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16 Interactions and Cumulative Effects

16.1 Introduction

In addition to the assessment of impacts from the individual topics set out in Chapters 6 to 15 of this Environmental Impact Assessment (EIAR), the interaction between these factors has also been considered as part of the environmental impact assessment.

This chapter analyses the Interrelationships and cumulative effects and main interactions between different aspects of the environment likely to be significantly affected by the Proposed Project. This is sometimes referred to as the 'interrelationships' or 'in combination effects' between different environmental effects. The assessment includes consideration of particular locations/receptors where several effects for example noise, air and landscape may all occur.

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Commented [DFDCE2R1]: Typically the author isn't put in the Interactions Chapter as this is a collation of the information from various other chapters.

Commented [ES3]: Map of the scheme area?

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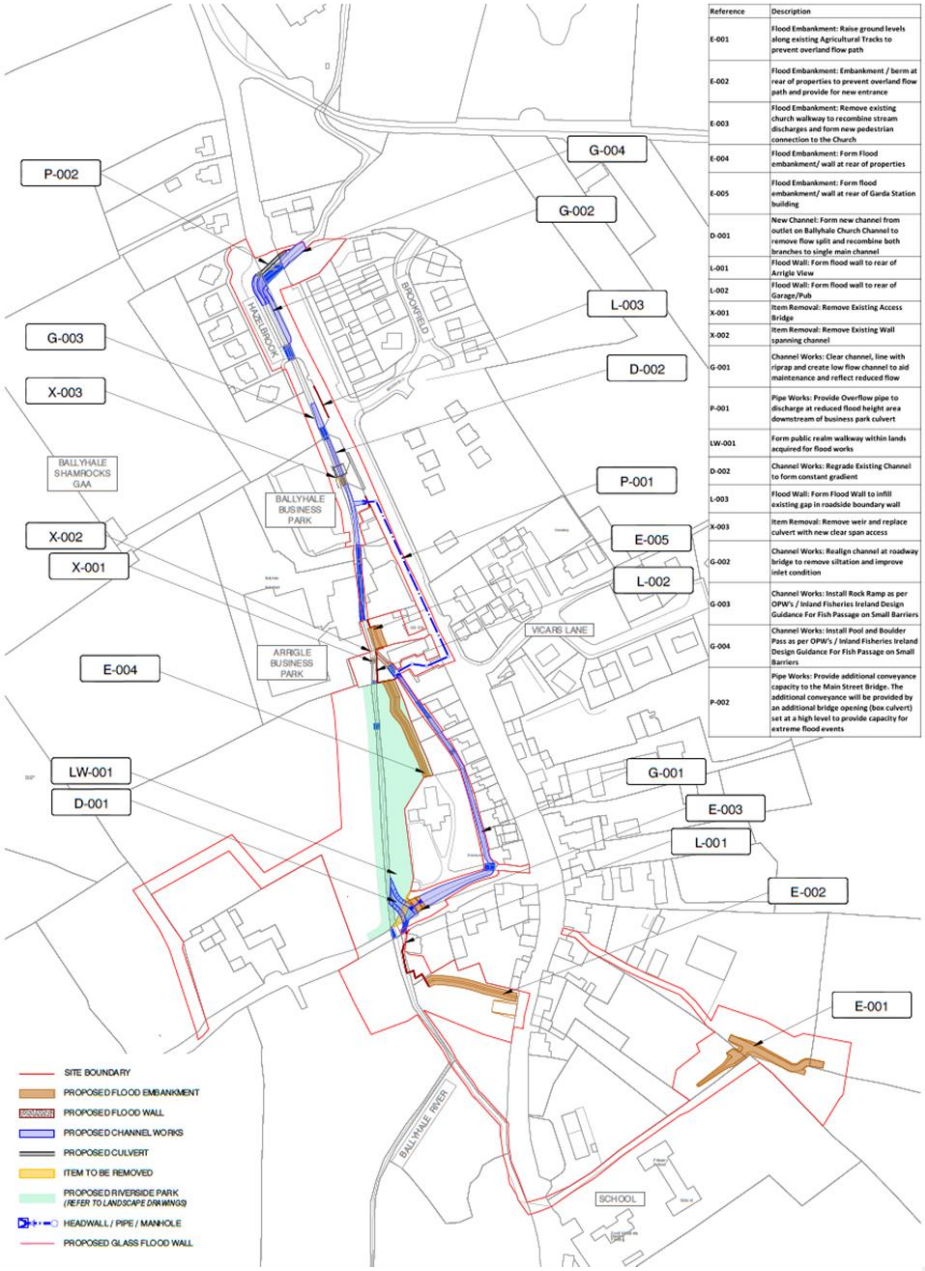

Reference	Description
E-001	Flood Embankment: Raise ground levels along existing Agricultural Tracks to prevent overland flow path
E-002	Flood Embankment: Embankment / berm at rear of properties to prevent overland flow path and provide for new entrance
E-003	Flood Embankment: Remove existing church walkway to recombine stream discharges and form new pedestrian connection to the Church
E-004	Flood Embankment: Form Flood embankment/ wall at rear of properties
E-005	Flood Embankment: Form flood embankment/ wall at rear of Garda Station building
D-001	New Channel: Form new channel from outlet on Ballyhale Church Channel to remove flow split and recombine both branches to single main channel
L-001	Flood Wall: Form flood wall to rear of Arrigle View
L-002	Flood Wall: Form flood wall to rear of Garage/Pub
X-001	Item Removal: Remove Existing Access Bridge
X-002	Item Removal: Remove Existing Wall spanning channel
G-001	Channel Works: Clear channel, line with riprap and create low flow channel to aid maintenance and reflect reduced flow
P-001	Pipe Works: Provide Overflow pipe to discharge at reduced flood height area downstream of business park culvert
LW-001	Form public realm walkway within lands acquired for flood works
D-002	Channel Works: Regrade Existing Channel to form constant gradient
L-003	Flood Wall: Form Flood Wall to infill existing gap in roadside boundary wall
X-003	Item Removal: Remove weir and replace culvert with new clear span access
G-002	Channel Works: Realign channel at roadway bridge to remove siltation and improve inlet condition
G-003	Channel Works: Install Rock Ramp as per OPW's / Inland Fisheries Ireland Design Guidance For Fish Passage on Small Barriers
G-004	Channel Works: Install Pool and Boulder Pass as per OPW's / Inland Fisheries Ireland Design Guidance For Fish Passage on Small Barriers
P-002	Pipe Works: Provide additional conveyance capacity to the Main Street Bridge. The additional conveyance will be provided by an additional bridge opening (box culvert) set at a high level to provide capacity for extreme flood events

Figure 16-1 Overview Layout

16.2 Assessment Methodology

16.2.1 Statutory Requirements

Article 3 of the EIA Directive outlines the information to be contained in an EIAR as follows;

> "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; and
>
> (e) the interaction between the factors referred to in points (a) to (d)."

The aforementioned Directive are transposed into Irish Legislation through the Planning and Development Regulations 2018.

16.2.2 Guidance

This chapter has been prepared in accordance with the following guidelines;

- EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2022.
- EPA (2015) Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft, 2015;
- EPA (2015) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, Draft, 2015; and
- EPA (2002) Guidelines on the Information to be contained in Environmental Impact Statements, 2002;
- EPA (2003) Advice Notes on Current Practise in the Preparation of Environmental Impact Statements, 2003.
- European Commission Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions.

16.2.3 Interaction of Effects

All environmental factors are inter-related to some extent, and the relationships can range from tenuous to highly complex.

The major interactions between the recorded environmental impacts are assessed within the individual chapters of the EIAR. Table 16-1 provides a matrix summarising the primary interactions between the various parameters outlined in this EIAR from Chapters 6 to 15, inclusive.

Table 16-1: Matrix to Summarize Key Inter-relationships

Key Environmental Interaction Matrix	Biodiversity	Water Environment	Land and Soils	Landscape and Visual	Cultural Heritage	Population and Human Health	Air Quality	Noise and Vibration	Material Assets	Traffic and Transport
Biodiversity		✓	✓	✓						
Water Environment	✓		✓			✓				
Land and Soils	✓	✓					✓	✓		✓
Landscape and Visual	✓				✓				✓	
Cultural Heritage				✓						
Population and Human Health		✓					✓	✓	✓	✓
Air Quality			✓			✓				✓
Noise and Vibration			✓			✓				✓
Material Assets				✓		✓				✓
Traffic and Transport			✓			✓	✓	✓	✓	

The purpose of the effects matrix is to identify potential significant effects on different environmental issue. Actual effects and their significance are dealt with in the most relevant chapter.

This assessment was based on information contained within this EIAR, the outcome of workshops and consultation with the relevant sub-consultants. The main environmental interactions anticipated as they relate to the Proposed Project are also summarised in the following sections.

16.3 Potential Interactive Effects

16.3.1 Biodiversity and Water Environment

Site activities during the construction phase have the potential to give rise to water pollution and impacts on flora and fauna that use water within the same catchment. The proposed scheme has been designed to limit the potential for water pollution with extensive mitigation measures proposed to minimise the potential for water pollution arising from the works.

16.3.2 Biodiversity, Land and Soils and Water Environment

The removal of soils, overburden and rock during the construction phase has the potential to give rise to impact on water quality. However, these effects and mitigation measures to avoid cumulative effects are detailed in the Biodiversity, Land and Soils and Water Environment Chapters. In summary, these assessments have identified that such interacting effects with the Biodiversity, Land and Soils and Water Environment Chapters are not significant.

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Commented [ES7]: In summary, these assessments have identified that such interacting effects with the …….. are **not significant.**

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16.3.3 Biodiversity and Landscape & Visual

The removal vegetation within the footprint of the proposed scheme and surrounding areas will result in a visual change to the landscape during the construction phase, which will become part of the normal landscape in the operational Biodiversity and Landscape and Visual Chapters. In summary, these assessments have identified that such interacting effects with the Biodiversity and Landscape and Visual Chapters are not significant.

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16.3.4 Land and Soils, Air Quality and Noise and Vibration

The removal of soils, overburden and rocks during the construction phase has the potential to give rise to dust and noise impacts. However, these effects and mitigation measures to avoid cumulative effects are detailed in this Land and Soils, Air Quality and Noise and Vibration Chapters. In summary, these assessments have identified that such interacting effects with the Land and Soils, Air Quality and Noise and Vibration Chapters are not significant.

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16.3.5 Landscape and Visual and Cultural Heritage

Site activities during construction have the potential to result in landscape and visual impacts. However, these effects and mitigation measures to avoid cumulative effects are detailed in this Landscape and Visual and Cultural Heritage Chapters. In summary, these assessments have identified that such interacting effects with the Landscape and Visual and Cultural Heritage Chapters are not significant.

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16.3.6 Population and Human Health, Air Quality, Noise and Vibration & Traffic and Transport

Site activities during construction have potential to give rise to dust and noise impacts due to increased levels of traffic. However, these effects and mitigation measures to avoid cumulative effects are detailed in this Population and Human Health, Air Quality, Noise and Vibration & Traffic and Transport Chapters. In summary, these assessments have identified that such interacting effects with the Population and Human Health, Air Quality, Noise and Vibration & Traffic and Transport Chapters are not significant.

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16.4 Cumulative Effects

The EU Guidelines define cumulative effects/impacts as:

> "Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project. For example;
>
> - Incremental noise from a number of separate developments.
> - Combined effect of individual impacts, e.g. noise, dust and visual, from one development on a particular receptor; and
> - Several developments with insignificant impacts individually but which together have a cumulative effect."

The EPA draft guidelines on the information to be contained in EIAR's mirrors this approach and defines cumulative impacts/effects as 'The addition of any minor or significant effects, including effects of other projects, to create larger, more significant effects'.

Therefore, the assessment of cumulative impacts considers the total impact associated with the Proposed Project when combined with other past, present and reasonably foreseeable future developments.

A search in relation to plans and projects that may have the potential to result in cumulative impacts was carried out. Data sources included the following:

- Kilkenny County Council (planning and roads section)
- An Bord Pleanála website
- Kilkenny County Council Development Plan
- EIAR Portal

As identified in Table 2.1 of the Planning Policy Chapter of this EIAR, the projects identified for consideration for potential cumulative impacts are listed below.

Table 16-2 Projects identified for consideration for potential cumulative impacts

Planning Ref:	Location	Description	Distance from Ballyhale
19/583	Ballyhale and Kiltorcan, Co. Kilkenny	For the development compromising of the provision of four battery storage containers which are required for the operation of the previously granted solar far in the townlands of Ballyhale and Kitorcan, Co. Kilkenny. (Reg. Ref, 16/592 & PL10.247616). The planning application also includes an extension to the operational permission of the solar farm to increased from 25 to 30 years and a reduction in the validity period of planning approval from 10-4 years.	2-4 KM
21/856	Leggetsrath West, Hebron Industrial Estate Kilkenny	To carry out development on a 1.9-hectare site. The development will consist of the construction of a 1769sqm portal frame steel clad building to include 1254sqm of production space, 515sqm of office space, entrance from existing internal road network, carparking, bicycle parking, roof mounted solar photovoltaic cells, connection to existing foul and surface water services, palisade fence to site boundary, landscaping and all associated siteworks. Permission was granted on the 13/10/2021.	25.4 KM
ABP 309306	Castlebanny Windfarm	The construction of 21 wind turbines and ancillary works at Castlebanny, Co. Kilkenny	4.8 km

Planning Ref:	Location	Description	Distance from Ballyhale
19/605	Derrynahinch, Kiltorcan Co. Kilkenny	The development consisting of a 10-year permission for the construction of a Solar PV Energy Development within a total site area of up to 9 ha to include an electrical transformer/inverter station module, battery storage modules, solar PV panels, ground mounted on steel support structures, access roads, fencing and associated electrical cabling ducting and ancillary infrastructure. Permission was granted with conditions on the 05/12/2019.	3.5km
Part 8 Scheme	R713/R448 Knocktopher to Ballyhale	To provide an continuous footway along the northern verge of the R731 from Ballyhale to the junction at Ballyhale.	2- 4km

The overall cumulative effects are listed below.

Table 16-3 Overall cumulative effects

Cumulative Impacts on Environmental Factors	
Cumulative impact assessment of all projects	Biodiversity: Taking the projects noted in Table 16.2 in-combination with the proposed scheme, with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.
	Water Environment: Taking the projects noted in Table 16.2 in-combination with the proposed scheme, with the Implementation of the proposed mitigation measures within the EIAR will ensure that there will be no cumulative significant adverse impacts on the water environment from the Proposed development in combination with other developments
	Land and Soils: Taking the projects noted in Table 16.2 in-combination with the proposed scheme, with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.
	Landscape & Visual: Taking the projects noted in Table 16.2 in-combination with the proposed scheme, with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.
	Cultural Heritage: Taking the projects noted in Table 16.2 in-combination with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.

	Population and Human Health: Taking the projects noted in Table 16.2 in-combination with the proposed scheme There may be a cumulative impact if the construction phases of projects commence at the same time as there may be an increase in local traffic, resulting in an increase in disruption, delays and emissions. However, given the nature of these projects, construction traffic is not likely to travel through Ballyhale, but would use alternative haulage routes for efficiency, and would operate under appropriate construction traffic management plans. There will be no operational impacts as there is no traffic associated with the operational phase of the development.
	Air Quality: Taking the projects noted in Table 16.2 in-combination with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.
	Noise and Vibration: Taking the projects noted in Table 16.2 in-combination with the implementation of the proposed mitigation measures there are no significant cumulative effects with the proposed scheme.
	Material Assets: Taking the projects noted in Table 16.2 in-combination with the proposed scheme there are slight negative, direct and indirect effects during the construction stage. There are no significant in-combination effects predicted during the operation stage of the scheme
	Traffic and Transport: Taking the projects noted in Table 16.2 in-combination with the proposed scheme there are slight temporary negative, direct and indirect effects during the construction stage. There are no significant in-combination effects predicted during the operation stage of the scheme

16.5 Mitigation Measures

Where any potential interactive negative interactive or cumulative impacts have been identified in the above, a full suite of appropriate mitigation measures have already been included in the relevant sections of the EIAR and are included in a schedule of mitigation that is included as Chapter 17 of the EIAR.

Commented [ES25]: Conclusion heading?

Commented [DFDCE26R25]: No conclusion required for this chapter

16.6 References

- European Commission (1999), guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. European Commission, Luxembourg.
- Environmental Protection Agency (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. EPA. Wexford.
- Health and Safety Authority (2018) Notified Seveso Establishments.www.hsa.ie. Available from: https://www.hsa.ie/eng/Your_Industry/Chemicals/Legislation_Enforcement/COMAH/List_of_Establishments/.