# Chapter 13
# Water

## Contents

# 13. Water

## 13.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of Swords 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 & 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 infrastructural projects.

An assessment of the Proposed Scheme's compliance with the Water Framework Directive (WFD) (Directive 2000/60/EC) requirements is provided in Appendix A13.1 (WFD Compliance Assessment) in Volume 4 of this EIAR; the status of WFD water bodies and protected areas within the Study Area are provided in Section 13.3.3 and a summary of the conclusions of the WFD assessment is provided in Section 13.6.3

Flooding has been assessed within a Scheme Specific Flood Risk Assessment (FRA) report in Appendix A13.2 in Volume 4 of this EIAR. The results of this assessment have been summarised in Sections 13.3.10 and 13.4.5.5 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 & Environmental Impact Assessment Process). 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 maintained. 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. Therefore, any identified surface water bodies within that area have been considered as receptors including those classified under the 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.

### 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 water bodies 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 the 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 Compliance Assessment) in Volume 4 of this EIAR; 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.

In the absence of WFD assessment guidance specific to Ireland, the assessment has been carried out using the UK Environment Agency's (2016) Water Framework Directive assessment: estuarine and coastal waters (updated 2017). No specific guidance exists for freshwater water bodies, however this guidance was used as the basis of the UK Planning Inspectorate's (2017) Advice Note Eighteen: The Water Framework Directive (version 1) 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 River Basin Management Plan for Ireland 2018 – 2021 (hereafter referred to as the RBMP 2018 – 2021) was published by the Department of Housing, Planning and Local Government in April 2018 and covers Ireland as a whole. 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 'At Risk' water bodies, the RBMP 2018 - 2021 identified the frequency of significant pressures impacting these receptors 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 of Housing, Local Government and Heritage, published the draft River Basin Management Plan for Ireland 2022-2027 for public consultation (Department of Housing, Local Government and Heritage 2021). The consultation period closed 31 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; with some reductions, and 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.

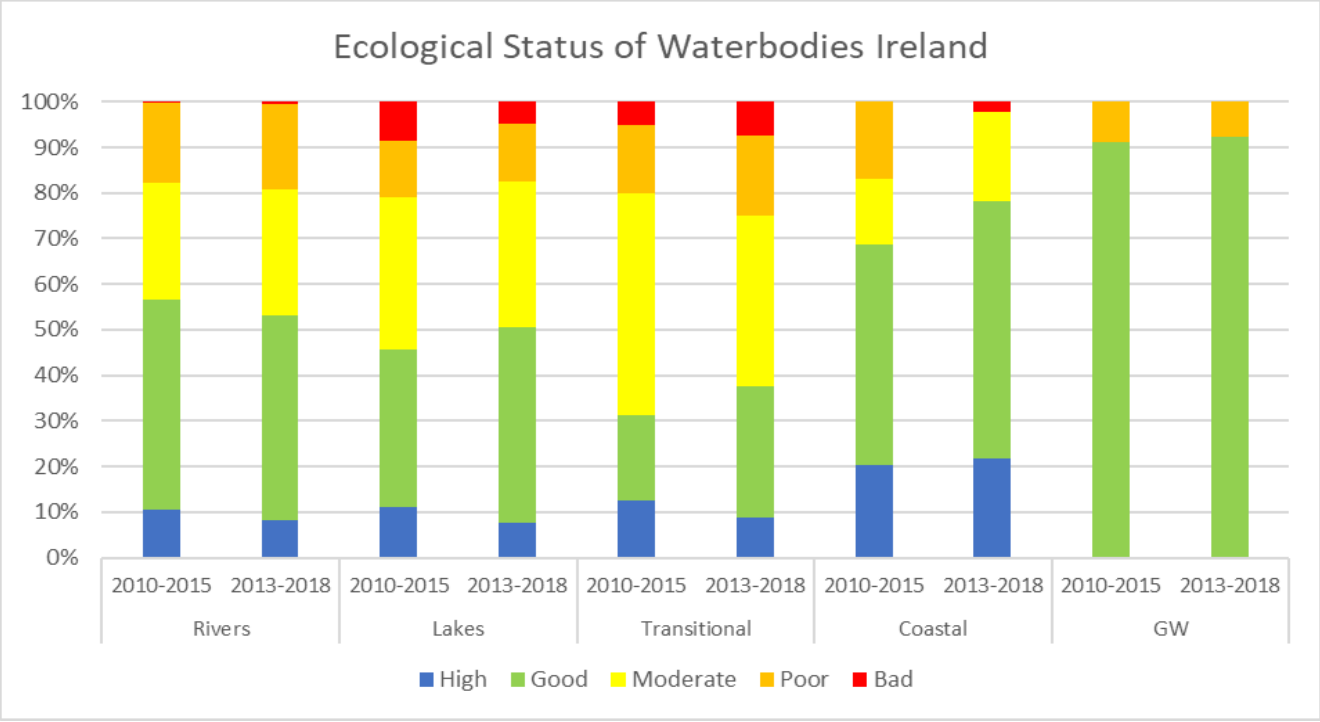


**Image 13.1: Ecological Status of Water Bodies in Ireland**

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) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022); and<br>Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report, 2017. (EU, (European Commission, 2017) |
| Water | • Transport Infrastructure Ireland (TII) Road Drainage and the Water Environment (DN-DNG-03065) (TII 2015);<br>• National Roads Authority (NRA) Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes (NRA 2005)*;<br>• NRA Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2008)*; and<br>• 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 and Rail Procurement Agency merged to establish a new agency – 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 the Desk Study

Table 13.2 details the data sources consulted during the assessment.

**Table 13.2: Data Sources Used to Undertake the Desk Study**

| Assessment Attribute | Title |
|---|---|
| General | • Ordnance Survey of Ireland (OSI) - current and historic mapping; and<br>• Aerial photographs (i.e. Google Maps). |
| Surface Water Quality and Hydromorphology | • WFD Ireland Database;<br>• EPA water quality monitoring database and reports. EPA Water Environment Maps (EPA 2020a)<br>• EPA Environmental Data Maps;<br>• National Parks and Wildlife Service (NPWS) - designated sites (NPWS, 2020); and<br>• Inland Fisheries Ireland (IFI) - fishery resources. |
| Hydrology | • Catchment Summaries;<br>• RBMP 2018 - 2021; and<br>• 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 and March 2022. In March 2022, visual inspections were made at some crossing locations and areas identified as potentially high risk (e.g. locations of proposed

construction compounds). See Figure 13.2 in Volume 3 of this EIAR for further details of the locations and the results of the survey are provided in Section 13.3.4.

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 risk (recording the pathway for any surface runoff to the watercourse and the likelihood of surface runoff reaching 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).

No water quality sampling was carried out; information relating to the quality of the water bodies was drawn from the EPA's online mapping and information portals, as detailed in Section 13.2.3.1

## 13.2.4 Appraisal Method for the Assessment of Impacts

### 13.2.4.1 General Approach

The following method for the assessment of impacts has been adapted from the 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 2008), specifically Section 5.6. The assessment also took account of the guidance set out in the Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022). 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, 2018) 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, Site specific Flood Risk Assessment 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 (NRA 2009) 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) as a result 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 are 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 2008) Adapted to include WFD Guidance (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 WFD water body which is protected by EU legislation e.g. a Designated European Sites (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) or 'Salmonid Waters'; and<br>• 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<br>or<br>very high quality or value at a national scale | • Any WFD water body (specific EPA segment) which has a direct hydrological connection of <2km to European sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters);<br>• WFD water body ecosystem protected by national legislation (Natural Heritage Area (NHA) status);<br>• 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<br>• Nutrient Sensitive Areas. |
| High | Receptor (or receptor attribute) has a moderate value at an international scale<br>or<br>high quality or value on a national scale | • A WFD water body with High or Good Status;<br>• 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<br>• WFD water body which has direct hydrological connection to sites/ecosystems protected by national legislation (NHA status);<br>• 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<br>• 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);<br>• WFD water body with limited (>2km <5km) hydrological importance for sensitive or protected ecosystems (much further downstream);<br>• 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;<br>• Evidence of historical channel change through artificial channel straightening and re-profiling; and<br>• 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); and<br>• A WFD water body with >5km (or no) hydrological connection to European sites or national designated sites.<br>Or<br>• A non-WFD water feature with minimal hydrological importance to sensitive or protected ecosystems; and/or economic and social uses;<br>• 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<br>• 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 2022):

- 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 project impacts; and
- Possibility of effectively reducing the impacts.

**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 |
|---|---|---|
| Large Adverse | Results in loss of attribute and/or quality and integrity of the attribute | ▪ Loss or extensive change to a fishery;<br>▪ Loss of regionally important public water supply;<br>▪ Loss or extensive change to a designated nature conservation site;<br>▪ Reduction in water body WFD classification or quality elements;<br>▪ Results in loss of receptor and/or quality and integrity of receptor; and<br>▪ 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 to 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;<br>▪ Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies;<br>▪ Contribution to reduction in water body WFD classification;<br>▪ Results in impact on integrity of receptor or loss of part of receptor; and<br>▪ 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. |
| Small 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;<br>▪ Minor impacts on water supplies;<br>▪ Results in minor impact on integrity of receptor or loss of small part of receptor; and<br>▪ 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; and<br>▪ Results in an impact on receptor but of insufficient magnitude to affect either use or integrity. |
| Small 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 |
|---|---|---|
| Large 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 2022)**

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

#### 13.2.4.5 Methodology for Operational Phase Traffic Impact Assessment

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 this, the TII Standard Road Drainage and the Water Environment (DN-DNG-03065TII) (TII 2015) guidance document 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. Therefore, this 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 drainage from side roads carrying displaced traffic would discharge to, Catchment Plans were consulted (see Proposed Surface Water Drainage Works (BCIDD-ROT-DNG_RD-0304_XX_00-DR-CD-9001) in Volume 3 of this EIAR).

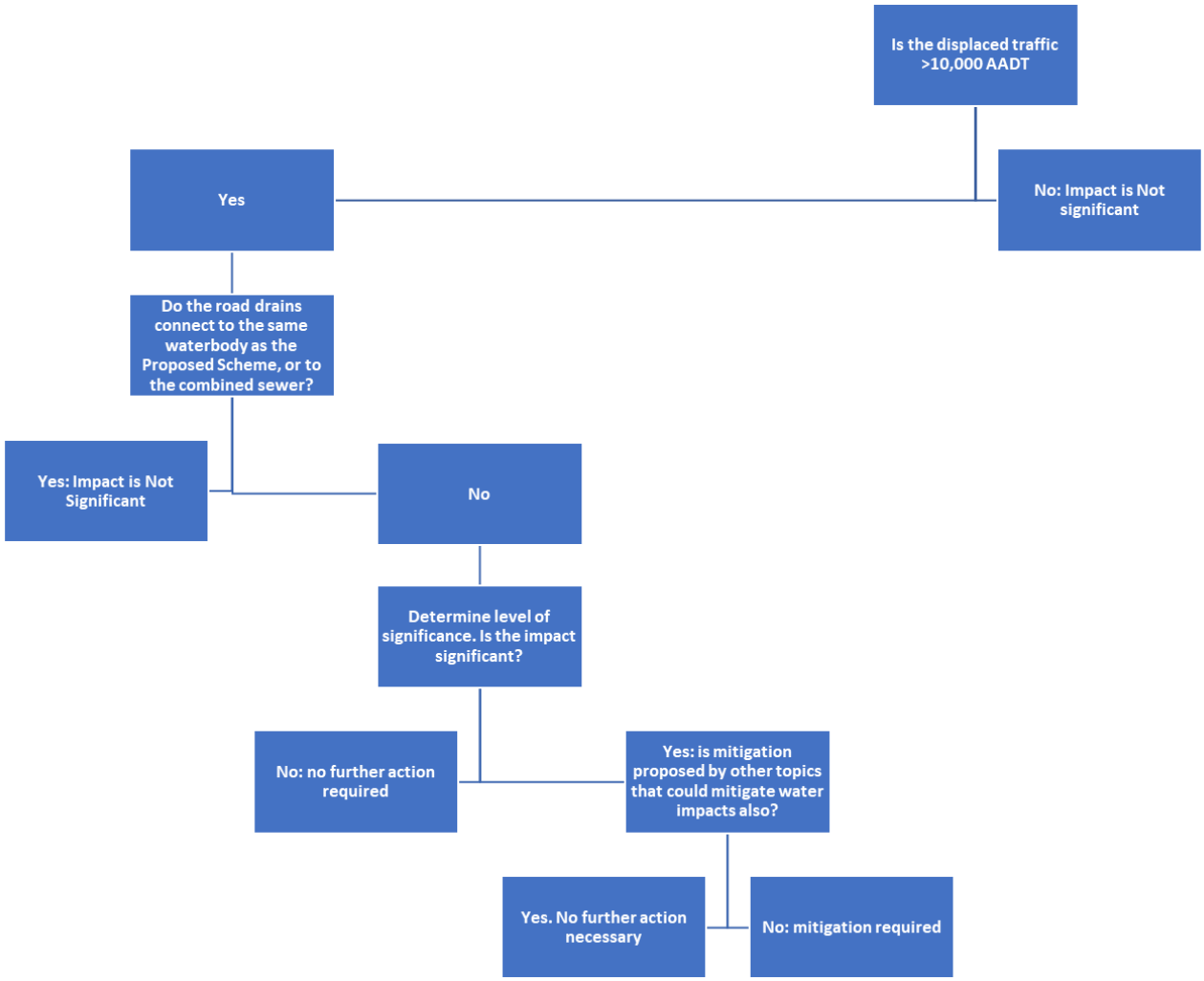


**Diagram 13.1: Traffic Assessment Decision Tree**

If, through the decision tree, it is determined that a new water body is potentially impacted upon, a qualitative assessment of the potential impact will be carried out. For the sections of road being considered in this assessment, the use of the Highways England Water Risk Assessment Tool (HEWRAT) is generally not considered appropriate, and it is considered that it would be a disproportionate level of assessment for the scale of the Proposed Scheme unless new levels of AADT are above 11,000 (see below). Taking into account the existing urban nature of the roads under consideration, the following criteria are applied to determine the magnitude of impact on the new receptor:

- If the road section length is <100m, the magnitude is negligible;
- If AADT is <10,500, the magnitude is small;
- If AADT is >10,500 and <11,000, the magnitude is medium; and
- For AADT >11,000, the HAWRAT spreadsheet will be used to check for potential impacts from heavy metals and sediment.

## 13.3 Baseline Environment

### 13.3.1 WFD Catchment Overview

The study area lies within Hydrometric Area (HA) 09 (Liffey and Dublin Bay) with one water feature located in the Hydrometric Area (HA) 08 (Nanny-Delvin).

The Liffey and Dublin Bay Catchment Summary (EPA 2021b) 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, County Dublin, draining a total area of 1,616km$^2$. There are six main water bodies within the study area in this catchment; Gaybrook_010, Sluice_010, Mayne_010 (including Cuckoo Stream), Royal Canal Main Line (Liffey and Dublin Bay), Santry_010 and the Tolka_060 (refer to Figure 13.1 Surface Water Study Area in Volume 3 of this EIAR). The largest urban centre in the catchment is Dublin City. The other main urban centres, relevant to the study area of the Proposed Scheme, are Pinnockhill, Santry, Whitehall, Beaumont and Drumcondra. 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.

The Nanny-Delvin Catchment Summary (EPA 2021b) describes this catchment as including the area drained by the River Nanny and the River Delvin and by all streams entering tidal water between Mornington Point and Sea Mount, County Dublin, draining a total area of 711km$^2$. The only water body within the area located in this catchment is the Ward_040. The largest urban centre in the catchment is Swords. The other main urban centres in this catchment are Donabate, Lusk, Skerries, Balbriggan, Stamullin, Laytown, Bettystown, Duleek, Ashbourne, Ratoath and Dunshaughlin. The total population of the catchment is approximately 159,230 with a population density of 224 people per km$^2$. This catchment is characterised by an undulating landscape, underlain for the most part by impure limestones and shales with metamorphic bedrock underlying the northern part of the catchment. There are no significant sand or gravel aquifers in the catchment.

### 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 2018a). The EPA assigns biological river quality (biotic index) ratings Q1 to Q5 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 a bad water quality. This data will be used to inform baseline receptor importance.

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

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

| 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 EPAs 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):

- Ward_040 (Swords Glebe);
- GayBrook_010 (River Gaybrook);
- Sluice_010 (River Sluice);
- Mayne_010 (River Mayne);
- Mayne_010 (Cuckoo Stream);
- Santry_010 (River Santry);
- Tolka_060 (River Tolka);
- Tolka Estuary;
- Royal Canal (Royal Canal Main Line (Liffey and Dublin Bay)); and
- Liffey Estuary Upper.

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 body Section ID | Heavily Modified? | Type | Status (2016 – 2021) | Key Pressures: Elements Causing Less Than Good Status | Risk Categorisation |
|---|---|---|---|---|---|---|
| Broadmeadow_SC_010 | Ward_040 | Partially culverted | River | Poor | Urban Runoff Pressures Hydromorphology Pressures | At Risk |
| Mayne_SC_010 | Gaybrook_010 | Partially culverted | River | Poor | Anthropogenic Pressures | Review |
| Mayne_SC_010 | Sluice_010 | Partially culverted | River | Poor | Anthropogenic Pressures | Review |
| Mayne_SC_010 | Mayne_010 | Partially culverted | River | Poor | Urban Runoff Pressures | At Risk |
| Mayne_SC_010 | Santry_010 | Partially culverted | River | Poor | Urban Runoff Pressures Hydromorphology Pressures | At risk |
| Tolka_SC_020 | Tolka_060 | No | River | Moderate | Urban Runoff Pressures Hydromorphology Pressures | At risk |
| N/A | Tolka Estuary | No | Transitional | Moderate | Urban Wastewater | At Risk |
| N/A | Royal Canal Main Line (Liffey and Dublin Bay) | – N/A | Artificial Water body (AWB) | Good Ecological Potential | None identified | Review |
| N/A | Liffey Estuary Upper | No | Transitional | Good | SWOs | Review |

## 13.3.4 Field Survey

The proposed Scheme was surveyed in 2020 and 2022. The water bodies surveyed were the Royal Canal, Tolka_060, Mayne_010 and the Santry_010. The results of the March 2020 and 2022 field surveys are detailed in Table 13.8 and Table 13.9.

**Table 13.8: Survey Information for Selected Sites Along the Proposed Scheme**

| Survey Attribute | Survey Location 1 | Survey Location 2 | Survey Location 3 | Survey Location 4 | Survey Location 5 |
|---|---|---|---|---|---|
| **Location** | Mayne_010 | Santry_010 | Mayne_010 (Cuckoo Stream) at Dublin Airport | Tolka_060 | Royal Canal |
| **Visual Flow** | Low flow | Low flow | High flow | Medium to high water level with high fast-moving flow | Flow is altered as it is a canal. On the east side there is high water but slow canalised flow. |
| **Date** | 02/03/2020 | 02/03/2020 | 02/03/2020 | 02/03/2020 | 02/03/2020 |
| **Visual Water Quality** | Low, heavy amounts of litter | Outfalls noted into watercourse, although unsure of source | Potential to be poor due to proximity to the airport gates / runway | Clear water, no signs of indicator pollution vegetation growth. | Minimal rubbish pollution |
| **Bed Observation** | Not uniform, mainly small rocks and silt. Some larger rocks | Fine sediment and small rocks | Assumed to be flat | Mainly small rocks, some larger ones. Areas of deposition. | Bed is not visible but channel is artificial |
| **Bank Stability** | Not possible to assess due to dense vegetation | River undercutting wall on right bank. Left bank is densely vegetated. Slight creep of left bank noted in places | Good, concrete banks | Concrete banks | Stone walls, vegetated bank on the right bank |
| **Features** | Trash screen and culvert | Small riffles downstream | Culvert and trash screens | Bridge crossing | Lock and quay as well as a bridge |
| **Modifications** | None other than the culvert | None seen | Heavily modified, concrete channel and culvert | Concrete channel | Canal / artificial water body |
| **Runoff Pathway** | Road gullies present so potential for discharge to watercourse | No obvious pathways | From Dublin Airport, potentially some runoff from the road as well | No obvious pathways | Pathways present both perpendicular and parallel to the east |
| **Runoff Risk** | Medium likelihood due to gradient of surrounding banks | Low | Medium | Medium | High from the left bank which is a pedestrian path |
| **Riparian Detail** | Dense vegetation | Dense and varied vegetation on left bank | None | Good riparian vegetation – gorse, butterfly bush, ash, ground ivy | Grass verge. Low slope. Some rush vegetation. Stone wall |
| **Natural Barriers** | Large debris in small channel | None | Culvert and trash screen | None | Lock and quay |
| **Discharges** | None visible | Outfall downstream of culvert | None visible but potential from road and Dublin Airport | None visible | None visible |
| **Culverted** | Yes | Partially | Yes | No | No |

**Table 13.9: Survey Information for Selected Sites Along the Proposed Scheme March 2022**

| Survey Attribute | Survey Location 1 | Survey Location 2 | Survey Location 3 | Survey Location 4 | Survey Location 5 |
|---|---|---|---|---|---|
| Location | Gaybrook stream off Nevinstown Lane | Sluice River d/s of Proposed Scheme | Mayne river at Proposed Scheme crossing – cycle path | Santry river at Proposed Scheme crossing/pond | Tolka Crossing – Frank Flood Bridge |
| Visual Flow | Low | Moderate | Low | Fast | Moderate |
| Date | 09/03/2022 | 09/03/2022 | 09/03/2022 | 09/03/2022 | 09/03/2022 |
| Climate observations | Raining and overcast | Light rain overcast | Heavy rain | Light rain, overcast | Heavy rain, overcast |

| Survey Attribute | Survey Location 1 | Survey Location 2 | Survey Location 3 | Survey Location 4 | Survey Location 5 |
|---|---|---|---|---|---|
| Waterbody Crossed | Yes | Yes | Yes | Yes | No |
| Construction compound | No | No | No | No | No |
| Closest Waterbody | Gaybrook_010 | Sluice_010 | Mayne_010 | Santry_010 | Tolka_60 |
| Distance to Waterbody | Less than 5m | Survey point was located over water body | 5m | Survey point located over culverted water body | 10m from survey point |
| River flow | Low | Moderate | Low | Fast | Moderate |
| Water Quality | Low levels of flow, unable to determine water quality | Clear, good quality | Sheen noted on the surface of waterbody. Contains run off from airport. There is the potential for it to be of poor quality | Slightly discolored. Vegetation debris noted between the river and the pond. Some waste noted along the edge of the pond. | Discolored |
| Run-off pathway | Low risk of run-off, barrier separating commercial land from the Gaybrook_010 | Impermeable path | Dublin airport, potential run off from the road also. | Potential run off pathway from road. Surface water drain is noted 5m north of the survey point. | Potential run off pathway from bridge |
| Run-off risk | Low | Low | Medium | Medium | Medium |
| Riverbed observations | Vegetation present along river bed | Pebbles visible along river bed | Culverted | Water level to deep to see river bed | Water too deep to see river bed |

### 13.3.5 Designated Sites

The designated European 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 Special Areas of Conservation (SAC), Special Protection Areas (SPA), proposed Natural Heritage Areas (pNHA), NHAs, 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) in Volume 2 of the EIAR and Figure 12.2 in Volume 3 of the EIAR, respectively. The following European sites were identified to be relevant to this assessment:

- South Dublin Bay and River Tolka Estuary SPA (site code: 004024 (2km from the Proposed Scheme);
- Baldoyle Bay SAC (site code: 000199) (13pprox.. 6.5km from the Proposed Scheme);
- North Dublin Bay SAC (site code: 000206) (13pprox.. 2km from the Proposed Scheme);
- South Dublin Bay SAC (site code: 000210) (13pprox.. 9km from the Proposed Scheme);
- Malahide Estuary SAC (site code: 000205) (13pprox.. 3km from the Proposed Scheme);
- North Bull Island SPA (site code: 004006) (13pprox.. 6km from the Proposed Scheme);
- North Bull Island SAC (site code: 000206) (13pprox.. 6km from the Proposed Scheme);
- Baldoyle Bay SPA (site code: 004016) (13pprox.. 7km from the Proposed Scheme); and
- Malahide Estuary SPA (site code: 004025) (13pprox.. 3km from the Proposed Scheme).

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

- Santry Demesne pNHA (site code: 000178);

- Baldoyle Bay pNHA (site code: 000199);
- Malahide Estuary pNHA (site code: 000205);
- North Dublin Bay pNHA (site code: 000206);
- South Dublin Bay pNHA (site code: 000210);
- Feltrim Hill pNHA (site code: 001208); and
- Sluice River Marsh pNHA (site code: 001763).

There are three Nutrient Sensitive Areas in the study area. They are the River Liffey, Liffey Estuary and Tolka Estuary, designated under the Urban Wastewater Treatment (UWWT) Directive (refer to Figure 13.2 in Volume 3 of this EIAR)

There are two designated shellfish areas: one in Malahide, located downstream of the Liffey and Dublin Bay catchment and one in Balbriggan \ Skerries, located downstream of the Nanny-Delvin catchment. The shellfish areas are 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 Program).

There are eight designated marine bathing waters downstream and potentially hydrologically linked to the Proposed Scheme, as listed below. The EPA published its Bathing Water Quality – A Report for the Year 2020 in May 2020 (EPA 2020c) and the website 'www.beaches.ie' keeps this information regularly updated. The beaches and the most up to date assessment (checked July 2022) of their quality is provided below:

- Portmarnock, Velvet Strand Beach – Excellent Quality (approximately 7km from the closest point of the Proposed Scheme);
- Sutton, Burrow Beach – Excellent Quality (approximately 8.5km from the closest point of the Proposed Scheme);
- Claremont Beach – Excellent Quality (approximately 11.5km from the closest point of the Proposed Scheme);
- Dollymount Strand – Poor Quality (approximately 8km from the closest point of the Proposed Scheme);
- North Bull Wall – Poor Quality (approximately 7km from the closest point of the Proposed Scheme);
- Half Moon Beach – Excellent Quality (approximately 6km from the closest point of the Proposed Scheme);
- Shelley Banks – Excellent Quality (approximately 5km from the closest point of the Proposed Scheme); and
- Sandymount Strand – Excellent Quality (approximately 5km from the closest point of the Proposed Scheme).

There are no designated salmonid rivers within the study area.

### 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 are designated as Drinking Water Rivers.

### 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 licensed 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.

The following IE / IPPC sites were identified:

- IE Licenced Facility Dublin Aerospace, Dublin Airport, Reg No: P0480-02;

- IE Licenced Facility Barclay Chemicals, Santry, Dublin 9, Reg No: P0317-01;
- IE Licenced Facility Independent Newspapers, Middle Abbey Street, Dublin 1, Reg No: P0111-01;
- IPPC Licenced Facility Anglo Beef Processors, Cloghran, Swords, Reg No: P0189-01; and
- IPPC Licenced Facility Computer Plating Specialists, Santry Avenue, Dublin 9, Reg No: P0278-01.

Table 13.10 outlines the number of SWOs in the study area and which watercourses they outfall to.

### 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 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.

The existing drainage is largely a separate system with all but Section 5 of the Proposed Scheme (closest to the City Centre) discharging to surface water sewers and ultimately to local water bodies (see Table 13.10). There are no direct discharges to Gaybrook_010 identified from the drainage records. The water body rises to the west of the R132 and is picked up in the surface water system for the road and taken north to outfall to the Ward_040. Drainage records in this section of the R132 are unclear, however it is unlikely that the surface water system on the eastern side of the road would discharge to Gaybrook_010. To the east of the R132, Gaybrook_010 is likely receiving water from nearby fields and properties along Nevinstown Lane. As a result, Gaybrook_010 is scoped out of this assessment.

**Table 13.10: Existing Drainage**

| Catchment | Existing Network Type | Proposed Scheme Section ID | Water body |
|---|---|---|---|
| 1 | Surface Water (Storm) | 1 | Ward_040 |
| 2 | Surface Water (Storm) | 2 | Sluice_010 |
| 3 | Surface Water (Storm) | 2 | Mayne_010 |
| 4 | Surface Water (Storm) | 2 | Mayne_010 |
| 5 | Surface Water (Storm) | 2/3 | Santry_010 |
| 6 | Surface Water (Storm) | 4 | Tolka_060 |
| 7 | Foul/Combined | 5 | Ringsend WwTP |

### 13.3.9 Surface Water Features

The seven WFD water bodies within the study area are discussed within this Section: Ward_040; Sluice_010; Mayne_010; Santry_010; Tolka_060,Tolka Estuary and Royal Canal Main Line (see Table 13.11).

The Santry_010 is contained within the RBMP 2018 - 2021 ‘Priority Areas for Action’. Hydromorphological characteristics were assessed during field survey. The study area is composed of a wide variety of features, including culverted rivers and modified water bodies with concrete channels and dense vegetation. A summary of the baseline condition of each of these WFD water bodies and their associated flood risk within the study area is detailed in the following sections.

**Table 13.11: Distance of the Water Bodies within the Study Area to the Proposed Scheme and the Individual Sections of the Proposed Scheme.**

| WFD Water Body (EPA Name) | Nearest Proposed Scheme Section | Approx. Distance from Proposed Scheme (m) | Number of Crossings |
|---|---|---|---|
| Ward_040 | Pinnock Hill to Airside Roundabout | 330m | 0 |
| Sluice_010 | Airside Roundabout to Northwood Avenue | 0m | 1 |
| Mayne_010 | Airside Roundabout to Northwood Avenue | 0m | 1 |
| Santry_010 | Airside Roundabout to Northwood Avenue | 0m | 1 |
| Tolka_060 | Shantalla Road to Botanic Avenue | 0m | 1 |
| Tolka Estuary | Shantalla Road to Botanic Avenue | 600m | 0 |
| Royal Canal | Botanic Avenue to Granby Avenue | 0m | 1 |

#### 13.3.9.1 Ward_040

The segment of Ward_040 within the study area begins at Forest Road and flows north, parallel to the road for 673m before joining the main channel of Ward_040. The overall length of the Ward_040 is 10.69km. Ward_040 has a Moderate WFD status and is At Risk of not achieving Good Status by 2027 due to a number of significant pressures such as urban wastewater from Combined Sewer Overflows, urban runoff from diffuse sources and altered habitat due to morphological changes in the watercourse.

The Ward_040 was last assessed in 2017 at three monitoring stations. The EPA River Quality Survey reported that:

> *'Site 0070 in the upper of the Ward River improved from poor to moderate ecological condition in 2017. The previous improvement at Killeek Bridge (0300) to good ecological conditions has been maintained. Site 0610 remains a poor ecological condition.'*

None of these stations are located along Swords Glebe.

In terms of assigning sensitivity, Ward_040 is of Moderate WFD status and is approximately 2.7km upstream of a designated site at its closest point to the Proposed Scheme. As such it is of Medium sensitivity.

#### 13.3.9.2 Sluice_010

The Sluice_010 rises to the north of Dublin Airport and flows in an easterly direction through the towns and surrounding areas of Greenwood, Abbeyville, Kinsealy and Old Portmarnock before entering the Mayne Estuary and subsequently the Irish Sea. The River Sluice has a total length of 15.17km. Land along the water body is utilised for agricultural land use purposes with the downstream extents being residential.

The Sluice_010 will be crossed by the Proposed Scheme at R132 Swords Roads, north of the Metropoint Business Park. In terms of assigning a sensitivity to it, it has Poor Status under WFD; the crossing of it is more than 7km upstream of a designated site; and it is not a Special Protected Area. As such, it is classified as being of Low sensitivity.

#### 13.3.9.3 Mayne_010

The Mayne_010 commences at Dardistown (west of the M50 / M1 Motorway Interchange). It flows under the interchange, parallel to the Northern Cross Route Extension (R139 Road) until it crosses the R107 Malahide Road. From that point it flows through the Castlemoyne Estate, where is joined by a tributary known as Cuckoo Stream and then continues to flow under the Dublin / Belfast railway line before discharging to the Mayne Estuary, in which is part of the Baldoyle Bay SAC. The tributary (EPA name Cuckoo Stream) commences at Dublin Airport

and flows under the M1 Motorway at Toberbunny and joining the main channel of Mayne_010 upstream of Balgriffin Park. The Mayne_010 (including the Cuckoo Stream) has a total length of 16.52km. Land to the north of the watercourse is utilised for agricultural land use purposes with land use to the south being predominantly urban.

Mayne_010 will be crossed by the Proposed Scheme at R132 Swords Roads, north of the M1 Turnapin. The Mayne_010 tributary will also be crossed by the Proposed Scheme at R132 Swords Road, south of Dublin Airport Terminal 2. Mayne_010 has a Poor WFD Status and is At Risk of not meeting the WFD objective of Good Status by 2027. The main risks are anthropogenic pressures.

The Mayne_010 was last assessed in 2019 at one monitoring station. The Q Value was unsatisfactory at Q2 to Q3. The EPA River Quality Survey reported that:

> '*Ecological conditions at Wellfield Bridge (0500) remains poor (Q2-3) with an impoverished pollution tolerant fauna evident in low numbers.*' (EPA 2020b)

This station is not located within the study area of the Proposed Scheme, but approximately 5km downstream.

The Mayne_010 has Poor status; the crossing of it by the Proposed Scheme is approximately 6.5km from Baldoyle Bay SAC. It is assigned low sensitivity.

#### 13.3.9.4 Santry_010

The Santry_010 has its origins at Harristown Lane, south of R108 South Parallel Road. The Santry_010 flows through Silloge, under the M50 Motorway at Ballymun and through Santry Demesne. It then passes under the M1 / M50 Motorway at Santry, through Coolock where it flows into Santry_020 and under the Dublin / Belfast railway line before discharging to Dublin Bay at North Bull Island SPA/SAC. Land use within the catchment is predominantly urban with land surrounding the upstream portion of the river being used for agriculture purposes.

The Santry_010 EPA segment will be crossed by the Proposed Scheme at R132 Swords Road, north of Santry Demesne. Santry_010 has a Poor WFD status and is At Risk of not achieving Good Status by 2027 due to a number of significant pressures such as urban wastewater, urban runoff from diffuse sources causing nutrient and organic pollution and altered habitat due to morphological changes in the watercourse.

The Santry_010 was last assessed in 2019 at one monitoring station. The EPA River Quality Survey reported that:

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

The station is located downstream of the study area, approximately 1.8km from the Proposed Scheme.

The Santry_010 is of Poor status; the crossing of it by the Proposed Scheme is approximately 6km from North Bull Island SPA/SAC. It is assigned low sensitivity.

#### 13.3.9.5 Tolka_060

The River Tolka is the second largest river in Dublin. Tolka_010 rises in the south-west of Dunshaughlin from where it flows through Dunboyne as Tolka_020 and Blanchardstown as Tolka_040, before entering the north-west of Dublin City as Tolka_050, becoming tidal downstream of Drumcondra at the Tolka_060 segment, and flowing into Dublin Bay along the northern edge of Dublin Port. Generally, the River Tolka has poor water quality, both biologically/ecologically and chemically. Ecological Status in both the Tolka_040 and Tolka_050 water bodies was Poor in the 2013 to 2015 monitoring cycle and both segments are At Risk. There are significant industrial pressures throughout the Tolka_SC_020 sub-catchment, particularly urban diffuse and misconnections. There have been misconnection studies initiated and extensive studies throughout the Tolka Valley Park area. Illegal dumping is also an issue in the Dunsink Lane area and there have also been improvement attempts made with a large-scale SuDS programme in the Ballymun area. Tolka Estuary is a Nutrient Sensitive Area.

The EPA segment Tolka_060 will be crossed by the Proposed Scheme at Drumcondra, north-west of Holy Cross College. Its segment length is 3km and it flows directly into the Tolka Estuary approximately 500m after the point at which it will cross the Proposed Scheme.

In terms of assigning sensitivity, the Tolka_060 has a Poor WFD status and is At Risk of not achieving Good Status by 2027. Its main pressures are due to urban runoff and urban wastewater from Combined Sewer Overflows. The crossing is 600m upstream of the Tolka Estuary which is a Nutrient Sensitivity Area under the UWWTD and a WFD Special Protected area. It is also within the South Dublin and Tolka Estuary SPA. As such, it is classified as being of High sensitivity.

#### 13.3.9.6 Tolka Estuary

Tolka Estuary is a transitional water body within the Tolka Estuary Nutrient Sensitive Area. Tolka Estuary is fed by the Tolka_060 which flows into Liffey Estuary Lower before reaching Dublin Bay. Tolka Estuary has a Poor WFD status and is At Risk of not achieving Good Status by 2027. The main risk is urban wastewater from Combined Sewer Overflows, as Tolka Estuary is impacted by Ringsend Wastewater Treatment Plant (WwTP) and the agglomeration network. Other than Ringsend WwTP, the most significant source of nutrients from the Tolka catchment to the Tolka Estuary is diffuse urban pollution, which will be reviewed as part of Irish Water's drainage network planning (EPA 2018b).

This water body is not directly crossed by the Proposed Scheme and surface water drains from the route of the Proposed Scheme do not drain into it, however it is only 600m downstream of the crossing of the Tolka_060 and activities proposed at that location pose a risk to this water body also. As a result, it is included in this assessment.

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

#### 13.3.9.7 Royal Canal (Royal Canal Main Line (Liffey and Dublin Bay))

The Royal Canal (Royal Canal Main Line (Liffey and Dublin Bay)) (hereafter referred to as the Royal Canal) is an artificial water body, primarily used for recreation and was constructed in the 18th century, shortly after the Grand Canal. The Royal Canal is 145km long and runs from the River Liffey in Dublin to Cloondara on the River Shannon, with an 8km branch line into the town of Longford. Along the length of the Royal Canal there are 46 sets of locks. The Royal Canal will be crossed by the Proposed Scheme at Binn Bridge in Drumcondra. As stated in the EPA Water Quality in Ireland 2013 – 2018 Report (EPA 2019), assessments of the Royal Canal using macroinvertebrates indicates generally good biological conditions. Similarly, positive results were identified in terms of macrophyte assessment. The Royal Canal achieved good ecological potential in the period from 2013 to 2015.

In terms of assigning sensitivity, this water body is of Good WFD status. It has an indirect hydrological connection to Dublin Bay SAC via the Liffey Estuary Lower. It is determined to be High sensitivity.

#### 13.3.9.8 Liffey Estuary Upper

The Liffey Estuary Upper is a transitional water body and is within the Liffey Nutrient Sensitive Area. It is fed by the Camac_040, Liffey_190 and Poddle_010 and flows into Liffey Estuary Lower before reaching Dublin Bay. The Proposed Scheme does not cross this water body and there are no direct surface water discharges to it; however, the combined sewer system does outfall to it in times of high flow or emergencies through the Surface Water Overflows (SWOs). The only potential impacts on this water body would be during operation so it is not considered for construction related impacts.

Liffey Estuary Upper has a Good WFD status and is At Risk of not achieving the WFD objective of Good Status by 2027. The main risk is urban wastewater from SWOs on the sewer network. The key impacts are considered to be nutrient pollution and alterations to habitats due to morphological changes.

In terms of assigning it sensitivity, it is of Good status. It is not a designated site but has an indirect connection to Dublin Bay SAC via Liffey Estuary Lower. Liffey Estuary Lower is a WFD protected area. Sensitivity has therefore been determined to be High.

#### 13.3.9.9 Summary of Baseline Receptor Sensitivity

**Table 13.12: Baseline Receptor Sensitivity**

| Water Body Section ID | Attributes | Indicator / Feature | Sensitivity |
|---|---|---|---|
| Ward_040 | River | Moderate WFD Status<br>>2km from designated site. | Medium |
| Sluice_010 | River | Poor WFD Status.<br>>2km from designated site. | Low |
| Mayne_010 | River | Distant (>2km) hydrological connection to Baldoyle Bay SAC and SPA, Poor Ecological status | Low |
| Santry_010 | Partially culverted, heavily modified river | <2km Hydrologically connected to North Dublin Bay SAC and North Bull Island SPA | Low |
| Tolka_060 | River | Poor WFD Status<br>Short (600m) and direct hydrological connection to Tolka Estuary Nutrient Sensitive Area and WFD Special Are of Protection. | High |
| Tolka Estuary | Transitional | Poor WFD Status<br>Nutrient Sensitive Area<br>Special Area of Protection | Very High |
| Royal Canal Main Line (Liffey and Dublin Bay) | Artificial water body | Good Ecological Potential | High |
| Liffey Estuary Upper | Transitional | Good | High |

## 13.3.10 Flood Risk

Flood Risk is not considered as part of the impact assessment in this Chapter; a separate Site Specific Flood Risk Assessment (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 flood risk from the FRA is provided here for ease of reference.

The FRA has been prepared in accordance with 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). A copy of the FRA 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 Zones A and B.

#### 13.3.10.1 Groundwater, Estuarine and Coastal Flooding

There is no identified risk of groundwater, estuarine or coastal flooding to the Proposed Scheme. The risk of flooding from these sources is therefore considered to be low.

#### 13.3.10.2 Fluvial Flooding

The Proposed Scheme is at risk from fluvial flooding in four locations:

- Swords Road from Cuckoo Stream in the 1% and 0.1% AEP floods;
- Swords Road from the Mayne River in the 0.1% AEP flood;
- Swords Road from the Santry River in the 10% and 1% AEP floods; and
- Drumcondra Road Lower (Frank Flood Bridge) from the River Tolka. This is in Flood Zone A. OPW records show however that the area is defended to a 1% AEP standard by the river Tolka Flood Relief Scheme.

#### 13.3.10.3 Pluvial Flooding

OPW records show the risk of pluvial flooding along the route between the City Centre and the M50 overpass in the 10% AEP flood. It is reasonable to assume that the remainder of the Proposed Scheme (between Pinnock Hill Roundabout and the M50 overpass) is exposed to a similar level of flood risk.

#### 13.3.10.4 Climate Change

Future climate change is predicted to give rise to an increased risk of flooding through rising sea levels and an increase in river flows and the frequency and intensity of extreme rainfall. The OPW has identified two potential scenarios for the impacts of climate change that are known as the Mid-Range Future Scenario (MRFS) and High-End Future Scenario (HEFS).

The Mid-Range Future Scenario (MRFS) scenario is intended to represent the 'likely' future scenario based on a range of forecasts. The High-End Future Scenario (HEFS) represents a more extreme forecast that is at the upper end of accepted projections.

For the purposes of this flood risk assessment, the potential impact of climate change on flood risk to the Proposed Scheme has been made relative to the MRFS scenario as suggested in the recent document Ref PL 2/2014 issued by the Department of Housing, Local Government and Heritage.

Likely impacts of climate change on sources of flood risk are identified as follows:

- Coastal: no change. There is no existing risk of coastal flooding to the Proposed Scheme. Future climate change will not result in potential flooding of the route from coastal sources;
- Fluvial: Future climate change has the potential to increase the risk from fluvial flooding to the Proposed Scheme in three locations:
    - Cuckoo Stream: climate change results in a 0.07m increase in flood levels, slightly increasing the depth of flooding for the 1% and 0.1% AEP floods. The Proposed Scheme is still not at risk during the 10% AEP flood. Owning to the marginal increase in water levels, this does not change the conclusions drawn for flood risk for the current situation;
    - Mayne River: climate change results in a 0.18m increase in flood levels, increasing the depth of flooding for the 1% and 0.1% AEP floods. The Proposed Scheme is still not at risk during the 10% AEP flood; and
    - Santry River: climate change results in a 0.03m increase in flood levels, very slightly increasing the depth of flooding for the 10%, 1% and 0.1% AEP floods. Owing to the marginal increase in water levels, this does not change the conclusions drawn for flood risk for the current situation.
- Estuarine. no change. There is no existing risk of estuarine flooding to the Proposed Scheme. Future climate change will not result in potential flooding of the route from estuarine sources;

- Pluvial: Future climate change will result in increased rainfall depths over the Proposed Scheme. For existing drainage systems there will be an increase in the risk of flooding as no works are proposed to increase their capacity; and
- Groundwater: The scheme is not at risk from groundwater flooding. Future climate change will not affect this conclusion.

## 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 are 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 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. oversized pipes) 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 (Proposed Scheme Description), and Appendix A4.1 Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors 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 and connections to the existing drainage system. Attenuation will be in the form of swales, filter drains and attenuation ponds and tanks. In total it is proposed that there will be two swales, six attenuation ponds, three underground attenuation tanks and one filter drain along the Proposed Scheme. 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 following drainage types are proposed:

- Sealed Drainage which collects, conveys and discharges runoff via a sealed pipe network;
- Grass Surface Water Channels & Swales are provided as road edge channels;
- Filter Drains are provided as road edge channels;
- Tree Pits are provided in close proximity to the road;
- Attenuation Tanks – Where there is insufficient attenuation volume provided by the proposed SuDS drainage measures, an attenuation tank is required to provide the required volume; and
- Oversized pipes – Where there is insufficient space available for SuDS measures it is proposed to provide some attenuation volume online using oversized pipes.

The drainage system for the Proposed Scheme will discharge to eight surface water bodies and one WwTP. Details of the proposed drainage treatment for each catchment and subsequently each water body are provided

in Table 13.13. This table also includes details of the changes to impermeable areas. No new outfalls are proposed.

No new outfalls are proposed. Discharges from new drainage design will be to existing surface water systems and outfalls.

**Table 13.13 Proposed SuDS and Changes to Impermeable Areas**

| Water Body | Approx. Impermeable Surface Area | | | | | SuDS Measures Proposed |
|---|---|---|---|---|---|---|
| | Existing ($m^2$) – Whole Catchment | Change of Use to Impermeable ($m^2$) | Change of Use to Permeable Areas ($m^2$) | Net Change ($m^2$) | % Change | |
| Ward_040 | 3,689,466 | 5,036 | 3,297 | 1,739 | 0.05% | Attenuation tank, new surface water drainage pipes and intercepting existing surface water network |
| Sluice_010 | 4,024,159 | 6,035 | 771 | 5,264 | 0.13% | Dry detention basin, swale |
| Mayne_010 | 3,917,435 | 3,577 | 225 | 3,352 | 0.09% | Attenuation tank, oversized pipes, new pipe network |
| Mayne_010 | 2,179,912 | 714 | 1.5 | 712.5 | 0.03% | Dry detention basin, attenuation tank |
| Santry_010 | 9,067,247 | 6,530 | 311 | 6,219 | 0.07% | Oversized pipe, dry detention basin |
| Tolka_060 | 31,680,617 | 4,642 | 302 | 4,340 | 0.01% | Oversized pipe, |
| Liffey Estuary Upper | 251,900 | 233 | 0 | 233 | 0.09% | None |

**Table 13.14 Summary of Impermeable Area Increases by Water Body**

| Water Body | Existing | Additional (Net Change) Impermeable | Percentage Change |
|---|---|---|---|
| Ward_040 | 3,689,466 | 1,739 | 0.047 |
| Sluice_010 | 4,024,159 | 5,264 | 0.13 |
| Mayne_010 | 6,097,347 | 4,065 | 0.07 |
| Santry_010 | 9,067,247 | 6,219 | 0.07 |
| Tolka_060 | 31,680,617 | 4,340 | 0.01 |
| Liffey Estuary Upper | 251,900 | 233 | 0.09 |

#### 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.

#### 13.4.1.3 The Frank Flood Bridge

Frank Flood Bridge (formerly known as Drumcondra Bridge) is an existing structure that carries the Proposed Scheme over the River Tolka. The Proposed Scheme is wider than the existing arrangement and consequently a proposed independent parallel pedestrian/cycle bridge is proposed.

The proposed bridge consists of a 50m, 2-span steel structure comprising central varying depth box girder with a tie down arrangement at the north of the structure. The span arrangement is governed by the flood plain on the south side of the river which needs to remain open for high flow situations. North span will be 38m and south span

will be 12m. Distance between the deck soffit and the ground varies. A minimum clearance of 1.5m is provided at the abutments.

Allowance will be made to accommodate the large amount of services required below the deck. The substructure will consist of conventional bank seat abutments supported on piled foundations at the north and south end of the structure. The central support will consist of a leaf pier supported by piled foundations set back an appropriate distance from the river wall.

### 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 the existing road infrastructure, so infrastructure provision for buses, pedestrians and cyclists would remain the same.

The Baseline (see 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 process under baseline conditions (i.e. what is there at present) and reported by the EPA. The RBMP 2018-2021 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 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, Tolka_SC_020 and Broadmeadow_SC_010 sub-catchments are urban runoff from diffuse urban sources, and urban wastewater from SWOs. There are also anthropogenic pressures in the Mayne_SC_010 and pressures from industry in the Mayne_SC_010 and Tolka_SC_020. Hydromorphological pressures in the Broadmeadow_SC_010 are also present due to an arterial drainage scheme on the Ward_040 and waste from a number of EPA licensed facilities.

Urban Runoff, which relates to a mixture of misconnections, leakage from sewers and runoff from paved and unpaved areas, has been identified as a significant pressure to Santry_010, the Tolka_060 and Ward_040. Further investigation, outside the scope of this assessment, is required to determine the nature and extent of the impacts. The urban runoff impacts on the Santry_010, including misconnections, can be partially attributed to operations at Dublin Airport and associated activities and the M1 motorway may also be impacting status of these water bodies. The Tolka_060 is impacted by multiple point source discharges from industry.

Urban wastewater discharges from WwTPs and agglomeration networks have been identified as pressures to all water bodies within the study area. These include urban wastewater discharges from SWOs. There are planned improvements to Urban Waste-Water Discharges and their contribution to achieving WFD objectives across the country. Recent regulation for authorising and regulating urban wastewater discharges, and licensing for those in areas where the population is over 500 should contribute to reducing the pressures.

The EPA Urban Wastewater Treatment in 2019 report (published in 2019) highlights two key actions to improve treatment at WwTPs:

- Upgrade deficient wastewater treatment systems in as timely a manner as possible. This requires increased investment and efficient delivery of infrastructure improvements; and
- Get the best performance from the existing treatment systems by continuing to improve how they are operated, managed and maintained.

The draft RBMP includes an action for Irish Water to continue investment in wastewater infrastructure with Irish Water investing in 83 WwTPs and 10 collection networks at an estimated cost of €1.022 billion, over the period

2020 to 2024. In addition, as part of Ireland's National Recovery and Resilience Plan 2021 (Government of Ireland 2021), Irish Water will be delivering its enhanced Ambition Programme, which aims to deliver 10 priority WwTP 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), i.e. Do Minimum, in line with the assessment of impacts on traffic as set out in Chapter 6 (Traffic & 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 13.4.5.3 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 these 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.

In addition to a detailed description of the works involved, Chapter 5 (Construction) also details the location of five 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 36 months. The Construction Compounds will be in place for the full duration of the extent of the works they support and will be removed following completion of the works they support. The Construction Compounds will be located at the following sites:

- Construction Compound SW1: Cloghran Junction;
- Construction Compound SW2: Collinstown Cross;
- Construction Compound SW3: Coolock Lane;
- Construction Compound SW4: Collins Avenue Junction ; and
- Construction Compound SW5: Frank Flood Bridge.

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

- Change in the natural hydrological regime due to an increase in discharge as a result of dewatering activities (if required) during construction. This may alter the groundwater regime and affect the baseflow to a surface water receptor;
- Disruption to local drainage systems due to diversions required to accommodate the construction works;
- Modifications to the hydraulic characteristics of water features through modifications to the channel dimensions during construction of outfalls and culverts, where required; 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; and
- Re-exposure of historically settled contaminants within or near to water bodies due to working within or near to the water body.

13.4.4.2.3 Hydromorphology

- Increased sediment loading due 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;
- In-stream working which can lead to localised changes in the flow and sediment processes within the channel; and
- 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 in Table 13.15.

13.4.4.3.1 Ward_040

Junction Upgrades and associated works are proposed at Pinnock Hill Junction to Airside Junction. The Ward_040 is over 200m from the Proposed Scheme, however surface water sewers in the road in this location discharge to it. The nature of the Proposed Scheme in this location is such that there will be minimal intrusive works and low potential for impacts. Potential impacts on the water body will be Short-Term, Adverse and Negligible in magnitude resulting in impacts of Imperceptible significance.

13.4.4.3.2 Sluice_010

The proposed new cycle track and footpath and narrowing of road to accommodate these works at Airside Junction to Airport Roundabout have the potential to impact Sluice_010 as this section of the route crosses the

water body directly. The water body is culverted under the road, though is open within 10m of the route boundary, therefore there is potential for impacts such as increased runoff and sediment loading to the water body. These are anticipated to be Short-Term, Adverse and Small in magnitude resulting in impacts of Imperceptible significance.

Construction compound SW1 is proposed to be located north-east of Cloghran roundabout. Surface water drains in the R132 are understood to discharge to the Sluice_010 from this location. The proposed site is currently greenfield and has a gentle slope down to a footpath. There is no retaining wall. There is a risk that during site preparation rainfall events onto exposed soils could result in silty water runoff from the site to surface water drains in the road. There is also a risk that spillages of contaminants such as hydrocarbons could reach surface water drains across land. Potential impacts on the water body will be Short to Medium-Term, Adverse and of Medium magnitude, resulting in impacts of Slight significance.

#### 13.4.4.3.3 Mayne_010

There is potential to impact the Mayne_010 as a result of the Proposed Scheme. Despite the fact that the proposed works are not major as they are within the existing boundary and do not involve any excavation or filling works (i.e. at grade works), the water body is directly crossed by the Proposed Scheme as it is culverted under the road. Potential impacts will be Short-Term, Adverse and Small in magnitude resulting in impacts of Imperceptible significance.

Construction compound SW2 is proposed to be located at the Collinstown Cross. Surface water drains at this junction are understood to discharge to the Mayne_010. The proposed site is currently a mix of made ground and grassland, with some trees present. There is no retaining wall. There are surface water drains in the road in close proximity to the site. There is a risk that during site preparation rainfall events onto exposed soils could result in silty water runoff from the site to surface water drains in the road. There is also a risk that spillages of contaminants such as hydrocarbons could reach surface water drains across land. Potential impacts on the water body will be Short to Medium-Term, Adverse and of Medium magnitude, resulting in impacts of Slight significance.

#### 13.4.4.3.4 Santry_010

The proposed works in Section 2 are not intrusive but have the potential for impacts on the Santry_010. The water body is culverted under the existing route, and with the water body open upstream and downstream of this crossing, there is potential for sediment runoff from earth works. Potential impacts will be Short-Term and Small in magnitude resulting in impacts of Imperceptible significance.

There are some more intrusive works proposed in Section 3 south of the water body. Surface water sewers in this area discharge to the Santry_010. Land take and earthworks due to the extension of bus and cycle tracks may lead to silty water runoff to storm drains Potential impacts will be Short Term, Adverse and Small magnitude resulting in impacts of Imperceptible significance.

Construction compound SW3 is proposed to be located at Coolock Lane. Surface water drains here are understood to discharge to the Santry_010. The proposed site is currently greenfield and slopes down to the surface water drains in the R104. There is no retaining wall. There are surface water drains in the road in close proximity to the site. There is a risk that during site preparation rainfall events onto exposed soils could result in silty water runoff from the site to surface water drains in the road. There is also a risk that spillages of contaminants such as hydrocarbons could reach surface water drains across land. Potential impacts on the water body will be Short to Medium-Term, Adverse and of Medium magnitude, resulting in impacts of Slight significance.

#### 13.4.4.3.5 Tolka_060

The proposed works in Section 4 are relatively minor and not intrusive. As for the other water bodies in this section, there is potential for impacts because the Proposed Scheme crosses the Santry_010 and surface water sewers in the southern part of Section 2 discharge to it. Potential impacts will be Short-Term, Adverse and Small magnitude resulting in impacts of Moderate to Slight significance.

Construction Compound SW4 is proposed to be located at the Collins Avenue. Surface water drains at this junction are understood to discharge to the Tolka_060. The proposed site appears to have been cleared in preparation for development. To the north and west, the site is bounded by a high retaining wall; to the south and east there are high earth embankments most likely created when the site was cleared. There are surface water drains in the road in close proximity to the site. There is a risk that during site preparation rainfall events onto exposed soils could result in silty water runoff from the site to surface water drains in the road. There is also a risk that spillages of contaminants such as hydrocarbons could reach surface water drains across land. The retaining walls and earth embankments reduce the likelihood of these impacts occurring; the greatest risk will be at the site entrance as there are surface water drains in the road at this location. Potential impacts on the water body will be Short to Medium-Term, Adverse and of Small magnitude, resulting in impacts of Moderate to Slight significance.

It is proposed to construct a parallel bridge alongside the existing Frank Flood Bridge for pedestrians and cyclists to use. Full details of the construction method are included in Chapter 5 (Construction). To the south of the water body, the bridge will be supported by concrete piles, positioned high up the river bank to allow for flood flows. It is also proposed to provide a short section of scour protection at the toe of the embankment to the north of the river. Potential impacts could arise from the installation of the piles, the bridge and the construction of the scour protection. These activities are both in-stream and near to stream activities. Potential impacts will be Short-Term, Adverse and Medium in magnitude resulting in Very Significant impacts.

In addition, existing services under the river will be diverted. This includes oil filled high voltage cables which are sensitive to ground disturbance. The section of existing oil filled cables along the length of the proposed HDD duct installation will be cut at each end, capped and left as redundant cables in situ by ESB following commissioning of the replacement cables (in consultation with the Appointed Contractor). New electrical cables will be installed in the new ducts beneath the river between two joint bays and transition joints used to join the oil filled cables to the new electrical cables. A new standalone oil line will be installed in the duct with the new electrical cables to allow the oil to continue to perform its function in cooling the remaining existing oil filled cables at either side of the new river crossing. The ducting installed by HDD will be continuous welded HDPE which provides protection to the water body should any leak arise.The methods proposed for installation mean that the cables will be capped some distance from the water body and so risk of an accidental release reaching the water body will be minimised. However, there is a risk that a leak from the new ‘oil line’ or existing cables could result in impacts on the Tolka_060; there is evidence (EPA, 2020) of leaks occurring from some ESB oil filled cables in Dublin over the past 20 years. In addition, if any leakage has occurred, works to the banks either side of the river could create potential pathways for pollutants to the water body. Potential impacts will be Medium-Term, Adverse and Large magnitude impacts resulting in Profound impacts.

The diverted services are to be installed under the river through drilled ducts. All water and slurry generated is received back at the slurry recirculation unit where solids are removed from the slurry and the useful slurry is reused as drilling fluid to provide lubrication for the drilling process. The drilling operation still poses some risk to the water body in the event of a ‘breakout’ of the drilling muds used in the process. Potential impacts will be Short-Term, Adverse and Large magnitude impact, resulting in Profound impacts.

Construction compound SW5 is proposed to be located at the crossing of the Tolka_060. The site is on the banks of the Tolka_060 and slopes towards the water body. There is a risk that during site preparation rainfall events onto exposed soils could result in silty water runoff from the site to the water body. There is also a risk that spillages of contaminants such as hydrocarbons could reach the water body across land. These risks are limited somewhat by the low retaining wall at the site, however this will be removed in sections where access to the water body is required to facilitate construction. Potential impacts on the water body will be Short to Medium-Term, Adverse and of Large magnitude, resulting in Profound impacts.

South of the Tolka_060, in Section 5, very limited works are proposed. Although a short section of surface water sewers in this location discharge to the Tolka_060 the nature of the proposed works is such that any potential impacts will be Short-Term, Adverse and of Negligible magnitude resulting in impacts of Imperceptible significance.

13.4.4.3.6 Tolka Estuary

Oil pollution from the diversion of the cables could have downstream impacts on the Tolka Estuary. Oil disperses in a very thin layer across water and a small amount can cover a large area. Should an oil spill occur, an assumed oil slick depth of approximately 5mm has been used to determine the likelihood of it reaching the estuary. In order for a 5mm slick to cover the river all the way to the estuary, which is 600m downstream of the bridge works, a minimum of 40 litres of oil would need to be spilled into the river. ESB's reporting to the EPA does not cite either the 220kV cable which passes under the river or the 38kV cable which is in the existing bridge structure, as having leaked, however where leaks occur they can be at a rate of 150 to 200 litres per month. This means that there is potential for a large volume of oil to be leaked during the construction process which could reach the estuary. There would be some dispersion and emulsification by the time it reached the estuary so the impacts, whilst Adverse, would be most likely Short-Term and of Medium magnitude, resulting in a Moderate to Very Significant impact.

13.4.4.3.7 Royal Canal Main Line (Liffey and Dublin Bay)

For a short distance south of the Frank Flood Bridge, surface water discharges to a combined sewer. There are no direct connections to the Royal Canal. Proposed works close to the canal to the north, where overland flows could impact the water body, are very limited in nature. More intrusive works are a proposed south of the canal and within 100m of it, however the road slopes down from the bridge over the canal and so it is unlikely any overland flows would reach the canal. Impacts are therefore predicted to be Short-Term, Adverse and Negligible. This would lead to an Imperceptible significance of impact.

### 13.4.4.4 Summary of Construction Phase Impacts

**Table 13.15: Summary of Predicted Construction Phase Impacts on water bodies within the Study Area.**

| Water Body Name | Project Activity | Predicted Impacts | | | |
|---|---|---|---|---|---|
| | | Description of Impacts | Sensitivity of Receptor | Magnitude of Impacts | Significance of Effects |
| Ward_040 | Junction upgrades; roundabout reconfiguration | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Medium | Negligible | Adverse<br>Imperceptible<br>Short-Term |
| Sluice_010 | New cycle tracks, footpaths and road narrowing | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel, spills). | Low | Small Adverse Short-term | Adverse<br>Imperceptible<br>Short-Term |
| Sluice_010 | Construction Compound SW1 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Low | Medium | Adverse<br>Slight<br>Short-Term |
| Mayne_010 | Junction upgrades, road widening and associated works | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills) | Low | Small Adverse Short-term | Adverse<br>Moderate to Slight<br>Short-Term |
| Mayne_010 | Construction Compound SW2 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Low | Medium | Adverse<br>Slight<br>Short to Medium-Term |
| Santry_010 | Road widening and associated works (Old Airport Road to Coolock Lane Junction) | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills) | Low | Small Adverse Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Santry_010 | Construction Compound SW3 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Low | Medium | Adverse<br>Slight<br>Short to Medium-Term |

| Water Body Name | Project Activity | Predicted Impacts | | | |
|---|---|---|---|---|---|
| | | Description of Impacts | Sensitivity of Receptor | Magnitude of Impacts | Significance of Effects |
| Tolka_060 | Road widening / new bridge and associated works<br>ESB Cable diversion | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills from working near the channel etc.).<br>• In-stream works altering flow regimes etc. | High | Large | Adverse<br>Profound<br>Medium-Term |
| Tolka_060 | Construction compound SW4 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | High | Medium | Adverse<br>Very significant<br>Short to Medium-Term |
| Tolka_060 | Construction compound SW5 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Very High | Large | Adverse<br>Very Significant<br>Short to Medium-Term |
| Tolka Estuary | Frank Flood Bridge – diversion of ESB cables | • Anthropogenic sources (fuel spills). | Very High | Small | Adverse<br>Significant<br>Short-Term |
| Royal Canal | Junction upgrades, road widening and associated works | • Increased surface water runoff;<br>• Increased sediment in runoff. | High | Negligible | Adverse<br>Imperceptible<br>Short-Term |

## 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 side roads 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 – Surface Water Runoff

Assessments for each receptor are provided below, with a summary of impacts provided in Table 13.16.

13.4.5.2.1 Ward_040

An increase in impermeable area of 1,739m2 is proposed. This equates to a 0.05% increase in the catchment overall. This is proposed to be attenuated using an attenuation tank. No 'soft' SuDS (swales, tree pits, ponds etc) are proposed. There will be no net increase in runoff rates, however there would be an increase in overall volumes of surface water being discharged. This could lead to impacts on hydrology, water quality and geomorphology. The restricted rate of runoff will prevent impacts connected to flow; the attenuation tank will also lead to a certain

level of treatment, mainly through facilitating the settlement of suspended solids. Potential impacts will be Permanent, Adverse and of Negligible magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.2 Sluice_010

An increase in impermeable area of 5,264m$^2$ is proposed. This equates to a 0.13% increase in impermeable area within the existing boundary of the catchment. An increase in impermeable area will result in an increase in the rate and amount of runoff to the receiving watercourse. This can change flow regimes and morphology of the watercourse as well as potentially increasing flood risk downstream if there is no mitigation. The increase in runoff can also result in an increased pollution load in the watercourse as sediment and other contaminants are carried to the watercourse through the drainage system.

However, swales and a dry detention basin is proposed to restrict runoff rates. They will also provide some level of treatment for water quality. Potential impacts will be Permanent, Beneficial and of Negligible magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.3 Mayne_010

An increase in impermeable area of 4,065m$^2$ is proposed. This equates to an increase of 0.07% in the catchment overall. Runoff rates will be restricted to existing rates through the use of attenuation tanks and oversized pipes. No 'soft' SuDS (swales, tree pits, ponds etc) are proposed. There will be no net increase in runoff rates, however there would be an increase in overall volumes of surface water being discharged. This could lead to impacts on hydrology, water quality and geomorphology. The restricted rate of runoff will prevent impacts connected to flow; the oversized pipe and attenuation tank will also lead to a certain level of treatment, mainly through facilitating the settlement of suspended solids. Potential impacts will be Permanent, Adverse and of Negligible magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.4 Santry_010

An increase in impermeable area of 6,219m$^2$ is proposed. This equates to a 0.07% increase in the impermeable area in the catchment. Runoff rates will be restricted through the use of oversized pipes and a dry detention basin. No 'soft' SuDS (swales, tree pits, ponds etc) are proposed. There will be no net increase in runoff rates, however there would be an increase in overall volumes of surface water being discharged. This could lead to impacts on hydrology, water quality and geomorphology. The restricted rate of runoff will prevent impacts connected to flow; the oversized pipes and attenuation tank will also lead to a certain level of treatment, mainly through facilitating the settlement of suspended solids. Potential impacts will be Permanent, Adverse and of Negligible magnitude, resulting in an impact of Imperceptible significance.

13.4.5.2.5 Tolka_060

An increase in impermeable area of 4,340m$^2$is proposed. This equates to a 0.01% increase in the impermeable area in the catchment. Runoff rates will be restricted to existing rates largely through the use of oversized pipes. No 'soft' SuDS (swales, tree pits, ponds etc) are proposed. There will be no net increase in runoff rates, however there would be an increase in overall volumes of surface water being discharged. This could lead to impacts on hydrology, water quality and geomorphology. The restricted rate of runoff will prevent impacts connected to flow; the oversized pipes will also lead to a certain level of treatment, mainly through facilitating the settlement of suspended solids. Potential impacts will be Permanent, Adverse and of Negligible magnitude, resulting in an impact of Imperceptible significance.

The bank reprofiling and scour protection works at the Frank Flood Bridge have the potential for permanent impacts on the hydromorphology of the water body, however given the existing nature of the water body in this location, where it is highly channelised, it would have a low sensitivity to change of this nature. Potential impacts will be Short-Term, Adverse and of Negligible magnitude, resulting in impacts of Imperceptible significance.

13.4.5.2.6 Royal Canal Main Line (Liffey and Dublin Bay)

There is no potential for significant impact on the Royal Canal from the Proposed Scheme, as there is no direct hydrological connection to this water body and therefore no pathway for pollutants or increased surface water runoff.

13.4.5.2.7 Liffey Estuary Upper

With increased impermeable area, there is potential increased surface water to enter the combined sewer systems and result in impacts on the Liffey Estuary Upper as a result of increased frequency of operation of SWOs and volumes of wastewater being discharged. The increase in impermeable area is, however, very small in this section of the Proposed Scheme. In addition, attenuation is provided, which means there would be a Permanent, Adverse impact of Negligible magnitude. This would result in impacts of Imperceptible significance.

### 13.4.5.3 Summary of Operational Phase Impacts

**Table 13.16: Summary of Potential Operational Phase Impacts on Water Bodies within the Study Area**

| WFD Water Body Name | Project Activity | Predicted Impacts | | | |
|---|---|---|---|---|---|
| | | Description of Potential Impacts | Sensitivity of Receptor | Magnitude of Impacts | Significance of Impacts |
| Ward_040 | Increase in impermeable area draining to the water body.<br>Installation of SUDS | • Increase in volumes of surface water<br>• Increased settlement of solids<br>• No net increase in runoff rates | Moderate | Negligible | Permanent<br>Adverse<br>Imperceptible |
| Sluice_010 | Increase in impermeable area draining to the water body; use of biological SuDS. | • No net increase in runoff rates<br>• Increase in volumes of surface water<br>• Increased settlement of solids<br>• Increased treatment via swales | Low | Negligible | Beneficial<br>Imperceptible<br>Permanent |
| Mayne_010 | Increase in impermeable area draining to the water body.<br>Installation of SuDS. | • No net increase in runoff rates<br>• Increase in volumes of surface water<br>• Increased settlement of solids. | Low | Negligible | Adverse<br>Imperceptible<br>Permanent |
| Santry_010 | Increase in impermeable area draining to the water body.<br>Installation of SuDS. | • No net increase in runoff rates<br>• Increase in volumes of surface water<br>• Increased settlement of solids | Low | Negligible | Beneficial<br>Imperceptible<br>Permanent |
| Tolka_060 | Increase in impermeable area draining to the water body Installation of SuDS. | • No net increase in runoff rates<br>• Increase in volumes of surface water<br>• Increased settlement of solids | High | Negligible | Adverse<br>Imperceptible<br>Permanent |
| Tolka_060 | Bank reprofiling and scour protection works. | • Hydromorphological changes to river banks | High | Negligible | Adverse<br>Imperceptible<br>Short-Termt |
| Royal Canal | Increase in impermeable area draining to the water body. | • No impacts predicted | High | N/A | N/A |
| Liffey Estuary Upper | Increase in impermeable area draining to the water body. | • Potential for increased operation of surface water overflows to the Liffey Estuary Lower as a result of increased surface water flows. | High | Negligible | Adverse<br>Imperceptible<br>Permanent |

#### 13.4.5.4 Assessment of Potential Impacts – Traffic Redistribution

Surface water drainage on the route of the Proposed Scheme will continue to discharge to existing catchments; a reduction in traffic numbers along this route is anticipated and it would lead to a reduction in the routine contaminants discharging to the Ward_040, Mayne_010, Santry_010, Sluice_010, Tolka_060 and the Royal Canal Main Line.

Traffic modelling (see Chapter 6 (Traffic & Transport)) was carried out for two scenarios, Do Minimum and Do Something, for the years 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 seven locations AADTs were predicted to increase to above 10,000 in both the 2028 and 2043 Do Something scenarios. Details of these locations are presented in Table 13.17.

**Table 13.17: Road Sections Where Traffic Flows Have Increased >10,000 in 2028 and/or 2043**

| Road Name | A_B (GIS) | Length of Section (km) | 2028 Do Minimum | 2028 Do Something | % Increase | 2043 Do Minimum | 2043 Do Something | % Increase | Closest Existing Drainage Route | Likely Change in Drainage Catchment | Significant Impact? |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R125, Nevinstown West | 37743_37695 | 0.538 | 7708 | 10340 | 34 | 7931 | 10830 | 37 | Ward_040 | No | No |
| Oscar Traynor Road | 13462_13389 | 0.264 | 9754 | 11475 | 18 | 10217 | 11925 | 17 | Santry_010 | No | No |
| Collins Avenue Extension | 18370_18371 | 0.409 | 4426 | 10131 | 129 | 5837 | 10522 | 80 | Santry_010 | No | No |
| Parnell St | 2119_2451 | 0.12 | 8814 | 10221 | 16 | 8445 | 9618 | 14 | Ringsend WwTP | No | No |
| Summerhill Parade | 2231_2371 | 0.27 | 11209 | 12015 | 7 | 9984 | 10671 | 7 | Ringsend WwTP | No | No |
| North Strand Road | 2101_2224 | 0.115 | 10467 | 10716 | 2 | 9974 | 10095 | 1 | Ringsend WwTP | No | No |

#### 13.4.5.5 Summary of Flood Risk Assessment

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

##### 13.4.5.5.1 Pluvial Flooding

There is a risk of pluvial flooding along the entire Swords Scheme. This is a function of the capacity of the existing surface water network, which is typically designed to contain a 20% AEP storm. It is beyond the scope of the Swords Scheme to increase the capacity of the existing surface water network.

The Proposed Scheme will result in the creation of additional impermeable surfaces for local sections of road widening. SuDS measures have been implemented to ensure that there is no change in existing runoff rates as a consequence of the scheme. This will ensure no increase in the risk of pluvial flooding.

##### 13.4.5.5.2 Fluvial Flooding

The Proposed Scheme is at risk from fluvial flooding from Cuckoo Stream, Mayne River, Santry River and River Tolka.

The Proposed Scheme will not affect any of the existing bridges or culverts on the Cuckoo Stream, Mayne River and Santry River where they cross the scheme. In these locations, the proposed works typically comprise reorientation of the existing highway. It is not possible to raise the level of the highway to reduce the existing level of flood risk. It is also beyond the scope of the Proposed Scheme to implement a wider flood relief scheme for the

Cuckoo Stream, Mayne River or Santry River to reduce the risk of fluvial flooding from the watercourses. No works are undertaken to change the level of the road or adjacent lands that will impact the floodplain and any associated storage for any of these watercourses.

At the existing Frank Flood Bridge crossing of the River Tolka, a new bridge has been proposed upstream of the existing crossing (with the existing bridge retained). Qualitative and quantitative analysis completed for a Stage 3 Assessment carried out show that the proposed bridge will not impact on flood levels for the River Tolka. This is because the flow area and soffit levels of the existing Frank Flood Bridge are significantly less and below those proposed for the new bridge respectively. This will mean that in a flood, flows will continue to be backed-up by the existing Frank Flood Bridge when its existing soffit levels are reached before the new bridge could have any hydraulic effect.

#### 13.4.5.5.3 Climate Change

Increased rainfalls depths and intensities will increase the risk of pluvial flooding from the existing surface water drainage network. New drainage measures which installed as part of the scheme, including any SuDS, are designed to allow for future climate change.

There will be an increased risk of fluvial flooding to the Proposed Scheme as a consequence of climate change. As noted, it is not possible to reduce the current risk of fluvial flooding to the Proposed Scheme as the existing road levels need to be maintained. The Proposed Scheme will not exacerbate the impacts of climate change on the risk of fluvial flooding.

The impact of climate change on coastal flooding is not applicable to the Proposed Scheme as the current and future risk is low.

A Stage 3 Detailed Risk Assessment was considered necessary at the Frank Flood Bridge over River Tolka due to the construction of a new bridge upstream of it. Results show that there will be no change in flood risk patterns or processes as consequence of the Proposed Scheme.

## 13.5 Mitigation and Monitoring Measures

### 13.5.1 Introduction

This Section sets out the measures envisaged to avoid, prevent or reduce any significant adverse impacts on the environment identified in Section 13.4 and, where appropriate, identifies any proposed monitoring of the efficacy of implementing those mitigation measures. This Section covers both the Construction and Operational Phases. Construction 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 Appendix A5.1 CEMP 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, 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:

- A requirement for a Pollution Incident Response Plan;
- Construction Compounds 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; and
- Monitoring.

#### 13.5.2.2 Site Specific Mitigation Measures

Following implementation of the mitigation measures outlined in the SWMP within Appendix A5.1 CEMP in Volume 4 of this EIAR, the majority of impacts will be Not Significant. However, additional measures will be required for protection of water bodies at Construction Compound locations and at the installation of the new bridge alongside the existing Frank Flood Bridge crossing the Tolka_060 and the associate diversion of ESB oil filled cables, which together have the potential to result in Medium-Term, Very Significant adverse impacts on the water body.

13.5.2.2.1 Construction Compounds

Construction compounds SW1, 2 and 3 are on similar sites and have similar levels of risk associated with them. The general measures for Construction Compounds will apply, however additional measures are required to prevent overland flow of silty water and hydrocarbons to surface water drains. Site fencing will include a silt fence for the perimeter of the site to prevent overland flows. Surface water drains at access points will be covered.

Construction compound SW4 is on a cleared development site. It is only a risk at the access to the site. The surface water drain in the road on Collins Avenue at the entrance to the compound will be covered.

Construction compound SW5 is on the south bank of the Tolka_050 and has direct and short connection to the water body over land. The existing short retaining wall will be kept in situ in so far as is reasonably practicable. Where it is removed, mitigation measures as described for the Frank Flood Bridge will be used to help control pollution pathways from the Construction Compound. Fuel will be stored as far from the water body as is reasonably practicable within the site and be on an impervious base. Where any spillages of oil onto permeable ground occur, the contaminated ground will be removed and disposed of off site by a licensed carrier.

13.5.2.2.2 Frank Flood Bridge

Full details of the construction of the bridge are provided in Chapter 5 (Construction) in Volume 2 of this EIAR. Of note to this chapter is the following method of installation:

A temporary platform / pontoon will be erected within the river channel to facilitate construction. The platform / pontoon will be located immediately upstream of the existing bridge. To ensure no increased in flood risk, the following mitigation measures will be put in place:

- Works will be undertaken from 1st July to 30th September when flows are expected to be at their lowest. This restriction also aligns with ecological restrictions on the works due to Salmon and Kingfisher habitats; and
- The platform/pontoon (which will be required for two seasons between 1st July and 30th September) will be designed so that it can be removed from the channel at short notice in the event of anticipated increase in river water levels, prolonged heavy rainfall or a flood warning.

Historical records from the existing gauging station at Drumcondra (ref 9019) will be reviewed to identify potential rate of change of flows in the river to inform the design of the Pontoon and the methods required to remove it in the event of a flood.

This approach will limit to the potential for impacts on water quality as well as flood risk and ecology.

Bridge abutments will be installed from the north and south banks of the water body and from the pontoon. Specific measures to protect the water body will be implemented as follows:

- Diversion away from working areas using sandbags (or similar) of flow into the middle and northern or southern channel of the existing bridge (depending on which bank is being worked on), allowing a dry space within which works can be carried out on the embankment; and
- Install a silt fence across the northern or southern channel to ensure no silty water runoff downstream in the event of rain.

In-channel and river bank working general principles will also apply as follows:

- All necessary consents will be obtained from the relevant regulator (such as IFI, OPW or the local authority), as appropriate; Bank stabilisation and erosion protection will be designed in consultation with the Inland Fisheries Ireland (IFI), Office of Public Works and National Parks & Wildlife Service (NPWS);
- All construction machinery operating within proximity to any water body will be mechanically sound to avoid leaks of oils, hydraulic fluid, etc. Machinery will be cleaned and checked prior to commencement of works;
- The area of disturbance of the watercourse bed and bank will be the absolute minimum required for the installation of the structure;
- While dewatering is not anticipated dewatering flows will be directed to a settlement pond (or other) treatment system;
- Any banks affected during construction works near a watercourse will be reinstated back to pre-development conditions as far as practicable, recognizing the re-profiling of the banks in this location; and

- Any bank-side clearance in the immediate area of the crossing will be kept to a minimum and adequate measures will be put in place to control or minimize the risk of siltation. This may include such measures as:
    - Bunding and diversion of site runoff to settlement ponds,
    - Stripping of topsoil. See Soils in A Guide to Landscape Treatments for National Road Schemes in Ireland (National Roads Authority, 2005), and where necessary, surfacing of site with granular material; and
    - Covering of temporary stockpiles.

Concrete piling:

- Monitoring of the alkalinity of water downstream by testing the PH levels will be implemented concurrently to the works to check for impacts of concrete 'washout' or spills.

For the Horizontal Directional Drilling (HDD) under the Tolka_060 to install three ducts for the diversion of services:

- A drilling Slurry Management Plan will be implemented by the Appointed Contractor and all additives proposed will be biodegradable, chemically inert and non-hazardous to aquatic life;
- A slurry recirculation unit will be utilised, and careful monitoring and management of such a unit can determine if any loss of slurry volume is experiences during the works; and
- The Slurry Management Plan will include an Incident Response Plan to be implemented in the event of a loss of drilling fluids; and

For the diversion of ESB oil filled cables:

The section of existing oil filled cables along the length of the proposed HDD duct installation will be cut at each end, capped and left as redundant cables in situ by ESB following commissioning of the replacement cables (in consultation with the Appointed Contractor). New electrical cables will be installed in the new ducts beneath the river between two joint bays and transition joints used to join the oil filled cables to the new electrical cables. A new standalone oil line will be installed in the duct with the new electrical cables to allow the oil to continue to perform its function in cooling the remaining existing oil filled cables at either side of the new river crossing. The ducting installed by HDD will be continuous welded HDPE which provides protection to the water body should any leak arise.

For the existing cables either side of the water body, a ground investigation, where construction works are to take place near to the ESB oil-filled cable will be carried out prior to construction commencing. Following this appropriate mitigation measures will be confirmed and deployed, which could for example result in the removal of all contaminated material from site as outlined in Chapter 14 (Land & Soils). Any hazardous material to be removed from site will be removed in accordance with measures outlined in Chapter 18 (Waste & Resources).

A summary of predicted impacts following mitigation measures is provided in Table 13.18.

**Table 13.18: Summary of Potential Construction Phase Impacts, Following the Implementation of Mitigation Measures**

| Water Body Name | Project Activity | Predicted Impacts | | |
|---|---|---|---|---|
| | | Description of Impacts | Significance of Effects (Pre Mitigation and Monitoring) | Significance of Effects (Post Mitigation and Monitoring) |
| Ward_040 | Junction upgrades; roundabout reconfiguration | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Imperceptible<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Sluice_010 | New cycle tracks, footpaths and road narrowing | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel, spills). | Adverse<br>Imperceptible<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |

| Water Body Name | Project Activity | Predicted Impacts | | |
|---|---|---|---|---|
| | | Description of Impacts | Significance of Effects (Pre Mitigation and Monitoring) | Significance of Effects (Post Mitigation and Monitoring) |
| Sluice_010 | Construction Compound SW1 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Slight<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Mayne_010 | Junction upgrades, road widening and associated works | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills) | Adverse<br>Moderate to Slight<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Mayne_010 | Construction Compound SW2 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Slight<br>Short to Medium-Term | Adverse<br>Imperceptible<br>Short-Term |
| Santry_010 | Road widening and associated works (Old Airport Road to Coolock Lane Junction) | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Imperceptible<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Santry_010 | Construction Compound SW3 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Moderate to Slight<br>Short to Medium-Term | Adverse<br>Imperceptible<br>Short-Term |
| Tolka_060 | Road widening / new bridge and associated works<br>ESB Cable diversion | • Increased surface water runoff;<br>• Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills from working near the channel etc.).<br>• In-stream works altering flow regimes etc. | Adverse<br>Profound<br>Medium-Term | Adverse<br>Imperceptible<br>Short-Term |
| Tolka_060 | Construction compound SW4 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Significant<br>Short to Medium-Term | Adverse<br>Imperceptible<br>Short-Term |
| Tolka_060 | Construction compound SW5 | • Increased sediment in runoff;<br>• Anthropogenic sources (fuel spills). | Adverse<br>Profound<br>Short to Medium-Term | Adverse<br>Imperceptible<br>Short-Term |
| Tolka Estuary | Frank Flood Bridge – diversion of ESB cables | • Anthropogenic sources (fuel spills). | Adverse<br>profound<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |
| Royal Canal | Junction upgrades, road widening and associated works | • Increased surface water runoff;<br>• Increased sediment in runoff. | Adverse<br>Imperceptible<br>Short-Term | Adverse<br>Imperceptible<br>Short-Term |

### 13.5.3 Operational Phase

Mitigation for the Operational Phase has been built into the design of the Proposed Scheme and is detailed in Section 13.4.1. No additional mitigation is required.

In the Operational Phase the infrastructure (including the maintenance regime for SuDS) will be carried out by the Local Authorities and will be subject to their management procedures.

A summary of predicted impacts following mitigation measures is provided in Table 13.19.

**Table 13.19: Summary of Potential Operational Phase Impacts, Following the Implementation of Mitigation Measures**

| WFD Water Body Name | Project Activity | Predicted Impacts | | |
|---|---|---|---|---|
| | | Description of Potential Impacts | Significance of Impacts (Pre Mitigation) | Significance of Impacts (Post Mitigation) |
| Ward_040 | Increase in impermeable area draining to the water body | • Increased surface water run off;<br>• Increased sediment in run off;<br>• Anthropogenic sources (fuel etc);<br>• Increased scouring of watercourse. | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Sluice_010 | Increase in impermeable area draining to the water body; use of biological SuDS | • Increased surface water run off;<br>• Reduced sediment in run off;<br>• Reduced level of contamination from Anthropogenic sources (fuel etc); | Beneficial Imperceptible Permanent | Beneficial Imperceptible Permanent |
| Mayne_010 | Increase in impermeable area draining to the water body | • Increased surface water run off;<br>• Increased sediment in run off;<br>• Anthropogenic sources (fuel etc);<br>• Increased scouring of watercourse. | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Santry_010 | Increase in impermeable area draining to the water body | • Increased surface water run off;<br>• Reduced sediment in run off;<br>• Reduced level of Anthropogenic sources (fuel etc); | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Tolka_060 | Increase in impermeable area draining to the water body | • Increased surface water run off;<br>• Increased sediment in run off;<br>• Anthropogenic sources (fuel etc);<br>• Increased scouring of watercourse. | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Tolka_060 | Bank reprofiling and scour protection works | • Hydromorphological changes to river banks. | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Tolka_060 | Diversion of ESB cables under the water body | • Potential for leaks from the cables – mitigated by design. | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |
| Royal Canal | Increase in impermeable area draining to the water body | • No impacts predicted | N/A | N/A |

| WFD Water Body Name | Project Activity | Predicted Impacts | | |
|---|---|---|---|---|
| | | Description of Potential Impacts | Significance of Impacts (Pre Mitigation) | Significance of Impacts (Post Mitigation) |
| Liffey Estuary Upper | Increase in impermeable area draining to the water body | • Potential for increased operation of surface water overflows to the Liffey Estuary Lower as a result of increased surface water flows | Adverse Imperceptible Permanent | Adverse Imperceptible Permanent |

## 13.6 Residual Impacts

### 13.6.1 Construction Phase

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

### 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.

### 13.6.3 Summary of WFD Assessment

The full WFD Assessment is in Appendix A13.1 (WFD Compliance Assessment) in Volume 4 of this EIAR. A summary is provided here for ease of reference.

#### 13.6.3.1 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 (Table 13.20).

**Table 13.20: 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 Good Ecological Status (GES) or Good Ecological Potential (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 in 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 Article 4.8 and Article 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. 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*'.

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the Habitats Directive) 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 Natura Impact Statement (NIS). The NIS is a standalone document included in the planning application for the Proposed Scheme. It concludes that the Proposed Scheme will not lead to a deterioration in the features of any designated site. The Proposed Scheme is not considered to be a risk to designated habitats, and therefore, is compliant with the Habitats Directive.

Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC) (hereafter referred to as the Nitrates Directive) 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 Directive 2006/7/EC of the European Parliament and of the Council of 15 February 2006 concerning the management of bathing water quality and repealing Directive 76/160/EEC (hereafter referred to as the rBWD) 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 original directive. 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 BWD.

#### 13.6.3.2 Conclusion

Considering all requirements for compliance with the WFD, the Proposed Scheme will not cause a deterioration in status in any water body, and will not prevent it from achieving Good Ecological Status or Good Ecological Potential; there are no cumulative impacts with other developments; 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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EPA (2015), Advice Notes on current practice in the preparation of Environmental Impact Statement (EIS) and draft revised notes (September 2015) [Draft].

EPA (2018a). 09 Liffey and Dublin Bay Catchment Summary WFD Cycle 2.

EPA (2018b). Subcatchment Assessment, WFD Cycle 2, Catchment Liffey and Dublin Bay, Subcatchment Tolka_SC_020.

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