East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 12 – Hydrology

EirGrid

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Contents

12. Hydrology

12.1 Introduction

This Chapter presents the assessment of the potential impacts of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development) on the surface water environment during the Construction and Operational Phases of the Proposed Development. A full description of the Proposed Development is presented in Chapter 4 (Proposed Development Description) in Volume 2 of this Environmental Impact Assessment Report (EIAR).

The assessment of impacts on biodiversity and groundwater are discussed in Chapter 10 (Biodiversity) and Chapter 11 (Soils, Geology, and Hydrogeology) in Volume 2 of the EIAR, respectively. A Natura Impact Statement (NIS) has also been prepared and is included as a standalone document in the planning application pack. A Flood Risk Assessment (FRA) has been prepared and is included as Appendix A12.1 in Volume 3 of this EIAR, and a Water Framework Directive (WFD) Compliance Assessment is included as a supporting document in Volume 5 of this EIAR.

This Chapter considers the Construction and Operational Phases of the Proposed Development, in relation to the following subtopics:

- Hydrology, including surface water drainage;
- Hydromorphology;
- Surface water quality including surface water supply and wastewater discharge;
- WFD assessment; and
- A summary of flood risk (refer to the separate FRA which is included as Appendix A12.1 in Volume 3 of the EIAR).

12.2 Methodology

12.2.1 Study Area

The baseline study area for this assessment is 250 metres (m) from the centreline of the Proposed Development, which includes the upgrade works to both Belcamp and Woodland Substations and vegetation clearance areas, as shown in Figure 12.1 in Volume 4 of this EIAR. Given the nature and extent of the Proposed Development, it is anticipated that any likely significant impacts from the Proposed Development would occur at a local water body scale, and therefore, a 250m study area is based on professional judgement and is considered appropriate to encompass all water bodies that may be susceptible to significant impacts. Therefore, any identified surface water bodies within that area have been considered as receptors which include WFD designated and non-designated water bodies.

12.2.2 Relevant Guidelines, Policy and Legislation

This Chapter has been prepared in accordance with the following legislation:

- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (hereafter referred to as the Water Framework Directive (WFD));
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 (as amended by S.I. No. 327/2012, S.I. No. 386/2015, S.I. No. 77/2019) which gives effect to the WFD; and

- S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003 (as amended by S.I. No. 413/2005, S.I. No. 219/2008, S.I. No. 93/2010, S.I. No. 326/2010, S.I. No. 350/2014, and S.I. No. 166/2022) (hereafter collectively referred to as the Water Policy Regulations), which give legal effect to the WFD in Ireland.

The following national policies are considered relevant to the Proposed Development:

- Project Ireland 2040 - National Planning Framework (Government of Ireland 2020); and
- Project Ireland 2040 - National Development Plan 2021-2030 (Government of Ireland 2021).

The following guidance documents are adhered to in the assessment:

- Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (IFI 2016);
- Planning for Waterbodies in the Urban Environment: A Guide to the Protection of Waterbodies through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI 2020);
- EirGrid's Ecology Guidelines for Electricity Transmission Projects (EirGrid 2020);
- 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 Flood Risk Guidelines) (DEHLG and OPW 2009); and
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022a).

This assessment also follows guidelines established by Transport Infrastructure Ireland (TII) (formerly the National Roads Authority (NRA)), namely the Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (hereafter referred to as the NRA Guidelines) (NRA 2009) and the Guidelines for the Crossing of Waterbodies During the Construction of National Road Schemes (NRA 2005), in terms of the criteria for ranking significance of potential impacts. Although these guidelines were developed for road schemes, they are applicable to this assessment given that the Proposed Development is associated with new linear infrastructure.

12.2.2.1.1 Water Framework Directive

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

The Water Policy Regulations require the assessment of permanent impacts of a 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 of the Proposed Development as some potential construction impacts are considered permanent in the absence of mitigation.

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 under the Water Policy Regulations.

The second cycle RBMP for Ireland 2018 - 2021 (hereafter referred to as the RBMP 2018 – 2021) was published by the Department of Housing, Planning and Local Government (DHPLG) in April 2018 and covers Ireland as a whole (DHPLG 2018). For the second cycle, the original (2009) Eastern, South-Eastern, South-

Western, Western and Shannon River Basin Districts were merged to form one national River Basin District (RBD).

In September 2021, the Minister of Housing, Local Government and Heritage (DHLGH), published the Draft River Basin Management Plan for Ireland 2022 – 2027 (hereafter referred to as the Draft RBMP) for public consultation (DHLGH 2021). The consultation period closed on 31 March 2022. The Draft RBMP sets out from 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.

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

12.2.3 Data Collection and Collation

Information on the baseline environment, including hydrology, hydromorphology and water quality of the surface water receptors within the study area has been collated through desk study and field surveys.

12.2.3.1 Data Sources

The key data sources used for the purpose of this assessment are:

- Catchments.ie – Water quality data for Ireland (DHLGH, EPA and Local Authority Waters Programme 2024);
- Environmental Protection Agency (EPA) – WFD Ireland online map viewer (EPA 2024);
- GeoHive (Ireland) – National Geospatial Data Hub (Government of Ireland and Tailte Éireann 2024);
- National Parks and Wildlife Service (NPWS) - Designated Sites (NPWS 2024);
- Office for Public Works (OPW) Flood Mapping (OPW 2024);
- Summary Report - Water Quality in Ireland 2016-2021 (EPA 2022b); and
- Tailte Éireann (formerly Ordinance Survey Ireland (OSI)) Drainage ditch layer from Prime 2 data (Tailte Éireann 2024).

12.2.3.2 Difficulties Encountered in Compiling Information

The following limitations and difficulties compiling information were encountered during the production of this Chapter:

- Water levels and flow rates are subject to weather variations in the days leading up to field surveys. Where water levels at the crossing locations were too deep, the bed was not be visible from the bank side, and therefore, the identification of specific morphological features and bed material types could not be fully determined and recorded. This was the case at one crossing location (see Appendix 12.2 in Volume 3 of this EIAR for specific locations);
- Safe access to the exact crossing locations was not always possible due to vegetation or land access issues. This was the case at five crossing locations (see Appendix A12.2 in Volume 3 of this EIAR for specific locations), and desk-based sources alongside professional judgment were used to extrapolate observations;
- Only WFD designated water bodies were visited as part of the field surveys; and
- Unnamed, non-designated watercourses were not visited as part of the site survey and have been determined using OS mapping. In some cases, OS mapping indicates unnamed non-designated

and some WFD designated watercourses immediately downstream of existing road crossings but does not map them upstream. Where this is the case, it has been assumed that there is an upstream channel, but it is either not mapped and / or not designated.

12.2.3.3 Field Surveys

Field surveys were carried out between 9 to 11 May 2023. During the surveys, visual observations were made at proposed water body crossing locations to further characterise the nature of the water bodies. The results from the field survey are presented in Appendix A12.2 in Volume 3 of this EIAR.

Where possible, walkover surveys were undertaken at, and immediately up- and downstream of, proposed water body crossing locations. Where access was constrained or landowner issues were identified (see Section 12.2.3.2), visual observations were made from bridges and from the top of riverbanks, as close as practicable to the crossing location. The following visual observations were recorded at each survey location:

- Planform - recording the channel pattern (e.g. straight, meandering, single thread or multiple thread));
- Flow conditions (recording observations such as flow types, heights and velocities);
- Bank stability (recording any instances of erosion, aggradation or incision);
- Riverbed (sediment type, qualitative description of size and shape, noting any potential erosion or deposition issues (i.e. incision or aggregation));
- Anthropogenic modifications (including structures (bridges, footbridges, culverts etc.) flood walls, bed and/or bank reinforcement or in channel structures;
- Runoff pathways and risk (recording the pathway for any surface runoff to the water body and the likelihood of surface runoff reaching the river);
- Riparian vegetation (type, density, height, maturity);
- Outfalls and discharges (recording any outfalls and discharges / active or derelict); and
- Land use (recording the use of land on the left and right floodplains and surrounding area).

No water quality sampling was carried out as water quality is not a constant parameter and varies significantly depending on weather, flows and seasons. EPA data on water quality from catchments.ie (DHLGH, EPA and Local Authority Waters Programme 2024) was deemed sufficient to get a representative baseline.

It is possible that some minor drainage ditches located in proximity to the Proposed Development works may not be identified in this Chapter. However, the mitigation detailed and proposed as part of this planning application (contained within Section 12.5 of this Chapter and within the Construction Environmental Management Plan (CEMP) which is included as a standalone document in the planning application pack) will be implemented when dealing with any such features to avoid, reduce or offset any potential negative impacts.

12.2.3.4 Flood Risk Assessment

A FRA has been completed for the Proposed Development (refer to Appendix A12.1 in Volume 3 of this EIAR) in accordance with the Flood Risk Guidelines (DEHLG and OPW 2009).

The FRA considers the potential flood risk to the Proposed Development during the Construction and Operational Phases. This assessment has been undertaken through review of the OPW flood risk maps (OPW 2024) and assessing water body locations with respect to the Proposed Development. The assessment of flood risk is based on existing information at the time of the study and recommendations of climate change allowances by the OPW.

12.2.4 Appraisal Method for the Assessment of Impacts

12.2.4.1 General Approach

The following method for the assessment of impacts has been adapted from the NRA Guidelines. The surface water environment is intrinsically linked to flood risk, ecological receptors and groundwater, considered in the FRA Report (Appendix A12.1 in Volume 3 of this EIAR), and Chapter 10 (Biodiversity) and Chapter 11 (Soils, Geology and Hydrogeology) in Volume 2 of this EIAR. Commercial and recreational uses of the water environment are not included in the scope of this Chapter, as commercial and recreational interests are considered and assessed in Chapter 5 (Population), Chapter 15 (Agronomy and Equine) and Chapter 17 (Material Assets) in Volume 2 of this EIAR.

The NRA Guidelines outline how impact type, magnitude, and duration should be considered relative to the importance of the hydrological receptors and their sensitivity to change in order to determine significance of 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 Development will be determined based on two parameters:

1. The importance of the water body attributes (hydrology, surface water quality, hydromorphology and surface water supply) to change; and
2. The magnitude of the impacts on water body attributes.

12.2.4.2 Importance of Receptors

The importance of surface water receptors to changes as a result of the Proposed Development are determined by a set of criteria based on those outlined in the NRA Guidelines. These are presented in Table 12.1.

Table 12.1: Criteria Used to Evaluate the Importance of Surface Water Receptors (NRA 2009)

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

12.2.4.3 Magnitude of Impact

The magnitude of impacts on receptors (or attributes) is determined in accordance with the EPA Guidelines (EPA 2022a). The scale or magnitude of potential impacts (both beneficial and adverse) depends on both the degree and extent of which the Proposed Development may impact the surface water receptors during the Construction and Operational Phases.

Factors considered to determine the magnitude of potential impacts include the following:

- Nature of impacts;
- Intensity and complexity of the impacts;

- Expected onset, duration, frequency and reversibility of the impacts;
  - Momentary Effects lasting from seconds to minutes;
  - Brief Effects lasting less than a day;
  - Temporary Effects lasting less than a year;
  - Short-term Effects lasting one to seven years;
  - Medium-term Effects lasting seven to fifteen years;
  - Long-term Effects lasting fifteen to sixty years; and
  - Permanent Effects lasting over sixty years.
- Cumulation of the impacts with other existing and / or approved project impacts; and
- Possibility of effectively reducing the impacts.

Table 12.2 illustrates the criteria used for determining the magnitude of impact on surface water receptors.

Table 12.2: 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; Loss of regionally important public water supply; Loss or extensive change to a designated nature conservation site; Reduction in water body WFD classification or quality elements; Results in loss of receptor and/or quality and integrity of receptor; and 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 in impact which may alter the existing or emerging trends.
Medium Adverse	Results in effect on attribute and/or quality and integrity of the attribute	Partial loss in productivity of a fishery; Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies; Contribution to reduction in water body WFD classification; Results in impact on integrity of receptor or loss of part of receptor; and 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; Minor impacts on water supplies; Results in minor impact on integrity of receptor or loss of small part of receptor; and 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 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	No measurable impact on integrity of the attribute; and Results in an impact on receptor but of insufficient magnitude to affect either use or integrity.
Medium Beneficial	Results in moderate improvement of attribute quality	Has some potential to result in minor improvement WFD quality element(s).
Large Beneficial	Results in major improvement of attribute quality	Improvement in water body WFD Classification.

12.2.4.4 Significance of Impacts

The significance of an impact is determined by combining the importance of the receptor with the predicted magnitude of impact. Any residual impacts are reported after the assessment of the effectiveness of essential mitigation measures required to reduce and, if possible, offset likely significant adverse environmental impacts. The matrix used for the determination of significance is shown in Table 12.3 (EPA 2022a).

Table 12.3: Categories of Environmental Impacts

Importance of Attribute	Magnitude of Impact			
	Negligible	Small Adverse	Medium Adverse	Large Adverse
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

12.3 Baseline Environment

Baseline data were collated through a desk-based study and field survey. The Proposed Development and associated study area is located within the Hydrometric Area (HA) 09 (Liffey and Dublin Bay) and HA 08 (Nanny-Delvin) water catchment areas (EPA 2021b).

12.3.1 Catchment Overview

The Proposed Development will span two hydrometric areas, the first of which is the Liffey and Dublin Bay Catchment. The 3rd Cycle Draft Liffey and Dublin Bay Catchment Report (HA09) (EPA 2021a) 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 (kilometres squared). The catchment is characterised by a sparsely populated, upland south-eastern area and a densely populated, flat, low-lying area over the remainder of the catchment basin. The largest urban centre in the catchment is Dublin City. The catchment area is heavily urbanised and industrialised within the vicinity of the city of Dublin.

The second hydrometric area which the Proposed Development will interact with is the Nanny Delvin catchment. The 3rd Cycle Draft Nanny Delvin Catchment Report (HA08) (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 largest urban centre in the catchment is Swords. The other main urban centres in this catchment are Donabate, Lusk, Skerries, Balbriggan, Stamullen, Laytown, Bettystown, Duleek, Ashbourne, Ratoath and Dunshaughlin. The total population of the catchment is approximately 159,230 (EPA 2021b) with a population density of 224 people per km^2.

12.3.2 Designated Sites

12.3.2.1 Overview

A review was conducted to determine those European sites which are within the study area and / or hydrologically connected to the study area. There are no Special Areas of Conservations (SAC), designated bathing waters, Natural Heritage Areas (NHA), or shellfish protection areas within 5km of, or in direct hydrological connection to, the Proposed Development. A summary of the closest WFD protected areas is provided in Table 12.4.

Table 12.4: Designated Sites within and Adjacent to the Study Area

WFD Register of Protected Areas Category	Designated Sites Present in Study Area?	Designated Sites Present Within 5km	Commentary
Nutrient Sensitive Areas	No	No	Closest Nutrient Sensitive Area is >5km south of the Proposed Development, and not in direct hydrological connection.
Shellfish Areas		No	Closest shellfish area is Malahide within the Irish Sea >5km to the north-east of the Proposed Development
Bathing Waters		No	Closest bathing water is located at Portmarnock Velvet Strand Beach, approximately 5.5km to the east of the Proposed Development.
SACs		Yes	Closest SAC is the Malahide Estuary SAC located approximately 3.5km to the north-east of the Proposed Development and not hydrologically connected.
SPAs		Yes	Closest SPA is the Malahide Estuary SPA located approximately 3.5km north east from the Proposed Development. Hydrological connections via the Sluice_010 and Mayne_010 water bodies are approximately >5km downstream.
NHAs		No	Closest NHA is the Hodgestown Bog NHA located more than 20km to the south-west of the Proposed Development.
pNHAs	No	Yes	Closest pNHA is associated with Baldoyle Bay (Feltrim Hill), located at its closest approximately 1.1km east from the Proposed Development. Hydrological connections via the Sluice_010 and Mayne_010 water bodies are >5km downstream.
Salmonid Rivers	No	No	No designated Salmonid Rivers within the study area. No water bodies hydrologically connected to designated Salmonid Rivers downstream.
Drinking Water Protected Rivers			No designated Drinking Water Protected Rivers within the study area. No hydrologically connected water bodies to downstream Drinking Water Protected Rivers.

12.3.3 Drinking Water Supply (Surface Water Abstractions)

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

12.3.4 Surface Water Features

The EPA River dataset (EPA 2024) is designed as a geometric river network for monitoring, management, and reporting purposes. The EPA has split rivers and streams up into smaller sections to allow areas to be easily distinguished. These segments are assigned segment codes. The EPA's segmented coding and naming has been applied throughout this Chapter. The WFD status of the rivers and streams within the study area of the Proposed Development are detailed in Table 12.5. Baseline descriptions for each water body within the study area are provided in Section 12.3.5.

Table 12.5: Current Designation Status for Identified WFD Water Bodies within the Study Area (EPA 2024)

WFD Water Body Name	WFD Water Body Code	WFD Sub-Catchment	Approximate Chainage along Proposed Development Route (m)	Ecological Status or Potential (2016 - 2021)	Risk Status	Importance	Key Pressures: Elements Causing or with Potential to Cause Less than Good Status	Proposed Crossing Methodology
Dunboyne stream_010	IE_EA_09D040500	Tolka_SC_010	2,165	Poor	At Risk	Low	Agriculture, Domestic Wastewater	Open Cut Trenching
Dunboyne stream_010	IE_EA_09D040500	Tolka_SC_010	10,800	Poor	At Risk	Low	Agriculture, Domestic Wastewater	Within Road Structure
Rye Water_030	IE_EA_09R010400	Liffey SC_080	3,000	Poor	At Risk	Low	Agriculture	Not crossed, adjacent to works area and Construction Compound
Tolka_020	IE_EA_09T010600	Tolka_SC_010	11,640	Moderate	At Risk	Medium	Agriculture	Within Road Structure
Tolka_020	IE_EA_09T010600	Tolka_SC_010	12,545	Moderate	At Risk	Medium	Agriculture	Open Cut Trenching
Pinkeen_010	IE_EA_09P020500	Tolka_SC_010	16,340	Moderate	At Risk	Medium	Agriculture, Domestic Wastewater	Open Cut Trenching
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	17,750	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	18,160	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	18,200	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_010	IE_EA_08W010050	Broadmeadow_SC_010	19,235	Poor	Under Review	Low	None Identified	Open Cut Trenching
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,460	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Affected by Passing Bay. Within Road Structure
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,640	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure
Ward_020	IE_EA_08W010070	Broadmeadow_SC_010	20,855	Moderate	At Risk	Medium	Agriculture, Hydromorphology, Urban Wastewater	Within Road Structure

WFD Water Body Name	WFD Water Body Code	WFD Sub-Catchment	Approximate Chainage along Proposed Development Route (m)	Ecological Status or Potential (2016 - 2021)	Risk Status	Importance	Key Pressures: Elements Causing or with Potential to Cause Less than Good Status	Proposed Crossing Methodology
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	23,635	Poor	At Risk	Low	Agriculture, Urban Runoff, Urban Wastewater, Other Anthropogenic Pressures	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	24,600	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	24,800	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	26,190	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	28,355	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Open Cut Trenching
Ward_030	IE_EA_08W010300	Broadmeadow_SC_010	29,290	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Ward_030	IE_SE_08W010300	Broadmeadow_SC_010	29,900	Poor	At Risk	Low	Agriculture, Other, Urban Runoff, Urban Wastewater	Within Road Structure
Sluice_010	IE_EA_09S071100	Mayne_SC_010	31,770	Poor	Under Review	High	None Identified	Within Road Structure
Mayne_010	IE_EA_09M030500	Mayne_SC_010	36,820	Poor	At Risk	High	Urban Runoff Pressures	Open Cut Trenching

12.3.5 Baseline Descriptions

The following sections provide baseline descriptions for each of the water bodies within the 250m study area associated with the Proposed Development. As part of baseline data gathering, walkover surveys of the crossed water bodies were undertaken to further characterise the nature of the water body in these locations. The study area associated with the Proposed Development was surveyed on 9, 10 and 11 May 2023. The results of the field surveys, including photographs taken at each survey location are provided in Appendix A12.2 in Volume 3 of this EIAR. The field surveys are also supplemented from desk-based information using data sources outlined in Section 12.2.3.

12.3.5.1 Dunboynestream_010

Dunboynestream_010 forms part of the Tolka_SC_010 catchment. The catchment area of Dunboynestream_010 measures 19.32km^2, draining from the west upstream of Bogganstown, through Dunboyne town before discharging to the River Tolka at its confluence downstream of the study area. The water body displays a single thread channel with two small tributaries evident.

Dunboynestream_010 was visited as part of the site surveys (Water Body Crossing References: WCP01 and WCP02). The flow in the water body was observed to be low velocity, smooth and rippled in places. The banks appeared to be stable, with evidence of erosion and minor undercutting; there was evidence of poaching along the right bank top at WCP01. At WCP02 the banks are concrete at the existing road crossing structure and are heavily vegetated and stable outside the crossing.

The bed at WCP01 was comprised of predominately silt and fine sand with rare gravels. Small poorly developed riffles are present downstream from the crossing location. At WCP02, bed material is comprised of predominately silt to fine sands with rare gravels contained within a trapezoidal channel cross-section with approximately 40-degree banks. No distinct bedforms were observed. Riparian vegetation comprises overhanging shrubs and mature deciduous vegetation at WCP01 and vegetation consisting of herbaceous grasses and shrubs was observed at WCP02.

Existing pressures include agricultural and domestic wastewater which may impact baseline water quality in the water body. Hydromorphological pressures include an existing masonry bridge at Rathregan Court, discharge pipes were observed to be present along the bank adjacent to the field, these are likely field drainage at WCP01 and a box culvert at Summerhill Road.

There are no known abstractions from the water body, and it is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.2 Rye Water_030

Rye Water_030 forms part of the Liffey_SC_080 catchment. The water body displays an overall length of 33.87 km draining from the north, upstream of Barstown and the R156 road before discharging to the Rye Water_040 >10km downstream of the study area. The water body holds an overall poor ecological status and fail for surface water chemical status under the WFD.

The channel displays a single thread, low sinuosity planform within the study area. The water body was not visited as part of the site surveys. Aerial imagery indicates that mature riparian vegetation consisting of deciduous trees lines both banks which overhang the channel, making further characterisation of the watercourse bed and banks difficult. Existing pressures include agricultural which may impact baseline water quality in the water body. Hydromorphological pressures include an existing crossing below the R156 road.

There are no known abstractions from the water body, and it is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.3 Tolka_020

Tolka_020 forms part of the Tolka_SC_010 catchment. The catchment area of the Tolka_020 measures approximately 25.68km^2, draining from the west downstream of Woodtown, the water body then flows in an easterly direction to its confluence with the River Tolka (Tolka_030) at Clonee downstream of the study area. The water body displays a single thread channel and dendritic drainage pattern where small tributaries enter.

The Tolka_020 was visited as part of the site surveys (Water Body Crossing References: WCP03 and WCP04). The flow in the water body was observed to be of low velocity and smooth at both crossing locations. Some chute flow was noted at WCP04 where a 20cm drop in bed level was observed downstream of the proposed crossing. The banks appear to be stable and heavily vegetated at both crossing points; some minor undercutting to the left bank downstream of WCP04 was noted. The bed at WCP03 was not visible due to dense vegetation cover; at WCP04 the bed was noted to be comprised of steps formed from cobbles and boulders. Riparian vegetation comprises dense herbaceous grasses, shrubs, brambles and deciduous trees which overhang the channel from both banks.

Existing pressures comprise agricultural sources which may impact baseline water quality in the water body. Hydromorphological pressures include a concrete right bank and a pipe culvert at WCP03. At WCP04 a discharge pipe and a twin box culvert below Dunboyne Bypass were noted.

There is one discharge location on the Tolka_20 at Batterstown (Emission ID: TPEFF2300A0063SW001). There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the River Tolka systems supports populations of Lamprey and brown trout, in addition to other fish species.

12.3.5.4 Pinkeen_010

Pinkeen_010 forms part of the Tolka_SC_10 catchment. The catchment area of the Pinkeeen_010 measures 13.80km2, draining from the northwest at Rathbeggan and then flowing south easterly towards its confluence with the Tolka_030. The Pinkeen_010 displays a single thread mainstem channel with a number of tributaries inputting.

Pinkeen_010 was visited as part of the site surveys (Water Body Crossing Reference WCP05). At the crossing point, the flow was noted to be generally smooth and rippled. The banks were observed to be steep with bank angles ranging between 35 and 60 degrees and heavily vegetated. Vegetation consists of herbaceous and water-based grasses, nettles, brambles and shrubs. The bed of the water body is a mixture of sand and gravel substrate smothered with fine silts and often choaked with in-channel vegetation growth. In channel vegetation was observed to trap fine sediment which combined to cause ponded flow.

Existing pressures comprise of agricultural and domestic wastewater sources which may impact baseline water quality. Hydromorphological pressures include a masonry bridge (L1010) observed on site at the crossing point.

There are no known discharges or abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.5 Ward_020

The Ward_020 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_020 is 8.60km2, draining from the west at Nuttstown and then flowing in an easterly direction towards its

confluence with Ward_030 west of North Road at Ward Cross. Within the study area, the Ward_020 displays a single thread channel with input from several tributaries outside of the study area.

Ward_020 was visited as part of the site surveys (Water Body Crossing References: WCP06, WCP09, WCP10 and WC11). At WC11, the water body crossing was not surveyed due to dense vegetation restricting safe access. At the remaining crossing points, the flow was noted to be smooth, rippled and ponded in areas. The banks were noted to be steep with angles ranging between 50 and 80 degrees. Both banks were and heavily covered by dense vegetation including herbaceous and water-based grasses, shrubs and deciduous trees which overhang the channel in places. The channel bed was not visible at WCP06. At WCP09 and WCP10, the channel was trapezoidal in shape and bed material consisted of predominately fine silts and sands with rare gravels. No distinct bedforms were observed however loosely defined riffles are potentially forming in place. Riparian vegetation comprises dense shrubs and deciduous trees which overhang the channel, herbaceous and water-based grasses and managed grassed fielded areas.

Existing pressures comprise agricultural and urban wastewater sources which may impact baseline water quality. Hydromorphological pressures include a masonry bridge and a pipe culvert on Kilbride Road and at WCP09, a drainage ditch on the left bank was also observed draining nearby agricultural fields.

There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system throughout, with salmon present in the lower reaches.

12.3.5.6 Ward_010

Ward_010 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_010 is 9.18km^2, draining from the northwest from Fairyhouse Road to the east of Rathbeggan. The water body then flows in a general southwest and westerly direction before its confluence with Ward_020 east if Ballymacarney Solar Farm. Within the study area the Ward_010 displays a single thread, low sinuosity planform.

Ward_010 was visited as part of the site surveys (Water Body Crossing References: WCP07 and WCP08). The flow in the water body was observed to be predominately smooth with occasional rippled flow. Banks are steep with angles of approximately 75 degrees and heavily vegetated with shrubs and deciduous trees overhanging the channel. The channel bed is comprised of predominately silt and fine sands with rare gravels and no distinct bedforms observed. Woody debris in the channel was noted at WCP08. Discharge pipes were also noted to be present at both crossing points.

There are no existing pressures identified which may impact baseline water quality. Hydromorphological pressures include a masonry bridge at Priest Town Road and wire fences which cross the channel.

There are no known discharges or abstractions from the on or to the water body, however the presence of discharge pipes at both crossing location indicate likely agricultural discharges from adjacent fields. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system, with salmon present in the lower reaches.

12.3.5.7 Ward_030

Ward_030 forms part of the Broadmeadow_SC_010 catchment. The catchment area of Ward_030 is 32.93km^2, draining from the northwest at Muckerstown Solar Farm and flows in a general south westerly direction to its confluence with Ward_040 at Toberburr. Ward_030 displays a single thread channel with input from a number of tributaries out with the study area.

Ward_030 was visited as part of the site surveys (Water Body Crossing References: WCP12, WCP13, WCP14, WCP15, WCP16, WCP17, WCP18, WCP19). At WCP12, WCP13, WCP18 the water body was not surveyed due to landowner constraints and inaccessibility. At the remaining WCP locations, flow in the water body was observed to be of low velocity and often smooth with some ponded flow, isolated rippled flow and unbroken standing waves are also noted. Banks are steep with angles between 45 and 75 degrees and heavily vegetated with deciduous vegetation and shrubs which overhang most of the channel.

At WC14, a masonry wall occupies the bank top and at WCP17 the right bank, adjacent to the field appears to have been regraded to a 45-degree slope with soil exposed. The channel bed at the crossing locations was trapezoidal in shape. Bed material consists of predominately fine silt and sand with no distinct bedforms observed at WCP14, WCP15 and WCP19. Bed material at WCP17 was observed to be coarser with mobile gravels and rare cobbles and boulders, alongside regularly spaced loosely defined riffles. At WCP16, the water depth was too deep to observe bed material, but rippled flows and unbroken standing waves indicate that bedforms may be visible during lower flows.

Existing pressures comprise of agricultural, urban runoff, urban wastewater and other anthropogenic pressures which may impact baseline water quality. Hydromorphological pressures include a pipe culvert and a masonry arch culvert on Newpark Road.

There are no known discharges or abstractions from or to the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Ward River System is an important salmonid system, with salmon present in the lower reaches.

12.3.5.8 Sluice_010

Sluice_010 forms part of the Mayne_SC_010 catchment. The catchment area is 25.90km2, draining from the eastwards from its source north of Dublin Airport prior to discharging to the Irish Sea at Portmarnock. Sluice_010 displays a single thread channel within the study area. Out with the study area there are a number of tributary inputs.

Sluice_010 was visited as part of the site surveys (Water Body Crossing Reference: WC20). The flow in the water body was observed to be alternating smooth and rippled flow. Banks were noted to be steep with angles ranging between 45 and 70 degrees and heavily vegetated. Some minor undercutting was observed along the right bank where tree roots were exposed. Bed material consists of silts, fine sands, coarse gravel with occasional cobbles. The silt was observed to smother the coarser bed material and some woody debris was noted on the channel bed. Riparian vegetation was observed to be dense consisting of grasses, shrubs, hedges and deciduous trees which overhand the channel.

The EPA Mapper identifies anthropogenic influence as an existing pressure on the Sluice_010 which is likely related to the number of times it is crossed by existing infrastructure. Hydromorphological pressures include a discharge pipe located downstream of the crossing and multiple infrastructure crossings.

There is one recorded discharge location (a storm water overflow, registration number: D0021-01) at Kinsealy. There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River. Consultation with IFI indicates that the Sluice River system supports a resident population of Brown trout within the lower reaches.

12.3.5.9 Mayne_010

Mayne_010 forms part of the Mayne_SC_010 catchment displaying a catchment area of 20.29km2. The single thread channel drains eastwards from Dublin airport, prior to discharge to the Irish Sea. Mayne_010 forms two mains channel which converge at the confluence north of Belmayne.

Mayne_010 was visited as part of the site surveys (Water Body Crossing Reference: WCP21). The flow in the water body was observed to be alternating smooth and rippled flow with unbroken standing waves in the rippled sections. Banks were noted to be comprised on the left bank of masonry wall and the right bank appears to have been regraded to a 45 degree slope.

The channel bed is composed of concrete at the crossing location. When the concrete bed ends, bed material was noted to comprise of sands, gravels and cobbles with rare boulders. Coarse sediment appears mobile forming riffles upstream of the existing crossing location where the channel bed gradient steepens locally. Riparian vegetation is observed to consist of dense vegetation including shrubs, hedges and deciduous trees which overhand the channel margins along the left bank. Where the masonry wall is present, riparian vegetation is absent.

Existing pressures include urban runoff which may impact upon baseline water quality. Hydromorphological pressures include a discharge pipe located downstream of the crossing point and a concrete bed at the proposed WCP.

There are two recorded discharge points, one to the north of Clonshaugh Business Park at the Airport Motorway Interchange (Registration Number: D0034-01), and another at the intersection between the R123 Moyne Road and the R106 Coast Road (Registration Number: D0034-02) that may impact baseline water quality. There are no known abstractions from the water body. The water body is not designated at risk under WFD from water abstraction, additionally, the water body is not a designated Drinking Water Protected River.

12.3.5.10 Unnamed Non-Designated Watercourses

There are numerous unnamed non-designated watercourses within the 250m study area. These are straightened land drains / ditches. A number of these unnamed watercourses (See Table 12.6) will be crossed by the Proposed Development. Those unnamed watercourses that are within the study area but are not proposed to be crossed by the Proposed Development have been scoped out of this assessment as it is not considered there will be any impacts on these as a consequence of the Proposed Development during the Construction or Operational Phases. The unnamed watercourses that are crossed by the Proposed Development have been named from west to east to be included within the assessment. Table 12.6 details the unnamed watercourses and their baseline description.

Table 12.6: Unnamed Watercourse Crossings

Watercourse	Approximate Chainage	Baseline Description	Crossing type
Unnamed Watercourse 1	1050	These watercourses were not visited as part of the site surveys. Ordnance Survey (OS) mapping and aerial imagery indicate the channels display straightened single thread planforms over the entire length. Riparian vegetation is dominated by improved pasture and vegetation lining the banks including deciduous trees. Aerial imagery of the channel is obscured by riparian vegetation making further characterisation difficult.	Off road.
Unnamed Watercourse 2	1600		Off road.
Unnamed Watercourse 3	2750		Off road.
Unnamed watercourse 4	4020		In-road.
Unnamed Watercourse 5	5900		In-road.
Unnamed Watercourse 6	6000		In-road.
Unnamed watercourse 7	7000		No crossing but runs parallel to works area.
Unnamed Watercourse 8	7900 – 8000		No crossing but runs parallel to works area.
Unnamed Watercourse 9	8100		In-road.
Unnamed Watercourse 10	8250		In-road.
Unnamed Watercourse 11	8350		In-road.
Unnamed Watercourse 12	8460		Not crossed but runs parallel to works area.
Unnamed Watercourse 13	8750-9300		In-road.
Unnamed Watercourse 14	9150 - 9250		In-road.

Watercourse	Approximate Chainage	Baseline Description	Crossing type
Unnamed Watercourse 15	9350		In-road.
Unnamed Watercourse 15A	9800		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 16	10425		In-road.
Unnamed Watercourse 17	10950 – 11025		In-road.
Unnamed Watercourse 18	11450		In-road.
Unnamed Watercourse 19	11950		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 20	12100 - 12225		In-road.
Unnamed Watercourse 21	13900 – 15100		In-road.
Unnamed Watercourse 22	14450		In-road.
Unnamed Watercourse 23	14450 - 14950		In-road.
Unnamed Watercourse 24	15250 - 15475		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 24A	16800		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 25	17050		In-road.
Unnamed Watercourse 26	19700-19825		Unclear if crossed by existing road. If watercourse extends upstream this will be an in-road crossing.
Unnamed Watercourse 27	20375		In-road.
Unnamed Watercourse 28	21350		Off-road.
Unnamed Watercourse 29	21600 - 22100		Off-road – Unclear if crossed. If watercourse extends upstream this will be an offroad crossing.
Unnamed Watercourse 30	25500-25550		In-road not crossed runs parallel to the proposed cable route.
Unnamed Watercourse 30A	28000		In-road, not crossed, flows parallel with the proposed cable route.
Unnamed Watercourse 30B	28250		In-road.
Unnamed Watercourse 31	30150 – 30475		In-road.
Unnamed Watercourse 32	30750 – 31150		Not crossed, runs parallel to works area.
Unnamed Watercourse 33	31150-31650		In-road.
Unnamed Watercourse 33A	34700		Off-road.
Unnamed Watercourse 34	35225		Off-road.
Unnamed Watercourse 35	36600		Off-road.

12.3.6 Flood Risk

A separate site-specific Flood Risk Assessment has been completed for the Proposed Development. A copy of the FRA report is included in Appendix A12.1 in Volume 3 of this EIAR. Given the connectivity between this

assessment and the FRA, a summary of the baseline flood risk and the assessment of future risk from the FRA is provided in this Chapter for ease of reference. The FRA has been prepared in accordance with the Flood Risk Guidelines (DEHLG and OPW 2009).

The FRM Guidelines define three Flood Zones:

- Flood Zone A – where the probability of flooding from rivers and the sea is highest (greater than 1% Annual Exceedance Probability (AEP) or 1 in 100 year for river flooding or 0.5% AEP or 1 in 200 for coastal flooding);
- Flood Zone B – where the probability of flooding from rivers and the sea is moderate (between 0.1% AEP or 1 in 1,000 year and 1% AEP or 1 in 100 year for river flooding and between 0.1% AEP or 1 in 1,000 year and 0.5% AEP or 1 in 200 year for coastal flooding); and
- Flood Zone C – where the probability of flooding from rivers and the sea is low (less than 0.1% AEP or 1 in 1,000 for both river and coastal flooding). Flood Zone C covers all areas which are not in Flood Zone A and Zone B.

The majority of the Proposed Development is located in Flood Zone C, apart from localised areas in close proximity to watercourses. A detailed baseline assessment of flood risk, including flood zone mapping, is provided in Appendix A12.1 in Volume 3 of this EIAR.

12.3.7 Summary of Receptor Importance

Table 12.7 provides an indication of importance for the identified receptors based on NRA Guidelines as discussed in Section 12.2.4.

Table 12.7: Summary of Scoped in Baseline Receptor Importance.

Water Body ID	Attributes	Indicator/Feature	Importance
Dunboynestream_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of potentially mobile gravels a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Rye Water_030	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of potentially mobile gravels. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Tolka_020	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites. Supports populations of salmonids.	High
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Pinkeen_010	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium

Water Body ID	Attributes	Indicator/Feature	Importance
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_020	Hydrology and Surface Water Quality	Water body has a moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to be attempting to recover to natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Ward_030	Hydrology and Surface Water Quality	Water body has Moderate WFD status and is >5km from European or national designated sites.	Medium
	Hydromorphology	Water body appears to generally be in natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Sluice_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body appears to generally be in natural equilibrium with evidence of a limited range of fluvial processes. Water body is subject to some anthropogenic modification.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Mayne_010	Hydrology and Surface Water Quality	Water body has poor WFD status and is >5km from European or national designated sites.	Low
	Hydromorphology	Water body is modified and is engineered. However, displays some evidence of natural features indicating an attempt to recover to a natural equilibrium.	Medium
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A
Unnamed Watercourses 1 to 35	Hydrology and Surface Water Quality	Water body is not designated under WFD and is >5km from European or national designated sites.	Low
	Hydromorphology	Water bodies are straightened and channelised with potential to be largely constrained by hard engineering or lack of morphological diversity in features and process. Watercourses may be subject to drying up during summer months.	Low
	Surface Water Supply	No surface water abstractions have been identified within the study area.	N/A

12.4 Potential Impacts

This Section presents potential impacts that may occur due to the Proposed Development on the identified and in-scope receptors. All potential impacts are identified in the absence of control measures or mitigation. The assessment informs the need for mitigation and / or monitoring measures, which are presented in Section 12.5. Section 12.6 presents the predicted residual impacts, following the implementation of these mitigation and / or monitoring measures.

12.4.1 'Do Nothing' Scenario

If the Proposed Development does not go ahead, there will be no change to baseline surface water conditions as a result of the Proposed Development. The impact would therefore be Neutral.

12.4.2 Construction Phase

Key infrastructure and construction activities required for the Proposed Development are described in detail in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. The proposed construction timeline, the location of Temporary Construction Compounds (TCCs) and Horizontal Directional Drilling (HDD) Compounds, the duration of any necessary traffic diversions, hours of working and numbers of personnel involved are also outlined in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

Given the nature of the Proposed Development, the potential for impacts on the water environment, is for the most part, associated with the Construction Phase, and are similar to any civil engineering project. These include potential impacts on:

- Surface water quality from sediment runoff, spillages, discharges or physical modification;
- Drainage patterns from formation of impermeable surfaces and working in or near water bodies;
- Working within water bodies and disturbing natural bed material and features; and
- Flood risk.

Construction impacts for the proposed cable route are assessed based on the construction methodology provided in Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR. This involves open cut trenching, and such construction methods will require the provision of a dry working area. Provision of a dry working area will be undertaken using techniques outlined in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. These techniques include temporary watercourse diversions (where practicable i.e. where there are no topographical or space constraints), fluming and over pumping. Where watercourses are flumed or over pumped, the dry works area will be isolated by installing an impermeable barrier between the watercourse and the works area. The impermeable barrier will be tailored to the watercourse in question. Techniques will include the use of inflatable dams, frame dams, or sandbags in smaller watercourses. For larger watercourses, water will be carried over or around the isolated dry works area.). It is noted that consultation with IFI indicates that temporary diversions are preferred, with fluming second to this and over pumping least preferred. Therefore, the appointed contractor will consult IFI prior to a final decision being made on water crossing techniques.

Where possible, provided that there is no risk of excessive scour and favourable topographical and space constraints, any temporary diversions will be within the footprint of the existing channel. Where temporary diversions are not achievable due to space or topographic constraints, fluming or over pumping will be utilised. This will have a direct impact on the cross section of the channel and is expected to give rise to localised changes in water depth, velocities and sediment erosion / deposition. Once the underground cable crossing is completed, the landscape will be restored as described in Chapter 4 (Proposed Development Description) Section 4.5.2.5 in Volume 2 of this EIAR. These works will include riverbank stabilisation, gravel replacements, bank reprofiling and vegetation planting should they be required post construction. In all

cases, the site will be restored post-installation as described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

Construction impacts have been assessed based on the above construction methodology. Such methods allow the provisions of a dry working area whilst maintaining downstream flows.

12.4.2.1 Hydrology

12.4.2.1.1 Impact 1 – Changes in Surface Water Drainage Pathways

The proposed activities may result in localised changes to surface water drainage patterns and restrictions to infiltration of rainfall in soils. Given the largely rural locations of the Proposed Development, existing drainage networks are available, and any disturbance will be localised and temporary in duration. Surface water contributions will remain unchanged and will likely discharge to the same catchment.

12.4.2.2 Surface Water Quality

12.4.2.2.1 Impact 2 – Contaminated Runoff and Release of Sediment

Excavation works and works associated with the creation of the proposed cable route, Passing Bays and Joint Bays, alongside the storage of excavated material, vegetation clearance, crossing of water bodies and infilling of trenches can pose a risk to surface water quality through the potential for contaminated surface water runoff and the release of sediment to water bodies. In addition, surface water quality may be impacted by open cut trenching, either by the direct crossing of a water body, or from crossings in close proximity to water bodies. Elevated levels of sediment would impact on water quality by affecting dissolved oxygen, pH, turbidity, nutrient levels, and temperature, all of which have the potential to have negative impacts on aquatic species. The construction of below-ground structures, such as Joint Bays, may require dewatering (depending on ground conditions and water table elevations at the time of excavation), and any associated discharges from groundwater to surface water bodies which have the potential to alter baseline water quality.

Working adjacent to water bodies and along the bank top can induce sediment-laden runoff as a result of destabilisation and erosion of the banks due to heavy plant and machinery.

12.4.2.2.2 Impact 3 – Increased Erosion of Exposed Surfaces

The use of construction vehicles and machinery can cause increased erosion of exposed surfaces, which once exposed to rainfall, can result in excessive volumes of eroded material entering surface water features. Excessive sediment-laden runoff may potentially have a negative impact on water quality. Proposed access tracks used to facilitate construction may affect surface runoff patterns, creating alternative flow paths and may promote erosion of previously unaffected areas.

12.4.2.2.3 Impact 4 – Accidental Release of Polluting Materials

An accidental release of potentially polluting substances such as cement and oils (hydrocarbons) can result in significant impacts on the surface water environment and associated aquatic environment. The release of hydrocarbons from accidental spillages from plant, vehicles and machinery may result in a deterioration to water quality including a reduction in dissolved oxygen. This can have a negative impact on any water-dependant species present. The immiscible nature of hydrocarbons will hamper dilution until degradation is achieved.

Concrete and cement are highly alkaline and fresh concrete has corrosive properties. Concrete wash water is a particularly severe pollutant, as it typically has a high pH (11-12) coupled with extremely high suspended

sediment content. In the freshwater environment, pH levels which are elevated beyond natural conditions can have significant impacts upon water bodies.

During the Construction Phase, TCCs (including HDD Compounds) will be required along the Proposed Development. All wastewater will be collected in sealed tanks and taken off site for appropriate disposal by licensed waste contractors.

12.4.2.3 Hydromorphology

12.4.2.3.1 Impact 5 – Changes in Water Depth and Channel Cross-Section

Open cut trenching will be carried out in the dry works area which will be achieved through the installation of an impermeable barrier, the type of which will be tailored to the specific water body. The existence of a temporary impermeable barrier to facilitate open cut trenching will have a direct impact on the cross section of the channel. This is likely to give rise to localised but temporary changes in water depth and flow velocities with the potential for subsequent changes in sediment transport, erosion and deposition. This will occur over the Construction Phase, and for a short time (1 to 7 years) post-construction as the water bodies re-equilibrate.

12.4.2.3.2 Impact 6 – Removal of Riparian Vegetation

Vegetation clearance / topsoil stripping and tracking of plant and machinery within a water body floodplain and along banks has the potential to increase fine sediment delivery to water bodies through accelerated fluvial activity causing an increase in the rate of bank erosion. Construction within the floodplain leading to possible reduction in riparian corridor extents and composition along water bodies, reduction in habitat diversity, bank stability and increased risk of bank retreat. In-channel construction associated with open cut trenching can lead to the removal of natural bed substrate and natural morphological features and disruption to lengths of natural bank.

The changes to water body hydromorphology may potentially lead to changes in river processes and habitats upstream and downstream. Such impacts would occur on a local scale and will be short-term over the Construction Phase. However, impacts may be extended for a short term beyond the Construction Phase until vegetation re-establishes.

12.4.2.3.3 Impact 7 – Temporary Culverting for Construction Access

Temporary culverting to facilitate construction access has the potential to induce changes to the channel bed, banks substrate and flow patterns through accelerated fluvial activity causing an increase in the rate of bed and bank erosion and a reduction in habitat ecological connectivity.

Construction Traffic

The Proposed Development will cross three motorways (M1, M2 and M3), and a further 10 regional and local roads are expected to be affected by temporary traffic management (TTM) measures. No disruption to access is anticipated for the M1, M2 and M3 Motorways as trenchless techniques will be used to avoid direct impacts on these routes. The regional and local roads which may be affected include the R156, R157, R147, L5026 Pace, L010 Nuttstown Road, Priestown Road, Kilbride Road, the R121, R122, Kilreesk Road, R108, Naul Road and Stockhole Lane. Figure 14.5 in Volume 4 of this EIAR shows the location of regional and local roads likely to be affected by TTM measures. TTM could increase vehicle traffic on roads which would not normally experience such levels of traffic and this could lead to increased pollutant loadings from general road pollutants being washed into watercourses.

As stated, these will be temporary (limited to the Construction Phase) and will be captured by the existing road drainage network. Therefore, no significant impacts are anticipated.

12.4.2.4 Surface Water Supply

As identified within the baseline, there are no known surface water abstractions within the study area. Additionally, none of the WFD designated water bodies are designated as drinking water protected rivers, nor are they hydrologically connected to such within 5km of the Proposed Development. Therefore, no impacts to surface water supply are anticipated. This is therefore scoped out of further assessment for both the Construction and Operational Phases.

12.4.2.5 Construction Phase Impacts on Scoped in Receptors

Table 12.8 identifies the potential Construction Phase impacts on the identified and in scope receptors. Note that the unnamed watercourses were not visited as part of the site survey and have been determined using OS mapping. In some cases, OS mapping indicates unnamed non-designated and some WFD designated watercourses immediately downstream of existing road crossings but does not map them upstream. Where this is the case, it has been assumed that there is an upstream channel, but it is either not mapped and / or not designated.

Table 12.8: Potential Pre-Mitigation Impacts on Specific Water Features – Construction Phase

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
Dunboyne Stream_010	**WCP01, WCP02**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction compound TCC2 and access adjacent to the water body; • Formation of temporary access culvert; and • Open cut trench crossing of water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and discharge to the water body due to increased impermeable area from construction access tracks. The above impacts will be short-term and at a localised scale. Fluming or over pumping of the channel will be required to provide a dry working area to construct the cable crossing. This will maintain downstream flows. Therefore, the magnitude of impacts is reported as **Negligible**.	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing and to excavate around the existing culvert on WCP2 to allow for the proposed cable route; also, increased risk of sediment pollution from disturbed riverbed and bank material during construction; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. • **Impact 7** – temporary construction access crossing risk of changes to morphological features, process and ecological connectivity as a result of temporary culverting. These impacts are short-term in nature and will be confined to the construction phase. Impacts will be on a localised scale but will have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Low	Large Adverse	Moderate
		Hydromorphology	**Potential hydromorphology impacts include:**	Medium	Large Adverse	Significant

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing and temporary culvert. Provision of a dry working area and excavations required for the cable trench will temporarily remove flow from a section of channel and would also remove natural bed substrate. The requirement for temporary culverting will constrain channel cross sectional area over the culvert footprint and duration of the works; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Large Adverse**.			
Rye Water_030	**N/A**	**Main activities:** • Excavations and construction activities within 100m of water body to form construction compound TCC1; and • Operation of TCC1 during construction period.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1** - disruption to local drainage systems due to diversions required to accommodate the construction compound and access; and • **Impact 3** – increases in surface water run-off and discharge to the water body due to increased impermeable area from construction compound and access tracks. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Therefore, the magnitude of impacts is reported as **Negligible**.	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2** – increased silty water run-off and disturbance during near channel works; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a reach scale but would have the potential to impact the water body	Low	Medium Adverse	Slight

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			downstream. Without mitigation the need for working and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Medium Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, are likely to remove riparian vegetation, altering and destabilising channel banks, However the location for the works is approximately 100m from the water body, and therefore riparian vegetation removal is unlikely. Given the above, without mitigation, the magnitude of impact is reported as **Negligible**.	Medium	Negligible	Imperceptible
Tolka_020	**WCP03, WCP04**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; • Open cut trench crossing of water body; and • Upgrades to the Woodland substation which would require working adjacent to the water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Therefore, the magnitude of impacts is reported as **Negligible**.	High	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:**	High	Large Adverse	Very Significant

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2** – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing. Increased risk of sediment pollution from disturbed riverbed and bank material during construction; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale but would have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Pinkeen_010	**WCP05**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; and • Open cut trench crossing of water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1** – disruption to local drainage systems due to diversions required to accommodate the construction works; and	Medium	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 3** – increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible**.			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2** – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale but would have the potential to impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Medium	Large Adverse	Significant
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, are likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse**.	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
Ward_010	**WCP6, WCP07, WCP08**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Formation and use of construction access adjacent to the water body; and • Open cut trench crossing of water body. There are two crossings on this water body located on separate tributaries which converge downstream of Belgree Road.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible**.	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; and • **Impact 4 –** risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Low	Large Adverse	Moderate
		Hydromorphology	**Potential hydromorphology impacts include:**	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**			
Ward_020	**WCP09, WCP10, WCP11**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; and • Open cut trenching of the water body;				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1** – disruption to local drainage systems due to diversions required to accommodate the construction works; and • **Impact 3** – increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible**.	Medium	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2** – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; and	Medium	Large Adverse	Significant

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a reach scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Ward_030	**WCP12, WCP13, WCP14**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying; • Construction and use of HDD Compound and construction access; • Open cut trenching of the water body; and • This water body would be crossed in three separate locations (outwith existing road crossings).				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works and HDD compound; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding.	Medium	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. This would maintain downstream flows and discharge from runoff. Therefore, the magnitude of impacts is reported as **Negligible.**			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2** – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trenching and dry working area; • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Medium	Large Adverse	Significant
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts Are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Sluice_010	**WCP15**	**Main activities:**				

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
		• Excavations and construction activities within 50m of water body to form trenching for cable laying; • Construction and use of HDD Compound and construction access; • Open cut trenching of the water body;				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works, HDD Compound Joint Bay formation and open cut crossing; • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding; and The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of open cut trenching and the dry working area; • **Impact 4 –** risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potentially to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**	Low	Large Adverse	Moderate
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features;	Medium	Medium Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**			
Mayne_010	**WCP16**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying and Joint Bay formation; and • Open cut trenching of the water body; • Formation and use of construction access adjacent to the water body; and • Upgrade to Belcamp Substation adjacent to the water body including formation of TCC6				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction of the TCC6 and the upgrades to Belcamp Substation; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding; The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing. This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**	Low	Negligible	Imperceptible
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2 –** increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing; also increased risk of sediment pollution from disturbed riverbed and bank material during construction of open cut trenching and the dry working area;	Low	Large Adverse	Moderate

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			• **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potential to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Large Adverse.**			
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2 –** potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Medium	Medium Adverse	Moderate
Offroad Unnamed Watercourse crossings: Unnamed Watercourse 1, 2, 3, 28, 29, 33A, 34, 35	**N/A**	**Main activities:** • Excavations and construction activities within 50m of water body to form trenching for cable laying and Joint Bay formation; and • Open cut trenching of the water body; and • Formation and use of construction access adjacent to the water body.				
		Hydrology	**Potential hydrology impacts include:** • **Impact 1 –** disruption to local drainage systems due to diversions required to accommodate the construction works Joint Bay formation and open cut crossing; and • **Impact 3 –** increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks and areas of new hardstanding. The above impacts would be short-term and at the local scale. Fluming or over pumping of the channel would be required to provide a dry working area to construct the cable crossing.	Low	Negligible	Imperceptible

Water Body	Water Body Crossing	Attribute	Description of Specific Construction Impacts on Water Feature (without mitigation)	Importance	Magnitude	Significance
			This would maintain downstream flows. Additionally, construction drainage would be employed such that flows are collected on the upstream side of the works and redirected to the water body. Therefore, the magnitude of impacts is reported as **Negligible.**			
		Surface Water Quality	**Potential surface water quality impacts include:** • **Impact 2** – increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing, Passings Bays (where within 50 m of UNWC's) and Joint Bays. Increased risk of sediment pollution from disturbed riverbed and bank material during construction of the open cut trench; and • **Impact 4** – risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body. These impacts are short-term in nature and would be confined to the construction phase. Impacts would be on a local scale on both tributaries and would have the potential to cumulatively impact the water body downstream. Without mitigation the need for working in and adjacent to the channel presents a risk for deterioration in baseline water quality. Therefore, the magnitude of impact is reported as **Medium Adverse.**	Low	Medium Adverse	Slight
		Hydromorphology	**Potential hydromorphology impacts include:** • **Impact 2** – potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • **Impact 5** – in-channel works to construct the proposed open cut crossing. Provision of a dry working area and excavations required for the cable trench would temporarily remove flow from a section of channel and would also remove natural bed substrate; and • **Impact 6** – works within the vicinity of and along the banks, and is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body. These impacts would be short-term and at the local scale. Therefore, without mitigation, the magnitude of impact is reported as **Medium Adverse.**	Low	Medium Adverse	Slight

12.4.2.5.1 Construction Impacts for Proposed 'In-Road' Water Body Crossings

There are 33 locations where the proposed cable route will cross an existing water body or unnamed watercourse where that water body/watercourse is already crossed by the existing road network. A list of these crossing types is provided in Table 12.5 and Table 12.6. The potential Construction Phase impacts in these locations will differ from the ones listed in Table 12.8.

At existing road crossings, the water bodies are culverted and will therefore be sealed from potential increases in silty runoff over the culvert footprint. Additionally, due to the culvert structures, the water bodies do not have natural banks or riparian zone and therefore runoff due to erosion and removal of riparian vegetation would not occur. This can also be said for the disturbance of natural bed material which is unlikely to be present within the culverts. If natural bed material is contained within the culverts, then this would remain sealed from the works area by the culvert and therefore will not be impacted.

There is the potential for works in the road immediately before or after existing culvert crossings to generate silty runoff which could enter the upstream / downstream channel out with the culvert. Any runoff generated from the works will be captured within existing road drainage, where present.

Based on the above, the magnitude of impact for hydrology, surface water quality and hydromorphology for the water bodies which the Proposed Development will cross within the existing road structure is reported as Negligible. This results in an Imperceptible significance of impact for all water bodies associated with in-road crossings.

12.4.3 Operational Phase

During the Operational Phase of the Proposed Development, all new cable infrastructure will be located below-ground and will not interface with surface water receptors.

There is a requirement for a permanent crossing of the Dunboyne Stream_010 to allow for the provision of the new permanent access track extending north from the R156 Regional Road to Joint Bay 1. At the time of writing, there is little design information available on the arrangement and type of watercourse crossing (i.e., culvert or bridge). Further work will be undertaken at the detailed design stage to develop the crossing design. Therefore, for the purpose of this EIAR, as a precautionary approach, it is assumed that the crossing will take the form of a pipe culvert. It is assumed that the temporary culvert (for the proposed construction access track) will also form the operational culvert upon completion.

12.4.3.1 Hydrology and Surface Water Quality

During the Operational Phase of the Proposed Development, all new cable infrastructure will be located below-ground and will not interface with surface water receptors. As the land will continue to drain as per the existing situation along the proposed cable route, significant adverse impacts on drainage infrastructure as a result of the Proposed Development are not anticipated.

The proposed substation upgrades at Belcamp and Woodland are upgrades that will occur within the existing substation footprints in the context of existing grid infrastructure. The substations will continue to function as they do under baseline conditions (in terms of the surface water environment) with no changes to existing or new discharges. Therefore, no operational impacts are anticipated.

12.4.3.2 Hydromorphology

Site restoration works will be carried out following completion of any water body crossings, as described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR), to baseline conditions or to provide betterment, thereof. All restoration will be in agreement with IFI. These works will include riverbank

stabilisation, gravel replacements and replacements of local riparian vegetation etc. Each water body crossing location will be restored post-installation. The upgrades to the substations at Belcamp and Woodland will be contained within the existing substation footprints and will not encroach on any water body. Any riparian vegetation removed during construction will be reinstated and is expected to recover.

During the Operational Phase of the Proposed Development all new cable infrastructure will be located below-ground and will not interface with surface water receptors.

Given the need for a permanent culvert crossing of Dunboyne Stream_010, there is the potential for changes in the baseline hydromorphology of the water body. The crossing will cause a permanent removal of the bed and banks over the crossing footprint. There will be a loss of lateral and longitudinal fluvial and ecological connectivity and the removal of hydromorphological features over the culvert footprint. The culvert also has the potential to alter channel flow patterns through the slackening or steepening of channel gradients. This has the potential to lead to downstream erosion and instability of the natural channel, with the potential for erosion to migrate upstream. This will be a permanent and initially localised impact, with the potential for erosion to migrate upstream to the culvert. The magnitude of impact is therefore reported as **Large Adverse** and given the sensitivity of the receptor this equates to a Significant magnitude of impact.

12.5 Mitigation and Monitoring Measures

12.5.1 Construction Phase

12.5.1.1 Mitigation Item 1 – General Mitigation

The following mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase:

- The Construction Environmental Management Plan (CEMP), (which is included as a standalone document in the planning application pack), and its associated appendices (Appendix C - Construction Resource Waste Management Plan (CRWMP) and Appendix D - Surface Water Management Plan (SWMP)) will be implemented in full. General measures to control and manage activities, surface water, drainage and waste at the surface to prevent issues are outlined within Sections 1 to 5 of the SWMP and Sections 1 to 4 of the CEMP. The measures include general mitigation to control accidental spillage or increased runoff as a result of hardstanding or precipitation infiltration into stockpiles, exposed soils and silt;
- A full-time on-site Environmental Clerk of Works (EnCoW) will be appointed prior to the commencement of works. The role of the EnCoW will be to monitor and report on compliance with planning consents, environmental permits, legislation and mitigation. The EnCoW will be experienced in the types of construction works that are being carried out;
- Works will be carried out in accordance with the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016);
- Works method statements will be agreed with IFI for all water body crossings, prior to works commencing at each crossing. The works method statement will include details on monitoring requirements for instream concrete pouring works and handheld turbidity monitoring for instream works. The method statements will ensure that:
    - Prior to the concrete pour taking place, all mitigation for turbidity and erosion control will be checked to ensures it is fit for purpose;
    - Established concrete washout management areas will be designated to control the discharge of concrete washout;
    - An emergency response plan will be developed and communicated to site staff prior to the concrete pouring;

    - The EnCoW and on-site personnel will monitor the concrete pour continuously, ensuring that any spills are promptly addressed and mitigated; and
    - The EnCoW will conduct a thorough inspection of the site after the concrete pour to identify any environmental impacts and implement clean-up measures if necessary.
- An adverse weather stop work plan will be developed to ensure that activities with the potential to cause pollution are stopped under certain weather conditions. Met Éireann (red, amber, yellow) warnings will be monitored daily by the EnCoW by accessing the Met Éireann website (Met Éireann 2024). Works will be stopped where red weather warning are issued. Where an amber weather warning is issued, works will be monitored by the EnCoW and stopped where deemed appropriate based on the site conditions.

12.5.1.2 Mitigation Item 2 - Surface Water Quality Protection Measures

The following surface water quality mitigation measures will be implemented prior to commencement, and throughout the duration of the Construction Phase. Works will only be completed outside of any known seasonal restrictions including instream working restrictions which are generally confined to the summer/early autumn season (i.e., June / July / August / September):

- Activities will be planned in advance and machinery will be managed to ensure that the number of trips is limited to the minimum required at each location;
- A buffer zone of 20m will be maintained between storage and working areas and WFD designated water bodies (as listed in Table 12.7), taking account of the minimum working area required to facilitate the works;
- Oil or fuel stored in or adjacent to the works area will be kept in a bunded area (providing 110% capacity of the largest storage unit), at a minimum distance of 20m from any WFD designated water body, or any non-designated water body that appears on a 1:50,000 OS map. This will include all unnamed watercourses as listed in Table 12.7;
- Tracking beside streams and tracks will be avoided where practicable to avoid damage to the bankside. Where tracking of plant and machinery is necessary, steps will be taken to reduce the impact to channel banks through the provision of track mats to reduce the impacts on the substrate;
- Geotextile or timber matting will be used on soft ground unless the EnCoW advises, before or after monitoring, that use of a wide-tracked machine alone, will produce relatively lower siltation risk, than the installation and removal of bog mats;
- The time period over which areas of clearance are left open will be reduced insofar as is reasonably practicable;
- Re-instatement method statements will be subject to approval by the EnCoW. Species local to the surrounding area will be used in the reinstatement for any vegetation lost during construction, as described in Chapter 10 (Biodiversity) in Volume 2 of this EIAR;
- Concrete will be brought to site by covered truck;
- Wet concrete operations adjacent to water bodies will be avoided, where possible, with a minimum separation distance of 20m, with exception to in-stream pours which will be undertaken within a sealed dry working area. The appointed contractor will ensure that all concrete truck washing / cleaning is undertaken off site, where possible, and remote from water bodies or potential pathways to water bodies;
- In order to reduce the risk of contamination arising as a result of spills or leakages, measures including, but not limited to, the following will be employed:
    - All collected waste will be managed in accordance with Number 10 of 1996 - Waste Management Act, 1996 (as amended), and all associated Regulations;
    - Fuels, chemicals, liquid and solid waste will be stored on impermeable surfaces;
    - All tanks and drums containing potentially polluting materials will be bunded;

    - Refuelling of plant, equipment and vehicles will be carried out on impermeable surfaces; and
    - All tanks will be marked with the substances they are carrying. Tanks will not be emptied and refilled with another substance (i.e. emptied of fuel and refilled with water) prior to appropriate cleaning and removal of contaminating substances.
- Spill kits will be provided at all compound locations and carried by all crews during underground cable installation works. Spill kits will be of adequate size for the volume of substances being carried;
- The Emergency Incident Response Plan and environmental control and mitigation measures described in the CEMP will be agreed prior to construction with IFI; and
- Water pumped from the dry works areas and dewatering will be treated using settlement tanks to remove sediment prior to discharge onto grass and allowed to filter back to water body

12.5.1.3 Mitigation Item 3 - Silt Control Measures

- Silt control measures will be used to control silt generated from activities on-site and prevent it gaining access to surface drainage which could convey silt to larger streams and water bodies;
- Silt traps will be located in small drains where flow is small and silt fences will be located where runoff from large areas needs to be controlled;
- Silt fences will be installed in the working areas and not at the water body;
- Where distances between the works and water body allow, a minimum setback distance of 20m from the water body will be maintained;
- Proposed construction access routes will be delineated, such that an appropriate set back distance from water bodies is maintained;
- Where an appropriate set back distance cannot be maintained, and works are to be undertaken adjacent to water bodies, the setback distance will be delineated and monitored by the EnCoW on-site;
- Where the site is constrained, the best available set back distance will be determined by the EnCoW, taking account of the minimum working area required to facilitate the works;
- Clearing and stripping of topsoil or existing roads and footpaths that expose underlying granular layers at each phase of works will be delayed as long as possible, and will be carried out shortly before construction begins; and
- Cut-off ditches, berms or diversion channels will be utilised around working area boundaries, where possible, to limit surface water entering the excavated areas and silty water running off the site into surface water drains or watercourses.

12.5.1.3.1 Silt Traps

The purpose of a silt trap is to reduce the level of solids in slow flowing water. The silt trap works by allowing a build-up of water behind it slowing the flow and allowing solids to settle out. The following requirements will apply during the Construction Phase:

- Silt traps will be placed in drains downstream of working areas where the volume of water flow is expected to be low and will be identified on-site by the EnCoW;
- Silt traps will be made of terram, not mesh;
- The silt trap will be staked into the banks of the drain / water body, such that no water can flow around the sides;
- The material will be bedded into the drain bed / water body to prevent water flowing beneath it;
- The height of the trap will be lower than the bank heights. The upper edge will be fixed to a timber cross piece. This will allow water to overtop the silt trap and not burst through or around it;

- Inspections will be carried out daily during the proposed Construction Phase works by the EnCoW, and after heavy rains and / or strong winds; weekly on completion of the works for at least one month, and monthly thereafter until bare areas have developed new growth;
- Any build-up of solids will be carefully removed without removing any vegetation growing on the bottom;
- The silt trap will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

12.5.1.3.2 Silt Fences

The following measures will be implemented in relation to silt fences during the Construction Phase:

- Silt fences will be installed prior to the commencement of works and will be inspected daily by the site team and EnCoW to inform adaptive management, as required. The locations of the same will be determined by the EnCoW;
- Site restoration post-works will be carried out, in agreement with IFI. These works will include riverbank stabilisation, gravel replacements, bank profiling and planting where required. In all cases, the site will be restored post-installation;
- Silt fences will be installed downslope of the area where silt is being generated;
- The silt fence will contain the area where silt is generated and will terminate on high ground (i.e., an elevated area not adjacent to any watercourse);
- The base of the silt fence will be bedded at least 15cm to 30 cm into the ground at 2m intervals. The manufacturer's installation instructions will be followed during installation to ensure that the silt fence is appropriately installed;
- Once installed, the silt fence will be inspected regularly by the EnCoW, daily during the proposed Construction Phase works, and regularly on completion of the works until bare areas have developed new growth, but particularly after heavy rains and / or strong winds. Any defects will be rectified immediately;
- Two lines of silt curtain / fence will be installed for the receptors outlined in Table 12.7, unless otherwise agreed by the EnCoW;
- Any build-up of sediment along the fence boundary will be removed daily;
- Silt fences will be maintained until vegetation on the disturbed ground has re-established;
- The silt fencing will be left in place until the works are completed (which includes removal of any temporary ground treatment) and will remain in place until bare areas have developed new growth;
- Silt fences will not be removed during heavy rainfall;
- The silt fence will not be pulled from the ground but cutaway at ground level and posts removed; and
- A record of when it was installed, inspected and removed will be maintained by the EnCoW as part of the site works package.

12.5.1.4 Mitigation Item 4 - Construction Compounds / Laydown Areas

All proposed TCCs and HDD Compounds will be secured with hoarding / fencing around the compound perimeters, as appropriate. Where temporary construction areas are required and existing hardstanding is not available, engineered stone fill will be laid, compacted, and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition. Temporary facilities will be provided at the TCCs / HDD Compounds,

including Construction Phase car parking and welfare facilities and temporary material storage areas, as necessary.

Where a construction access route is required, engineering stone fill will be laid and compacted and maintained as required for the duration of the works. Once the works are completed, the engineered stone fill will be removed, and the land will be reinstated to its original condition. All construction workers will be required to use the designated access / egress routes only. Storage of fuel and refuelling will be undertaken within bunded areas.

Any discharges from temporary welfare facilities will be connected to either the existing sewage network (where available) or to a sealed holding tank to be emptied and disposed of off site by a licensed contractor to an approved licensed facility.

Storage of fuel and refuelling will be undertaken within bunded hardstanding areas. Water will be brought to site via tankers, as required. Where a potential flood event is forecast, plant and materials vulnerable to flooding in any 'at risk' compounds areas will be relocated to parts of the compound that are considered to be not at risk of flooding.

12.5.1.5 Mitigation Item 5 - Open Trench Water Crossings

As with all construction works proposed, no works on water bodies will be allowed to commence until the relevant Risk Assessment Method Statements (RAMS) and pertinent Health and Safety documents are received from the specialist appointed contractor and are reviewed and agreed by the Client's representative. The appointed contractor documents will include method statements, open trenching risk assessments and environmental management plans specific to the area where the trenching is to take place. These plans will be submitted by the appointed contractor to the Employer's Representative on-site for review and comment, prior to commencing open trench operations. In addition to this, for the in-channel crossings, the appointed contractor will be required to prepare detailed construction method statements. Such method statements will be provided to IFI for approval.

All open trenched water body crossings will take place during the June to September period in order to avoid the period of salmon and trout spawning, unless otherwise agreed with IFI. Consultation to-date with IFI indicates that for the crossings of the Tolka_020 (WB06), as a minimum, instream timing restrictions will apply as per the Guidelines on Protecting Fisheries During Construction Works in and Adjacent to Waters (IFI 2016).

The ground preparation works (such as soil stripping and hardstand formation) adjacent to the water body crossing will be carried out in the same manner as that for other works activities. All clean coarse surface material (gravel, cobbles and boulders) on the riverbed or stream to a depth of 30cm will be removed. Where a depth of 30cm is not present, the full depth of the layer will be removed to where the substrate is mainly clay or sand. Any natural bed substrate removed from water bodies will be stored separately to other stockpiled material and covered with suitable waterproofing (geotextile base and cover) to prevent the washing out of fines such that they can be reinstated upon completion of the works.

Design options considered for open cut crossings include the following:

- Temporary watercourse diversions;
- Fluming; and
- Over pumping.

An exercise was undertaken to look at the required space needed to temporarily realign the channels during construction, and this concluded that temporary realignment would not be feasible within the footprint of the Proposed Development due to the limited space available within the planning application boundary and / or the presence of nearby infrastructure. Following consultation with IFI to-date, fluming was agreed to be the

preferred option to over pumping (see Section 3.5.2.4 in Chapter 3 (Consideration of Reasonable Alternatives) in Volume 2 of this EIAR).

Where sites can be flumed, the diameter of the flume pipe will be chosen to accommodate flows at the time, with spare capacity to cover that predicted over the period that the works are expected to last. A clay material will be used around the flume pipe to create a seal and prevent leakage and loss of flow volumes. Image 4.21 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR includes an example graphic of a typical flume pipe crossing.

Where fluming cannot be achieved, and damming and pumping methods are to be used for open trenching, sandbags will be used with an impermeable barrier. Material excavated from the trench (and an upstream pump sump, if required) will be placed on terram on level ground as far back from the water body edge, as is practicable, and surrounded on its downslope side by a silt fence and / or impermeable berm to prevent material re-entering the water body. This material, if deemed suitable, can be used to partially backfill the trench. However, a significant amount of material will be in excess and will be removed from site by a suitably licensed handler to a suitably licensed facility. All pumps will be monitored on a daily basis, and if failure occurs, pumps will be repaired or replaced as soon as possible.

Dewatering of the excavation will be treated on-site, and where necessary, pumps will be used to remove excess water from excavations. De-watering volumes will be treated using settlement tanks before the settled water is returned to the water body. A second tank in series with the first will be used if the first is not sufficient to remove enough solids. Pumped over water will be directed to a splash plate to prevent erosion of the riverbed / bank at the downstream outlet.

The natural bed material removed which was set aside will be used to reinstate the stream bed after the ducts have been installed and the flume pipe has been removed, as well as all the damming materials. The stream bed will be reinstated at the same level and grade as it was prior to the works to ensure that there are no changes in channel bed gradient.

All bank surfaces will be reinstated using biodegradable stabilising materials (e.g. coir matting), which will be allowed to degrade and revegetate naturally from wind-blown seed. A silt fence will be placed along the riverbank where the works were undertaken to prevent solids washed off during heavy rainfall from entering the stream while the surface re-vegetates. This measure will be particularly important at sites which slope to the edge of the water body. Visual monitoring, supported by visual turbidity monitoring of receiving waters, will be conducted by appointed contractor's EnCoW for the duration of the works. Post-reinstatement, weekly monitoring will also be undertaken until vegetation is established.

Where temporary culverts are required, they will be designed with input from a fluvial geomorphologist during the detailed design phase. At a minimum they will:

- Not lead to changes in channel gradient upstream, through and downstream of the structure;
- Have buried inverts and be embedded with material removed from the channel during construction. This will aid in maintaining fluvial process and ecological connectivity;
- For the detailed design of the crossing structure, climate change will be considered to ensure the culvert is adequately sized.

12.5.2 Pre-Construction / Detailed Design

In relation to the proposed permanent crossing of the Dunboyne_010 water body, an options appraisal will be undertaken at the detailed design stage to outline the most appropriate crossing methodology. Mitigation Item 6 is provided based on a culverted crossing method (a precautionary approach, as described in Section 12.4.3). For clarity, bridge crossing mitigation measures are provided in Mitigation Item 7, should a bridge crossing be selected as the most appropriate option at the detailed design stage.

12.5.2.1 Mitigation Item 6 – Permanent Culvert Crossing

In relation to the proposed permanent culvert crossing on Dunboyne Stream_010, the detailed design stage will consider the following:

- The culvert will be positioned on the straightest part of the water body and aligned with the water body bed in this location;
- Culvert lengths will be the minimum required to facilitate the crossing;
- Bottomless or clear span culverts will be favoured during the detailed design stage with respect to closed pipe culverts;
- All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse (and will be agreed with IFI during the detailed design stage);
- Where possible, pre-cast elements for culverts and concrete works will be used;
- Culverts will be installed such that, where practicable, they align with the existing channel gradient and maintain existing channel width. This will help to ensure adequate water depth and velocity for fish passage;
- The natural riverbed level and slope will be maintained, by burying the culvert invert below the natural bed level. The culvert invert will be embedded to a minimum depth of 300mm (millimetres), or as agreed with IFI during the detailed design stage;
- All guidance / mitigation measures proposed by the OPW or the IFI will be incorporated into the detailed design of the proposed culvert;
- A sediment retention system (e.g. baffles) will be installed within culverts, where required, based on channel gradient and likely flow conditions;
- A low flow channel will be considered during the detailed design stage to account for periods of low flow during summer months. The low flow channel will be designed in conjunction with the hydraulics of the culvert with input from an experienced fluvial geomorphologist; and
- Energy dissipation at culvert outlets (where deemed necessary, based on hydraulic analysis during the detailed design stage) will be designed with reference to appropriate guidance and technical standards guidance.

12.5.2.2 Mitigation Item 7 - Permanent Bridge Crossing

In relation to the proposed permanent crossing on Dunboyne Stream_010, should the detailed design identify a bridge crossing as the preferred option, the detailed design will consider the following:

- Abutments will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. This will help to minimise or prevent the need for bed and bank reinforcement, reduce the risk of creating a barrier to fish passage and will allow mammal passage under the bridge structure;
- The distance between the bridge abutments will be designed to be as wide as possible to maintain the bank habitat, maximising the riparian corridor and allowing the water body some space to move;
- The natural channel width will be maintained;
- The foundations (of abutments) will be buried deep enough to minimise or prevent the need for bed or bank reinforcement or bridge weirs or aprons. This will maintain the natural bed material and bed levels, protecting habitat and allowing fish passage;
- The foundations will be buried deep enough to allow for scour during high flows. A suitably qualified engineer or geomorphologist will be consulted to advise on an appropriate depth;
- The structure will be designed to facilitate the passage of woody debris;
- The requirements for bed and bank reinforcement will be considered, only if the risk of erosion cannot reasonably be eliminated through the above measures;

- The length of bed and bank protection will be restricted and green bank protection measures will be implemented, where applicable;
- Bridge piers / abutments will be designed to minimise impacts on morphological processes such that abutments are set back on the floodplain. In-channel structures will not be favoured as part of the detailed design; and
- The crossing location will be identified with input from an experience geomorphologist to identify preferential crossing locations within the Planning Application Boundary in relation to channel alignment.

12.5.3 Operational Phase

12.5.3.1 Mitigation Item 8

- Regardless of the crossing type selected and designed for the proposed permanent crossing of the Dunboyne_010 water body, post-construction management and maintenance will be carried out and will include sediment and debris clearance, riparian vegetation management, and structure repair or maintenance as and when required by regular inspection.

12.6 Residual Impacts

12.6.1 Construction Phase

Table 12.9 shows the predicted residual impacts for surface water features, following the implementation of mitigation and monitoring measures during the Construction Phase.

Table 12.9: Predicted Residual Impacts on Specific Water Features Post Mitigation – Construction Phase

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
Dunboyne Stream_010: WCP1 and WCP2	Hydrology	• Disruption to local drainage systems due to diversions required to accommodate the construction works; • Increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks; and • Impacts will be temporary and confined to the construction period.	Low	Negligible	Imperceptible	N/A	Negligible	Imperceptible
	Surface water quality	• Increased silty water run-off and disturbance during in and near channel works to construct the open trench crossing and to excavate around the existing culvert on WCP 2 to allow for the proposed cable route; • Increased risk of sediment pollution from disturbed riverbed and bank material during construction; • Risk of chemical pollution resulting from accidental releases of fuel, oils, cementitious material (or other polluting substances) while working adjacent to and within the water body; and • Impacts will be temporary and confined to the construction period and a short period after until vegetation re-establishes.	Low	Large Adverse	Moderate	Mitigation Items 1 - 5	Negligible	Imperceptible
	Hydromorphology	• Potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; • In-channel works to construct the proposed open cut crossing and temporary culvert. Provision of a dry working area and excavations required for the cable trench would	Medium	Large Adverse	Significant		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
		temporarily remove flow from a section of channel and would also remove natural bed substrate; • Works within the vicinity of and along the banks, is likely to remove riparian vegetation, altering and destabilising channel banks. These impacts are likely to lead to increased erosion and sediment input into the water body; and • Impacts will be temporary and confined to the construction period.						
Rye Water_030	Hydrology	• Disruption to local drainage systems due to diversions required to accommodate the construction works; • Increases in surface water run-off and thus discharge to the water body due to increased impermeable area from construction access tracks; and • Impacts will be temporary and confined to the construction period.	Low	Negligible	Imperceptible	Mitigation items 1-4	Negligible	Imperceptible
	Surface Water Quality	• Sediment laden runoff as a result of TCC1 construction compound; and • Impacts will be temporary and confined to the construction period.	Low	Medium Adverse	Slight		Negligible	Imperceptible
	Hydromorphology	• Potential fine sediment input from construction activities as described above for surface water quality. This is likely to lead to changes to morphological features and processes (if present), including smothering of bed substrate and depositional features; and • Impacts will be temporary and confined to the construction period.	Medium	Negligible	Imperceptible		Negligible	Imperceptible
Tolka_020: WCP03 and WCP04	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	High	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	High	Large Adverse	Significant		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Pinkeen_010: WCP05	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_010: WCP07 and WCP08	Hydrology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Low	Large Adverse	Moderate		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_020: WCP06, WCP09, WCP010, WCP11	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Ward_030: WCP12, WCP13, WCP14, WCP15 WCP16, WCP17, WCP18, WCP19	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Medium	Large Adverse	Significant		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Sluice_010: WCP20	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Large Adverse	Moderate		Negligible	Imperceptible

Construction			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water crossing point ID	**Attribute**	**Impact Summary**	**Importance**	**Magnitude**	**Significance**		**Magnitude of Impact**	**Significance**
	Hydromorphology	• As for Dunboyne Stream_010 (WCP01 and WCP02)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Mayne_010: WCP21	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Large Adverse	Moderate		Negligible	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP0)	Medium	Medium Adverse	Moderate		Small Adverse	Slight
Unnamed Watercourses 1, 2, 3, 7, 8, 12, 17,28, 29, 30, 32, 34 and 35	Hydrology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Negligible	Imperceptible	Mitigation items 1-5	Negligible	Imperceptible
	Surface water quality	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Medium Adverse	Slight		Small Adverse	Imperceptible
	Hydromorphology	• As for Dunboyne Stream_010 (WCP1 and WCP2)	Low	Medium Adverse	Slight		Small Adverse	Imperceptible

12.6.2 Operational Phase

Table 12.10 shows the predicted residual impacts for surface water features during the Operational Phase, following the implementation of pre-construction and detailed design and Operational Phase mitigation and monitoring measures, as outlined in Section 12.5.2 and Section 12.5.3.

Table 12.10 Predicted Residual Impacts on Specific Water Features Post Mitigation – Operational Phase

Operation			Pre-Mitigation Significance			Mitigation ID	Post-Mitigation (Residual Impacts)	
Water Body (Water Crossing Point ID	Attribute	Impact Summary	Importance	Magnitude	Significance		Magnitude of Impact	Significance
Dunboyne Stream_010: Permanent Access Track	Hydromorphology	• Permanent removal of the bed and banks over the crossing footprint. • Loss of lateral and longitudinal fluvial and ecological connectivity • Removal of hydromorphological features over the culvert footprint. • Potential to alter channel flow patterns through the slackening or steepening of channel gradients. This can lead to downstream erosion and instability of the natural channel, with the potential for erosion to migrate upstream.	Medium	Large Adverse	Significant	Mitigation Item 6 and / or Mitigation Item 7 and Mitigation Item 8	Small Adverse	Slight

12.6.3 WFD Assessment Summary

The WFD assessment (presented as a supporting document in Volume 5 of the planning application pack) concluded:

> *"Taking into consideration the impacts of the Proposed Development on the biological, physico-chemical and hydromorphological quality elements, it is concluded that following the implementation of design and mitigation measures, it will not compromise progress towards achieving GES or GEP or cause a deterioration of the overall status of the water bodies that are in scope; it will not compromise the qualifying features of protected areas and is compliant with other relevant Directives. It can therefore be concluded that the Proposed Development is fully complaint with WFD and therefore does not require assessment under Article 4.7 of the WFD."*

12.6.4 Flood Risk Assessment Summary

The conclusions of the FRA (included as Appendix A12.1 in Volume 3 of this EIAR) are summarised in the sections below:

12.6.4.1 Impacts on Fluvial Flooding

The Proposed Development is at low risk from fluvial flooding during construction. Any works at watercourses (e.g. open cut trenching for crossings) have been designed to maintain waterflows and allow the discharge of water without affecting flood risk. Once construction is complete, the Proposed Development is expected to slightly increase existing impermeable areas at the locations where off-road Joint Bays are proposed. In the crossing of the Dunboyne Stream_010, the structure will be designed to not increase the fluvial flood risk over the adjacent areas. The hardstanding areas around the off-road Joint Bay will be similarly constructed to not increase fluvial flood risk. All Joint Bays and link boxes are designed with watertight connections, as standard. Drainage sumps are proposed for the Joint Bays, to provide for additional drainage. It is considered that the hardstanding areas, Joint Bays, and permanent access tracks will not result in any significant loss of floodplain and will not increase the risk of flooding.

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). For river flow, the MRFS indicates a rise of 20% in river flows. For the MRFS, there is only a temporary risk of flooding during construction. Future climate change will not affect this conclusion, with exception to the proposed construction access track crossing with Dunboyne Stream. For the detailed design of the crossing structure, climate change will be considered. The Proposed Development will have no known impact on fluvial flood risk based on online information provided by the OPW (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on fluvial flooding).

12.6.4.2 Impacts on Pluvial Flooding

In order to assess the increase in pluvial flood risk, the following points need to be considered:

- Will the Proposed Development increase the rainfall runoff rate?; and
- Will the Proposed Development alter existing flow or drainage paths?

The Proposed Development will result in a slight increase in the area of hardstanding surfaces. The permanent access track materials will be water permeable to a degree, but there will be a change from the current greenfield conditions. The permanent access tracks will be sloped to discharge to the adjacent greenfield. There will be no significant change in runoff as a result of the hardstanding areas, Joint Bays, and

permanent access tracks. On the off-road sections, these areas will runoff to the adjacent greenfield areas. There will be a low impact on surrounding areas due to pluvial flooding, due to the proposed additional hardstanding areas, and permanent access tracks around off-road Joint Bays (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on pluvial flooding).

12.6.4.3 Impacts on Groundwater Flooding

Groundwater flooding occurs as a result of upwelling in occurrences where the water table or confined aquifers rise above the ground surface. This tends to occur after long periods of sustained rainfall and / or very high tides. High volumes of rainfall and subsequent infiltration to ground will result in a rising of the water table. Groundwater flooding tends to occur in low-lying areas where, with additional groundwater flowing towards these areas, the water table can rise to the surface causing groundwater flooding. The Proposed Development will involve new works below the existing ground levels, but it is unlikely that this will contribute to groundwater flooding, based on available online mapping from the OPW and GSI (refer to Appendix A12.1 in Volume 3 of the EIAR for further details on groundwater flooding).

12.6.4.4 Impacts on Artificial Drainage Systems

The Proposed Development is not expected to cross any existing artificial drainage systems, as the proposed cable route will be significantly deeper than the expected level of existing drainage networks. During the Operational Phase, the Proposed Development is also expected to have no impact on artificial drainage systems.

12.7 Conclusion

Following the implementation of mitigation measures, as outlined in Section 12.5, any residual impacts upon water bodies have been assessed to be Slight or Negligible during the Construction Phase, and therefore, no significant residual impacts have been predicted. There will be no significant residual impacts on water bodies for surface water elements during the Operational Phase, following the implementation of mitigation measures.

12.8 References

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