

SECTION 19: Cumulative Effects and Interactions

19.1 Introduction

Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from and this EIAR will look at:

- the interaction between all of the different permitted and planned projects in the same area in combination with this proposed development; and
- the interaction between the various impacts within this proposed development.

Cumulative effects will consider whether the addition of many minor or significant effects of the proposed development itself or the cumulation of effects of other permitted or planned projects have the potential to result in larger, more significant effects when combined with the effects of the proposed development. Interactive effects will consider the interaction between the various environmental aspects, for example the interaction between noise and ecology. This Section summarises the residual effects that have been identified in **Sections 6–18** and determine whether they give rise to cumulative and/or interactive effects based on best scientific knowledge. Accordingly, when a topic is not mentioned, the authors have concluded that there are no likely residual significant effects that could give rise to cumulative and/or interactive effects.

19.2 Assessment Methodology

19.2.1 Overview

The assessment of cumulative effects has been undertaken on a qualitative basis by each of the environmental topic leads based on best scientific knowledge. The approach has aligned with the overarching EIA guidance as outlined in **Section 1.4.3** (including the draft EPA guidance and EC guidance) as well as per the methodology adopted for each environmental factors described in **Sections 6–18**. A summary of these effects is provided herein based on best scientific knowledge.

Interactions

The EIAR has considered and assessed the interactive effects arising from the construction and operation of the proposed development based on best scientific knowledge. Interactive effects (or interactions) specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Part 1(e) in Article 3 of the EIA Directive which states:

“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:

- population and human health;
- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- land, soil, water, air and climate;
- material assets, cultural heritage and the landscape;
- the interaction between the factors referred to in points above.

Cumulative Effects

The EIAR has considered and assessed cumulative effects arising from the construction and operation of the proposed development. A cumulative assessment has been undertaken based on best scientific knowledge in accordance with Part 5 of Annex IV of the EIA Directive:

“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;”

The assessment specifically considers whether any of the proposed and/or recently approved schemes in the local area have a potential to exacerbate (i.e. alter the significance of) effects associated with the proposed development based on best scientific knowledge.

19.3 Interactive Effects

The assessment of interactive effects has considered likely significant effects that may arise during construction and operation of the proposed development based on best scientific knowledge. A summary of these effects is presented in the matrix in Table 19.1. The purpose of the matrix in Table 19.1 is to summarise likely interactive effects of significance. Actual effects and the description of significance are dealt with in the most relevant Section (Refer to Sections 6-18 for further detail).

Table 19.1: Interactive Effects Summary Matrix

	Water	Biodiversity	Lands and Soils	Air and Climate	Noise and Vibration	Odour	Archaeology, Architectural and Cultural Heritage	Material Assets	Traffic and Transportation	Landscape and Visual	Population and Human Health	Resource and Waste Management	Major Accidents and Natural Disasters
Water		✓	✓	✗	✗	✗	✗	✓	✗	✗	✓	✗	✓
Biodiversity			✓		✓	✗	✗	✗	✗	✓	✗	✗	✓
Lands and Soils				✗	✓	✗	✓	✓	✓	✓	✓	✓	✓
Air and Climate					✗	✓	✗	✗	✓	✗	✓	✗	✓
Noise and Vibration						✗	✓	✗	✓	✗	✓	✗	✗
Odour							✗	✗	✗	✗	✓	✗	✗
Archaeology, Architectural and Cultural Heritage								✓	✓	✗	✗	✗	✗
Material Assets									✓	✗	✗	✓	✓
Traffic and Transportation										✗	✓	✓	✗
Landscape and Visual											✓	✗	✓
Population and Human Health												✓	✓
Resource and Waste Management													✓

Major Accidents and Natural Disasters														
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19.3.1 Interactive Effects during Construction

Likely significant interactive effects during construction that have been identified based on best scientific knowledge are discussed in **Table 19.1**

Table 19.1: Interactive effects during construction

Receptor	Environmental Factors	Summary of Potential Effect	Further information
Bathing Water Quality / Recreational Users (University of Limerick Boathouse and users of riverside walkways)	Water, Land and soil, Population and Human Health	The presence of pathogens and bacteria in bathing water can impact on Human Health.	<i>Slight, short-term, negative effects</i> without mitigation during construction. No potential impacts on human health as a result of changes in water quality at bathing water beaches are predicted. Potential impacts were assessed by the water quality assessment. Refer Sections 13, 14, 17.
Lower River Shannon	Land and soil, Water	The impact due to discharge from dewatering, surface water and presence of silt	<i>Moderate, short-term, negative effect</i> All water shall be passed to a suitably sized settlement pond, or a proprietary silt removal system located within the working area, before discharge to the River Shannon or the local sewer network. Any discharge to either sewer or watercourse would be subject to a discharge licence. Refer Sections 13, 14.
University of Limerick	Noise and Vibration, Air Quality and Climate, Major Accidents and Natural Disasters, Population and Human Health	General disturbance due to construction process to surrounding receptors (including noise generation, dust deposition, use of generators, presence of hoarding at working areas etc.);	<i>Local, temporary, short term, slight – moderate negative effect.</i> Refer Sections 8, 9, 17, 18.
University of Limerick, Road Network in Castletroy (Harvard close and Plassey Park Road).	Traffic and Transport, Air quality and Climate Noise and Vibration Population and Human Health	Generation of additional vehicles (construction traffic) on the road network and associated potential for air and noise emissions and disturbance.	<i>Slight, short term, imperceptible, negative impact.</i> The change in air quality was assessed against standard thresholds required to avoid impacts on public health. The impacts are predicted following the implementation of proposed mitigation measures. The actual change in traffic flows (annual

			<p>average daily traffic (AADT) flows per day) has been considered against the IAQM and EPUK criteria. The proposed development will have no construction traffic impact on the local air quality and minimal noise levels. The construction phase Green-house Gas (GHG) emissions are estimated to be miniscule in terms of national targets and considered not significant. Therefore, there will be no operational impact on local air quality, and on nearby sensitive ecological habitats. And will not give rise to significant adverse effects on human health.</p> <p>Refer Sections 6, 8, 9, 17.</p>
Local residents, Recreational users of the Boathouse and riverside public footpaths, Students and employees in the vicinity	Landscape and Visual, Population and Human Health Biodiversity	Visual impact on the surrounding landscape, due to the construction process and an increase in activity at the site and on the surrounding access roads.	<p><i>Local (within 0.5km of site), short-term, moderate, and reversible.</i></p> <p>These impacts will be for the construction phase only.</p> <p>Refer Sections 11, 12, 17.</p>
WwTP site Waste, management facilities	Resources and Waste Management Land and Soils Traffic and Transportation	Generation and transport of construction waste (including excavation waste). Topsoil, soil, rock and naturally occurring material excavated in the course of construction.	<p><i>Slight, short term, negative effect.</i></p> <p>Activities will require removal and disposal off site. All excavated material shall be disposed of at a suitably licensed facility.</p> <p>Refer Sections 6, 12, 15.</p>

19.3.2 Interactive Effects during Operation

Likely significant interactive effects during operation that have been identified based on best scientific knowledge are discussed in Table 19.2:

Table 19.2: Interactive effects during operation

Receptor	Environmental Factors	Summary of Potential Effect	Further information
Lower River Shannon	Water Biodiversity Land and soil	Potential effects in the Shannon river and quality of receiving	<i>Long term, imperceptible/neutral impact on water quality,</i>

		waters on Sea Lamprey (<i>Petromyzon marinus</i>), Brook Lamprey (<i>Lampetra planeri</i>), River Lamprey (<i>Lampetra fluviatilis</i>), Atlantic Salmon (<i>Salmo salar</i>) and also hosts European Eel (<i>Anguilla anguilla</i>) and coarse fish species.	i.e. an effect which alters the character of the environment without affecting its sensitivities. As a result, no significant impact on biodiversity is predicted due to the proposed development with the proposed mitigation measures. Refer Sections 11, 13, 14.
Local residents, Recreational users of the Boathouse and riverside public footpaths, Students and employees in the vicinity	Landscape and Visual, Biodiversity	Visual impact due to proposed development with mitigation (relocation of trees to an area closer to the southwestern boundary of the site during operational phase).	<i>Slight, permanent, negative impact</i> which will reduce to imperceptible with distance. Visual impact will be screened by the existing vegetation and will not change the fabric of the existing landscape. Within a 0.5km proximity, the proposed development will be prominent and increase the visual clutter slightly. Refer Sections 11, 12.
Local residential and employment sector	Population and Human Health, Water, Major Accidents and Natural Disasters	Potential improvements to water quality and improved opportunities for employment, housing and wellbeing	<i>Significant to moderate, long-term positive effect</i> The enhanced water quality and increased WwTP capacity arising from the proposed development will facilitate growth. the WwTP outflow will reduce the risk of downstream flooding, with a consequent positive impact on human health Refer Sections 14, 17, 18.
University of Limerick, Properties along Shannon River	Odour, Population and Human Health	Odour nuisance impact on local population during operation.	<i>Slight, permanent, positive impact.</i> Proposed odour control unit to be installed at the Sludge Building, it is predicted that there will be a 68% - 81% reduction in the worst-case odour concentrations between the existing Castletroy WwTP and the Proposed Upgrade at the

			nearest Sensitive Residential Properties. Refer Sections 7, 17.
University of Limerick, Properties along Shannon River	Air and Climate Population and Human Health	Impact on air quality and human health during operation of both the existing WwTP and the proposed upgrades	<i>Slight, neutral, permanent impact</i> No significant impact on local air quality as there are no significant sources of air pollutants involved. As there will be no additional traffic flows to the plant, no operational impact is predicted. In view of the size and scale of the proposed development, GHG emission from operational road traffic, space heating of buildings are not considered to be significant. Refer Sections 8, 17.
WwTP site Waste, management facilities	Resource and Waste Management Traffic and Transportation	Disposal of sludge generated will require use of transport to Bunlicky Sludge Hub Centre and thus waste will affect the traffic and transportation during operation as well.	<i>Imperceptible, long term, negative impact</i> The sludge produced by the proposed development will be thickened and dewatered to a minimum 18% dry solids, for appropriate disposal in accordance with the Uisce Éireann National Wastewater Sludge Management Plan (NWSMP). Refer Sections 6, 15.

19.4 Cumulative Effects

19.4.1 Development Plans

The following plans were identified as potential sources of cumulative impacts:

- Limerick Development Plan 2022-2028
- Irish Water's Biodiversity Plan (BAP)
- National Wastewater Sludge Management Plan

The proposed development may contravene a number of mitigatory policies and measures set out in the Limerick Development Plan 2022-2028. Therefore, there may be cumulative effects from the proposed development in combination with the Limerick Development Plan 2022 –2028. The projects outlined in Limerick Development Plan that can contribute to cumulative impacts are therefore considered further in the cumulative assessment.

The Irish Water's BAP has set out objectives to preserve and where possible enhance the natural environment and its ecosystems. The proposed GCSWOE project is not considered to interfere with the objectives of the BAP.

19.4.2 Existing or commenced Planning Applications

Table 19.3 refers to the developments considered for cumulative effects. Any other existing applications not identified do not have the potential to exacerbate effects.

Table 19.3: Schedule of developments considered for cumulative effects

File Number	Address	Relevance	Description	Status	Decision Date
181104	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 89 no. residential units. Ancillary site development works included	Application Finalised	4/30/2019
181105	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 41 no. residential units. Ancillary site development works included	Application Finalised	4/30/2019
18698	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 38 no. residential units. Ancillary site development works included	Application Finalised	10/18/2018
21350	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 62 no. residential units. Ancillary site development works included	Application Finalised	10/26/2021
211152	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 89 no. residential units. Ancillary site development works included	Application Finalised	3/15/2022
211400	Newtown, Castletroy, Co. Limerick	Located near study site	a residential development comprising 96 no. residential units. Ancillary site development works included	Application Finalised	5/4/2022
21396	7 Lonsdale Road, Plassey Enterprise Centre, National Technology Park, Castletroy, Limerick		demolition of existing boiler house construction of a two storey front and rear extension which will accommodate a new office space, storage space and new entrance, along with alterations to front and side elevations and all associated site works	Application Finalised	3/10/2022
198004	Orchard Site (bounded by Castle Street,		provision of older persons residential accommodation consisting of 27 units on two	Application Finalised	10/2/2019

	Island gate, Old Dominick Street and Church Street), King's Island, Limerick.		adjacent sites specifically, modifications and re-paving of a section of Old Dominick Street, vehicle and pedestrian access road, footpaths, parking spaces, open space and soft landscaping to public and private amenity spaces, all associated site works		
22558	Johnson & Johnson Vision Care, Plassey Park Road, National Technology Park Rivers, Limerick		a water retention pond, area circa 1,100m ² with 2.0m high perimeter fence, relocation and modification of existing landscaped berm, and associated ancillary works	Decision Made	9/16/2022
191037	Foxhollow,, Golf Links Road, Castletroy, Co. Limerick.		demolition of an existing haybarn and construction of a residential development comprising 6 units and all ancillary site development works	Application Finalised	5/15/2020
21660	Monaleen National School, Monaleen Road, Castletroy, Co. Limerick		the demolition of the existing single storey school buildings and the provision of a new stepped 2 storey school building comprising: 32no. classrooms, special needs unit, GP room, library, resource rooms, staff room, ancillary accommodation all measuring approximately 5,516 m ²	Application Finalised	1/20/2022
211793	Plassey Park Road, National Technology Park, Rivers, Limerick		a water recycling plant, comprising single/part two storey enclosures for mechanical and electrical equipment, storage tanks approx. 15m high and evaporating equipment approx. 20m high, access road, perimeter fence and ancillary site works	Decision Made	9/9/2022

19.4.3 Existing or Commenced Projects

There are various identified existing or commenced projects in the vicinity that may or may not have a cumulative impact. A list of the projects are as follows:

- Kings Flood Relief Scheme
- Castleconnell Flood Relief Scheme
- Corbally Baths Project
- Bunlicky WwTP upgrade

19.4.4 Significance of Cumulative Impact

The detailed assessment provided in the preceding sections attribute to the fact that the proposed development will not have any residual negative impacts on any of the environmental aspects or on the European Sites. The impact of the proposed development on water quality has been demonstrated to be imperceptible. Consequently, the contribution of this project to any cumulative water quality impacts will also be imperceptible.

Various other developments around the vicinity of the site were taken into consideration to assess for cumulative effects. Limerick Co. Co. planning portal was accessed to examine planning applications in the vicinity of the site for the potential to act in combination with the proposed project (Table 19.3). Active (within 5years) planning applications in the surrounding area consist of housing projects and applications for projects within Johnson and Johnson landholdings.

Majority of the planning applications around the site are residential developments. The planning applications propose the construction of residential units in Newtown, Castletroy. Due to the distance between the sites, there are no negative cumulative impacts in association with these construction sites. Although the construction of the older persons residential accommodation can have a negative impact on the quality of water due to oil spillage, concrete, dust emissions. These activities can lead to a significant increase in the population of the area and with the upgrade project of the WwTP, it will be able to treat the excess flows.

The construction of water retention tank and water recycling plant in the Johnson and Johnson landholdings have no negative cumulative impacts due to the location and distance of the development from our site.

Two flood relief schemes, Kings FRS and Castleconnell FRS are around the site of the proposed upgrade project. There are no significant abstractions or discharge of water into these developments that will have a negative impact on the quality of water. In fact, the FRS will have a positive impact and help in enhancing the entire situation. Therefore, there are no significant cumulative effects due to the two FRS.

Corbally Baths is a historic swimming area approximately 8km downstream from Castletroy WwTP. A project to reinstate the baths has been ongoing in recent years. The Baths draw water directly from the Lower River Shannon, and therefore depend on its water quality which at present is not of appropriate standard. WQ monitoring in the area, carried out by a local interest group, showed a significant deterioration after the first flush of rainfall events, indicating that storm water overflows in the area are having an effect. The proposed development will see the installation of stormwater storage that will greatly reduce, and almost eliminate spills during the bathing season which will have a positive effect on cumulative downstream water quality.

Limerick (Bunlicky) WwTP is located to the west of Limerick city , approximately 13km downstream from Castletroy WwTP. It currently serves a population equivalent of 186,233PE (2020 AER) and is due to undergo a similar development project which will upgrade the treatment capacity of wastewater and sludge processes on the site. Due to the distance downstream and mixing of flow with other tributaries, there will be no cumulative effects from the combination of Castletroy effluent with current or future discharges from the Bunlicky WwTP.

The sludge from the Castletroy WwTP will be transported to Bunlicky for treatment. This is the same as the current situation and there are only two lorries each day. This is not expected to have bare any significance on the Bunlicky project, either during its construction or operational phases. therefore, there will be no significant cumulative effect to Traffic and Transportation due to the upgrade projects.

This EIAR has considered potential cumulative impacts arising from the construction and operation of the proposed upgrade project in accordance with the EIA Directive and corresponding guidelines. It has done so mainly through the integration of cumulative impacts in the undertaking of baseline surveys related to effects on Biodiversity, Water Quality, Noise and Vibration, Air Quality and Climate, Traffic and Transport, Landscape and Visual Impacts and Waste Management. The proposed development is not likely to give rise to any significant or interactive cumulative impacts.