



## Chapter 16

# Water

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# 16. Water

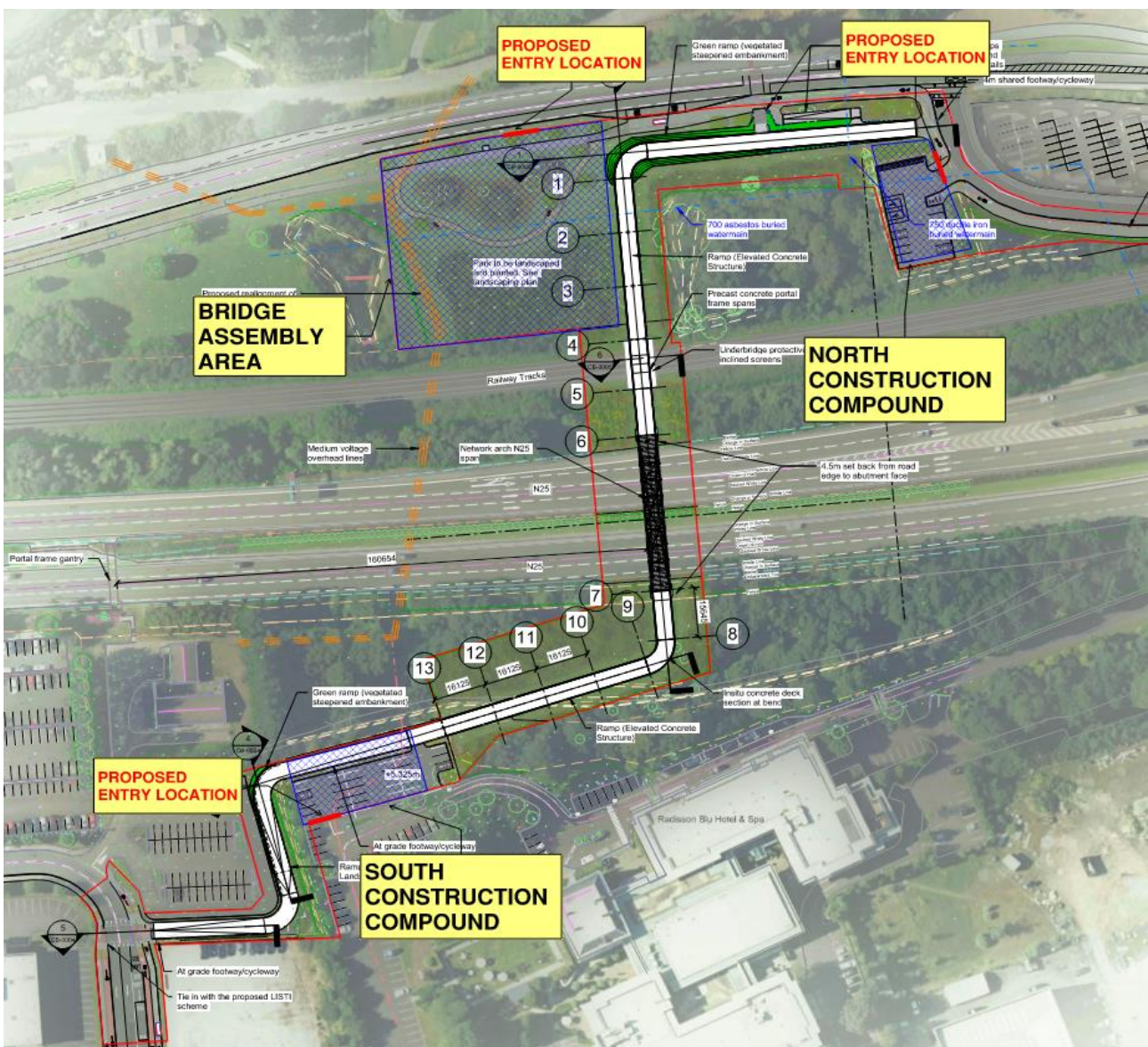
## 16.1 Introduction

This chapter of the EIAR presents the hydrological assessment of the Construction, Operation, and Decommissioning Phases of the Proposed Development, as described in **Chapter 4, Description of the Proposed Development** and **Chapter 5, Construction Strategy**. This chapter sets out the methodology used in the assessment, the baseline conditions, potential impacts, mitigation measures and residual impacts associated with the Proposed Development.

This chapter was prepared by Mesfin Desta. Mesfin's details, including relevant qualifications and experience, are included in **Chapter 1, Introduction**.

### 16.1.1 Characteristics of the Proposed Development

The Proposed Development, including the proposed temporary construction compounds and bridge assembly area, is illustrated in **Image 16.1**.



**Image 16.1: Extract of Proposed Development site layout, illustrating proposed construction compounds and bridge assembly area**

The proposed structure consists of a single span (approximately 49m) steel network arch structure over the N25, a 2 x 15m span precast segmental portal frame structure over the Irish Rail line, and access ramps to the north and south sides. The proposed bridge spans between the Eastgate Business Park (south access ramp) and the Little Island train station area (north access ramp). The proposed crossing will be approximately 460m long and the anticipated life span of the structure is 120 years, with the construction period lasting approximately 18 months.

## 16.2 Assessment Methodology

### 16.2.1 Study area

The study area is in Little Island Co. Cork, approximately 10km east of Cork City. The Proposed Development crosses the N25 dual carriageway and the Irish Rail line to the west of Little Island. The study area for this assessment has been set to extend to approximately 250m beyond the footprint of the Proposed Development as any significant impacts are considered to occur at local waterbodies at the stated offset. This distance is deemed adequate to capture all those waterbodies that will have direct hydrological connection to the works.

Any identified surface waterbodies within the study area have been considered as receptors including those classified under the Water Framework Directive (WFD), including riverine, transitional waterbodies, lakes, coastal waterbodies and non-WFD classified waterbodies.

Existing and proposed artificial drainage features such as Sustainable Drainage Systems (SuDS) have not been considered as receptors within the assessment.

### 16.2.2 Legislation and guidelines

This assessment has been undertaken in accordance with the Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022). The following additional guidance was also consulted during the preparation of this chapter:

- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009);
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (referred to as the FRM Guidelines) (DEHLG and OPW, 2009);
- The WFD Regulations, S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009;
- S.I. No. 108/1978 - Local Government (Water Pollution) Regulations, 1978;
- Number 1 of 1977 - The Local Government (Water Pollution) Act; and
- Number 21 of 1990 - Local Government (Water Pollution) (Amendment) Act, 1990.

### 16.2.3 Data collection and collation

Information on the baseline environment including hydrology, hydromorphology and the water quality of the receptors within the study area was collected and collated by means of a desk study.

**Table 16.1** lists the data sources which were reviewed as part of the desktop assessment.

**Table 16.1: Data sources**

Assessment Attribute	Title
General	<ul style="list-style-type: none"> <li>• Ordnance Survey Ireland (OSI)</li> <li>• Aerial photography (i.e., Google Earth, Google Maps)</li> </ul>
Surface Water Quality and Hydromorphology	<ul style="list-style-type: none"> <li>• EPA GIS Maps</li> </ul>

Assessment Attribute	Title
Hydrology	<ul style="list-style-type: none"> <li>Catchment Summaries</li> <li>EPA Hydrometric Data System</li> </ul>
Flood Risk	<ul style="list-style-type: none"> <li>OPW National Flood Information Portal (OPW, 2022)</li> </ul>

#### 16.2.4 Methodology for assessment of impacts

Significance criteria referenced have generally followed the EPA guidelines (EPA, 2022), unless stated otherwise.

The overall impact on surface water receptors (i.e., rivers, canals, transitional waterbodies, coastal waterbodies and lakes, as applicable) as a result of the Proposed Development was determined based on two parameters:

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

The sensitivity of surface water attributes to change are determined by a set of criteria including their relative importance or ‘value’ (i.e., whether features are of national, regional or local value).

##### 16.2.5.1 Sensitivity of receptors

**Table 16.2** outlines the criteria for estimating the sensitivity of surface water receptors (NRA, 2009), adapted to reflect WFD assessment guidelines (Environment Agency, 2016).

**Table 16.2: Criteria used to evaluate the sensitivity of surface water receptors**

Sensitivity	Criteria	Typical Example
<b>Extremely High</b>	Receptor (or receptor attribute) has a very high quality or value on an international scale	<ul style="list-style-type: none"> <li>Any WFD waterbody which is protected by European Union (EU) legislation (e.g., Designated European Sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)) or ‘Salmonid Waters’; and</li> <li>A waterbody 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.</li> </ul>
<b>Very High</b>	Receptor (or receptor attribute) has a high quality or value on an international scale.  Or  very high quality or value at a national scale	<ul style="list-style-type: none"> <li>Any WFD waterbody (specific EPA segment) which has a direct hydrological connection of &lt;2km to European Sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters);</li> <li>WFD waterbody ecosystem protected by national legislation (Natural Heritage Area (NHA) status);</li> <li>A waterbody that appears to be largely in natural equilibrium and exhibits a diverse range of morphological features (such as pools and riffles);</li> <li>There is a diverse range of fluvial processes present, with very limited modifications; and</li> <li>Nutrient Sensitive Areas.</li> </ul>
<b>High</b>	Receptor (or receptor attribute) has a moderate value at an international scale.  or  high quality or value on a national scale	<ul style="list-style-type: none"> <li>A WFD waterbody with High or Good WFD Status;</li> <li>A Moderate WFD Status (2022 - 2027) waterbody with some hydrological connection (&lt;2km) to European Sites or protected ecosystems of international status (SAC / SPA or Salmonid Waters) further downstream;</li> <li>WFD waterbody which has a direct hydrological connection to sites / ecosystems protected by national legislation (NHA status);</li> <li>A waterbody 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</li> </ul>

Sensitivity	Criteria	Typical Example
		<p>processes present, with very limited signs of modification or other anthropogenic influences; and</p> <ul style="list-style-type: none"> <li>• Direct hydrological connectivity to Nutrient Sensitive Areas.</li> </ul>
<b>Medium</b>	Receptor (or receptor attribute) has some limited value at a national scale	<ul style="list-style-type: none"> <li>• WFD waterbody with Moderate WFD Status (2022 - 2027);</li> <li>• WFD waterbody with limited (&gt;2km; &lt;5km) hydrological importance for sensitive or protected ecosystems (much further downstream);</li> <li>• A waterbody 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;</li> <li>• Evidence of historical channel change through artificial channel straightening and re-profiling; and</li> <li>• Some hydrological connection downstream Nutrient Sensitive Areas.</li> </ul>
<b>Low</b>	Receptor (or receptor attribute) has a low quality or value on a local scale	<ul style="list-style-type: none"> <li>• Waterbody with Bad to Poor WFD Status (2022 - 2027);</li> <li>• A WFD waterbody with &gt;5km (or no) hydrological connection to European Sites or national designated sites;</li> <li>• A non-WFD water feature with minimal hydrological importance to sensitive or protected ecosystems; and / or economic and social uses;</li> <li>• 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</li> <li>• Many existing pressures which are adversely affecting biodiversity.</li> </ul>

### 16.2.5.2 Magnitude of impacts

The scale or magnitude of potential impacts (both beneficial and adverse) depends on both the degree and the extent to which the Proposed Development may impact water bodies during the Construction, Operational and Decommissioning 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 the impacts of other existing and / or approved projects; and
- Possibility of effectively reducing the impacts.

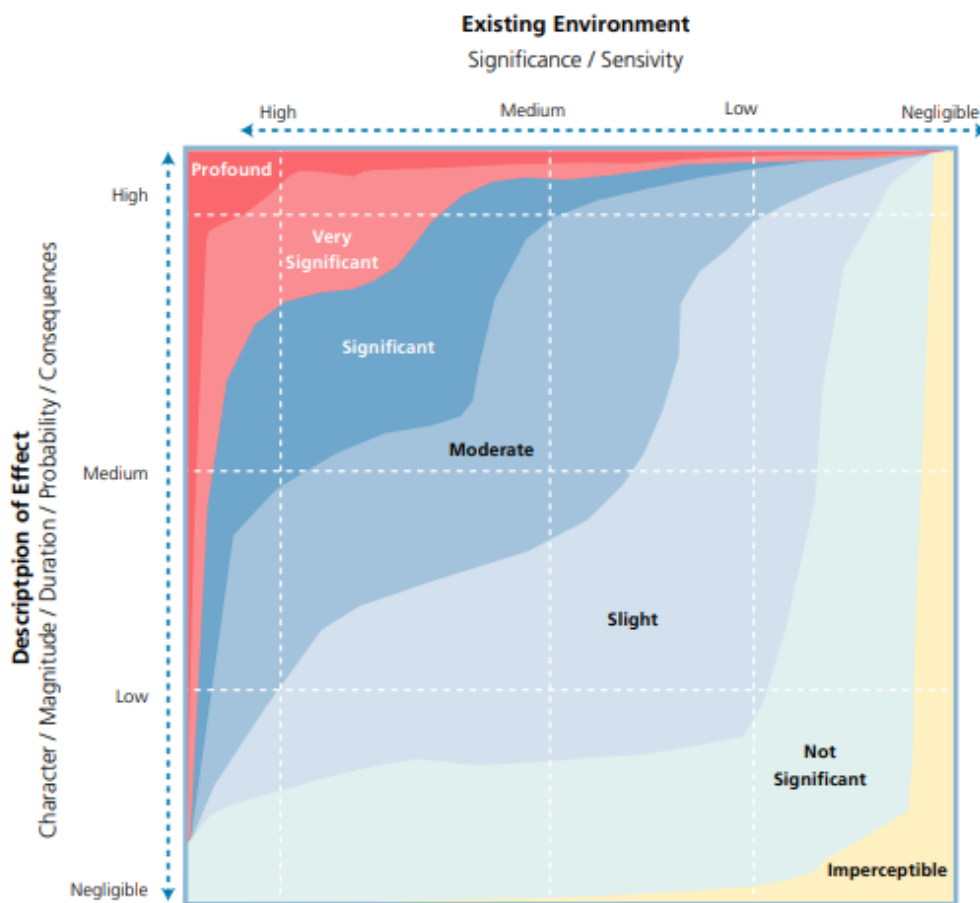
**Table 16.3** identifies a list of the criteria for determining the magnitude of impact on surface water receptors.

**Table 16.3: Criteria determining the magnitude of impact on surface water receptors (NRA, 2009)**

Magnitude of impact	Criteria
<b>Large Adverse</b>	Results in loss of receptor and / or quality and integrity of receptor.
<b>Moderate Adverse</b>	Results in impact on integrity of receptor or loss of part of receptor.
<b>Small Adverse</b>	Results in minor impact on integrity of receptor or loss of small part of receptor.
<b>Negligible</b>	Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.
<b>Small Beneficial</b>	Results in minor improvement of receptor quality.
<b>Moderate Beneficial</b>	Results in moderate improvement of receptor quality.
<b>Large Beneficial</b>	Results in major improvement of receptor quality.

**16.2.5.3 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 **Image 16.2**. Descriptions of the categories in the context of the water environment are outlined in **Table 16.4**.



**Image 16.2: Categories of environmental impacts (EPA, 2022)**

**Table 16.4: Descriptions of environmental impacts**

Impact Category	Description
<b>Profound</b>	An impact which obliterates sensitive characteristics
<b>Very Significant</b>	An impact which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment
<b>Significant Effects</b>	An impact which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
<b>Moderate Effects</b>	An impact that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
<b>Slight Effects</b>	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
<b>Not Significant</b>	An impact which causes noticeable changes in the character of the environment but without significant consequences
<b>Imperceptible</b>	An impact capable of measurement but without significant consequences

#### 16.2.5.4 Assessment limitations

No limitations were identified which had the potential to affect the conclusions of this chapter.

### 16.3 Baseline Environment

The baseline environment describes the existing waterbodies within the study area as identified and categorised under the Second Cycle River Basin Management Plan (RBMP) 2018-2021 (Government of Ireland, 2018) and reported by the EPA. The RBMP categorises significant pressures impacting waterbodies and identifies measures and actions aimed at addressing each at the sub-catchments. It should be noted that at the time of writing, the Third Cycle RBMP for Ireland 2022-2027 (Government of Ireland, 2022) is still in draft form, with the finalised plan yet to be published.

An illustration of the baseline surface water area surrounding the Proposed Development site is presented in **Figure 16.1** in **Volume 3** of this EIAR.

#### 16.3.1 Hydrometric area

The Proposed Development site is in Hydrometric Area 19 (Lee, Cork Harbour and Youghal Bay), within the WFD sub-catchment of Tibbotstown\_SC\_010. The WFD risk status of the Tibbotstown\_010 WFD sub-catchment is under ‘review’ due to its unassigned status. However, urban runoff and urban wastewater are known pressures from existing surface water drainage systems within the sub-catchment.

#### 16.3.2 Existing surface water and foul water drainage system

The main surface water drainage system directly connected to the Proposed Development is the Kilcoolishal Stream. The Kilcoolishal Stream drains the wetland area that encroaches the Proposed Development site to the north of the N25 before discharging to Cork Harbour. The stream is completely culverted south of the N25 within the Eastgate Business Park car park. No record of water quality data or monitoring station data is available on this stream or any other stream within the 500m wide corridor from the subject site.

The harbour at the discharge location for this stream is a Special Protection Area (SPA) – the Cork Harbour SPA (Site Code: 004030). It is located approximately 2.5km west of the Proposed Development and has a hydrological connection to the Proposed Development via the Kilcoolishal Stream and the underlying groundwater body discharging to Lough Mahon; a transitional water body. Cork Harbour, downstream of the site, is also designated as a proposed Natural Heritage Area (pNHA). The WFD risk status assigned to the Cork Harbour SPA is under ‘review’. The sensitivities of the waterbodies with a hydrological connection to the study area are outlined in **Table 16.5**.



**Table 16.5: Baseline receptor sensitivity**

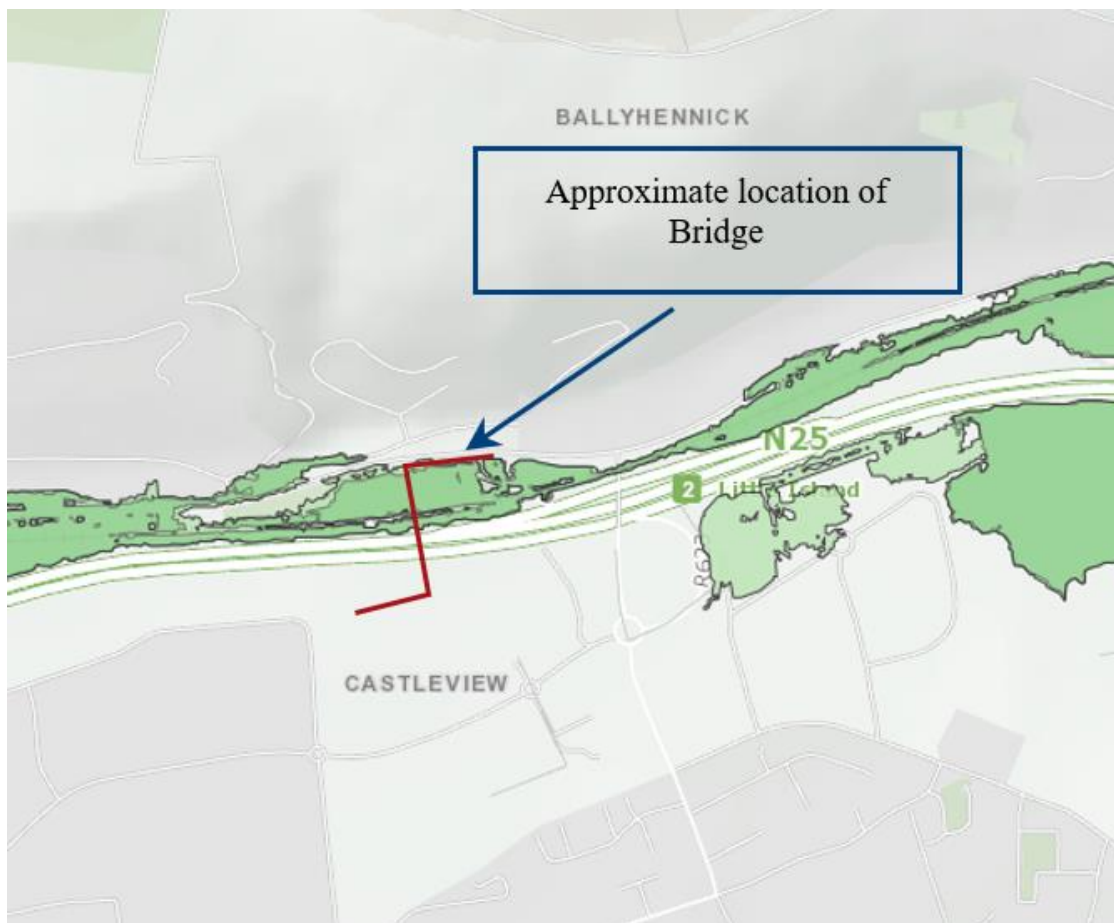
No.	Waterbody name	Sensitivity of receptor	Sensitivity
1	Kilcoolishal Stream (Tibbotstown_010)	High Sensitivity watercourse due its hydrological connectivity to the Cork Harbour SPA. WFD risk status under review. Good status, No high-status objective.	High
2	Lough Mahon	Lough Mahon is a transitional waterbody with a high sensitivity to nutrients. WFD status: at risk from urban wastewater.	High
3	The Cork Harbour SPA	The Cork Harbour SPA is a SPA under the EU Birds Directive and supports several wintering birds.	High

The existing drainage system at the Proposed Development site is serviced by surface water and sewer drainage networks. Flows are typically collected in standard gullies and routed via a culvert system to its outfall at Cork Harbour. There are no SuDS / attenuation features within the existing drainage system.

**16.3.3 Flood Risk**

A detailed Flood Risk Assessment (FRA) has been undertaken for the Proposed Development (refer to **Appendix 16.1** in **Volume 4** of this EIAR). Through Catchment Flood Risk Assessment and Management (CFRAM) map analysis, the FRA identified the main source of flood risk to be coastal. The Proposed Development location lies within the 0.5% AEP coastal floodplain (within Flood Zone A) on the northern access ramp. Refer to **Image 16.3**.

The Cork County Development Plan Mapper 2022-2028 (CCC, 2022) also identifies a flood risk to the south of the N25. However, the Proposed Development location lies outside of the 0.5% AEP coastal floodplain (within Flood Zone C) on the southern access ramp. Hence, the southern access ramp is under low risk. Refer to **Image 16.4**.



**Image 16.3: Extract from South Western CFRAMS coastal flood extents, current scenario (0.5% AEP)**

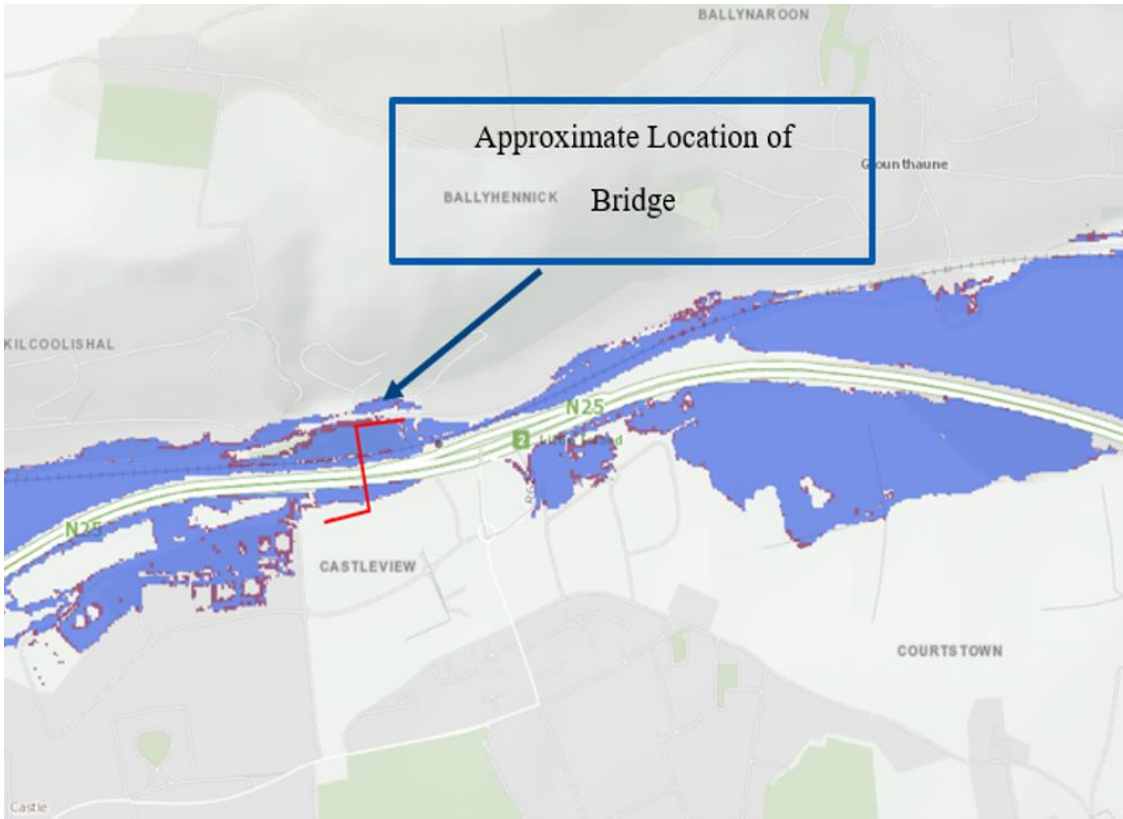


Image 16.4: Cork County Development Plan Mapper 2022-2028 coastal flood extents (0.5% AEP) (CCC, 2022)

## 16.4 Potential Impacts

### 16.4.1 ‘Do-Nothing’ Impact

The ‘Do-Nothing’ scenario considers the likely scenario that would arise assuming the Proposed Development were not progressed, i.e., if nothing was done. The baseline environment would be as described in Section 16.3, with water bodies identified and categorised under the RBMP 2018-2021 and reported by the EPA.

The most significant pressures to the waterbodies ‘at risk’ of achieving Good status within the Tibbotstown\_010 WFD sub catchment is urban runoff and urban wastewater. The current trend on pressures will continue for the foreseeable future unless a planned intervention is implemented.

Therefore, in the absence of the Proposed Development, the baseline surface water environment will not be impacted. The ‘Do-nothing’ scenario is contrasted with the ‘Do-something’ scenario where the Proposed Development proceeds as planned. The following subsections document the potential impacts of the Construction, Operational and Decommissioning Phases of the Proposed Development.

### 16.4.2 Construction Phase

**Chapter 5, Construction Strategy** outlines the strategy to construct the Proposed Development. In addition to a detailed description and methodologies of the works involved, details on sequencing and duration, the location of the temporary construction compounds and bridge assembly area, the proposed traffic management plan, hours of working, and numbers of personnel involved are also provided.

This assessment considers the potential impacts from the construction of the Proposed Development prior to mitigation or control measures being implemented.

The following construction activities have the potential to result in hydrological effects:

- Site clearance and construction of access and haul roads;
- Establishment and use of temporary construction compounds and bridge assembly area;

- Utility diversion;
- Foundation construction; and
- Transportation of concrete, fuel, and other chemicals with a potential to impact on water quality.

The construction of the Proposed Development will result in the removal of topsoil or vegetation which may increase the risk of sediment laden runoff, leading to water quality degradation.

#### *16.4.2.1 Surface water quality*

There are numerous substances used on construction sites that are potential pollutants to water bodies and which could affect surface water quality. Runoff from the working areas during construction may contain increased sediment loads, suspended solids and contaminants. This is typical on construction sites and working areas of this nature. A summary of potential pollutants of relevance to water quality is provided below:

- Potential sources of pollution from site drainage include runoff and erosion from site earthworks and stockpiles. This has the potential to pose a risk to the nearby Kilcoolishal Stream as the site will be exposed to rainfall which has the potential to produce silt laden runoff;
- Any accidental spillages of fuel and / or discharge of oil from leaks in vehicles or fuel tanks;
- Any accidental spillages of other major pollutants present, including fuels and lubricants required for plant and equipment on site;
- The washing of construction vehicles and equipment poses a pollution risk to the nearby Kilcoolishal Stream if undertaken in inappropriate locations and in the absence of effective management and mitigation; and
- Surface water run-off from construction activities has the potential to be contaminated and pose a risk to the water quality of the nearby Kilcoolishal Stream.

In the absence of mitigation measures, all of the above have the potential to alter the water quality of the Kilcoolishal Stream. However, given the size of the stream in question the impact is considered to be short-term and not significant.

#### *16.4.2.2 Wastewater*

Effluent and sanitary waste will be generated from facilities provided for the construction staff on site. Temporary foul drainage at the construction compounds will cater for welfare facilities. The welfare facilities will be either mobile welfare vans, towed units or self-contained units, and will be fully bunded with foul sewage and wastewater removed and disposed of off-site to appropriately licensed treatment facilities. This will have a short-term impact and the significance of this impact will be imperceptible.

#### *16.4.2.3 Water supply*

The contractor will require a water supply connection for onsite personnel during construction. In addition to supplying potable water for the welfare facilities, the existing water main will supply water for the wheel washes, if required, and for dust control in dry windy weather. The quantity of water required for these uses will be weather dependent. Where connection to the existing water main is not possible, mobile bowsers will be provided. This will have a short-term impact and the significance of this impact will be imperceptible.

### 16.4.5.2 Assessment of potential impacts on sensitive receptors

An assessment of the potential impacts on sensitive receptors is presented in **Table 16.6**.

**Table 16.6: Construction impact risk assessment for surface waters**

No.	Waterbody name	Construction activity	Potential impacts (pre-mitigation)			
			Description of impacts	Magnitude of impacts	Sensitivity of receptor	Significance of impacts
1	Kilcoolishal Stream (Tibbotstown_010)	Northern access ramp and temporary construction compounds	Impacts on water quality from construction activities at the northern access ramp and temporary construction compounds	Low to negligible	High Sensitivity. Kilcoolishal Stream is a high sensitivity watercourse due to its hydrological connectivity to the Cork Harbour SPA. WFD risk status: under review. Good status, no high-status objective.	Short-term and not significant impact if unmitigated
2	Lough Mahon				High Sensitivity. Lough Mahon is a transitional waterbody with a high sensitivity to nutrients. WFD status: at risk from urban wastewater.	
3	The Cork Harbour SPA				High Sensitivity. The Cork Harbour SPA is a SPA under the EU Birds Directive and supports several wintering birds.	

### 16.4.3 Operational Phase

The operation of the Proposed Development will not significantly increase surface runoff as the access ramps will be vegetated and the main bridge deck will be constructed from steel or concrete materials with non-slip surfacing and associated drainage collection, which will not result in any significant increase in surface water runoff.

The potential impacts during the Operational Phase are limited to the effect of maintenance activities on water quality and surface runoff due to accidental spills and pollution incidents, including oils, silt and other waste potentially entering nearby surface water receptors. Maintenance activities will occur on an infrequent basis.

The Operational Phase of the Proposed Development is predicted to have a long term, imperceptible hydrological impact in the absence of mitigation measures.

### 16.4.4 Decommissioning Phase

The design life of the proposed new pedestrian and cycle bridge is 120 years. Should the Proposed Development be decommissioned, temporary supports will be used, and the bridge will be removed in a sequence that does not require interaction with the adjacent Kilcoolishal Stream.

It is therefore predicted that the decommissioning of the Proposed Development will have an imperceptible hydrological impact.

### 16.4.5 WFD assessment summary

The Proposed Development is located within the Tibbotstown-SC\_010 (Code 19\_2) WFD sub-catchment. The Kilcoolishal stream has a hydraulic connection to the Cork Harbour SPA and is an unassigned water body.

There will be no direct discharges from the Proposed Development during the Construction, Operational or Decommissioning Phases. Therefore, the status of the existing environment is not anticipated to be altered. It is considered that mitigation measures and good construction management practices (refer to Section 16.5) will ensure that the status of the receiving aquatic environment remains unaffected.

Taking into consideration the anticipated impacts of the Proposed Development on the biological, physico-chemical and hydromorphological quality elements, and the mitigation measures proposed, it is concluded that the Proposed Development 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 have been assessed.

#### 16.4.6 Flood Risk

As the flooding is coastal, the 0.5% AEP tidal level (2.86m OD), approximately 1.75km upstream of the Proposed Development site can be conservatively applied to the Proposed Development. Accordingly, the maximum flood level on site will be 3.66m OD, taking account of the 0.5m mid-range future scenario climate change allowance and a freeboard of 0.5m. The lowest point on the northern side of the access ramp is at 3.40m OD and hence a short section of the ramp will be at risk of flooding from this event. This is deemed acceptable as the bridge structure is considered a 'less vulnerable' development, considering the embankment at the access ramp will be vegetated and will be made flood resilient.

However, given that the site is partially located in Flood Zone A, a development management Justification Test was completed to ensure that the Proposed Development complies with the requirements of the Guidelines. The Justification Test satisfied all the criteria and deemed the Proposed Development to be appropriate at the proposed location and that it will not interfere with the floodplain area.

Refer to the FRA in **Appendix 16.1** in **Volume 4** of this EIAR for further details.

### 16.5 Mitigation and Monitoring

#### 16.5.1 Mitigation

The preceding sections have assessed the potential impacts of the Proposed Development in the absence of mitigation measures. The Proposed Development, as outlined in **Chapter 4, Description of the Proposed Development**, has considered a range of best practice construction measures which will ensure the impacts are reduced, or avoided where possible. In addition, the following mitigation measures are outlined to further mitigate the impacts identified in the preceding sections.

##### 16.5.1.1 Construction Phase

The nearest environmental receptor is the Cork Harbour SPA, approximately 2.6km downstream of the Proposed Development site. This SPA has a hydrological connection to the Proposed Development via the Kilcoolishal Stream.

The employment of good construction management practices will minimise the risk of adverse impacts on water quality, the hydrological regime and flood risk. All construction activities will be undertaken in accordance with the guidance 'Environmental Good Practice on Site' (CIRIA, 2015) and 'The control of water pollution from construction sites' (CIRIA, 2001).

The following standard measures will be implemented during the construction of the Proposed Development:

- Earthworks operations will be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe run-off and prevent ponding and flooding;
- Run-off will be controlled to minimise the water effects in outfall areas;
- All concrete mixing and batching activities will be in areas away from watercourses and drains;
- Collection systems will be used to prevent any contaminated drainage entering surface water drains, watercourses or groundwater, or draining onto the land;
- The use of cleaning chemicals will be minimised;
- Good housekeeping (site clean-ups, use of disposal bins, etc.) will be implemented on the site;
- Careful consideration will be given to the location of any fuel storage facilities. All vehicles and plant will be regularly inspected for fuel, oil and hydraulic fluid leaks. Suitable equipment to deal with spills will be maintained on site;

- Where dewatering may be required, it will be overseen and approved by a qualified hydrogeologist and treated appropriately in a site water treatment facility before being discharged to the local drainage network. No outfall will be permitted into existing watercourses;
- Where practicable, soil excavation will be completed during dry periods;
- No materials will be stored in floodplains or in areas which would impede flood flow paths (northern side of Proposed Development site); and
- To prevent the accidental release of hazardous materials (fuels, cleaning agents, etc.), all hazardous materials will be stored within secondary containment designed to retain at least 110% of the storage contents. Temporary bunds for oil / diesel storage tanks will be used on the site during the Construction Phase of the project. Safe materials handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development.

The following additional measures will be implemented for the protection of the Kilcoolishal Stream:

- Works in the vicinity of the stream will be carried out in the summer months, when water levels and flows within the stream are minimal. In the eventuality that the stream is not dry, construction works to the section of the Kilcoolishal stream crossing the construction boundary (approximately 28m) will be banded on either side with earthen bunds and silt screens. Water would be over pumped in the flow direction. Environmental control measures will be implemented during construction in line with standard guidelines (i.e., ‘The Control of Water Pollution from Construction Sites’ (CIRIA, 2001) and ‘The Control of Water Pollution from Linear Construction Projects’ (CIRIA, 2006)) for best practice measures for controlling water pollution. The Report for Screening for Appropriate Assessment submitted as part of the planning application concluded that the proposed project, in the absence of mitigation, and either alone or in combination with other plans and / or projects, does not have the potential to significantly affect any European Site, in light of their conservation objectives. The environmental control measures which will be implemented relate to the minimisation of localised potential impacts;
- Apart from the area of the Kilcoolishal Stream directly affected by the bridge construction (i.e., Irish Rail portal frame), a buffer strip of 10m will be implemented around the stream with no works taking place in this area. Where this is not possible, in particular for the construction of the Irish Rail portal frame, the streambed and stream banks of the Kilcoolishal Stream in this location will be reprofiled and reinstated following construction and the bunds and silt traps removed;
- No plant or tools will be washed in the stream, should it contain water; and
- Spill kits will be permanently on hand and kept close to the works areas. Staff will be trained in how to use the spill kits correctly.

The above mitigation measures are also incorporated into the CEMP – refer to **Appendix 5.1 in Volume 4** of this EIAR.

#### *16.5.1.2 Operational Phase*

The Proposed Development will incorporate appropriate surface water drainage features which will collect and discharge surface water, thereby reducing the risk of flooding from surface water. Surface water drainage from the main span of the bridge will be captured in drainage channels and discharged into the N25 or railway line drainage system, as appropriate.

#### *16.5.1.3 Decommissioning Phase*

Should decommissioning activities occur, the proposed works will be undertaken in a safe manner by minimising interaction with the nearby watercourse. As such, mitigation measures will be limited to ensuring that no temporary works are placed in nearby watercourses during the Decommissioning Phase. No materials will be deposited in nearby watercourses during the Decommissioning Phase.

## 16.5.2 Monitoring

### 16.5.2.1 Construction Phase

The following monitoring activities will be undertaken for the Construction Phase:

- Visual monitoring will be undertaken as part of the regular site audits during the construction of the Proposed Development to ensure that existing surface water runoff is draining from the site and is not exposed to any contaminants;
- The contractor will be required to ensure that the sanitary facilities for site personnel are maintained as per the CEMP (refer to **Appendix 5.1 in Volume 4** of this EIAR) and that effluent storage is regularly emptied and disposed of appropriately;
- The contractor will be required to ensure that the water supply to the site is maintained as per the CEMP (refer to **Appendix 5.1 in Volume 4** of this EIAR) and that it is free of contaminants; and
- The contractor will be required to monitor the weather forecast to inform the programming of earthworks and stockpiling of materials so as to minimise the risk of flooding.

### 16.5.2.2 Operational Phase

There are no monitoring activities required during the Operational Phase of the Proposed Development.

### 16.5.2.3 Decommissioning Phase

There are no monitoring activities required during the Decommissioning Phase of the Proposed Development.

## 16.6 Cumulative Impacts

A review of Cork County Council (CCC), An Bord Pleanála (ABP) and Department of Housing, Local Government and Heritage (DHLGH) online planning records has indicated that other projects have been permitted or proposed within the surrounding area that may give rise to cumulative impacts in combination with the impacts of the Proposed Development. The list of projects is included in **Chapter 20, Cumulative and Interactive Impacts**.

Taking the nearby projects together in combination with the Proposed Development, no significant cumulative construction or operation impacts are predicted.

## 16.7 Residual Impacts

### 16.7.1 Construction Phase

Following the implementation of the mitigation measures described in Section 16.5, there will be no significant residual impacts on water quality, the hydrological regime and onsite drainage infrastructure, including both surface water and foul drainage, during construction.

### 16.7.2 Operational Phase

The Proposed Development is predicted to have an overall imperceptible, long-term residual impact on water quality, the hydrological regime and onsite drainage infrastructure, including both surface water and foul drainage, within the study area during operation.

A small section of the approach ramp on the northern side of the bridge will be at risk of flooding during the Operational Phase. However, the flood extent is small, and the volume of flood displaced will also be small. Furthermore, a development management Justification Test has been completed which concluded that the Proposed Development would be appropriate at the proposed location and would not interfere with the floodplain area. Therefore, there will be no significant residual impact on flood risk caused by the operation of the Proposed Development.

### 16.7.3 Decommissioning Phase

It is not anticipated that there will be any significant residual impacts arising from the Decommissioning Phase of the Proposed Development.



## 16.8 References

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