



BALLINA FLOOD RELIEF SCHEME

Environmental Impact Assessment Report Chapter 20: Interactions and Cumulative Effects

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Contents

20	INTERACTIONS AND CUMULATIVE EFFECTS	1
20.1	Introduction	1
20.2	Interactions	1
20.2.1	Legislation and Guidance	1
20.2.2	Methodology	1
20.2.3	Description of Interactions	4
20.3	Cumulative Effects	10
20.3.1	Legislation and Guidance	10
20.3.2	Methodology	10
20.4	Chapter References	24

Tables

Table 20-1	Interactive Effects Summary Matrix Identifying Interactions between Factors During Construction (C) and Operational and Maintenance (O) Phases	3
Table 20-2:	Screening criteria for cumulative impact assessment.	11
Table 20-3:	Criteria for the Allocation of Data Confidence.	12
Table 20-4:	Potential Cumulative Impacts and Likely Significance on Traffic and Transportation	13
Table 20-5:	Potential Cumulative Impacts and Likely Significance on Population	15
Table 20-6:	Potential Cumulative Impacts and Likely Significance on Human Health	15
Table 20-7	Potential Cumulative Impacts and Likely Significance with other projects on Terrestrial Biodiversity	16
Table 20-8	Potential Cumulative Impacts and Likely Significance with other plans on Terrestrial Biodiversity	17
Table 20-9:	Potential Cumulative Impacts and Likely Significance on Aquatic Biodiversity	18
Table 20-10:	Potential Cumulative Impacts and Likely Significance on Water	19
Table 20-11:	Potential Cumulative Impacts and Likely Significance on Utilities	21
Table 20-12:	Potential Cumulative Impacts and Likely Significance on Waste	21
Table 20-13:	Potential Cumulative Impacts and Likely Significance on Cultural Heritage	22

20 INTERACTIONS AND CUMULATIVE EFFECTS

20.1 Introduction

The preceding chapters of this EIAR identify the potential significant environmental impacts and residual effects that may occur in terms of the disciplines in chapter 6 to chapter 19 as a result of the Proposed Scheme as described in Chapter 5 of this EIAR.

Mitigation measures and best practice measures for the construction phase are detailed in the supporting Construction Environment Management Plan (CEMP). The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect. The potential for these interactions is discussed in **Section 20.2**.

Section 20.3 of this chapter presents a summary of the potential cumulative effects of the Proposed Scheme with other approved/proposed plans and projects, during the construction and operational/ maintenance phases. Cumulative impacts result from changes that may arise from in-combination effects of the Proposed Scheme with other developments in proximity to the Proposed Scheme.

20.2 Interactions

20.2.1 Legislation and Guidance

Interactions are addressed within Article 3 (1) of the EIA Directive as amended by Directive 2014/52/EU which requires that *“the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d). Also, pursuant to section 50(3)(b) of the Roads Act 1993 (as amended) the EIAR (or EIS as then was under the Roads Act) is to contain “50(3)(b) a description of the aspects of the environment likely to be significantly affected by the proposed road development, including in particular—*

- *human beings, fauna and flora,*
- *soil, water, air, climatic factors and the landscape,*
- *material assets, including the architectural and archaeological heritage, and the cultural heritage,*
- *the inter-relationship between the above factors.”*

The interaction of effects within the Proposed Scheme in respect to each of the environmental factors, listed in Article 3(1) of the EIA Directive, have been identified and addressed in detail in the respective chapters in this EIAR. This chapter presents an assessment of the interaction (inter-relationship) of impacts between the various environmental factors.

20.2.2 Methodology

20.2.2.1 Interaction Matrix

A matrix is presented in **Table 20-1** which identifies the potential interactions between the various aspects of the environment already assessed in this EIAR. The matrix highlights the occurrence of potential positive or negative effects during both the construction (C) and operational (O) phases. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix. Therefore, each potential interaction is identified twice. Once a potential interaction between two environmental components has been discussed, the interaction will not be discussed again in the following relevant section.

The presence of ‘√’, indicates that the Proposed Scheme results in an interaction between the two factors. Where there is no potential for an interaction between factors, a hyphen ‘-’ is present in the cell. In **Section**

Chapter 20 Interactions and Cumulative Effects

20.2.3 below, the potential interactions identified between each environmental component are discussed in further detail.

Chapter 20 Interactions and Cumulative Effects

Table 20-1 Interactive Effects Summary Matrix Identifying Interactions between Factors During Construction (C) and Operational and Maintenance (O) Phases

	Phase	Traffic & Transportation	Population	Human Health	Aquatic Biodiversity	Terrestrial Biodiversity	Land, Soil and Hydrogeology	Water	Air Quality	Climate	Noise and Vibration	Material Assets Waste/Utilities	Material Assets: Land and Property	Cultural Heritage	Landscape and Visual
Traffic and Transportation	C		✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	✓
	O		✓	-	-	-	-	✓	-		✓	✓	✓	-	-
Population	C	✓		✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
	O	✓		-	-	-	✓	✓	-	-	-	-	✓	✓	✓
Human Health	C	✓	✓		-	-	✓	✓	✓	✓	✓	✓	-	-	-
	O	-	-		-	-	✓	✓	-	-	-	-	-	-	-
Aquatic Biodiversity	C	-	-	-		✓	✓	✓	-	-	-	-	-	-	-
	O	-	-	-		✓	✓	✓	-	-	-	-	-	-	-
Terrestrial Biodiversity	C	-	-	-	✓		✓	✓	✓	-	✓	-	-	-	-
	O	-	-	-	✓		✓	✓	-	-	-	-	-	-	-
Land, Soil and Hydrogeology	C	-	✓	✓	✓	✓		✓	✓	-	-	✓	✓	✓	-
	O	-	✓	✓	✓	✓		✓	-	-	-	-	-	-	-
Water	C	✓	✓	✓	✓	✓	✓		-	-	-	✓	-	✓	-
	O	✓	✓	✓	✓	✓	✓		-	-	-	✓	-	-	-
Air Quality	C	✓	✓	✓	-	✓	✓	-		✓	-	✓	-	-	-
	O	-	-	-	-	-	-	-		-	-	-	-	-	-
Climate	C	✓	✓	✓	-	-	-	-	✓		-	✓	-	-	-
	O	-	-	-	-	-	-	-	-		-	-	-	-	-
Noise and Vibration	C	✓	✓	✓	-	✓	-	-	-	-		-	-	-	-
	O	✓	-	-	-	-	-	-	-	-		-	-	-	-
Material Assets Waste/Utilities	C	✓	✓	✓	-	-	✓	✓	✓	✓	-		✓	-	✓
	O	✓	-	-	-	-	-	✓	-	-	-		-	-	-
Material Assets: Land and Property	C	✓	✓	-	-	-	✓	-	-	-	-	✓		-	✓
	O	✓	✓	-	-	-	-	-	-	-	-	-		-	✓
Cultural Heritage	C	-	✓	-	-	-	✓	✓	-	-	-	-	-		✓
	O	-	✓	-	-	-	-	-	-	-	-	-	-		-
Landscape and Visual	C	✓	✓	-	-	-	-	-	-	-	-	✓	✓	✓	
	O	-	✓	-	-	-	-	-	-	-	-	-	✓	-	

20.2.3 Description of Interactions

20.2.3.1 Traffic and Transport

20.2.3.1.1 Traffic and Transportation with Population, Land and Property

The Proposed Scheme will give rise to additional traffic movements, specifically heavy goods vehicles on the local road network creating a short-term inconvenience for local road users, residents, commercial properties, and traffic flow. Local short-term diversions and lane closures are also required to facilitate the construction works. A Construction Traffic Management Plan will be in place to minimise all disruption, as described in **Appendix 6-2**. With the implementation of this Plan and all mitigation measures as detailed in Chapter 21 Schedule of Environmental Commitments and the Construction Environment Management Plan (CEMP), impacts from Traffic and Transport on Population will be imperceptible during the construction and operational phases. There is a requirement for temporary and permanent access wayleaves for construction and maintenance machinery in some areas of the Scheme Area for both the construction and operational phases. Access agreements will be in place with all relevant landowners prior to any construction and operation works and as such impacts on Land and Property by traffic and transport are assessed as not significant.

20.2.3.1.2 Traffic and Transportation with Human Health, Air Quality, Climate

The increase in traffic movements will give rise to an increase in dust and exhaust emissions at a local level which can have a negative impact on air quality, and subsequently, human health. The total construction Greenhouse Gas emissions for the Proposed Scheme as a percentage of Ireland's 2022 GHG emissions ceiling is 0.002% and includes CO₂ emissions from additional traffic volumes generated, materials as well as excavations. As such, impacts from traffic and transportation on air quality and climate change is imperceptible during the construction phase.

With the implementation of all mitigation measures as detailed in as detailed in Chapter 21 Schedule of Environmental Commitments and the CEMP, dust and exhaust emissions from the additional traffic will be imperceptible. During the operational phase, excavation works, traffic movements will be considerably reduced. The total operational GHG Emissions as a percentage of 2022 National GHG emissions is assessed as 0.0001%. As such, impacts from Traffic and Transport on Human Health, Air Quality and Climate are not foreseen during the operational phase.

20.2.3.1.3 Traffic and Transportation with Water

Construction activities within the floodplain or channel may temporarily increase flooding on the roads until new defences are implemented. However, the design of the Proposed Scheme and the construction programmed for during lower flow periods will reduce the potential for this to occur. As such, the potential effects of flooding onto the road network during the construction phase will be not significant.

There will be a positive residual effect on traffic and transport during the operational stage as the flood defences will prevent the flooding of roads including Emmett Street, Cathedral Road, Clare Street, Bachelors Walk, Barrett Street, Lower bridge, Downhill Road, Creggs Road and Quay Road.

20.2.3.1.4 Traffic and Transportation with Noise and Vibration

The Proposed Scheme will generate a higher frequency of movement on the local road network during the construction phase to the local area surrounding the work sites. Heavy Good Vehicles will be required to enter and leave the construction sites at the same time, contributing to a higher degree of noise and vibration compared to smaller vehicles. The predicted noise and vibration effects from construction traffic are assessed as not significant within this EIAR. Noise and vibration emissions generated from traffic and transport required for the operation and maintenance phase will be imperceptible.

Chapter 20 Interactions and Cumulative Effects

20.2.3.1.5 Traffic and Transportation with Material Assets – Waste and Utilities

Transportation of waste material to licensed waste facilities will contribute to additional traffic on the local road network: however, the predicted level of waste related traffic is anticipated to be small and is assessed as not significant within this EIAR and the additional traffic generated during the construction phase is assessed as short-term imperceptible to slight for this phase. All waste materials will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility i.e. a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence. The transportation of waste and utilities will be imperceptible during the operation and maintenance phase.

20.2.3.1.6 Traffic and Transportation with Landscape and Visual

The construction phase of the Proposed Scheme will see the short-term introduction of additional traffic including heavy goods vehicles into the town which may give rise to short term visual impacts to other road users, pedestrians and residents within the area. These potential visual effects during the construction phase are considered to be short term negligible to minor and not significant adverse effects. The additional traffic volumes generated during the operational phase for infrequent maintenance works are considered to be imperceptible and as such, a landscape and visual impact from such is not foreseen.

20.2.3.2 Population

20.2.3.2.1 Population with Human Health, Air Quality, Climate

The Proposed Scheme has been assessed as having a low to imperceptible impact of dust-related human health effects as a result of the construction phase activities. Best practice mitigation measures including dust suppression methods are proposed for the construction phase of the Proposed Scheme. The mitigation measures in place during construction of phase will ensure that the impact of the Proposed Scheme complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the effect of the Proposed Scheme on air quality, and consequently, population and human health will be not significant. Interactions between population and human health and air quality during the operational phase are not foreseen.

20.2.3.2.2 Population with Human Health, Land Soil, Geology and Hydrogeology, Water

There are no public water supply schemes within the Scheme Area that rely on groundwater. There are no source protection areas associated with groundwater abstraction schemes. Mitigation and best practice measures will be in place to ensure any potential for contamination or accidental spillage from hydrocarbons that may have impacts on human health through surface and groundwater contamination is imperceptible. The potential for impacts from the above during the operational phase is also considered to be imperceptible.

With the implementation of the Proposed Scheme, a reduction in urban flooding, which may cause health impacts through stress and contamination, will occur. The reduction in urban flooding during the operational phase will have a positive impact on water quality.

20.2.3.2.3 Population with Human Health, Noise and Vibration

The construction phase will generate an increase in noise levels in the vicinity of the construction site which may have the potential to cause a nuisance to sensitive receptors in the area and consequently may have human health effects. The contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of '*British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise*' and all mitigation measures as detail in Chapter 15 Noise and Vibration and the CEMP will be implemented; thus, the potential effects during the construction phase are considered not significant. Noise and vibration emissions that would impact population or human health during the operational phase are not foreseen.

Chapter 20 Interactions and Cumulative Effects

20.2.3.2.4 Population with Human Health, Material Assets – Waste and Utilities

Utility diversions may be required to facilitate construction activities. Liaison with utility providers will be undertaken and agreements will be in place prior to any potential diversion works. Alternative connections will be provided before any connections are severed and supply to existing services will be maintained during the construction phase; thus, minimising disruption where possible. Notification will be issued to the affected area prior to any scheduled interruptions. Impacts on local utility users and providers is considered to be short term and not significant.

All excavated materials which cannot be recycled on site will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility, thus minimising the potential impacts on population and consequently, human health through misuse of waste materials, etc. No interruptions to utilities or notable waste generation are foreseen during the operational phase.

20.2.3.2.5 Population with Land and Property

The Proposed Scheme requires temporary and permanent use of land for various functions such as temporary construction compounds, permanent flood defence infrastructure and permanent wayleave access for maintenance. The land types required for these uses vary from public greenspaces, agricultural land and small portions residential gardens. Vegetation clearance in the form of tree and hedgerow removal is required in some locations which may give rise to localised visual impacts. The majority of these requirements will be reinstated to a pre-construction condition or as agreed with the landowner. CPO/contractual agreements with all landowners and Mayo County Council will be in place prior to any construction works commencing.

20.2.3.2.6 Population with Landscape and Visual and Cultural Heritage

The presence of construction sites and heavy goods vehicles within the town and specifically along the River Moy, may impact the perceived setting of cultural assets and leisure spaces within the area and give rise to a short-term visual impact for locals and tourists. Following the implementation of mitigation measures detailed in Chapter 18 Archaeology and Cultural Heritage and Chapter 19 Landscape and Visual, it is anticipated that effects to population and tourism is short term imperceptible for the construction phase. During the operational phase, the Proposed Scheme will improve the open space, leisure and play facilities, particularly along the River Moy.

20.2.3.3 Landscape and Visual Impact

20.2.3.3.1 Landscape with Cultural Heritage

While the landscape and visual impact caused by the removal of vegetation could have an impact on the landscape setting of cultural heritage receptors, no key cultural heritage receptors of high amenity value are considered to have interactive adverse negative impacts on landscape and visual receptors.

Any temporary cultural heritage indirect impacts are considered negative minor or negligible significance of effects. In some instances, these impacts are predicted to result in a positive minor significance of effect during operational stage whereby the character and amenity value is protected from any future flood-related indirect impact, and an improvement to the existing modified environment is ensured to enhance overall Public Realm and amenity value.

20.2.3.3.2 Landscape with Human Health

The landscape and visual effects identified may also be observed by the general population and individual receptors adjacent to the Proposed Scheme. These effects may indirectly interact with human health effects associated with open space, leisure and play and are considered **negligible to minor and not significant adverse** effects.

20.2.3.4 Aquatic Biodiversity

20.2.3.4.1 Aquatic Biodiversity with Terrestrial Biodiversity and Water

The terrestrial riparian zone has an intrinsic role in aquatic ecosystem structure, function and productivity in terms of providing, for example, shade and thermal regulation, cover for fish, food sources, woody debris input, bank stabilisation etc. There are no negative interactions between mitigations proposed in relation to riparian terrestrial habitat protection and those listed in the current chapter. Proposed riparian and/or water dependent habitat protection and compensatory planting measures will help mitigate any potentially negative interactive effects on aquatic habitats and fisheries values in the Zol of the Proposed Scheme. There are no significant residual effects on aquatic biodiversity from terrestrial biodiversity measures during the construction phase. There is potential for slightly positive, long-term impact on water quality through and downstream of Ballina because of reduction in risk and frequency of flood waters overtopping walls and being contaminated within the urban drainage area.

20.2.3.4.2 Aquatic Biodiversity with Water, Land, Soil, Geology and Hydrogeology

There is potential for emissions such as sediment run off and accidental hydrocarbon spillage to surface water and groundwater arising from the construction phase of the Proposed Scheme. There are no negative interactions between mitigations proposed in relation to surface and ground water quality protection and the measures required to protect aquatic biodiversity. On the contrary, proposed water quality protection measures are essential to mitigate any potentially negative interactive effects on aquatic habitats and fisheries values in the Zol of the Proposed Scheme.

20.2.3.5 Terrestrial Biodiversity

20.2.3.5.1 Terrestrial Biodiversity with Water, Land, Soil, Geology and Hydrogeology

Construction works may have the potential to generate suspended solids and/or mobilise contaminants and result in concrete and fuel spillages and due to the close interaction of surface and groundwater any contaminants that have the potential to reach groundwater can impact surface water and thus aquatic biodiversity with the knock-on effect on terrestrial biodiversity taxa that rely on aquatic biodiversity. Appropriate construction phase mitigation measures have been outlined to ensure that the potential impact of groundwater quality will be imperceptible and not significant during both the construction and operational phases.

20.2.3.5.2 Terrestrial Biodiversity with Air Quality, Climate

The generation of dust and vehicle emissions as a result of the Proposed Scheme has the potential to impact upon terrestrial biodiversity. Construction works will take place directly beside and within sections of the designated sites. As discussed in Chapter 14 Climate, the Proposed Scheme will generate 3,576 tonnes CO₂e or 0.002% of Ireland's 2022 Green House Gas (GHG) emissions¹ and just 47 tonnes CO₂e or 0.0001% of the National GHG emissions, therefore residual effects on climate as a result of the Proposed Scheme have no impact on biodiversity. Dust emissions from the Proposed Scheme during the operational phase are not foreseen.

20.2.3.5.3 Terrestrial Biodiversity with Noise & Vibration

The generation of noise and vibration from the Proposed Scheme has the potential to impact upon terrestrial biodiversity e.g. by disturbing roosting, nesting or foraging breeding birds and overwintering waterbirds and by disturbing otter, harbour seal, badger and other protected mammals. With the implementation of mitigation measures as detailed in Chapter 15 Noise and vibration, impacts on terrestrial biodiversity are

¹ Relative to Ireland's national GHG emissions in 2022 were 60.76 Mt CO₂e. Refer to Chapter 14 table 14.6 for details.

Chapter 20 Interactions and Cumulative Effects

considered not significant during the construction phase. Impacts during the operational phase are not foreseen.

20.2.3.6 Land, Soil, Geology and Hydrogeology

20.2.3.6.1 Land, Soil, Geology and Hydrogeology with Water

Any potential impacts on surface water during the construction phase will have associated impacts on groundwater and vice versa as contaminants e.g. due to sediment run off or hydrocarbon spillage are rapidly transported into the groundwater system. With the implementation of best practise measures and Mitigation measures have been recommended to reduce these impacts and ensure the effect is imperceptible. Impacts during the operational phase are also considered to be imperceptible.

20.2.3.6.2 Land, Soil, Geology and Hydrogeology with Air Quality

Construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the construction phase. Interactions between Land, Soil, Geology and Hydrogeology with Air Quality during the operational phase are not foreseen.

20.2.3.6.3 Land, Soil, Geology and Hydrogeology with Material Assets – Waste & Utilities, Land and Property

Prior to any excavation works, agreements will be in place with all relevant landowners for access, land use and wayleave requirements. During the construction phase, it will be required to excavate portions of private and public land to facilitate the implementation of flood defences. The excavated soils and materials will be reused or recycled where possible with the remainder temporarily stored and stockpiled on parcels or public and private, before being tested and transported to a soil recovery facility. It will also be required to remove vegetation in the form of trees and hedgerows. These areas of land take will be reinstated to pre-construction condition, where possible with the agreement of landowners. As such, impacts on land and property from groundworks during the construction phase are assessed as not significant.

The generation of waste material, where it cannot be reused will be stockpiled before being tested and classified and transported to a soil recovery facility. Waste generation will have associated impacts on soil and groundwater quality from erosion and the generation of suspended solids from stockpiled material. With the implementation of mitigation measures detailed in Chapter 16 Material Assets- Waste and Utilities, impacts are considered to be imperceptible. Impacts on waste and utilities from land soil, geology and hydrogeology during the operational phase from maintenance works are not foreseen. The requirement for additional landtake during the operational phase is not foreseen.

20.2.3.6.4 Land, Soil, Geology and Hydrogeology with Cultural Heritage

During construction stage, there is potential to reveal previously unknown archaeological finds and features at a sub-surface state. As part of the iterative design process, the Proposed Scheme has taken account of any predicted impact on the recorded Cultural Heritage dataset, as well as cognisance of unrecorded features and areas of archaeological potential. Mitigation measures to address the potential archaeological sub-soil remains has been set out in line with industry best practice regarding preservation *in situ* / preservation by record and as such, the residual effects on potential sub-surface archaeology are not significant.

20.2.3.7 Water

20.2.3.7.1 Water with Material Assets – Waste & Utilities

With the implementation of best practise measures and all mitigation and monitoring measures as detailed in Chapter 21 Schedule of Environmental Commitments, any potential effects from the construction phase on

Chapter 20 Interactions and Cumulative Effects

utilities such as waste removal or damage to the foul sewage network, which could interact with surface or groundwater is assessed as not significant. Impacts from the same during the operational maintenance works phase are not significant.

20.2.3.7.2 Water with Cultural Heritage

Any potential flooding risk to properties, including Records of Protected Structures or those recorded within the National Inventory of Architectural Heritage during construction stage will be reduced to an imperceptible residual significance of effect by means of a range of mitigation measures and commitments. There are no predicted impacts on the Cultural Heritage resource that will require monitoring as part of any future maintenance regime for the Proposed Scheme; however, on-going monitoring of hydrological processes that affect water velocity will be undertaken to avoid and prevent any potential scouring impact to the protected in-river structures.

20.2.3.8 Air Quality

20.2.3.8.1 Air Quality with Climate, Material Assets- Utilities and Waste

There is potential for climate and air quality interactions due to the emissions from the burning of fossil fuels associated with vehicles and machinery required for waste management. Emissions of dust and CO₂ from construction works traffic and transport, including movements from site to waste facilities are assessed within the EIAR as not significant. Management measures will be put in place during the construction phase to minimise the amount of waste entering landfill. The total operational GHG Emissions for the Proposed Scheme are calculated to be 0.0001% of 2022 National GHG emissions and therefore are not foreseen to have any discernible on climate change.

20.2.3.9 Material Assets - Waste & Utilities

20.2.3.9.1 Material Assets- Waste & Utilities with Landscape and Visual

The generation and storage of waste material during construction activities such as removal and topsoil and subsoil for excavations will have a direct landscape and visual impact on the study area. The generation of waste material, where it cannot be reused will be stockpiled before being tested and classified and transported to a soil recovery facility. Should these stockpiles be visible then this will have landscape and visual effects. Mitigation measures have been recommended in Chapter 16: Material Assets (Waste & Utilities) to reduce these impacts. These effects during the construction phase considered negligible to minor and not significant adverse effects.

20.2.3.10 Summary of Interactions

Interacting factors are expected to be greatest during the construction phase. Construction works have the potential to impact on population and human health in the form of dust and noise emissions, potential run off into surface and ground waters, traffic interruptions, short term visual effects and land take requirements. There is also potential for impacts on terrestrial and aquatic biodiversity. However, as discussed within the respective chapters of this EIAR, there are no significant residual effects with the implementation of all mitigation and monitoring measures as detailed in the CEMP and Chapter 21 Schedule of Environmental Commitments. As such, there are no potential interactions between the various disciplines that may arise which are considered significant.

The Proposed Scheme will provide defence measures against flooding which is direct consequence of climate change. While the construction and operation of the Proposed Scheme itself will not have an impact on climate change, the Proposed Scheme will provide defence measures against flooding which is direct consequence of climate change.

Overall positive impacts on flood risk are to be expected from flood relief schemes as the overall objective of such projects is to protect communities from flooding. The Ballina Flood Relief Scheme will benefit residential and commercial properties, public open spaces, aquatic and terrestrial biodiversity and the integrity of archaeology and Protected Structures.

20.3 Cumulative Effects

20.3.1 Legislation and Guidance

Cumulative effects are defined as per the EPA Guidelines (EPA, 2022) as “*the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.*” The EIA Directive (2014/52/EU) mandates that an account is provided for “*the interaction between any of the foregoing aspects.*”

Annex IV (5)(e) of the EIA Directive as amended by Directive 2014/52/EU requires that the EIAR shall contain “*a description of the likely significant effects of the project on the environment resulting from, inter alia: (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;*”

Furthermore, Annex IV (5) states that the EIAR shall contain: “*the description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project*”.

The following guidelines and publications were considered in undertaking the Cumulative Impact Assessment (CIA):

- “*Guidelines on the Assessment of Indirect and Cumulative Impacts as well as Impact interactions*” (European Commission (EC), 1999).

20.3.2 Methodology

The following sections outlines the process followed to identify and screen in projects that are considered cumulatively alongside the Proposed Scheme. The process has considered information made publicly available for proposed projects, as well as the potential for interactions on a conceptual, spatial and temporal basis.

20.3.2.1 Cumulative Impact Assessment Stage 1

The initial step of the Cumulative Impact Assessment (CIA) Stage 1 is to identify the proposed developments seeking planning permission that may impact the environment cumulatively with the Proposed Scheme. These interactions may arise during the construction or operational phases. Existing projects, where relevant, have been considered as part of the chapter baselines in **Chapters 6 – 19**.

The Zone of Influence (Zoi) for each of the disciplines is used to identify the occurrence of other proposed/approved plans or projects which may result in cumulative impacts with the Proposed Scheme. Projects, plans and relevant activities occurring within 5 km of the centreline of the Proposed Scheme are identified for the purpose of assessing CIA Stage 1.

RPS undertook a desk study to source publicly available information on projects and relevant development plans within the defined Zoi using internet searches, planning databases and other available sources to identify other projects falling within the Zoi. This search was conducted using My Plan map viewer, the EIA Portal map viewer and planning application map viewer. The search was limited to the five-year period from the date of issue of the report and excluded ‘incomplete’, ‘withdrawn’, and ‘refused’ applications, as well as those under ‘retention’ as it is assumed this category included existing developments. A five-year time frame is deemed the most appropriate period for planning searches as permissions granted more than five years ago would generally be constructed, partially constructed, or are under construction when the Proposed Scheme is implemented and are unlikely to result in cumulative impacts.

A search of An Bord Pleanála’s website and the Local Authority website was completed to identify any relevant applications including Strategic Infrastructure Development (SID) and Strategic Housing Development (SHD) applications in the past five years or in proximity to the Proposed Scheme.

Chapter 20 Interactions and Cumulative Effects

Searches for EPA licence applications and licenced facilities (in particular those discharging to the River Moy) were also undertaken. To inform the CIA on land, soils, biodiversity and water, all EPA facilities and applications within the area defined by the water catchment and groundwater body were also searched. If listed as 'Licensed' then the facility was considered as part of the baseline. Where the status of the application (LicensedSta) is listed as 'Applied', these facilities were examined further for hydrological connectivity or other pathway for cumulative impact.

Once the relevant development plans and projects were collated, the list was refined based on the following:

The following types of projects were not considered:

- One-off housing, farm sheds/ buildings, house/ building extensions/ renovations.
- Projects that are defined as having 'planning' status are assumed to have potential for temporal overlap and are considered for cumulative impacts as the construction timeline is 'unknown'.
- Projects where any appealed decision was refused.
- Any EPA licence which expires before 2025 was excluded on the basis of no temporal overlap with the assumed construction programme for the Proposed Scheme.

Approximate distances of the developments from the Proposed Scheme are also provided to better understand any spatial overlap. Confidence in the status of the permissions is also noted, as there may be uncertainty as to whether a development had been constructed, or where construction may have been delayed beyond the timeframes/ durations noted in the planning permission.

The full list of all projects that may have potential for cumulative impacts are provided in **Table 1 of Appendix 20-1**.

20.3.2.2 Cumulative Impact Assessment Stage 2

At Stage 2, the EIA specialists carried out a screening exercise on the list of plans, projects and activities compiled during Stage 1 of the CIA (Appendix 20-1). This is carried out in accordance with a set of defined screening criteria (grounds for screening in or out) in order to identify which plans, projects and activities compiled should be considered in the assessment of cumulative effects. The relevant plans, projects and activities are listed and assessed in Stage 3 (section 20.3.2.3 below). The criteria are explained in **Table 20-2**.

Table 20-2: Screening criteria for cumulative impact assessment.

Criteria	Criteria- explanation	Screening decision (in/out)
Included as part of the topic baseline	As the project has been considered as part of the relevant chapter baseline, it has already been assessed/considered and hence is not considered within the CIA.	Screened out
Part of the baseline but has an ongoing impact	As the project has been considered as part of the relevant chapter baseline, it has already been assessed. However, the project has ongoing impacts (e.g. operational effects) and is therefore considered relevant to the CIA.	Screened in
Potential cumulative impact exists	An effect and pathway have been identified either within the construction or operational and maintenance phase of the project that may cause a combined impact to the Proposed Scheme	Screened in
Low data confidence	The data provided by the project does not provide enough evidence or lacks adequate information for an assessment of cumulative effects to be completed.	Screened out
No conceptual or physical effect receptor pathway	No source, pathway or effect was identified between the Proposed Scheme and the project.	Screened out
No temporal overlap	The project is defined by a different time frame and does not overlap with the time frame of the Proposed Scheme.	Screened out

Chapter 20 Interactions and Cumulative Effects

20.3.2.2.1 Data confidence

In order to categorise data confidence for the purposes of this EIAR, a three-point scale was employed (**Table 20-3**). This scale aims to provide a transparent basis upon which projects, plans and activities may be screened in or out at this step.

For the purposes of screening, projects with high or medium data confidence were automatically screened into the CIA. Projects, plans and activities with low data confidence were screened out of the assessment. This category includes projects, plans and activities that may take place in the future, but have no information on how the plan or project will be executed and therefore cannot be considered within the CIA.

Decisions upon whether to screen a project, plan or activity in or out at this stage were taken on a topic-by-topic basis. This allowed certain projects, plans and activities to be screened in for certain topics where sufficient detail is present, while the same project, plan or activity may be screened out for another topic.

Table 20-3: Criteria for the Allocation of Data Confidence.

Data confidence	Criteria
High	<ul style="list-style-type: none"> Projects, plans and activities with an EIAR or other equivalently detailed planning document, containing sufficient topic-specific detail for an adequately detailed CIA to be undertaken on a quantitative or semi-quantitative manner. Peer reviewed and/or industry standard third party quantitative, semi-quantitative or qualitative data. Detailed project parameters for other projects being proposed by the Developer and third-party project details published in the public domain and confirmed as being accurate by the Developer.
Medium	<ul style="list-style-type: none"> Projects, plans and activities with an EIAR or other equivalently detailed planning document, containing a moderate level of detail that still allows a CIA to be undertaken on a qualitative basis. Third-party data supplied to or obtained by the Developer that has not been subject to peer review and cannot be quality controlled by the Developer. Peer reviewed and grey literature that is considered relevant, but either old, and hence potentially not as representative of the current situation, or of insufficient detail in order to accurately inform assessment in its own right.
Low	<ul style="list-style-type: none"> Projects, plans and activities with a lack of robust information and where details of implementation are scarce or likely to change before any potential consent/approval. Projects, plans and activities that may be developed in future, but for which no specific information is currently available.

20.3.2.2.2 Conceptual overlap

For a cumulative effect to occur, it must be established that there is potential to directly or indirectly affect the receptor(s) in question. In EIA terms, this is described as an impact-receptor-pathway and is hereafter referred to as a conceptual overlap. An example of a conceptual overlap can be seen where increased suspended sediment concentrations arising from a nearby project and from the Proposed Scheme (impact) affect the same population of fish or marine mammals (receptor). Conversely, a conceptual overlap cannot be demonstrated between activities such as the operation of surface water infrastructure and roosting bats. It is in cases such as this second example where projects, plans and activities are screened out at this stage.

Each project, plan and activity on the Stage 1 list has been considered on a topic-by-topic basis to evaluate the potential for conceptual overlaps to exist. Projects, plans and activities that clearly do not have such an overlap are screened out of the assessment. In cases where a conceptual overlap is not clear-cut, the project, plan and activity in question has been screened into the CIA in order to maintain the maximum design scenario approach. These projects are then further considered in the relevant topic chapters.

20.3.2.2.3 Physical overlap

The ability for impacts arising from the Proposed Scheme to overlap with those from other projects, plans and activities has been assessed on a receptor basis for each topic. In most examples an overlap of the physical extents of the impacts arising from projects, plans and activities must be established for a

Chapter 20 Interactions and Cumulative Effects

cumulative impact to arise. For example, a cumulative sedimentation impact or accidental spill impact to be established between the Proposed Scheme and another project, it must be established that the extent of sediment or pollutant release from both projects has the potential to overlap and may affect a receptor at a single physical place (e.g. upstream or downstream projects with sediment or pollutant release to the River Moy). Exceptions to this exist for certain mobile receptors that may move between and be subject to separate physical extents of impact from two or more projects.

20.3.2.2.4 Temporal overlap

In order for a cumulative effect to arise from two or more projects, a temporal overlap of impacts arising from each must be established. Some impacts are active only during certain phases of development, such as piling noise during construction. Such a consideration is particularly important for receptors such as aquatic biodiversity, where the overlap of impacts during construction, such as noise from the piling activities or demolition of an existing wall, may be important. The anticipated construction periods for projects, plans and activities within the Stage 1 list have been obtained from their relevant planning documents (e.g. Scoping Reports, EIARs etc.). The details provided represent the current understanding of programmes of development though it is recognised that these programmes may be subject to change. In order to consider worst case, where information on construction timeframes is unknown or not certain, it has been assumed that construction programmes will overlap.

For the purposes of the Proposed Scheme CIA, all projects, plans and activities that were built and operational at the time of the Proposed Scheme data collection (field surveys etc.) have been screened out of the relevant EIA topic CIA. This is because the effects of these projects have already been captured within the Proposed Scheme site-specific surveys, and hence their effects have already been accounted for within the baseline assessment. The exclusion of built and operational projects that were in place at the time of data collection/survey in this way avoids the double counting that would occur if projects were to be included within both the baseline and the CIA. The exception to this is where projects have an ongoing impact, and this is addressed by the screening criterion 'part of the baseline but has an ongoing impact'.

20.3.2.3 Cumulative Assessment Stage 3

Stage 3 comprises the cumulative impact assessment of the projects and plans screened in during Stage 2. At Stage 3, all topics aimed to undertake a full quantitative assessment; however, where project information was considered insufficient, a mix of qualitative and quantitative, or wholly qualitative assessment was employed. The significance of effect for each cumulative effect is presented independently for the assessment, except where no relevant projects have been screened in. See **Section 20.3.2.3** below.

20.3.2.3.1 Traffic and Transportation

Projects that are screened into the CIA are located within the Zol of the Proposed Scheme or where projects had the scope to potentially alter the traffic volumes and/or flows.

Table 20-4: Potential Cumulative Impacts and Likely Significance on Traffic and Transportation

Project	Planning Reference	Development Type	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Residual Impact
PR5	20683	Residential	There is potential for slight cumulative effects as the care home development has an entry onto Bunree Road which is one of the roads in Ballina town being used as a diversion.	Slight short term	N/A	Slight

Chapter 20 Interactions and Cumulative Effects

Project	Planning Reference	Development Type	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Residual Impact
PR9	22322	Residential	The development of this residential scheme has potential for cumulative effects on traffic and transport in the town due to the potential for extra traffic, but the impacts are considered not significant.	Not Significant	N/A	Not Significant
PR13	22531	Retail area/Forecourt	The redevelopment of this fuel station has potential for cumulative effects on traffic and transport in the town due to the potential for extra traffic, but the impacts are considered not significant.	Not Significant	N/A	Not Significant
PR14	22797	Community Facilities	The redevelopment of the school has potential for cumulative effects on traffic and transport in the town due to the potential for extra traffic, but the impacts are considered not significant.	Not Significant	N/A	Not Significant
PR16	21793	Laying of a 50mm diameter waterpipe/ deck extensions	The development has potential for cumulative effects on traffic and transport in the town due to the potential for extra traffic, but the impacts are considered not significant.	Not Significant	N/A	Not Significant
PR21	21358	Construction of a new steel framed commercial unit with associated on-site car parking	The development has the potential for non-significant cumulative effects on Bunree Road one of the roads used as a diversion through additional vehicle movements during construction and after opening.	Not Significant	N/A	Not Significant
PR21a	316178	Wind Farm	Wind farm, substation and ancillary infrastructure.	Not Significant	N/A	Not Significant

20.3.2.3.2 Population

There is a potential for cumulative impacts to population as a result of changes to traffic, air quality, and noise during the construction phases. These impacts are discussed in the associated chapters of the EIAR.

If the construction periods of the Proposed Scheme and planned developments within the Population study area are to overlap, there is a potential to impact on population and human health through disruptions to tourism, recreation and businesses in Ballina. However, these effects will be temporary.

Once operational, the Proposed Scheme, when considered cumulatively with the above developments, will have a positive impact to the population of Ballina through improved opportunities for business, recreation and tourism in the area. These positive cumulative impacts on population will be more significant if the planned larger residential developments proceed.

Chapter 20 Interactions and Cumulative Effects

Table 20-5: Potential Cumulative Impacts and Likely Significance on Population

Project	Planning Reference	Development Type	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Residual Impact
PR1A	N/A	Infrastructure	Construction may cause disruptions to tourism, recreation and businesses in Ballina, but effects are considered temporary.	Not Significant	N/A	Not Significant (Beneficial)
PR5	20683	Residential	Once operational, the Proposed Scheme, when considered cumulatively with the above developments, will have a positive impact to the population of Ballina through improved community facilities and accommodation			
PR9	22322	Residential				
PR16	21793	Residential				
Ballina Town Public Realm Works	N/A	N/A				
Ballina Active Travel	N/A	N/A				

20.3.2.3.3 Human Health

The potential for cumulative effects has been considered for the construction and operation of the Proposed Scheme cumulatively with other projects. Operation of the Proposed Scheme and the developments identified below, will result in positive impacts to populations in Ballina due to improved flood risk, access, recreational opportunities, and business and employment opportunities. There is potential for greater positive cumulative effects during operation than the individual effects identified, particularly if the larger residential developments identified above proceed.

Table 20-6: Potential Cumulative Impacts and Likely Significance on Human Health

Project	Planning Reference	Development Type	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Residual Impact
PR1A	N/A	Infrastructure	Potential for cumulative impacts on population health during construction through disruptions to recreational activities, access to services and amenities, and increased construction dust and noise.	Not Significant	Mitigated through appropriate construction management plans.	Not Significant
PR5	20683	Residential				
PR9	22322	Residential				
PR16	21793	Residential				
PR23	19119	Residential				
Ballina Town Public Realm Works	N/A	N/A				

Chapter 20 Interactions and Cumulative Effects

Project	Planning Reference	Development Type	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Residual Impact
Ballina Town Active Travel Plan	N/A	N/A				
Ballina Town Public Realm Works	N/A	N/A	Potential for positive cumulative impacts on population health during operation through public realm improvements, and additional active travel and recreation opportunities.	Not Significant	N/A	Not Significant
Ballina Town Active Travel Plan	N/A	N/A				

20.3.2.3.4 Terrestrial Biodiversity

Projects

With respect to the IEFs relating to the European sites (SACs and SPAs), the cumulative assessment of these IEFs has been completed as part of the in-combination assessment of the Proposed Scheme as set out in the NIS which is documented under separate cover, however, **Table 20-7** present projects envisaged to overlap with the Proposed Scheme that may have likely significant effects on terrestrial biodiversity.

Table 20-7 Potential Cumulative Impacts and Likely Significance with other projects on Terrestrial Biodiversity

Project	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Likely Residual Impacts after Mitigation
Ballina and Lough Talt Water Supply Upgrade Project	<p>If works occur concurrently or closely before or after the Proposed Scheme works at Quignamanger, it could result in short-term disturbance of a number of species including bats, otter and overwintering waterbirds.</p> <p>Potential for the temporary and permanent loss of foraging and resting habitat for each of these species also.</p>	Barrier effect, disturbance and loss of habitat for roosting, foraging and commuting bats, foraging and resting otter and foraging and resting overwintering waterbirds due to construction works along the Moy estuary.	<p>Appropriate lighting during night-time works or no night-time works</p> <p>Avoidance of otter resting areas (holts/couches) or compensatory artificial holts and resting areas</p> <p>Avoidance of winter working hours to prevent disturbance to overwintering waterbirds.</p> <p>Avoidance of bat roosts of compensatory artificial roosts (e.g. bat boxes, bat houses etc.)</p> <p>Minimal removal of bankside vegetation</p>	Imperceptible

Chapter 20 Interactions and Cumulative Effects

Plans

Table 20-8 presents plans envisaged to overlap with the Proposed Scheme which have the potential to have likely significant effects on terrestrial biodiversity.

Table 20-8 Potential Cumulative Impacts and Likely Significance with other plans on Terrestrial Biodiversity

Plan	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Likely Residual Impacts after Mitigation
Ballina Town Public Realm Works and Ballina Quay Development Plan	<p>If works occur concurrently or closely before or after the Proposed Scheme works within the centre of Ballina town and/or Quignamanger, it could result in short-term disturbance of a number of species including bats, otter and overwintering waterbirds.</p> <p>Potential for the temporary and permanent loss of foraging and resting habitat for each of these species also.</p>	Barrier effect, disturbance and loss of habitat for roosting, foraging and commuting bats, foraging and resting otter and foraging and resting overwintering waterbirds due to construction works along the river Moy including at Ballina Quay.	<p>Appropriate lighting during night-time works or no night-time works</p> <p>Avoidance of otter resting areas (holts/couches) or compensatory artificial holts and resting areas</p> <p>Avoidance of winter working hours to prevent disturbance to overwintering waterbirds.</p> <p>Avoidance of bat roosts of compensatory artificial roosts (e.g. bat boxes, bat houses etc.)</p> <p>Minimal removal of bankside vegetation</p>	Imperceptible

There is potential for cumulative effects to occur as a result of the Proposed Scheme and the Ballina Town Public Realm Works and Ballina Quay Development plan, and the Ballina and Lough Talt Water Supply Upgrade Project should works for both occur concurrently or very closely together. However, should the mitigation measures outlined above be implemented these effects are considered negligible.

There is also the potential for a cumulative loss of habitat as a result of both the Proposed Scheme and these plans/project. However, on the basis that the design and mitigation measures employed for the Proposed Scheme will result in no significant residual effects on terrestrial biodiversity, a cumulative loss of habitat is considered to be **not significant**.

20.3.2.3.5 Aquatic Biodiversity

Projects

With respect to the IEFs relating to the European sites (SACs and SPAs), the cumulative assessment of these IEFs has been completed as part of the in-combination assessment of the Proposed Scheme as set out in the NIS which is documented under separate cover.

National Plans

Water Action Plan 2024

The Water Framework Directive (WFD) provides a framework for the protection and improvement of rivers, lakes, marine and groundwaters in addition to water-dependent habitats. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists. The Water Action Plan 2024 sets out a proposed framework for the protection and improvement of Ireland's water environment in line with WFD objectives.

Chapter 20 Interactions and Cumulative Effects

There are binding obligations on all Irish local authorities, including Mayo County Council, to achieve at least good status of surface waters, under the terms of the EU Water Framework Directive 2000/60/EC. The implementation of the Water Action Plan 2024 seeks compliance with the environmental objectives set under the plan, which will be documented for each water body. This includes compliance with the European Communities (Surface Waters) Regulations S.I. No. 272 of 2009 (as amended). The implementation of the Water Action Plan 2024 and achievement or maintenance of environmental objectives which will be set for the receiving water bodies will have a positive impact on water dependent habitats and species within European sites.

The Water Action Plan 2024 is the third River Basin Management Plan for Ireland, and it outlines the measures the Irish government and other sectors are taking to improve water quality in Ireland's groundwater, rivers, lakes, estuarine and coastal waters and provide sustainable management of our water resources. It sets out a roadmap to restore Ireland's water bodies to the equivalent of 'good status' or better and to protect water from any further deterioration. The plan focuses on protecting and restoring water quality by preventing and reducing pollution, by restoring the natural ecosystem functions of rivers and by continuing to invest in water infrastructure.

The Water Action Plan 2024 outlines the approach that Ireland will take to protect waters. As the overall aim of the Water Action Plan is to protect and/or restore waters in Ireland, there are no predicted in-combination effects from the Water Action Plan with the Proposed Scheme on any European site(s).

Inland Fisheries Ireland (IFI) Corporate Plan 2021-2025

IFI's Corporate Plan details the vision, mission and values of IFI across seven strategic objectives for the period 2021 to 2025. Under each of the seven objectives a series of actions required to achieve the objectives are described, with the intended outcomes outlined. The strategic objectives outline where Inland Fisheries Ireland will focus their efforts between 2021 and 2025.

The implementation of this corporate plan will have a positive impact for biodiversity of inland fisheries and ecosystems. Compliance with key environmental issues and objectives of this corporate plan will be expected to result in positive in-combination effects on European sites. This plan will not contribute to in-combination or cumulative negative impacts with the Proposed Scheme.

Table 20-9: Potential Cumulative Impacts and Likely Significance on Aquatic Biodiversity

Project	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Likely Residual Effect after Mitigation
OPW Arterial Drainage Maintenance	Drainage works involving physical removal of substrates (dredging) causes disturbance, mortality and localised decline in density of aquatic biota with recovery taking a number of years. Elevated suspended solids have effects on aquatic biota as described in Section 9.4.2, Chapter 9: Aquatic Biodiversity , it could result in short term temporary elevation of suspended solids levels and short to long term effects on morphology in the affected watercourses (Moy and Brusna).	Likely significant negative in the event that dredging occurred on the following ² OPW channels at the same time as construction works for the Proposed Scheme: Moy – Lower C1 between Tullyegan C1/7 confluence and Brusna C1/5 confluence. Brusna (Glenree) – C1/5 between C1/5/5 confluence in townland of Behymore and River Moy confluence including no dredging in tributaries C1/5/1, C1/5/2, C1/5/3 and C1/5/4. Tullyegan – Lower C1/7 in townland of Commons.	Phasing of works – deferral of any localised channel maintenance that involves dredging in the channels listed such that there is no concurrent dredging and flood relief scheme construction phase works.	Not Significant

² See OPW Drainage Maptool for channel locations: https://www.floodinfo.ie/map/drainage_map/.

Chapter 20 Interactions and Cumulative Effects

20.3.2.3.6 Land, Soil and Hydrogeology

As per **Chapter 11: Land, Soil, Geology and Hydrogeology**, the Hydrogeological Study Area extends outside the footprint of the Proposed Scheme to include a 1 km buffer zone, therefore projects and plans within this buffer zone were assessed for a cumulative impact in combination with the Proposed Scheme on land, soils, geology and hydrogeology.

It is considered following on from a review of other proposed projects within the study area that the construction of the Proposed Scheme in combination with other proposed projects will not result in significant cumulative impacts. From a land, soils, geology and hydrogeology perspective most of the proposed projects will result in the loss of a small quantity of soil and geology. However, the cumulative loss is still considered small on a local scale. As such, there are no likely significant direct, indirect cumulative impacts in combination with other proposed projects on land, soils, geology and hydrogeology.

20.3.2.3.7 Water

Projects

All projects involving construction in the catchment have the potential to cause pollution to watercourses, without mitigation. However, based on submissions from MCC Water Services and Environment departments in response to the applications, and extant planning guidelines and the MCDP, it is assumed that consented projects will adhere to appropriate environmental measures during construction, including the management of discharges to drainage systems and watercourses. Similarly, it is assumed that no projects will be permitted that are located in the floodplain which could result in increased water levels downstream, or which increase runoff rates to watercourses. Therefore, no projects were screened in for cumulative impacts on water quality and flood risk unless there was a clear temporal and spatial overlap that would aggravate the risk of these impacts.

Plans

Table 20-10 present plans envisaged to overlap with the Proposed Scheme and have likely significant effects.

Table 20-10: Potential Cumulative Impacts and Likely Significance on Water

Project	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Likely Residual Impacts after Mitigation
Ballina and Lough Talt Water Supply Upgrade Project	If works occur concurrently with the Proposed Scheme works, it could result in short term temporary elevation of suspended solids levels and short to long term effects on morphology in the affected watercourses (Quignamanger).	Deterioration in water quality and morphological conditions.	Consultation and collaboration with Uisce Éireann to offset timing of construction works.	Imperceptible
Moy Arterial Drainage Scheme	If works occur concurrently with the Proposed Scheme works, it could result in short term temporary elevation of suspended solids levels and short to long term effects on morphology in the affected watercourses (Moy, Brusna and Tullyegan).	Deterioration in water quality and morphological conditions.	Consultation and collaboration with OPW to offset timing of construction works. Works to adhere to OPW's environmental management guidelines for ADS works (OPW, 2019)	Imperceptible

Chapter 20 Interactions and Cumulative Effects

20.3.2.3.8 Air Quality

Construction Phase

According to the IAQM guidance (2014), there is the potential for cumulative dust impacts to any nearby sensitive receptors should the construction phase of the Proposed Scheme coincide with the construction phase of any other permitted projects within 350 m of the site. If a simultaneous construction phase were to occur this would result in cumulative dust soiling and dust-related human health and ecological effects associated with the proposed works localised to the works area. A review of the planned and permitted projects within the vicinity of the Proposed Scheme was undertaken and there were no developments within 350 m of the scheme that had the potential to generate cumulative construction phase dust impacts.

Operational Phase

There are no predicted effects to air quality as a result of the operational phase of the Proposed Scheme therefore, there is no potential for cumulative effects.

20.3.2.3.9 Climate

With respect to the requirement for a cumulative assessment PE-ENV-01104 (TII, 2022) states that “*for GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable.*”

However, by presenting the GHG impact of a project in the context of its alignment to Ireland’s trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland’s ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

20.3.2.3.10 Noise and Vibration

Separation distances of the various works areas from each other are sufficient for distance attenuation of noise and vibration to occur such that cumulative noise and vibration impacts will not arise.

The list of projects with the potential for cumulative effects has been reviewed and the potential for cumulative effects with the Proposed Scheme has been assessed. Most projects are sufficiently remote or screened from this project such that noise or vibration levels will not be cumulative. Similarly, if the projects do not occur at the same time as this project, there will be no cumulative noise and vibration effect. None of the projects are considered likely to result in significant effects due to cumulative noise or vibration with this project.

20.3.2.3.11 Material Assets: Waste and Utilities

There is potential for cumulative effects to arise with the projects outlined in **Table 20-11 and Table 20-12** A ZoI of 5 km was chosen to conservatively capture any potential impacts to utility connections and overlapping demand from waste management outlets.

The potential for cumulative effects exists only where utilities are disrupted at the same time during the construction phase with the Proposed Scheme. It is good practice for all construction works to implement measures to avoid/minimise disruption to services through prior consultation with utility providers in advance of works along with implementing measures to avoid/minimise disruption to services. In the unlikely event of services being disrupted unintentionally, it is again good practice to restore services as quickly as possible.

Utilities

The potential for cumulative effects exists only where utilities are disrupted at the same time during the construction phase with the Proposed Scheme. It is good practice for all construction works to implement measures to avoid/minimise disruption to services through prior consultation with utility providers in advance of works along with implementing measures to avoid/minimise disruption to services. In the unlikely event of services being disrupted unintentionally, it is again good practice to restore services as quickly as possible.

Chapter 20 Interactions and Cumulative Effects

Table 20-11 displays the potential projects that has potential to cause cumulative impacts with the Proposed Scheme.

Table 20-11: Potential Cumulative Impacts and Likely Significance on Utilities

Project	Planning Reference	Development Type	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Likely Residual Impacts after Mitigation
PR1	2028	Residential	Disruption to utilities during construction phase may be potentially impacted due to proximity and nature of works.	Slight	As prescribed in Chapter 16: Material Assets: Waste & Utilities	Imperceptible
PR1A	TBC	Infrastructure		Slight		Imperceptible
PR 6	19884	Residential		Slight		Imperceptible
PR 7	20632	Residential		Slight		Imperceptible
PR 8	20316	Retail		Slight		Imperceptible
PR 9	22322	Residential		Slight		Imperceptible

Waste

There is potential for cumulative effects to arise on the demand for available waste management outlets for the off-site reuse, recycling, recovery and/ or disposal of waste required for the projects **Table 20-12** during the construction phase of these projects should they overlap. However, the expected waste quantities for the Proposed Scheme are not significant. The implementation of measures to prevent waste being generated on-site in the first instance and the potential for re-use and recycling in accordance with the waste hierarchy will ensure that the volume of waste for disposal is minimised.

Table 20-12: Potential Cumulative Impacts and Likely Significance on Waste

Project	Planning Reference	Development Type	Potential Cumulative Impact	Effect without Mitigation	Mitigation	Likely Residual Impacts after Mitigation
PR1A	TBC	Infrastructure	Demolition and excavation may contribute to additional waste to regional waste facilities.	Slight	As prescribed in Chapter 16: Material Assets: Waste & Utilities.	Imperceptible
PR 6	19884	Residential		Slight		Slight
PR 8	20316	Retail		Imperceptible		Imperceptible
PR 9	22322	Residential		Imperceptible		Imperceptible
PR 11	18577	Community Facility		Slight		Slight
PR 18	23224	Conservation repairs to Hermitage at Beleek Woods		Slight		Slight

20.3.2.3.12 Material Assets: Land and Property

None of the schemes proposed will result in any significant additional construction and/or operational land take within the study area.

20.3.2.3.13 Cultural Heritage

Projects

A consideration of all current and active planning applications lodged to Mayo County Council within a 5 km radius of the Proposed Scheme comprise a number of domestic residential and commercial applications such as house extensions, residential housing developments and demolition of existing derelict buildings within the town (Bury St, Teeling St., O'Rahilly St, McDermott St) for replacement commercial premises and/or dwellings (apartments). None of these applications, considered cumulatively in the context of the

Chapter 20 Interactions and Cumulative Effects

Proposed Scheme, are likely to have predicted significant negative cumulative effects on the Cultural Heritage resource.

Plans

The Mayo County Development Plan, Draft County Mayo Heritage Plan and Draft Ballina Town & Environs LAP, acknowledges the importance of the Cultural Heritage resource and includes a number of planning and strategic policies and objectives in relation to same. The Built & Archaeological Heritage Climate Change Sectoral Adaptation Plan (2019) acknowledges the risk of flood waters in eroding foundations and causing damage to historic structural fabric (high velocity), as well as the risk of heavy flotsam carried in floods to cause built and mechanical damage (dynamic impact) to bridges and other historic infrastructure. Post-flood event recovery and rebuilding operations can also risk potential loss of historic fabric. Furthermore, there is a risk of fluvial erosion/pluvial scouring resulting in partial or complete loss of buried archaeological soil/feature deposits and artefacts/collections, as well as potential deterioration due to a drying-out phase (e.g. salts, microbiological activity).

The Draft Ballina Public Realm Strategy seeks to identify opportunities for enhanced public realm amenity value in the town via activating and integrating the river front, creating interactive and adaptable civil amenity space and stitching the River Moy into the public realm. Potential for waterfront/amenity improvement was also identified along the riverbanks of the Moy as well as enhancing the streetscape of Upper Bridge and Lower Bridge including the use signage/public art strategy at same as well as planting, enhanced seating and high-quality street furniture along Cathedral Road and Emmet Street.

As part of these plans, programmes and projects, relevant standard mitigation and best practice measures are set out to safeguard the Cultural Heritage resource. This, together with the provision of avoidance and/or reduction of adverse impacts for the proposed Flood Relief Scheme, including use of sensitive design finishes for hard defences to integration of developed public realm strategies along the River Moy waterfront (see **Chapter 19: Landscape and Visual**), indicates that there are no likely predicted significant negative cumulative effects on the Cultural Heritage resource.

The Proposed Scheme will seek to safeguard the Cultural Heritage resource from future inland flooding events in Ballina and in turn, prevent potential losses. As such, when considered in the context of relevant strategic plans and guidelines this is likely to have a predicted overall positive cumulative effect.

20.3.2.3.14 Landscape and Visual

There is potential for cumulative effects to arise on the in terms of landscape and visual amenity, to whether each of these projects has the potential to give rise to likely significant cumulative effects with the proposed scheme. The Landscape and Visual Study Area extends outside the footprint of the Proposed Scheme to include a 100 m buffer zone around the Proposed Scheme, therefore projects and plans within this buffer zone were assessed for a cumulative impact in combination with the Proposed Scheme on landscape and visual amenity.

Table 20-13: Potential Cumulative Impacts and Likely Significance on Cultural Heritage

Project	Planning Reference	Development Type	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Residual Impact
PR1	2028	Residential	Cumulative landscape and visual effects if construction coincides in the Tullyegan sub-study area and at operation	Construction landscape and visual effects will be amplified. Not significant operational landscape and visual effects.	Coordination between the projects to ensure construction phases are over different periods	Not significant operational landscape and visual cumulative impact. No cumulative impact at construction stage.
PR20	20646	Waste treatment	Cumulative landscape and visual effects if construction coincides in the	Construction landscape and visual effects will be amplified	Coordination between the projects to ensure construction	No cumulative impact.

Chapter 20 Interactions and Cumulative Effects

Project	Planning Reference	Development Type	Potential Cumulative Effect	Effect Without Mitigation	Mitigation	Residual Impact
			Bunree sub-study area		phases are over different periods	
PR 28	2360261	The replacement (“restringing”) of the existing overhead line circuit conductor wires with a new higher capacity conductor	Cumulative landscape and visual effects if construction coincides in the Behy sub-study area	Construction landscape and visual effects will be amplified	Coordination between the projects to ensure construction phases are over different periods	No cumulative impact
Draft Ballina Local Transport Plan 2023 (Draft LPT)	N/A	N/A	Potential cumulative landscape and visual effects if current Draft LPT implemented along the River Moy, Quignamanger and Brusna	Changes to the landscape including possible removal of trees to accommodate new infrastructure	Ridgepool Road was designed in accordance with the current Draft LPT	The residual impact cannot be quantified as details of the alignment of infrastructure changes are still at draft stage

20.3.2.4 CIA Stage 3

The list of projects acknowledged as having a potential cumulative effect with the Proposed Scheme are provided in **Appendix 20.1**.

20.3.2.4.1 Mitigation Measures

Due to the insignificant effects, few additional mitigation measures have been proposed from the respective disciplines. Best practice will be maintained and will be deemed sufficient for most cumulative effects. The only measure proposed to counteract the cumulative effects between the Proposed Scheme with other proposed projects is to consult and collaborate with OPW to offset timing of construction works.

20.3.2.4.2 Residual Impacts

Based on the assessment above, the cumulative effects associated with the Proposed Scheme will not result in likely significant effects to the environment.

20.3.2.4.3 Transboundary Effects

There is no potential for transboundary effects.

20.4 Chapter References

- EC, 1999. *Guidelines on the Assessment of Indirect and Cumulative Impacts as well as Impact interactions*, s.l.: s.n.
- EPA, 2022. *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, s.l.: s.n.
- Hubble, T., Docker, B. & Rutherford, I., 2010. *The role of riparian trees in maintaining riverbank stability: A review of Australian experience and practice*. s.l.:Elsevier.
- OPW, 2019. *Environmental Guidance: Drainage Maintenance & Construction*, s.l.: Office of Public Works.
- TII, 2022. *Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline & Greenways)*, s.l.: s.n.
- Weilgart, L., 2018. *The Impact of Ocean Noise Pollution on Fish and Invertebrates*. Wädenswil: Ocean Care.