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Environmental Impact Assessment Report

TEN-T Priority Route Improvement Proposed Development, Donegal

Chapter 9B: Biodiversity – Aquatic Ecology

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EIAR

March 2026

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List of Abbreviations

The following is a list of abbreviations used within this chapter of the Environmental Impact Assessment Report (EIAR).

List of Abbreviations	
AADT	Annual average daily traffic
ADP	Antecedent Dry Period
CIEEM	Chartered Institute of Ecology and Environmental Management
CCA	Climate Change Allowance
CRFB	Central Fisheries and Regional Fisheries Board
CW	Constructed Wetlands
DAERA	Department of Agriculture, Environment and Rural Affairs
DMRB	Design Manual for Roads and Bridges
ECoW	Environmental Clerk of Works
EQS	Environmental Quality Standards
FPM	Freshwater Pearl Mussel
FRV	Floating River Vegetation
GSI	Geological Survey Ireland
HEWRAT	Highways England Water Risk Assessment Tool
IAPS	Invasive Alien Plant Species
IECS	Institute of Estuarine and Coastal Studies
IEF	Important Ecological Features
IFI	Inland Fisheries Ireland
ISO	International Organisation for Standardisation
ITM	Irish Transverse Mercator
IUCN	International Union for the Conservation of Nature
LC	Least Concern
NBAP	National Biodiversity Action Plan
NBDC	National Biodiversity Data Centre
NHA	National Heritage Area
NIEA	Northern Ireland Environmental Agency
NIS	Natura Impact Statement
NRA	National Roads Authority
OPW	Office of Public Works
PAH	Polycyclic Aromatic Hydrocarbons
QI	Qualifying Interest
RHAT	Rapid Hydromorphology Assessment Technique
TII	Transport Infrastructure Ireland
TP	Total Phosphate
TSS	Total Suspended Solids
WFD	Water Framework Directive
ZoI	Zone of Influence

9B BIODIVERSITY - AQUATIC ECOLOGY

9B.1 Introduction

9B.1.1 Scope and Objectives

This chapter of the Environmental Impact Assessment Report (EIAR) provides the assessment of impact on aquatic biodiversity of the TEN-T Priority Route Improvement Proposed Development, Donegal (hereafter referred to as the "Proposed Development"). An examination is made of potential effects during construction and operation phases of the Proposed Development. It sets out measures to address any identified likely significant effects and presents the likely residual effects following their application. The assessment is informed by the other chapters of the EIAR:

- **Chapter 4:** Project Description
- **Chapter 9A:** Biodiversity - Terrestrial
- **Chapter 10:** Land, Soil & Hydrogeology
- **Chapter 11:** Water
- **Chapter 12:** Air Quality

The description and background of the Proposed Development is provided in Chapter 4: Project Description of the EIAR and is divided into three sections as follows:

- **Section 1:** N15/N13 Ballybofey/Stranorlar Urban Region.
- **Section 2:** N56/N13 Letterkenny to Manorcunningham.
- **Section 3:** N14 Manorcunningham to Lifford/Strabane/A5 Link.

9B.1.2 Legislation, Policy and Guidance

The assessment of the likely significant effects of the Proposed Development on aquatic ecological features has taken account of the following legislation, policy and guidance documents:

9B.1.2.1 Legislation

EU Legislation

- EU Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU).
- EU Habitats Directive - Council Directive 92/43/EEC (1992), ensures conservation of a wide range of rare, threatened or endemic animal and plant species, and characteristic habitat types.
- EU Water Framework Directive (2000/60/EC) (WFD) for the protection and improvement of water quality in all waters so that good ecological status is achieved within specified timelines.

National Legislation

- The Wildlife Act 1976 (S. I. No. 39 of 1976), as amended 2000 and 2023, is the principal national legislation providing for the strict protection of wildlife and the control of some activities that may adversely affect wildlife. It aims to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems and protect species from injury, disturbance, and damage to breeding and resting sites. Such species, where relevant, are considered as sensitive ecological receptors in this chapter.
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011), as amended ('the Habitats Regulations'), transpose the EU Habitats Directive (see above) into Irish law. In Ireland, these sites are designated as European Sites and include Special areas of Conservation (SAC), established under the Habitats Directive and Special Protection Areas (SPA), established under the Birds Directive 2009/147/EC as well as candidate sites (cSAC and cSPA).

- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended, give legal effect in Ireland to the Water Framework Directive (WFD).
- European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009), as amended (S.I. 77 of 2019, S.I. 288 of 2022 and S.I. No. 50 of 2025), establishing legally binding water quality objectives for all surface waters and environmental quality standards (EQSs) for pollutants.
- European Communities (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988) designating "*waters capable of supporting salmon (Salmo salar), trout (Salmo trutta), char (Salvelinus) and whitefish (Coregonus)*" as salmonid waters. This sets out the water quality standards that must be achieved in 'Salmonid Waters'.
- Foyle Fisheries Act 1952 Section 47 as amended by Article 18(3) of the Foyle and Carlingford Fisheries Act 2007 (relating to the disturbance of fisheries habitats during construction)
- Foyle Fisheries Act 1952 Section 70 (regarding fish movement as part of construction works).
- Section 171(1) of the Fisheries (Consolidation) Act 1959, as extended by Section 10 of the Foyle Fisheries (Amendment) Act, 1961 as amended; relating to water quality pollution that is detrimental to fisheries interests in the Foyle catchment.
- Conservation (Natural Habitats &c.) Regulations (Northern Ireland) 1995 (as amended). Updated through the Conservation (Natural Habitats &c.) (Amendment) (Northern Ireland) (EU Exit) Regulations 2019

9B.1.2.2 Policy

- The 4th National Biodiversity Action Plan 2023 - 2030 (NPWS, 2024), which sets the national biodiversity agenda for Ireland 2023-2030.
- The Water Action Plan 2024: A River Basin Management Plan for Ireland (DHLGH, 2024) which sets out actions necessary to protect and restore water quality in Ireland. The overall aim is to ensure that Ireland's natural waters are sustainably managed and that freshwater resources are protected to maintain and improve Ireland's water environment.
- County Donegal Development Plan 2024–2030 (DCC, 2024a) contains an objective to preserve and enhance the biodiversity of the county in accordance with the relevant European Union (EU) policies and national legislation. The objectives and policies relating to biodiversity are listed in Appendix C9A.02.

9B.1.2.3 Guidance

The methodology and associated impact assessment were conducted using the following guidance:

- CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.3.
- EPA (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports.
- NRA Guidelines for assessment of ecological impacts of National Road Schemes Revisions 1 and 2 (NRA, 2003, 2009).
- Inland Fisheries Ireland (IFI) Guidelines on protection of fisheries during construction works in and adjacent to waters (IFI, 2016).
- Loughs Agency (2016) Guidelines for Fisheries Protection during Development Works (Foyle and Carlingford areas). Environmental Guidelines Series No. 1.
- NRA 'Guidelines for the crossing of Watercourses During Construction of National Road Schemes (2008).
- CIRIA C648 (2006) Control of water pollution from linear construction proposed developments. Technical guidance.

9B.1.3 Competent Experts

Lead Author: Lauren Williams BSc PGDip MCIEEM: Senior aquatic ecologist with 25 years professional consultancy experience. Lauren holds a BSc in Zoology (University of Otago, New Zealand), Post Graduate Diploma in Environmental Monitoring Assessment and Engineering with Distinction from Trinity College Dublin, and a Certificate in Environmental Law (NZ). For 22 years Lauren worked with the Aquatic Services Unit (ASU), University College Cork (UCC) and is now an independent consultant. Full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) since 2015. Lauren specialises in a wide range of aquatic habitat and water quality survey, interpretation and ecological impact assessment, and is an accredited River Habitat Survey (RHS) UK and related River Hydromorphology Assessment Technique (RHAT Ireland) surveyor. She has contributed expertise to numerous large infrastructural projects in Ireland including roads, flood relief schemes, pipelines, licenced discharges and renewable energy projects. She has carried out aquatic sampling, monitoring, and reporting as part of EPA national river monitoring programmes and is a recognised aquatic protected species surveyor (freshwater pearl mussel and white-clawed crayfish). Lauren carried out aquatic ecological baseline surveys for Sections 1 and 2 of the Proposed Development, authored the impact assessment for Sections 1 and 2 and co-authored the desk study and impact assessment for Section 3.

Co-Author: Paul Murphy is the Director of EirEco Environmental Consultants. He has been operating as an environmental consultant in Ireland for the last 30 years dealing with all aspects of ecological survey and habitat management. During this time, he has worked on a large range of projects including numerous major road and infrastructural development schemes, habitat management and restoration projects. During his career, he has developed expertise in a wide variety of survey and assessment techniques in a range of disciplines including habitat and botanical surveys, aquatic ecological assessment and faunal surveys. Paul carried out all aquatic ecological baseline surveys for Section 3 of the Proposed Development and co-authored the impact assessment for Section 3.

9B.2 Methodology

The authors of this chapter were involved from a very early stage in the planning and design for the Proposed Development and have conducted multiple site visits between 2018 and 2025. A combination of desk and field studies, constantly updated (2018-2025), were used to characterise baseline aquatic habitats which iteratively informed the design and underpin the current impact assessment. The aim was to determine aquatic ecological value based on fisheries value, biological water quality (Q-value), protected species, general hydromorphology and geographical importance, including any conservation designations. Field investigations covered all surface waters (rivers, streams, drains, transitional waters) intersected by the Proposed Development in each of the three road sections.

9B.2.1 Desk Study

A thorough desk-based search of available information was undertaken to characterise the receiving aquatic environment and identify ecological values and/or sensitivities. The desk study commenced in 2018 to determine the scope and extent of necessary field surveys and constraints. Formal compilation of desk study data was conducted in late 2025 to early 2026. Online information, data request results and information from the published and unpublished literature were utilised from the following sources:

- Environmental Protection Agency (EPA) maps and data[1]
- Water Framework Directive (WFD) maps and data[2]
- National Parks and Wildlife (NPWS) maps and data[3]
- Geohive mapping[4]
- Geological Survey of Ireland (GSI) mapviewer[5]

[1] https://gis.epa.ie/EPAMaps/ (Accessed March 2026)

[2] https://www.catchments.ie/ (Accessed March 2026)

[3] https://www.npws.ie/maps-and-data (Accessed March 2026)

[4] https://www.geohive.ie/ (Accessed March 2026)

[5] https://www.geohive.ie/ (Accessed March 2026)

- National Biodiversity Data Centre (NBDC) maps and data[6]
- Inland Fisheries Ireland (IFI) and WFD fish survey data[7]
- Loughs Agency fisheries data (formal electrofishing data requests) and publications
- Academic papers and scientific journals.

The examined Zone of Influence (ZoI) was established using the Source-Pathway-Receptor model (OPR, 2021), which is a standard tool used in environmental assessment. For an effect to be likely, all three elements of this mechanism must be in place. The ZoI for aquatic ecological field studies was considered using expert judgement and taking account of existing watercourse morphology, size and flow types primarily in terms of potential for downstream export of potential pollutants. Small tributaries, for example, were investigated primarily at crossing points and in the downstream channel for at least 500m downstream of the Proposed Development. Aquatic habitats of the main river channels were investigated over greater distances (1 km or more) depending on the types of interventions proposed and the nature of the channel, e.g., spate river with diverse instream habitats or uniform/drained and tidal. The desk study accounted for catchment level hydrological connectivity, e.g., available fisheries data, downstream EPA biological water quality data and connectivity to sites designated for nature conservation within the hydrological catchments of the Proposed Development. In addition, rare and protected[8] freshwater species records within the following 10 km grid squares were examined:

- **Section 1** – C10, H09 and H19
- **Section 2** – C10, C11, C20, C21
- **Section 3** – C20, C21, C30, H39

9B.2.2 Field Studies

Aquatic surveys were conducted in July 2018, June 2020 and September 2024 and September 2025 for the Proposed Development including:

- General habitat descriptions: 2018, 2020, 2024, 2025 (Section 1, Section 2, Section 3)
- Biological water quality assessment: 2018, 2020, 2024, 2025 (Section 1, Section 2, Section 3)
- Fisheries habitat assessments: 2018, 2020, 2024, 2025 (Section 1, Section 2, Section 3)
- Swilly estuary habitat characterisation: 2018 (validated 2020 and 2024) (Section 2)
- Freshwater pearl mussel survey (FPM): 2018, 2020 (Section 1)

The range of surveys carried out depended on the habitat encountered at each site, i.e., many channels were minor or dry drains. At a minimum, all sites were subject to general habitat description and fisheries habitat assessment. Representative sites on watercourses with suitable gravel riffle habitat were sampled for biological water quality classification (Q-value). Any fish observed or captured in kick-samples were noted. Not all sites were suitable for Q-value assessment owing to unsuitable habitat, little or no flow and very minor nature of the watercourse (e.g., dry or stagnant field drains).

Fieldwork was conducted in good weather conditions when water levels were average to low and hence amenable to full characterisation of habitat and ecological value. Assessment of ecological value was backed up by the desk study and consultation with the relevant fisheries agencies:

- **Loughs Agency**: watercourses within the Foyle catchment, i.e. Section 1 and southern Section 3.
- **Inland Fisheries Ireland**: watercourses within the Lough Swilly catchment, i.e. Section 2 and northern Section 3.

[6] https://maps.biodiversityireland.ie/ (Accessed March 2026)

[7] http://wfdfish.ie/ (Accessed March 2026)

[8] Including but not limited to animal and plants listed in Annex II and/or IV of the Habitats Directive FPO S.I. No. 235 of 2022 Wildlife Acts 1976 to 2022.

General Habitat Description

Survey sites were visually assessed as to bankside and in-channel habitat and plant community. Site habitat characteristics recorded included: substrate and flow types, depth and width, shading, surrounding land-use and general morphological character. The latter were assessed and recorded based on criteria for river hydromorphology using the principles of the River Hydromorphology Assessment Technique (RHAT) (NIEA, 2014). As part of habitat descriptions, instream plant community was recorded at each site to assist in identification (where it occurs) of Annex I habitat 3260 'Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion'*, also known as 'floating river vegetation' (FRV) habitat. The habitat is designated under the EU Habitats Directive (92/43/EEC) although it is not a Qualifying Interest habitat of any SAC affected by the Proposed Development in the Republic of Ireland. It is however a protected habitat on the River Finn in Section 3 of the Proposed Development within the Northern Ireland River Foyle and Tributaries SAC. FRV has a broad classification, covering rivers from upland bryophyte and macroalgal dominated stretches, to lowland depositing rivers with pondweeds and starworts (EC, 2013; Hatton-Ellis *et al.*, 2003). Many of the species named as components of FRV habitat (EC, 2013) are widespread and common in Irish rivers including, *Ranunculus spp., Myriophyllum* spp*., Callitriche* spp*., Berula erecta, Zannichellia palustris, Potamogeton* spp. and the aquatic moss *Fontinalis antipyretica*. The presence/absence and broad coverage of indicator species were used, where relevant, to assess presence/absence of FRV habitat.

Fisheries Habitat Assessment

A field-based fisheries habitat assessment was undertaken, recording the principle in-channel and bank-side habitats (e.g., substrates, flow types, instream vegetation, sedimentation), and their suitability as potential spawning, nursery, holding and residential sites for fish (primarily salmonids, lampreys and eel). The surveys were undertaken using a combination of wading using a bathyscope (where accessible) and bankside walkovers, entering the channel where possible to observe substrates. The assessment used expert judgement arising from many years of electrofishing and Q-value kick-sampling experience and observations, backed up by evidence from the scientific literature as to the suitability of channel morphology in relation to fisheries habitat (e.g., Armstrong *et al*., 2003). In the case of fisheries habitats, where a qualifying term, i.e., "Excellent", "Good", "Fair", "Poor" or "None", is used for spawning, nursey or holding habitat, it is based on the method of the Salmonid Life Cycle Unit Score (O'Connor & Kennedy 2002, Loughs Agency 2009). The descriptors for each qualifying term are shown in Table 9B-1.

Table 9B-1: Salmonid Life Cycle Unit Score and Expert Judgement Qualification

Habitat Quality	Life Cycle Unit Habitat Score	Expert Judgement Qualification
Excellent	1	Watercourse is ideal habitat for the species owing to high quality and diversity of habitats (flow types, substrate types, bed profiles, riparian habitat) that support relevant salmonid life stages
Good	2	Likely and certain that the watercourse supports the species owing to good quality of habitat conditions
Fair	3	Possible that the stream section could support the species but it there is sub-optimal diversity of flow, bed profile, substrate diversity and/or instream water quality and physical conditions
Poor	4	Possible, but unlikely, that the stream could support the species owing to impaired habitat conditions such as drainage, lack of flow, bed profile and substrate diversity and/or instream water quality and physical conditions
None	0	No possibility that the watercourse could support the species in question in the relevant life stage owing to completely unsuitable habitat and conditions.

Swilly Estuary Crossing Habitat Characterisation

The River Swilly at the proposed crossing location in Section 2 is part of Lough Swilly SAC (Site Code 002287). The Qualifying Interest (QI) habitat is classified as 'Estuaries' (1130) in the Site-Specific Conservation Objective (SSCO) mapping of marine habitats (NPWS, 2011b). It was unclear from NPWS mapping of the marine communities in the estuary as to whether 'Mud Community Complex' extended into the upper estuary where the new bridge is proposed. In order to establish the intertidal habitat community type, a walkover and benthic habitat survey of the River Swilly crossing area near Milk Isle was commissioned from an estuarine specialist (BSc (Hons), MSc), head of Marine Section from Aquatic Services Unit, University College Cork (UCC). The survey was undertaken on 11 July 2018. This was an early design-stage habitat verification study to underpin subsequent bridge design considerations in relation to potential Annex I habitat. The walkover and survey of the River Swilly crossing area (Site W2-18) involved taking a set of five, 10cm Ø core samples for infaunal assessment and a 0.25m^2 dig through for larger macrofauna at two locations within the river crossing area. Sample site locations are shown in Table 9B-2. Sampling methodology followed the methods outlined in the Marine Monitoring Handbook (Davies *et al*., 2001). The results of those surveys fed into the design of the proposed clear span bridge that does not impinge on the intertidal habitat. Subsequent walkover surveys were conducted in June 2020 and September 2024 as a habitat reverification exercise.

Table 9B-2: Location of River Swilly Estuarine Sampling Sites (ITM)

Site	Easting	Northing
Swilly - S1	619086	911690
Swilly - S2	619014	911558

Freshwater Pearl Mussel Survey

The River Finn is a '*Margaritifera Sensitive Catchment'* classified as a "*Catchment of other extant populations*" (NPWS, 2017b). NPWS hold two historical records for freshwater pearl mussel on the River Finn, near Castlefinn (c.12km downstream of Proposed Development Section 1): One live adult (1989), one dead shell (1994). The latter dead shell was badly eroded suggesting it had been dead for some time. Beasley and Roberts (1996) reported findings of 1993/1994 pearl mussel surveys in Donegal rivers, including 13 sites on the main channel in the River Finn catchment. No live mussels were found at any site throughout the catchment from Lifford/Strabane through to Lough Finn. They reported that pearl fishing has been taking place in Donegal for at least 300 years (Redding, 1693 and McCrea, 1973, cited Beasley and Roberts, 1996) with the practice likely to be responsible for the destruction of several *M. margaritifera* populations in Donegal including that of the River F inn.

However, owing to unusually low water levels (drought) in 2018 and 2020, the opportunity was taken to conduct Stage 1 freshwater pearl mussel surveys on the main channel of the River Finn at locations listed in Table 9B-3. The surveys were carried out as a precaution in relation to the Proposed Development, despite the classification of the river as a "*former pearl mussel river*" (Beasley and Roberts, 1999) and the general acceptance that the pearl mussel population is now extinct on the River Finn (Moorkens, 2012, Reid & Roberts 2013, cited Ecofact 2024). The surveys covered two areas:

- **Sites F1 and F2:** Upstream of Ballybofey in relation to the proposed bridge crossing (12 July 2018)
- **Site F3:** Downstream of Ballybofey, covering a reach downstream of the Mullaghagarry tributary confluence (11 June 2020).

Table 9B-3: Locations of River Finn FPM Survey (ITM)

Site		Easting	Northing
Finn - F1 (1.5km channel length encompassing R252 link to 300m d/s proposed crossing point)	US	611536	895547
	DS	612822	895053
Finn - F2 (350m channel length downstream Drumboe Lower tributary)	US	613109	895198
	DS	613249	894877
Finn – F3 (c.500m reach of channel downstream Mullaghagarry Tributary confluence)	US	616561	895004
	DS	616867	894756

Key: US = upstream end of survey reach; DS = downstream end of survey reach

Pearl mussel surveys were carried out under NPWS license C58/2018 (exp. 31 December 2018) and C156/2020 (exp. 31 December 2020) using Stage 1 freshwater pearl mussel survey methodology (NPWS, 2004). The survey is a presence/absence survey that determines whether there is a mussel population in the river reach in question. It involved manual searching for mussels using a bathyscope viewer and snorkelling, with particular focus on suitable habitat patches, i.e., fine bed material accumulations downstream of larger boulders, stable marginal areas under overhanging trees. If mussels had been observed, the survey would have progressed to Stage 2 survey and counting of individuals, but no mussels were observed in Stage 1 surveys, therefore no progression to Stage 2 survey was required. In addition, all smaller streams were assessed in terms of their suitability for freshwater pearl mussel based on hydromorphological features such as size, depth, flow, substrate type.

Biological Water Quality Assessment

In Ireland, biological water quality is assessed using the Q-value metric. The system is based on field sampling and observations, which evaluates habitat quality and macroinvertebrate diversity and abundance to interpret ecological status as set out in Table 9B-4. The EPA operate a system of river monitoring which provides Q-value data for classification of status on a three-yearly cycle. EPA Q-value data was reviewed for all relevant channels. This data is useful in characterising water and habitat quality for impact assessment purposes because water quality is a primary determinant of habitat quality for aquatic organisms. In addition, the Q-value is the most commonly used Biological Quality Element (BQE) defining ecological status on Irish rivers. Under the WFD all surface waters must be maintained or restored to, at least, 'good' ecological status (Q4). High status waters must not suffer deterioration.

Table 9B-4: EPA Water Quality Ratings and WFD Status Summary

Biotic Index	Ecological Quality Ratio (EQR)	Quality Descriptor	Water Quality	WFD Status
Q5	1.0	Unpolluted	Good	High
Q4-5	0.9	Unpolluted	Fair-Good	High
Q4	0.8	Unpolluted	Fair	Good
Q3-4	0.7	Slightly Polluted	Doubtful - Fair	Moderate
Q3	0.6	Moderately Polluted	Doubtful	Poor
Q2-3	0.5	Moderately Polluted	Poor- Doubtful	Poor
Q2	0.4	Seriously Polluted	Poor	Bad
Q1-2	0.3	Seriously Polluted	Poor- Bad	Bad

Potentially affected watercourses were also sampled during field studies to determine Q-value and water quality implications, in accordance with EPA protocols. This involved taking a two-minute, travelling kick-sample of macroinvertebrate fauna from a fast flowing (riffle) area of the river using a long-handled sampling

net (250 mm width, mesh size 0.25 mm). Riffle areas of streams received preference in sampling, as riffle fauna tends to be more sensitive to pollution impacts. Stone washing was employed to ensure 'clinging' species, e.g. leeches and gastropods, were adequately collected. The relative abundance and sensitivity of aquatic organisms to pollution was then assessed at the bankside using the Q-rating system as published in Toner *et al*. (2005).

9B.2.3 Assessment Methodologies

The assessment of the impact(s) of the Proposed Development on terrestrial and aquatic biodiversity has been completed with reference to the following guidance documents, which are specific to biodiversity:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine, Version 1.3 - Updated September 2024 (CIEEM, 2018) and;
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes, Revisions 1 and 2 (NRA, 2003, 2009).

The CIEEM (2018) guidelines have been used as the primary basis of this assessment. The process also aligns with EPA (2022) guidelines and incorporates NRA (2009) guidelines for the ecological valuation of watercourses.

9B.2.3.1 Important Ecological Features

Important Ecological Features (IEFs), as termed in CIEEM (2018), are defined here as those aquatic ecological receptors which are valued at Local Importance (higher value) (Category D) or higher. Refer to Table 9B-5. The methodology used to value ecological features is with reference to fisheries value and geographic frames of reference as set out in Section 9B.2.3.2, below. Ecological features below this value (i.e., Category E) were scoped out of further ecological impact assessment as the significance of any potential impact is deemed to be minor or negligible by virtue of the channel having little or no fisheries value and no sensitive aquatic habitat or species. However, potential indirect effects on downstream IEF watercourses were examined even if the localised aquatic environment was of low ecological value.

9B.2.3.2 Ecological Valuation of Watercourses

The criteria used for assessment of ecological value of watercourses are adapted from NRA (now TII) guidelines (NRA, 2003 and 2009) involving careful consideration of fisheries value, water quality and consideration of contextual information for the resource at a geographic level. The evaluation criteria used to classify sites is shown in Table 9B-5. This is based on NRA guidelines that were originally published in 2003 which set out criteria that classify aquatic habitat value within the study area, with slight modifications to align with the geographical valuation scale provided in revision of that document in NRA (2009). NRA (2003) made greater reference to aquatic habitats, while NRA (2009) was more focused on terrestrial habitats. Hence, only criteria with direct relevance to aquatic habitats and fisheries have been retained in this table, clearly setting out significance criteria applied. Site-specific survey data and EPA biological monitoring data fed into the overall assessment of aquatic ecological value. All assessments were made in the context of national trends, guidelines, regulations, national monitoring data sets (EPA, IFI) and WFD criteria, as appropriate.

Table 9B-5: Ecological Evaluation Criteria – Watercourses

Relevant Criteria	Category
International Importance: Sites designated (or qualifying for designation) as an SAC. Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters); Regulations, 1988, (S.I. No. 293 of 1988). Major salmonid (salmon, trout or char) lake fisheries.	**A**
National Importance: Sites or waters designated or proposed as a Natural Heritage Area (NHA) or Statutory Nature Reserve or National Park. Undesignated sites containing significant numbers of resident or regularly occurring populations of Annex II species under the EU Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of species protected under the Wildlife Acts; and/or species listed on a Red Data list. Major trout fishery rivers. Waterbodies with major amenity fisheries value. Commercially important coarse fisheries.	**B**
County Importance: Small water bodies with known salmonid populations or with good potential salmonid habitat. Undesignated sites containing any resident or regularly occurring populations of Annex II species under the EU Habitats Directive. Large water bodies with some coarse fisheries value. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	**C**
Local Importance (Higher Value): Small water bodies with some coarse fisheries value or some potential salmonid habitat. Any waterbody with unpolluted water (Q-value rating 4-5, Q5).	**D**
Local Importance (Lower value): Water bodies with no current fisheries value and no significant potential fisheries value. Artificial or highly modified habitats with low species diversity and low wildlife value.	**E**

(Adapted from NRA, 2003 and 2009)

9B.2.3.3 Ecological Impact Assessment Process

The impact assessment uses the Source-Pathway-Receptor (S-P-R) conceptual model approach. For an effect to occur there must be a possible pollutant source and a pathway that provides connection to a particular receptor. The impact significance then depends on the characteristics of the source (e.g., pollutant type, concentration), the pathway (e.g., level of attenuation, separation distance) and the sensitivity of and consequent effect the receptor.

The ecological impact assessment process, as described by CIEEM (2018), involved:

- Identifying and characterising impacts and their effects in the absence of mitigation.
- Incorporating measures to avoid and mitigate negative impacts and effects.
- Assessing the significance of any residual effects after mitigation.

9B.2.3.4 Characterising and Determining Significance

Impacts and effects on aquatic IEFs are characterised with the following qualitative terms, as relevant (CIEEM, 2018; EPA, 2022):

- **Neutral Impact/Effect:** No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error (EPA, 2022).

- **Positive Impact/Effect:** A change that improves the quality of the environment (e.g., by increasing species diversity, extending habitat or improving water quality). This may also include halting or slowing an existing decline in the quality of the environment.
- **Negative Impact/Effect:** A change which reduces the quality of the environment (e.g., destruction of habitat, removal of foraging habitat, habitat fragmentation, water quality decline):
  - **Extent**: The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions.
  - **Magnitude:** Magnitude refers to size, amount, intensity and volume, quantified where possible and expressed in absolute or relative terms.
  - **Duration and Reversibility:** Defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. Terminology from within EPA (2022) guidelines were used to define duration (Table 9B-6).
  - **Frequency and Timing:** The number of times an activity occurs will influence the resulting effect. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons (e.g., fish spawning season).

Table 9B-6: Ecological Impact Duration Criteria

Impact Duration	Criteria as per EPA (2022)
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years
Medium-term Effects	Effects lasting seven to fifteen years
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects from which spontaneous recovery is possible within a reasonable timescale, or which may be counteracted by mitigation.
Irreversible Effects	Effects from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it.

Any number of possible impacts and effects on IEFs may arise from a development. However, it is only necessary to describe in detail the impacts that are likely to be significant. Impacts that are either unlikely to occur or, if they did occur, are unlikely to be significant are scoped out. If in doubt, the precautionary principle was applied, and the potential impacts were assessed.

The approach to determining significance does not utilise a matrix of degrees of impact significance such as EPA (2022) but follows an alternative industry standard for ecological impact significance where effects are determined to be ‘significant’ or ‘not significant’. For the purposes of the ecological impact assessment, a “significant effect” is defined as an effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment (EPA, 2022) and either supports or undermines the biodiversity and/or conservation objectives for the IEF receptor.

9B.2.4 Data Limitations

This Chapter of the EIAR has been prepared based upon the best available information in combination with regular site visits and in accordance with current best practice and relevant guidelines. There were no technical difficulties, or otherwise, encountered in the preparation of this chapter of the EIAR.

9B.3 Consultations

The following consultees were contacted to ascertain any commentary or observations in relation to the Proposed Development and aquatic ecology:

- **National Parks and Wildlife Service (NPWS) (5 February 2019):** The meeting discussed setback of structures from riverbanks, methodologies and documents to consider during the preferred route corridor selection process.
- **NPWS - 23 October 2019:** The meeting discussed mitigation through avoidance, impacts on EU sites, recommendation to consult IFI/Loughs Agency and EPA.
- **NPWS - 10 September 2020:** The meeting discussed licenses for protected species, SCI bird species, non-native invasive species including Asian clam (*C. fluminea*), and aspects of mitigation.
- **NPWS - 4 February 2025 and 22 May 2025:** These two meetings clarified the current position of the Proposed Development and outlined the updates that had been carried out and the approach to finalising the EIA and the NIS. Mitigation measures were discussed.
- **Loughs Agency - 15 November 2018, 10 July 2020, 28 September 2021, 7 August 2025 and 30 March 2026:**
    - The 28 July 2020 meeting discussed general quality and fisheries value of affected watercourses rivers within Section 1 and southern Section 3 of the Proposed Development. Permit requirements under the Foyle Fisheries Act 1952 (as amended) Section 47 (in respect of bed material disturbance/removal for in-stream works) and Section 70 (in respect of fish removals during construction) of that Act were also discussed. Further written consultation was conducted, which resulted in Loughs Agency staff corroborating field data and proposed watercourse crossing types (bridges, culvert types) at locations where small tributaries with fisheries significance are subject to proposed culverting.
    - The 28 September 2021 and 7 August 2025 meetings clarified the approach taken by designers regarding structures within the River Finn/Foyle system and confirmed requirements for Section 47 and Section 70 permits, as above. Further, a formal data request was made to Loughs Agency who provided Foyle catchment electrofishing and consolidated salmon redd count data for the years 2020-2024 (refer to Appendix 9B.06 Loughs Agency Fisheries Data 2020 -2024) which underpins the baseline and impact assessments made in this EIAR.
    - The 30 March 2026 meeting provided an update on the Proposed Development with a discussion on the information the Loughs Agency requires for an "approval in principle."
- **Inland Fisheries Ireland (IFI) - 14 November 2018; 16 September 2020; and 4 September 2025:** The meetings discussed crossing of the estuarine River Swilly in Section 2, attenuation ponds and hydrocarbon interceptors, culvert designs, prevention of Asian clam (*Corbicula fluminea*) introduction. Further meetings between IFI and Donegal County Council took place.

All proposed watercourse structures have been designed in accordance with Loughs Agency and Inland Fisheries Ireland (IFI) Guidelines (Loughs Agency, 2011, IFI, 2016) for fisheries protection during development works. Details of all proposed Loughs Agency watercourse crossing locations, crossing and culvert types and specifications (height, width, length, slope) have been submitted to the Loughs Agency as part of consultation. As also mentioned in Section 9B.5.3.1, the Loughs Agency has agreed in principle with the design approach applied as to watercourse crossing type with respect to fisheries value of the watercourse in question, i.e., bridge or culvert type (box, pipe). Highly sensitive fisheries waters, including SAC watercourses, are bridged, while pipe culverts are only used on channels (drains) with low or no fisheries sensitivity.

The structures and works required within the River Finn/Foyle system, including the construction of bridges and culverts, any fish removals during construction and operation phase fish passage considerations, have

been fully considered and assessed throughout this EIAR, and as set out in Section 9B.5.3 (construction) and Section 9B.5.4 (operation), and detailed in Appendices 9B.04 and 9B.05. The full range of potential construction methodologies that could be employed by the appointed contractor (which methodologies will be selected at the detailed design stage) have been assessed and a comprehensive suite of mitigation measures as set out in Section 9B.6, addressing all potential construction methodologies, has been applied.

Further, the Loughs Agency have provided a copy of the usual conditions attached to Section 47 and Section 70 permits, and those conditions have been incorporated into the mitigation measures set out in Section 9B.6 below so as to ensure that the standard conditions attached to such Loughs Agency permits are fully reflected and incorporated into the Proposed Development.

It was agreed between Donegal County Council and the Loughs Agency that Donegal County Council apply to the Loughs Agency for an "approval in principle" for the works to watercourses within the remit of the Loughs Agency which are proposed as part of the Proposed Development. That application has been submitted to the Loughs Agency, and when the approval in principle is issued Donegal County Council will publish it on https://www.donegal-ten-t.ie/. Permits under sections 47 and 70 of the Foyle Fisheries Act 1952 (as amended) will be obtained from the Loughs Agency.

All of the potential construction methodologies that will be employed for in-stream works have been considered and assessed in this chapter of the EIAR, and detailed mitigation measures are set out that address any potential impacts on watercourses (Sections 9B.5 and 9B.6), which includes all of the typical conditions generally attached to Loughs Agency Section 47/70 permits. In those circumstances, notwithstanding that formal permits will be required from the Loughs Agency in order to ensure that the carrying out of works to watercourses as part of the Proposed Development will not constitute an offence under the Foyle Fisheries Act 1952 (as amended), the authors of this chapter of the EIAR are satisfied that all potential impacts to watercourses have been fully considered and assessed as part of this EIAR. Further details regarding consultations with statutory and non-statutory consultees are provided in Appendix C9A.04.

9B.4 Baseline Environment

This section summarises the baseline environment with respect to aquatic biodiversity based on desk studies and field surveys. The baseline has been used to assign an ecological evaluation to watercourses according to Table 9B-5 and hence identify IEFs that will be taken forward for assessment of effects.

9B.4.1 Aquatic Receiving Environment

9B.4.1.1 Section 1 - Baseline Aquatic Environment

Most of Section 1 is set in the EPA sub catchment Finn [Donegal] _SC_030, including a new clear span bridge crossing of the main channel of the River Finn, 2.4km upstream of Ballybofey, where the channel is part of the River Finn SAC (Site Code: 002301). There are also crossings and/or interactions on several small 1st, 2nd and 3rd order EPA delineated watercourses that drain to the River Finn. A small portion at the northern end of Section 1 is in the Deele [Donegal] _SC_010 sub catchment, including a new clear span bridge crossing of the Cloghroe River plus crossings and/or interactions on two small 1st/2nd order EPA delineated channels.

Table 9B-7 sets out Section 1 watercourse names (EPA) and survey site codes as referred to in this chapter, including ITM co-ordinates. Figure 9B-1 shows watercourses and survey site locations in relation to the Proposed Development. EIAR Drawing 9B.01 in Volume D: Book of Drawings contains higher resolution maps of aquatic survey site locations and their EPA watercourse and water body names. See Appendix C9B.01 for detailed survey site habitat and summary data and Appendix C9B.02 for representative images of survey points W1-01 to W1-22.

Table 9B-7: Section 1 - Aquatic Field Survey Watercourses and Locations

EPA Sub Catchment (SC)	EPA Watercourse name	Location Description	Stream Order	Aquatic Site Code	X (ITM)	Y (ITM)
Finn [Donegal] _SC_030	(un-named)	Tributary of Burn Daurnett in Meencargagh townland	2	W1-01	610040	892766
	(un-named)	Tributary of Burn Daurnett in Meencargagh townland	2	W1-02	610290	892809
	Cappry	Tributary of Burn Daurnett in Cappry townland	1	W1-03	610968	893693
			1	W1-04	611040	893614
			1	W1-05	611267	893506
	River Finn	Main channel River Finn, 2.4km upstream of Ballybofey	6	W1-06	612484	895003
	Dromboe Lower	Tributary of River Finn at Dromboe Lower	1	W1-07	613089	895391
	Backlees	Tributary of River Finn at Dromboe Upper	2	W1-08	613890	896000
			2	W1-09	613960	896633
	Greenhills 01	Small tributary of Backlees near Dromboe Upper	1	W1-10	614253	896551
	Kilross 01	Upper tributary of Lough Alaan in Tircallan townland	1	W1-15	615942	897172
	Tircallan	Upper Mullaghagary tributary in Tircallan townland	1	W1-16	616185	896990
	Mullaghagarry	Tributary of River Finn in Castlebane/Treanamullin townland	2	W1-17	616610	896206
			2	W1-18	616487	896047
	Treanamullin	Small tributary of Mullaghagarry in Castlebane/Mullindrait townland	1	W1-19	616470	895744
	Mullaghagarry	Tributary of River Finn, existing N15 culvert	2	W1-20	616583	895207
	River Finn	Main channel River Finn, 3.2km downstream of Ballybofey	6	W1-21	616717	895056
	Burn Daurnett	Main channel of Burn Daurnett at Cappry, River Finn tributary	3	W1-22	612493	893665
	Aghasheil	Minor, ephemeral tributary of River Finn 1km upstream Ballybofey	1	W1-23	612630	894960
Deele [Donegal] _SC_010	Magheracorran	Tributary of Cloghroe River in Teevickmoy townland	2	W1-11	615960	899582
			2	W1-13	616103	899750
	Lisnaree	Tributary of Magheracorran in Teevickmoy townland	1	W1-12	616200	899583
	Cloghroe River	Existing Callan Bridge (N13). Tributary of River Deele	2	W1-14	615989	900020

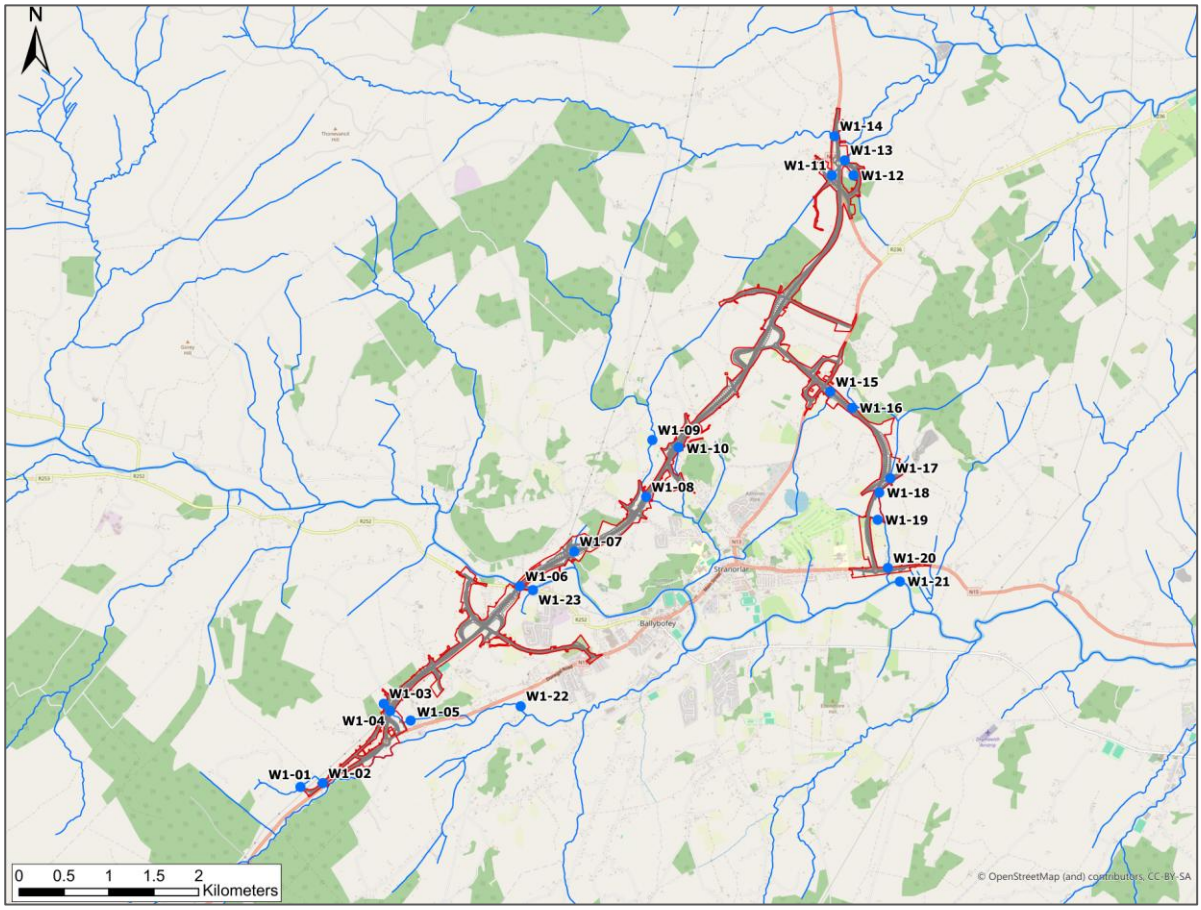

Figure 9B-1: Section 1 - Aquatic Survey Site Location Overview Map

River Finn and Tributaries – Fisheries Data Review

The River Finn rises in the Stack Mountain range in central County Donegal, draining in a predominantly easterly direction through Ballybofey / Stranorlar to confluence with the River Foyle at Lifford / Strabane. The main channel of the River Finn is a designated [9]Salmonid Water and is part of the River Finn SAC (Site Code: 002301). It is considered one of Ireland's premier spring salmon waters. Aquatic qualifying interests of the SAC are Annex I Habitat 1130 – Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) and Atlantic salmon (NPWS, 2017). Habitat 1130 is confined to upland lakes within the designation (located over 20 km upstream) and does not occur within the ZoI of the Proposed Development. The only qualifying interest species of the SAC occurring within the relevant study area is Atlantic salmon.

Loughs Agency conducts catchment-wide juvenile salmonid surveys in the Finn, using semi-quantitative (five-minute single-pass) electrofishing at numerous sites. Main channel and tributary sites that occur within the Section 1 study area are surveyed. The most recent Loughs Agency electrofishing data are presented in Appendix 9B.06. Results over several years (2021-2024, annually) consistently show that, in the reach upstream of Ballybofey at the proposed new bridge crossing of the River Finn (W1-06), salmon fry (0+ age class) were absent or present in 'excellent' numbers, while trout fry were present in 'good' to 'excellent' numbers. Note that electrofishing data for juvenile trout cannot distinguish the proportion that will go on to become brown trout (*Salmon trutta*) or sea trout (*Salmo trutta trutta*) (Niven & McCauley, 2016). Parr (1+ age class) of both species were generally present through the reach in 'fair' numbers. The potentially affected reach encompassing the proposed crossing was previously classified by Niven *et al.* (2011b) as mainly Grade 1 and 2 nursery habitats for salmonids, with small patches of Grade 2 holding and limited Grade 3

[9] European Communities (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988)

spawning habitats (Scale: 1 'excellent' to 4 'poor'). Annual salmon redd surveys are undertaken by the Loughs Agency, with composite redd count data for the years 2020-2024 (presented in Appendix 9B.06) showing indicative local distribution of spawning habitats. The redd count data, along with field survey observations, below, aligns with the earlier classification by Niven *et al.* (2011b), in that the proposed crossing reach is less suitable for spawning but is good nursery habitat based on juvenile salmonid numbers. Trout fry and parr were recorded each year (2021-2024) in 'fair' to 'good' numbers throughout the Backlees (tributary of River Finn), including low abundance near the crossing point (W1-08) and higher numbers in the upper catchment area (Liskeran Burn, upstream of W1-09). Salmon fry and parr were present in fair to excellent numbers each year in the lower reaches of the Backlees (c.670 m upstream of River Finn and 1.0 km downstream of the crossing point W1-08, suggesting salmon spawn locally, downstream of the Proposed Development in the lower Backlees. Trout and salmon fry and parr occurred in the Burn Daurnett consistently over the survey years (2021-2024) in 'fair', mainly 'good' and up to 'excellent' numbers (Loughs Agency electrofishing data 2020-2024, *formal data request*), a continuation of salmonid presence in earlier sampling rounds as part of Loughs Agency catchment fisheries status reporting (McCauley and Deehan, 2019). Note that

Two sites are also monitored as part of WFD fisheries status reporting: Stranagoppoge and Clady Bridge, c.20 km upstream and downstream of Ballybofey respectively. Available data (summer 2016) showed good numbers of fry (0+ year old) and reasonable numbers of parr (1+ year old) salmon at both surveillance sites using single pass electrofishing over 100 m^2. Brown trout (*Salmo trutta*) were very scarce at both sites. Lampreys (species not defined) were recorded at Clady Bridge and eel (*Anguilla anguilla*) at both stations. The Clady Bridge site was at High Status for fish stocks, while Stranagoppoge was Moderate (Niven and McCauley, 2018). The salmon run on the Finn is throughout the season (1 March – 15 Sept.), particularly good in spring. Sea trout (*Salmo trutta trutta)* run July to mid-August. (Loughs Agency, 2019). Loughs Agency also operates a fish counter on the Finn at Killygordon, i.e., circa 10km downstream of Ballybofey. Fish counts for 2020, 2021, 2022, 2023 and 2024 were: 2,302, 2,409, 1,194, 1750, 1025, respectively (Loughs Agency 2025[10]). The management target for the Finn is 5,410 upstream moving salmon annually. The fish counts show the river is consistently not meeting its management target and has failed to do so for many years (Niven *et al*., 2016; Niven and Clarkin, 2018). Combining the above information, it is evident that the River Finn main channel in the crossing reach upstream of Ballybofey, is an important salmonid nursery area, but holding areas and spawning potential is more limited. Of the main tributaries affected by Section 1 of the Proposed Development, the Burn Daurnett is an important salmonid (trout and salmon) spawning and nursery stream, while the Backlees, a small tributary of the Finn supports some trout spawning and nursery habitat throughout but juvenile salmon are only present on the lower reaches likely owing to the natural barrier formed by a steep waterfall upstream of the proposed W1-08 crossing point.

Cloghroe River (Deele Catchment) - Fisheries Data Review

At the northern end of the Proposed Development, the Magheracorran (Teevickmoy Burn) is intercepted by Section 1. This is a small tributary of the Cloghroe River itself a tributary of the Deele River. The River Deele rises in the Cark Mountain plateau between the Derryveagh and Stack Mountains and flows in mainly an easterly direction towards the River Foyle at Lifford. Teevickmoy Burn joins the Cloghroe River about 1.5 km downstream of the N13 road and the Cloghroe River then joins the Deele River a few hundred metres downstream.

Loughs Agency fish monitoring surveys show the River Deele to have reasonable numbers of salmon ('Fair' to 'Good') and trout ('Good' - to - 'Excellent') fry (0+) in the region near the Cloghroe River confluence (Niven *et al.*, 2011a, 2016; Niven and McCauley, 2017). Recent survey data from the Deele main channel (2021-2024, see Appendix 9B.06) near the Cloghroe River confluence show generally 'good' to 'excellent' numbers of salmon and trout fry and parr. The composite redd count data (2020-2024) shows salmon spawning redds recorded along the Cloghroe River upstream as far as the existing N13, which aligns with field observations. Niven *et al*. (2011a) classified the Cloghroe River as mainly Grade 2 and 3 nursery habitats for salmonids with small patches of Grade 3 holding and one small reach of Grade 3 spawning habitat (Scale: 1 'excellent' to 4 'poor'). Trout fry were observed in the Magheracorran (tributary of Cloghroe) during field surveys of 2020 and 2024.

[10] Loughs Agency fish count data available at: https://www.loughs-agency.org/what-we-do/protection/fish-counter-programmes. Note: 2022 fish count included an average count added from Feb-May 2023 due to one of the channels not being operational.

Table 9B-8: EPA Q-value Data – River Finn and Burn Daurnett

EPA Code	Station Name	2016	2019	2022	2025
01F010600	Finn – Bridge 2.5 km u/s Ballybofey	3	3-4	4-5	4
01F010800	Finn – Br S of Stranorlar	3	3	4	3-4
01F010900	Finn – Bridge S. of Killygordon	3	3-4	3-4	3-4
01B020010	Burn Daurnett – Blackburn Br	2-3	3-4	3-4	3
01B020200	Burn Daurnett – Bridge N.W. of Daisy Hill	3	3-4	3-4	3

River Finn and Tributaries – EPA Biological Water Quality Data Review

Biological water quality is monitored by the EPA on the River Finn and Burn Daurnett at stations upstream and downstream of the study area. EPA Q-value results over recent years are shown in Table 9B-8. Burn Daurnett is currently Q3, 'poor' status (2025), upstream and downstream of the study area, a decline compared to previous years. River Finn is Q4, 'good' ecological status (2025), upstream of Ballybofey, declining to Q3-4 – 'moderate' status downstream of the town, remaining 'moderate' by c.10 km downstream of Ballybofey at Killygordon. The achievement of high-status Q-rating in 2022 was a dramatic improvement over previous monitoring. Indications are that waters of the River Finn are "*unpolluted*" upstream of Balleybofey but decline with distance downstream. The Burn Daurnett was '*slightly polluted'* throughout in 2025. Project specific Q-value data taken in 2024 is provided in Appendix 9B.3 for sites sampled on watercourses in relation to the Proposed Development, including streams not monitored by the EPA (where suitable stony substrates were present).

Cloghroe River – EPA Biological Water Quality Data Review

Biological water quality is monitored by the EPA on the Cloghroe and Deele Rivers. Relevant EPA Q-value data in this catchment is shown in Table 9B-9. The Cloghroe and the river Deele upstream and downstream of the Cloghroe confluence are most recently rated Q4, 'good' ecological status (2025).

Table 9B-9: EPA Q-value Data – Cloghroe / Deele Catchment

EPA Code	Station Name	2016	2019	2022	2025
01C050400	Cloghroe – Br d/s Callan Bridge	3	3-4	4	4
01D010200	Deele (Donegal) – 2nd Br d/s Br near Newtown	3	3-4	3-4	4
01D010300	Deele (Donegal) – Glasly Bridge	~	4	3-4	4

Lough Alaan – Data Review

Lough Alaan is set between Lough Hill to its east and the N13 road to the west, adjacent to Ballybofey and Stranorlar Golf Club. Lough Alaan is known as a wild trout lake, attracting high local amenity and recreational value, including angling. Its feeder tributary stream, which is intercepted in the very upper reach on the link road near Tircallan, flows into the lake in a north-south direction, parallel and right next to the existing N13 road. Loughs Agency staff conducted a fish stock assessment at Lough Alaan in July 2013 using dutch-fyke and multi-mesh gill nets. Two species were recorded with a total of 37 fish captured: 18 brown trout and 19 eels (Niven and McCauley, 2015). The study identified presence of stratification within the lough, with a thermocline ranging from 23°C at the surface to 15°C at 6 m. Dissolved oxygen was very low in the deeper lake levels (hypolimnion) compared to shallower levels (epilimnion). In summer there would typically be no mixing between these layers, meaning oxygen depletion (anoxia) occurs in the hypolimnion. Anoxia at depth would mean the deeper area of the lough is uninhabitable to fish. Trout were only captured in the epilimnion in the 2013 study. The lough inflow and outflow streams are not monitored by the EPA. The Proposed

Development intersects with the lake inflow stream in the very upper reaches where it is a minor, ephemeral field drain with no fisheries value.

Field Survey Findings - Habitat Descriptions and Fisheries Habitat Assessment (Section 1)

Refer to Appendix 9B.01 for detailed site habitat descriptions. One crossing is proposed on the main channel of the River Finn in Section 1 (W1-06) where it is a large, moderately fast flowing, primarily eroding type river with a wet width of approximately 30m and is part of the River Finn SAC. The proposed bridge is a seven-span structure of 360m total length over the river, the floodplain and the R252 road. A single 85m span will clear the River Finn and R252 road, with piers set outside the SAC boundary on both banks. There will be no instream footprint and no permanent footprint within the SAC. Dominant flow at crossing W1-06 is a glide/run over mixed substrates of mainly large and small boulder, cobble and bedrock outcrops with patches of coarse gravel and interstitial sand. A section of rapid/run in the crossing reach is followed by a lower gradient reach forming a glide between outcropped boulders. Instream plant community is bryophyte and liverwort dominated, primarily the aquatic mosses *Fontanalis* spp. Although the community aligns somewhat with the CB6b FRV habitat type (Fast-flowing, bryophyte-dominated rivers) as defined in UK rivers (Hatton-Ellis *et al.* 2003), only one indicator species (*Fontanalis antipyretica*) (EC, 2013) was recorded in the 500 m reach surrounding the proposed bridge crossing point. Given the broad classification of FRV, Habitat 3260 bryophyte community is technically present, but it is a poor representation owing to only one vegetation component of the Annex type habitat being present (Hatton-Ellis *et al*., 2003) and is not considered pertaining to the annexed type. Low vegetation diversity is likely linked to existing hydromorphology, influenced by what appears to be historical deepening / channelisation (perhaps owing to the historic iron, flax, corn and sawmill race diversion on the north bank), hence shading from the vertical right-hand side (RHS) bank and reduced flow diversity. Riparian habitat on the left-hand side (LHS) consists of treelines, hedgerow and improved agricultural grassland with invasive Himalayan balsam (*Impatiens glandulifera*) occasional along the bank. The RHS bank is reinforced by mortared stonework backed by the R252 road.

Grade 1 and 2 salmonid nursery habitats are present in the vicinity of the crossing reach with small patches of Grade 2 holding and Grade 3 spawning habitats [Scale:1 (excellent) to 4 (poor)]. Juvenile salmonids were observed in the proposed crossing reach W1-06. The review of Loughs Agency fisheries data (see Appendix 9B.06 and fisheries review, above) shows fish species present within the River Finn included Atlantic salmon, sea trout (migratory) and brown trout (resident), European eel and stone loach. Migratory sea lamprey (*Petromyzon marinus*) and river lamprey (*Lampetra fluviatilis*) are likely to spawn in the Finn although nursery habitat (silt deposits) was not recorded at the crossing location (W1-06) but were present in the slower flowing reaches downstream of Ballybofey (at site W1-21). The presence of migratory lampreys may be precluded by downstream barriers on the Finn (i.e., weirs). Whilst the small tributary of the River Finn at W1-07 (Dromboe Lower) has been entirely piped and/or culverted for most of its length, good salmonid spawning and nursery habitat was present in the short, open reach across the floodplain downstream of the local road, with an abundance of juvenile salmonids observed during field survey in 2020 and 2024. The Aghasheil (W1-23) is not intercepted by the road alignment. It has a high, perched outfall to the River Finn and no fisheries significance as it is piped/culverted at the existing R252 road and is clearly ephemeral (not flowing on several site visits over the years).

The River Finn downstream of Ballybofey at survey point W1-21, downstream of the input from Mullaghagary tributary (affected by the N15 link road), forms a wide laminar glide over substrates of mainly large cobble and small boulder with patches of coarse gravel/sand and few outcropping large boulders. During field survey of 2020 and 2024, all substrates at W1-21 were coated in a layer of pollution tolerant filamentous green algae (*Cladophora* sp.), fine sediment and/or algal detritus with sediment accumulations occurring in slack flow areas. There was no (or very little) salmonid spawning habitat at W1-21 but nursery habitat and holding pools and glides were present as the river broadens out, deepens and has reduced flow diversity.

The Burn Daurnett is not crossed by the Proposed Development but is within the ZoI at the southern end of Section 1. It was surveyed at point W1-22 where it was a moderate sized, moderate to fast flowing, primarily eroding river with a wet width of 4-5 m. It has been historically drained but has recovered a reasonably natural instream morphology, forming a series of mainly riffle/run and glide sequences over substrates of gravel, cobble and coarse sand with reaches of bedrock. It supports an aquatic bryophyte plant community, in addition to mats of *Phormidium*. The riparian habitat consists of treelines, hedgerow and improved agricultural grassland, with abundant coniferous forestry in the upstream catchment area. The Burn Daurnett comprises good salmonid (salmon and trout) spawning and nursery habitats, with occasional holding pools.

Spawning gravels and occasional silt deposits are suitable for brook lamprey. With generally abundant cover from native broadleaved riparian vegetation, the Burn Daurnett is an important spawning and nursery tributary of the Finn (see Appendix 9B.06 for fisheries data), although impaired water quality may be depressing productivity. There are no pearl mussels in the Burn Daurnett (Ecofact, 2024).

The unnamed tributary of the Burn Daurnett at Meencargagh (W1-01 and W1-02) is a minor channel, modified by drainage and realignment/culverting at the existing N15 crossing, but has potential trout spawning and nursery habitat (in winter flows). The Cappry at W1-03 and W1-04 is a minor drain with no fisheries significance. It is piped between W1-04 and W1-05 and at that point had a strong smell of sewage/septic tank run-off in both 2020 and 2024 surveys. Whilst the channel has some potential trout and eel habitat from W1-05 downstream, it is grossly polluted which would virtually preclude fisheries significance.

The Backlees (Dromboe Burn) tributary of the River Finn, is crossed at W1-08, and on its tributary the Greenhills 01 (W1-10). At survey points W1-08 and W1-09 it is a small-medium sized (2 m wetted width, 15 cm depth), fast flowing mountain stream of variable gradient set in a mainly agricultural setting. Flows are dominated by step-pool and riffle/run over substrates of cobble and gravel with some finer bed material. The riparian habitat consists of treelines, hedgerow and improved agricultural grassland. There was abstraction observed upstream of the W1-08 crossing location, where slurry tanks draw water. The Backlees has patchy trout spawning and nursery habitat throughout, with Loughs Agency data (see Appendix 9B.06 and fisheries review, above) showing that salmon use the lower reaches for spawning and nursery but cannot ascend a natural barrier (steep waterfall) that is located just upstream of the proposed (W1-08) crossing point. At W1-10 the watercourse is an insignificant, ephemeral field boundary drain (0.15 m width, 0.01 m depth) which is virtually dry during the summer months and has little or no fisheries value.

The Mullaghagarry at points W1-17, W1-18 and W1-20 (the latter being the existing N15 crossing) is a moderate sized stream (wet width 2.5 - 3.2 m) with stony substrates and flows consisting mainly of step/pool and run/glide habitat over cobble and small boulder. There were limited pockets and reaches of deposited gravels or fines meaning the stream is likely to support trout and brook lamprey, although none were observed during repeated field surveys (2018-2024). The stream has an aquatic bryophyte (moss and liverwort) community, though highly shaded by a broadly continuous broadleaved riparian treeline. There is an existing culvert at W1-17 which is a major fish passage barrier as the stream flows subterranean beneath the existing structure, undermining it. This tributary of the Finn is quite steep in its mid-reaches, however, further upstream at point W1-16 (Tircallan), the stream gradient is lower, and the watercourse is still quite substantial (2.8 m width; 0.05 m depth), collecting surface run-off from the Tircallan area and historically realigned along the existing N13 in the upper reaches. There were potential trout spawning and nursery gravels at W1-16, but no fish observed. However, during survey in 2024 at a location about 500m upstream of W1-16 (ITM: 616041, 897527) the stream was small (1.0 m width; 0.08 m depth) with gravel and coarse sand substrates, and juvenile trout were observed, which confirms the upper Tircallan / Mullaghagarry tributary has fisheries sensitivity.

The Cloghroe River (W1-14) is a medium sized river (3.2 m wet width and a 0.3 m depth). It has been historically drained (deepened) but has recovered fairly natural in-channel riffle/run and pool/glide habitats over stony substrates of embedded cobble, small boulder, with pebble, gravel and sand. It contains an instream bryophyte community consisting of mosses and liverworts with >30% coverage of filamentous green algae (*Cladophora)* recorded during 2020 and 2024 surveys. A riparian treeline is broadly continuous on the true left, including willow, ash, alder, hawthorn. The Cloghroe River comprises good salmonid nursery habitat with some spawning potential and holding capability in deeper pool/glide, downstream of the proposed crossing point (see Appendix 9B.06 and fisheries review, above), while brook lamprey and eel are likely also present.

The Magheracorran, a tributary of the Cloghroe is generally a small watercourse (1.5m width; 0.07m depth) that has been heavily modified by culverting under the existing N13 road and has been historically deepened and realigned in relation to the road and agricultural drainage. Despite historical modification, upstream and downstream of the N13 culvert there were patches of riffle/run habitat over gravel and pebble substrates . Juvenile trout were captured at both W1-11 and W1-13, which suggests fish can pass the existing N13 culvert (>50m length but of low gradient) with a viable population locally. The Lisnaree (tributary adjoining the Magheracorran) at W1-12 is an insignificant drainage ditch with no fisheries significance.

River Finn - Freshwater Pearl Mussel Survey Findings (Section 1)

Freshwater pearl mussels were absent from all three survey reaches examined, taking advantage of unusually low water levels in 2018 and 2020. Site F1 was the full 1.5km reach encompassing the River Finn main channel crossing location in Section 1; Site F2 was the c.350m reach downstream of Dromboe Lower Tributary (downstream of F1). Site F3 covered a c.500m reach downstream of the Mullaghagarry tributary confluence with the main channel of the Finn.

Though mussels were absent, there were patches of suitable habitat available for the species in the F1 and F2 reaches. Biological water quality (Q3 / indicative of 'poor' ecological status in 2018 and 2020) was sub-optimal for this pollution sensitive invertebrate. Physical habitat opportunity for mussels within F1 and F2 included stable patches of gravel and coarse sand deposited downstream of large boulders / bedrock outcrops, plus, stable cobble / pebble glides with pockets of fine interstitial bed material (Plate 9B-1). Aquatic mosses (mainly *Fontanalis squamosa*) and liverworts (*Chiloscyphus* sp.) were the dominant instream vegetation. Silt was generally absent owing to moderate swift flow and rooted macrophytes were scarce.

The F2 reach downstream of the Dromboe Lower tributary confluence had broadly similar habitats to those encompassing the proposed crossing location, although there was more cobble/pebble forming, riffle/run habitat extending downstream (Plate 9B-3) as opposed to bouldery glides further upstream (Plate 9B-2). Reach F3 was dominated by laminar glide habitat with generally larger substrates of cobble and small boulder and a paucity of fine interstitial substrates. There were no mussels observed along the 500 m reach and habitat was unsuitable, with obvious signs of eutrophication evident in the layer of filamentous diatom and algae covering substrates. Pollution tolerant filamentous green algae (*Cladophora* sp.) was abundant in all three reaches, mainly in glides and margins, indicating nutrient enrichment and considered a poor indicator for pearl mussels (FGA cover F1 and F2 = 60%; F3 = 80%).

A report by Ecofact (2024) for Donegal County Council contains the following additional pearl mussel survey findings in the Ballybofey area of the River Finn:

- Pearl mussel survey by Ecofact (2017, cited Ecofact 2024) of the River Finn at Ballybofey/Stanorlar in February 2017: no live or dead mussels found.
- Pearl mussel survey by Ecofact (2020, cited Ecofact 2024) of the River Finn at Ballybofey/Stanorlar in June 2020: no live or dead mussels found.

The findings of the current study and Ecofact (2024) fully concur with Beasley and Roberts (1996, 1999) who proposed that even though habitat may be locally suitable and while there may be one or two old, remnant adult mussels on the channel (as they found in 1993), the Finn is now a "*former pearl mussel river*" likely owing to historical pearl fishing in combination with degraded water quality.

Plate 9B-1: FPM Site F1, River Finn at proposed bridge crossing location (July 2020)

Plate 9B-2: FPM Site F1 River Finn, typical habitat in bridge crossing reach, low flow (July 2018)

Plate 9B-3: FPM Site F2 - River Finn, downstream Dromboe Lower stream confluence (July 2018)

Plate 9B-4: FPM Site F3 - River Finn, downstream Mullaghagarry stream confluence (July 2020)

The EPA water quality record (Table 9B-10) going back as far as 1984 shows sustained, impaired water quality downstream of Ballybofey (Station 01F010800), declining as far as 'bad' status (Q2) in 1998. There was also a sudden decline in water quality upstream of Ballybofey (Station 01F010600) between 1998 and 2001, from pristine (high status, Q5) down to poor status (Q3).

Table 9B-10: Historical River Finn EPA Q-Values in Relation to Pearl Mussel Habitat Quality

EPA Code	Station Name	1984	1990	1994	1997	1998	2001	2004	2011	2013	2016	2019	2022
01F010600	Finn – Bridge 2.5 km u/s Ballybofey	4-5	4-5	4-5	4-5	5	3	3	3-4	3-4	3	3-4	4-5
01F010800	Finn – Br S of Stranorlar	3-4	3	3	3	2	4	3-4	3-4	3-4	3	3	4

Pearl mussels are highly sensitive to water quality degradation. As per European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 (S.I. No. 296), functioning pearl mussel populations require consistent high-status waters (Q5/Q4-5) for successful recruitment.

Given that impaired water quality has, in recent times persisted on the Finn for at least 18 years (upstream) and 38 years (downstream) of Ballybofey, and there has been no agency-led effort to re-establish the species; a difficult task that would potentially involve captive breeding, recruitment and translocation from captivity, there is little to no possibility that a pearl mussel population would have spontaneously recovered between the surveys conducted in 2018/2020 and 2025 when the current report was prepared. The combination of sustained pearl fishing, poor water quality and absence of a dedicated multi-agency effort to reintroduce mussels supports the general acceptance that the pearl mussel population is currently functionally extinct on the River Finn (Moorkens, 2012, Reid & Roberts 2013, cited Ecofact 2024).

Field Survey Findings - Biological Water Quality Assessment (Section 1)

Biological water quality assessment was undertaken in 2020 and again in 2024. Macroinvertebrate lists and Q-ratings are presented in Appendix C9B.03. If a site was surveyed for Q-rating in both years, the 2024 result is reported for that site as it is the current baseline. Watercourses associated with six crossings were completely unsuitable for Q-sampling: W1-03, W1-04, W1-10, W1-15 (dry); W1-12 and W1-19 (stagnant with silty substrates).

The main channel of the River Finn merited Q4 indicative ‘good’ status in 2024, which was slightly poorer than the EPA rating of Q4-5 (high status) at the same site in 2022. On this, it’s noted the River Finn had been at Q3 / Q3-4 (poor to moderate status) for many years prior to the EPA 2022 survey (see EPA data in Table 9B-8), therefore Q4 in 2024 is in alignment that water quality on the Finn main channel upstream of Balleybofey appears to have improved in more recent years.

The Mullaghagarry (tributary of Finn affected by the N15 link road) merited Q4 ‘good’ status in 2024 at the downstream end (W1-20). This stream (W1-16, W1-18, W1-20) generally had moderate to good water quality in 2020 and 2024. Likewise, the Magheracorran (tributary of Cloghroe) at the northern end of Section 1 (W1-11, W1-13) most recently recorded Q4 ‘good’ status. These results align with field observations of juvenile trout in both watercourses.

The Backlees (tributary of Finn crossed by the mainline at W1-08) merited Q3, ‘poor’ status, and was slightly turbid during both 2020 and 2024. Impaired water quality, along with natural barriers (e.g., waterfalls) may help explain low numbers of trout fry and parr recorded by the Loughs Agency in electrofishing surveys (2021-2024) in the upper reaches of this stream (refer to Loughs Agency fisheries data review, above).

In the Burn Daurnett catchment, the main channel was Q3-4 ‘moderate’ status in 2024 field surveys which aligns with EPA status reported in 2022. The Cappry tributary was dry in the upper reaches (W1-03), becoming a stagnant drain (W1-04) then piped through to W1-05 where there is clearly an organic input with a strong sewage smell recorded in both 2020 and 2024. W1-05 merited a Q2 potentially ‘bad’ status in 2020 and was deemed too polluted to sample in 2024 (anoxic mud and sewage fungus). The tributary represented by W1-01 and W1-02 was Q3 ‘poor’ status in 2024. A new culvert on the existing N15 had “bedded in” by 2024, with the realigned channel upstream of the road having recovered gravelly substrates but peat silt, likely form an upstream source, was noted. There are clearly pressures in the Burn Daurnett catchment that are depressing water quality, noting that the upper catchment area is heavily afforested by plantation conifer.

9B.4.1.2 Section 2 - Baseline Aquatic Environment

Section 2 of the Proposed Development is set in the EPA sub catchments of Swilly_SC_010 and Leslie Hill [Stream]_SC_010, which all ultimately flow into Swilly Estuary. A new mainline clear span bridge crossing of the estuarine River Swilly is proposed approximately 1.5km downstream of the existing N56 bridge ('Port Bridge' near Polestar Roundabout, Letterkenny). A new clear span footbridge over the Isle Burn (EPA Leslie Hill Stream) is proposed near the Manorcunningham Roundabout, over muddy, tidal river habitat upstream of the estuary. In addition, there are crossings and/or interactions on a number of small 1st and 2nd order EPA delineated watercourses and several drains, mainly in the low-lying Milk Isle / Bunnagee area that lies behind the flood embankments bordering Lough Swilly (tidal river/estuary).

Table 9B-11 sets out Section 2 watercourse names (EPA) and survey site codes as referred to in this chapter, including ITM co-ordinates. Figure 9B-2 shows watercourses and survey site locations in relation to the Proposed Development. EIAR Drawing 9B.02 in Volume D: Book of Drawings contains higher resolution maps of aquatic survey site locations and their EPA watercourse and water body names. See Appendix C9B.01 for detailed survey site habitat and summary data and Appendix C9B.02 for representative images of survey points W2-01 to W1-28.

Table 9B-11: Section 2 - Aquatic Field Survey Watercourses and Locations

EPA Sub Catchment (SC)	EPA Watercourse Name	Location Description	Stream Order	Aquatic Site Code	X (ITM)	Y (ITM)
Swilly_SC_010	(un-named)	Tributary of Swilly in Drumany	1	W2-01	619782	909866
			1	W2-02	620183	910514
			2	W2-03	620116	910533
			2	W2-04	620073	910662
			2	W2-05	619910	910942
	Bunnagee	Tributary of Swilly	1	W2-06	619756	911027
	(un-named)	Tributary of Swilly	2	W2-07	619822	911167
	(un-named)	Tributary of Swilly at Dromore Lower	1	W2-08	620380	910927
	(un-named)	Tributary of Swilly at Drumgreggan	1	W2-09	620678	911090
	Farsetmore	Tributary of Swilly at Drumgreggan	1	W2-10	621272	911058
				W2-11	621239	911199
				W2-12	621221	911447
	(Drain - non EPA)	Milk Isle drain	~	W2-16	619327	911324
			~	W2-17	619218	911495
	Swilly 39	River Swilly main channel in Swilly Estuary	5	W2-18	619085	911675
	Coaghmill	Tributary of Corranagh Burn		W2-19	619638	909693
	(Drain - non EPA)	Bunnagee drains	~	W2-20	619622	911063
	~		~	W2-21	619521	911120
	(Drain - non EPA)	River Swilly embankment toe-drain	~	W2-22	619557	911203
	Dromore 39	Tributary of Swilly	1	W2-23	620270	911070
	Lurgybrack	Local name 'Corranagh Burn', tributary of River Swilly	2	W2-24	619265	910335
	(Drain - non EPA)	Drain in Corranagh townland (connects to Lurgybrack)	~	W2-25	619217	909096

EPA Sub Catchment (SC)	EPA Watercourse Name	Location Description	Stream Order	Aquatic Site Code	X (ITM)	Y (ITM)
Leslie Hill [Stream]_SC_010	Trimragh	Tributary of Isle Burn at Swilly Estuary	1	W2-13	622356	911215
	Maghera_Mor 39	Tributary of Isle Burn at Swilly Estuary	1	W2-14	622601	911038
	Leslie Hill stream	Existing crossing of Isle Burn/Corkey River main channel at Swilly Estuary	4	W2-15	623069	910845
	(Drain - non EPA)	Drain in Listellian townland (connects to Maheraboy 39)	~	W2-26	619689	907788
	Magheraboy 39	3.7km d/s of Listellion drain in Aghlehard townland	2	W2-27	622098	909965
	Dooballagh (Burn)	Existing crossing on Raphoe Road at old mill site	2	W2-28	619935	907615

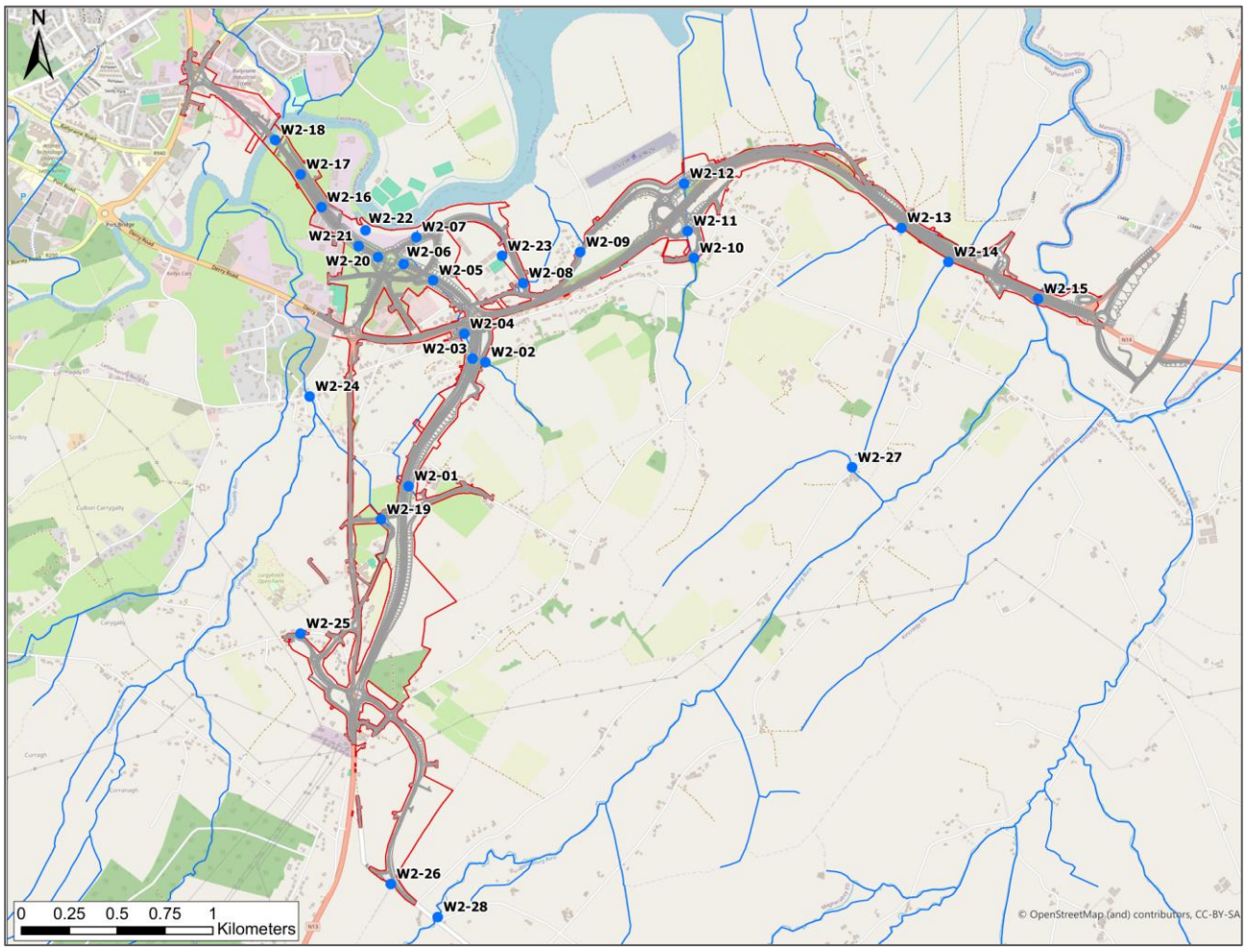

Figure 9B-2: Section 2 - Aquatic Survey Site Location Overview Map

River Swilly – Data Review

The River Swilly rises in the mountains of Glendore, flowing generally east north east through Letterkenny into the estuary at Lough Swilly before flowing into the Atlantic Ocean. The river is tidal to a point upstream of Letterkenny near the Oldtown Bridge. The lower reaches, i.e., those within the ZoI of the proposed Section 2 development, are estuarine in nature and have been highly modified (dredged, embanked) by OPWs Swilly Embankments drainage scheme. The main channel of the River Finn is a designated Salmonid Water upstream of the Proposed Development, commencing at the existing N56 'Port Bridge', extending upstream for 15km to the headwaters east of Breenagh.

IFI carry out WFD freshwater fish stock monitoring at a site on the River Swilly, c.12 km upstream of Letterkenny, where brown trout, salmon, lamprey and eel have been recorded in surveys conducted in 2011, 2014, 2017 and most recently 2021. The WFD fish ecological status at this monitoring site is 'good' (Gordon *et al.*, 2021). This is relevant in so far as migratory fish including salmon, sea trout, eel, river and sea lampreys are species that would be passing through Lough Swilly Estuary and past the location of the proposed new Swilly Bridge in Section 2.

Biological water quality is monitored by the EPA on the River Swilly in freshwater reaches upstream of Letterkenny. Recent data is displayed in Table 9B-12, showing the river is currently 'unpolluted' (Q4-5), equating to high status. Note that the freshwater reaches of the River Swilly are not affected by the Proposed Development, but it is of some relevance that waters flowing into the estuary are currently at high status.

Corravaddy Burn and Corranagh Burn (W2-24, EPA Lurgybrack) join to form one channel just upstream of the existing N56 crossing location, forming a tributary of the River Swilly. The Corranagh Burn/ Lurgybrack discharges to the tidal zone of the Swilly downstream of Letterkenny. The channel is relevant in so far as the Coaghmilll (W2-19) tributary of the Corranagh Burn and ephemeral drains (W2-25) in Corranagh townland are intercepted by the Proposed Development. The EPA monitor this tributary, with records (Table 9B-12) showing an improvement in water quality from poor status (Q3) through to good status (Q4) in 2023. In 2021, IFI conducted electrofishing on the Corranagh Burn (at Corranagh Bridge, just upstream of drainage connectivity from the Proposed Development), recording high abundance of young-of-the-year (0+ age class) brown trout (n = 83 fish; 10 min standard timed electrofishing) (Gordon *et al*., 2021). The Corranagh Burn, in fact, had the highest 0+ brown trout density of ten sites surveyed throughout the River Swilly catchment in 2021 indicating it is an important trout recruitment stream. No other species were captured at the site, suggesting that brook lamprey is absent from this rocky gully stream.

Isle Burn/Corkey River (EPA Leslie Hill Stream)

At Manorcunningham, several small streams potentially affected by the Proposed Development drain to the Isle Burn River, which forms the lower, tidal reaches of the "Corkey" River (EPA name Leslie Hill stream). The existing N13 crossing of the Isle Burn also form part of the Proposed Development. The Isle Burn also flows into Swilly Estuary (of Lough Swilly). The Isle Burn, immediately downstream of the existing N13 crossing, forms part of the Lough Swilly SAC / pNHA, with Lough Swilly SPA located a further 1 km downstream.

Table 9B-12: EPA Water Quality Monitoring Data – Section 2

EPA Code	Station Name	2016	2019	2023	2025
39S020190	River Swilly – Br. At Newmills	4-5	4	4	4
39C030250	Corravaddy Burn – Br. Near Bunnagee	3	3-4	4	4
39L050600	Leslie Hill Stream – Br.at Leslie Hill	2-3	4	4	4
39D020110	Dooballagh Burn - 100m d/s Foundry Bridge	4	4	~	4
39D020200	Dooballagh Burn - Br. At Pluck Mill	4	4	~	4

The Isle Burn (EPA – Leslie Hill stream) from the Swilly Estuary up to the headwaters is an excellent salmon spawning area (noted in IFI consultation). The Isle Burn side tributaries convey water with some spawning capability, but the main channel has the majority of fish spawning.

EPA monitoring data for freshwaters of the Isle Burn / Corkey River is available through records for "Leslie Hill stream", which reported good ecological status (Q4), "unpolluted", in 2025. This is a significant improvement from 2016 (Table 9B-12) when water quality dropped to Q2-3 'poor' status. There is distant connectivity to the Isle Burn / Corkey River from the proposed Section 2 development via the Dooballagh Burn represented by survey sites W2-27 and W2-28. Both the Magheraboy 39 (W2-27) and the Dooballagh (Burn) (W2-28) are small stony streams with trout spawning and nursery downstream of the Proposed Development. The EPA rated the Dooballagh Burn at 'good' ecological status (Q4) in 2025. Field studies showed the Magheraboy 39 (W2-27) was 'moderate' ecological status in 2024 (Appendix C9B.03). Reasonably distant connectivity to these latter channels is via networks of ephemeral drains; the streams themselves are not directly impacted by the Proposed Development.

Swilly Estuary Overview

The Swilly Estuary (Lough Swilly) covers an area of 59 km², starting at the tidal limit of the River Swilly in Letterkenny town and extending seaward approximately 20 km north-easterly to the village of Rathmullan (CRFB, 2010). The estuary is within Lough Swilly SAC (002287) and Lough Swilly including Big Isle, Blanket Nook and Inch Lake pNHA (000166). The Swilly Estuary is a Transitional Waterbody (IE_NW_220_0100) monitored by the EPA, currently reported for the 2019-2024 at 'poor' ecological status.

Lough Swilly is an important fisheries resource. The Central Fisheries and Regional Fisheries Board (now IFI) carried out WFD fish sampling in the Swilly Estuary in 2009, recording 32 fish species, which was the highest fish species richness for any transitional water body surveyed nationwide that year. Juveniles of commercially important fish species were present (cod, plaice and whiting), plus species of angling importance (sea trout, flounder (*Platichthys flesus*) and lesser spotted dogfish (*Scyliorhinus canicular*)) (CRFB, 2010).

Swilly Bridge Crossing Reach Survey Results (Lough Swilly SAC)

The intertidal area beneath the proposed new Swilly Bridge crossing (W2-18) is uniform and typical of upper estuarine systems. The community complex present was identified as typical of the 'Mud community complex' of the of the Annex I Habitat, Estuaries [1130], a qualifying interest habitat identified in the Lough Swilly SAC Conservation Objectives supporting document (NPWS, 2011) although the faunal diversity and abundances were low. Initial surveys were conducted in 2018, with follow up site-visits in 2020 and 2024 which confirmed ongoing presence of the Annex I habitat. The findings iteratively informed the proposed bridge design as a 108 m clear span over the channel with piers and abutments outside the SAC boundary and no temporary or permanent in-channel footprint, hence avoiding direct physical impact on Annex I habitat of Lough Swilly SAC.

The intertidal soft sediment consists primarily of soft, liquid muds (Plate 9B-5) sloping into the river from dry, compact mud located at the top of the shore adjacent to the terrestrial area of the crossing (Plate 9B-6). Diatoms were common across the soft, intertidal muddy area. The anoxic layer across the site was located just beneath the sediment surface. No large fauna (e.g., molluscs) were returned in either dig. Results from the infaunal replicate cores indicated the area to be species poor, with low faunal abundances across the survey area.

The fauna present in the area consist primarily of Oligochaetes within the sloping mud, and the polychaete *Hediste diversicolor*, which is present in the firmer, compacted mud near the top of the shore. The brown algae, *Fucus* sp. is present across the shoreline. The site classifies as typical of the Polychaete / Oligochaete-dominated upper estuarine mud shores habitat – LS.LMu.UEst (JNCC, 2022) which has been described as '*Upper estuarine sandy mud and mud shores, in areas with significant freshwater influence. Littoral mud typically forms mudflats, though dry compacted mud can form steep and even vertical structures, particularly at the top of the shore adjacent to saltmarshes. Little oxygen penetrates these cohesive sediments, and an anoxic layer is often present within millimetres of the sediment surface. The upper estuarine mud communities support few infaunal species and are principally characterised by a restricted range of polychaetes and oligochaetes*.' This description corresponds well with the results from

survey of the study area. The area of interest examined at the crossing point was uniform in nature, with only this single marine biotope identified.

Subsequent site visits of 2020 and 2024 verified there had been no physical changes to the intertidal habitat structure or type. This is unsurprising given the sheltered physical location of this depositional and static habitat so far upstream in the estuary. Even if there had been slight changes to the (low diversity) faunal composition this far up the estuary between 2018 and 2025 (when the current report was prepared), the annexed habitat classification does not alter and the targets and attributes for the QI habitat 1130 Mud community complex were applied in this impact assessment. The conservation targets for this community are: (1) permanent habitat area is stable or increasing, subject to natural processes (2) communities should be conserved in a natural condition (NPWS, 2011).

Plate 9B-5: River Swilly, overview of the intertidal area at crossing point (Site W2-18) (June 2020)

Plate 9B-6: River Swilly, intertidal bank habitat at crossing point (W2-18) (Sept. 2024)

It is worth noting that OPW dredges the margins of the estuarine Swilly main channel (i.e., excavator reach width from the bank) approximately every 5 years as part of the Swilly Embankments Drainage Scheme. OPW clarified that the Swilly main channel (OPW reference channel 'C1') was subject to cleaning of sluice outfalls in 2023 and 2024, but there was no broad scale dredging because the flood berms are unstable in some locations (OPW, 2025). Future OPW maintenance on Channel C1 of the Swilly Embankments Scheme is scheduled in 2028 and will likely be similar to that undertaken recently owing to berm instability.

Survey Findings – Combined Habitat, Q-value and Fisheries Descriptions

See detailed habitat summaries in Appendix C9B.01. Section 2 of the Proposed Development interacts with a number of different watercourses including the Rivers Swilly (W2-18), Isle Burn (W2-15), Farsetmore (at Drumgreggan) (W2-10, W2-11, W2-12) and numerous drainage ditches (W2-01, W2-02, W2-03, W2-04, W2-05, W2-06, W2-07, W2-08, W2-09, W2-13, W2-14, W2-16, W2-17, W2-19., W2-20, W2-21, W2-22, W2-23).

The River Swilly is intercepted by the Proposed Development at W2-18 where a new clear span bridge is proposed. The river is strongly tidal at this point and instream habitat is comprised of intertidal mud, pertaining to Annex I Habitat 1130 Estuaries. A set-back embankment follows the course of the Swilly along the Milk Isle and Bunnagee areas, leaving approximately 20m of vegetated ground between embankment top and riverbank. A toe-drain (W2-22) runs along the back of the embankment and outflows to the Swilly through non-return valves.

The Isle Burn River is also tidal at the existing / proposed crossing point (W2-15). The intertidal soft sediment of the channel consists primarily of soft, liquid muds, sloping into the river from steepened, mud/clay banks with grassy bank-tops, sloped by drainage maintenance to an embankment on the top of the right-hand side bank and to a setback embankment on the left-hand side. The channel was being dredged as part of OPW

standard drainage maintenance in 2024. Lough Swilly SAC boundary is directly adjacent to the existing triple barrel culvert at the crossing. The proposed new Active Travel footbridge is located on the upstream side of the existing culvert structure, outside the SAC boundary with no instream footprint.

Both the Swilly and Isle Burn crossing points are important routes for migrating fish species: Atlantic salmon, sea trout, river and sea lampreys and eel of the Isle Burn/Corkey River and River Swilly catchments. There is no freshwater spawning or nursery habitat present in the tidal areas of these rivers at the points of the proposed crossings; however, they do provide potential foraging areas for estuarine fish, e.g., flounder, mullet.

Crossings W2-10, W2-11 and W2-12 intercept the Farsetmore tributary of the Swilly Estuary (at Drumgreggan). At its upstream end (W2-10) it is a small (wetted width: 0.5 m: depth: 0.04 m), gully stream flowing through an existing box culvert that has a perched concrete apron (fish passage barrier). It then flows in step-pool fashion down a wooded valley in the reach upstream of existing N14 (W2-11), where it is culverted under the road in an oversized ribbed pipe. Substate consists of mainly pebble and gravel with some cobble and patches of silt and it is quite embedded. Upstream of W2-12 it is heavily polluted by livestock access to the watercourse and there is a concrete apron downstream of the N14 culvert that has broken and forms a fish migration barrier. In the absence of these barriers (an obvious pollution source) the stream ought to support trout and brook lamprey. Because of the existing barriers, there is a low probability of a residual trout population in the W2-12 to W10 reach, but the reach has been treated as potentially fish bearing for the purpose of this assessment.

The Corannagh Burn (EPA name Lurgybrack) (W2-24) is not directly impacted by the Proposed Development but is the main receiving water for drainage in this catchment, i.e., from Coaghmill (W2-19) and the Corranagh drain (W2-25). The Lurgybrack is a moderate sized stream set in a wooded gully, with step-pool and riffle run habitats and gravelly substrates that IFI electrofishing (Gordon *et al*., 2021) demonstrated support high densities of juvenile trout (i.e., at Corranagh Bridge). The scoured nature of the rocky substrates offer little to no opportunity for brook lamprey.

At the northern end of Section 2, a proposed side road at Listellian townland crosses into the Dooballagh Burn drainage catchment, connecting to Isle Burn/Corkey River (EPA Leslie Hill stream). A small drain (W2-27) is crossed, and while this has no sensitivity in the crossing reach, it connects to a small trout stream, the Magheraboy 39 (W2-27) which joins the Dooballagh Burn. The proposed road ends in the catchment of the Dooballagh Burn (W2-28) near Foundry Bridge (old mill site). This is a moderate sized stream with juvenile (1+ age class) trout recording during kick-sampling in 2024.

The remaining watercourses within Section 2 have been classed as drainage ditches. The majority of these drains are deep and stagnant or sluggish (W2-07, W2-08, W2-09, W2-13, W2-16, W2-17, W2-20, W2-21, W2-22, W2-23), while the rest have been classified as relatively, small field drains with little to no flow (W2-01, W2-02, W2-03, W2-04, W2-05, W2-06, W2-14, W2-19). Eel were the only species potentially present in the lower reaches of W2-05, W2-07, W2-08, W2-09, W2-13, W2-14, W2-20, W2-21 and W2-22. The remaining watercourses (W2-01, W2-02, W2-03, W2-04, W2-06, W2-13, W2-14, W2-19, W2-23) were assessed to have no significant fisheries habitat. In general, Section 2 has low fisheries significance.

Biological Water Quality Assessment – Field Survey Findings

Biological water quality assessment was undertaken in 2020 and again in 2024. Macroinvertebrate lists and Q-ratings are presented in Appendix C9B.03. Six watercourses were sampled in total (W2-05, W2-08, W2-11, W2-24, W2-27, W2-28). All other sites were unsuitable for Q-sampling for several reasons including: tidal waters, stagnant, dry, insufficient flow and/or substrates, visible pollution (e.g., sewage).

Farsetmore (tributary of Swilly at Drumgreggan) was sampled in 2020 and 2024 at W2-11, with a Q3-4 rating indicative of moderate status in both years. The tributary of the river Swilly at Dromore Lower (W2-05) returned Q3, potential ‘poor’ status in both 2020 and 2024. The small tributary of the Swilly at W2-08 was sampled in 2024, returning Q3, indicative of poor status. The Lurgybrack (W2-24) returned Q3, ‘moderate’ status in 2024. The results suggest water quality is generally impaired in the small tributaries draining the Corranagh/Dromore/Drumgreggan slopes towards the Swilly Estuary.

In the Isle Burn catchment (EPA Leslie Hill stream) at Listellian the downstream site on the Magheraboy 39 (W2-27) was Q3-4, 'moderate' status, while the Dooballagh Burn (W2-28) attained Q4, 'good' status.

Section 2 - Protected Species Records

Table 9B-13 lists rare and protected aquatic species that are found within the 10 km grid squares that intersect Section 2. The record for freshwater pearl mussel occurs in rivers upstream and/or not hydrologically connected to the Section 2 Proposed Development. No pearl mussels or mussel habitats are affected by Section 2 of the Proposed Development.

Table 9B-13: Rare and Protected Aquatic Species – Section 2

Class	Scientific Name	Common Name	Grid Square^				Conservation Status~
			C10	C11	C20	C21	
Bivalve	*Margaritifera margaritifera*	Freshwater pearl mussel		*, X			II V (EU HD), WA, CR

^ NBDC (*), NPWS (x)

~Protection status following criteria set out in Plant Red Data Book (Curtis & McGough, 1988: Stewart & Church, 1992) – Ex Extinct, E Endangered, V Vulnerable, R Rare, I Indeterminate, and K Insufficiently known. Ireland Red Lists using IUCN (2001) – RE Regionally Extinct, CR Critically Endangered, EN Endangered, VU Vulnerable, NT Near threatened, LC least concern, DD data deficient, NA not assessed. FPO denotes that the species is protected under the Flora Protection Order, 2022. EU HD Annex I-V – denotes EU Habitats Directive Annexed I to V Species. WA denotes species listed under the Wildlife Acts.

9B.4.1.3 Section 3 - Baseline Aquatic Environment

Section 3 of the Proposed Development is set in several EPA sub catchments: Leslie Hill [Stream]_SC_010, flowing into Swilly Estuary and the Johnston Stream_SC_010, Deele [Donegal]_SC_010 and Finn [Donegal]_SC_030, which all ultimately flow to the transitional water body 'Foyle and Faughan Estuaries' (UKGBNI5NW250010) and to Lough Foyle. New crossings of main channels of River Finn (N14/N15 to A5 Link), Swilly Burn and Deele River are proposed. In addition, there are crossings and/or interactions on a number of small 1st and 2nd order EPA delineated watercourses and several drains.

Table 9B-14 sets out Section 3 watercourse names (EPA) and survey site codes as referred to in this chapter, including ITM co-ordinates. Figure 9B-3 shows watercourses and survey site locations in relation to the Proposed Development. EIAR Drawing 9B.03 in Volume D: Book of Drawings contains higher resolution maps of aquatic survey site locations and their EPA watercourse and water body names. See Appendix C9B.01 for detailed survey site habitat and summary data and Appendix C9B.02 for representative images of survey points W3-01 to W3-21.

Table 9B-14: Section 3 - Aquatic Field Survey Watercourses and Locations

EPA Sub Catchment (SC)	EPA Watercourse Name	Location Description	Stream Order	Aquatic Site Code	X (ITM)	Y (ITM)
Leslie Hill [Stream] _SC_010	Churchland 39	Drainage ditch tributary to W3-02.	1	W3-01	623932	910575
	Pluck	Leslie Hill Stream Tributary	4	W3-02	624072	910522
	Pluck	Leslie Hill Stream Tributary (u/s W3-02)	3	W3-03	624462	910424
	Pluck	Leslie Hill Stream Tributary (u/s W3-03)	3	W3-04	625305	910062
	Drumoghill	Leslie Hill Stream Tributary	2	W3-05	625403	909748
	Drumoghill	Drainage ditch - upper reaches W3-05.	1	W3-06	625700	909075
	Doorabble	Drainage ditch Tributary to W3-08.	1	W3-07	626253	908358
	Pluck	Leslie Hill Stream Tributary	2	W3-08	626623	908249
	Galdonagh Glebe	Drainage ditch	1	W3-09	627343	907264
Johnston Stream _SC_010	Sheskinapoll	Upper reaches of Swilly Burn Tributary W3-11.	1	W3-10	627659	906529
	Sheskinapoll	Swilly Burn Tributary	2	W3-11	628069	905736
	Drumbeg	Swilly Burn Tributary	3	W3-12	628821	904075
	Drumbeg	Swilly Burn Tributary (d/s W3-12)	3	W3-13	629384	903149
	Swilly Burn	Swilly Burn	3	W3-14	629455	902065
	Tullyrap	Drainage ditch tributary of Swilly Burn W3-14.	1	W3-15	629591	901809
	Tullyrap	Drainage ditch tributary of Swilly Burn W3-14.	1	W3-16	629610	901624
Deele [Donegal] _SC_010	Deele (Donegal)	River Deele	4	W3-17	631117	899710
	Cavanacor	River Deele Tributary	1	W3-18	631484	899338
	Murlough 01	Drainage ditch flowing into River Deele (W3-17)	1	W3-19	631670	899273
	Ballynabreen	Stream flowing into River Deele (W3-17)	1	W3-20	632054	899144
Finn [Donegal] _SC_030	Finn (Donegal)	River Finn	6	W3-21	632628	897022

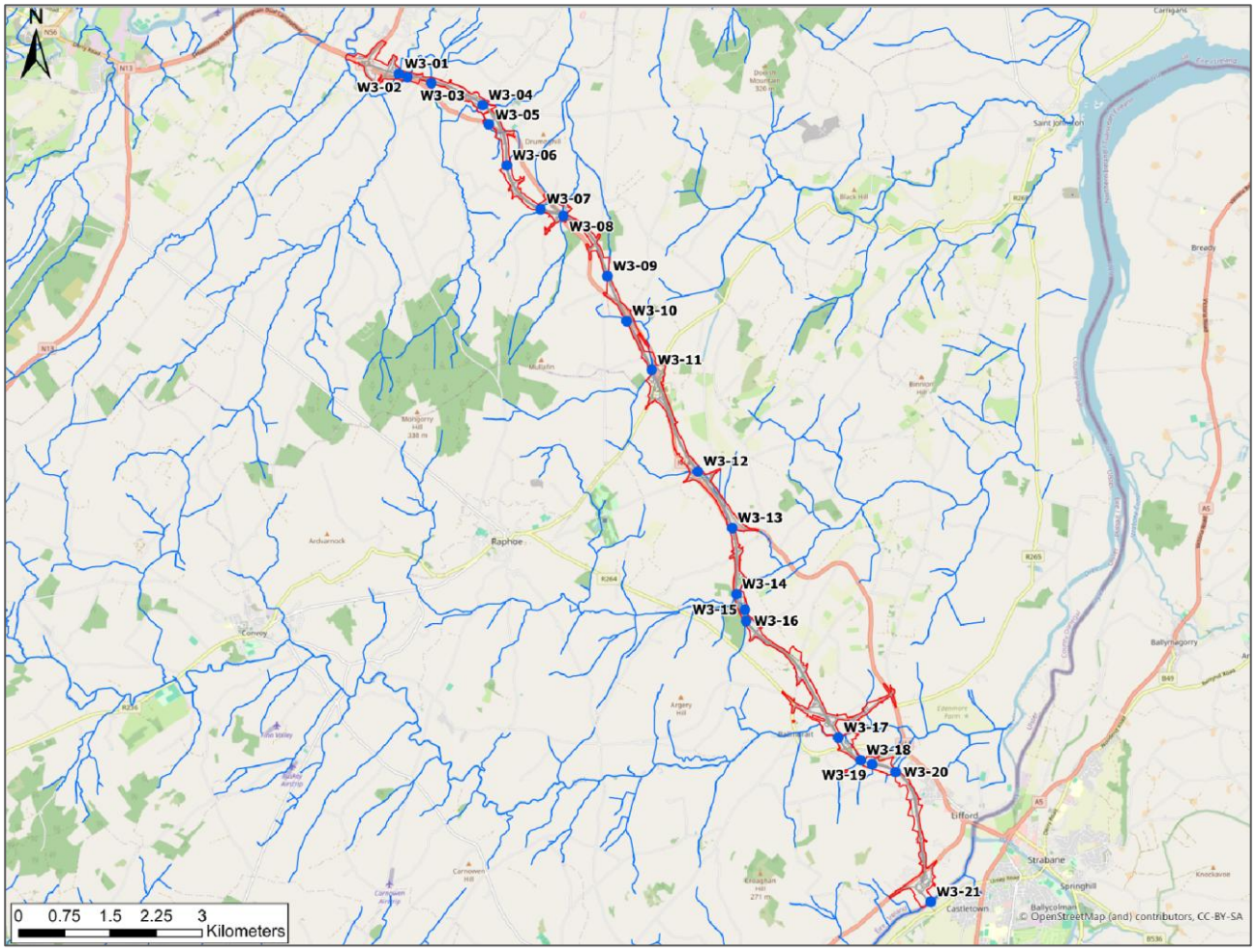

Figure 9B-3: Section 3 - Aquatic Survey Site Location Overview Map

Overview – Section 3 Watercourses

There are 21 watercourse crossings along the length of Section 3, in addition to several minor drainage ditches, the latter of which are not considered as having any aquatic ecological value on account of their small size and ephemeral nature. The main watercourses in the vicinity of the scheme have been subject to drainage schemes and are canalised with flood embankments with their historic floodplains providing intensive farmland. The northern section of the Proposed Development (watercourse W3-01 to W3-11) drains to the north towards Lough Swilly via tributaries of the Leslie Hill Stream (also known as the 'Corkey River', and 'Isle Burn' in its lower estuarine reaches). The central and southern portion of the route drain to the east via the Swilly Burn (W3-14) and River Deele (W3-17) and their tributaries to the River Foyle; named the 'Foyle and Faughan Estuaries' transitional water body (UKGBNI5NW250010). The extreme southern portion of the Proposed Development lies within the River Finn catchment and includes the proposed cross-border N14/N15 to A5 Link Bridge over the tidally influenced main channel of the river (W3-21) just upstream of Lifford / Strabane. The latter Section 3 bridge over the River Finn is 28 km downstream of the proposed Section 1 bridge in Ballybofey (refer to Section 9B.4.1.1, above).

Leslie Hill Stream/Corkey River Overview

The Leslie Hill Stream (also known as the Corkey River) flows into Lough Swilly at the northern end of the Proposed Development via the Isle Burn. The Isle Burn downstream of the N13 is within the Lough Swilly SAC (002287), and Lough Swilly Including Big Isle, Blanket Nook & Inch Lake pNHA (000166), while the Lough Swilly SPA (004075) commences a little over 1 km further downstream. The Leslie Hill Stream was reported as having good (Q4) water quality on its main stem at Leslie Hill (Table 9B-12) and upstream at Kincraigy during the latest EPA monitoring in 2025 (EPA Envision website). There is no EPA water quality data available for the tributaries of the Leslie Hill Stream that are crossed at several locations by the

Proposed Development (W3-01 to W3-11). There was no existing data on the fisheries status of the Leslie Hill Stream tributaries.

Swilly Burn River Overview

The Swilly Burn rises to the northwest of Raphoe and flows into the transitional / estuarine reaches of the River Foyle. Its water levels are tidally influenced in the proposed crossing reach at W3-14. Its affected tributary (W3-12, W3-13) flows in a southerly direction paralleling the existing N14 and joins the main stem approximately 1 km downstream of the Proposed Development. The Swilly Burn has poor water quality downstream of Raphoe and is rated Q3 (poor ecological status) in recent years at the EPA monitoring station downstream of Raphoe (Table 9B-15). There are ongoing proposals to upgrade the WWTP at Raphoe which may assist in improving the water quality in the main stem, but currently the plant is non-compliant with its emission limit values for biologically significant [11]parameters (UE, 2024). EPA do not monitor the Swilly Burn tributaries crossed by the Proposed Development, but field survey Q-values (Appendix C9B.03) showed impaired water quality. The Swilly Burn in the lower reaches in the vicinity of the Proposed Development has the bivalve 'Asian clam' (*C. fluminea*), an Invasive Alien Species (IAS) listed under the [12]Third Schedule of the Habitats Regulations (2011), as amended, (Loughs Agency, *pers.com*.). Relevant Lough Agency fisheries data (2020-2024) for the Swilly Burn catchment is set out in Appendix C9B.06 and reviewed in conjunction with field study findings, below.

Table 9B-15: EPA Water Quality Monitoring Data – Section 3

EPA Code	Station Name	2016	2019	2022/2023	2025
39L050600	Leslie Hill Stream – Br.at Leslie Hill	2-3	4	4	4
39L050400	Leslie Hill Stream – Br. W of Kincraigy	3	4	4	4
01S030300	Swilly Burn – Br. 1.5km SE of Raphoe, S Magheraha	~	~	3	3
01D010600	Deele (Donegal) - Ballymonaster Br	4	4	3-4	4
01D010500	Deele (Donegal) - Bridge 1.5 km S.E. of Convoy	4	4	3	4
01F011100	River Finn – Castlefin Br.	~	3-4	3-4	3-4

River Deele Overview

The River Deele rises in the Cark Mountain plateau which is located between the Derryveagh Mountains to the north and the Bluestack Mountains to the south. The River Deele and tributaries have a channel length of approximately 32 km and has a catchment area of 313 km² including other smaller rivers which discharge directly to the tidal River Foyle (Loughs Agency, 2010). Its water levels are tidally influenced in the proposed crossing reach at W3-17. The Deele has 'unpolluted' water quality within the study area recorded as Q4 ('good' ecological status) at Ballymonaster Bridge in 2025 and at Carrickbrack (c. 1.5 km downstream of Convoy) in the same year (EPA Envision website). The Deele supports spawning by salmon and sea trout and brown trout mainly in its middle reaches (Loughs Agency, 2011). The river also supports populations of smelt (*Osmerus eperlanus*), river/brook lamprey and possibly sea lamprey, along with European eel, stone loach, three-spined stickleback (*Gasterosteus aculeatus*) and minnow (*Phoxinus phoxinus*). Trout stocks are reported as being good in the Deele with the main run of sea trout occurring in late summer and early autumn (O'Reilly, 2004). Relevant Lough Agency fisheries data (2021-2024) for the Deele catchment is set out in Appendix 9B.06 and reviewed in conjunction with field study findings, below.

[11] Ammonia, Biological Oxygen Demand, ortho-Phosphate, Suspended Solids.

[12] Also listed on 'First Schedule' of European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024)

River Finn Overview

The River Finn runs to the south of the proposed Section 3 development and will be crossed at survey point W3-21 by way of the proposed N14/N15 to A5 Link bridge (approx. Ch16+500). The river rises in the Bluestack mountain range in central Donegal and flows in a predominantly easterly direction through Ballybofey /Stranorlar to its confluence with the tidal River Foyle in the Lifford/Strabane area. In Section 3, the River Finn forms the international border between the Republic of Ireland (ROI) and Northern Ireland (NI). The river and floodplains within County Donegal (ROI) are designated as the River Finn SAC (002301). On the County Tyrone (NI) side of the river, the Finn is under a contiguous conservation designation as the River Foyle and Tributaries SAC. The Finn main channel in Section 3 is tidally influenced and is a holding and migration route for salmon, not possessing spawning or nursery habitats. Within the ROI, the main channel of the River Finn is a designated [13]Salmonid Water (from a point c.500m upstream of the proposed new bridge at W3-21) and is considered one of Ireland's premier spring salmon waters (O'Reilly, 2014). Relevant Lough Agency fisheries data for the Finn catchment (2021-2024) is set out in set out in Appendix 9B.06 and reviewed under Section 9B.4.1.1 above (Section 1 baseline aquatic environment).

Field Survey Findings - Habitat and Fisheries Descriptions

Small tributaries of the Leslie Hill Stream are crossed at several locations by the Proposed Development (W3-01 to W3-04). During the surveys carried out as part of this assessment in 2020, water quality was recorded as representative of 'moderate' (Q3 / Q3-4), though the crossing in the upper reaches at Doorabble (W3-05) was recorded as being representative of 'good' status (Q4). While there is no current data on the fisheries status of the tributaries, the watercourses are likely to contain small resident populations of brown trout and may support a run of Atlantic salmon and sea trout in the lower reaches. At watercourse crossings W3-02 and W3-03, while there is potential salmonid spawning habitat, the doubtful water quality (as evidenced by floc and algae on the substrate) render it unlikely. There is potential for movement upstream including sea trout, European eel and potentially also river/brook lamprey and/or sea lamprey. No ammocoetes (juvenile larval stage of lamprey) were evident in silt sampled with a 2 mm mesh in any of the watercourses.

The lower reaches of the Swilly Burn river in the vicinity of the proposed crossing (W3-14) are canalised with large flood embankments and have a uniform gentle glide flow. The steep banks are dominated by rank grassland with occasional willow and a narrow fringe of reed canary-grass (*Phalaris arundinacea*) along the water's edge. The substrate is silty with some gravel and supports occasional patches of perfoliate pondweed (*Potamogeton perfoliatus*) and starwort (*Callitriche* sp.). The conditions at the crossing point and downstream to the Foyle estuary are unsuited for spawning by salmonids or lamprey and the doubtful water quality renders the habitat generally unsuitable as nursery habitat. Loughs Agency conduct electrofishing annually on the Swilly Burn at two sites near Raphoe (c.4km upstream of the proposed new bridge crossing). In the years 2020 to 2024 salmon were absent (refer to Appendix 9B.06). Trout of the 1+ age class were present each year and 0+ fish were present in 2021 and 2024 (Loughs Agency, *formal data request*). This, in combination with poor water quality, demonstrates the limited potential for salmonid spawning or nursery at the tidally influenced crossing point.

The Swilly Burn tributary, EPA name 'Drumbeg' (survey sites W3-12, W3-13) has suitable habitat for trout and brook lamprey. The most recent Loughs Agency electrofishing data (refer to Appendix 9B.06) recorded small numbers of juvenile trout at a monitoring site c.800m downstream of W3-13: 1 no. 0+ fish in 2024 and 5 no. 1+ fish in 2020; but no fish in 2022 (Loughs Agency, *formal data request*). There were no salmon captured in any year. Minnow were recorded during field surveys for the Proposed Development. Fisheries habitat is considered limited by poor water quality in the lower reaches of the tributary, although it was evident that water quality had improved slightly by site visits in 2025. Q values determined as part of this assessment found this tributary to be representative of poor (Q3) to moderate (Q3-4) ecological status over the course of surveys conducted in 2020 and 2025 (Appendix 9B.03).

The proposed crossing point of the River Deele (W3-17) is in the lower reaches of the river where it has been canalised with large flood embankments and is subject to tidal effect. The substrate is dominated by mud and algal mat with extensive beds of perfoliate pondweed and starwort, with occasional water crowfoot (*Ranunculus* sp.) and flote grass. The habitat pertains to a modified and enriched version of Annex I Habitat

[13] European Communities (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988)

3260 (Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (termed "floating river vegetation") but is not within a site designated for this Annex I habitat. The steep banks have a lower fringe of tall herb swamp (FS2) dominated by reed canary-grass, nettle (*Urtica dioica*), and Himalayan balsam (*Impatiens glandulifera*). The upper bank and flood embankment are under a mixture of rank and improved grassland. The River Deele currently has slightly impaired water quality within the study area (see above EPA river monitoring data). The Deele supports spawning by salmon, seatrout and brown trout mainly in its middle reaches, i.e., upstream of the proposed crossing point. Recent Loughs Agency electrofishing data (refer to Appendix 9B.06) from the site nearest the proposed new bridge crossing (4.35km upstream of W3-14) showed good numbers of trout and salmon fry and parr each year between 2020 and 2024, inclusive (Loughs Agency, *formal data request*).) The river also supports populations of smelt, river/brook lamprey and possibly sea lamprey, along with European eel, stone loach, three-spined stickleback and minnow. Trout stocks have long been reported as being good in the Deele with the main run of sea trout occurring in late summer and early autumn (O'Reilly, 2004).

The proposed crossing point of the River Finn (W3-21) is a wide (40 m), deep (1-2 m) sluggish glide with high water colour, turbidity and is tidally influenced in terms of its water levels. There was minimal submerged instream macrophyte growth observed over multiple visits between 2020 and 2025, the only species recorded being patches of water starwort (*Callitriche* sp.) in the shallower margins. There is a narrow marginal fringing reed community on both banks dominated by reed canary grass (*Phalaris arundinacea*) with meadowsweet (*Filipendula ulmaria*) and water forget-me-not (*Myosotis scorpiodes*) and occasional scattered willow. The aquatic vegetation does not pertain to 'floating river vegetation' (Annex I Habitat 3260, *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation) having only one characteristic species, in low abundance (Hatton Ellis *et al*., 2003; EC, 2013). The habitat requires, at a minimum, four characteristic vegetation components to be classified as the designated type (Hatton-Ellis *et al.,* 2003). The proposed crossing point is 1.5 km upstream of the transitional water (UK Foyle and Faughan Estuaries; UKGBNI5NW250010). The crossing reach and downstream does not possess salmon spawning or nursery habitats, however the reach is a migration route for regular passage of adult fish moving upstream to spawn and smolts moving downstream to the sea. Salmon may use the area as a lie-up while waiting for increased flows before moving upstream. Migration of adult salmon upstream can occur at any time of the year. Spring fish (those that spend more than one year at sea and thus are typically larger) tend to move upstream in April and May while grilse (those that spend a single winter at sea) move upstream in the latter part of the summer and through autumn for the spawning period of autumn into winter. Smolts migrate to sea mainly during April to June under cover of darkness. All movements are mainly undertaken during periods of higher flow (Hendry & Cragg-Hine, 2003). Similarly, there is no spawning habitat for sea or river lamprey in the vicinity of the proposed river crossing or downstream, due to the slack gradient and tidal conditions which prevail a short distance downstream of the crossing point. Both species will, however, migrate from the estuary into the freshwater reaches to spawn. Larval lamprey (ammocoetes) may occur in soft sediments along the shoreline but the steep prolife of the banks limits the availability of suitable habitat to small patches.

Field Survey Findings - Biological Water Quality Assessment

Refer to Appendix 9B.03 for macroinvertebrate lists and Q-values. In 2025 Q-value surveys on the Leslie Hill stream tributaries (W3-03, W3-05, W3-08) were between potential 'moderate' (Q3-4) and 'good' (Q4) status, a slight improvement over 2020. The Swilly Burn tributary (W3-14) was assessed to be potential 'poor' status in 2020, but had improved slightly to Q3-4, representing 'moderate' status in 2025. In the Deele sub-catchment, it was not possible to access the main channel during surveys of 2025, but its small tributary at W3-18 (EPA name Cavanacor) merited Q3, indicative of 'poor' status. The River Finn is not suited to Q-sampling at the proposed crossing point (W3-21); being a deep glide. It was assessed by the EPA at Q3-4 'moderate' status at Castlefin Bridge (c.5km upstream of the proposed crossing point) in 2022.

Biological water quality assessment was not undertaken at seven water crossings (W3-01, W3-06, W3-07, W3-09, W3-15, W3-19, W3-20) as they were unsuitable for sampling and classified as drainage ditches.

Table 9B-16 lists rare and protected aquatic species that are found within the 10 km grid squares that intersect Section 3. Freshwater pearl mussel records are historical and located upstream of the Section 3 study area (refer to Section 9B.4.1 for details). Pearl mussels are not affected by Section 3 of the Proposed Development because the Finn and Foyle rivers are tidal at Lifford/Strabane, rendering habitat unsuitable for the species. The rivers Finn, Deele and Swilly Burn at the proposed crossing points (W3-21, W3-17, W3-14)

are migration routes for sea lamprey and possess marginal silt deposits within which juvenile sea lamprey could burrow, but there is no spawning habitat at or downstream of the crossings.

Table 9B-16: Section 3 - Protected Aquatic Species Records

Class	Scientific Name	Common Name	Grid Square				Conservation Status
			C21	C20	C30	H39	
Bivalve	*Margaritifera margaritifera*	Freshwater pearl mussel			*		II V (EU HD), WA, CR
Hyperoartia	*Petromyzon marinus*	Sea lamprey			x		II EU HD, OSPAR, NT

^ NBDC (*), NPWS (x)

~Protection status following criteria set out in Plant Red Data Book (Curtis & McGough, 1988: Stewart & Church, 1992) – Ex Extinct, E Endangered, V Vulnerable, R Rare, I Indeterminate, and K Insufficiently known. Ireland Red Lists using IUCN (2001) – RE Regionally Extinct, CR Critically Endangered, EN Endangered, VU Vulnerable, NT Near threatened, LC least concern, DD data deficient, NA not assessed. FPO denotes that the species is protected under the Flora Protection Order, 2022. EU HD Annex I-V – denotes EU Habitats Directive Annexed I to V Species. WA denotes species listed under the Wildlife Acts.

9B.4.2 Designated Sites for Nature Conservation

Sites designated for nature conservation which could be affected by the Proposed Development were identified using the S-P-R model and are described in detail in Chapter 9A Biodiversity - Terrestrial. Also refer to the accompanying NIS which describes designated sites that are considered for the Stage 2 – Appropriate Assessment process.

9B.4.2.1 Natura 2000

The relevant European Sites for this Proposed Development have been identified as follows with their respective Qualifying Interests (QIs) or Special Conservation Interests (SCIs) summarised in the NIS for the Proposed Development.

- **River Finn SAC (Site Code: 002301).** The SAC comprises almost the entire freshwater element of the River Finn and its tributaries the Corlacky, the Reelan sub-catchment, the Sruhamboy, Elatagh, Cummirk and Glashagh, and includes Lough Finn where the river rises. It encompasses an area of circa 5,498 ha. The salmon spawning grounds at the headwaters of the Mourne and Derg Rivers, Loughs Derg and Belshade and the tidal stretch of the Foyle north of Lifford to the border are also part of the site. The assessment of the Proposed Development has been completed with reference to: Conservation Objectives, Site Synopsis and related publications NPWS, 2017, 2019). The River Finn SAC is designated for Northern Atlantic wet heaths with Erica tetralix, Blanket bogs, Transition mires and quaking bogs, Atlantic salmon and Otter. Note that the impact assessments for the QI terrestrial habitats and otter are set out in Chapter 9A: Terrestrial Biodiversity.

- **Lough Swilly SAC (Site Code: 002287)** is a large site, situated in the northern part of Co. Donegal. It comprises the inner part of Lough Swilly. It extends from below Letterkenny to just north of Buncrana. Lough Swilly is a long sea lough, cutting through a variety of metamorphic rocks on the west side of Inishowen, encompassing a total area of circa 9,298 ha. The main rivers flowing into the site are the Swilly, Lennan and Crana. At low tide, extensive sand and mudflats are exposed, especially at the mouths of the Swilly and Lennan rivers. The site is estuarine in character, with shallow water and intertidal sand and mudflats being the dominant habitats. The assessment of the Proposed Development has been completed with reference to: Conservation Objectives, Site Synopsis and related publications (NPWS, 2011a, b, c; NPWS, 2016).

- **Lough Swilly SPA (Site Code: 004075)** overlaps with much of the Lough Swilly SAC area. The SPA encompasses a total area of circa 8.559 ha. The SPA comprises the inner part of Lough Swilly from just east of Letterkenny northwards to Killygarvan (c. 2 km north of Rathmullan) on the west side and to c. 2 km south of Buncrana on the east side and includes the adjacent Inch Lough. It includes sections of the estuaries of the River Swilly, the River Leannan and the Isle Burn and the predominant habitat is a series of extensive sand and mud flats which are exposed at low tide.

An overview of Natura 2000 sites (European Sites) within the context of the Proposed Development can be found within EIAR Drawing 9A.01 in Volume D: Book of Drawings (European Sites (Irl)). How each of the designated Natura 2000 sites interact with Sections 1, 2 and 3 of the Proposed Development is outlined in EIAR Drawing 9A.02 in Volume D: Book of Drawings. Effects on Natura 2000 sites are considered in detail within the NIS for the Proposed Development.

9B.4.2.2 Former Natura 2000 Sites (Northern Ireland)

There are two former Natura 2000 sites that lie within the jurisdiction of Northern Ireland which are considered relevant to the Proposed Development, and which are now protected under the national legislation of the UK rather than via the Directives of the European Union, namely:

- **River Foyle and Tributaries SAC**[14]**:** this assessment was made with reference to its Conservation Objectives[15] and cognisant of the assessment completed with respect to the Republic of Ireland (ROI) River Finn SAC which flows into the River Foyle and Tributaries SAC as they are effectively part of the same watercourse/catchment. Of relevance, this SAC is designated for Watercourse of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, Atlantic salmon and Otter. Note that the impact assessment for otter is set out in Chapter 9A: Terrestrial Biodiversity.
- **The Lough Foyle SPA**[16,17]**:** Supports an international important assemblage of birds including waterbirds. The Proposed Development has hydrological connectivity to this site.

An overview of the former Natura 2000 sites in Northern Ireland within the context of the Proposed Development can be found within EIAR Drawing 9A.03 (all three sections of the Proposed Development) and 9A.04 (the individual three sections of the Proposed Development) in Volume D: Book of Drawings (European Sites (UK)).

9B.4.2.3 Hydrological Connectivity to Designated Sites

The hydrological connectivity of each Section the Proposed Development is summarised below.

Table 9B-17: Relevance of European Sites to each Section of the Proposed Development

Site	Section 1	Section 2	Section 3
Lough Swilly SAC (002287)	**No** pathway between source and receptor.	**Yes,** direct pathway between source and receptor	**Yes**, potential pathway between source and receptor.
Lough Swilly SPA (004075)	**No** pathway between source and receptor	**Yes**, potential pathway between source and receptor.	**Yes**, potential pathway between source and receptor.
River Finn SAC (002301)	**Yes,** direct pathway between source and receptor	**No** pathway between source and receptor.	**Yes**, direct pathway between source and receptor.
River Foyle and Tributaries SAC (Site code: UK0030320)	**Yes,** indirect pathway (21 km downstream) between source and receptor	**No** pathway between source and receptor	**Yes**, direct pathway between source and receptor
Lough Foyle SPA (004087)	**Yes,** very distant pathway between source and receptor	**No** significant pathway between source and receptor.	**Yes,** distant pathway between source and receptor

[14] River Foyle and Tributaries SAC - Reasons for Designation (https://www.daera-ni.gov.uk/publications/reasons-designation-special-area-conservation-river-foyle-and-tributaries).

[15] River Foyle and Tributaries SAC – Conservation Objectives (https://www.daera-ni.gov.uk/sites/default/files/publications/doe/Conservation%20Objectives%20%282017%29.%20%20River%20Foyle%20%26%20Tributaries%20SAC.%20%20Version....pdf).

[16] Northern Ireland Environment and Heritage Service (1999) *Lough Foyle SPA*. (https://www.daera-ni.gov.uk/sites/default/files/publications/doe/Lough%20Foyle%20SPA%20Citation%20documents%20and%20map.pdf).

[17] Northern Ireland Environment Agency (2015) *Lough Foyle SPA – Conservation Objectives*. (*https://www.daera-ni.gov.uk/sites/default/files/publications/doe/lough-foyle-spa-conservation-objectives-2015.pdf*).

9B.4.2.4 National Sites

In determining the nationally designated sites of relevance, all designations within ROI and Northern Ireland were initially considered including the information collated as part of the desk study. The designations of relevance to the Proposed Development and this assessment were then identified through a combination of considering potential impacts using the S-P-R model and applying the professional judgement and experience of the assessor. The national designations considered of relevance are summarised below.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs)

Four pNHA have a hydrological connectivity to one or more sections of the Proposed Development, namely:

- **Lough Swilly including Big Isle, Blanket Nook and Inch Lake pNHA** (Site Code: 000166). The boundary of Lough Swilly including Big Isle, Blanket Nook and Inch Lake pNHA (hereafter referred to as the Lough Swilly pNHA) is broadly contiguous with the boundaries of Lough Swilly SAC and SPA. The pNHA that is only considered relevant to Section 2 and 3 of the Proposed Development is traversed by Section 2 in two areas as illustrated in EIAR Drawings 9A.06 and 9A.07 in Volume D: Book of Drawings. It is not traversed by Section 3, albeit the pNHA lies, in part, within the hydrological catchment of the pNHA.

- **River Foyle, Mongavlin to Carrigans pNHA:** (Site Code: 002047) (Section 1, Section 3). The pNHA is identified due to its wetland habitats which overlaps completely with the River Finn SAC designation detailed above. It is circa 32 km downstream of Section 1 and circa 5.6 km downstream of Section 3. It is considered that the pNHA is significant distance downstream of Section 1 for no likely significant effects to arise due to factors such as dilution over distance.

- **Port Lough pNHA:** (Site Code: 000180) is a relatively small site with a variety of natural habitats including open lake, reed-beds, freshwater marsh, cutaway bog and lowland wet grassland. The site lies 12 km northeast of Section 2 and 10.5 km northeast of Section 3. No impacts or effects to the habitats of the pNHA are predicted due to the spatial and hydrological context of the pNHA to the Proposed Development.

Areas of Special Scientific Interest (Northern Ireland)

Areas of Special Scientific Interest (ASSIs) are protected areas in Northern Ireland. Two ASSIs have been designated which are considered relevant to the Proposed Development:

- **Lough Foyle ASSI (Site Code: ASSI051)**. This site includes the whole of the intertidal area and foreshore, some sections of the backshore and the tidal waters of several tributary rivers of Lough Foyle within the Northern Ireland jurisdiction. The biological interest of the ASSI is associated with the intertidal and shore vegetation, the internationally significant wintering wildfowl and wader populations, the occurrence of a number of rare estuarine fish species and the presence of a small common seal (*Phoca vitulina*) colony. The ASSI is considered relevant with respect to the Proposed Development, particularly Sections 2 and 3, since it supports water dependent habitats and species that are dependent on the Lough Swilly and Lough Foyle complex.

- **River Foyle and Tributaries ASSI (Site Code: ASSI229)**. This ASSI shares broadly the same boundary as the former Natura 2000 site of the same name in Northern Ireland (as detailed above). It includes the part of the River Finn which lies within Northern Ireland in addition to the River Mourne and its tributary, the River Strule (up to its confluence with the Owenkillew River) and the River Derg, along with two of its sub-tributaries, the Mourne Beg River and the Glendergan River. The ASSI is notable for the physical diversity and naturalness of the banks and channels, especially in the upper reaches and the richness and naturalness of its plant and animal communities, in particular the population of Atlantic salmon, which is of international importance. The ASSI is considered relevant with respect to the Proposed Development, namely Sections 1 and 3, due to the hydrological connectivity of these sections to the ASSI and their integral part on maintain salmon.

An overview of the designated national sites (pNHAs and ASSIs) within the context of the Proposed Development can be found within EIAR Drawing 9A.06 in Volume D: Book of Drawings. How each of these designated national sites interact with Sections 2 and 3 of the Proposed Development is outlined in EIAR Drawing 9A.07 in Volume D: Book of Drawings.

9B.4.3 Invasive Alien Species (IAS)

Invasive Alien Species (IAS) listed in Table 9B-18 were recorded at various locations and within each section of the Proposed Development as part of the ecological walkover and habitat mapping surveys. Refer to EIAR Drawings 9A.17 through 9A.19 for Invasive Alien Plant Species locations in Volume D: Book of Drawings. See also Chapter 9A: Biodiversity – Terrestrial and Appendix B within Appendix C9A.01.

Table 9B-18: IAPS Recorded

Species	Section 1	Section 2	Section 3
Giant rhubarb (*Gunnera tinctoria*)	Y	N	N
Himalayan balsam (*Impatiens glandulifera*)	Y	Y	Y
Himalayan knotweed (*Polygonum polystachyum*)	Y	Y	N
Japanese knotweed (*Reynoutria japonica*)	Y	Y	Y
Rhododendron (*Rhododendron ponticum*)	Y	Y	Y
Salmonberry (*Rubus spectabilis*)	N	Y	N
Asian clam (*Corbicula fluminea*)	N	N	Y

9B.4.4 Important Ecological Features IEFs

The identification of aquatic IEF's has been made with reference to NRA guidance for watercourses set out in Table 9B-5. A summary of ecological valuation and IEFs identified for each section are set out in Table 9B-19 (Section 1) Table 9B-20 (Section 2) and Table 9B-21 (Section 3).

Table 9B-19: Section 1 – Ecological Valuation of Combined Aquatic Features

Watercourse (and representative sites codes)	Ecological Valuation – Combined aquatic (Habitat, Fisheries, Q-value)	Reason	IEF?
River Finn (W1-06, W1-21)	International Importance (A)	Within River Finn SAC and designated Salmonid Water. Salmon, trout and lamprey (sea, river and brook) spawning, nursery and holding habitat.	Yes
Dromboe Lower (W1-07)	Local Importance (lower value) (E) and International Importance (A)	Upper reach is piped and of Local Importance (lower value), but lower reach is within River Finn SAC. Supports salmonids.	Yes
Burn Daurnett (W1-22)	County Importance (C)	Confirmed trout and salmon stream, supports ex-situ QI species of River Finn SAC	Yes
Cloghroe River	County Importance (C)	Trout and potential salmon spawning / nursery stream + brook lamprey. Downstream connectivity to River Deele.	Yes
Lough Alaan	County Importance (C)	Trout lake with angling amenity value. Not directly affected, but downstream of W1-15 crossing)	Yes
Backlees (W1-08, W1-09)	Local Importance (higher value) (D)	Low productivity trout stream within crossing reach, but salmon spawning 1 km downstream in lower reaches	Yes
Mullaghagarry (W1-17, W1-18, W1-20)	Local Importance (higher value) (D)	Low productivity trout stream	Yes
Magheracorran (W1-11, W1-13)	Local Importance (higher value) (D)	Small trout stream	Yes
Tircallan (W1-16)	Local Importance (higher value) (D)	Low productivity trout stream	Yes
Unnamed tributaries of Burn Daurnett (W1-01, W1-02)	Local Importance (higher value) (D)	Potential trout habitat, but low value owing to channelisation	Yes
Aghasheil (W1-23)	Local Importance (lower value) (E)	Low value drain (ephemeral)	No
Greenhills 01 (W1-10)	Local Importance (lower value) (E)	Low value drain (ephemeral)	No
Kilross 01 (W1-15)	Local Importance (higher value) (E)	Low value drain (ephemeral)	No
Treanamullin (W1-19)	Local Importance (lower value) (E)	Low value drain (ephemeral)	No
Lisnaree (W1-12)	Local Importance (lower value) (E)	Low value drain (ephemeral)	No

Table 9B-20: Section 2 – Ecological Valuation of Combined Aquatic features

Watercourse (and representative sites codes)	Ecological Valuation – Combined aquatic (Habitat, Fisheries, Q-value)	Reason	IEF?
River Swilly (W2-18)	International Importance (A)	Within Lough Swilly SAC and migration route to designated Salmonid Water. Salmon, sea trout and anadromous lamprey migration route. Annex I QI habitat 'Estuaries'.	Yes
Isle Burn (W2-15)	International Importance (A)	At boundary of Lough Swilly SAC and migration route to Corkey River salmonid waters. Salmon, sea trout and anadromous lamprey migration route. Annex I QI habitat 'Estuaries'.	Yes
Dooballagh Burn	County Importance (C)	Trout salmon spawning / nursery stream + brook lamprey. Distant connectivity (long pathway) from Proposed Development to Isle Burn.	Yes
Farsetmore (W2-10, W2-11, W2-12)	Local Importance (higher value) (D)	Potential trout stream. Though not highly sensitive, this is the most 'natural' of all the Section 2 tributaries intercepted by the proposal.	Yes
Lurgybrack (W2-24)	Local Importance (higher value) (D)	Potential trout stream. No direct impact but is in the ZoI in Corranagh Burn.	Yes
Magheraboy 39 (W2-27)	Local Importance (higher value) (D)	Small trout stream. No direct impact but is in the ZoI in Isle Burn catchment.	Yes
Drains: Bunnagee, Milk Isle, Dromore, Drumgreggan (W2-05, W2-06, W2-07, W2-08, W2-09, W2-16, W2-17, W2-20, W2-21, W2-22, W2-23)	Local Importance (lower value) (E)	Low quality, highly modified, trickle flow, dry or stagnant.	No
Rossbrackan Drains: Maghera-more 39, Trimragh (W2-13, W2-14)	Local Importance (lower value) (E)	Low quality, highly modified, ephemeral.	No
Field drains: Drumany, Corranagh, Listellian (W2-01, W2-02, W2-03, W2-04, W2-19, W2-26)	Local Importance (lower value) (E)	Low quality, highly modified, trickle flow, dry or stagnant.	No

Table 9B-21: Section 3 – Ecological Valuation of Combined Aquatic features

Watercourse (and representative sites codes)	Ecological Valuation – Combined aquatic (Habitat, Fisheries, Q-value)	Reason	IEF?
Leslie Hill Stream and Tributaries (W3-02, W3-03, W3-04, W3-05 and W3-08)	Local Importance (higher value) (D)	All potentially fish bearing though currently with poor water quality.	Yes
Leslie Hill Stream Tributaries (W3-01, W3-06, W3-07 and W3-09)	Local Importance (lower value) (E)	All minor drains with no fisheries potential.	No
Swilly Burn and tributaries (W3-10, W3-11, W3-12, W3-13, W3-14, W3-15 and W3-16)	Local Importance (higher value) (D)	All potentially fish bearing though currently with poor water quality.	Yes
River Deele (W3-17)	County Importance (C)	Supports populations of salmonids, lamprey and eels.	Yes
River Deele tributary (W3-18)	Local Importance (higher value) (D)	Limited potential for fish due to steep gradient.	Yes
River Deele tributary (W3-19, W3-20)	Local Importance (lower value) (E)	Minor channels with no fisheries potential.	No
River Finn (W3-21)	International importance (A)	Designated Salmonid Water and SAC supporting populations of salmonids, lamprey and eels.	Yes

9B.5 Assessment of Significant Effects

9B.5.1 Introduction

The assessment of significant effects on the identified IEFs during construction and operation, in the absence of mitigation, has been completed with reference to the Project Description set out in Chapter 4: Project Description with reference to the impact assessment methodology set out above.

9B.5.2 Do Nothing Scenario

In the absence of the Proposed Development (*i.e.* the "do nothing" scenario), the identified aquatic habitats and IEFs would be subject to continued water quality pressures linked to existing land use management practice as currently experienced, including agriculture, forestry and urban pressures. Furthermore, unattenuated (and consequently untreated) road run-off pollution from existing road surfaces that currently have inferior, or no drainage treatment will continue to enter receiving watercourses. Such ongoing sources of potential operational phase impact may worsen as traffic volumes are predicted to increase into the future (refer to Chapter 6: Traffic and Transportation). This is of particular significance in areas where severely congested traffic occurs regularly across the existing River Finn bridge in Ballybofey (Section 1) and N56 Port Bridge over the River Swilly in Letterkenny (Section 2), which can give rise to elevated concentrations of road run-off pollutants linked to idling and stop-start traffic (Huber *et al*., 2016). The Proposed Development incorporates modern drainage design features (hybrid wetland attenuation ponds, hydrocarbon interceptors) which likely contribute to **long-term positive** effects on water quality and aquatic habitats (compared to the do-nothing scenario) that would not otherwise be achieved.

9B.5.3 Construction Phase Effects

9B.5.3.1 Mechanisms of Construction Phase Impact

The principal impacts from the construction phase of the proposed road development on the aquatic environment include:

- Temporary water quality degradation from construction related activities, i.e., sediment run-off, turbidity and accidental spillage (concrete, hydrocarbons), with potential downstream impacts on aquatic habitats and fauna (fish, macroinvertebrates, instream plants).
- Disturbance / loss of habitat during instream works (culverting, channel realignment)
- Introduction / spread of IAPS owing to earth movement
- Impact on water quality arising from dust during construction
- Impacts on aquatic habitats and/or species listed as Qualifying Interests of a designated site.

The construction phases for Sections 1, 2 and 3 will last approximately 36 months each, will run concurrently, and are proposed to be broken down into distinct parts (Table 9B-22) to facilitate within each section: haul routes, construction compounds and constraints such as major river crossings (which dictate haul routes). See Chapter 4: Project Description for details of the construction phasing and components for each Section. Note that the Active Travel route utilises all the same watercourse crossings as the mainline and associated link roads across the Project and is therefore accounted for in the construction phase impact assessment below (bridges, culverts, drainage). Locations for the proposed construction compounds are shown in the General Arrangement drawings in EIAR Drawings 4.1 (Section 1), 4.2 (Section 2) and 4.3 (Section 3), and proposed haul routes for each of the sections are shown in EIAR Drawings 4.47 (Section 1), 4.48 (Section 2) and 4.49 (Section 3), in Volume D: Book of Drawings.

Table 9B-22: Construction Phase Parts by Section

Section	Construction Phase Parts
Section 1	Part 1 – Mainline southern tie-in to the River Finn Crossing, including the Ballybofey Link Road. Part 2 – Mainline River Finn (SAC) Crossing to the northern tie-in, including the proposed grade separated junction at Teevickmoy. Part 3 – N15 Primary Road Connector from the mainline to the tie-in with the N15 at Treanamullin.
Section 2	Part 1 – Mainline southern tie-in to the River Swilly Crossing, including the links in the vicinity of Dry Arch Roundabout / Bonagee. Part 2 – Mainline River Swilly (SAC) Crossing to the northern tie-in at Ballyraine. Part 3 – Realignment and improvement of the existing N56 Dual Carriageway between Dry Arch Roundabout and the interface with Section 3 at Pluck, including the proposed grade separated junction at Trimragh.
Section 3	Part 1 – Mainline northern tie-in at the interface with Section 2 to Swilly Burn River. Part 2 – Swilly Burn River to River Deele River. Part 3 – River Deele River to Lifford Junction. Part 4 – N14/N15 to A5 Link including the River Finn (SAC) Crossing to Northern Ireland.

The following paragraphs set out types of effects arising from the primary sources / pathways for impact on aquatic receptors associated with large road construction developments. Site-specific significance of construction phase effects for watercourses in each of the three sections of the Proposed Development are then detailed in Sections 9B.5.3.2 to 9B.5.3.4.

Effects of Temporary Water Quality Degradation

During construction, all watercourses are at risk of direct and indirect effects related to potential deterioration in water quality with effects on aquatic biota owing to silt or other pollutants entering the system.

Suspended Solids: The principal source of road construction related impact on aquatic receptors arises from the potential escape of excessive amounts of suspended solids (SS) leading to turbidity and sedimentation locally and downstream (CEDR, 2018a). Sources of sediment loss include general earthworks, construction haul road levelling, soil stockpiling / spreading, site compounds, additional ground and archaeological investigations, pumping of solids-contaminated water from on-site excavations, vehicular activity in and beside streams, culverts and realignments. Studies in Ireland during construction of bridges and culverts on the M3 and M7 motorways showed that instream SS concentrations in dry weather were generally low (below the designated salmonid water permissible limit of 25 mg/l) but were elevated for short periods during storm events. Revegetation of topsoiled surfaces (6-months post construction) significantly reduced SS losses (Cocchiglia *et al.*, 2012). Escaped solids can settle in watercourses and winnow downstream, resulting in smothering of plants and macroinvertebrates, causing fish to abandon affected areas at least in the short-term. At worst, such sedimentation could occur over salmonid spawning / nursery areas, reducing fish recruitment through egg and fry mortalities. Turbidity within the water column can cause physical damage, physiological and behavioural changes to fish (e.g. respiration, migration) and benthic macroinvertebrates (e.g. drift responses). Similar to salmonids, lampreys depend on clean gravels for spawning, and although lamprey nursery areas (silt deposits) are less likely to be significantly affected by small amounts of sedimentation, excessive sedimentation can cause impaired feeding ability/success or asphyxia to juveniles (ammocoetes). Construction related dust emissions from haul routes, site compounds, excavations or hardstand areas are also suspended solids sources.

Other Pollutants: The scale and nature of the Proposed Development mean there is potential for loss of cementitious materials or hydrocarbons (fuels, oils, hydraulic fluids) during the construction phase through leaks, accidental spillage or wash out from construction sites. Cement is highly alkaline and can cause serious fish kills if concentrations are high, with similar effects on macroinvertebrates. Hydrocarbon spills can give rise to tainting of fish or, if large enough, fish and invertebrate kills which can have trophic effects (negative impact on species that forage upon fish and invertebrates).

Temporary Instream Works

The major rivers are all bridged using clear spans (see bridge construction details in Sections 9B.5.3.2 to 9B.5.3.4). There are three crossings of SAC watercourse channels: River Finn at Ballybofey (Section 1), River Swilly downstream of Letterkenny (Section 2) and River Finn upstream of Lifford (Section 3). There is also a footbridge proposed at the existing N13 crossing of the Isle Burn at the SAC boundary (Section 2).

There will be no temporary or permanent instream footprint within an SAC watercourse for the Proposed Development (Sections 1, 2 or 3). There is temporary incursion required into the River Finn SAC to construct bridge piers for the River Finn A5 Link Bridge in Section 3, but this does not involve instream intrusion.

The primary direct impact on aquatic habitats relates to temporary disturbance and change/loss of habitat owing to culvert construction and associated localised realignments. In fish sensitive watercourses, dewatering for culvert installation and/or realignment can cause fish mortality and will require fish removals as detailed for each crossing in Appendix 9B.04. Culverts have all been designed according to OPW Section 50 requirements with regards to freeboard and accommodation of flood flow (Design Flow: Q100 + 20% [18]CCA), also allowing embed of 500mm (for box type) or 300mm (for pipes) as required by IFI and Loughs Agency guidance. Pipe culverts are only used on small drainage channels that have low or no fisheries value. Highly fisheries sensitive waters, including SAC watercourses, are bridged. Proposed culverts on EPA delineated watercourses have been discussed with Loughs Agency (Section 1 and southern Section 3) and IFI (Section 2 and northern Section 3). Both agencies have agreed in principle with the design approach applied regarding watercourse crossing type proposed with respect to fisheries value of the watercourse in question (i.e., bridge; box or pipe culvert).

The full range of potential construction methodologies that will be employed in the construction of culverts and realignments have been considered and assessed in this EIAR. All watercourse structures on fisheries channels of the Foyle catchment (Section 1 and southern Section 3) and Swilly catchment (Section 2 and northern Section 3) have been designed in accordance with Loughs Agency (2016) and IFI (2016) guidelines for fisheries protection during development works. Works in the Foyle catchment will, as set out in Section 9B.3 above, be carried out in accordance with permits issued by the Loughs Agency under Section 47 and Section 70 of the Foyle Fisheries Act 1952 (as amended). Similarly, installation of culverts / realignments on the very small number of fisheries channels where fish removal is anticipated in the Lough Swilly catchment (Section 2 and northern Section 3), which are within the remit of Inland Fisheries Ireland (IFI)), will be carried out in accordance with Section 14 Authorisation from the Department of Climate, Energy and the Environment (DCEE) under the Fisheries Consolidation Act 1959 (as amended). Refer to site specific assessments of significance of culvert constructions at each watercourse in Appendix 9B.04 as addressed in Sections 9B.5.3.2 to 9B.5.3.4.

Timing of Instream Works

Direct instream works such as culvert installation and channel realignment and/or large scale out of stream works with the potential for excessive sediment wash out have the greatest potential for negative impacts during spawning/breeding and early nursery periods for aquatic protected species in the study area. Pre-application consultation has confirmed that allowable instream works period for fisheries channels identified across the Proposed Development is May 1st to September 30th of any year. This applies in the Foyle catchment (Loughs Agency - Sections 1 and 3) and the Lough Swilly catchment (IFI - Section 2 and 3).

Effects of Invasive Alien Species (IAS) Transfer

Construction works involving large scale earthworks and instream works carry potential for introduction and/or transfer of Invasive Alien Species (IAS) which can have significant negative impacts on the physical nature and ecological function of watercourses and riparian corridors.

The IAS, Asian clam (*Corbicula fluminea*), is an invasive bivalve species that has been recorded in the lower Swilly Burn (Section 3 of Proposed Development). This species colonises mud, silt, sand and gravel benthic substrates of rivers and lakes, with the ability to reproduce rapidly, altering ecosystems and food webs.

[18] CCA = Climate Change Allowance

Invasive Alien Plants Species (IAPS) can degrade quality of allochthonous organic inputs to river channels and cause erosion of riverbanks when they die back in winter. Potential impact may extend to the downstream reaches of each watercourse and beyond should species or fragments of species be mobilised within the aquatic system (e.g. Japanese knotweed, Himalayan balsam). This effect can be potentially permanent (>60 years) and irreversible because eradication is difficult once IAPS take hold. It is noted that all three Sections obtain an earthworks balance with all requirements to win and dispose of material being met within the Proposed Development boundary by the utilisation of material extraction areas / deposition areas that are identified in the design. Accordingly, there will be no net import or export of earthworks material to / from Sections 1, 2 or 3. However, IAPS exist within the works footprints and can be spread internally.

In the absence of mitigation, potentially **permanent, significant negative** effects on aquatic ecological receptors may arise from spread of IAS (plant and animal) as a result of the Proposed Development.

Air Pollution

Generation and dispersion of dust during the proposed construction works from material haulage can have a negative effect on aquatic habitats. Dust from construction works can deteriorate aquatic habitats by increasing turbidity locally and potentially increase sedimentation in watercourses. The impact of construction dust on watercourses is predicted to be localised and short-term (one to seven years) in duration (though intermittent and reversible) given the construction works will be phased over a period of approximately three years in each Section. The magnitude is high where works occur near aquatic SAC habitats (River Finn, Lough Swilly). In the absence of mitigation relating to dust control (see Chapter 12: Air Quality) localised **short term significant negative** effects on IEF watercourses (i.e., those with fisheries significance) and QI habitats/species of River Finn SAC (Sections 1 and 3) and Lough Swilly SAC (Section 2) cannot be ruled out.

9B.5.3.2 Section 1

Watercourses in southern Section 1 drain ultimately to the River Finn SAC, i.e., via the Burn Daurnett, Backlees and Mullaghagarry sub-catchments to the River Finn main channel, and onwards to meet the River Foyle at Lifford/Strabane c. 25 km downstream. At the Section 1 N15 northern tie-in, drainage is to the Cloghroe River within the River Deele catchment. The Deele flows c. 25 km eastwards from the Cloghroe confluence via Convoy to join the River Foyle just downstream of Lifford, with distant downstream connectivity (> 35 km) to Lough Foyle. The River Foyle and 7 km of the lower River Finn (upstream as far as Clady) are part of both the River Finn SAC (ROI) and River Foyle and Tributaries SAC (NI).

Section 1 involves construction of three river bridges (see Table 9B-23) and 38 no. culverts including associated (mainly minor stream) diversions to align proposed culvert crossings with the road. Refer to Chapter 4: Project Description for further details of bridge, culvert and stream diversion works in Section 1 and Chapter 11: Water for details of hydrological analyses that determined proposed culvert size and bridge design. Bridges, culverts and stream diversions have been designed (with appropriate OPW Section 50 approval) such that there will be no changes in the existing hydrological regimes and water body scale morphology of watercourses.

Section 1 River Finn Bridge Construction Phase Effects (SAC river)

Expected construction sequence for the proposed Section 1 River Finn bridge crossing (Ch. +2400) (EIAR Drawing 4.13) is described in Section 4.12.9 of Chapter 4: Project Description. The bridge construction duration is estimated to be approximately 18 to 24 months, within the 36-month overall construction period that occurs on either side of the proposed bridge. Descriptions of the bridge construction sequence should be read in conjunction with the Bridge Construction and Temporary Works drawings - EIAR Drawings 4.14 and 4.15 in Volume D: Book of Drawings. The drawings show temporary work areas for the structure in relation to SAC boundaries. In-stream works are not required for construction of the Section 1 River Finn bridge. The bridge construction involves no temporary or permanent in-stream footprint, nor incursion into the SAC. This proposed bridge is 27 km upstream of the Section 3 proposed River Finn Bridge (N14/N15 to A5 Link), which is described in Section 9B.5.3.4.

The proposed bridge has seven-spans: 43 m, 55 m, 85 m, 55 m, 43 m, 39.5 m and 39.5 m giving a total length of 360 m. The 85 m main span will cross the full width of the River Finn plus the existing R252 road. The Southern Abutment and Piers 1 and 2 are located on the south side of the river. On the northern side of the river, Piers 3, 4, 5 and 6 continue across the floodplain meeting the Northern Abutment where the road embankment commences. The northern embankment / abutment is, at nearest, 85m from the SAC boundary.

The southern bridge pier (Pier 2) is set back from the channel by virtue of being immediately south of the R252 road, where temporary construction works occur at nearest just over 5m from the SAC boundary and approximately 8 m from the River Finn wetted channel. The southern piers and abutment construction areas are outside the 0.1%AEP [19]flood zone with low probability of flooding during construction. On the northern bank, the closest pier to the river (Pier 3) is set c.5m back from the SAC boundary and approximately 15 m in total from the River Finn wetted channel. However, the temporary construction works area is directly contiguous with the SAC boundary (10 m back from the Finn wetted channel).

As set out in the Project Description, there are measures included as part of the bridge construction works to avoid direct and indirect impact on the SAC, contain the temporary works areas and manage pollutant run-off at bridge pier sub-structure construction areas (foundation piling) on either side of the River Finn channel. This includes: (i) the use of temporary sheet-piled cofferdams installed around the bridge piers with a top height that excludes the 1% AEP (+ 20% CCA) flood level + freeboard; (ii) reno-mattress hardstandings (or similar) -essentially flat gabions filled with clean stone - which avoids placing large areas of clause 804 which can become entrained to the SAC river during potential flooding, (iii) robust silt fencing along the SAC boundary and around temporary works and hardstanding areas to prevent pollutant run-off; (iv) fencing to demarcate and thus prevent unwanted incursion into the SAC.

The scale of construction works at the River Finn crossing, with associated piers across the northern floodplain and southern approach, plus general earthworks and drainage represent a combined significant source of potential construction phase sediment and pollutant loss with pathways to salmonid (and lamprey) habitats of the Finn, including Annex II QI species, Atlantic salmon. The duration of any consequent effect on aquatic habitats would be dependent on the extent to which salmonid recruitment was affected, e.g., related to level of sediment wash out. In that regard, it should be noted that the River Finn bridge crossing occurs over habitat with salmonid nursery sensitivity but has less spawning sensitivity locally; being a bouldery and swift glide with minimal suitable gravels. Owing to the river's fast-flowing nature at the crossing point, sediment would be less likely to accumulate locally but could impact on downstream spawning and nursery areas of the Finn as it winnows longitudinally.

Whilst the construction sequence has been carefully set out in Section 4.11.9 of Chapter 4: Project Description to reduce potential sources of construction phase pollutant loss to the River Finn, in the absence of the full suite of mitigation measures in the area of water quality protection and monitoring (refer to Section 9B.9) to ensure their efficacy, there is potential for **indirect short-term significant negative** effects at an international level with regards to salmon, lamprey, trout and macroinvertebrate habitats in the River Finn downstream of the bridge construction site.

In addition, the River Finn Bridge / R252 link area will have three outfalls from permanent attenuation ponds to the river comprising two from the southern bank: one near the mainline crossing (Pond 10), one near the R252 link road (Pond 11); and one from the northern bank (Pond 9). The attenuation ponds are outside the 1%AEP (+ 20% CCA) flood extent. The outfalls will be constructed without excavations at the river bank. Instead, the outfalls will be set back from the channel, discharging over secured 'green' erosion protection mats, e.g., pipe to swale scenario (using vegetated armour such as Hanes ScourStop ® transition matting, or similar). It is important to note that once installed, attenuation ponds and interceptor ditch outfalls are primarily ephemeral in nature (intermittent flow during certain rain events) meaning their outfalls are not continuous sources of flow with scouring potential at the river bank. Water quality of such outfalls is either the same as background (interceptor ditches that collect non-road related surface flow) or has been treated via hybrid wetland attenuation ponds.

[19] OPW Floodmaps: https://www.floodinfo.ie/map/floodmaps/ [Accessed November 2025]

Table 9B-23: Section 1 Bridges and Habitat Sensitivity

Bridge Ref	Sensitivity	Bridge Span & Length (m)	Deck Width (m)	*Freeboard (m)
River Finn Bridge (Mainline)	Spans River Finn SAC, with QI species Atlantic salmon present. Designated Salmonid Water (patches of spawning water, mainly nursery/ holding /migration areas present)	Seven-span 360m (SAC river clear span 85m)	26.5	7.14
Backlees Bridge (Mainline)	Spans a small salmonid spawning/nursery tributary of River Finn, 1.8km upstream of SAC.	Single span 52m	28	3.75
Cloghroe Bridge (N13 Tie-in North)	Spans a moderate sized salmonid spawning/nursery tributary of River Deele.	Single span 18m	17	0.35

** Freeboard above 100-year flood level, i.e., bridge level will be a greater distance over average and low flow river level*

Backlees and Cloghroe River Bridges Construction Phase Effects (Non-SAC rivers)

Backlees Bridge will be a clear span, with no instream works required (refer to EIAR Drawing 4.17 in Volume D: Book of Drawings. The design was specifically guided by the need to retain the natural morphology of this moderately small salmonid stream which has steeper sections of bedrock step-pool and waterfall / rapid. The provision of a bridge avoided requirement for an excessively long, steep culvert that would have resulted in habitat loss and permanent fish passage severance, contrary to hydromorphology quality requirements (supporting the biological quality elements) under the WFD. Whilst there will be no instream works, in the absence of measures to prevent sediment wash-out and pollutant spillage from the general earthworks and construction, there is potential for likely **short term significant negative** effects on trout (locally at low densities) and salmon spawning and nursery habitat 1 km downstream on the Backlees stream. Contaminants could potentially reach the main channel confluence of the River Finn a further 700 m downstream within holding habitats for QI species salmon in the Ballybofey urban area.

The Cloghroe River Bridge requires instream works during construction for a permanent river realignment. The proposed realignment reach has existing patchy salmonid spawning, but mainly nursery habitats with occasional holding glide-pool areas, although productivity is low owing to historic deepening (high banks) and high shade (tunnelling effect of riparian vegetation). The diversion has been designed into the Proposed Development to match pre-existing morphology (refer to EIAR Drawing 4.16 in Volume D: Book of Drawings). Bridge abutments will be a minimum of 5 m from the bank of the newly diverted channel. In the absence of measures to remove and relocate fish during construction, reinstate run-glide instream habitat, and prevent sediment wash-out and pollutant spillage from the general earthworks and construction, there is potential for likely **short term significant negative** effects on salmonids (trout and salmon), brook lamprey and macroinvertebrates. Indirect effects include sediment and pollutant wash out that could, if excessive, reach the main channel of the Deele River approximately 1.8km downstream, affecting salmonid (salmon and trout) spawning and nursery habitat present on the main channel.

Section 1 Culverts – Construction Phase Effects

See Appendix C9B.04 for the detailed site-specific examination of construction phase effects at each culvert crossing. Refer to Drainage Layout drawings in EIAR Drawing 4.40 in Volume D: Book of Drawings for culvert locations.

Culvert construction has potential (in the absence of mitigation) for likely **temporary to short term significant negative** localised direct and indirect effects on fisheries channels at 14 no. fisheries sensitive crossing locations as set out on a site-specific basis in Appendix C9B.04. These channels support salmonids, mainly trout in the smaller streams affected by culverting, noting that larger more sensitive channels of Finn, Backlees and Cloghroe are bridged. Culverts have been designed to meet OPW Section

50 requirements and will ensure no impediment to the continued movement of fish (refer to site-specific detail in Appendix 9B.05).

Culvert construction or realignment on smaller tributaries feeding the River Finn SAC and/or the Deele catchment can potentially damage downstream sensitive areas, regardless of local significance. That is because smaller channels are pathways to: (1) River Finn, including salmon as a QI species of the River Finn SAC, or (2) salmonid habitats of the Cloghroe/Deele Rivers at the N13 tie-in, northern end of Section 1. All culverting and associated earthworks and diversions will therefore require carefully implemented mitigation as set out in a site-specific context in in Appendix C9B.04.

Mullaghagarry stream has potential to support salmon as well as trout, but impaired water quality and the current fish passage barrier at Site W1-17 depresses the habitat quality and accessibility for salmon. The removal / replacement of the existing impassable culvert at Site W1-17 will open the channel for salmonid migration further upstream. This results in reconnecting approximately 2 km of linear fluvial habitat of additional, potential salmonid spawning/nursery habitat that is currently inaccessible past Site W1-17 resulting in a **permanent positive** effect.

Section 1 - General Earthworks and Drainage Infrastructure Installation

It is proposed that advance works to install interceptor drains and attenuation ponds will allow revegetation of these drainage features before their outfalls to watercourses are connected. This approach will significantly reduce sources of suspended solids during the early construction phase and help attenuate sediment wash out through the construction phase.

Whilst the design has sought to avoid direct source-pathway links to aquatic receptors, and where possible set back construction and major embankment earthworks from watercourses, there is still potential for sediment losses to occur from the construction site. Large scale sediment loss, if it did occur in the absence of mitigation, may clog gravels and reduce egg and fry survival in salmonid habitats, with **short term significant negative** effects on fish sensitive waters of River Finn and its tributaries: Burn Daurnett (W1-22), Backlees (W1-08), Mullaghagarry (W1-18), Tircallan (W1-16); and the River Deele tributaries: Cloghroe (W1-14) and Magheracorran (W1-13).

It is noted that the typically upland-type watercourses in Section 1, including the River Finn main channel upstream of Ballybofey, are such that flows are generally spate driven and quite turbulent, meaning that sediment would likely be rapidly flushed out over a single winter season following construction. Hence any sedimentation related effects on localised salmonid populations if they did occur would likely be of short-term duration at worst, with relatively “clean” gravels available for spawning in at least the second winter season after construction. Trout densities in small tributaries are apparently low, based on field observations and habitat features. Therefore, the impact on fish numbers, relative to the total catchment area, will be minimal but locally significant. Considerable numbers of juvenile salmonids (salmon and trout) could be locally affected in the River Finn reach upstream of Ballybofey if heavy silt plumes arose during the construction of the proposed bridge and associated works on either bank, i.e., along the R252 link and Dromboe Lower floodplain. The result would likely be that fish abandon foraging areas in the Finn main channel in response to physiological stress or gill abrasion, moving to alternative nursery and holding habitats that are available upstream and downstream of the Proposed Development. Older fish would be less susceptible and more mobile in their response to turbidity events. As described above, any sedimentation is unlikely to be long lasting but could temporarily smother macroinvertebrate habitats affecting localised trophic webs.

There are sixteen proposed deposition areas in Section 1, all of which are located outside the 1% AEP (+20% CCA) flood extent; are close to the permanent works and are set back from drains and watercourses. Flood storage areas are required in three locations in Section 1: one area adjacent to the Burn Daurnett river at the proposed Dooish Junction, and small areas at the N15 (eastern) tie-in and N13 (northern) tie-in. These areas involve excavations to increase flood storage where adjacent embankment would otherwise slightly alter localised flood risk. In the absence of focused mitigation around suspended solids loss prevention, potential exists for washout of sediment to IEF watercourses, ultimately connected to the salmonid habitats of the River Finn, with potential for localised **short-term significant negative** effects on fisheries recruitment.

One significant material extraction area is proposed in Section 1 located, at nearest, 400m south of the River Finn. The material will be used for the approach embankment leading up to the River Finn which avoids the need for haulage of additional material across the river to construct the southern embankment, noting that the southern embankment itself terminates 50m south of the River Finn (and hence the SAC). If run-off from the area was not controlled, there is potential for **short-term significant negative** effects on salmonid habitats of the River Finn.

9B.5.3.3 Section 2

All watercourses in Section 2 ultimately drain to Lough Swilly SAC and SPA and their underpinning national designations. Section 2 involves construction of one major bridge and one Active Travel footbridge (see Table 9B-24 and 34 no. culverts, including diversions of minor streams to align proposed culvert crossings. Refer to Chapter 4: Project Description for further details of bridge, culvert and stream diversion works in Section 2 and Chapter 11: Water for details of hydrological analyses that determined proposed culvert size and bridge design. Bridges, culverts and stream diversions have been designed such that there will be no changes in the existing hydrological regimes and associated morphology of the relevant watercourses.

Section 2 Bridges – Construction Phase Effects

River Swilly Bridge (SAC crossing)

The expected construction sequence for the River Swilly Crossing is described in Section 4.13.9 of Chapter 4: Project Description and EIAR Drawings 4.19 through 4.21 in Volume D: Book of Drawings. The bridge construction duration is estimated to be approximately 24 months, within an overall 36-month construction period that occurs on either side of the proposed bridge. Descriptions of the bridge construction sequence should be read in conjunction with EIAR Drawing 4.21. The drawings show temporary work areas for the structure in relation to the SAC boundaries.

Table 9B-24: Section 2 Bridges and Habitat Sensitivity

Bridge Ref	Sensitivity	Bridge Span & Length (m)	Deck Width (m)	Freeboard (m)
River Swilly Bridge	Spans Lough Swilly SAC: QI habitat 'Estuaries' present at crossing. Migration route to designated Salmonid Water upstream (River Swilly).	Three-span 234m (SAC river clear span 108m)	28.25	3.70
Isle Burn Active Travel Bridge	Spans Isle Burn at Lough Swilly SAC boundary: QI habitat 'Estuaries' present 3.8 km downstream of proposed crossing. Migration route to salmonid waters of Leslie Hill Stream (Corkey River).	Single Span 40m	4.5	2.24

In-stream works are not required for construction of the Section 2 River Swilly bridge. The construction involves no temporary or permanent in-stream footprint, or incursion into the SAC. The River Swilly is tidal at the proposed crossing point, with intertidal mud ('Mud community complex, and QI habitat 'Estuaries' 1130) lining the channel and exposed at low tide. There is no temporary or permanent footprint on this QI habitat of the SAC as a result of the bridge construction.

The proposed 108m span will clear the river channel and the eastern side (Milk Isle) flood embankment. Plate 9B-7 shows morphological features relevant to this assessment.

The Eastern Pier (EP) of the bridge (Milk Isle side) is set behind the combined raised flood embankment and backing toe-drain at a distance of > 50m from the tidal River Swilly wetted channel. This is distance of c.3 m set back from the SAC boundary. The Eastern Abutment is a further 63 m inland from the pier. Pier construction works on this eastern (Milk Isle) side occur on flat ground agricultural land where the risk of sediment and pollutant wash out to the Swilly toe-drain is inherently reduced owing to its low gradient. Best Practice sediment loss controls (silt fencing) on the eastern (Milk Isle) side would likely be very effective

owing to the flat topography. There are no direct hydrological outfalls to the River Swilly from the construction work area on this eastern (Milk Isle) side at the crossing location because temporary works are behind the existing flood embankment (Em), draining to the drain-like toe-drain (Td) where silt and sediment naturally deposit and are dredged as part of the OPW Swilly Embankments drainage programme. The toe-drain forms an additional line of protection during the Eastern Pier construction phase in the form of a linear settlement area (in conjunction with standard sediment control measures).

Plate 9B-7: River Swilly Crossing Point (view downstream) at High Tide (Sept. 2024)
Panorama taken from the crest of the embankment (Em) showing the general morphology including Toe-drain (Td) on the eastern (Milk Isle) side with flat land near where the Eastern Pier (EP) will be located outside the SAC. The Western Pier (WP) (Ballyraine side) will be just inside the riverine border of rough vegetation. Both piers are outside the SAC boundary with no temporary or permanent footprint within the SAC during construction or operation.

The Western Pier (WP) (Ballyraine side) is located approximately 5 m from the Lough Swilly SAC boundary and a total of 15 m from the Swilly wetted channel on gently sloping, rough grassland (Plate 9B-7). The Western Abutment will be a further 63 m inland from the pier. There is no embankment or toe-drain on the western side of the channel meaning there is not the same level of inherent protection between the temporary construction works and the River Swilly / Lough Swilly SAC.

As set out in the Project Description, there are measures included as part of the expected bridge construction sequence to avoid direct and indirect impact on the SAC, contain the temporary works areas and manage pollutant run-off at the Western Pier sub-structure construction area (foundation piling) on the Ballyraine side of the river. This includes: (i) the use of a temporary sheet piled cofferdam installed around the bridge pier area with a top height that excludes the 0.5% AEP coastal flood level + 200 mm freeboard; (ii) use of reno-mattress hardstandings (or similar) - essentially flat gabions filled with clean stone - which avoids placing large areas of clause 804 which can become entrained to the SAC river during potential flooding; (iii) robust silt fencing along the SAC boundary and around temporary works and any hardstanding areas to prevent pollutant run-off; (iv) fencing to demarcate and thus prevent unwanted incursion into the SAC.

The SAC will therefore be a ‘no-go’ exclusion zone throughout the construction on both banks. Once the piers and abutments are installed the bridge deck will be constructed using a balanced cantilever method over the River Swilly, with no instream footprint on the river or Annex I QI Habitat 1130 ‘Estuaries’.

Whilst there is no incursion to the SAC involved with bridge construction, two proposed outfalls will be installed from the western bank directly to the River Swilly: one from Attenuation Pond 07 and one from an interceptor ditch. These outfalls will be constructed without excavations within the SAC. Instead, outfalls will be set back from the channel, discharging over secured ‘green’ erosion protection solution (e.g., vegetated armour such as Hanes ScourStop ® transition matting, or similar). It is important to note that attenuation ponds and interceptor ditch outfalls are primarily ephemeral in nature (intermittent flow during certain rain events) meaning their outfalls are not continuous sources of flow with scouring potential at the river bank. Water quality of such outfalls is either the same as background (interceptor ditches that collect non-road related surface flow) or has been treated via wetland hybrid attenuation ponds. Attenuation Pond 06, on the eastern side of the bridge will outfall to the series of ephemeral drains (W2-16, W2-17) in the Milk Isle area

that have low ecological value. Whilst they do eventually connect with the River Swilly via the embankment toe-drain, the pathway is highly attenuated throughout before reaching Lough Swilly via non-return outfalls from the embankment toe-drain.

Whilst the construction sequence has been carefully set out in Section 4.12.9 of Chapter 4: Project Description to reduce potential sources of construction phase pollutant loss to the Swilly Estuary, in the absence of the full suite of mitigation measures in the area of water quality protection and monitoring (refer to Section 9B.9) to ensure their efficacy, there is potential for **indirect short-term significant negative** effects at an international level with regards to QI habitat 1130 'Estuaries' at and downstream of the bridge construction site.

Isle Burn Active Travel Bridge (SAC boundary)

The proposed Isle Burn Active Travel bridge is located on the upstream side of the existing N13 triple-barrel culvert crossing (Site W2-15) of the Isle Burn River (EPA Leslie Hill stream), 30 m upstream of the Lough Swilly SAC boundary. There is no temporary construction phase, nor permanent footprint in Lough Swilly SAC. The river is heavily tidally influenced at this location but is classed by the EPA as being within the freshwater Leslie Hill stream river water body, 2.3 km upstream of the 'Swilly Estuary' transitional water body. The river has vertical banks and benthos of fine mud and clay. The channel is regularly dredged as part of OPW Swilly Big Isle Drainage Scheme (Channel code: Isleburn). Details of the construction sequence and standard water quality protection measures are set out in Section 4.13.10 in Chapter 4: Project Description. The single span steel bridging structure will be craned into position following construction of the abutments. Temporary fencing at 5 m set-back from the river channel will demarcate the limit of allowable working, providing a 'no-go' exclusion zone for the construction period. Access tracks and haul routes will approach from either bank for the installation of abutments. There is no drainage outfall from the Proposed Development directly to the Isle Burn (Lough Swilly SAC) at the Rossbrackan end of Section 2. Attenuation Pond 10 is located outside the 0.5% AEP coastal and fluvial flood extents. Pond 10 outfall is to the Maghera-more 39 watercourse, a virtually flat, vegetated drain/wetland which ultimately merges with the Swilly Embankment toe-drain before out falling via non-return valve to the estuary. Apart from the pond's attenuation and treatment function, this non-IEF watercourse (stagnant, vegetated drain) and the embankment toe-drain will further attenuate runoff and facilitate solids settlement during construction.

The primary concern during construction at both bridges (mainly the River Swilly Bridge), would be risk of excessive sediment loss from construction areas. If this occurred, increased turbidity may give rise to behavioural, physiological or physical changes in migratory freshwater fish (salmon, sea trout, river/sea lampreys, eel) and estuarine species of River Swilly or Isle Burn, the most common change being behavioural in terms of either avoiding or being attracted to turbidity plumes. In that regard, it is noted that estuarine and migratory fish species are adapted to variable background levels of turbidity within a naturally muddy, depositing transitional water environment. Conservatively, if there intense heavy rainfall combined with a complete absence of water quality protection measures during construction, additional sedimentation (over normal baseline levels) of the estuarine benthic habitat could occur and have temporary localised effects on the polychaete/oligochaete-dominated upper estuarine mud community complex habitat (QI Habitat 1130 'Estuaries'). It is noted that an Irish study at Clonakilty Bay, West Cork, demonstrated that six months after direct physical disturbance of estuarine mudflat habitat related to pipeline laying, there was no significant difference in the mean number of total individuals (of all species) per core sample at study sites and the recovery in the impacted area was due to recovery of the polychaete *Hediste diversicolor* and Oligochates (*Tubifex* spp.) (Lewis *et al.,* 2002). This demonstrates that both adult and juvenile *Hediste diversicolor* are mobile, with considerable dispersal capacity and are good burrowers, which aids their rapid recolonisation of disturbed mud community habitat. There is potential that indirect effects of, e.g., temporary or short-term additional sediment supply during construction, could cause temporary to short-term localised changes in faunal diversity and/or densities, noting that baseline diversity and abundances are low and there will be no direct disturbance of the habitat.

Also noted is that upper estuarine habitat is by nature resilient; subject and adapted to regular bouts of turbidity and variability in sediment levels within the water column and benthos (a balance of natural accretion and erosion that is normal for such aquatic environments). Given there is no direct habitat disturbance required for the bridge constructions, the likelihood of significant effects on the local 'Mud community complex' and wider Estuary sub-type habitats of Lough Swilly, is therefore low. Furthermore, the crossing reaches of the River Swilly and Isle Burn (Leslie Hill Stream) are routinely dredged as part of OPW

drainage maintenance; thus, being a regularly disturbed environment regardless of additive impact from the Proposed Development. The indirect impact is predicted to be temporary, slightly negative and of local spatial extent, limited to the immediate downstream reaches of the estuarine River Swilly and Isle Burn, and reversible within a short period of time. However, in the absence of dedicated mitigation measures around sediment loss control and water quality protection and applying the precautionary principle given the bridge construction period of 24-36 months; the impact is considered potentially localised **indirect temporary to short term significant negative** at an international level, given the local presence of QI habitat 'Estuaries (1130).

Section 2 Culverts – Construction Phase Effects

See Appendix C9B.04 for the detailed examination of construction phase effects at each culvert crossing. Refer to Drainage Layout EIAR Drawings 4.41 in Volume D: Book of Drawings for culvert locations.

Of the 34 no. culverts proposed in Section 2, only Farsetmore stream has some degree of fisheries significance primarily from W2-12, and downstream for c.300m, i.e., to where the channel gradient levels out and is less suitable for fish. However, it has impaired water quality and morphology owing to stock access and a combination of artificial and natural fish passage barriers upstream of point W2-12. From an abundance of caution this stream has been treated as fish bearing. In the absence of mitigation in the areas of water quality protection and fisheries restrictions there is potential for localised **temporary to short-term significant negative** effects at a higher local level, affecting small numbers of trout and brook lamprey (sub-optimal habitat) at W2-12 (S2-CUL.32) and W2-11 (S2-CUL.31 and S2-CUL.30) and downstream for approximately 300m.

Works in the Corranagh Burn catchment: Corranagh drains (W2-25) and Coaghmill (W2-19), drain to the sensitive trout spawning/nursery habitats of the Corranagh Burn, hence there is potential for **temporary to short term significant negative** indirect effects in the absence of water quality protection measures during culverting and general earthworks in this catchment.

Works in the Dooballagh Burn catchment: Listellian drains (W2-01 to W2-06) drain collectively to the trout spawning/nursery habitats of Magheraboy 39, Dooballagh (Burn) and (distantly) the Leslie Hill Stream, hence there is potential for **temporary to short term significant negative** indirect effects in the absence of water quality protection measures during culverting and general earthworks in this catchment.

Culvert installation in the numerous drains of low ecological value that are crossed in Section 2 can be managed using standard water management techniques like dam and pump-over. Whilst of no salmonid value at all, the low gradient drains of Milk Isle and Bunnagee may have presence of eel. Given eels are a protected species, if they were not removed from dewatered sections of low-lying drains during construction, a locally **significant negative** effect (mortality) would arise.

All small drains and watercourses crossed by the Proposed Development ultimately flow to River Swilly / Lough Swilly. Any culvert construction or realignment, locally significant or not, could have significant indirect negative effects on Lough Swilly SAC. In the absence of mitigations in the areas of water management (e.g., temporary diversion, pump-over) and general water quality protection (sediment and pollutant loss controls), **significant indirect negative** effects on habitats and estuarine fisheries value of Lough Swilly.

Section 2 - General Earthworks and Drainage Infrastructure Installation

It is proposed that interceptor drains and attenuation ponds will be allowed to revegetate in advance of the main earthworks phase, i.e., before outfalls are connected to watercourses. Whilst this will greatly reduce sources of suspended solids and will help attenuate run-off (solids settlement) through the construction, the worst-case scenario of uncontrolled runoff has been considered in this assessment.

There are seven deposition areas and sixteen material extraction areas in Section 2, each located near the permanent works. None of these areas are within 50 m of the Lough Swilly SAC boundary and all are outside the 1% AEP (+20% climate change) flood extent and are set back from drains and watercourses. Flood compensation areas are required near the Bonagee Junction, which involve excavations to increase flood storage. Given the generally low ecological value of watercourses within Section 2, particularly the low-lying Bunnagee drains, and the flat topography which inherently limits run-off, there are no likely significant

effects predicted on aquatic receptors related to flood storage area construction. These areas have indirect connectivity to Lough Swilly SAC, but the Swilly Embankments along the SAC boundary provide a barrier between the work areas, and the embankment toe-drain provides attenuation between the work areas and the non-return outlets to Lough Swilly. However, given the substantial combined earthworks required for the road and drainage infrastructure and in the event of an intense rainfall event there is potential, in the absence of mitigation, for **significant indirect negative** effects on habitats and estuarine fisheries value of Lough Swilly related to sediment loss (turbidity and sedimentation).

9B.5.3.4 Section 3

Watercourses in the northern half of Section 3 drain to Lough Swilly via the Isle Burn (EPA name Leslie Hill Stream) which flows into Lough Swilly SAC and SPA and their underpinning national designations. The southern half of Section 3 drains via small tributaries and main channels of the Swilly Burn, Deele and Finn rivers, which all flow into the River Foyle, named 'Foyle and Faughan Estuaries' transitional water body (UKGBNI5NW250010) and onwards to Lough Foyle. The River Foyle and 7 km of the lower River Finn (from Lifford/Strabane, upstream as far as Clady) are part of both the River Finn SAC (ROI) and the contiguous River Foyle and Tributaries SAC (NI).

Section 3 involves construction of three major river bridges (Table 9B-25): River Finn (W3-21), Swilly Burn (W3-14) and River Deele (W3-17), each of which will be crossed by clear-span structures over the channel and will retain the existing channel and banks of the watercourse intact. In-stream works are not required for the construction of these major bridge crossings**.**

A total of 33 no. culverts are proposed, with associated minor stream diversions to align culvert crossings perpendicular to the road. Refer to Chapter 4: Project Description for further details of bridge, culvert and stream diversion works in Section 2 and Chapter 11: Water for details of hydrological analyses that determined proposed culvert size and bridge design. Bridges, culverts and stream diversions have been designed such that there will be no changes in the existing hydrological regimes and water body scale morphology of the relevant watercourses.

Table 9B-25: Section 3 Bridges and Habitat Sensitivity

Bridge Ref	Sensitivity	Bridge Span & Length (m)	Deck Width (m)	Freeboard (m)
River Finn Bridge	Internationally important (A) river designated as River Finn SAC and Salmonid Water. Clear span over river.	Eight-span 284m (SAC river clear span 63m)	25	2.8
River Deele	County importance (C) river supporting populations of salmonids, lamprey and eels. Clear span over river.	Three-span 108m (central clear span 60m)	25	6.5
Swilly Burn	Local Importance (higher value) (D) river with some fisheries value. Clear span over river.	Single Span 25.6m	50.5	3.0

Section 3 Bridges – Specific Construction Phase Effects

River Finn N14/N15 to A5 Link Bridge (SAC crossing)

This proposed bridge is 27 km downstream of the Section 1 proposed River Finn Bridge, which is described in Section 9B.5.3.2, above. The River Finn upstream of Lifford / Strabane in Section 3 of the Proposed Development forms the international border between the Republic of Ireland (ROI) (County Donegal) and Northern Ireland (NI) (County Tyrone). The River Finn at the proposed N14/N15 to A5 Link bridge is location is under conservation designation in both jurisdictions: River Finn SAC (ROI) and River Foyle and Tributaries SAC (NI). Refer also to Section 9B.11 below, for detailed description of transboundary effects on aquatic receptors.

The design, construction sequence and standard water quality protection measures are set out in Section 4.13.9 of Chapter 4: Project Description and EIAR Drawings 4.36 through 4.38 in Volume D: Book of Drawings. The bridge construction duration is estimated to be 18 months within the overall 36-month construction period for Section 3. Descriptions of the bridge construction sequence should be read in conjunction with EIAR Drawings 4.36 through 4.38, which show temporary work areas for the structure in relation to the SAC boundaries. In-stream works are not required for the construction of the River Finn N14/N15 to A5 Link Bridge, but there will be a temporary (construction phase) and permanent (operation phase) footprint within the River Finn SAC on the floodplain in County Donegal.

The proposed N14/N15 to A5 Link bridge design for the crossing of the River Finn is an eight-span structure with an overall length of approximately 284 m. It consists of a 63m main span that clears the River Finn, plus 33m southern and 191m northern approach structures. The clear span over the River Finn will have no direct impact on the River Finn, retaining the riverbanks intact (with a minimum 5m exclusion zone from the top of the riverbank) and with no requirement for in-stream works during construction. The northern side of the bridge construction is in the Republic of Ireland (County Donegal), and the southern side is in Northern Ireland (County Tyrone). Refer to Section 9B.11, Transboundary Effects for a description of the legal framework and cross border considerations for the aquatic ecological impact assessment.

Figure 9B-4 shows the plan and profile for the proposed bridge, including SAC boundaries on both Donegal and Tyrone sides of the river. The River Finn main channel width at the bridge site is circa 50 m. As set out in Chapter 4: Project Description, an exclusion zone along the riverbank will be established at the outset of construction works using solid fencing. The exclusion zone will be 7.9m on the ROI side and 9.1m on NI side.

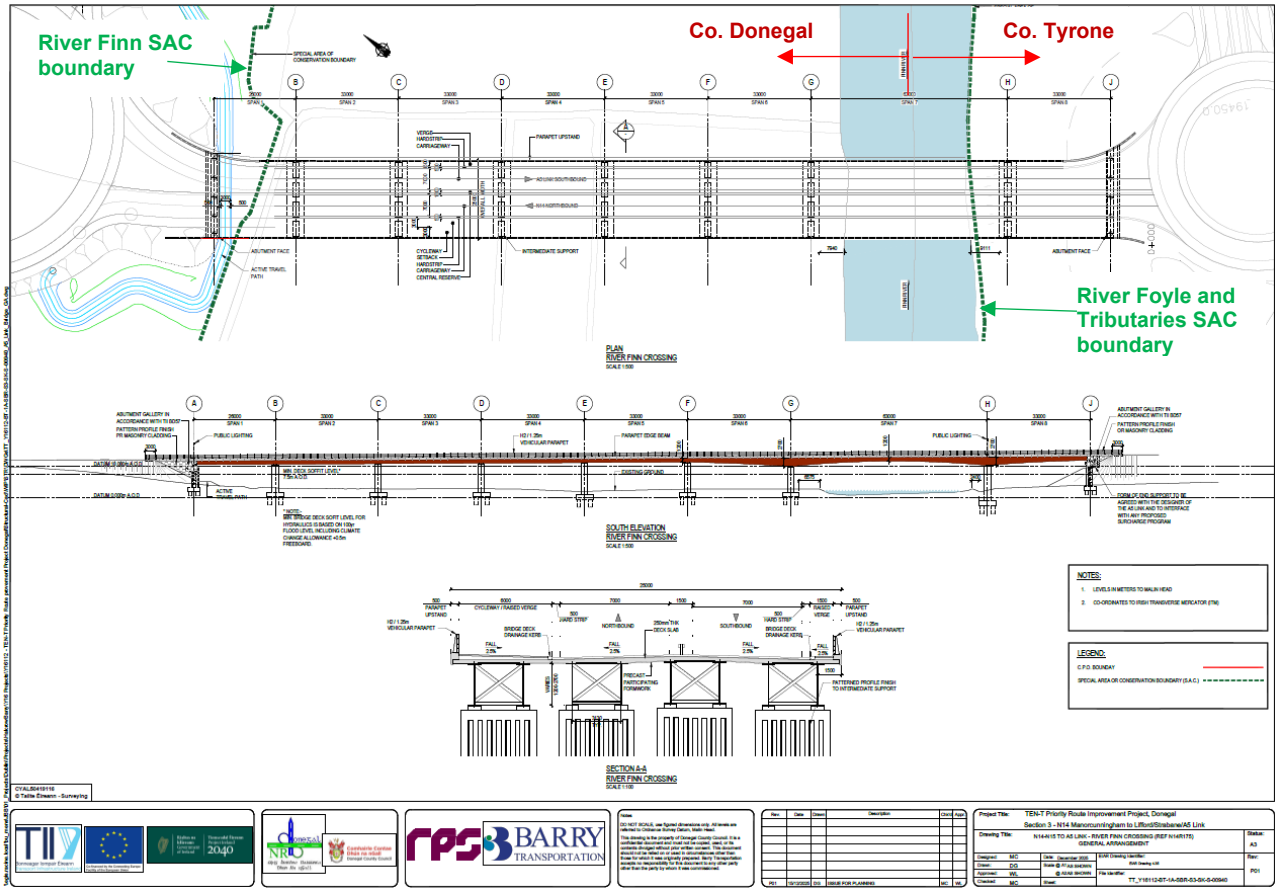

Figure 9B-4: N14/N15 to A5 Link - River Finn Crossing General Arrangement

The river is tidal in the proposed crossing reach. The predicted designed flood level at the bridge crossing site is 6.73 mOD Malin based on combined 100 year fluvial and tide event and includes 20% climate change allowance. The minimum road level is 9.8 mOD which is just over 3m above the flood level. Existing

floodplain ground level on the northern (Co. Donegal) side of the river is broadly 2.1 to 2.6 mOD Malin and 3.7 mOD on the southern (Co. Tyrone) side. It would not be feasible to build temporary cofferdams or temporary work platforms that extend above the combined tidal and fluvial flood level of 6.73 mOD to provide containment areas for construction of bridge pier foundations. For that reason, the focus of the proposed construction works is on limiting potential sources of sediment washout to the SAC river. This includes: (i) use of reno-mattresses hardstandings (or similar) with a low fines composition to create working platforms on the floodplain which is located on the northern bank; (ii) robust silt fencing and fencing between the temporary works area and the River Finn along the exclusion zone boundaries (7.9m on the ROI side and 9.1m on NI side).

There is no requirement for new drainage outfalls to the River Finn from the proposed new bridge and carriageway, nor from the mainline drainage network. The latter will discharge from Attenuation Pond 16 via swale to existing, ephemeral drainage ditches that outfall to the Finn. During construction, however, two minor field ditches will be required to be diverted as they pass under the proposed bridge alignment. It is proposed that the ditches will be diverted before interacting with the works area. This will require a temporary land drain to intercept them which will be connected to the existing field drainage network and not require a new connection to the river. The permanent Section 3 Attenuation Pond No.16 will discharge via swale to the existing network of land drains on the River Finn floodplain outside the SAC. Hence there is no excavation required at the River Finn bank for new outfalls, and no instream works associated.

During the River Finn bridge construction in Section 3, permanent Attenuation pond 16 will be installed at the start of the construction period. The pond is outside the SAC and outside the 1%AEP (+20% CCA) flood extent. During construction, all drainage will be either diverted or pumped to pond 16 instead of constructing a temporary settlement pond within the SAC. Cofferdams will be constructed around each bridge pier so that water within any excavations are contained and can be pumped out and tankered to Pond 16. This approach negates requirement for additional drainage diversions and attenuates and treats construction phase run-off via Pond 16.

Six bridge piers are located within the SAC boundary on the floodplain on the County Donegal side of the river. As a consequence, there will be a small permanent loss of wet grassland habitat within the SAC, equating to 240 m^2 (6 no. sets of piers x 4 piers per set x 10 m^2 per pier of habitat loss). To construct the bridge a temporary floating road is required within the County Donegal (ROI) side of the river which will have a temporary negative but reversible impact on this wet grassland habitat. Wet grassland is not a qualifying interest or Annex listed habitat type and will recover on completion of the construction phase. Similarly, minor temporary works within the SAC boundary are required, i.e., at the base of low embankments for the Active Travel path, but this also occurs on wet grassland and does not result in a permanent footprint within the River Finn SAC. The disturbance of non-annexed wet grassland habitat in the construction phase is **short-term, reversible and not significant**. The loss of a small area (240 m^2) of non-annexed habitat (wet grassland) within the SAC is **permanent** but **not significant**.

The River Finn at the crossing location is deep, channelised and heavily silted. It is covered by the River Foyle and Tributaries SAC (UK) designated for salmon and 'floating river vegetation' (*Ranunculion fluitantis* and *Callitricho-Batrachion*). Note that the designation also includes otter (*Lutra lutra*) which are assessed in Chapter 9A: Biodiversity Terrestrial. The river at this location is tidally influenced and does not comprise sensitive salmonid spawning or nursery habitats at or downstream of the construction area. The River Foyle below Strabane is slow flowing, increasingly tidal with downstream distance, and aquatic plants in the channel are extremely limited, particularly in the more saline areas (NIEA, 2024). The Foyle / Finn rivers in the reasonable ZoI of the Proposed Development are purely a holding habitat and migration route for anadromous and catadromous fish. As such, it is noted that older fish (smolts, adults) are more resilient and adapted to occasional periods of turbidity, i.e., being highly mobile, and either avoid or are attracted to silt plumes if they did unexpectedly arise. Importantly, sedimentation of spawning beds is not an issue as they are not present at the crossing location or downstream to the sea. Migrating fish could, however, in the absence of mitigation be affected by excessive turbidity and/or toxicity if there was uncontrolled sediment and pollutant wash out from the bridge construction areas on both sides of the river.

Water depth and high colour in the vicinity of the crossing point appear to restrict aquatic macrophyte development and the only instream plant growth recorded was a *Phalaris* dominated fringing reed community along both banks of the Finn, with small amounts of yellow waterlily (*Nuphar lutea*) close to the bank. As set out in Section 9B.4.1.3, the instream plant community in this tidal river reach does not conform

to 'floating river vegetation' nor pertain to the Habitat 3260 Annex I type (ROI) or the designated qualifying feature *Ranunculus* vegetation of the River Foyle and Tributaries SAC (NI). The proposed N14/N15 to A5 Link bridge construction upstream of Lifford has no pathway to impact on conservation objectives for 'floating river vegetation'. This is because: (i) the habitat is absent in the downstream ZoI, and (ii) the internationally important *Ranunculus* community of the River Foyle and Tributaries SAC (NI) is found in the lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane (NIEA, 2024), and none of these rivers or their sub-catchments are impacted by the Proposed Development.

In the absence of robust mitigation in the area of sediment (and other pollutant) loss controls there is potential for **indirect short-term significant negative** effects at an international level on water quality of the lower River Finn, potentially affecting migrating salmon which is a QI species of the River Finn SAC and a reason for designation of the River Foyle and Tributaries SAC (Northern Ireland).

It is noted that the requirement for a permanent access track (for future bridge maintenance) across the River Finn SAC floodplain has been avoided as bridge maintenance can be achieved from the bridge or the ground. Temporary mats will be used, if required, to allow vehicular access to the intermediate piers to facilitate scaffold erection for bearing inspection, maintenance and replacement.

River Deele and Swilly Burn Bridges (Non-SAC)

The proposed River Deele bridge (Site W3-17) is 3.5 km upstream of the ROI River Finn SAC boundary and an additional circa 5 km upstream of the River Foyle and Tributaries SAC boundary on the lower River Foyle.

The proposed Swilly Burn bridge (Site W3-14) is 6.8 km upstream of the contiguous ROI River Finn SAC and River Foyle and Tributaries SAC boundaries on the lower River Foyle.

Both bridges over the River Deele and Swilly Burn are clear span structures with the abutments set-back from the rivers sufficiently to avoid any requirement for instream works or modification of the existing riverbanks. The setback for the River Deele will be 4.6m on the northern side and 23.5m on the southern side. The setback for the Swilly Burn will be 6.9m on the northern side and 8.4m on the southern side. The River Deele span will be 60m while that of the Swilly Burn 23.5m. Both rivers are being crossed in the lower reaches where there are subject to tidal influence and have been subject to past drainage with adjacent flood embankments. As these crossings occur in the lower, tidally influenced sections of the rivers, they do not support any spawning or nursery habitat for salmonids or lamprey species, though soft sediments may be used by ammocoete larvae as they undergo their passive downstream migration. Mindful of presence of the invasive species, Asian clam (*C. fluminea*) in the lower Swilly Burn, there are no instream works or entry to water required for the construction of either of these bridges.

Section 3 Culverts and Realignments – Construction Phase Effects

See Appendix C9B.04 for the detailed examination of construction phase effects at each culvert crossing. Refer to Drainage Layout EIAR Drawings 4.42 in Volume D: Book of Drawings for culvert locations. Culvert construction has potential (in the absence of mitigation) for **short term significant negative** localised direct and indirect effects on fisheries channels at 19 no. fisheries sensitive crossing locations as set out on a site-specific basis in Appendix C9B.04.

The Leslie Hill Stream tributaries W3-02, W3-03 and W3-04 and the Swilly Burn Tributary (W3-13) will have pre-cast concrete bottomless culverts, which will also extend to include the riverbank on both sides, thus, allowing for unimpeded fish and mammal movement. Other watercourses will be crossed with appropriately sized culverts designed to match existing channel widths in accordance with IFI requirements, whilst accommodating flood flows in line with the OPW requirements. These culverts will have inverts set 500 mm below bed level to ensure they are always backwatered and therefore accommodate unimpeded fish movement under all flow conditions. The culverts will also accommodate mammal passage either as a dedicated ledge or as a separate but immediately adjacent 600 mm pipe culvert. There will therefore be no impediment to the continued movement of fish on all watercourses within Section 3.

The Swilly Burn tributary (EPA name Drumbeg, Site W3-12) at Tullyrap will require an extensive realignment over a total length of approx. 1km (Ch.9+200 to 10+200). The existing N14 at this location will be realigned to the east of the proposed new road to avoid requirement for a series of extensive culverts. The proposed

realignment will be to the west of the proposed road and adequate land take has been included to create a meandering channel which is marked “Tullyrap Water Diversion” in the General Arrangement EIAR Drawing 4.3 (sheets 5 and 6 of 10) and Drainage Layout EIAR Drawings 4.42 (sheets 5 and 6 of 10) in Volume D: Book of Drawings. The latter drawing series shows the newly created channel with morphology designed to mimic ‘natural’ and the location of proposed culverts S3-CUL-24, S3-CUL-25 and S3-CUL-26 (refer to Appendix 9B.04 for construction phase details for culverts). The proposed design, whilst resulting in temporary disturbance of the aquatic habitat, will ensure the channel remains largely open in the construction phase. The watercourse along this stretch is mainly within a modified steep-sided channel with a base width of c.2.0 m and a riffle / glide flow. There are scattered Hawthorn and Willow along the banks with adjoining improved agricultural grasslands. To the north of the existing L2374 road however, the stream takes on a more natural character with some outcropping bedrock as the gradient increases towards the existing bridge on the N14 at Drumbeg. The stream is bounded by a narrow strip of Oak-Ash-Hazel woodland (WN2) which extends along the stream from the L2374 to approx. 150m upstream of the N14 bridge (see Plate 9B-8**)**.

Plate 9B-8: Swilly Burn Tributary W3-12 at Tullyrap

Instream habitat of the Drumbeg stream (at Tullyrap) is suitable to support fish, however, water quality was generally poor (Q3) with extensive algal mats and no evidence of fish during early field sampling (2020) with slight improvement (Q3-4) by surveys of 2025. Loughs Agency electrofishing data (Appendix 9B.06) showed small numbers of juvenile trout do occur in the stream on occasion. Trout were captured in 2020 (5 no. 1+ fish) and 2024 (1 no. 0+ fish). No fish were captured in 2022 sampling, and no salmon were present in any of the samples (Loughs Agency data, *formal data request*). While the loss of original habitat (which is modified by previous drainage) is extensive (1.0 km) and permanent, the proposed design of the realigned channel and associated landscaping will, over time (operational phase), provide better instream conditions for fish and a nett increase in area of aquatic and riparian habitat. The construction phase effects, in the absence of mitigation in the area of fish removal, water management and water quality protection during construction, will be likely **short term significant negative** direct and indirect owing to physical impact on habitats affecting fisheries habitats and low numbers of trout within the Drumbeg stream at Tullyrap.

Section 3 - General Earthworks and Drainage Infrastructure Installation

There are significant earthworks, including nine deposition areas and a number of material extraction areas in Section 3. Deposition / extraction areas are each located near the permanent works; are outside the 1% AEP (+20% climate change) flood extent and are set back from drains and watercourses. There are no deposition or material extraction areas within 100 m of the major rivers (Isle Burn, Swilly Burn, Deele, Finn). The nearest to the Lough Swilly SAC is 2.3 km distant (northern Section 3) and the nearest to the River Finn SAC is 1 km distant. However, given the substantial earthworks proposed, in the absence of mitigation, there is potential for **significant indirect negative** effects on IEF (fish sensitive) watercourses locally and downstream habitat and water quality of Lough Swilly SAC and River Finn SAC, primarily related to sediment loss (turbidity and sedimentation).

9B.5.4 Operational Phase Effects

9B.5.4.1 Mechanisms of Operation Phase Impact

Potential impacts from the operation phase of the Proposed Development on the aquatic environment include:

- Water quality degradation owing to road run-off pollutants
- Habitat alteration / loss and/or fragmentation – in relation to watercourse crossings
- Bridge shading effects
- Hydromorphology – changes to hydrology, morphology, continuity
- Potential hydraulic changes – in relation to instream structures
- Changes in water quality due to accidental hazardous spillages

The following paragraphs set out the effects of these primary sources, pathways and types of operation phase impacts on aquatic receptors associated with large road developments. The significance of operation phase effects for each watercourse in the three road sections (S1, S2, S3) of the Proposed Development are then detailed in Sections 9B.5.4.2 to 9B.5.4.4.

Potential Water Quality Degradation owing to Road Runoff Pollutants

Traffic emissions and road surfaces are sources of contaminants which are exported in run-off and drainage to aquatic receiving environments. Traffic-related pollutants originate mainly from tyre and brake lining abrasion, hydrocarbon leakage, combustion residue and asphalt surfaces (Healy *et al.,* 2008), but can include contaminants from highway structures, e.g., zinc from bridge and safety fencing galvanised structures (Huber *et al.*, 2016). Typical road run-off contaminants in Ireland are: Total Suspended Solids (TSS), heavy metals, hydrocarbons including polycyclic aromatic hydrocarbons (PAHs), chlorides, nitrates and phosphorus (Bruen *et al.*, 2006). Chloride (Cl) would be attributed to de-icing in winter, which may occur in County Donegal from time-to-time but is not considered a major source owing to the relatively mild Atlantic climate and limited requirement and/or duration for its use (Refer to Appendix 9B.07: Road De-icing Examination). Pollutants can be sediment bound and/or in soluble form, although the majority of the pollutant load, including the PAH, is sediment bound (TII, 2014). TSS are, by weight, the principal contaminants of road surface drainage, meaning attenuation and settlement of TSS are a primary focus in the treatment of road runoff through attenuation.

Negative impact on aquatic ecology from the main contaminants includes:

- TSS causing behavioural, physiological and physical impacts on aquatic organisms and degradation of their habitats (turbidity, sedimentation)
- Metals and PAHs can be acutely (in soluble form) and chronically (sediment-bound phase) toxic to freshwater organisms in high concentrations.
- Nitrates and phosphorus cause eutrophication of surface waters, which reduces oxygen availability to aquatic organisms and physically degrades habitat (through algal growth / decay and smothering of benthos).

Bruen *et al.* (2006) and TII (2014) summarise post-doctoral research regarding impact of road drainage on surface water quality in Ireland, including relevant UK findings. It outlines effective drainage treatments and designs that best mitigate the impact of road run-off on water quality and aquatic habitats in Irish conditions. These documents underpin relevant TII Standards: Drainage Systems for National Roads (DN-DNG-03022) (TII, 2024), incorporating Road Drainage and the Water Environment (DN-DNG-03065) (TII, 2015a), which have been used to inform drainage design for the Proposed Development. The following are the main points from this research with relevance to the current assessment:

- Road runoff in Ireland contains pollutants at similar concentrations to UK studies. Principle metals present in highway runoff are copper, zinc and cadmium, mostly sediment bound. The main factors influencing contaminant concentration in run-off are primarily traffic density, i.e., Annual Average Daily Traffic (AADT) and rainfall regime (volume, duration and antecedent conditions).

- No significant impact was detected in Irish studies on instream vegetation, macroinvertebrates or fish community structure downstream of outfalls from road discharge (although many streams were already polluted upstream, i.e., similar to many of the Donegal rivers in question which are generally Q3 to Q3-4, indicative of poor-to-moderate ecological status);
- Benthic sediment accumulation in the operation phase has been linked to culverting (but not bridging) although impacts were not sufficient to impact on fish communities (Wellman *et al.,* 2000).
- Previous studies in England (Maltby *et al.,* 1995: Perdikaki and Mason, 1999) showed localised impacts downstream of road drainage discharge points, indicated by a decline in macroinvertebrate diversity and/or biotic metrics based on macroinvertebrates. The effects were confined to smaller streams for relatively short distances downstream of the discharge and were generally considered not significant.
- In terms of the effect of traffic volume on pollutant export, a critical review of road run-off pollution studies worldwide was carried out by Huber *et al.* (2016), covering AADTs between 100 and 328,000 in countries across six continents. Their finding was that AADT explained about 30% of the variation observed in studies of heavy metal concentrations, with other important factors being, e.g., (1) braking and acceleration activity at traffic signals or congestion areas, (2) additional braking on exit and link roads compared to highways, (3) speed of travel, influencing pollutant wash out. One of their findings was, broadly, that urban roads with AADT> 5,000 vehicles per day can potentially be more polluting than highways because of site-specific braking and acceleration factors.
- UK studies show that in the absence of treatment, impact on water quality can be expected from highways with >30,000 AADT, although at AADT >15,000 the level of pollution could be of concern (Bruen *et al.,* 2006). The UK surface water risk assessment for road runoff pollution: Highways England Water Risk Assessment Tool (HEWRAT) uses three traffic volume (AADT) bands: ≥10,000 to <50,000, ≥50,000 to <100,000 and ≥100,000. The Irish standards also apply these bands for assessment of potential toxic effects of metals and risk of sedimentation, suggesting risk of impact at AADT ≥10,000.
- In terms of the effect of rainfall on pollutant export; runoff resulting from short intense rainfall following a long dry period is likely to wash off metals deposited on the road surface and may cause stress to the receiving stream ecology in the first-flush (Bruen *et al.,* 2006) given soluble metals usually exert the greatest impact or toxicity to aquatic life.
- Antecedent Dry Period (ADP) is a determinant affecting concentrations of highway pollutants, especially in relation to first flush effects (CEDR, 2018b). Exceptionally high TSS concentrations have been recorded from a filter drain after an extended ADP (20 days) (Bruen *et al.,* 2006), though it is worth noting that the frequent rainfall regime in Donegal is such that ADP would seldom be extended.

All drainage and storm-water run-off controls for the Proposed Development are designed to comply with TII Standard DN-DNG-03065 Road Drainage and the Water Environment (TII, 2015a). Lined attenuation ponds will be provided at all major surface water outfalls along the length of the road scheme and are designed in accordance with DN-DNG-03063 Vegetated Drainage Systems for Road Runoff (TII, 2015b) and the SUDs Manual (CIRIA C753) (Ballard *et al*., 2015). Attenuation ponds have been designed as hybrid wetlands, which are proven to provide a water treatment function (see Section 9B.5.6.2). Refer to Chapter 4: Project Description, Figure 4.10 for a schematic view of proposed hybrid wetland attenuation pond design.

Potential Habitat Degradation/Loss and Fragmentation – Operation Phase

Culverting can result in habitat degradation or loss over the culvert length as these areas can become largely unusable to fish and macroinvertebrates. Improperly designed or maintained culverts can also form barriers to fish migration, fragmenting habitats in streams that currently or potentially support fish. Clear-span bridges have no negative effects on fish movement. An Irish study that investigated operational impact on fish passage at culverts on a modern highway project (M3) showed that fish passage was possible through culverts designed to current standards, although dry-weather water depths and measured water velocities in some culverts were below permissible limits and were at risk of impeding fish passage under low-flow conditions (Cocchiglia *et al*., 2012), therefore culverts on the Proposed Development will include, at a minimum, a low flow channel with baffles specified where effective slope requires (refer to Section 9B6.1).

Box culverts are specified for smaller channels with fisheries significance. Pipe culverts are only used on watercourses (and drains) that have little or no fisheries sensitivity. In general, culverts have been set along the line of the existing watercourse and to a similar width to that of the natural low-flow channel. Larger box-type culverts will have their invert buried to a depth of 500 mm to stimulate settlement of a natural stream bed within during the operation phase. For minor water courses or drains that are normally dry in the

absence of rainfall, a minimum culvert dimension of 900 mm will be used. For EPA delineated watercourses which have constant flow but no significant fisheries sensitivity, 1200 mm diameter pipes at a minimum are specified. Box culverts have been designed according to OPW Section 50 standards to ensure the appropriate headroom (freeboard) and design-flows are achieved.

Site specific operational phase impact assessments at each proposed culvert location are based on culvert specifications (length, slope, dimensions, type) and aquatic receptor sensitivity and are presented in Appendix C9B.05. These are further discussed in Sections 9B.5.4.2 to 9B.5.4.4, below.

Potential for Accidental Hazardous Substance Spillage

Outlet designs from the surface water drainage controls systems (attenuation ponds that limit run-off to greenfield 100-year rainfall event rates) enable a degree of containment in the very unlikely event of a significant hazardous spill occurring on the new road. A spillage pollution risk assessment was conducted in accordance with TII Standard DN-DNG-03065 Road Drainage and the Water Environment (TII, 2015a) which showed **no significant** risk of a serious pollution incident occurring across all three Sections (see Chapter 11: Water).

Potential Hydraulic Changes

Poorly designed crossings and insufficient storm water discharge attenuation can disrupt natural river hydraulics leading to increased erosion and/or flooding as a result of flow changes. To avoid this, all bridges, culverts, stream diversions and catchment run-off interceptors have been designed such that there will be no changes in the existing hydrological regimes and water body scale morphology of watercourses. See Chapter 11: Water for details of hydrological analyses that underpin designs. Measures to attenuate and treat carriage-way run-off in the form of hybrid wetland attenuation basins have also been incorporated into the drainage design in accordance with TII standards. Given that culvert designs are to OPW Section 50 requirements, with special measures prescribed for fish passage (Appendix C9B.05) and the drainage design, there will be no significant operational impact on hydrology and hydraulic conditions and hence effects on aquatic receptors will be **not significant**.

Potential Hydromorphological Changes

Culverts and permanent channel realignments can alter hydromorphology with the potential to affect instream and riparian habitats for fish and macroinvertebrates. Such impacts have been avoided by embedment of culverts and realignment design that allows for reinstatement of habitat that broadly matches or improves pre-existing habitats. Shading effects of bridges or darkness within culverts are not considered particularly deleterious to fish passage as fish can migrate in darkness or light, although the transition zone into structures on fish bearing streams will be softened by riparian planting. Culverts will be straight with light penetrating at both ends to aid passage and include low-flow channels and baffles where necessary on a site-specific basis as prescribed in Appendix C9B.05.

Potential Bridge Shade Effects

Whist the proposed clear span bridges will not impact on fish passage, instream plants require light to conduct photosynthesis, propagate and survive, in turn affecting aquatic macroinvertebrate and fisheries productivity. Natural shade is highly beneficial to rivers and streams through regulation of water temperature and provision of physical cover to instream organisms and is suggested as a potential management strategy to mitigate climate-change induced instream water temperature increases (Johnson & Wilby, 2015) and to improve water quality conditions in small and moderate-size watercourses that are exposed to excessive algal growth during summer periods (Ghermandi *et al*., 2009). In the experience of this author, depending on instream depth and height of a bridge over average water levels, a localised reduction in coverage of in-channel and riparian vegetation does occur beneath major bridges, however such a reduction is comparable (certainly in lowland channels where the principal instream algal components are macrophytes) to the reduction of instream algal coverage observed in unmodified reaches where native riparian vegetation naturally shades the channel. More upland or fast-flowing watercourses with a bryophyte dominated instream community tend to be less impacted by shade in terms of algal coverage, with perhaps a slight change in the species composition, with liverworts and aquatic moss species such as *Fissidens* sometimes becoming more dominant in reaches of reduced light incidence, whether natural or artificial. The impact of reduced light is therefore variable and depends on channel size, geographic location and morphology. The

ecological consequence (effect) of bridge shade as such, is entirely site specific. For example, as for naturally shaded reaches, it is not uncommon to observe larger fish holding over in deeper waters, or salmonid fry and parr shoaling in bridge shaded reaches, i.e., cooler waters and beneficial microclimates with overhead cover from predation. It is also very common in enriched watercourses (widespread across the Proposed Development area) that bridge shaded reaches, similar to naturally shaded reaches, have little or no filamentous green algal (FGA) cover compared to unshaded reaches, an impact that has the effect of reducing dissolved oxygen fluctuations and eventual Biological Oxygen Demand (BOD) release when FGA biologically decays in the autumn / winter. The site-specific significance of bridge shade effects at major crossings are set out under the relevant assessments for Sections 1, 2 and 3, below.

9B.5.4.2 Section 1

Section 1 Operational Phase Effects - Road Runoff

The modelled traffic volumes (AADT) for Section 1 mainline under a High Growth Scenario is up to 14,600 (3.8% HGV) by 2047 (Table 9B-26). This is a worst-case scenario, noting the modelled Central Growth Scenario predicts AADT up to 13,200 (~3.8% HGV) by 2047 (refer to Chapter 6: Traffic and Transport). These are relatively low AADT scenarios compared to other major Irish highways. There is a predicted 77% reduction in traffic volumes over the existing River Finn Bridge in Ballybofey. This gives rise to potential for slightly positive, long-term impact on water quality and aquatic ecology compared to the current scenario owing to removal of stop-start traffic through Ballybofey/Stranorlar, which is currently on a highly congested road with absence of modern drainage treatment and attenuation features. Given the sensitivity of the River Finn and Cloghroe/Deele systems and proximity to the SAC, environmental control measures have been incorporated into the design of the road drainage system to attenuate runoff and provide for treatment of suspended solids, trace metals and hydrocarbons along the carriageway drainage pathway.

HEWRAT assessments were conducted (see Chapter 11: Water) as per TII Standard DN-DNG-03065 across all discharge points to watercourses from Section 1 of the Proposed Development. Results show that owing to the designed level of attenuation: (i) all outfalls pass the risk assessment in terms of soluble (acute) copper and zinc impacts in road run-off discharge; (ii) all outfalls pass the risk assessment relating to Environmental Quality Standards (EQS) (mean annual concentration) for copper and zinc, (iv) all outfalls pass the assessment for non-accumulation of sediment related to chronic impact because low flow discharge velocity at outfalls is exceeded; (v) spillage risk assessment results show that the annual probability of a serious pollution incidents are below the acceptable risk limit of 0.5%, and (vi) all applicable outfalls pass the cumulative assessment for soluble copper and zinc (acute and EQS) and sediment (chronic) pollutants, i.e., where there is more than one discharge on the same reach of a watercourse. In relation to road run-off, effects on aquatic receptors in Section 1, including QI species salmon of River Finn SAC will be intermittent, imperceptible and **not significant** in the operation phase.

Table 9B-26: S1 Bridge Crossing Data under High Growth Scenario Including A5 Link

Section 1	Existing River Finn Bridge		Proposed River Finn Bridge		Proposed Backlees Bridge		Proposed Cloghroe Bridge		Existing Mullaghagarry Culvert	
	AADT	**%HGV**	**AADT**	**%HGV**	**AADT**	**%HGV**	**AADT**	**%HGV**	**AADT**	**%HGV**
Do-Minimum (2047)	16,300	3.50%					10,500	3.30%	8,100	3.30%
Proposed Development (2047)	3,700	4.10%	14,600	3.80%	14,600	3.80%	13,200	3.50%	9,200	2.70%

It is assessed that the combination of: (1) relatively low AADT, (2) attenuation of runoff via ponds/wetlands, and (3) consequent treatment of road surface drainage, would lead to an imperceptible impact on receiving water quality linked to road run-off, with effects on aquatic ecological receptors including aquatic QI species/habitat of River Finn SAC being **not significant** in the operational phase.

Section 1 River Finn SAC Bridge Shade Effect

The proposed bridge is seven spans in total with an 85 m clear span over the River Finn upstream of Ballybofey (Section 1). There is no instream footprint, with the piers at nearest c. 8m back from the southern bank and c. 15 m back from the wetted channel on the northern bank. The river is 30 m wide forming a glide-run habitat over bouldery substrates. The channel is generally wooded on both banks and has a moderate degree of shade owing to the steep / vertical (historically drained) banks on the south side of the crossing reach. The proposed bridge deck width is 26.5 m with a clearance of c.18m above summer river levels. The orientation of the bridge is NE-SW, meaning there will be light incidence from the SE position of the sun, likely penetrating beneath the bridge deck more so outside of summer months when the sun is lower, noting the 18 m bridge deck clearance above the river. The NW side of the bridge will become more shaded compared to baseline. . The instream plant community is bryophyte dominated (mainly *Fontinalis antipyretica, F. squamosa*) and the liverwort *Chiloscyphus* sp. Aquatic mosses tend to tolerate low light and are the dominant feature of instream vegetation in this location owing to existing shading from riparian treelines, high water colour (humic substances) and (likely historical) deepening that has formed vertical banks on the southern (RHS) bank. Permanent bridge shading, similar to these existing features, could reduce aquatic moss cover locally. This is likely to be more noticeable in the long-term operation phase on the western side of the bridge where light incidence would become more limited compared to baseline. Whilst this is an impact, it does not necessarily significantly alter the ecological functionality of the reach for fish, i.e., as migration, holding and nursery habitat. The large bouldery substrates in the reach will remain places that act as refugia for salmonid parr, that can still feed on macroinvertebrate drift, and the bridge will create alternative, shaded micro-habitats locally. Older fish may even display a preference for the cover provided by the bridge in the slightly deeper water areas that are present. Bridge shading effect is very localised and **not significant**. It does not affect the conservation objective targets for salmon as a QI species of the River Finn SAC.

Section 1 Operational Phase Effects - Culverts

See Appendix C9B.05 for the site-specific examination of operation phase effects at each Section 1 culvert crossing. Refer to Drainage Layout EIAR Drawings 4.40 in Volume D: Book of Drawings for culvert locations.

The main issue during operational phase is the potential for habitat fragmentation caused by severance of fish passage, i.e., through culverts on fish bearing channels. Culverts on fish bearing channels are box type and will be embedded 500mm below the natural bed level. Each location was examined for length and effective slope (%) (Appendix C9B.05) which are important determining factors in the ability for fish to maintain a burst speed to pass.

S1-CUL.14 (Backlees, u/s W1-08) and S1-CUL.22 (Tircallan, W1-16) exceed 3% effective slope and will certainly require baffles (e.g., notch weir type or angled side bar types) to facilitate fish passage during the operation phase. These culverts are on low productivity trout streams but require special consideration in the detailed design to maintain fisheries connectivity as set out in Appendix C9B.05. A further 5 no. culverts require careful design to ensure an adequate low-flow channel to maintain hydrological connectivity. This can be achieved using, e.g., side baffles that help secure internal cobble/gravel deposits or through use of the concrete mammal ledge to create an internal 2 -stage channel that provides the low flow channel. In the absence of these measures at these two locations, there is potential for permanent **significant negative** effect on fish passage and aquatic habitat connectivity.

The proposed S1-CUL.25 (Mullaghagarry at W1-17) is a large culvert where the height has deliberately been increased in the design, with headwalls raised to shorten the overall length. This will result in the removal of the existing culvert (Plate 9B-9) where flow currently undermines the structure (flows underneath the culvert bed) and forms a complete fish passage barrier. This will result in reconnection of approximately 2-3 km of channel (and fisheries habitat) upstream of this point in the catchment. Trout were observed as far upstream as the existing N13 crossing (1km u/s site W1-16) on the Tircallan watercourse in the headwaters of the Mullaghagarry catchment, but the channel could equally support salmon spawning in the lower reaches if water quality improves in the future. This results in a permanent **significant positive** effect for the Mullaghagarry catchment, with a gain of approximately 2km (c. 4,000m^2) of fluvial channel for potential spawning/nursery upstream of the existing barrier.

Plate 9B-9: Mullaghagarry at W1-17, Existing Impassable Culvert on Local Road

In Section 1, a total of c.478m (linear) of watercourses of Local Importance (higher value) will be subject to permanent habitat change / degradation through introduction of culvert footprints. These are relatively small watercourses (mean 1.5-3m width) with very limited (and historically drained/ suboptimal) patches of trout habitat. Fish passage will be maintained through these structures according to detailed design requirements set out in Appendix C9B.05. The habitat change is negative but will result in only minor loss of localised productivity and is **not significant** at a geographical scale.

In total, approximately 1050m (linear) of watercourses of Local Importance (lower value) will be subject to permanent habitat change through introduction of culvert footprints. These are minor drains (largely ephemeral) with no fisheries sensitivity, and the effect is **not significant**.

9B.5.4.3 Section 2

Section 2 Operational Phase Effects - Road Runoff

The modelled traffic volumes (AADT) along the Section 2 mainline under a High Growth Scenario is between 24,200 and 30,700 (2.2 to 3.6% HGV) by 2047 (Table 9B-27). This is a worst-case scenario, noting the modelled Central Growth Scenario predicts AADT up to 28,700 (~3.2% HGV) by 2047 (refer to Chapter 6: Traffic and Transport). These AADTs are comparable to other major Irish highways (e.g., N7 Kildare, M7 Monasterevin, M4 Maynooth) and are around the 30,000 AADT level at which potential for impact on surface waters has been highlighted by previous studies (Section 9B.5.4.1).

Table 9B-27: S2 Bridge Crossing Data under High Growth Scenario Including A5 Link

Section 2	Existing River Swilly Bridge		Proposed River Swilly Bridge		Existing Corravaddy (Burn)		Existing Isle Burn/Corkey River	
	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV
Do-Minimum (2047)	46,300	2.50%			45,000	3.30%	28,400	3.20%
Proposed Development (2047)	25,200	2.20%	24,200	2.70%	25,300	3.60%	30,700	3.30%

In the main, there is a low risk of significant adverse effects on aquatic receptors resulting from road run-off in the operation phase because receiving watercourses (drains and streams) are generally of minor ecological importance. The exceptions to this are the drainage catchments of Farsetmore which has trout potential), and Corranaghburn (EPA Lurgybrack): a productive trout stream receiving drainage (indirectly) from the Proposed Development in Corranagh and Lurgybrack townlands. Furthermore, all drainage eventually flows to a European site: Lough Swilly SAC. For this reason, hydrocarbon interceptors and lined attenuation ponds have been incorporated into the design of the road drainage system to attenuate suspended solids, trace metals and hydrocarbons along the carriageway drainage pathway. Attenuation ponds are designed as hybrid wetlands to provide a water treatment function.

See Section 9B.6.2 for a review of the efficacy of vegetated constructed wetlands in pollutant removal. Any effects on receiving watercourses, if they did occur, are expected to be confined to a short distance immediately downstream of pond outfalls, taking the form of a localised reduction in the diversity of benthic macroinvertebrates at the few sites that are not drainage ditches.

Regarding the downstream Lough Swilly SAC, the QI habitat in proximity to the crossing is Mud Community Complex of Annex I habitat Estuaries [1130]. The main water quality pressure on estuaries in Ireland are related to nutrient enrichment (eutrophication), which causes excessive growth of macroalgae/phytoplankton and reduced dissolved oxygen concentration. The sources of this pressure are mainly sewage/waste water discharge and agriculture. Road runoff is not a significant source of nutrient. Irish studies show values for total phosphate (TP) in untreated road runoff during stormflows from comparable schemes as follows (from Bruen *et al.*, 2006):

- N7 Kildare Bypass (AADT 25-30,000; HGV 12.5%) – TP range 0.029-3.0mg/l; TP mean = 0.46mg/l
- M7 Monasterevin – (AADT 25-30,000; HGV 12.7%) - TP range 0.07-0.45mg/l; TP mean = 0.18mg/l
- M4 Maynooth (AADT 28,392; HGV 9.6% - TP range 0.1-0.21mg/l; TP mean = 0.14mg/l

These are relatively low TP concentrations, e.g., compared to wastewater discharge Emission Limit Values (ELVs). In addition, treatment of road drainage via attenuation ponds (as proposed in this scheme) has been shown in Irish studies to achieve TP removal efficiency of between 64% and 69% (Bruen *et al.*, 2006). This suggests TP concentrations in discharges from attenuation ponds can be expected to be very low across Section 2, further diluted within the Lough Swilly waterbody where residual concentrations would be imperceptible. Wetland attenuation also has potential to remove up to 94% of total suspended solids (Bruen *et al.*, 2006) which reduces sediment (and associated TP) load and risk of sedimentation locally or further downstream during the operation phase.

The provision of a new crossing of the River Swilly in Section 2 will result in a 46% reduction in traffic over the existing, highly congested Swilly crossing (N56 'Port Bridge' near Polestar Roundabout). Traffic will instead utilise the new Swilly crossing with its proposed modern, sustainable drainage system. There is potential, therefore, for slightly **positive long-term** impact on water quality and aquatic ecology (compared to the current scenario). It would be expected that the proposed level of attenuation in ponds/wetlands and consequent treatment of road surface drainage would lead to at worst an imperceptible impact and at best a slightly positive impact on receiving water quality compared to baseline.

HEWRAT assessments were conducted (see Chapter 11: Water) as per TII Standard DN-DNG-03065 across all discharge points to watercourses from the Section 2 Proposed Development. Results show that owing to the designed level of attenuation: (i) all outfalls pass the risk assessment in terms of soluble (acute) copper and zinc impacts in road run-off discharge; (ii) all outfalls pass the risk assessment relating to Environmental Quality Standards (EQS) (mean annual concentration) for copper and zinc, (iv) all sites pass the assessment for sediment (chronic) impacts because the non-silting low-flow discharge velocity is adequate; (v) spillage risk assessment results show that the annual probability of a serious pollution incidents are well below the acceptable risk limit of 0.5%, and (vi) all applicable outfalls pass the cumulative assessment for soluble copper and zinc (acute and EQS) and sediment (chronic) pollutants, i.e., where there is more than one discharge on the same reach of a watercourse. In relation to road run-off, the effects on aquatic receptors in Section 2, including QI habitat of Lough Swilly SAC will be intermittent, imperceptible and **not significant** in the operation phase.

Bridge Shading Effects - Lough Swilly SAC Bridge

The three-span bridge at the River Swilly crossing (W2-18) includes a 108 m clear span over the River Swilly. There is no temporary or permanent instream footprint. The Western Pier (Ballyraine side) is located approximately 5 m from the Lough Swilly SAC boundary and a total of 15 m from the Swilly wetted channel on gently sloping, rough grassland. The Eastern Pier (Milk Isle side) is set behind the combined raised flood embankment and backing toe-drain at a distance of >50m from the tidal River Swilly wetted channel and a distance of circa 3 m set back from the SAC boundary. The bridge deck width is 28.25 m with clearance of circa 8-10 m above the benthic low tide channel (i.e., gradually sloping mudflat on each side). The orientation of the bridge is WNW-ESE, meaning there will be light incidence from mainly the S and SW position of the sun, with shading variable depending on season, i.e., daylight hours and position of the sun. The instream habitat is comprised of intertidal mud with the only macrophytes present being fucoid seaweed on the shoreline. The surface of the intertidal mud had a diatom biofilm (microphytobenthos) with a low abundance infauna of primarily Oligochaetes and the polychaete *Hediste diversicolor*. The general absence of macrophytes indicates that depth (and likely estuarine related turbidity) plays a role in algal productivity in any case and that the diatom biofilm on the mudflats is subject to regular changes in light incidence with tides. The focus in this assessment is on the diatom biofilm because that is the principal primary production element of the mudflat habitat at the River Swilly crossing location.

Shading has been reported to affect properties of estuarine microphytobenthos, but there are inconsistent findings throughout the literature, and it is very clear that light incidence is just one of many variables governing microphytobenthos properties. Tolhurst *et al*. (2020) manipulated light exposure on exposed intertidal flats next to the seaward edge of a mangrove forest in Sydney Harbour, Australia. Lightly shaded plots showed increased microphytobenthos biomass, while heavy shade decreased biomass, although they found there were different amounts and directions of response in absorption at different light wavelengths under different shading treatments, suggesting physiological shifts in pigment composition and/or behavioural responses such as migration by motile diatom species and/or a change in overall species composition. They noted that changes to temperature and (sediment) moisture may have also contributed to the results because shading can decrease surface temperature and evaporation rates during exposure at low tide. There were reductions in abundance of some infauna under heavy shade, mainly oligochaetes, but the differences were not significant compared to unshaded or lightly shaded experimental plots. Closer in context to Irish conditions, Defew *et al.* (2004) conducted a laboratory experiment using a natural microphytobenthic assemblage from the Eden Estuary, Scotland, to study effects of temperature and light incidence on response and species composition of an estuarine biofilm. At 10 °C, diatoms dominated the assemblage and individuals adapted to changes in the light regime by physiological acclimation (changes to pigments and light usage) with no change in biomass. At 18 °C, diatoms still dominated with no notable change in biomass, but a significant change in the species composition occurred, with species richness, evenness and diversity significantly higher in shaded assemblages. Cyanobacterial biomass increased with

increasing temperature and at 26 ºC was higher in shaded plots, and in all light conditions at high temperature eventually crashed (presumed self-induced nutrient limitation). There are clearly limitations to applying these findings to the site-specific situation on the River Swilly, but there is agreement in the literature that estuarine diatom biofilms show considerable adaptation to the particular light, temperature, nutrient and substrate conditions of a site. Numerous factors, not least periodic tidal shading effects have a role to play, seasonally influenced in terms of temperature induced response.

On balance, as supported by the literature, it is expected that intermittent shading effects between pre-existing tidal inundation and future daily/seasonally shifting bridge shade footprint at the kinds of temperatures that can be expected in the cool Atlantic climate of northern County Donegal ([20]annual daily mean range 3.4 – 19.4 ºC) will be imperceptible in terms of overall primary productivity either local to the bridge and certainly within the wider SAC. The localised microphytobenthos beneath the more often shaded areas may show some slight decrease in biomass, with the diatom assemblage either remaining similar and adapting physiological or behaviourally (at lower temperatures, i.e., autumn through spring) or changing in assemblage but not biomass at the kind of temperatures that can be expected in summer. Note also that higher summer temperatures will be ameliorated by increased shade on the exposed low tide mudflat. None of this will fundamentally alter the level of primary productivity that forms the basis of the localised trophic web, i.e., which supports low abundances of infauna and has an anoxic layer just beneath the sediment surface. The predicted bridge shading effect will therefore be highly localised, **permanent**, **not significant**. It does not affect the conservation objective targets for habitat 1130 Estuaries as a QI species of the Lough Swilly SAC.

Section 2 Operational Phase Effects - Culverts

See Appendix C9B.05 for site-specific examination of operational phase effects at each Section 2 culvert crossing. Refer to Drainage Layout EIAR Drawings 4.41 in Volume D: Book of Drawings for culvert locations.

Farsetmore is the only watercourse with some (low level) fisheries potential where negative effects could arise in the absence of mitigation to ensure fish passage through proposed culverts: S2-CUL.30, S2-CUL.31 and S2-CUL.32. This results in a degradation/loss of 184m (approximately 275m^2) of aquatic habitat of Local Importance (higher value) within the culvert footprints of Section 2, but with good culvert design as prescribed in Appendix C9B.05, fragmentation effects will be **not significant**.

All other culverted watercourses in Section 2 have low ecological value with little or no fisheries significance meaning habitat degradation/loss and fragmentation effects in the operation phase will be **neutral** or **not significant**. The most sensitive watercourses, River Swilly and Isle Burn will have clear span bridges, with no loss of habitat and no negative impact on fish migration.

[20] OPW Hydrometric Station 39061 (Port Bridge) Swilly Estuary. Note: temperature data only available for complete years 2011-2015.

9B.5.4.4 Section 3

Section 3 Operational Phase Effects - Road Runoff

The modelled traffic volumes (AADT) along the Section 3 mainline under a High Growth Scenario is up to 13,200 by 2047 (Table 9B-28). This is a worst-case scenario, noting the modelled Central Growth Scenario predicts main alignment AADT up to 11,300 by 2047 (refer to Chapter 6: Traffic and Transport).

These are relatively low AADT scenarios compared to other major Irish highways. The proposal in Section 3 will result in approximately 50% reduction in AADT over the existing Lifford and Deele bridges and 96% reduction in AADT at the existing Swilly Burn Bridge. This gives rise to potential for slightly positive, long-term impact on water quality and aquatic ecology in the long-term as traffic volumes are transferred to the new road with its incorporated modern, sustainable drainage treatment and attenuation features along the entire carriageway. HEWRAT assessments were conducted (see Chapter 11: Water) as per TII Standard DN-DNG-03065 across all discharge points to watercourses from the Section 3 Proposed Development. Results show that owing to the designed level of attenuation: (i) all outfalls pass the risk assessment in terms of soluble (acute) copper and zinc impacts in road run-off discharge; (ii) all outfalls pass the risk assessment relating to Environmental Quality Standards (EQS) (mean annual concentration) for copper and zinc, (iv) all sites pass the assessment for sediment (chronic) impacts because the non-silting discharge flow velocity is exceeded; (v) spillage risk assessment results show that the annual probability of a serious pollution incidents are well below the acceptable risk limit of 0.5%, and (vi) all applicable outfalls pass the cumulative assessment for soluble copper and zinc (acute and EQS) and sediment (chronic) pollutants, i.e., where there is more than one discharge on the same reach of a watercourse. In relation to road run-off, the effects on aquatic receptors downstream of Section 3 outfalls to watercourses will be intermittent and **not significant**.

Table 9B-28: S3 Bridge Crossing Data under High Growth Scenario Including A5 Link

Section 3	Existing Lifford Bridge		A5 Link Bridge		Existing Deele Bridge (N14)		Proposed Deele Bridge	
	AADT	%HGV	AADT	%HGV	AADT	%HGV	AADT	%HGV
Do-Minimum (2047)	23,700	2.90%			11,500	2.40%		
Proposed Development (2047)	13,200	1.60%	14,800	3.30%	4,900	1.10%	11,100	2.90%
Section 3	**Existing Swilly Burn Bridge (N14)**		**Proposed Swilly Burn Bridge**					
	AADT	**%HGV**	**AADT**	**%HGV**				
Do-Minimum (2047)	7,000	3.00%						
Proposed Development (2047)	300	3.90%	9,400	3.20%				

The risk of any impact on aquatic habitats is therefore expected to be low with negligible effects downstream of outfalls to watercourses. It would be expected that the combination of: (1) relatively low AADT, (2) attenuation of runoff via ponds/wetlands, and (3) consequent treatment of road surface drainage, would lead to an imperceptible impact on receiving water quality linked to road run-off, with **not significant** effects on aquatic ecological receptors, including aquatic QI species/habitat of River Finn SAC (Co. Donegal) and the contiguous River Foyle and Tributaries SAC (Co. Tyrone) in the operational phase.

Section 3 River Finn SAC Bridge Shade Effects

Existing floodplain ground level is broadly 2.1 to 2.6 mOD on the northern (Co. Donegal) side and 3.6 mOD on the Co. Tyrone side. The river has steep (vertical) banks with summer water level of c.1.5 mOD and the proposed minimum road level is 9.8 mOD. The bridge is therefore set approximately 8.3 m above normal summer river levels. It is 25 m wide with a NW-SE orientation meaning there will be daily light incidence from

mainly the NE and SW position of the sun, with the shadow footprint variable and according to season, i.e., daylight hours and position of the sun.

The river is wide and deep in the crossing reach with plant growth primarily confined to margins, characterised by commonly occurring emergent species dominated by reed canary-grass (*P. arundinacea*). Submerged macrophyte species, which are photo-sensitive and are precluded by water depth and turbidity, were not present. The instream plant community present is therefore not considered highly sensitive to any changes in light incidence as depth / turbidity characteristics are overriding determinants. Localised shade cast by bridge shadow will likely cause a slight reduction in productivity of ephemeral filamentous green algae during summer months (e.g., pollution tolerant *Cladophora,* which was recorded during field surveys) which represents a slightly positive effect locally through reduction in dissolved oxygen and BOD fluctuations. There may be a slight localised reduction in productivity of the fringing reed community along a narrow reach under the bridge, but this is of little ecological consequence given river depth and colour provides localised cover for migrating fish, which may even display a preference for cover provided by the bridge in the slightly deeper water areas that are present. The shading effect will be permanent and **not significant**.

Section 3 Operational Phase Effects - Culverts

See Appendix C9B.05 for site-specific examination of operational phase effects at each Section 3 culvert crossing. Refer to Drainage Layout EIAR Drawings 4.42 in Volume D: Book of Drawings for culvert locations.

The River Finn (W3-21), Swilly Burn (W3-14) and River Deele (W3-17) will be crossed by clear span bridge structures which will retain the existing channel and banks of the watercourse intact. Leslie Hill Stream tributaries W3-02, W3-03 and W3-04 and the Swilly Burn Tributary (W3-13) will have pre-cast concrete bottomless culverts, which will also extend to include riverbank on both sides thus allowing for unimpeded mammal movement.

Other watercourses will be crossed with appropriately sized culverts designed to match existing channel widths whilst accommodating flood flows in line with the OPW requirements. These culverts will have inverts set 500mm below bed level to ensure they are always backwatered and therefore accommodate unimpeded fish movement under all flow conditions. The culverts will also accommodate mammal passage either as a dedicated ledge or as a separate but immediately adjacent 600mm pipe culvert. Aquatic and riparian habitat may change over time due to the reduced light penetration affecting plant growth.

The loss of aquatic habitat within the section of culverts will constitute a slight to moderate negative impact. Habitat loss will be kept to a minimum by localised channel realignments to give right-angled (not skewed) crossings, minimising the length of culvert. It is proposed that channels to be realigned will be designed to replicate a natural meandering watercourse with appropriate instream and riparian habitat enhancement measures. As many of the existing channels have been heavily modified and effectively canalised during drainage operations, this will therefore present an increase in biodiversity value once vegetation is established and will partially offset the loss of habitat.

In Section 3, a total of c.1155m (linear) of watercourses of Local Importance (higher value) will be subject to permanent habitat change through introduction of culvert footprints. These are relatively small watercourses (mean 1.5-3m width) with very limited (and historically drained/ suboptimal) patches of trout habitat. The habitat change is negative but will result in only minor loss of localised productivity and is not significant at a geographical scale. In addition, approximately 384m (linear) of watercourses of Local Importance (lower value) will be subject to permanent habitat change through introduction of culvert footprints. These are minor drains with no fisheries significance, and the effect is **not significant**.

9B.6 Mitigation Measures

The following mitigation measures address potential significant impacts identified through the assessment completed in Section 9B.5. They have been developed with reference to the Project Description set out in Chapter 4, the works programme (set out in Chapter 4: Project Description Section 4.10) and the construction phases (set out in Chapter 4: Project Description Section 4.11 – 4.14). Unless otherwise stated, the mitigation measures detailed below apply to all sections of the Proposed Development.

For ease of reference, site-specific mitigation details at culvert crossings are summarised in Appendix C9B.04 (Construction Phase) and Appendix C9B.05 (Operation Phase). The operational phase design mitigations will inform the detailed design of all culverts. All mitigations will be incorporated into the Environmental Operating Plan (EOP) for the Proposed Development.

9B.6.1 Construction Phase Mitigation

At the time of writing, the following guidance applies to all construction works in and near watercourses:

- Loughs Agency (2016) *Guidelines for Fisheries Protection during Development Works (Foyle and Carlingford areas)*. Environmental Guidelines Series No. 1
- IFI (2016) *Guidelines on protection of fisheries during construction works in and adjacent to waters.*
- NRA (2008) '*Guidelines for the crossing of Watercourses During Construction of National Road Schemes'*.
- Murnane *et al.* (2006) [CIRIA C648] *Control of water pollution from linear construction proposed developments.* Technical guidance.

The final EOP will be prepared with reference to the above guidance and any relevant updated guidance available at the time of its preparation.

The Applicant will ensure the implementation of the mitigation, monitoring and other environmental commitments set out in the EIAR after any approval as may be granted by the Commission for the Proposed Development. The Applicant will employ a suitably qualified and experienced Project Ecologist who will form part of the Employer's Site Representative Team and who will oversee the implementation of the mitigation and monitoring measures. The Project Ecologist will be appointed prior to the commencement of any construction or enabling works.

The Applicant will ensure that the Contractor shall appoint a suitably qualified person(s), to the role of Environmental Clerk of Work(s) (ECoW) for each section. The appointed ECoW must hold a relevant degree (e.g., in Environmental Science, Ecology, or a related discipline) and demonstrate significant relevant experience, typically a minimum of 2-5 years in an ECoW or similar role.

The ECoW will be appointed prior to the commencement of any construction or enabling works. The ECoW will be responsible for and oversee the contractor's environmental management of the construction works. The ECoW will, as necessary, liaise with the relevant environmental stakeholders, e.g. NPWS, IFI, Loughs Agency, and keep the Project Ecologist informed of all liaisons, decisions and agreements.

The Applicant will ensure that the contract(s) for the construction of the Proposed Development allow for the regular checking of mitigation measures, monitoring and other environmental commitments, the cessation of construction works at any locations where these are not operating as planned, and the undertaking of corrective actions. In addition, the contract(s) will include provision for the Project Ecologist to review and accept any corrective actions proposed by the contractor(s) and/or their ECoW prior to their implementation, and monitoring of the efficacy of those corrective actions to ensure the aims and objectives of the environmental protection measures are achieved.

Post-construction, the Applicant (Donegal County Council) will be responsible for ensuring compliance with all environmental conditions associated with consent during construction, monitoring and operational maintenance phase over the lifetime of the Project.

9B.6.1.1 Overarching Mitigation Measures

General Measures

Good site management shall be kept at all times, with site personnel made aware by the ECoW of the importance of the freshwater environment, the location of the SAC boundaries and the requirement to avoid pollution of all types throughout the construction phase.

To avoid unintended incursion by personnel, equipment and materials into adjacent lands, especially where the works occur at the SAC boundary and where no works are to occur within the SAC (i.e., River Finn SAC Section 1 and Lough Swilly SAC Section 2), the temporary construction site works boundary will be fenced off and site access/egress points constructed. Only dedicated site access/egress points will be used by personnel and equipment.

Robust sediment control measures will be employed in all aspects of the road construction. Key principles in mitigating run-off of suspended solids will be: (i) divert clean water away from construction areas; (ii) minimise erosion from exposed soils, and (iii) prevent contaminated runoff from entering water courses (CEDR, 2018a). Loss of sediment and pollutants (hydrocarbons, concrete) from road construction areas will be controlled using measures detailed in Chapter 4: Project Description, Chapter 11: Water and measures set out below.

Instream Works – Timing Restrictions and Permits (All Sections)

Instream works shall only be undertaken during the period 1 May to 30 September as required by both the Loughs Agency and IFI to avoid accidental damage or siltation of salmonid spawning beds.

- Timing restrictions and fish removal during temporary works are required at specified fish bearing watercourse crossings as set out on a site-specific basis in Appendix C9B.04.

- Instream works in fish bearing watercourses of the Foyle catchment (Section 1 and southern Section 3) will be carried out in accordance with Section 47 and Section 70 permits from the Loughs Agency, as set out in Section 9B.3 above. This applies to all culvert installations, preparatory works, temporary crossings and diversions.

- Typical conditions for Section 47 and 70 permits as provided by the Loughs Agency relate to the protection of water quality during instream works and have been included for in the sub-sections below, both as part of the design of the Proposed Development and the suite of mitigation measures required to protect aquatic habitat quality, which apply across the whole project whether the waters are under Loughs Agency or IFI jurisdiction.

- Final detailed design and construction method statements for instream works on fisheries channels will be submitted to the Loughs Agency (Section 1 and southern Section 3) as required during the Section 47 permit application process. This applies to all culvert installations, temporary crossings and diversions. Construction methods shall employ approaches and mitigations set out under subheadings below ('*Water Management Measures – Culverts', 'Dewatering Protocol during Watercourse Interventions*') and all overarching water quality protection measures herein.

- Final detailed design and construction method statements for instream works on fisheries channels within the remit of IFI (Section 2 and northern Section 3) will be submitted to IFI at detailed design stage, well in advance of works commencing. This applies to all culvert installations, temporary crossings and diversions.

- The ECoW will ensure notification is made to IFI and Loughs Agency the weeks prior to actual commencement of construction works on watercourses (or a time frame specified in any condition of an electrofishing permit/licence) so that the appropriate agency can, if they deem fit, schedule a staff member to be on-site to observe e.g., during temporary stream diversions or electrofishing.

- Fish passage conditions on fish bearing streams will be maintained at all times even during temporary diversions (see Appendix C9B.04 for site-specific details on fish bearing streams).

- As per typical Loughs Agency construction phase conditions, instream works activities shall not, including in conjunction with any other activities by any other persons:

  a) Raise the waterway downstream to a suspended solids level in excess of 10 milligrams per litre above the upstream level in the mixing zone;

  b) Cause the waterway downstream to contain visible oil or grease;

  c) Cause the waterway downstream to contain any substance (other than as defined above) which will cause the waterway or water in an underground stratum to be toxic or injurious to fish or other aquatic organisms.

- To comply with the above typical conditions of Loughs Agency for water quality protection during instream works monitoring shall be implemented as set out under *Monitoring of Temporary Instream Works Areas* in Chapter 11 – Water Section 11.12.

- Instream works will be carried out in adherence to IFI Biosecurity Protocol (Caffrey, 2010), regarding 'check, clean, dry' and disinfection stations for cleaning waders, boots and equipment to prevent transference of pathogens between watercourses and waterbodies.

Culvert Installation Measures

During the construction phase the Contractor shall ensure that:

- Culvert installation is in accordance with detailed design that includes site-specific construction phase mitigations set out in Appendix 9B.04 relating to timing restrictions (fish bearing waters) and general water quality protection measures.

- Culverts shall be constructed in accordance with detailed design that includes site-specific operation phase mitigations set out in Appendix 9B.05 relating to culvert specification /mitigation to ensure fish passage (i.e., low flow channels, baffles) as specified for each culvert.

- All instream works will occur in the dry using appropriate water management techniques (see 'Water Management Measures', below).

- Where watercourses are to be permanently or temporarily diverted or culverted, dewatering will be required (excepting where channels are dry during spring/summer). Fish removal is required for the installation of culverts at locations specified in Appendix C9B.04. This shall be undertaken by suitably qualified electrofishing specialists in accordance with electrofishing permits from the Loughs Agency (Sections 1 and 3) and Section 14 Authorisation from IFI (Section 2), as appropriate. Refer 'Dewatering Protocol during Watercourse Interventions', below, for specific measures that will be employed where channels are to be dewatered and destocked of fish.

- Bank protection at the entrance and exit of culverts will be rock armour, placing boulders one third of their size below bed level, built to a height that matches the prevailing (upstream / downstream) bank top level and back filled to allow riparian vegetation regrowth and planting. The Contactor shall adhere to IFI (2016) guidelines (pages 10-11) with regard to bank protection works at crossings.

- Adequate fish resting places (pools or slower water) will be provided for in the detailed design above and/or below culverts, as required.

- As per TII (2008) and IFI (2016) Guidance, culverts will require detailed designs that incorporate internal baffles to aide fish passage dependent on slope/length (see Culvert Design Measures, below) and design mitigations in Appendix C9B.05.

Culvert Design Measures (to Ensure Fish Passage)

Table 9B-29 presents guidance taken from TII (2008) and IFI (2016) on the crossing of watercourses with culverts. The parameters for slope have been used to guide the requirement for baffles on fish bearing streams in Sections 1, 2 and 3. There is discrepancy noted between TII (2008) and IFI (2016) guidance on culvert slope and baffle requirement. Given that IFI (2016) is the more recent document, the mitigation for culverts in this assessment has considered overall length of culvert, pre-existing channel form (e.g., step-pool, riffle-run) and made a judgment on where baffles will be required to facilitate fish passage. The judgement was backed up by the international literature, which broadly agrees that a slope of <1% (even for length >30m) would not present a significant barrier to salmonid movement and generally a slope of 1-2%, depending on length and outlet character generally would not require baffles to facilitate fish passage (BCME, 2001; USFS, 2005; Scottish Government, 2012). At a minimum, all culverts on fish sensitive watercourses will require a low flow channel. Internal baffles are required in prescribed locations, as set out in Appendix C9B.05 (Operational Phase Effects - Culverts).

Table 9B-29: Guideline Summary - Fish Passage at Culverts

	Culvert length (m)	Effective Slope of Culvert Should Not Exceed:
TII (2008) Guidance	<24 m	≤1.0%, unless baffles are added
	>24 m	≤0.5%, unless baffles are added
	Any length	5.0% at any time, even with baffles
	Any length	If steeper slope (>5.0%) is indicated - will require specific design to allow fish to swim upstream without undue effort, e.g., notched baffles, baffles plus low-flow channel
IFI (2016) Guidelines	Any length	3%, unless baffles are added

The following are the overarching measures for culverts, noting that site specific measures (where required) are detailed out in Appendix C9B.05:

- Bridges or box culverts have been specified for all fish bearing channels on the scheme.
- Box culverts will be set at least 500 mm below the existing bed level and mimic the gradient of the pre-existing channel long section. The culvert invert at the upstream and downstream end shall be the full 500mm embedment to ensure there is no defined lip or apron at the entry or exit.
- All pipe culverts on the scheme are >1.2 m diameter and no pipe culverts are used on salmonid watercourses. Pipe culverts have a 300mm embed below natural bed level.
- Preliminary specifications (height, width, slope) for culverts > 60 m in length were given special consideration for fish passage on channels with fisheries significance, i.e., by increasing height to improve light penetration (e.g., S1-CUL.25) and ensuring effective slope is low. These details are set out on a site-specific basis in Appendix 9B.05.
- Additional works to minimise erosion will be undertaken, e.g., rock armour, downstream pools, baffles to protect bank and channel flows. All such works will ensure fish passage is not obstructed.
- During construction original bed material will be stockpiled (where salvageable) and reinstated or, where imported, will consist rounded washed gravels derived from local rock type which will be either seeded upstream of smaller culverts or placed within the larger culvert before they become live.
- Culverts will, at detailed design stage, incorporate a two-stage (low-flow) channel, including any additional site-specific requirements for each culvert as set out in Appendix C9B.05. Rock armour training will be used to mimic the existing bed width at entry and exit to ensure fish passage in low flow. In no instance shall flows be allowed to disperse across the bottom of a flat box culvert.

- There shall be no screening of temporary or permanent culverts to prevent rubbish build up as this can cause obstruction to fish passage.

Stream Diversion and Channel Realignment Measures

Existing natural watercourse flow paths are proposed to be altered to suitably align proposed culvert crossings with the road at numerous locations across the three sections. These diversion works have been designed such that there will be no changes in the existing hydrological or water body scale morphological regimes of the relevant watercourses. Layout plans of the stream diversion works are provided in the General Arrangement EIAR Drawings 4.40 (Section 1), 4.41 (Section 2) and 4.42 (Section 3) in Volume D: Book of Drawings. Mitigation as per IFI (2016) guidelines will be adhered to in the design and construction of permanent and/or temporary stream diversions. The following channel realignment measures are prescribed to ensure reinstatement of good hydromorphology and apply at all permanent stream diversions including those associated with culvert approaches and exits:

- Stream diversions and realignments are primarily associated with culvert installation that involve instream works, hence all measures set out above relating to instream works and culvert construction apply. This includes instream works timing restrictions and provision of final detailed construction method statements for all realignments to be submitted to the Loughs Agency (Section 1 and southern Section 3) and to IFI (Section 2 and northern Section 2) as appropriate.

- Preliminary designs of the two more significant permanent stream diversions are shown in the EIAR drawings for the following locations:

    - Cloghroe River (Site W1-14) at the N13 northern tie-in for Section 3 (Mainline 1.3): EIAR Drawing 4.01 (Section 1 General Arrangement, sheet 7 of 8) and EIAR Drawing 4.16 (Section 1 Cloghroe River Bridge); and

    - Swilly Burn tributary between Ch. 9+200 to Ch10+200 (EPA name Drumbeg, Sites W3-12 / W3-13) in EIAR Drawing 4.03 (Section 3 General Arrangement, sheets 5 and 6 of 10).

- These diversions will be constructed in accordance with the designs provided, and in accordance with permits from the Loughs Agency as discussed in Section 9B.3 above.

- Newly formed channel base widths will be designed to match the width of the original channel.

- Newly formed channel sections shall mimic (or improve) the existing habitats. They will incorporate instream substates and meanders that give rise to flow type variation (riffle, glide and pool sequences) as found in fish bearing waters.

- New channel sections shall be fully constructed in dry conditions (using appropriate Water Management Measures, see below), i.e., offline construction, temporary diversion, dam and pump over, piping/fluming.

- Where in-stream bed material is to be removed from a dewatered section during construction, coarse aggregates (cobbles, gravels) shall be stockpiled for replacement in the reformed or new channel. Additional coarse material shall match the existing gravel size and be of local rock type origin.

- Permanent stream diversions shall be completed as far in advance as possible, i.e., allowing for “bedding in” of substrates and not before a cover of bankside vegetation (low grass at the very least) has established prior to connection of flow.

- The abandoned stretches of old watercourses shall be electro-fished before dewatering by suitably qualified personnel in accordance with permits from the Loughs Agency or Section 14 Authorisation from the IFI, as appropriate.

- Newly constructed river and stream channels shall have banks battered to a finished angle of not greater than 45 degrees on one bank and not greater than 30 degrees on the opposite banks, (to allow for maintenance of a low flow channel, and overflow and a flood flow channel).

- Banks shall be top soiled and seeded to ensure the growth and development of a broad range of local grasses and shrubs thereby facilitating development of stable bank root structures.

- Broadleaves shall be planted along newly created channel to provide a mixture of dapple and shade conditions. Such riparian tree planting shall be in scattered groups (not linear) set back from the watercourse channel to avoid "tunnelled" growth that can reduce instream productivity.

- Allowance has been made for vegetated riparian strips and planting between new road infrastructure and the newly formed channel to create shade and cover for fish. Riparian planting will be of native species and will be in scattered clumps, not linear plantings, to avoid tunnelled vegetation around watercourses.

Water Management Measures – Culvert and Realignment Construction

- The preferred method for culvert installation shall be offline, which allows for flow to continue in the existing watercourse until the new channel and culvert have been constructed and bedded in before going live. The Contractor shall endeavour to construct offline as a first preference.

- In cases where online construction is unavoidable the options for water management on watercourses affected by the Proposed Development (i.e., all are small as larger channels are being bridged) are: dam and pump-over, temporary piping, temporary diversion channel.

- Temporary diversion channels will be the second most preferable option after offline construction.

- Temporary diversion channels for culvert installation shall provide for fish passage, be non-eroding, and be of similar width to the natural stream channel. The temporary channel must be lined with suitable grade of impermeable geotextile membrane, secured up the channel banks to form a complete seal, and lined with washed rounded gravels in the base (low fines). This will minimise erosion and solids export from the temporary channel.

- Temporary diversion channels will be designed to accommodate flows as could be expected to occur in the May-September works period.

- The Dewatering Protocol for Watercourse Interventions, below, shall apply to the abandoned channel of a temporary diversion.

- The Dewatering Protocol for Watercourse Interventions, below, shall apply to those locations where it is necessary to dam (cofferdams, sandbagging, sheet piling) and pump-over, pipe or gravity flume to create a dry working area.

Dewatering Protocol during Watercourse Interventions

Water drawdowns in streams will be necessary: (1) where culverts are installed online requiring temporary drying out using temporary diversion, temporary dam and pumping or piping/fluming, or cofferdam; (2) where watercourses are abandoned following permanent diversion. The following mitigation will apply:

- For online construction, damming shall occur at low flow. Sufficient pump or flume capacity will be on hand before operations commence to ensure that: (a) upstream flows can be adequately transferred, and (b) downstream flows are not stopped or significantly interrupted.

- For temporary diversions, an upstream and downstream earthen bund shall remain in place until the adjacent temporary channel is constructed and lined. A dam shall then be introduced both upstream and downstream with the bunds opened to the diversion at that stage. The dams will be kept in place while the reach is electrofished and drawn down.

- Any cofferdam or sheet pile materials will be cleaned and dried between river catchments and sites within river catchments to prevent spread of invasive species and biological agents.

- Sand-bags will be of good integrity (i.e., composed of high-grade polythene, not webbing or hessian), filled with clean, coarse grade sand with no fines at all, sealed and placed carefully so they don't burst. The dam shall be faced with impermeable geotextile on the upstream side to seal gaps if required.

- On fish bearing waters as prescribed in Appendix 9B.04, electrofishing will be undertaken by a suitably qualified, experienced ecologist and/or fisheries scientist to remove and relocate fish from the area to be dewatered (under appropriate permits from Loughs Agency or IFI). In some cases, it may be necessary to slightly draw down water prior to electrofishing, however that is unlikely given that affected watercourses are generally small in nature (i.e., larger channels are bridged).

- As per typical conditions of electrofishing permits from Loughs Agency and IFI, data on fish removed (e.g., species, abundance, size class) shall be submitted in report and excel format to Loughs Agency (Section 1 and southern Section 3) and IFI (Section 2 and northern Section 3).

- Where channels are permanently being abandoned, once fish are removed, residual water shall be allowed to soak to ground before infilling of the old channel.

- In areas of online construction, once fish are removed, the works area will be pumped dry.

- This water will be pumped into a temporary sediment attenuation pond or tank for settlement. Such ponds or tanks shall be sized to allow for sufficient volume and residence time to settle suspended solids before discharge, preferably to ground.

- An alternative for small volumes will be to pump to a constructed basin formed by hay bales covered with a porous geotextile fabric that will filter the pump-out water.

- Filtered out sediments shall be disposed of well away from the watercourse in a location where they cannot be entrained back to any watercourse or connected land drain.

- With any works involving river damming or cofferdams – there is always a need for additional pumping from the works area to retain dry conditions. Even small leaks through dams can lead to pooling of water, requiring intermittent pump out. This water can become contaminated with sediment or substances that are harmful to aquatic life.

- Water contaminated with spilled or leaked concrete within cofferdams or dewatered channels, including water that leaks and surrounds newly dry concrete, can be very alkaline. Such water will be pumped out and tankered off-site to an appropriate, licenced disposal facility.

- During pump-overs, on-site pumps will be screened according to IFI (2016) and Loughs Agency (2016) guidance to prevent fish being entrained, e.g., using an outer barrier of permeable terram fitted over a prefabricated frame, with a metal pumping strainer / grill fitted to the end of the pipe inside the exclusion barrier.

Soil Deposition Areas

- Any spoil spread on lands or used in contouring will be kept at least 5 m back from the edges of ephemeral land drains or 10 m from larger streams and rivers.

- The sequence of deposition with respect to a nearby drain or watercourse will include that a set-back earthen bund (tamped down mound) will be installed in advance of the main period of deposition, with further deposition occurring sequentially behind. The earthen bund forms a barrier to prevent un-controlled sediment run-off during rain events. A secure silt fence will be installed at the watercourse / drain side at the toe of the bund until the deposition area behind it is rolled, reseeded and revegetated to reduce sources and pathways of solids wash-out to surface waters.

- All deposition areas will be top-soiled, rolled and re-seeded as soon as they have been filled, to stabilise the area and reduce the possibility of solids wash-out to surface waters. A secure silt fence will be installed at the toe of the newly deposited material and left in-situ until the area is rolled, reseeded and revegetated. Coir matting may be used to cover the outer edges/faces of the areas to reduce erosion if there is a low

chance of the area revegetating before the winter months. Such matting (protection) shall be installed in each case between October and March, inclusive.

Silt Fencing Specification

- The bottom edge of the geotextile silt fence material must be installed to a 200 mm embed below ground level.
- Stakes should be placed at the ends, on any bends, and at 2 m intervals along the silt fence. Stakes need to be driven a minimum of 400 mm to provide adequate support.
- The silt fence must have a tensioned wire backing - a minimum of 2 lines of wire run along the stakes. The top wire is used to clip the geotextile onto to hold it up and provide strength against trapped sediment.
- Silt fences will be checked and maintained weekly at minimum, and always before any forecasted heavy rain event, and again following an event.

Sediment Loss Prevention Measures

The following measures for erosion and sediment control shall be adhered to by the Contractor:

- It is intended that all interceptor drains and attenuation ponds will be installed and revegetated in advance of the main earthworks phase, to reduce source areas for solids export. If it is not possible for revegetation of these features to be established in advance (e.g., seasonally constrained), then alternative measures, such as geotextile lining of temporary settlement areas and provision of coir matting on erodible cut slopes will be employed.
- Any temporary attenuation ponds utilised during the construction phase will be correctly designed and sized to allow sufficient volume and residence time for the settlement of suspended solids.
- Temporary attenuation ponds shall outfall to nearby land drains, not watercourses. This provides an additional line of attenuation prior to connectivity to a watercourse.
- Where permanent attenuation ponds are used for solids settlement during the construction phase, these will be cleaned out as required, i.e., when silt build up is observed during the construction phase and again at the end of the construction period.
- Any sediment removal from attenuation ponds during the construction phase shall occur during dry conditions with a dry (favourable) forecast of low rainfall (<5 mm daily rainfall), both during and in the 2–3 days following the maintenance event. The inlet and outlet of the settlement area will be temporarily bunded during such construction phase maintenance cleaning so that contaminated discharge does not occur.
- Topsoil stripping in proximity to any watercourses will be undertaken in dry weather conditions. Long-term stockpiles within 50m of a watercourse or drain will be covered with geotextile or coir matting or sown with an appropriate native grass seed and allowed to revegetate (if during summer months).
- Any temporary stockpiling of earthwork spoil will be placed on flat ground at least 10 m back from the edge of a riverbank or 5 m back from the nearest drainage ditch and covered with geotextile or coir matting if it is not being respread locally within 7 days.
- Stripped areas will be revegetated, particularly cut and fill slopes and disturbed slopes as soon as possible, e.g., by use of hydroseeding (larger areas), replacement of turves (smaller areas) etc. Mulches or other organic stabilisers will be used to minimise erosion until vegetation is established on sensitive soils. Hydroseeding shall not be carried out in close proximity to water, and these areas will be seeded by hand using native seed mix and native ground cover planting.

- Any preferable flow paths towards drains or water courses from construction areas will have features including cut-off drains, check dams, staked-down haybales, sandbags bunds, to slow run-off velocities, reduce erosive energy and prevent sediment entrainment to surface waters.

- The crossing of watercourses at natural fords will not be permitted owing to uncontrolled sediment losses that can be generated and the creation of fords on streams and rivers through the introduction of stone is prohibited. Crossing of watercourses during the construction phase will occur at the newly constructed culvert reaches.

- The workflow on each site in association with the scheme will be designed to minimise damage to the edge of watercourses by heavy construction vehicles, with avoidance of rutting which would increase the risk of gully erosion or solids wash-out during intense rainfall.

- Heavy vehicular movements will be restricted adjacent to watercourse and tidal areas to avoid sediment generation. Haul routes parallel to watercourses will be at nearest 5 m away from the bank top and will have a secure silt fence installed along the edge to prevent wash out, with check-dams on preferential flow paths (as above) to prevent solids wash out to the nearby surface water.

- Run-off from stockpiles will be collected via a shallow toe drain which will discharge to a temporary settlement pond. Sediment build-up will be removed at regular intervals by manual means only and will be re-used in landscaping when dry.

- The contractor will install wheel washes at compound and construction site exits to prevent sediment and dirt being transported on to the road network. These will be contained and treatment shall be employed, including through the use of adequately sized settlement tanks, to remove sediment before discharge to the environment. These areas will be separate to designated concrete chute wash-out areas.

- There will be no discharge of suspended solids in concentrations greater than 25 mg/l, nor discharge of any other deleterious matter to watercourses. To ensure this, the detailed water quality monitoring schedule set out in Chapter 11 – Water Section 11.12, shall be implemented.

Concrete Pollution Prevention

The use and management of concrete, which has a deleterious effect on water chemistry and aquatic habitats and species, in or close to watercourses shall be carefully controlled to avoid spillage. Alternate construction methods have been proposed to ensure avoidance of contamination with concrete, e.g. use of pre-cast units, stream diversions to undertake works in the dry, and permanent formwork. All avoidance measures will reduce the risks associated with concreting works. Where the use of concrete near water cannot be avoided, e.g. for in situ stitching, the following control measures will be employed:

- Best practice to be used in bulk-liquid concrete management addressing pouring and handling, secure shuttering/formwork, adequate curing times.

- Cement dust shall be controlled as it is alkaline and harmful to surrounding ecology. Activities which result in the creation of cement dust must be controlled by light dampening down.

- Any plant operating close to the water will require special consideration of the transport of concrete from the point of discharge from the mixer to final discharge into the delivery pipe (tremie). There will be no slewing of concrete skips or mobile concrete pumps over or near surface waters.

- The main pouring phases of liquid concrete associated with major bridge works (River Finn x 2, Swilly, Isle Burn, Cloghroe, Deele, Swilly Burn) will be carried out under regular checks by the ECoW who will have the authority to seek temporary halt to works to implement additional concrete loss measures if leakages is that could reach surface waters are observed.

- There will be no hosing of concrete, cement, grout (or similar) material spills into surface water drains. Such spills shall be contained immediately, and runoff prevented from entering the watercourse.

- Raw or uncured waste concrete will be disposed of by removal from the site and disposal at a licenced facility.
- On-site bulk liquid concrete batching will not be allowed and will be specifically prohibited in the contract documents.
- Washout from concrete lorries, except for the chute, will not be permitted on site and will only take place at the batching plant (or other appropriate facility designated by the manufacturer).
- Chute washout will be carried out at designated locations only. These locations will be signposted. The concrete plant and all delivery drivers will be informed of their location with the order information and on arrival on site.
- Chute washout locations will be provided within an appropriate designated, contained impermeable area and treatment facilities including adequately sized settlement tanks.
- Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks will be trapped on-site to allow sediment to settle out and reach neutral pH before clarified water is released to a drain system or allowed to percolate into the ground or alternatively disposed of as waste to a licensed facility.

Prevention of Pollution with Other Substances

The following guidelines based on Chilibeck *et al*. (1992) and NRA (2008) will be followed for the protection of all watercourses from pollution with other substances:

- Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development and an emergency response plan shall be in place, in case of accidental spillage.
- The storage of hydrocarbon pollutants (oils, fuel, chemicals, hydraulic fluids) will not occur within 100 m of all watercourses and will be undertaken in accordance with current best practice for oil storage (Enterprise Ireland, BPGCS005) on an impervious base within a bund and appropriately secured.
- All machinery operating in these locations will be steam-cleaned in advance of works and routinely checked to ensure no leakage of oils or lubricants occurs.
- All fuelling of machinery will be undertaken at least 50 m set-back from all watercourses.
- All hazardous materials on site will be stored within the site compounds in lockable, secondary containment designed to retain at least 110% of the storage contents.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of.
- Oil booms and oil soakage pads will be kept on site to deal with any accidental spillage.
- Prior to any instream works, the Contractor will ensure that all construction equipment is mechanically sound to avoid leaks of oil, fuel, hydraulic fluids and grease.
- No hydrocarbon-based waste material of any kind will be directed into any river, stream or drain.

Flood and Heavy Rainfall Preparedness

- Short- and long-range weather forecast will be monitored and works scheduled accordingly to avoid, e.g., fresh excavations and soil deposition activities near watercourses. Refer to Chapter 11 Water, Section 11.12.1.1, for detail on weather forecast monitoring in relation to construction works.

- Follow an emergency response and evacuation procedure for all works areas including removal of potential contaminants and construction plant and equipment.
- Bolster sediment run-off control measures in advance of forecast heavy rain events.
- Backup pumps and generators to be in place where over-pumping is taking place to mitigate against construction period pump failure or unexpected flooding.

Environmental Incidents and Accidents

- An emergency-operating plan shall be established to deal with incidents or accidents during construction that may give rise to pollution within any watercourse. This shall include means of containment in the event of accidental spillage of hydrocarbons or other pollutants (including oil booms, soakage pads, etc.).
- Throughout all stages of the construction phase of the Proposed Development the Contractor shall ensure that good housekeeping is maintained and that all site personnel are made aware of the importance of the freshwater environments and the requirement to avoid pollution of all types.
- Raw or uncured waste concrete will be disposed of by removal from the site.
- Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and properly disposed of.
- There shall be no discharge of un-attenuated water to the adjacent freshwater environment.

Invasive Alien Species Management Strategy

- Transfer of invasive alien plant species (IAPS) between sites within catchments and to other catchments will be prevented as per the Invasive Species Management Strategy set out in Appendix 4.04 of this EIAR. The strategy was prepared for the Proposed Development in line with TII Guidance (GE-ENV-01105, 2020) and the TII Standard (GE-ENV-01104, 2020) in relation to Management of Invasive Alien Plant Species on National Roads.
- Measures set out in the IAPS Management Strategy will be implemented during construction to ensure accidental spread does not occur from machinery or materials moved within or outside the site. Developers will also adopt any modified or updated approaches to invasive alien species control (www.invasives.ie).
- Asian clam (*C. fluminea*) has been recorded at the downstream end of the Swilly Burn near the proposed bridge (Site W3-14). There are no instream works at this or any other major river crossings in the Foyle catchment (rivers Deele, Swilly Burn, Finn) but instream works are required on smaller tributaries of the Foyle catchment main channels. To avoid transference of clams or their waterborne juvenile stages, construction personnel are strictly forbidden to enter the water at the major bridge crossing locations.
- If accidental contact with water occurs in the rivers of Section 3: Swilly Burn, Deele or Finn and/or Section 2: Swilly Estuary or Isle Burn (Lesliehill) - before moving to other areas within the catchment or any outside river, lake or estuary catchment the following biosecurity protocol shall be carried out:
    - **Check** – Remove any visible matter, including any clams you can see, along with plant material or mud. Empty boots, or drain all river water from containers.
    - **Clean** – Washdown all clothing, equipment and any other gear that was in contact with river water using tap-water onto grass (or a dedicated washdown area within the site compound), at least 50 m away from any watercourse and not into a stormwater drain system.
    - For any absorbent surfaces of equipment and/or materials that accidentally come into contact with river water use a suitable disinfection method for the item: (1) Hot water - Soak in hot tapwater (55°C) for at least 5 minutes; (2) Diluted bleach - Soak in household bleach in a 10% (1 in 10) ratio with water for 1 hour; (3) Virkon® Aquatic – use a spray bottle of solution according to manufacturer's instructions to douse the equipment; (4) Freezing – overnight until solid.

- **Dry** – Allow gear to dry to touch, inside and out, then leave it to dry for at least 48 hours (2 days) before using again.

- To avoid potential transfer of aquatic alien species or pathogens, there shall be no abstraction from any natural watercourse as part of construction activities. Any construction related water requirements will be served by tanker sourced from a municipal treatment supply.

- Any personnel that enter water as part of instream works on tributaries of the Swilly Burn will adhere to biosecurity protocols as set out in the Invasive Species Ireland Water Users Code of Practice (a joint development by NPWS and NIEA) which can be found online at: https://invasives.ie/biosecurity/ (Accessed February 2026).

9B.6.1.2 Site Specific Mitigation Measures

In addition to the overarching mitigation measures set out above which apply across the entire Project, the following site-specific mitigation will be implemented at key locations to avoid and/or minimise any adverse impact on the aquatic environment.

Enabling and Additional Ground Investigation Works

All general pollutant loss control measures set out above also apply for the pre-main construction enabling and any additional Ground Investigation (GI) works.

In relation to the proposed crossings of SAC rivers and their floodplain, proposed pre-commencement GI works will be rotary core boreholes and will include archaeological surveys and testing. The location of additional ground investigation and (potential) archaeological testing are described in EIAR Chapter 4: Project Description as follows:

- Section 4.12.9 – River Finn crossing in Section 1 (upstream Ballybofey). Proposed GI works are 8 m (minimum) away from the river channel, which is outside the SAC boundary as there are no temporary bridge construction works required within the SAC.

- Section 4.13.9 – River Swilly crossing in Section 2 (downstream Letterkenny). Proposed GI works are 15 m (minimum) away from the river channel, which is outside the SAC boundary as there are no temporary bridge construction works required within the SAC.

- Section 4.14.9 – River Finn crossing in Section 3 (upstream Lifford/Strabane) which occurs within the SAC boundary. Proposed GI works are 7.9 m (minimum) away from the river channel, i.e., bridge piers are required to cross the SAC floodplain on the County Donegal, ROI (northern side) of the river.

The above ground investigation and archaeological test trenching do not involve discharges to water. The GI works occur within discrete areas that are subject to disturbance by the construction footprint in any case, i.e., bridge pier foundations. The GI works areas will be surrounded in silt fencing prior to works commencing. In Sections 1 and 2, the SAC boundary shall be clearly marked by temporary exclusion fencing so that unintended incursion into the SAC does not occur. In Section 3 (within River Finn SAC) the riverside exclusion zone (7.9 m) shall be marked using temporary fencing to ensure an intact vegetated buffer area is preserved between the GI / archaeological works and the watercourse.

GI works and archaeological surveys and testing at the above locations will only be undertaken where feasible, having considered both ground conditions and ecological considerations and will be set back from these channels as far as practicable beyond the distances set out. In addition, any GI works or testing within 25m of these SAC channels, the investigations and/or testing will employ focused sediment loss prevention measures as required, e.g., silt fencing around any areas of soil stripping associated with these activities. The ECoW shall ensure the SAC boundaries (Sections 1 and 2) and riverbank exclusion zone (Section 3) are clearly marked and shall liaise with the work teams to ensure working area set-backs are adhered to and sediment loss prevention measures are implemented as prescribed.

SAC River Crossing Constructions

- The bridge crossings at SAC rivers: River Finn (Section 1), River Swilly (Section 2) and River Finn (Section 3) shall be constructed in strict adherence to the sequences set out in Chapter 4: Project Description. These methodologies were devised to include measures as part of the bridge construction works to avoid direct and indirect impact on each SAC in terms of containment of temporary works areas and management of pollutant run-off at bridge pier sub-structure construction areas (foundation pilings). This includes: (i) the use of temporary sheet-piled cofferdams installed around the bridge piers with a top height that excludes the 1% AEP (+ 20% CCA) flood level + freeboard; (ii) reno-mattress hardstandings (or similar) filled with clean stone - which avoids placing large areas of clause 804 which can become entrained to the SAC river during potential flooding, (iii) robust silt fencing along the SAC boundary and around temporary works and hardstanding areas to prevent pollutant run-off; (v) fencing to demarcate and thus prevent unwanted incursion into the SAC.

- All overarching pollutant loss control measures set out above also apply at each bridge crossing construction.

- Water quality monitoring during construction at these sites shall be undertaken according to the detailed schedule set out in Chapter 11: Water, Section 11.12.

Cloghroe and Backlees River Bridges (Section 1)

- There is a requirement for permanent channel realignment for construction of the Cloghroe Bridge at the northern N13 tie in, which will be carried out in accordance with permits from the Loughs Agency as discussed in more detail in Section 9B.3 above.The structure will be clear span with abutments set-back a minimum of 5 m from the river channel.

- The permanent realignment of Cloghroe River to facilitate the proposed new clear span bridge will be achieved by constructing the northern abutment first, with the 5 m set back and a 3 m wide ‘no working zone’ behind the riverbank crest. The new channel shall be constructed off-line with the river running in its natural course until the northern abutment is in place. Earthworks ‘plugs’ will remain in place until the new channel has been excavated and reinstated and fully lined with locally sourced, washed rounded gravel and rock material, with morphology that is characteristic of fisheries habitats, as per Loughs Agency 2016 *Guidelines for Fisheries Protection during Works*. When the new channel is ready to be wetted, dams shall be placed at the upstream and downstream ends, and the existing channel shall be destocked of fish under the appropriate permit as described in Section 9B.3, above, before diverting it into the new channel. In stream works can only occur May 1st to September 30th of any year. Fish shall be relocated downstream of the new channel where there is good spawning and nursery habitat available. The abandoned channel shall be infilled, and the construction of the southern abutment will then commence prior to laying of the bridge superstructure.

- The proposed Backlees Bridge is clear span with abutments a minimum set-back of 5 m from the channel. There shall be a no-go zone for construction works within 2.5 m of the channel bank at all times. This allows sufficient distance between the embankment of the proposed farm access track and the channel. To prevent sediment washout to this salmonid stream the entire channel length through the works zone shall be silt-fenced on both sides at the 2.5 m exclusion zone. Temporary sediment attenuation ponds or tanks shall be employed as required to prevent excessive solids wash out. Permanent attenuation pond No. 7 shall be utilised during the construction phase as on the southern bank.

- The construction of these bridges will be implemented in accordance with all overarching mitigation measures for water quality protection set out above with respect to the aquatic environment.

Isle Burn – Active Travel Footbridge (Section 2)

There are no instream works associated with the footbridge construction which occurs on the upstream side of the existing N13 Isle Burn culverts (W2-15). Work on the proposed footbridge will be implemented in accordance with overarching mitigation measures for water quality protection (suspended solids, concrete, hydrocarbons), as set out above.

Farsetmore Stream - Instream Works (Section 2)

Construction works on the Farsetmore stream are extensive with 3 No. new culverts and a realignment upstream of the existing N13 culvert. It is envisaged that the new culverts and realigned channels shall be constructed offline. Where instream works are required, water management techniques shall be employed (temporary diversion, dam and pump over/fluming) to allow works in the dry. Where dewatering of the existing channel is required, it shall be anticipated as a precaution that trout, brook lamprey and eel are present and will require removal by electrofishing by a qualified specialist with Section 14 Authorisation from IFI. Rigorous mitigation measures for water quality protection (mainly suspended solids losses), as set out in Chapter 11 Water and Section 9B.6.1.1, above, will be employed to prevent construction phase water quality degradation effects in this channel. Sensitive reinstatement of open channel sections shall be undertaken to mimic natural step-pool and riffle run habitats, characteristic of fisheries channels.

Tullyrap Watercourse Diversion (Section 3)

The watercourse realignment (EPA name Drumbeg, W3-12) in Section 3 between Ch. 9+200 to Ch10+200 will be constructed offline, i.e., in dry conditions, incorporating all features as described in Stream Diversion and Channel Realignment Measures, above. The new channel will be sinuous with varied flow regimes, comprising morphological characteristics conducive to fisheries habitats (riffle, glides and pools) generated by varying the channel width, using natural materials (locally sourced gravel and stone) and the judicious use of boulders to form restrictions that vary flow-types. The preliminary design follows principles defined in *Channels and Challenges – The enhancement of Salmonid Rivers* (O'Grady, 2006) and in alignment with Loughs Agency (2016) *Guidelines for Fisheries Protection during Development Works*. The channel will be backfilled on completion with locally sourced cobble and gravel with appropriate landscaping and riparian planting along the banks. Sufficient land-take has been included to accommodate the proposed channel and associated planting. The existing channel shall be destocked of fish under the appropriate permit from Loughs Agency (as set out in Section 9B.3, above) before diverting it into the new channel. Fish shall be relocated upstream of the new channel as there is potential habitat availability and they can drop downstream and colonise new habitats.

Coniferous Forestry Felling

Small areas of coniferous forestry will require felling as part of general site clearance works. This applies in Section 1 at the northern N13 tie-in where circa 3.75 ha of forestry clearance will be required. This occurs on a minor tributary in the upper River Deele catchment (Lisnaree, Site W1-12). The tributary is currently modified (channelised) through the conifer forest and is of low ecological value and ephemeral (dries out on occasion). It has no fisheries significance. The following Guidelines and Standards apply and will be complied with during felling operations:

- Forestry & Water Quality Guidelines (DAFM, 2000a)
- Forest Harvesting & the Environment Guidelines (DAFM, 2000b)
- Standards for Felling and Reafforestation (DAFM, 2019)

Specifically, this involves employing the following mitigation measures to protect water quality during felling operations:

Water exclusion zones (from Section 6.1 DAFM (2019)):

- Before operations commence, a 10 m wide exclusion zone will be identified along the edge of all aquatic zones and hotspots, and this will be marked clearly on a site map.

- All operators will be made aware of the exclusion zone and its purpose, through the pre-commencement awareness process and throughout operations. Machine traffic and timber stacking are not permitted within exclusion zones.

- Trees within the reach of the harvester arm will be felled by harvester and stacked outside the exclusion zone.

- Trees outside machine reach will be felled manually by chainsaw operators. Felled trees will be winched out of the exclusion zone where it is appropriate and safe to do so, or removed by extended harvester arm, for subsequent snedding and processing outside the exclusion zone.
- In all cases, trees will be felled away from the water feature.
- Regarding aquatic zones, watercourse banks must not be disturbed. No branches or debris will be allowed to enter the aquatic zone during operations. Any branches that do fall in will immediately and with care be removed.
- The accumulation of brash, logs and debris in on-site drains and any aquatic zones will be prevented.

Silt and sediment control (from Section 7 DAFM (2019)):

- Prior to the commencement of operations, silt traps will be installed within existing forest drains that connect with aquatic zones, either directly or indirect via relevant watercourses.
- Silt traps will be staggered along the length of the drain, and not only at the lower reaches towards its outflow.
- Silt trap designs will include log sections laid lengthways into the drain and/or the use of staked geotextile barriers.
- Silt fences will be installed where necessary, to block pathways for silt escapement where overland flow is possible.
- Once silt traps and silt fences become functional, they will be checked a minimum of twice weekly and maintained / repaired, as necessary, in order to ensure continued effectiveness throughout felling operations.
- Drainage channels which by-pass the vegetated buffer zone and provide direct connection between the felling area and the stream need to be intermittently blocked with staked plastic sheet pile to minimise the risk of silt and nutrient run-off into the receiving waters.
- Extraction and haul routes must be confined to the driest areas of the site and routed in order to minimise the amount of trafficking around the site. Wherever possible, low load bearing harvesters and forwarding machinery will be used. Thick brash mats will be used and maintained and will be removed once felling is complete. At no time will brash be allowed to accumulate in drains, no matter how small. If brash has to be stockpiled it will be in dry areas as far from drainage as possible.

Temporary water crossings (from Section 8 DAFM (2019)):

- Direct crossing over stream beds will not be permitted.
- Crossing of on-site forest drains / ‘relevant watercourses’ and aquatic zones will be avoided.
- The crossing of drains during felling and extraction will be minimised, and machine activity will be restricted to brashed extraction racks and haulage routes.
- Where a drain crossing is needed, a method will be selected that prevents the breakdown and erosion of drain sides.
- For larger drain crossings, i.e., those with standing water or obvious water flow, a heavy-duty plastic culvert will be deployed lengthways into the channel and covered with brash material.
- For smaller drain crossings, i.e., those that have no standing water and are generally dry, log sections will be temporarily laid lengthways into the channel and overlaid with brash.

- When installing and removing the temporary crossings, it will be ensured that no additional work is carried out within the aquatic zone, and that the upstream and downstream stream bed and bankside remain undisturbed.

The appointed ECoW will ensure all felling related water quality protection guidelines and standards are complied with during the pre-commencement and felling operation phases. The ECoW will carry out daily visual checks of all measures employed to avoid or reduce impact of forestry residues, erosion, including inspections of temporary drainage infrastructure (e.g., drain crossings), silt control measures, extraction routes and log storage areas.

9B.6.2 Operational Phase Mitigation

Surface Water Drainage Design

The surface water drainage network, and catchment run-off interceptors, incorporate numerous features that provide 'mitigation by design' in terms of attenuating and treating run-off which avoids and reduces potential impact on receiving watercourses. Such measures have been incorporated into the design in accordance with TII Drainage Standards (TII, 2024), which include for use of Sustainable Drainage Options (TII, 2014) and Vegetated Drainage Systems (TII, 2015b). Details on the proposed drainage measures are set out in Chapter 11: Water. The following have been incorporated within the surface water drainage network for the Proposed Development:

- Filter Drains
- Grassed Swales
- Infiltration Trenches
- Lined Attenuation Ponds
- Class I forecourt interceptor and Class I By-Pass Separator at Service Areas.

Class I by-pass hydrocarbon interceptors will be provided upstream of each proposed outfall to a watercourse or constructed attenuation pond. These are primarily aimed at removing hydrocarbons from run-off, while swales and attenuation ponds reduce the concentrations of other types of pollutants, e.g. heavy metals and sediment, and reduce the rate of run-off discharged to receiving watercourses. The rate at which flow is discharged from the attenuation ponds is limited to the 'greenfield' or pre-development run-off rate from that catchment area.

Where no surface water course or existing drainage network is available, soakaways are designed into the Proposed Development that will discharge run-off to ground. These have been designed in accordance with local hydrogeological conditions and in compliance with Groundwater Regulations[21] so that ground water is protected through the use of appropriate liners, where necessary.

Environmental Incidents and Accidents

The surface water drainage system has been designed to limit the potential for contaminated surface water run-off to reach the surface water during the operational stage. An Accidental Spillage calculation was carried out according to TII Standards which shows there is no significant risk of watercourse pollution in the event of accidental spillage.

Attenuation Ponds - Hybrid Wetlands

Lined attenuation ponds are provided at all major surface water outfalls along the length of the road scheme and are designed in accordance with TII Drainage Standards (TII, 2015a, b; 2024). Ponds are designed as hybrid wetlands, so they provide attenuation and a water treatment function. Ponds will be planted with vegetation suitable for the specific zonation within the pond, i.e., permanently wet, marginal zones and dry

[21] S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 and amendments (S.I. no. 389 of 2011, S.I. no. 149 of 2012, S.I. no. 366 of 2016 and S.I. no. 287 of 2022).

slopes. Additionally, where discharge is to ground via infiltration, infiltration basins/trenches are provided as the means of surface water discharge.

Irish studies have shown constructed wetland systems to be highly effective at removing road runoff pollutants (Healy *et al,* 2008 Bruen *et al.,* 2006; NRA, 2014), through physical (settlement and sedimentation), chemical (cation exchange and adsorption, oxidation and hydrolysis, precipitation) and biological processes including uptake of metals by wetland plants (Healy *et al.,* 2008). Reported removal efficiencies are up to 94% of TSS, 67% of total phosphate, 91% of total zinc, 67% of total cadmium, 60% of total lead and 78% of total copper (TII, 2014). Irish road runoff wetland attenuation studies showed peak flow rate reduction of 96%, with the wetland developing into habitat for many species.

Wetland planting within the ponds will include (amongst other species) Common reed (*Phragmites australis*) and Reedmace (*Typha latifolia*), both of which occur naturally in Co. Donegal (NBDC records). These species are metal tolerant and tend not to accumulate metals to toxic levels, hence suitable to support constructed wetland treatment function (Healy *et al,* 2008). To ensure the continued functioning of the operational phase drainage treatment train, maintenance of hybrid wetlands will involve sediment removal (minimum of every 25 years), regular monitoring of inlet and outlet (for blockage), and repair of required wetland planting (as above) and landscaping where necessary (TII, 2014) to ensure:

- Continuous base flow through the system to maintain plants and micro-organisms.
- Sufficient residence time to allow for sediment particles to settle and the removal of pollutants through adhesion to vegetation.

Hydrocarbon Interceptor Maintenance

- For the lifetime of the Project, the Applicant (or TII) will undertake a documented hydrocarbon interceptor maintenance schedule including regular maintenance and cleaning according to manufacturer guidance. This will ensure the continued functioning of the drainage treatment train.

9B.7 Residual Effects

9B.7.1 Project Wide Residual Effects

With the proposed design, and all mitigation measures and environmental controls implemented as prescribed in the EIAR including Section 9B.6, construction phase effects will be reduced to **temporary to short-term, not significant, negative** in relation to habitat disturbance and water quality degradation.

Owing to the iterative design process which ensures (i) no impediment to the continued movement of fish on all watercourses, and (ii) the incorporation of sustainable drainage features that attenuate and treat road run-off, there will be no likely significant negative direct, indirect or cumulative residual effects on IEF aquatic receptors arising in the operational phase. Potential exists for a **positive** effect on water quality and dependent aquatic ecological receptors in the long-term (compared to the baseline situation) owing to diversion of traffic volumes from roads with inferior or no drainage attenuation / treatment function.

A permanent loss of 240 m^2 of non-annexed habitat (wet grassland on the floodplain) within the River Finn SAC occurs at bridge pier footprints for the Section 3 - N14/N15 to A5 Link Bridge, which is of a scale and nature that has no adverse effect on the integrity of the SAC and the impact is **not significant**.

9B.7.2 Residual Effects on SAC Qualifying Interests / Features

9B.7.2.1 River Finn SAC

Residual effects on the relevant aquatic qualifying interest, Atlantic salmon, of River Finn SAC (ROI) are assessed against Site-Specific Conservation Objectives (NPWS, 2017) in Table 9B-30, as relates to Sections 1 and 3 (Finn/Foyle catchment), combined. The Natura Impact Statement (NIS) accompanying the application provides full details of effects on SAC Qualifying Interests.

Table 9B-30: Residual Effects on Atlantic Salmon (ROI River Finn SAC Conservation Objectives)

Attribute	Target	Residual Effects of Proposed Development
Distribution: extent of anadromy	100% of river channels down to second order accessible from estuary	**Not Significant,** neutral. No change over baseline. The scheme does not introduce any new barriers to salmon migration through Lifford / Strabane or Ballybofey/Stranorlar. This is owing to utilisation of clear span bridges on larger channels and all culverts designed to facilitate fish passage as per mitigations prescribed in Section 9B.6, above, and set out on a site-specific basis in Appendix 9B.05.
Adult spawning fish	CL for each system consistently exceeded	**Not Significant.** No change over baseline. The development will not impact on adult salmon returning numbers which are already below the required CL and have been for many years. With the design and mitigation implemented as prescribed there will be no change or damage to salmon spawning habitat that will support future returning fish stocks. The main salmon habitats are within the Section 1 ZoI: River Finn main channel and Burn Daurnett, and these are clear spanned (Finn) or not intercepted at all (Burn Daurnett). In Section 3, the proposed N14/N15 to A5 Link bridge over the lower River Finn (upstream of Lifford / Strabane) is also a clear span with no impact on fish migration to the upper reaches where spawning occurs. No salmon spawning or nursery habitat present in the tidally influenced, sluggish glide habitat of the lower River Finn in Section 3 or downstream into the similarly tidal, technically estuarine habitat of the River Foyle.
Salmon fry abundance	Maintain or exceed 0+ fry mean catchment-wide abundance at 17 salmon fry /5 minutes sampling	**Not Significant.** No change over baseline. All culverts and bridges have been assessed and will be passable to salmonids. There will be no temporary or permanent barriers introduced to salmon movement. With the design and mitigation implemented as prescribed, there is a low risk that salmon spawning habitat of the River Finn will be affected such that salmon fry abundance would decrease locally, or downstream. Any change would be temporary, not significant and related to construction phase disturbance only. Note that this target is mainly applicable to Section 1 as there is no salmon spawning or nursery habitat localised within the affected reach of the Finn or Finn/Foyle catchment in Section 3. Spawning habitats of the Deele and Swilly Burn catchments are not affected by the proposed Section 3 development as the main channel migration routes will be bridged by clear spans, allowing fish to reach ex-situ spawning beds in the upstream tributaries (mainly of the Deele). Refer to Appendix 9B.06, Figure 9B.06.6 which shows catchment wide composite spawning redd data for the Finn/Foyle catchment, indicating that spawning largely occurs in the upstream tributaries of the Finn and upper Deele and tributaries. Whilst there may be temporary to short term slight reductions in juvenile salmon recorded in areas that are immediately at or downstream of the proposed new River Finn bridge crossing and downstream of the proposed new Cloghroe Bridge (ex-situ spawning habitat of the Deele catchment), this would be related to temporary disturbance locally and fully reversible. The immediate habitat at the proposed River Finn bridge crossing is generally sub-optimal for spawning, being bouldery and swift with a paucity of gravels. Salmon fry (0+ year old) have been recorded in recent Loughs Agency monitoring data 2021-2024 as present in good numbers in the vicinity of the Section 1 River Finn Bridge crossing point, an improvement over earlier years when fry were only present in low numbers or absent (Niven *et al.*, 2011b, 2016; Niven and Mc Cauley, 2017). The recent improvement could be attributed to improved catchment water quality over recent years (from previous 'poor' to current 'high' status), and such increases in fish numbers can be expected to potentially be common to other main stem sites. There would not be any residual mechanism for change to salmon fry catchment-wide abundance arising from the Proposed Development as there are no barriers and no fundamental hydromorphological changes that would alter current distributions. Data from the Burn Daurnett of Section 1 (with fair-excellent fry numbers in Loughs Agency surveys) suggest the larger Finn tributaries are more significant for salmon spawning than the main channel itself. The Burn Daurnett is only indirectly affected by the Section 1 proposal.

Attribute	Target	Residual Effects of Proposed Development
		With all mitigations in place around water quality protection, there will be no significant negative residual effects in Burn Daurnett (ex-situ salmon spawning supporting the conservation objectives). The Proposed Development does not introduce any new barriers to fish migration and will not negatively impact on salmon fry catchment-wide abundance.
Out-migrating smolt abundance	No significant decline	**Not Significant,** neutral**.** No change over baseline. The Proposed Development in Sections 1 and 3 do not impact on downstream migrating smolts meaning there will be no decline in abundance of smolts reaching the sea during construction or operation.
Number and distribution of redds	No decline in number and distribution of spawning redds due to anthropogenic causes	**Not Significant,** neutral**.** No change over baseline. The Proposed Development with the design and mitigation implemented as prescribed in the area of water quality protection in the construction phase, will not impact on abundance of salmon reaching the spawning grounds nor on the quality of gravels in the productive spawning grounds which are extensive and largely in the tributaries well upstream of the Proposed Development (upstream of Ballybofey) or in the Burn Daurnett locally in Section 1. There are no instream works proposed for the River Finn bridge in Section 1 and no reason that fish would not spawn locally throughout the construction phase, where habitat is suitable. Whilst there may be temporary disturbance to localised spawning redd distribution, the number and general distribution of redds will not decline.
Water quality	At least Q4 at all sites sampled by EPA	**Not Significant**. Q-value is currently Q4-5 (high status) upstream of Balleybofey and Q4 downstream (2022 EPA data), which meets the target in the reaches directly and indirectly affected. The Proposed Development with the design and mitigation measures implemented as prescribed will not result in changes to water quality or hydromorphology to the extent that would cause deterioration of the macroinvertebrate Q-value. The long-term EPA records (Tables 9B-8 and 9B-14) indicates that wider catchment pressures are affecting Q-value in the reaches near Ballybofey, noting that the Q-value responds primarily to organic enrichment (nutrient driven eutrophication). The river declines to Q3-4 with downstream distance, but so does the distribution of salmon recruitment habitat owing to historical drainage and unsuitable substrates and habitat. The Proposed Development is not a significant source of soluble nutrient, i.e., low levels of sediment bound phosphorus (with mitigations in place) and these play less of a role in driving eutrophication over the expected short-term construction phase. The operation phase is not a source of nutrient input given the degree of attenuation and treatment provided by sustainable drainage design incorporated. It is also noted there has recently been a sustained improvement in biological water quality on the Finn in Section 1, from previous poor/moderate status (Q3/Q3-4) to current high/good status (Q4-5/Q4). The Proposed Development will have no negative impact or bearing on the apparent, overall catchment level improvement in biological water quality.

9B.7.2.2 River Foyle and Tributaries SAC

Residual effects on the relevant aquatic qualifying features, Atlantic salmon and Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation ('floating river vegetation') of River Foyle and Tributaries SAC (NI) are assessed against Site-Specific Conservation Objectives (NIEA, 2024) in Table 9B-31 as relates to Section 3 (Finn/Foyle catchment). Note that NIEA (2024) states that the internationally important qualifying feature populations of Atlantic Salmon and its *Ranunculus* community, are found in lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane. The River Foyle is only included downstream to provide a linkage to the sea for migrating salmon. The Proposed Development does not have any pathway for impact on the listed NI spawning and nursery sub-catchment tributaries of the Foyle, hence there is no pathway for direct effects on the aquatic qualifying features.

Table 9B-31: Residual Effects on Atlantic Salmon & Floating River Vegetation (NI River Foyle and Tributaries SAC Conservation Objectives)

Feature	Objective/ Target	Residual Effects of Proposed Development
Atlantic salmon	Maintain and if possible, expand existing population numbers and distribution (preferably through natural recruitment) and improve age structure of population.	**Not Significant,** neutral. No change over baseline. The internationally important population of salmon of this SAC is found in lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane. The Proposed Development has no impact on these tributaries within Northern Ireland. On the River Finn, a clear span bridge (N14/N15 to A5 link) is proposed upstream of Lifford which does not alter salmon migration into spawning waters of the upstream River Finn. Similarly, clear span bridges are proposed for crossings of the lower Deele and Swilly Burn rivers, which does not in any way impinge on fish passage to spawning waters of those sub-catchments which, whilst outside the SAC, support the Conservation Objective of the downstream SAC. There is no salmon spawning or nursery habitat in the reach of the River Finn crossed by the N14/N15 to A5 link bridge within the River Foyle and Tributaries SAC (NI) upstream of Lifford, nor in the downstream ZoI. The reach is a holding / migration area for salmon. The Finn and downstream Foyle are tidal and depositing, comprising predominantly deeper glide; hence lacking in flow characteristics and substrates suited to spawning / nursery. The Proposed Development has no impact on water quality or substrate quality of these tributaries. The Proposed Development, with all mitigations implemented will have no significant effect on water quality or condition of the holding and migration habitat of the Finn/Foyle river that links these tributaries to the sea. The Proposed Development, with all mitigations implemented does not have any negative impact on these Conservation Objectives for salmon.
Atlantic salmon	Maintain and if possible, enhance the extent and quality of suitable Salmon habitat - particularly the chemical and biological quality of the water and the condition of the river channel and substrate	
Water courses of plain to montane levels with the *Ranunculus fluitans* and *Callitricho-Batrachion* vegetation	Maintain and if possible, enhance extent and composition of community. Improve water quality Improve channel substrate quality by reducing siltation. Maintain and if feasible enhance the river morphology	**Not Significant,** neutral. No change over baseline. The internationally important 'floating river vegetation' communities of this SAC are found in lower sections of the River Derg and Mourne Beg River and along the Strule and Mourne Rivers down to Strabane. The Proposed Development has no impact on community extent or composition; water quality, substrate quality or morphology of these tributaries within Northern Ireland. The Proposed Development, with all mitigations implemented will have no significant effect on water quality or condition of the holding and migration habitat of the Finn/ Foyle river that links these tributaries to the sea. The Proposed Development, with all mitigations implemented does not have any negative impact on these Conservation Objectives for salmon.

9B.7.2.3 Lough Swilly SAC

Residual impacts on the relevant aquatic qualifying interest habitat 1130 Estuaries of Lough Swilly SAC are assessed against Site-Specific Conservation Objectives (CO) (NPWS, 2011) in Table 9B-32, as relates to Sections 2 and 3 (Lough Swilly catchment), combined.

Table 9B-32: Residual Impacts on Habitat 1130 Estuaries S2 (ROI Lough Swilly SAC Conservation Objectives)

Attribute	Target	Residual Impact of Proposed Scheme
Habitat Area	The permanent habitat area is stable or increasing, subject to natural processes	**Not Significant**, neutral. No change over baseline. Clear span bridges over the QI habitat at River Swilly (Milk Isle to Ballyraine) and Isle Burn. The Proposed Development does not impinge on nor cause to alter the permanent habitat area in any way.
Community distribution	The Mud Community Complex sediment / faunal community should be maintained in a natural condition	**Not Significant**, neutral. With the design, best practise and mitigations in place as prescribed in the areas of sediment loss controls and water quality protection there will be no significant direct or indirect impacts from the Proposed Development in Section 2, or indirectly from Section 3, nor cumulative impact that will alter the baseline condition in terms of the sediment / faunal community type: Mud community complex.

9B.7.3 Water Framework Directive Implications

A detailed assessment of the implications of the Proposed Development in terms of its residual effects on WFD objectives for directly and indirectly affected surface water bodies is included in Chapter 11: Water, Appendix C11.04. Refer to EIAR Drawings 9B.01 through 9B.03 in Volume D: Book of Drawings which contain maps showing EPA water body names in relation to aquatic survey sites and EPA named watercourses referenced in throughout this Chapter. The WFD compliance evaluation was carried out by the lead author of the current chapter through a process set out in WFD Common Implementation Strategy (CIS) Guidance (EC, 2017). It considers the impact of the Proposed Development on hydromorphological quality elements as defined in the WFD, which in turn underpin the biological quality elements that ultimately define surface water body status.

All surface water bodies relevant to the Proposed Development have been assigned formal status by the EPA (Republic of Ireland water bodies) or NIEA (Northern Ireland water bodies) as part of the most current data reporting period (2019-2024) (Refer to the WFD compliance evaluation in Appendix C11.04). In line with the decision in [22] *Bradán Beo*, EPA/NIEA assigned status (2019-2024) was used as the baseline against which WFD compliance was assessed for this project. The WFD objective for all surface water bodies directly affected by the Proposed Development is good status. One indirectly affected transitional, heavily modified water body (Foyle and Faughan Estuaries HMWB) has the objective of good ecological potential. There are no High-Status Objective (HSO) surface water bodies impacted by the development.

The WFD compliance evaluation concludes that the Proposed Development, by design and with mitigations implemented as prescribed in this Chapter and Chapter 11: Water, will not cause deterioration of status in any surface water body (overall or at individual quality element at water body level) nor will it prevent the achievement of good status. The Proposed Development therefore complies with WFD Article 4(1) objectives.

[22] Irish High Court case *Sweetman v An Bord Pleanála [2021] IEHC 16*

9B.8 Entire Project Effects

To aid the understanding of the hydrological relationship between the three Sections (1, 2 and 3) of the Proposed Development in terms of overall within-project and wider cumulative effects, refer to Figure 9B-5 which shows the major water catchments within which the road Sections occur: 01 Foyle and 39 Lough Swilly. Sections 1 and 3 have hydrological connectivity. Sections 2 and 3 have partial hydrological connectivity. Section 1 and 2 have no hydrological connectivity.

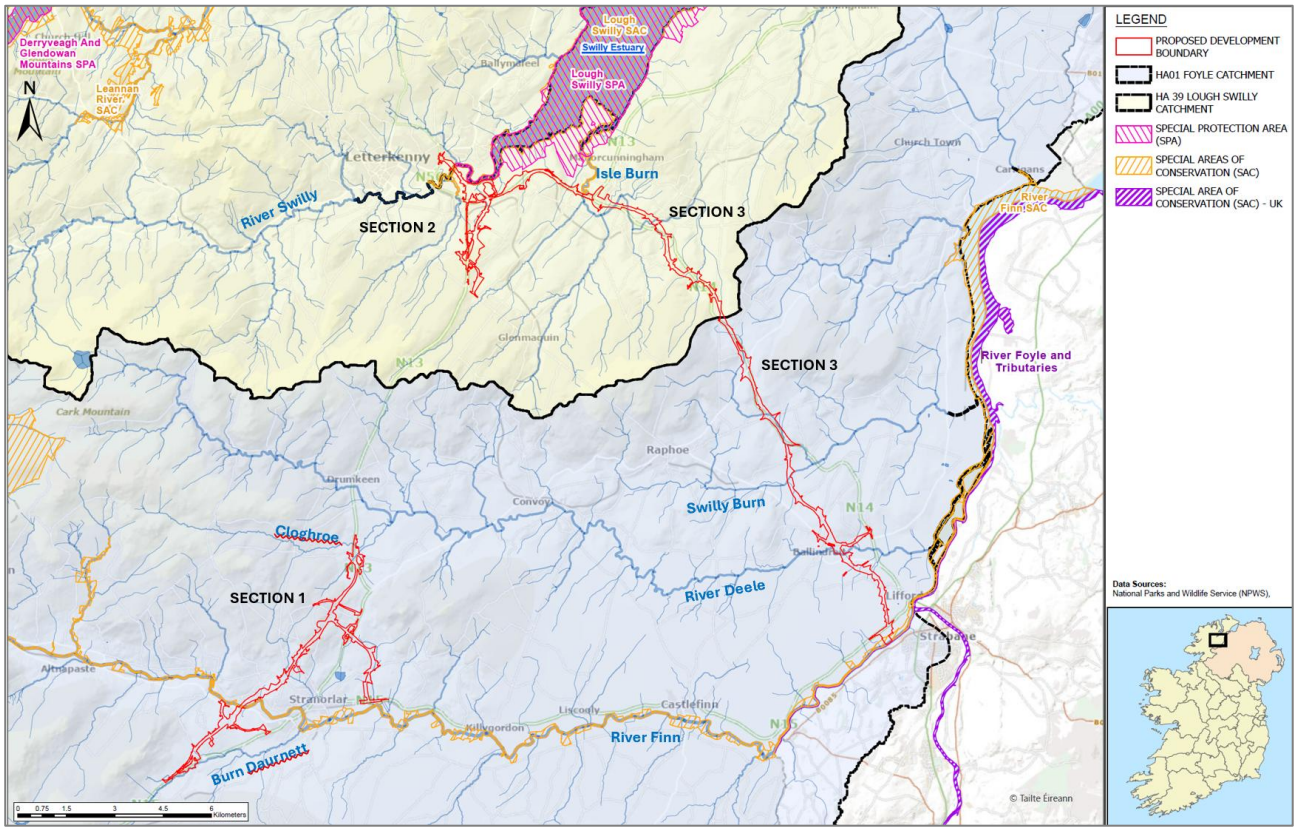

Figure 9B-5: Hydrological Connectivity Across Two Separate Water Catchments

The combined effect of elements within each of the three sections was considered as part of the impact assessment set out in Section 9B.5. For clarity, and preceding the assessment of cumulative effects with other projects, residual effects, is set out in Table 9B-33. With the implementation of mitigations as prescribed for all three road Sections the overall project residual effects will be temporary to short-term, direct and indirect, slight negative, reversible and **not significant**.

Table 9B-33: Overall Effects – Aquatic Ecology

Feature Type	Ecological Features	Significant Residual Effects			Overall Significant Residual Effects
		Section 1	Section 2	Section 3	All Sections
Designated Sites	River Finn SAC	None	None	None	None
	Lough Swilly SAC	N/A	None	None	None
	Lough Swilly SPA	N/A	None	None	None
	Lough Foyle SPA (ROI)	None	None	None	None
	Lough Foyle SPA (UK)	None	None	None	None

Feature Type	Ecological Features	Significant Residual Effects			Overall Significant Residual Effects
		Section 1	Section 2	Section 3	All Sections
	River Foyle and Tributaries SAC (UK)	None	None	None	None
IEF watercourses (Refer to Table 9B-7; Table 9B-11; Table 9B-14)	River Finn	None	N/A	None	None
	Lough Swilly	N/A	None	None	None
	Cloghroe River / Deele River (Deele catchment)	None	N/A	None	None
	Watercourses of Local Importance (higher value) (D)	No significant residual effects. 478m (linear) habitat change (culvert footprints)	No significant residual effects. 184m (linear) habitat change (culvert footprints)	No significant residual effects. 1,155m (linear) habitat change (culvert footprint)	No significant residual effects: 1,817 (linear) habitat change (culvert footprints on small channels)

9B.9 Effects with Other Plans and Projects

A list of other plans and projects to be considered in the cumulative impact assessment (CIA) for the Proposed Development, including the methodology applied for their selection, is set out in Chapter 19: Interactions & Cumulative Effects. The potential cumulative projects listed in Chapter 19 were up to date as of March 2026 and have been examined and assessed in terms of potential cumulative source and impact pathways which could impact on aquatic receptors. A total of 10 no. projects were screened into the Aquatic Biodiversity CIA. Refer to Chapter 19: Interactions and Cumulative Effects, Section 19.9.5, for the detailed examination of projects that were screened in for the Aquatic Biodiversity CIA.

Of the projects screened in but not yet submitted for planning approval, it is reasonable to assume none of these will have permission granted unless that individual project incorporates design, best practice and bespoke measures to mitigate likely significant effects identified for those projects which would include, at a minimum, best practice construction phase water quality protection measures to protect aquatic habitats and species in line with industry guidelines (e.g., CIRIA C648, Murnane *et al.* (2006); Loughs Agency (2016); IFI, (2016). Hence the CIA has been conducted by consideration of post-mitigation residual effects, in-combination with post-mitigation residual effects of the Proposed Development.

Across the Proposed Development (Sections 1, 2 and 3), of the 10 no. projects screened into the Aquatic Biodiversity CIA (Chapter 19), potential direct and indirect short-term negative, significant effects cannot be ruled in relation to two other proposed infrastructure projects that have a footprint in the Foyle (HA01) catchment:

- Proposed Ballybofey / Stranorlar Flood Relief Scheme (FRS) (in early design stage)
- Proposed Barnesmore Gap Greenway (in design and environmental assessment stage)

Refer to Chapter 19 Interactions & Cumulative Effects for the detailed cumulative impact assessment and mitigations prescribed in relation to potential in-combination effects between the Proposed Development with Ballybofey FRS and/or Barnesmore Gap Greenway.

9B.10 Monitoring

9B.10.1 Construction Phase

9B.10.1.1 Water Quality Monitoring

Refer to Chapter 11- Water, Section 11.12 for details of water quality monitoring during the construction phase. The monitoring schedule includes a combination of comprehensive visual inspections and water quality sampling with laboratory analysis at key locations.

9B.10.2 Operational Phase

In addition to maintenance over the life cycle of the attenuation pond / constructed wetlands, i.e., sediment removal every 25 years (at minimum), regular monitoring (for blockages) of inlet and outlet, and repair of planting and landscaping where necessary (TII, 2014) shall be undertaken by the road operator to ensure: (1) regular base flow through the system to maintain plants and micro-organisms; (2) sufficient residence time to allow for sediment particles to settle and the removal of pollutants through adhesion to vegetation.

9B.11 Transboundary Effects

9B.11.1 Background

The River Finn upstream of Lifford / Strabane in Section 3 of the Proposed Development forms the international border between the Republic of Ireland (ROI) (County Donegal) and Northern Ireland (NI) (County Tyrone). The river at this location is under conservation designation in both jurisdictions: ROI River Finn SAC and NI River Foyle and Tributaries SAC.

Section 3 of the Proposed Development includes the N14/N15 to A5 Link bridge (south of Lifford) to the border with Northern Ireland on the River Finn (at aquatic survey site W3-21 as shown in Figure 9B-3, Section 9B.5.3.4, above). The N14/N15 to A5 Link will connect to a proposed Trunk Road T3 (A5 Western Transport Corridor to Land Frontier), which in-turn will connect to the proposed A5 Western Transport Corridor (WTC). That proposed Trunk Road T3 (of approximately 79 metres of new road) will be pursued by the Department of Infrastructure (DfI) in Northern Ireland to provide a link between the proposed A5 WTC (NI) and the Donegal PRIPD.

The distance across the River Finn and its floodplain between the proposed N14/N15 junction and the A5 WTC junction is approximately 385 m. The main element of the N14/N15 to A5 Link is the proposed River Finn bridge which is an eight-span structure with a length of approximately 284 m. The eight span structure (refer to above Figure 9B-4) involves construction of:

- One abutment and six bridge piers across the floodplain in County Donegal (ROI).
- One abutment and one bridge pier in County Tyrone (NI).
- Clear span length of c.63 m (span 7) over the River Finn between the bridge piers in ROI and NI.

In June 2025, the High Court in Northern Ireland made a judgement regarding the A5 WTC whereby the permission granted for sections 2 and 3 of the A5 WTC was quashed. That decision has been appealed to the Court of Appeal in Northern Ireland.

The proposed N14/N15 to A5 Link including the proposed bridge over the River Finn (i.e. the link between the N14/N15 Lifford Junction and a proposed Trunk Road T3) will not be constructed until such time as a proposed Trunk Road T3 / Section 1 of the A5 WTC has been constructed or is under construction. As described in Section 4.9.1.2 of Chapter 4 of this EIAR, the section of the Proposed Development from Ballindrait Junction to the N14/N15 Lifford Junction is an essential element of the Project and can operate effectively without the N14/N15 to A5 Link should construction of the N14/N15 to A5 Link be delayed or not proceed. In the scenario without the proposed N14/N15 to A5 Link, traffic will still use the existing N14/ N15 /A38 River Foyle bridge crossing at Lifford/ Strabane for traffic travelling to and from Northern Ireland.

The scenarios with and without the N14/ N15 to A5 Link from the Proposed Development to the A5 WTC are therefore considered in this Chapter with respect to potential transboundary effects on aquatic receptors.

9B.11.2 Transboundary Effects including N/14/N15 to A5 Link

The N14/N15 to A5 Link is part of the Proposed Development. As such, it has been assessed in this Chapter within Section 9B.5.3.4 (construction phase) and Section 9B.5.4.4 (operation phase) and Section 9B.6 (mitigation measures), above. Effects were considered in the context of the River Finn SAC (ROI), its Qualifying Interests and conservation objectives (NPWS, 2017a) and the contiguous River Foyle and Tributaries SAC of Northern Ireland, its qualifying features and conservation objectives (NIEA, 2024). In the scenario where a proposed Trunk Road T3 / Section 1 of the A5 WTC has been constructed or is under construction and the N14/N15 to A5 Link is therefore constructed as part of the Proposed Development, the summary assessment of effects is as follows:

- With implementation of the specified design and mitigation measures (Section 9B.6), the residual impacts of the proposed N14/N15 to A5 Link on aquatic receptors will be localised, **indirect, negative, temporary, not significant**. The Proposed Development will not affect the conservation status of salmon, which is the only aquatic Qualifying Interest / Feature species present in the reasonable Zone of Influence. The waters of the River Finn and Foyle, at and downstream of the proposed N14/N15 to A5 Link bridge are not spawning or sensitive nursery waters, but are holding and migration areas for older, inward/outward migrating (smolt, adult) life stages which are generally more resilient and adapted to estuarine environments that are often naturally slightly turbid, for example. There will be one swale drainage channel discharging to existing ephemeral drains outside the SAC boundary on the Finn floodplain from Section 3 Attenuation Pond No. 16. These drains currently outfall to the River Finn and there is no requirement for an additional drainage outfall directly to the river itself. HEWRAT calculations (see Chapter 11: Water) per TII Standard DN-DNG-03065 show no significant risk of localised sedimentation or heavy metal impact on water quality at the discharge point and the operational phase effects on aquatic receptors will be **not significant**. The proposed N14/N15 to A5 Link development will have no adverse effect on conservation objectives or integrity of the contiguous River Finn SAC (ROI) and River Foyle and Tributaries SAC of Northern Ireland.

9B.11.3 Transboundary Effects without N14/N15 to A5 Link

In the scenario without the N14/N15 to A5 Link:

- There will be no potential for indirect effects on water quality and aquatic receptors related to the bridge construction. There will still be one swale drainage channel discharging to existing ephemeral drains outside the SAC boundary on the Finn floodplain from Section 3 Attenuation Pond No. 16. These drains currently outfall to the River Finn and there is no requirement for an additional drainage outfall directly to the river itself. HEWRAT calculations (see Chapter 11: Water) per TII Standard DN-DNG-03065 show no significant risk of localised sedimentation or heavy metal impact on water quality at the discharge point. There will still be minor temporary works within the SAC boundary, i.e., at the embankments for the active travel path but no permanent footprint in the River Finn SAC (ROI) or River Foyle and Tributaries SAC (NI).

- With all mitigations employed in the areas of sediment and pollutant loss control during the construction phase of southern Section 3 (Finn catchment), the residual impact on aquatic receptors of the River Finn will be **indirect neutral to temporary negative not significant**. The Proposed Development will not affect the conservation status of salmon, which is the only aquatic Qualifying Interest / Feature species present in the reasonable Zone of Influence, i.e., in the older, migrating life stages, and will have no adverse effect on conservation objectives or integrity of the River Finn SAC (ROI) or River Foyle and Tributaries SAC of Northern Ireland.

9B.11.4 Other Transboundary Effects from Proposed Development

Whether the N14/N15 to A5 Link is constructed or not, there will be hydrological connectivity from Section 3 of the Proposed Development to the River Foyle and Tributaries SAC (NI) via the Swilly Burn and Deele rivers. The proposed River Deele bridge (Site W3-17) is 3.5 km upstream of the River Finn SAC boundary and an additional c. 5 km upstream of the River Foyle and Tributaries SAC boundary on the lower River

Foyle. The proposed Swilly Burn bridge (Site W3-14) is 6.8 km upstream of the contiguous River Finn SAC (ROI) and River Foyle and Tributaries SAC (NI) boundary on the lower River Foyle. Salmon are the only aquatic Qualifying Interest present in the reasonable ZoI downstream of the Proposed Development. In this regard, the affected reaches of the lower Swilly Burn, Deele, Finn and Foyle are not spawning or sensitive nursery waters, but are holding and migration areas for older, inward/outward migrating life stages (smolt, adults) which are generally more resilient and adapted to estuarine environments that are subject to natural variability in turbidity for example. Owing to: (1) proposed clear span bridge designs over the Deele and Swilly Burn rivers, (2) mitigations implemented in the areas of sediment and pollutant loss control during construction, and at the separation distances involved along the lower reaches of these sluggish, tidally influenced rivers, transboundary construction phase effects on aquatic receptors will be indirect, short-term imperceptible negative and **not significant.**

Owing to the proposed drainage design (attenuation and consequent treatment), operational phase effects will be indirect, neutral-to-imperceptible and **not significant**. The Proposed Development will not affect the conservation objectives for salmon and there will be no adverse effect on integrity of the contiguous River Finn SAC (ROI) and River Foyle and Tributaries SAC of Northern Ireland.

9B.12 References

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