of filter drains and bioretention systems. These SuDS measures allow a level of treatment and/or attenuation to be provided before discharge to the network, reducing the impact on water quality as well as preventing an increase in runoff rates.

The details of drainage measures proposed for each catchment and subsequently each water body are provided in Table 13.12 and Table 13.13. No new outfalls are proposed.

Table 13.12 Proposed SUDs and Impermeable Area changes

Existing Catchment Reference	Water body	Approx. Surface Area m2					SuDS Measures Proposed
		Existing Road Corridor Area	Additional impermeable area	Additional permeable area	Net Change	Percentage change	
R01-01-01.3	Mayne_010	5,674	411	274	137	2.41	None required
R01-02	Mayne_010	16,250	1,090	954	136	0.84	Filter drains
R01-03	North Bull Island	34,808	4,749	3,343	1,406	4.04	Bioretention Systems
R01-04	Santry_020	44,363	1,809	2,306	-498	-1.12	None required
R01-05	Santry_020	37,408	2,680	2,338	343	0.92	Filter drains
R01-06	Tolka Estuary	28,617	885	574	311	1.09	Bioretention systems
R01-07	Tolka Estuary	59,540	19	141	-122	-0.20	Bioretention Systems

Table 13.13 Increases in Impermeable Areas by Water Body

Water body	Existing	Additional (net change) Impermeable	%age change
Mayne_010	21,924.0	273.0	1.2
North Bull Island	34,808.0	1,406.0	4.0
Santry_020	81,771.0	-155.0	-0.2
Tolka Estuary	88,157.0	189.0	0.2

13.4.1.2 Key Infrastructure Proposed

Key infrastructure elements for the Proposed Scheme are described in detail within Chapter 4 (Proposed Scheme Description) of this EIAR. Chapter 5 (Construction) describes the Construction Phase for the works related to these key infrastructure elements.

13.4.2 Do Nothing Scenario

In the Do Nothing Scenario the Proposed Scheme would not be implemented and there would be no changes to existing highway infrastructure, so infrastructure provision for buses, pedestrians and cyclists would remain the same.

The Baseline (Section 13.3) includes a description of the current status of the environment in and around the area in which the Proposed Scheme will be located and identifies the existing pressures on the water bodies within the study area; these are identified and categorised under the RBMP 2018-2021 process under baseline conditions (i.e. what is there at present) and reported by the EPA. The RBMP categorises significant pressures impacting water bodies in Ireland into 14 categories, and identifies measures and actions aimed at addressing each pressure. This supports the analysis of future trends expected in the water environment in order to determine the 'evolution of the baseline without the development'. Future trends will be more noticeable, predictable and measurable in the short to medium-term in relation to water quality, whereas hydrological and hydromorphological changes are subject to more long-term trends.

Future trends are determined based on the significant pressures identified under the RBMP, and the measures and actions in relation to policy and monitoring identified for the water bodies to meet the requirements of the WFD Directive and any information available detailing progress on those measures or actions.

The most significant pressures to water bodies 'At Risk' of achieving Good status within the Mayne_SC_010 and Tolka_SC_020 sub-catchments are urban runoff from diffuse urban sources, and urban wastewater from SWOs.

Urban runoff comprises a mixture of misconnections, leakage from sewers and runoff from paved and unpaved areas and has been identified as a significant pressure to Mayne_010 and Santry_020. RBMP 2018-2021 includes a measure for further investigation under the Local Authority Water Programme (LAWPRO) (See www.lawaters.ie) to determine the nature and extent of the impacts. The investigation will include a review of existing data collected by Dublin City Council. The Draft RBMP proposing six separate measures to address urban runoff pressures, including the development of strategies and guidance for nature-based solutions, including SUDS and the preparation of integrated urban drainage management plans.

Discharges from wastewater Treatment Plants (WwTPs) and agglomeration networks (including discharges from Storm Water/Emergency Overflows) have been identified as pressures to Santry_020 and the Tolka Estuary within the study area. These include. There are planned improvements to wastewater infrastructure across the country in order to achieve WFD objectives.

The Draft RBMP includes an action for Irish Water to continue investment in wastewater infrastructure with Irish Water investing in 83 wastewater treatment plants and ten collection networks at an estimated cost of €1.022bn, over the period 2020-2024. In addition. As part of Ireland's National Recovery and Resilience Plan (2021), Irish Water will be delivering its enhanced Ambition Programme, which aims to deliver ten priority wastewater treatment plant projects whose discharges have been identified as being significant pressures on receiving water bodies.

With these investigations, programmes and actions in place to locate and improve deficient infrastructure, it is anticipated that pressures from urban wastewater and urban runoff will be reduced over the coming years.

Therefore, in the absence of the Proposed Scheme the surface water environment in the area should improve, particularly in relation to water quality.

13.4.3 Do Minimum

The potential for changes in traffic loading on side roads, as set out in Section 13.2.4.5 of this chapter, means that the assessment of potential operational impacts from the Proposed Scheme is required to consider an additional future baseline scenario, as well as Do Nothing; Do Minimum, in line with the assessment of impacts on traffic as set out in Chapter 6 (Traffic and Transport).

The 'Do Minimum' scenario (Opening Year 2028, Design Year 2043) represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, without the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the quantitative assessments. Further detail on the Proposed Scheme and demand assumptions within this scenario is included in Chapter 6 (Traffic & Transport).

The outputs of the transport modelling for these future scenarios are used in the operational impact assessment in Section 13.5.3 of this chapter. In terms of the potential future baseline of the surface water environment under these two scenarios, there is a great deal of uncertainty, however it is reasonable to assume that the measures set out in the current and Draft RBMPs (once agreed) will be implemented and improvements to water bodies in terms of their biological, water quality and hydromorphology will continue to enable as many water bodies as possible to achieve 'Good' status by 2027.

13.4.4 Construction Phase

13.4.4.1 Introduction

Chapter 5 (Construction) outlines the principal Construction Phase activities required to complete the Proposed Scheme and includes details of activities such as new or improved bridges, road widening and narrowing, new and / or improved footpaths, cycle tracks, pavement repairs, road resurfacing, junction upgrades, new or improved lighting, bus stops, retaining walls and any other upgrade works, where relevant.

In addition to a detailed description of the works involved, Chapter 5 (Construction) also details the location of Construction Compounds, the location and duration of any necessary traffic diversions, hours of working, and numbers of personnel involved.

The duration of the Construction Phase is estimated to be two years. The Construction Compound at Buttercup Park will be in place for full duration of the extent of the works and will be removed following completion of the works they support.

The assessment considers the potential impacts of the Proposed Scheme construction activities prior to mitigation or control measures being implemented.

13.4.4.2 Potential Construction Phase Impacts

There are a number of potential construction related impacts which in the absence of mitigation could occur during the construction of the Proposed Scheme in relation to hydrology, water quality and hydromorphology. The potential for any of these types of impacts are considered for different construction activities for each water body within the study area. These potential construction phase impacts include:

13.4.4.2.1 Hydrology

- Disruption to local drainage systems due to diversions required to accommodate the construction works; and
- Temporary increase in hard standing areas and / or soil compaction during construction works which could result in temporary increased runoff rates to water bodies.

13.4.4.2.2 Water Quality

- Silty water runoff containing high loads of suspended solids from construction activities. This includes the stripping of topsoil / road surface during site preparation; the construction of widened roads; the dewatering of excavations and the storage of excavated material.
- Contamination of water bodies with anthropogenic substances such oil, chemicals or concrete washings. This could occur because of a spillage or leakage of oils and fuels stored on site or direct from construction machinery; and the storage of materials or waste in close proximity to water bodies or drains connected to the water bodies.
- Re-exposure of historically settled contaminants within or near to water bodies because of working within or in near to the water body.

13.4.4.2.3 Hydromorphology

- Increased sediment loading as a result of silty water runoff or dewatering activities, introducing a sediment plume, potentially leading to the smothering of bed substrate and changes to existing morphological features;
- Modifications to the morphological characteristics of the water body such as alterations to banks for construction of over bridges or other works.

13.4.4.3 Assessment of Potential Impacts on Receptors

Detailed assessment of the potential impacts on receptors is provided here and a summary table for all receptors provided at Table 13.14.

13.4.4.3.1 Mayne_010

A short section of the Proposed Scheme at is northernmost extent drains to the Mayne_010. The construction work on the road sections discharging to Mayne_010 includes carriageway and pavement resurfacing / reconstruction as required, readjustment of kerbs and new road layouts. These are not extensive or deep earthworks and, given the distance through surface water sewers to the water body (approximately 300m), and the size and nature of the receiving water, it is anticipated that potential impacts will be short term, adverse and negligible in magnitude resulting in an impact of Imperceptible significance .

13.4.4.3.2 Mayne Estuary

There are no direct discharges proposed to the Mayne Estuary. It is approximately 3.3km from the Proposed Scheme and could only be impacted upon via the Mayne_010 water body. It has been determined that there will be an imperceptible impact on the Mayne_010 at its closest point to the Proposed Scheme. It is therefore considered that this will not result in any impacts on the Mayne Estuary which is a further 3km from this point.

13.4.4.3.3 North Bull Island

Impacts on North Bull Island could potentially occur in the absence of mitigation as a result of polluting substances entering the surface water system in the northern section of the Proposed Scheme which discharges directly into Dublin Bay.

The construction work on the road sections discharging to North Bull Island includes carriageway and pavement resurfacing / reconstruction as required, readjustment of kerbs and new road layouts. These are not extensive or deep earthworks, and the water body is more than 2km from the Proposed Scheme, although hydrologically linked through surface water sewers. In addition, the water body is extremely large providing for substantial dilution, and is estuarine which means levels of suspended solids will be routinely and naturally elevated. As a result, potential impacts will be short term, adverse and negligible in magnitude, resulting in an impact of Imperceptible significance.

The construction and operation of the Construction Compound between Buttercup Park and Malahide Road could result in potential impacts on the water body. Any soil stripping during site establishment could result in an increase in fine sediment in surface water drains. As above, the distance to, and nature of, the receiving water body reduces the likely magnitude of potential impacts. As a result, potential impacts will be short term, adverse and negligible in magnitude, resulting in an impact of Imperceptible significance.

Accidental releases of oil and other noxious substances at the compound could also impact North Bull Island As above, the distance to, and nature of, the receiving water body reduces the likely magnitude of potential impacts. As a result, potential impacts will be short term, adverse and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.4.3.4 Santry_020

The proposed construction work on the road sections discharging to the Santry_020 includes carriageway and pavement resurfacing / reconstruction as required, readjustment of kerbs and new road layouts. These are not extensive or deep earthworks and would not likely generate large volumes of silty water, however surface water drains outfall directly to the Santry_020 in this section of the Proposed Scheme, minimising the potential for any solids to settle out in surface water sewers. As a result, potential impacts will be short term, adverse and small in magnitude, resulting in an impact of Moderate significance.

13.4.4.3.5 Tolka Estuary

Potential impacts on the Tolka Estuary could occur via existing surface water drains in Malahide Road which discharge to it, or via the Wad River which intersects the Proposed Scheme slightly south of Collins Avenue. The construction work on the road sections discharging to the Tolka Estuary includes carriageway and pavement resurfacing / reconstruction as required, readjustment of kerbs, new road layouts, roundabout converted to traffic signal junction, new junction layout and upgrading of an existing traffic signal junction These are not extensive or deep earthworks and would not likely generate large volumes of silty water; the water body is approximately 650m from the Proposed Scheme at its nearest point. In addition, the water body is extremely large, providing for substantial dilution, and is estuarine which means levels of suspended solids will be routinely and naturally elevated. As a result, potential impacts will be short term, adverse and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.4.3.6 Wad River

Potential impacts on the Wad River could occur via the surface water system on Malahide Road. Given the prevalence of fluvial flooding from this river, which is culverted for its entire length, it is likely there are connections to it from Malahide Road. That said, the works in this location, as set out for the Tolka Estuary, are extensive or deep earthworks and as such the magnitude of potential impacts is considered to be negligible. The impacts on the medium sensitivity receptor will be therefore Imperceptible.

Table 13.14: Summary of Potential Construction Phase Impacts on water bodies within the Study Area

Water body	Project Activity	Potential Impacts			
		Description of Impacts	Sensitivity of Receptor	Magnitude of Impacts	Significance of Effects
Mayne_010	Resurfacing and associated works	Minimal sediment release expected to be negligible.	Medium	Negligible	Imperceptible Short term Adverse
Mayne Estuary	Resurfacing and associated works	No impacts predicted	Extremely High	None	No impacts
North Bull Island	Resurfacing and associated works	Minimal sediment release expected to be negligible.	Extremely High	Negligible	Imperceptible Short term Adverse
	Construction Compound between Buttercup Park and Malahide Road	Minimal sediment release expected to be negligible.	Extremely High	Negligible	Imperceptible Short term Adverse
		Accidental release of oil and other noxious substances	Extremely High	Negligible	Imperceptible Short term Adverse
Santry_020	Resurfacing and associated works	Minimal sediment release expected to be negligible.	Very High	Negligible	Imperceptible Short term Adverse

Water body	Project Activity	Potential Impacts			
		Description of Impacts	Sensitivity of Receptor	Magnitude of Impacts	Significance of Effects
Tolka Estuary	Resurfacing and associated works	Minimal sediment release expected to be negligible.	Extremely High	Negligible	Imperceptible Short term Adverse
Wad River	Resurfacing and associated works	Minimal sediment release expected to be negligible.	Medium	Negligible	Imperceptible Short term Adverse

13.4.5 Operational Phase

13.4.5.1 Overview of Potential Impacts

The potential impacts for the Operational Phase are related to water quality and hydromorphology only. No potential changes to hydrology are predicted as the drainage design ensures no net increase in runoff rates.

Potential impacts that could occur include:

- Deterioration in water quality from increased levels of 'routine' road contaminates, such as hydrocarbons, metals, sediment and chloride (seasonal) due to:
  - Potential increase in pollution and sediment load entering surface water receptors from new or widened roads;
  - Increased impermeable area, and changes to the nature, frequency and numbers of vehicles using the new routes of the Proposed Scheme; and
  - Dispersal of traffic onto other the local road network which may drain to a different catchment or have less stringent pollution control infrastructure.
- Hydromorphology changes due to:
  - Changes in the flow regime due to increased surface water runoff or discharges, in new locations, resulting in changes to sedimentation processes and the structure of riverbanks.

13.4.5.2 Assessment of Potential Impacts on Receptors – Surface Water Runoff

Detailed assessments for each receptor are provided below, with a summary of impacts at Table 13.15.

13.4.5.2.1 Mayne_010

The northern end of the Proposed Scheme discharges to the Mayne_010. There will be a net increase in impermeable area of 273m$^{2.}$ This will be managed through the use of filter drains. As a result, there will be no net increase in runoff to Mayne_010. As a result, potential impacts will be permanent, beneficial and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.2 Mayne Estuary

There are no direct discharges to this water body. Impacts on the Mayne_010 are predicted to be Imperceptible; therefore, no impacts are anticipated for the Mayne Estuary.

13.4.5.2.3 North Bull Island

The northern end of the Proposed Scheme discharges to North Bull Island directly. There is a net increase in impermeable area of 1,406m^2. This will be attenuated using bioretention systems. As a result, there will be no net increase in runoff to North Bull Island; in addition, the swales will provide a small amount of improved treatment to the surface water runoff. As a result, potential impacts will be permanent, beneficial and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.4 Santry_020

The Santry_020 receives surface water from the northern end of the Proposed Scheme. There is a net decrease in impermeable area of 155m^2. As a result, potential impacts will be permanent, beneficial and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.5 Tolka Estuary

The Tolka Estuary receives surface water from the southern end of the Proposed Scheme. There is a net increase in impermeable area of 189m^2. Attenuation for this section of the Proposed Scheme will be via bioretention systems. As a result there will be no net increase in flow; in addition, the swales will provide a small amount of improved treatment to the surface water runoff. As a result, potential impacts will be permanent, beneficial and negligible in magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.6 Wad River

No surface water drains along the route of the Proposed Scheme are proposed to outfall to this water body. As a result there would be no change in the baseline situation and no impact on the Wad River.

Table 13.15: Summary of Potential Operational Phase Impacts on water bodies within the Study Area

WFD Water body Name	Project Activity	Potential Impacts			
		Description of Impacts	Sensitivity of Receptor	Magnitude of Impacts	Significance of Effects
Mayne_010	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Medium	Negligible	Imperceptible Beneficial Permanent
North Bull Island	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Extremely High	Negligible	Imperceptible Beneficial Permanent
Santry_020	Decrease in impermeable area draining to the water body	• Decreased surface water run off; • Decreased sediment in run off; • Decreased anthropogenic sources (fuel etc); • Decreased scouring of watercourse.	Very High	Negligible	Imperceptible Beneficial Permanent
Tolka Estuary	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Extremely High	Negligible	Imperceptible Beneficial Permanent

13.4.6 Assessment of Potential Impacts from Traffic Redistribution

Traffic modelling (Chapter 6 (Traffic & Transport)) has been undertaken for two scenarios: Do Minimum and Do Something for 2028 and 2043. The review of changes in AADT provides a mechanism to understand if the Proposed Scheme could result in traffic redistribution onto the surrounding local road network. A review of the data identified that, for most cases, any increases in traffic on the local road network would not lead to AADTs

being above 10,000. However, in four locations AADTs were predicted to increase to >10,000 in either or both the 2028 and 2043 Do Something scenarios. Details of these locations are presented in Table 13.16.

Table 13.16: AADT Ranges where increased >10,000 in 2043

Road Name	A_B (GIS)	2028 Do Min AADT	2028 Do Smthg AADT	% Change	2043 Do Min AADT	2043 Do Smthg AADT	% Change	Closest existing drainage	Likely change in drainage	Significant Impact
Howth Road	13465_13410	10104	10313	2	9968	10182	2	Santry_010 (Naniken)	No	No - existing catchment
Howth Road	13374_13465	10258	10425	2	10134	10300	2	Santry_010 (Naniken)	No	No - existing catchment
Clontarf Road	13541_13544	9051	10052	11	9170	10037	9	Tolka Estuary	No	No - existing catchment
Clontarf Road	13544_13112	9394	10206	9	9444	10335	9	Tolka Estuary	No	No - existing catchment

For all four of these locations, the likely drainage catchment was identified; in all cases, these roads will drain to the same catchment as the section of the Proposed Scheme that they are closest to (i.e. the traffic may have moved, but the runoff receptor remains the same). As above, the receptor is anticipated to benefit from the introduction of SUDS and minor treatment and/or attenuation. Based on the decision tree set out in Section 13.3 the potential impacts are not significant.

Overall, and based on the precautionary principle, the combination of traffic reduction on the main line, small scale treatment and/or attenuation and traffic displacement are predicted to have an imperceptible impact on the receptor.

13.4.7 Summary of Flood Risk Assessment

Summary text from the FRA (Appendix 13.2 in Volume 4 of this EIAR) is provided in this section.

13.4.7.1 Coastal Flood Risk

There are two points of the route located close to coastal boundaries; at Fairview approximately 0.5km from Dublin Bay and from Fairview (junction between R105 and R107), and on the R105 between the Tolka River and Royal Canal. Due to the extreme nature of coastal flood events, mitigation measures involving coastal flood defenses are not proposed as part of the Proposed Scheme.

13.4.7.2 Groundwater Flood Risk

The proposed works do not involve any excavations, significant changes in levels or basement construction. As the Proposed Scheme is on existing roads with no known flooding specifically due to groundwater it is not expected that this risk will increase to the site or surrounding areas due to the construction of the Proposed Scheme.

13.4.7.3 Pluvial Flood Risk

Where new surface water sewers are being proposed along the development Proposed Scheme, these networks shall be designed to provide attenuation for return period of up to 30 years where possible. This would be an improvement on the existing historical drainage network infrastructure and will reduce the overall risk of pluvial flooding. New drainage infrastructure will be provided including SuDS such as rain gardens, swales, and tree pits where possible. These SuDS features will provide source control measures and reduce the risk of pluvial flooding.

In summary, there is a risk of pluvial flooding along the proposed route, however, this risk will be reduced as a result of the drainage improvements of the Proposed Scheme.

13.4.7.4 Fluvial Flood Risk

Where new surface water sewers are being proposed along the development Proposed Scheme, these networks shall be designed to provide attenuation for return period of up to 30 years where possible. This localised improvement to the existing drainage infrastructure network will contribute to reducing the overall risk of fluvial flooding. Similarly, as part of the Proposed Scheme sections of new drainage infrastructure will be provided which include new SUDS such as rain gardens, swales and tree pits. These SuDS features will contribute to the management of fluvial flooding risk through the provision of surface water storage capacity in the network.

13.4.7.5 Justification Test

The Proposed Scheme is categorised by the Planning System and Flood Risk Management Guidelines for Planning Authorities (DoEHLG and OPW 2009) as a 'highly vulnerable development' and is required to pass the justification test if any part of the development is located within Flood Zone A or Flood Zone B. The Plan Making Justification Test and Development Management Justification have been assessed and passed in the Site Specific FRA and further investigation of the flood risk in the form of a Stage 2 FRA is not required. For more information on this see Appendix A13.2 in Volume 4 of this EIAR.

13.5 Mitigation and Monitoring Measures

13.5.1 Introduction

This section sets out the measures envisaged to avoid, prevent or reduce any potential significant adverse effects on the environment identified in Section 13.4 and, where appropriate, identify any proposed monitoring of the efficacy of implementing those mitigation measures. This section covers both the Construction and Operational Phases. Construction Phase works will take place in accordance with the Construction Environmental Management Plan (CEMP), which is included in Appendix A5.1 in Volume 4 of this EIAR.

13.5.2 Construction Phase

13.5.2.1 Mitigation Measures

In terms of mitigation, a Surface Water Management Plan (SWMP) has been prepared (provided in the CEMP, Appendix A5.1 in Volume 4 of this EIAR), which details control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Scheme. It will be a condition within the Employer's Requirements that the successful contractor(s), immediately following appointment, must detail in the SWMP how it is intended to effectively implement all the applicable measures identified in this EIAR and any additional measures required pursuant to conditions imposed by An Bord Pleanála to any grant of approval.

At a minimum, all the control and management measures set out in the SWMP will be implemented. This includes measures relating to:

- Construction Compound management including the storage of fuels and materials;
- Control of Sediment;
- Use of Concrete;
- Management of vehicles and plant including refuelling and wheel wash facilities (if necessary); and
- Monitoring.

13.5.3 Operational Phase

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme, which is outlined in Section 13.4.1.1. No additional mitigation is required.

In the Operational Phase the infrastructure (including the maintenance regime for SUDS) will be carried out by the local authority and will be subject to their management procedures.

13.6 Residual Impacts

13.6.1 Construction Phase

Following implementation of the mitigation measures outlined in Section 13.5 and the SWMP within the CEMP (Appendix A5.1 in Volume 4 of this EIAR), there are no significant impacts predicted on any of the receptors in this study area. Residual impacts are presented in Table 13.17.

Table 13.17: Summary of Residual Construction Phase Impacts on Water bodies within the Study Area

EPA River Name	Project Activity	Predicted Impacts		
		Description of Impacts	Potential Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
Mayne_010	Resurfacing and associated works	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse
Mayne Estuary	Resurfacing and associated works	• No impacts predicted	No impacts	No impacts
North Bull Island	Resurfacing and associated works	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse
	Construction Compound between Buttercup Park and Malahide Road	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse
		• Accidental release of oil and other noxious substances	Imperceptible Short term Adverse	Imperceptible Short term Adverse
Santry_020	Resurfacing and associated works	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse
Tolka Estuary	Resurfacing and associated works	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse
Wad River	Resurfacing and associated works	• Minimal sediment release expected to be negligible.	Imperceptible Short term Adverse	Imperceptible Short term Adverse

13.6.2 Operational Phase

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme. As a result, no residual significant impacts are anticipated for any water body in the study area. This is summarised in Table 13.18.

Table 13.18: Summary of Predicted Operational Phase Impacts on Water bodies within the Study Area

WFD Water body Name	Project Activity	Predicted Impacts		
		Description of Impacts	Potential Impact (Pre-Mitigation and Monitoring)	Predicted Impact (Post-Mitigation and Monitoring)
Mayne_010	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Imperceptible	Imperceptible Beneficial Permanent
North Bull Island	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Imperceptible	Imperceptible Beneficial Permanent
Santry_020	Decrease in impermeable area draining to the water body	• Decreased surface water run off; • Decreased sediment in run off; • Decreased anthropogenic sources (fuel etc); • Decreased scouring of watercourse.	Imperceptible	Imperceptible Beneficial Permanent
Tolka Estuary	Increase in impermeable area draining to the water body	• Increased surface water run off; • Increased sediment in run off; • Anthropogenic sources (fuel etc); • Increased scouring of watercourse.	Imperceptible	Imperceptible Beneficial Permanent

No significant residual impacts have been identified either in the Construction or Operational Phase of the Proposed Scheme, whilst meeting the scheme objectives set out in Chapter 1 (Introduction).

13.6.1 Summary of WFD Assessment

The full WFD Assessment is provided in Appendix A12.1 in Volume 4 of the EIAR. A summary is provided here for ease of reference.

13.6.1.1 Overview

Taking into consideration the anticipated impacts of the Proposed Scheme on the biological, physico-chemical and hydromorphological quality elements, following the implementation of design and mitigation measures, it is concluded that it will not compromise progress towards achieving Good Ecological Status (GES) or cause a deterioration of the overall Good ecological Potential (GEP) of any of the water bodies that are in scope. Therefore, the Proposed Scheme does not require assessment under Article 4.7 (refer to Table 13.19).

Table 13.19: Compliance of the Proposed Scheme with the Environmental Objectives of the WFD

Environmental Objective	Proposed Scheme	Compliance with the WFD Directive
No changes affecting high status sites	No water bodies identified as high status	Yes
No changes that will cause failure to meet surface water GES or GEP or result in a deterioration of surface water GES or GEP	After consideration as part of the detailed compliance assessment, the Proposed Scheme will not cause deterioration in the status of the water bodies during construction following the implementation of mitigation measures; during operation, no significant impacts are predicted.	Yes
No changes which will permanently prevent or compromise the Environmental Objectives being met in other water bodies	The Proposed Scheme will not cause a permanent exclusion or compromise achieving the WFD objectives in any other bodies of water within the River Basin District.	Yes
No changes that will cause failure to meet good groundwater status or result in a deterioration groundwater status.	The Proposed Scheme will not cause deterioration in the status of the of the groundwater bodies.	Yes

The WFD also requires consideration of how a new scheme might impact on other water bodies and other EU legislation. This is covered in Articles 4.8 and 4.9 of the WFD.

Article 4.8 states: '*a Member State shall ensure that the application does not permanently exclude or compromise the achievement of the objectives of this Directive in other bodies of water within the same river basin district and is consistent with the implementation of other Community environmental legislation*'.

All water bodies within the study area have been assessed for direct impacts, and indirect impacts on Mayne Estuary have also been assessed. The assessment concludes that the Proposed Scheme will not compromise the achievement of the objectives of the WFD for any water body. In addition, the Proposed Scheme has been assessed for the potential for cumulative impacts with other Proposed Developments within 1km of the study area. This concludes that in combination with other Proposed Developments the Proposed Scheme will not compromise the achievement of the objectives of the WFD for any water body. Therefore, the Proposed Scheme complies with Article 4.8.

Article 4.9 of the WFD requires that '*Member States shall ensure that the application of the new provisions guarantees at least the same level of protection as the existing Community legislation*'.

The Habitats Directive (1992) promotes the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance. There are European designated sites in the vicinity of the Proposed Scheme which have been assessed and are presented in the An Appropriate Assessment Screening Report and Natura Impact Statement (NIS) submitted with the application.

The Nitrates Directive (1991) aims to protect water quality by preventing nitrates from agricultural sources polluting ground and surface waters and by promoting the use of good farming practices. The Proposed Scheme will not influence or moderate agricultural land use or land management.

The revised Bathing Water Directive (rBWD) (2006/7/EC) was adopted in 2006, updating the microbiological and physico-chemical standards set by the original Bathing Water Directive (BWD) (76/160/EEC) and the process used to measure/monitor water quality at identified bathing waters. The rBWD focuses on fewer microbiological indicators, whilst setting higher standards, compared to those of the BWD. Bathing waters under the rBWD are classified as excellent, good, sufficient or poor according to the levels of certain types of bacteria (*intestinal enterococci* and *Escherichia coli*) in samples obtained during the bathing season (May to September). The Proposed Scheme will not impact any designated bathing waters as there are none less than 2km from the Proposed Scheme. It is therefore compliant with the revised Bathing Water Directive.

13.6.1.2 Conclusion

Considering all requirements for compliance with the WFD, the Proposed Scheme will not cause a deterioration in status in any waterbody, not prevent it from achieving GES or GEP; there are no cumulative impacts with other Schemes; and it complies with other environmental legislation.

It can be concluded that the Proposed Scheme complies with all requirements of the WFD.

13.7 References

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