

## 20 Cumulative and Interactive Effects

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### 20.1 Introduction

This chapter of the EIAR presents:

- an assessment of the interaction/inter-relationship of effects between environmental factors; *and*
- an assessment of the likely effects of the proposed scheme on the environment resulting from the cumulation of effects with other existing and/or approved projects.

The methodology used to assess interaction/inter-relationship and cumulative effects is presented in **Section 20.2**. Interactive effects are discussed in **Section 20.3** whilst cumulative effects are discussed in **Section 20.4**.

### 20.2 Assessment Methodology

#### 20.2.1 Overview and Guidance

The requirement to address interactions of effects and cumulative impacts is set out in the EIA Directive as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment.

Interactive effects (i.e. interactions or inter-related effects), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Part 1 of 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:*

- (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).”*

The EIAR has considered and assessed interactive effects between environmental factors arising from the construction and operation of the proposed scheme.

A cumulative assessment has been undertaken based on best scientific knowledge in accordance with Part 5 of Annex IV of the 2014 EIA Directive (2014/52/EU):

*“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;”*

The EIAR has also considered and assessed cumulative effects arising from the construction and operation of the proposed scheme.

This chapter has been prepared in accordance with the following guidance:

- Department of Housing, Planning and Local Government (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018.
- EPA (2017) Guidelines on the Information to be contained in Environmental Impact Assessment Reports, Draft, August 2017.
- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report. (Office for Official Publications of the European Communities 2017).
- 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.
- EPA (2003) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2003.
- EPA (2002) Guidelines on the Information to be contained in Environmental Impact Statements, 2002.
- European Commission (1999) Guidelines for the Assessment of Indirect and Cumulative Effects as well as Impact Interactions, (Office for Official Publications of the European Communities 1999).

## 20.2.2 Definitions

The following definitions are generally used in the description of cumulative effects or interaction of effects.

It is noted that the terms “*effects*” and “*impacts*” are used interchangeably in this chapter.

The EC guidance (2017) uses the following definition for cumulative effects are defined as:

*“Changes to the environment that are caused by activities/projects in combination with other activities/projects”.*

EC guidance (2017) also states that:

*“It is important to consider effects not in isolation, but together, that is cumulatively. [...] Cumulative effects are changes to the environment that are caused by an action in combination with other actions. They can arise from:*

- *The interaction between all of the different projects in the same area;*
- *The interaction between various impacts within a single Project (while not expressly required by the EIA Directive this has been clarified by the CJEU [Court of Justice of the European Union] [...]).*

Under the EPA draft guidance (2017) cumulative effects are defined as:

*“The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects”.*

The EC guidelines (1999) use slightly different definitions as follows:

*“Cumulative Impacts: Impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”.*

The EC guidelines (1999) use definitions as follows:

*“Impact Interactions: The reactions between impacts whether between the impacts of just one project or between the impacts of other projects in the area”.*

The term ‘*impact interactions*’ is equivalent to the term ‘*inter-relationship of effects*’. The EC guidelines (1999) accept that their definitions overlap to a certain extent. The EC guidelines also refer to ‘*Cross-Media Impacts*’, in which the impact in one environmental medium may also have an indirect impact on another medium.

### 20.2.3 Interactive Effects- Assessment Methodology

All environmental factors are inter-related to some extent, and the relationships can range from tenuous to inextricable. The assessment of interactive effects has considered likely significant effects that may arise during construction and operation of the proposed scheme. The interactions between the identified environmental impacts have already been considered and assessed within the individual chapters of this EIAR. There have been numerous discussions and communications between the environmental specialists and the design team throughout the design process which helped to identify and minimise the potential for significant interaction of impacts. Measures to minimise impacts have been incorporated into the design and are also included in all of the assessments and the residual impacts have been assessed.

The assessment of interactive 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, including Environmental Protection Agency (2017) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* and European Commission (2017) *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report*, as outlined in **Chapter 1, Introduction**, as well as per the methodology adopted for each environmental factor as described in **Chapters 7 – 19**.

**Table 20.1** presents the potential interactions between the environmental factors in a matrix format.

It examines the potential for the environmental factor or issue in the left-hand column to have an impact on the environmental factor listed in the top row of the matrix as a result of the proposed scheme. As discussed above, these potential interactions of impacts were identified throughout the design process and measures addressing these impacts have already been included within the individual chapters of this EIAR. The paragraphs following **Table 20.1** present an assessment of the potential interactions of impacts, mitigation measures and residual effects. This assessment is based on information contained within this EIAR and the outcome of discussions and interactions between the environmental specialists and the design team.

The effects matrix examines the potential for the environmental effect in the left-hand column to have an interactive or indirect effect on the environmental medium listed in the top row of the matrix. The following symbology is applied:

- If there is the potential for an effect during the construction, this is indicated by a ‘C’.
- An ‘O’ indicates the potential for an effect during the operational phase.
- ‘CO’ indicates the potential for an effect during construction and/or operational phases.
- If there is considered to be no potential for an effect, this is indicated by blank box.

#### 20.2.4 Cumulative Effects- Assessment Methodology

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”.*

Likely significant cumulative effects of the proposed scheme in-combination with other existing and/or approved projects for each of the environmental factors were initially identified, considered and assessed in respective chapters of the EIAR.

Section 20.4 of this chapter presents a summary of all of the individual assessments together and examines and assesses whether the proposed scheme in combination with those other existing/approved projects would be likely to have significant effects (direct and indirect) both on an individual basis with the proposed scheme and also cumulatively with all such projects. No additional mitigation measures are proposed in this chapter. The process for identifying “other existing and/or approved projects” is described in Section 20.4.1.

The assessment specifically considered whether any of the approved developments in the local or wider area have the potential to exacerbate (i.e. alter the significance of) effects associated with the proposed development based on best scientific knowledge. Developments which are already built and operating, and which are not identified in this chapter, are included in the baseline environment or have been assessed as not having the potential to exacerbate effects.

The assessment of cumulative effects has considered likely significant effects that may arise during construction and operation of the proposed scheme. Cumulative effects were assessed to a level of detail commensurate with the information that was available at the time of assessment based on best scientific knowledge.

The methodology for this cumulative assessment is a four-part assessment:

- The first stage of this assessment was to identify the “other existing and/or approved projects’ to be included in the assessment. This process is described in Section 20.4.1. The projects that were included in the assessment are presented in **Table 20. 2**.
- Following identification of the “other existing and/or approved projects’, the EIA Specialists then considered whether each of these projects has the potential to give rise to likely significant cumulative effects with the proposed scheme. Where projects were not considered to have the potential to give rise to likely significant cumulative effects with the proposed scheme, they were disregarded from further assessment for reasons pertaining to, for example- location from the proposed scheme, nature of development etc. The outcome of this ‘screening’ exercise is noted in **Table 20.3**.
- Following the identification of projects with potential to give rise to likely significant cumulative effects with the proposed scheme in **Table 20.3**, an assessment of the same was undertaken. **Table 20.4** presents the results of the likely significant direct and indirect cumulative effect assessment (under all of the individual environmental factors) for each project identified in **Table 20.3** individually, in-combination with the proposed scheme.
- **Table 20.5** presents the results of the likely significant direct and indirect cumulative effects assessment of each project listed in **Table 20.3** all together as a whole in combination with the proposed scheme.

It should be noted that likely significant cumulative effects of the proposed scheme in-combination with those projects listed in **Table 20. 2** for each of the environmental factors are also identified, considered and assessed in respective chapters (**Chapter 7-19**) of the EIAR.

All of the experts have reviewed the available documentation relating to the existing/approved projects in **Table 20. 2** in order to conduct their assessments.

## 20.3 Potential Interactive Effects

### 20.3.1 Interactive Effects Matrix

The interactive effects have been summarised in **Table 20.1** and described in text thereafter, in accordance with the methodology outlined in **Section 20.2.3**. The residual effects have also been summarised in text.

**Table 20.1 Interactive Effects Summary**

	Traffic and Transport		Air Quality and Odour		Noise and Vibration		Biodiversity		Archaeology, Architecture and Cultural Heritage		Landscape and Visual		Land and Soil		Water		Resource and Waste Management		Population and Human Health		Material Assets		Major Accidents and Disasters		Climate	
	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O	C	O
<b>Traffic and Transport</b>			✓		✓															✓					✓	
<b>Air Quality and Odour</b>							✓													✓						
<b>Noise and Vibration</b>							✓		✓											✓						
<b>Biodiversity</b>																				✓						
<b>Archaeology, Architecture and Cultural Heritage</b>										✓		✓														
<b>Landscape and Visual</b>							✓	✓												✓	✓					
<b>Land and Soil</b>	✓		✓												✓		✓									
<b>Water</b>							✓					✓								✓						
<b>Resource and Waste Management</b>	✓																									✓
<b>Population and Human Health</b>																										
<b>Material Assets</b>																				✓						
<b>Major Accidents and Disasters</b>																										
<b>Climate</b>																										

The potential environmental interactions and indirect effects arising from the proposed development, indicated in the matrix, are summarised in the following sections.

### 20.3.2 Traffic and Transport and Air Quality

The generation of traffic has the potential to have a negative effect on air quality. However, traffic levels generated by the proposed scheme during the construction and operational phases will not be significant enough to have a detectable effect on air quality. The predicted traffic volumes show that the anticipated increases are significantly less than 5% for operation and less than 10% for construction. Traffic is therefore unlikely to result in likely significant air quality effects during construction and operational phases.

The effects on traffic and transport due to the proposed scheme are assessed in **Chapter 7, *Traffic and Transport***. The effects of the traffic generated by the scheme on air quality are considered in **Chapter 8, *Air Quality and Odour***.

Following the implementation of the proposed mitigation measures, no significant residual effects on air quality are expected during the construction or operation of the proposed scheme.

### 20.3.3 Traffic and Transport and Climate

The transportation of construction material to and from site has the potential to affect the embodied carbon of the construction materials and thus has the potential to affect climate. Materials transport required during the operational phase will not be significant enough to have a detectable effect on climate.

The effects on traffic and transport due to the proposed scheme are assessed in **Chapter 7, *Traffic and Transport***. The effects of the traffic generated by the development on climate are assessed in **Chapter 19, *Climate***.

Following the implementation of the proposed mitigation measures, no significant residual effects on climate due to embodied carbon from material transport are expected.

### 20.3.4 Traffic and Transport and Noise and Vibration

The generation of traffic has the potential to have a negative effect on noise and vibration.

However, traffic levels generated by maintenance vehicles during the operational phase will not be significant enough to have a detectable effect on noise and vibration. The predicted increases on affected roads are significantly less than 25%. Traffic is therefore unlikely to result in significant noise effects during construction and operational phases.

The effects on traffic and transport due to the proposed scheme are assessed in **Chapter 7, *Traffic and Transport***. The effects of noise levels at the nearest sensitive receptors are assessed in **Chapter 9, *Noise and Vibration***.

Following the implementation of the proposed mitigation measures, no significant residual noise or vibration effects are expected.



### 20.3.5 Traffic and Transport and Population and Human Health

The generation of traffic during the construction and decommissioning phases of the proposed development has the potential to indirectly affect population and human health. Traffic flows on the public road network will be disrupted during the construction works. Temporary, negative, but not significant effects on road users, including pedestrian movements, will arise because of this disruption.

The effects of the traffic generated by the scheme on local road users is assessed in **Chapter 7, *Traffic and Transport***. The effects of traffic and transport on the population in the local area are addressed in **Chapter 16, *Population and Human Health***.

Following the implementation of mitigation measures there will be a temporary, slight negative but not significant residual effects on population and human health in the area due to the disruption from construction traffic.

### 20.3.6 Air Quality and Odour and Biodiversity

A potential interaction between air quality and biodiversity during the construction phase of the proposed scheme was considered at an early stage given the presence of the habitats along the river and at the Arklow Town Marsh pNHA. Following the implementation of the proposed mitigation measures, no significant residual negative effects to air quality and, consequently, biodiversity are expected due to the proposed scheme.

The emissions to air from the proposed scheme during operation will be insignificant, therefore there will be an insignificant effect on biodiversity.

The effects of emissions to air from the proposed scheme on air quality is assessed in **Chapter 8, *Air Quality and Odour***. The effects of the proposed scheme on biodiversity are assessed in **Chapter 10, *Biodiversity***.

### 20.3.7 Air Quality and Odour and Population and Human Health

A potential interaction between air quality and odour and population and human health during the construction phase of the proposed development is identified.

Dust, odour and other emissions generated during the construction works have the potential to affect properties and commercial facilities in the vicinity of the proposed scheme, as well as the homeowners, employees, visitors and customers who frequent these areas. However, as the air quality and odour effects during construction are expected to be moderate and short term, with the resulting effects to population and human health during the construction phase predicted to be not significant. The emissions to air from the proposed development during operation will be insignificant, therefore no significant effects to population and human health are predicted.

The effects of emissions to air, during the construction phase, on air quality and odour and the consequent effect on population and human health is assessed in **Chapter 8** *Air Quality and Odour* and **Chapter 16**, *Population and Human Health*.

Following the implementation of the proposed mitigation measures, no significant residual effects on air quality and odour and, consequently, population and human health, due to the proposed development are expected.

### 20.3.8 Noise and Vibration and Biodiversity

There is a potential interaction between noise and vibration and biodiversity during the construction phase.

Noise emissions from construction activities along with vibration effects at the piling locations, could result in short-term, negative, but not significant effects. This will result in not significant effects to biodiversity.

The noise generated by the proposed scheme during operation is not expected to have an effect on biodiversity. No vibration will be generated in the operational phase.

The effects of the construction phase noise emissions on species are assessed in **Chapter 10**, *Biodiversity*. The effects of the proposed scheme on noise and vibration are assessed in **Chapter 9**, *Noise and Vibration*.

Following the implementation of the proposed mitigation measures, no significant residual effects on species due to noise or vibration effects from the proposed scheme are expected.

### 20.3.9 Noise and Vibration and Archaeology, Architecture and Cultural Heritage

A potential interaction between noise and vibration and archaeology, architecture and cultural heritage during the construction phases of the proposed scheme is identified.

Vibration effects generated from construction activities, such as sheet piling and bridge underpinning has the potential to affect the protected structure Arklow Bridge. In the unlikely event the vibration effects exceed acceptable limits, works will cease and alternative construction methods will be used. Further, given the current traffic volumes crossing Arklow Bridge, vibration effects from the construction phases are not anticipated to be significant.

The effects vibrations from the construction phase on protected structures are assessed in **Chapter 9**, *Noise and Vibration*. The effects to on archaeological, architectural and cultural heritage are assessed in **Chapter 11**, *Archaeological, Architectural and Cultural Heritage*.

Following the implementation of the proposed mitigation measures there are no significant residual effects to archaeology, architecture and cultural heritage from construction vibration expected.

### 20.3.10 Noise and Vibration and Population and Human Health

A potential interaction between noise and vibration and population and human health during the construction phases of the proposed scheme is identified.

Noise and vibration generated from construction activities, has the potential to be a nuisance to nearby residential receptors and the local population. The noise and vibration effects will result in a slight, negative effect to the closest sensitive receptors.

The effects of noise and vibrations from the construction phase on sensitive receptors are assessed in **Chapter 9, *Noise and Vibration***. The effects to population and human health are assessed in **Chapter 16, *Population and Human Health***.

Following the implementation of the proposed mitigation measures, a slight, temporary but not significant effect to population and human health from construction noise and vibration are expected.

### 20.3.11 Biodiversity and Population and Human Health

A potential interaction between biodiversity and population and human health has been identified. A slight, negative effect on biodiversity, when trees and habitats are removed during the construction phase, has the potential to have a negative, but not significant effect on residential and recreational amenity, and enjoyment of the local area.

The effects of the construction phase on biodiversity are assessed in **Chapter 10, *Biodiversity***. The effects of construction on the population in the local area are addressed in **Chapter 16, *Population and Human Health***.

Following the implementation of the proposed mitigation measures and tree / landscape planting, no significant residual effects on biodiversity due to the proposed development are expected. Consequently, a resulting negative effect on population and human health, is not expected, with a potential positive effect predicted from the landscape planting.

### 20.3.12 Archaeology, Architectural and Cultural Heritage and Land and Soils

There is a potential interaction between archaeology, architectural and cultural heritage and land and soils during the construction phase. For example, the excavation of estuarine material during the dredging (Work package 2) has the potential to encounter previously un-recorded archaeological features. Therefore, an extensive suite of archaeological mitigation is proposed including the archaeological examination and metal detection of a portion of the dredged material before reuse or removal offsite.

The effects of the proposed scheme on archaeology, architectural and cultural heritage are addressed in **Chapter 11 *Archaeology, Architectural and Cultural Heritage***. The effects of the proposed scheme on land and soils are assessed in **Chapter 13, *Land and Soils***.

With the implementation of mitigation measures, the proposed scheme is not expected to have a significant effect on known archaeology, architectural or cultural heritage.

### 20.3.13 Archaeology, Architectural and Cultural Heritage and Landscape and Visual

Given the maritime heritage of the area, and the presence of the protected structure Arklow Bridge, there is a potential interaction between archaeology, architectural and cultural heritage and landscape and visual amenity arising from the proposed flood scheme.

The design has carefully considered the potential for likely significant effects on heritage/amenity especially in relation to the treatment of features such as the quay walls, Arklow Bridge, mooring posts, Tyrells yard slipway etc. Specific mitigation has been embodied into the design of the scheme so as to minimise likely significant negative effects. The maritime and industrial heritage features of the town's historic past have been incorporated into the proposed public realm design including the provision of information panels at features of an historical heritage and a glass panel inserted into the flood defence walls at the historic Tyrell's slipway so the structure can be viewed. This will have a positive residual effect to landscape and visual amenity with a resulting slight positive residual effect on cultural heritage.

The effects of the proposed development on archaeology, architectural and cultural heritage are addressed in **Chapter 11, *Archaeology, Architectural and Cultural Heritage***. The effects of the proposed development on landscape and visual amenity been addressed in **Chapter 12, *Landscape and Visual***.

### 20.3.14 Landscape and Visual and Biodiversity

A potential interaction between landscape and visual and biodiversity has been identified. A negative effect on landscape and visual amenity, when trees and habitats are removed during the construction phase, has the potential to have a negative, but not significant effect on biodiversity. Tree / landscape planting will be provided which will have a positive effect to landscape and visual character, as well as biodiversity, as a result of the proposed scheme.

The effects of the proposed scheme on landscape, and the removal of vegetation, are assessed in **Chapter 12, *Landscape and Visual***. The effects of the construction phase on biodiversity are assessed in **Chapter 10, *Biodiversity***.

Following the implementation of the proposed mitigation measures and the tree / landscape planting, no significant residual effects on biodiversity due to the proposed scheme are expected.

### 20.3.15 Landscape and Visual and Population and Human Health

A potential interaction between landscape and visual effects and population and human health during both the construction and operational phase of the proposed scheme is identified.

Construction activities have the potential to have localised short term, negative effects on visual amenity and landscape character, with a consequent short term, negative but not significant effect on the residential and recreational amenity of the receptor population. During the operational phase, the flood embankment walls have potential to have a negative effect to the visual amenity of the river.

However, over time, this will become more accepted as the new usage pattern establishes, and the public amenity benefit realised. The works to the public realm will have a positive, long-term effect with a resulting positive effect to the local population, amenity and tourism. The debris trap piers have the potential to have a negative effect on visual amenity, with a consequential negative, but not significant effect on the residential and recreational amenity of nearby residential receptors and the local population.

The effects of the proposed scheme on landscape, visual amenity and local population receptors are assessed in **Chapter 12, *Landscape and Visual***. The effects of landscape and visual on the population in the local area are addressed in **Chapter 16, *Population and Human Health***.

The overall impact of the proposed scheme on the local amenities will be positive and permanent with a resulting positive residual effect to population and human health in the area.

### 20.3.16 Land and Soils and Air Quality and Odour

A potential interaction between land and soils and air quality and odour during the construction phase of the proposed scheme is identified.

Excavations, dredging and associated activities, dependent on the nature of land and soils, during the construction phase have the potential to create odour, dust and emissions to air and thus have a moderate, short-term, negative effect on air quality and odour.

The effects of the proposed scheme on air quality are assessed in **Chapter 8, *Air Quality and Odour***. The effects of the proposed development on land and soils are assessed in **Chapter 13, *Land and Soils***.

Following the implementation of the proposed mitigation measures, no significant residual effect on air quality and odour is expected.

### 20.3.17 Land and Soils and Water

A potential interaction between land and soils and water during the construction phase of the proposed development is identified. Earthworks, dredging, drainage works, and works within and in proximity to the river during the construction phase, dependent on the nature of land and soils, have the potential to have a

slight to moderate temporary negative effects to water quality due to activities which could cause sediment-laden runoff and increased flood risk during instream works.

The effects of the proposed development on water quality are assessed in **Chapter 14, *Water***. The effects of the proposed development on land and soils are assessed in **Chapter 13, *Land and Soils***.

Following the implementation of the proposed mitigation measures, no significant residual effect to water quality due to the nature of land and soils is expected during the construction phase.

### **20.3.18 Land and Soils and Traffic and Transport**

A potential interaction between land and soils and traffic and transport during the construction phase of the proposed development is identified. Dredging, earthworks and associated activities during the construction phase, dependent on the nature of land and soils, have the potential to affect traffic and transport as material will need to be transported to the various site compounds and some material that is not re-used on site that will be transported to a suitable licensed facility for disposal or recovery, and/or will have potential for reuse on another construction site. This will result in slight, temporary, negative effects on traffic.

The effects of the proposed development on traffic and transport are assessed in **Chapter 7, *Traffic and Transport***.

Following the implementation of the proposed mitigation measures there will be some slight, temporary but not significant residual effects to traffic and transport expected.

### **20.3.19 Land and Soils and Resource and Waste Management**

There is a potential interaction identified between land and soils and resource and waste management during the construction phase. Land and soils have the potential to affect resource and waste management as the dredging, earthworks and associated activities will result in material that will be reused on site, as well as material that will require disposal or recovery at suitably licenced facility, and/or will have potential for reuse on another construction site. This will result in slight, negative and short-term effects to resource and waste management during the construction phase due to an increased demand on waste recovery and/or disposal sites. The effects on resource and waste management are expected to be not significant during the operational phase.

The effects of the proposed development on land and soils as a resource are assessed in **Chapter 13, *Land and Soils*** and **Chapter 15, *Resource and Waste Management***.

The residual effects of the proposed development on resource and waste management during the construction phase, following the implementation of mitigation measures are considered to be slight, negative and short-term.

### 20.3.20 Water and Biodiversity

Negative effects on water quality and changes to the hydrological regime, arising from run-off, suspended sediments, dredging activity, release of contaminants or herbicides during the construction phase of the proposed scheme, have the potential to have short term, negative but not significant effects on aquatic biodiversity including nearby marsh habitats within the Arklow Town Marsh pNHA (site code 001931) and the Avoca River.

The effects of the construction phase on biodiversity are assessed in **Chapter 10, Biodiversity**. The effects of the proposed scheme on water are assessed in **Chapter 14, Water**.

Following the implementation of the proposed mitigation measures, no significant residual effects on water quality and, consequently, on biodiversity due to the proposed scheme are expected.

### 20.3.21 Water and Population and Human Health

A potential interaction between water and effects to population and human health during the operational phase of the proposed scheme is identified.

The operation of the proposed scheme will result in an overall significant reduction in the existing flood risk which will have long-term slight positive effect to hydrology. This will result in a significant, long-term positive effect to residents, local amenities, tourism, human health and economic activities.

The effects of the proposed scheme on water are addressed in **Chapter 14, Water**. The effects of the proposed scheme on population and human health are addressed in **Chapter 16, Population and Human Health**.

There is a long-term, significant positive effect on population and human health predicted during the operational phase of the proposed scheme.

### 20.3.22 Resource and Waste Management and Climate

A potential interaction between resource and waste management and climate effects during the construction phase of the proposed scheme is identified. There is embodied carbon associated with the resources required and the waste generated during the construction phase with a consequential negative but not significant effect on climate.

The effects on resource and waste management from the proposed development are assessed in **Chapter 15, Resource and Waste Management**. The effects of resource and waste management on carbon emissions from the proposed development are assessed in **Chapter 19, Climate**.

There are no significant residual negative effects on climate expected due to the proposed scheme.

### 20.3.23 Resource and Waste Management and Traffic and Transport

A potential interaction between resource and waste management and traffic and transport effects during the construction phase of the proposed scheme is identified.

The transportation of resources and waste to and from site has the potential to affect traffic and transport during the construction phase. The dredge material will require transport to the various construction compounds. The construction phase will result in material requiring transport for disposal or recovery at a suitably licenced facility, and/or will have potential for reuse on another construction site.

Materials transport required during the operational phase will not be significant enough to have a notable effect on traffic and transport.

The effects to resource and waste management from the proposed development are assessed in **Chapter 15, *Resource and Waste Management***. The effects of resource and waste management on traffic and transport from the proposed development are assessed in **Chapter 7, *Traffic and Transport***.

Following the implementation of the proposed mitigation measures there will be temporary, slight but not significant residual effects to traffic and transport are expected due to the proposed scheme.

### 20.3.24 Material Assets and Population and Human Health

A potential interaction between material assets and population and human health may arise during construction with regards the diversions to existing electricity infrastructure, which could have a temporary, negative effect on the local population should supply be affected as a result of construction works.

Construction works will also have temporary impacts on material assets such as slipways, pontoons and floating moorings- which will be rendered inaccessible for a period of the works. An interaction with the population is identified here as a result of restricted amenity use of the river. During both the construction and operation phase there will also be reduced access to the river via existing slipways. A negative interaction with population is identified, again attested to amenity value.

There will be some permanent land-take in the construction and operational phase of the proposed scheme that will result in interactions with population due to either temporary or permanent loss of amenity areas. Land will be reinstated to its original use in the operational phase at SC6 and SC2- which are key amenity areas.

The effects on material assets are addressed in **Chapter 17, *Material Assets***. The direct and indirect economic and social benefits are addressed in **Chapter 16, *Population and Human Health***.



## 20.4 Likely Significant Cumulative Effects

This section of the chapter presents an assessment carried out to examine whether the proposed scheme along with any other existing and/or approved project could cumulatively result in a likely significant environmental impact.

### 20.4.1 Identification of “other existing and/or approved projects”

A review was initially carried out to identify other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular importance likely to be affected or the use of natural resources. A review was carried out of the planning files for:

- Wicklow County Council (WCC);
- An Bord Pleanála (ABP);
- County Councils in neighbouring counties
- Department of Housing, Planning and Local Government (DHPLG) – Foreshore Applications; *and*
- Department of Housing, Planning and Local Government (DHPLG)- EIA Portal.

Arising from this review, a number of existing and/or approved projects (as listed in **Table 20.2** and shown on **Figure 20.1** below) were identified which could have the potential for likely significant cumulative effects. The potential for likely significant cumulative effects of these projects were considered in each of the **Chapters 7-19**. Many of the projects were screened out by the environmental specialists for a number of reasons including the location, scale and nature of the project. Refer to **Table 20.3**. Refer to the specific chapters for details of the reasoning as to why projects were screened out.

Those projects which were screened in are considered in **Table 20.4**

The assessment also considers whether all of the existing/approved projects taken together as a whole will likely have significant cumulative effects in combination with the proposed scheme.

There are many projects listed on the planning database for Wicklow County Council, An Bord Pleanála, neighbouring county councils and the DHPLG Foreshore Applications and EIA Portal. However, the focus for this assessment was on the proximity, scale and nature of those projects in relation to the proposed scheme and on those which could potentially exacerbate environmental effects and thus be of significance to the cumulative effects assessment.

For example, particular attention was given to larger scale projects in proximity to the proposed scheme. Those projects where EIARs or NIS's accompanied the planning applications were also given due regard at review stage.

Live or proposed projects which have not yet been permitted were not considered in this assessment with the exception of the Arklow Bank Wind Park Phase 2 developments.

The Arklow Bank Wind Park Phase 2 Project will consist of three developments (subject to consent): onshore grid infrastructure, offshore grid infrastructure and operations & maintenance (O&M) facility.

At the time of writing of this EIAR, publicly available details of the onshore grid infrastructure (OGI) project were available from the ABP website: pre-application stage (Reference 30662), the EIA portal (2021060) and the project developer website. It is expected that the planning application to ABP will be submitted for this OGI project before this EIAR is published. Given the location of this development, it was included in the cumulative impact assessment.

The offshore grid infrastructure project was considered to be too distant from the flood relief scheme for cumulative effects to arise and was therefore not included in the assessment.

A planning application has not yet been submitted for the O&M facility. It was considered that there was insufficient information publicly available on the O&M facility to carry out a meaningful cumulative impact assessment and has therefore not been included in the assessment

Further, there are other applications which have been refused planning consent or have been withdrawn or invalidated and these have also not been considered or assessed in this cumulative effect's assessment.

**Table 20. 2 List of projects identified as having potential for likely significant cumulative effects due to the construction and/or operation of the proposed scheme**

<b>20426 (Circle K Safeway Service Station)</b>	
Address Line 1	Circle K Safeway Service Station (Ard Services Ltd Circle K Safeway Service Station, Dublin Road (R772))
Description	(i) demolition of existing roadside fuel forecourt and associated canopy (ii) demolition of southern part of existing premises, (iii) construction of a new 3 island fuel forecourt associated illuminated canopy, underground and overground fuel infrastructure
<b>19750 (Frank &amp; Sandra Duffy No 7 and 8 Bridge Street &amp;, No 34 Main Street)</b>	
Address Line 1	No 7 and 8 Bridge Street &
Description	demolition of 2 no buildings and for the erection of a retail and commercial building of 296.3 sqm and associated site works
<b>16248 (Gaines Europe Ltd Unit 1A Lower Tinahisk, South Quay)</b>	
Address Line 1	Unit 1A Lower Tinahisk
Description	A new warehouse storage & distribution facility of 5,000sqm with loading bays, parking areas & associated landscaping & boundary treatment works. Existing exit to the public road west boundary to be upgraded to improve turning radius for vehicles & facilities.
<b>16414 (Gaines Europe Ltd Tinahask Lower, South Quay)</b>	
Address Line 1	Tinahask Lower
Description	Demolition of existing disused industrial buildings of total floor area of 24,500 sqm
<b>S1201801 (Irish Water Arklow, Co. Wicklow) and associated Foreshore licence (FS006862)</b>	
Address Line 1	Arklow
Description	Arklow Waste Water Treatment Plant Project
<b>15857 (Joby Developments North Quay, Arklow)</b>	
Address Line 1	North Quay
Description	p.r.r. 05/610115 (for demolition of existing structures and construction of 2 no. 5 storey blocks comprising of 8 retail units and 50 residential units, an on-site wastewater treatment facility and ancillary parking and all associated site works)
<b>18316 (Mill Sea Ltd North Quay, Arklow)</b>	
Address Line 1	North Quay
Description	Demolition of existing disused industrial buildings including gas bottle filling plant, warehouse, administration offices, site office, security office and store of total floor area 2035 sqm.
<b>20469 (Wicklow County Council Inner Harbour / Dock, Off South Quay)</b>	

Address Line 1	Inner Harbour / Dock
Description	Construction of 14 storage units, for active registered fishers (under license agreement), with internal dimensions of approximately 35 sq metres and associated siteworks including provision for connection to services and two concrete slab work areas app
<b>181170 as amended by 191187 (Action Enterprises (Action Health Enterprises Ltd.))</b>	
Address	The Former Boland's Builders Providers , Castle Park , Arklow
Description	<p>A 5 storey Community Primary Healthcare Centre and retail units. The development will include the following: the construction of a 5 storey primary care centre complex (7440m2) comprising; receptions/waiting areas, GP surgeries and associated offices and consultation rooms, specialist consultant surgeries and associated offices and consultation rooms, HSE and TUSLA offices, consultation rooms and meeting rooms, other primary care offices consultation rooms and meeting rooms, and ancillary accommodation (6919m2). In addition, 3 no. lower ground floor retail units are proposed (521m2); also, the demolition and partial demolition of existing buildings on the site, entrance, surface car parking (44 spaces), bike parking, ESB sub station and switchroom (34m2), waste storage area, roof plant; landscaping and all other associated works. The proposed development involves work to the rear of an outbuilding forming part of a protected structure (listed as 22 Main Street, Arklow: RPS ref: A23-16322035)</p> <p>Modifications to the 5 storey Primary Healthcare Centre building permitted under PRR 18/1170. The amended building will have a reduced footprint and floor area (c.5,533m2) and the permitted top floor will be omitted. The amended building will be 4 storey plus roof level plant room. The building will have a revised internal layout incorporating two lightwells and revised elevations. The number of retail units will be reduced from 3 to 1. 2. Modifications of the external space including revised vehicular access route, 80 no. car parking spaces (including undercroft parking) and relocation of bicycle parking and waste store. 3. Provision of windows and entrances and signage to rear of the retail unit at 22 Main Street. 4. Installation of a pump station and treatment plant on site to treat wastewater from the Primary Healthcare Centre prior to discharge to the public sewer. 5. Landscaping, signage and all associated site works and services</p>
<b>18940 (Crag Digital Avoca Limited)</b>	
Address Line 1	Avoca River Park, Shelton Abbey & Kilbride, Arklow, Co. Wicklow
Description	Demolition of buildings and structures on site, construction of Data Storage Facility comprising 3 data storage buildings and all associated site infrastructure, including: a data storage facility 1 (6 Pod Data Centre) located to north of site served by 1 gas generator compound to south of Data Storage building including 5 flues & 2 banded fuel tanks located to south east & south west of Data Storage building and powered by (part grid / part gas) with emergency diesel fuel backup. Data storage facility 2 (8 pod data centre) located to south of Data Storage Facility 1 served by 1 gas generator compound to the south of building including 6 flues and 2 banded fuel tanks located to south east and south west of Data Storage building and powered by (part grid / part gas) with emergency diesel fuel backup. Data storage 3 (8 pod data centre) located to south of site served by 1 diesel generator compound to

	<p>north of building including 8 flues and 2 bunded fuel tanks, located to north east &amp; north west of Data Storage building &amp; powered by grid.</p> <p>Note: Another application has been made by Crag Digital Avoca Limited for this site, (Planning Reference 201285).</p>
<p><b>201285 (Crag Digital Avoca Limited)</b></p>	
<p>Address Line 1</p>	<p>Avoca River Park, Shelton Abbey &amp; Kilbride, Arklow, Co. Wicklow</p>
<p>Description</p>	<p>Demolition of existing industrial building units totalling (c.2784.4m<sup>2</sup>) comprising of a c.7.1m high Overall Main Building (c.2460m<sup>2</sup>), a c.4.2m high Substation (c. 107.3m<sup>2</sup>), a c.3.6m high Guardhouse (c.106.2m<sup>2</sup>), a c.3.6m high East-Building (c.39.1m<sup>2</sup>), c.5m high Water Tank (c.56.8m<sup>2</sup>) &amp;c.2.6m high Pump House Building (c.15.1m<sup>2</sup>), associated works.</p> <p>Development of 3 no. Data Centre Buildings, ancillary offices &amp; plant comprising of: Data Centre Building A, - a single storey Data Centre Building, with mezzanine 1st floor level offices (GFA c.10,564m<sup>2</sup>, building height c.13,658m &amp; structures c.15,137m), made up of 2 no. Data Halls &amp; loading areas with associated 2 no. Dock Levellers &amp; including 10 no. c.14m high flues, &amp; adjacent 1 no. Standby Power Generation Compounds, consisting of 10 no. IIV Diesel Generators and belly tanks (GFA c.530m<sup>2</sup>), 1 no. storage fuel tank (GFA c.15m<sup>2</sup>). Data Centre Building B - a single storey data centre building with mezzanine 1st floor level offices (GFA c.18,508m<sup>2</sup>, building height c.13,658m &amp; structures c.15,137m), made up of 4 no. Data Halls and loading areas with associated 2 no. Dock Levellers &amp; including 20 no. c.14m high flues, and adjacent 2 no. Standby Power Generation Compounds, consisting of 20 no. HV diesel Generators &amp; belly tanks (GFA c.1,060m<sup>2</sup>), 2 no. storage fuel tanks (GFA c.30m<sup>2</sup>). Data Centre Building C - a single storey data centre building with mezzanine 1st floor level offices (GFA c.18,508m<sup>2</sup>, building height c.13,658m &amp; structures c.15,137m), made up of 4 no. Data Halls &amp; loading areas with associated 2 no. Dock Levellers &amp; including 20 no. c.14m high flues, &amp; adjacent 2 no. Standby Power Generation Compounds, consisting of 20 no. Diesel Generators and belly tanks (GFA c.1,060 rr.2), 2 no. storage fuel tanks (GFA c.30m<sup>2</sup>)</p> <p>Upgrading of existing 110 kV Substation to comprise of Compound (c. 8539m<sup>2</sup>) consisting of 110kV GIS Switch Room (GFA c.708m<sup>2</sup>), and 4 no. External Transformers (GFA c.550m<sup>2</sup>), a grid connection, security fence &amp; all associated works &amp; services.</p> <p>Development of 1 no. Fire Hydrant Pump Hose (GFA c.129m<sup>2</sup>) with Sprinkler Tank (c.49m<sup>2</sup>), 1 no. single storey Security Guard Hose (GFA c.48m<sup>2</sup>) and 2 no. vehicular accesses, internal access roads &amp; 224 no. surface car parking spaces.</p> <p>An upgraded attenuation basin, a proposed wastewater treatment plant and polishing filter.</p>

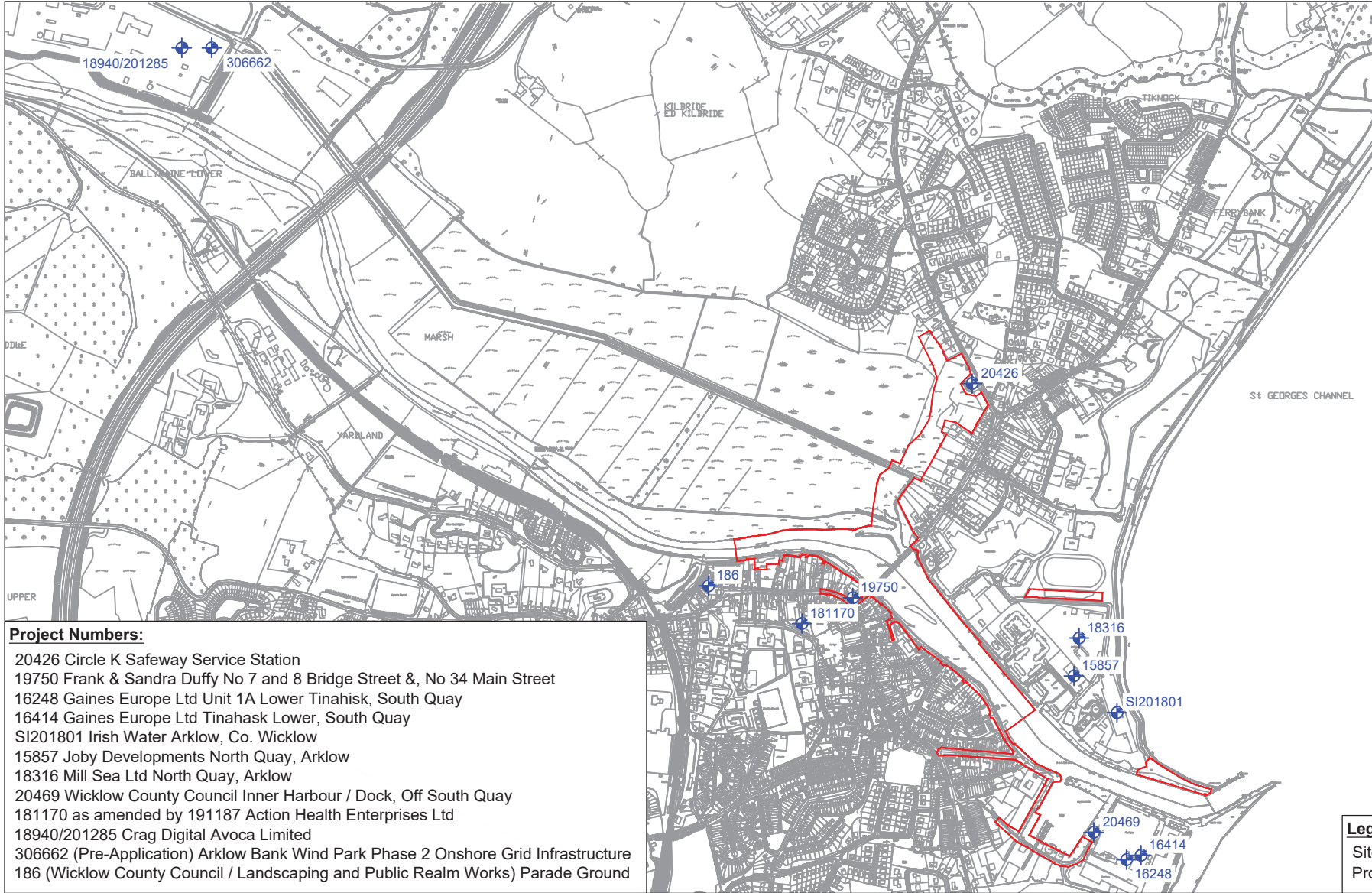
	<p>All associated site services, with c. 2.7m high palisade fence, landscaping, boundary &amp; all associated site development works above &amp; below ground. An EIAR has been prepared in respect of the proposed dev at Avoca River Park Shelton Abbey &amp; Kilbride Arklow.</p> <p>If the proposed development (ABWP Phase 2 OGI) is granted approval and proceeds to construction, one data hall from the data centre development, located on the substation site, will not be built.</p>
<p><b>306662 (Arklow Co. Wicklow, Pre-Application) Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure<sup>1</sup></b></p>	
<p>Description</p>	<p>This will comprise the onshore grid infrastructure including 220kV onshore export cable circuits and fibre optic cables, from the landfall of the offshore export cable circuits at Johnstown North, to a proposed new 220kV substation at Shelton Abbey and an overhead line connection from the new substation to the National Electricity Transmission Network (NETN). The Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure will provide:</p> <p>Landfall for two offshore export cable circuits from the High Water Mark (HWM) to two Transition Joint Bays (TJB) at Johnstown North, located approximately 4.5km northeast of Arklow Harbour,</p> <p>Connection by two underground 220kV high voltage alternating current cable circuits, and fibre optic cables over a distance of c. 6km, from the landfall to the new onshore 220kV substation,</p> <p>A new onshore 220kV substation, to be located at Shelton Abbey, north of the Avoca River, approximately 2.1km northwest of Arklow town consisting of two connected compounds:</p> <ol style="list-style-type: none"> <li>1. The transmission compound with the infrastructure to physically connect to the NETN, and</li> <li>2. The connection compound with the infrastructure to allow the connection of the windfarm in accordance with EirGrid grid code requirements.</li> </ol> <p>Flood defence improvement works to the existing Avoca River Business Park flood defences located c. 500m west of the substation site;</p> <p>A 220kV overhead line connection from the new 220kV substation at Shelton Abbey to the existing 220kV transmission network located c. 200m from the substation site.</p>

<sup>1</sup> At the time of writing this EIAR, a pre-application application submission had been made to the Board - planning reference 306662. Publicly available documentation on the proposed Arklow Bank Onshore Grid Infrastructure project were reviewed as part of the cumulative impact assessment for the FRS EIAR. The planning application for the proposed OGI development was lodged shortly before the submission of this EIAR

	The construction is expected to be completed from 2023-2024. The EIAR has been submitted.
<b>186 (Wicklow County Council / Landscaping and Public Realm Works) Parade Ground</b>	
Address Line 1	The Parade Ground, Main Street, Arklow, Co. Wicklow
Description	<p>This project would enable a significant transformation of the streetscape and public realm of the historic core of Arklow. WCC has given careful consideration to the location of the first flagship investment in Arklow town for a decade and has chosen the Parade Ground site because of its central location and because of the historic importance of the area, which was once home to Ormonde Castle.</p> <p>WCC plans to embrace the section of Castle wall that remains to commemorate the historic significance of the area which is to be viewed as a tourist landmark for Arklow within the proposed streetscape. Arup acknowledges that WCC along with their project partners view this project as a means to transform the Main Street area and reignite the vibrancy of Arklow Town. Part VIII Planning approval for the development was granted in 2018. As part of the Urban Regeneration Development Fund (URDF), a funding application was lodged which was deemed appropriate to proceed as a Category A project with funding granted. This project is being delivered with partial funding from the URDF supplemented by WCC funding. A design team lead by Arup was appointed to produce a detailed design and tender documents and support WCC in implementing this project. After a long and complex design process, construction work for the first phase is expected to commence in Q1 2021 to be concluded by Q4 2021. The Parade Ground is located within Arklow Town, in the Wicklow County Council area, on the R772 route through the town centre. This project involves the realignment of kerbs within the area, the reinstatement of asphalt and granite paving slabs, the installation of public realm furniture, the planting of new street trees, the diversion/protection of utilities, and includes the following:</p> <ul style="list-style-type: none"> <li>• Site clearance within proposed works area;</li> <li>• The construction of new drainage elements to connect to the existing network;</li> <li>• Full depth reconstruction of the existing road pavement;</li> <li>• New kerb and footway construction;</li> <li>• The construction of new raised pedestrian crossing points;</li> <li>• The installation of new uncovered bike racks;</li> <li>• The installation of a new water bottle refill station;</li> <li>• The installation of a new interactive Tourism Kiosk;</li> <li>• The installation of new street furniture including bollards, planters and benches;</li> <li>• The reinstatement of existing signage, and the provision of new signage and road markings;</li> <li>• The relocation of an existing bus stop, including enabling works for the installation of a new bus shelter;</li> <li>• The provision of new ducts within the footpath;</li> </ul>

	<ul style="list-style-type: none"> <li>• The provision of new sections of watermain, to Irish Water standards;</li> <li>• The provision of new street trees;</li> <li>• The relocation of existing lighting poles in the footpath and the provision of new poles and luminaries; and</li> <li>• The diversion/protection of existing utilities.</li> </ul>
<b>FORESHORE</b>	
<b>Application Name and Number</b>	FS007049 Sure Partners Site Investigations at Arklow Bank
<b>Year</b>	2019
<b>Description</b>	This application refers to the site investigation works required to inform the engineering and detailed design of the offshore wind farm to a sufficient level to allow detailed engagement with the supply chain so as to enable participation in a RESS auction. The objectives of the site investigation are to gather sufficient geotechnical information to develop a detailed ground model and to gather refined information on the wind resource. The geotechnical data will cover the array area, cable routes, land falls and potential in-harbour works.
<b>Status</b>	Applied





**Project Numbers:**

- 20426 Circle K Safeway Service Station
- 19750 Frank & Sandra Duffy No 7 and 8 Bridge Street &, No 34 Main Street
- 16248 Gaines Europe Ltd Unit 1A Lower Tinahisk, South Quay
- 16414 Gaines Europe Ltd Tinahisk Lower, South Quay
- SI201801 Irish Water Arklow, Co. Wicklow
- 15857 Joby Developments North Quay, Arklow
- 18316 Mill Sea Ltd North Quay, Arklow
- 20469 Wicklow County Council Inner Harbour / Dock, Off South Quay
- 181170 as amended by 191187 Action Health Enterprises Ltd
- 18940/201285 Crag Digital Avoca Limited
- 306662 (Pre-Application) Arklow Bank Wind Park Phase 2 Onshore Grid Infrastructure
- 186 (Wicklow County Council / Landscaping and Public Realm Works) Parade Ground

**Legend:**

- Site Boundary —
- Project Locations ◆

**ARUP**

Arup, 50 Ringsend Road  
 Dublin, D04 T6X0  
 www.arup.ie  
 Tel +353(0)1 233 4455 Fax +353(0)1 668 3169

Client  
**Wicklow County Council**

Project Title  
**Arklow Flood Relief Scheme**

Draining Title  
**Cumulative Projects**

Scale at A4 **NTS**  
 Role **Environmental**  
 Suitability **For Information**

Arup Job No <b>325246-00</b>	Rev <b>R01</b>
Name	

**Figure 20.1**

**Table 20.3 Potential for Cumulative Effects Screening Table**

No.	Project	Traffic and Transport	Air Quality and Odour	Noise and Vibration	Biodiversity	Heritage	Landscape and Visual	Land and Soils	Water	Resource and Waste	Population and Human Health	Material Assets	Major Accidents and Disasters	Climate
1	Circle K Service Station				✓	✓			✓	✓		✓	✓	
2	No 7 and 8 Bridge St, No 34 Main St					✓				✓		✓		
3	Gaines Europe Ltd Unit 1A									✓		✓		
4	Gaines Europe Ltd Tinahask Lower									✓		✓		
5	Irish Water WwTP	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
6	Joby Developments North Quay	✓								✓		✓		
7	Mill Sea Ltd North Quay									✓		✓		
8	Inner Harbour / Dock off South Quay									✓		✓		
9	Action Health Enterprises Ltd									✓		✓		
10	Crag Digital Avoca Limited									✓		✓	✓	
11	Arklow Bank OGI Pre-application	✓								✓		✓		
12	Parade Ground	✓								✓		✓		
13	Sure Partners Ltd Site Investigations				✓	✓				✓		✓		
	<b>All Projects</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

## 20.4.2 Overall Cumulative Effects Assessment

Likely significant cumulative effects<sup>2</sup> assessment of projects listed in **Table 20.2** and screened in **Table 20.3** in combination with the proposed scheme are listed in **Table 20.4**. The overall cumulative effects summary is provided in **Table 20.5**.

**Table 20.4 Projects with potential for Likely Significant Cumulative Effects**

<b>181170 (Action Health Enterprises GP Limited The Former Boland's Builders Providers, Castle Park)</b>	
<b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b>	<b>Resource and Waste Management:</b> Due to the nature of this development, there is potential for a cumulative resource and waste management effect during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. However, having regard to the imperceptible resource and waste management effect of the proposed scheme during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme.
	<b>Material Assets:</b> This project relates to the development of a primary care facility at Castle Park. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted. Should construction of the proposed scheme happen once this project is operational, there may be some cumulative effects on existing material assets by means of potential disruption to some utilities and services in the Arklow area. A potential slight negative and temporary indirect cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.
<b>20426 (Circle K Safeway Service Station)</b>	
<b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b>	<b>Biodiversity:</b> Both the Circle K project and Arklow FRS development carry the risk for the uncontrolled release of discharges including sediment laden water or other waste material pollution, to the nearby marsh habitats and river. There is potential that these discharges may act in combination to directly impacting habitat and water quality, and indirectly effect the availability of food items used by SCI birds foraging in the area. Biological receptors of concern with regard discharges are: <ul style="list-style-type: none"> <li>• Fish</li> </ul>

<sup>2</sup>It is noted that the terms “effects” and “impacts” are used interchangeably in this chapter and assessment.

	<ul style="list-style-type: none"> <li>• Otter</li> <li>• Benthic Habitats</li> <li>• Birds</li> </ul> <p>Activities proposed for Arklow FRS development will be require implementation mitigation measures that will ensure no significant release of sediment in laden water and runoff chemicals or other waste material pollution into the Arklow River or marsh area. With the implementation of measures, it is concluded that likely significant cumulative effects will not occur.</p>
	<p><b>Heritage:</b> This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located adjacent to Arklow Town Marsh and SC1 of the proposed scheme. This Circle K project involves development of over ground and underground fuel infrastructure. Even through this development is in close proximity to the proposed works within the Marsh and at SC1, this proposal is for a rebuild of a brownfield site already disturbed from an archaeological perspective. No likely significant cumulative effects will occur.</p>
	<p><b>Water:</b> This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located immediately adjacent to Arklow Town Marsh and SC1 of the proposed flood relief scheme. Due to the nature of this development, there is potential for a cumulative water quality effect during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight negative effects on water quality due accidental leak or spills which could be conveyed to Arklow Town Marsh via surface water run-off. With the implementation of the proposed mitigation measures for the FRS, construction of the FRS is not expected to give rise to impacts on water quality in Arklow Town Marsh, as a result of accidental leaks and spills. Consequently, no likely significant cumulative impacts are expected during the construction of the FRS and the Circle K project.</p>
	<p><b>Resource and Waste Management:</b> Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted Having regard to the imperceptible resource and waste management effect of the proposed scheme during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted</p>
	<p><b>Material Assets:</b> This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located immediately adjacent to Arklow Town Marsh and SC1 of the proposed scheme. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for</p>

	<p>cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p> <p>Should construction of the proposed scheme happen once this project is operational, there may be some cumulative effects on existing material assets by means of potential disruption to some utilities and services in the Arklow area. A potential slight negative and temporary indirect cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p> <p><b>Major Accidents and Disasters:</b> This project relates to the demolition of the existing, and construction of a new, fuel forecourt at the existing Circle K service station, which is located immediately adjacent to Arklow Town Marsh and SC1 of the proposed scheme. This Circle K project involves development of over ground and underground fuel infrastructure, which carries with it risk of fire or explosion. Arklow Town Marsh can be subjected to fire in periods of extreme heat or drought. Having regard to the potential risks associated with the proposed scheme, which includes the risk of Marsh fire, there is a potential for a cumulative risk of a major accidents or disaster occurring as a result of the development of this project. However, given the low likelihood of a fire occurring in the Marsh, and having regard to the safety procedures which will be required to be carried out during the construction phase of this project, no likely cumulative effect is identified.</p>
<p><b>19750 (Frank &amp; Sandra Duffy No 7 and 8 Bridge Street &amp;, No 34 Main Street)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Heritage:</b> This redevelopment is occurring at the corner of Bridge Street and Main Street in proximity to the proposed storm drainage element of the FRS. Both developments are located with the zone of archaeological potential for the historic town of Arklow. However, no likely significant cumulative effects will occur from an archaeological, architectural heritage and cultural heritage perspective.</p> <p><b>Resource and Waste Management:</b> The project relates to the demolition of 2 existing buildings and the construction of a new retail and commercial building on Main Street. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> The project relates to the demolition of 2 existing buildings and the construction of a new retail and commercial building on Main Street. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in</p>

	<p>the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p> <p>Should construction of the proposed scheme happen once this project is operational, there may be some cumulative effects on existing material assets by means of potential disruption to some utilities and services in the Arklow area. A potential slight negative and temporary indirect cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<p><b>Gaines Europe Ltd Unit 1A Lower Tinahisk, South Quay (16248)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Resource and Waste Management:</b> This project relates to the development of a new warehouse and distribution facility at Arklow Harbour. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> This project relates to the development of a new warehouse and distribution facility at Arklow Harbour. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<p><b>Gaines Europe Ltd Tinahisk Lower, South Quay (16414)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Resource and Waste Management:</b> This project relates to the demolition of an existing industrial building at Arklow Harbour. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste</p>

	<p>industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p>
	<p><b>Material Assets:</b> This project relates to the demolition of an existing industrial building at Arklow Harbour. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<p><b>SI201801 (Irish Water Waste Water Treatment Plant Arklow, Co. Wicklow)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme</b></p>	<p><b>Traffic and Transportation:</b> Due to the construction timelines associated with the Arklow Flood Relief Scheme and the Arklow Wastewater Treatment Plant there is likely to be cumulative impacts should the peak construction of both projects run concurrently. In addition, should both projects be carried out simultaneously, a co-ordinated traffic management plan will need to be prepared and agreed with Wicklow County Council for both projects.</p> <p>As the proposed Arklow Wastewater Treatment Plant has received planning permission, it is possible to carry out a combined assessment on traffic and transport based on the data presented in the EIAR to support the Wastewater Treatment Plant. This is detailed in Chapter 7 Traffic and Transportation of the EIAR. The conclusion of the assessment is that should the construction of the Arklow Flood Relief Scheme coincide with the construction of the Arklow Wastewater Treatment, there will be a greater increase in traffic in Arklow resulting in a temporary slight increase in traffic congestion along the primary road network. It is expected that at North Quay, South Quay, South Green and Tinahask Road that the impacts on traffic delays and queuing will be greatest should the two construction projects be carried out in tandem, however these temporary impacts will be over a shorter duration. Likely significant cumulative effects are not predicted. Lik</p> <p><b>Air Quality and Odour:</b> The proposed WwTP will physically overlap with the Arklow Flood Relief Scheme (FRS) as there are common areas within the town where works for both the proposed WwTP and FRS developments will be undertaken. It has been agreed between OPW and Irish Water that the project that is first able to progress the directly overlapping construction works on site will do so. Taking that into consideration the construction works assessed cumulatively are sheet piled foundations for the flood defence walls for the FRS on the south bank and the construction of the TBM launch shaft for the WWTP on North Quay.</p> <p>For the Arklow WWTP project, the closest of sensitive receptors are located approximately 20m away from the works. Therefore, there is the potential for soiling, PM10 and vegetation effects arising from the cumulative construction activities along the North Quay. However, as stated within the EIAR, “with the implementation of the standard mitigation measures outlined no significant negative effects are envisaged.”</p> <p>In relation to traffic, the construction traffic threshold of 10%, is not predicted to be exceeded should both projects be constructed in combination.</p>

With the implementation of the mitigation measures, no significant adverse residual negative effects on air quality are envisaged during the construction or operation of the proposed development. Therefore, cumulatively, no likely significant impacts are predicted.

In relation to odour, no significant effects are anticipated during the construction of the Arklow WwTP, therefore, no likely significant cumulative effects are predicted should both schemes be constructed concurrently.

**Noise and Vibration** The construction works which have been assessed cumulatively are sheet piled foundations for the flood defence walls and the construction of the TBM launch shaft for the WWTP on North Quay.

In practice, due to physical constraints, only limited works may be able to occur concurrently during the construction phase of the proposed development, limiting the potential for cumulative noise and vibration effects.

**Cumulative Noise Assessment with Proposed Development and Arklow WwTP:**

Arklow WwTP			Arklow FRS			Total Predicted Cumulative Noise Level (dB L <sub>Aeq,1hr</sub> )
Receptor Number	Phase	Predicted Noise (dB L <sub>Aeq,1hr</sub> )	Equivalent Receptor Number	Phase	Predicted Noise (dB L <sub>Aeq,1hr</sub> )	
S05	TBM shaft construction on North Quay	51	R02 (S03)	WP4 (Sheet pile construction)	71	71

Should the works occur simultaneously, the overall predicted impact would not be greater than the impact of the FRS works (71 dB<sub>L<sub>Aeq,1hr</sub></sub>). This impact is considered moderate, such that moderate, negative and short-term effects are predicted. Therefore, likely significant effects are not predicted.

**Biodiversity:** The main aim of the proposed Arklow Town WwTP development is to collect and appropriately treat the wastewater generated in Arklow town (which currently discharges untreated wastewater to the Avoca River) such that the treated effluent complies with national and EU standards.

The Arklow FRS development and the Arklow WwTP project overlap within the Avoca River and Estuary. There is potential that activities proposed for the schemes to result in cumulative effect to biological receptors.



With regard to potential cumulative effects, the activities proposed for the Arklow FRS development and the Arklow WwTP project of concern are those that have potential to result in:

- release of sediment and pollutants
- loss of terrestrial habitat and disturbance
- generation of noise

*Release of sediment and pollutants*

The above activities of concern proposed for the construction and operational phases of the Arklow FRS development with regard to the release of sediment and chemical pollutants from machinery include construction, dredging (both capital and occasional channel dredging) and excavation operations associated with the installation/ removal of temporary river access points, haul roads and causeways and the annual removal of debris from the debris and silt traps will result in the release of sediment to the river adjacent to, and downstream of, the development site. There is also potential risk of run off of sediment and chemical pollutants from stock piles of excavated material and dredge material.

For the proposed Arklow WwTP project the main potential sources of releases of sediment and pollutants from machinery are construction activities occurring within the Avoca River channel including the construction of interceptor sewers along the North and South Quays and the construction and operation of temporary causeway and the storage/ transportation of excavated materials and construction materials. These activities all have the potential to give rise for silt, soil and chemical pollutants to enter into the Avoca River and estuary. In addition, there is potential that the unintentional release of bentonite used for drilling could contribute to levels of suspended material in the water column.

For the schemes, the biological receptors of concern with regard to the potential effect of the release of sediment and pollutants are fish (including diadromous species migrating through the area) and benthic habitats.

There is potential that increases in suspended sediments due to activities proposed for the schemes could effect the gills of fish including migratory fish species such as salmon and lamprey, resulting in injury or mortality. There is also potential that increases in suspended sediments could effect water turbidity reducing predation efficacy in visual feeders such as salmon.

There is potential that the schemes will result in run off of sediment, and hazardous and non-hazardous material from stockpiles of material, and the accidental release of hydrocarbons from plant machinery and fuel stocks. Organic polymers or heavy metals

associated with cementing/ concreting materials used for construction activities for the schemes are toxic to organisms in sufficient quantities and have the potential to contaminate the seabed sediments adjacent to the project, inhibiting recolonisation of the area after construction and or dredging.

For the Arklow FRS development a suite of mitigation measures have been identified to ensure likely significant effects to fish and benthic habitats from discharges do not occur. These mitigation measures are detailed in **Chapter 10 Biodiversity** and the CEMP presented in **Appendix 5.1**.

Consent to undertake the Arklow WwTP project is subject to the meeting of conditions that require that activities are undertaken to ensure significant impact associated with discharges do not occur.

Following the implementation of mitigation measures proposed for the Arklow FRS development and the consent conditions set for the Arklow WwTP project, significant cumulative environmental effects due to discharges will not occur whether the schemes are undertaken concurrently or consecutively. The mitigation measures and consent conditions include the implementation of seasonal restrictions of in-stream works and standard construction best practices.

It should be noted that increased water turbidity following dredging for the Arklow FRS development will not introduce significant amounts of sediment to the lower Avoca or nearby marine environment, as local water currents will result in the deposition of the majority of sediment near the dredging activity. Where sediment is deposited outside of the immediate dredge areas, any effects of deposition are not likely to be significant for the local sedimentary habitats and fauna, as the areas are naturally turbid (see above) and hydrodynamically active experiencing a high degree of natural suspended solids due to the current tidal regime and sedimentary nature of the area.

#### *Loss of habitat and Disturbance*

##### *Birds*

Tree felling, removal of scrub and other tall vegetation is required to accommodate the proposed Arklow FRS development and the Arklow WwTP project. In a number of instances, the areas to be impacted by the schemes are foraging, resting and roosting habitats for resident birds. For both schemes tree/landscape planting will be undertaken to address the loss of terrestrial habitat. For the proposed Arklow FRS the landscape design/public realm drawings (**Appendix 4.2**) provide details on the planting types and species proposed in addition to the identification of trees to be retained within the planning boundary. The detail of the tree/landscape planting proposed is detailed in **Chapter 10 Biodiversity** while further details is provided in **Chapter 11 Landscape and Visual**. The removal of all vegetation will be carried out between 1 September and 28 February, to avoid any risk to breeding birds and their habitats.

In addition to the tree/landscape planting described above, the proposed Arklow FRS and the Arklow WwTP project include the installation of nesting boxes at the Arklow Bridge to provide nesting habitat for the Red-listed species Grey Wagtail, and for Pied Wagtail that feed extensively along the river channel.

In addition to above mitigation, the Arklow FRS development also includes mitigation to avoid direct and indirect effects on bird behaviour due to the loss of in-river gravel beds and habitats. Specifically, it is proposed to install three roosting platforms in the river channel upstream of Arklow Bridge and creation of riparian habitat.

Following the implementation of the mitigation measures described above for the schemes, significant cumulative environmental effects to birds due to habitat loss will not occur whether the schemes are undertaken concurrently or consecutively.

#### *Bats*

There is potential for disturbance, displacement, or habitat loss arising from the proposed schemes to affect bat species recorded during baseline surveys. The sources of effects common to the schemes relevant to bats are vegetation clearance and construction activities at Arklow Bridge. Given the potential for impacts, Bat Derogation Licences have been issued for schemes. Mitigation measures have been developed for the schemes to address potential effects. Mitigation measures proposed for the Arklow FRS development are detailed in **Chapter 10 Biodiversity**.

Following the implementation of the mitigation measures for the schemes, likely significant cumulative environmental effects to bats will not occur whether the schemes are undertaken concurrently or consecutively.

#### *Generation of noise*

The Arklow WwTP project includes for a range of mitigation measures required to ensure no significant effect of the project to marine mammals in coastal and marine environments east of Arklow Harbour at South Quay.

**Chapter 10 Biodiversity** has concluded that as the FRS development area does not represent an important foraging area for the marine mammals, it is highly unlikely to support significant number of marine mammal species and it is possible to rule out the potential for significant effects with regard to impact of noise on marine mammals. Consequently, it can be concluded here that significant cumulative environmental effects to marine mammal will not occur whether the schemes are undertaken concurrently or consecutively.

**Heritage:** The proposed Arklow WwTP comprising a new Wastewater Treatment Plant, associated infrastructure including sewer network and marine outfalls as well as an upgrade to existing coastal revetment. The WwTP shares common areas within Arklow town with the FRS and as such has the potential for in-combination with activities proposed for the FRS development.

In August 2019, Irish Water were granted permission to develop the WwTP Project. As currently proposed, the proposed Arklow WwTP works will overlap with the proposed flood relief scheme in terms of construction areas, structural components and possibly construction programme. The common work locations are set out in Table 5.1 of Chapter 5 Construction Strategy. There are also common works required by both schemes as detailed in Section 5.2.3 of Chapter 5 Construction Strategy. The promoters of this scheme, the Office of Public Works and Wicklow County Council, and Irish Water; the promoter of the WwTP Project, have agreed that whichever scheme commences first will carry out the common works. Furthermore, should the FRS proceed before the WwTP, a section of the WwTP interceptor sewer will be constructed as part of the FRS scheme (Refer to Chapter 5 Construction Strategy)

From a heritage interest, other elements of design coordination between both projects include:

- Works within the zone of archaeological potential for Arklow Town.
- Works along the South Quay and the development of a new quay wall downstream of Arklow Bridge.
- Arklow Bridge, a protected structure, where underpinning of the two southernmost arches is required.
- Development of a tunnel shaft at the location of the former Ferrybank House to be carried out by the WwTP.

Both projects have been developed as standalone projects, capable of being built independently of one another. In order to progress each project, it has been agreed that the project that is first able to progress, will carry out the directly overlapping on site construction works.

Depending on the final construction programme for both the WwTP and FRS, construction works for both projects may occur in parallel or sequentially.

The sequential (both before and after) and concurrent construction of the WwTP project and the FRS have been considered to identify the worst-case scenario of likely significant effects for the purposes of the cumulative impact assessment.

As part of the FRS, works within the river such as the debris trap, dredging, the lowering the bridge apron and underpinning of the bridge and within the Marsh will require archaeological investigation, monitoring and architectural heritage recording and assessment. The extent of this work, in these environments will be more extensive than envisaged for the WwTP. If the FRS scheme is progressed first, the works within the common areas will be completed as part of this scheme, these are concentrated around the town and are partly located within the zone of archaeological potential for the historic town of Arklow. This approach allows work for both schemes within a sensitive archaeological and built heritage environment to be completed, with the WwTP works incorporated with the minimum amount of disruption occurring. The FRS will be progressed with an integrated public realm

<p>element, providing an opportunity to improve amenities and landscaping along the Avoca River and Arklow town and integrating features of a built heritage nature.</p> <p>If the schemes are carried out at the same time, the cumulative effect to features of an archaeological, architectural and cultural heritage will be completed at the same time and a public realm works progressed immediately.</p> <p>If the WwTP is progressed first, the common areas to both schemes will be progressed along with other elements such as the development of the WwTP, a long sea outfall pipe, the interceptor sewer within the river channel and upgrading to existing outfall and coastal revetments. With this permitted WwTP development, all cultural heritage and archaeological and architectural heritage works can be mitigated through archaeological monitoring (terrestrial and underwater) and architectural heritage recording and assessment by a conservation engineer. Works to Arklow Bridge will be limited to the two most southern arches resulting in a lower overall impact to a protected structure.</p> <p>In summary, prior to mitigation measures being applied, the FRS will have a greater significant cumulative effect to features of an underwater archaeological potential and built heritage interest and a similar impact to features of an archaeological potential (terrestrial) to the permitted WwTP.</p> <p>However, following the implementation of the mitigation measures including public realm works for the FRS, there will not be a likely significant cumulative effect whether both schemes (the FRS and WwTP) are undertaken concurrently or consecutively.</p> <p><b>Landscape and Visual:</b> The Arklow WwTP shares a considerable site development area and common construction elements with the proposed Arklow FRS, in particular along South Quay, at the Arklow Bridge and along River Walk. The proposed Arklow FRS includes the common construction elements so that either project can be implemented in advance of the other.</p> <p>Cumulative landscape and visual effects therefore take into account the additional elements of the permitted Arklow WwTP in combination with the overall proposed Arklow FRS. In landscape and visual terms, they relate primarily to:</p> <ul style="list-style-type: none"> <li>● The permitted WwTP plant at North Quay</li> <li>● The permitted revetment upgrade</li> <li>● Continuation of the underground interceptor sewer along River Walk upstream of the carpark; and,</li> <li>● The SWO plant at the Alps.</li> </ul> <p>Cumulative landscape and visual effects within the core Arklow FRS project area are therefore predicted as similar to the landscape and visual effects arising from the Arklow FRS project and with the additional effects associated with permitted WwTP, revetment upgrade and interceptor sewer and SWO plant at River Walk and The Alps. These landscape and visual effects of these additional</p>
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	<p>elements were identified in the EIAR for the Arklow WwTP as ranging from significant/moderate and negative to slight and adverse and reducing over time with establishment to being moderate and neutral. Cumulative landscape and visual effects are not significant.</p> <p>In the event that the permitted Arklow WwTP project is implemented in advance of the Arklow FRS project, the baseline for the Arklow FRS would be the common construction elements of both projects together with the temporary finishes permitted under the Arklow WwTP project. The residual effects however, within the overlapping project areas, will be the same as those of the proposed Arklow FRS project.</p>
	<p><b>Land and Soils:</b> There will be interaction with the Arklow Wastewater Treatment Plant project during construction. Common works will be carried out by whichever scheme commences first and, therefore, it is not anticipated these would give rise to cumulative impacts. Cumulative impacts may arise from the use of common works areas though increase vehicle tracking and any adjacent excavation works during construction. However, construction strategy design and the inclusion of measures to address likely significant impacts potentially arising from activities in common areas, such as trafficability of soils and loss of soils and geology (albeit addressed under slightly different terminology) have been considered in the EIARs for both schemes. The Office of Public Works and Wicklow County Council will endeavour to minimise the in-combination effect of both schemes. A memorandum of understanding agreement has been signed by both project promoters. Therefore, likely significant effects are not predicted.</p>
	<p><b>Water:</b> This project relates to the development of a new Wastewater Treatment Plant at Ferrybank, Arklow. Due to the nature of this development, there is potential for a cumulative effect on hydrology, flood risk and water quality during the construction of the proposed scheme. Based on the current programmes for the Arklow Wastewater Treatment Project (WwTP) and the Arklow Flood Relief Scheme (FRS), it is expected that the some of the construction works for both projects will take place in parallel. The common works areas are set out in Chapter 5 of the EIAR.</p> <p>The contemporaneous construction of both developments could exacerbate effects on the hydrological regime and flooding. However, a number of the construction activities which could impact on the hydrological regime and flooding are common to both developments and will be constructed either through the WwTP or through the FRS. These include underpinning of the two southern arches of Arklow Bridge and the construction of the sheet piled wall and the associated temporary causeway in the river channel along River Walk and South Quay. Also, the interceptor sewer on River Walk and South Quay will be constructed as part of the FRS if the scheme proceeds in advance of the WwTP. Similarly, the water quality impacts associated with the works described above will arise through either the Wastewater Treatment Plant (WwTP) Project or the Flood Relief Scheme (FRS). A</p>

	<p>memorandum of understanding agreement has been developed by both parties to manage construction activities for both WwTP and FRS. Therefore, likely significant effects are not predicted.</p> <p>The bridge underpinning works and the construction of the flood defences walls and stormwater drainage system along River Walk and South Quay will have a cumulative impact with the proposed sewer construction works for the Arklow WwTP and may generate the potential for direct and indirect slight temporary negative effects on hydrology and water quality of the Avoca River during construction. If FRS proceeds to carry out common works, the existing sewer outfalls will be maintained. This will have a short-term negative effect on water quality. However, likely significant effects are not predicted.</p> <p><b>Resource and Waste Management:</b> This project relates to the development of a new Wastewater Treatment Plant at Ferrybank, Arklow. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. According to the EIAR for the Wastewater Treatment Plant project, the residual resource and waste management effects of this project during its construction are expected to be short term and imperceptible to slight. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant effects are not predicted.</p> <p><b>Population and Human Health:</b> As previously outlined, it is anticipated that the Arklow WwTP project will commence construction in 2021 and as such, construction activities may have to be coordinated between the WwTP project and the proposed scheme, depending on the final construction programmes for the same. This includes coordination and management of any common temporary working areas.</p> <p>It has also been identified that there are some works which are common to both projects.</p> <p>There is much potential for cumulative impacts from both the construction works for FRS and the proposed WwTP. There is a shared degree of underpinning works, construction of the interceptor sewer and flood defence walls, widening of South Quay and construction of flood defence walls, along with common works including some of the inceptor works, construction of a new quay wall along South Quay, and works along River Walk.</p> <p>Whether the construction phase of the WwTP project occurs either concurrently or sequentially with the construction phase of the proposed scheme, there is likely to be cumulative negative effects on local businesses, such as cafes and restaurants in vicinity to the works, and on the amenity of people living beside along South Quay and River Walk. However, these effects will be temporary in</p>
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nature and will have been moderated by the implementation of the proposed mitigation for both schemes. Therefore likely significant cumulative effects are not predicted.

There are potential cumulative effects on emissions to air including odour and noise. However, in a cumulative situation construction work will still have to observe maximum emission such as outlined in BS5228 for noise and Air Quality standards. All works, in particular those on the bridge, require traffic management, and works on South Quay and River Walk will need to be coordinated to minimise a cumulative negative impact on the public from prolonged works but given the observation of standards no adverse population and human health impact is anticipated.

Cumulative effects on Human Health are best considered through an examination of the predicted cumulative effects on Air Quality and Odour, Noise and Traffic. As outlined in Chapter 9, Noise and Vibration, a moderate, negative and short-term cumulative effect is predicted- under a worst-case scenario. There is also the potential for cumulative Air Quality effects- such as soiling, PM10 and vegetation effects arising from the cumulative construction activities along the South Quays. However, as stated within the WwTP EIAR, “with the implementation of the standard mitigation measures outlined no significant negative effects are envisaged”.

As both projects are predicted to have positive effects on population and human health in the operational phase, cumulative benefits are anticipated from both projects. In conclusion, likely significant cumulative effects are not predicted

**Material Assets:** As previously outlined, it is anticipated that the Arklow WwTP project will commence construction in 2021 and as such, construction activities may have to be coordinated between the WwTP project and the proposed scheme, depending on the final construction programmes for the same. This includes coordination and management of any common temporary working areas. It has also been identified that there are some works which are common to both projects. The key works in common to both projects are described in Section 5.2.3 in Chapter 5, Construction Strategy. There are also some service/utility diversions that will be required to facilitate both the WwTP project, and the proposed scheme. The promoters of the proposed scheme; the OPW and WCC, and Irish Water; the promoter of the WwTP project have agreed that whichever scheme commences first will carry out the common works.

The WwTP project provides for the diversion of overhead ESB cables on South Quay in order to facilitate the installation of the interceptor sewer. It is also proposed, as part of the proposed scheme, that the overhead electricity infrastructure along South Quay be diverted underground as part of the enabling works for WP1 and WP4.

Thus, in the event that the WwTP project is constructed first (particularly the proposed works along South Quay), it may not be necessary to underground the overhead ESB cables on South Quay during WP4, as these will have already been relocated.

Similarly, in the event of this proposed scheme being constructed first, this scheme will underground the overhead ESB cables on South Quay. Whichever project is underpinning the arches of Arklow Bridge first will also be responsible for removing the side lighting along Arklow Bridge. Any street furniture or lighting removed as part of the scheme will be given to Arklow Municipal District for storage and possible reinstatement in the future.



	Thus, the construction phase of the Arklow WwTP project will result in a likely negative and temporary direct cumulative effect with the construction phase of the proposed scheme. Likely significant cumulative effects are not predicted.
<b>15857 (Joby Developments North Quay, Arklow)</b>	
<b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b>	<b>Traffic and Transportation:</b> This project relates to the demolition of existing structures and construction of retail and residential units at North Quay. The proposed development will increase flows in the North Quay area, however the scale of traffic generation likely to be modest and the proposed development will have a slight negative direct cumulative effect with regards to the receiving transport networks should the development eventually begin construction before its planning expiry date of Sept 2019. Likely significant cumulative effects are not predicted.
	<b>Resource and Waste Management:</b> This project relates to the demolition of existing structures and construction of retail and residential units at North Quay. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted. Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.
	<b>Material Assets:</b> This project relates to the demolition of existing structures and construction of retail and residential units at North Quay. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted. Should construction of the proposed scheme happen once this project is operational, there may be some cumulative effects on existing material assets by means of potential disruption to some utilities and services in the Arklow area. A potential slight negative and temporary indirect cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.
<b>18316 (Mill Sea Ltd North Quay, Arklow)</b>	
<b>Potential for significant direct and indirect cumulative effects of projects listed in</b>	<b>Resource and Waste Management:</b> This project relates to the demolition of existing structures at Arklow Harbour. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight

<p><b>combination with the proposed scheme.</b></p>	<p>resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> This project relates to the demolition of existing structures at Arklow Harbour. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<p><b>20469 (Wicklow County Council Inner Harbour / Dock, Off South Quay)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Resource and Waste Management:</b> This project relates to the development of storage units at Arklow Harbour. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> This project relates to the development of storage units at Arklow Harbour. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. <b>Likely significant cumulative effects are not predicted.</b></p>
<p><b>201285 (Crag Digital Avoca Limited)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Resource and Waste Management:</b> This project relates to the demolition of existing industrial buildings and the construction of data centre buildings at Avoca River Business Park. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.</p>

	<p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> This project relates to the demolition of existing buildings and the development of 3 No data centre buildings and associated development. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area.</p> <p>A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Thus, likely significant cumulative effects are not predicted.</p> <p>Should construction of the proposed scheme happen once this project is operational, there may be some cumulative effects on existing material assets by means of potential disruption to some utilities and services in the Arklow area. A potential slight negative and temporary indirect cumulative effect is therefore identified, under this scenario. Thus, likely significant cumulative effects are not predicted</p> <p><b>Major Accidents and Disasters:</b> According to the EIAR for this development, the risk of a major accident or disaster from the site has been assessed to be very low. A comprehensive set of emergency plans and procedures would be produced for the Proposed Development in accordance with The Safety, Health and Welfare at Work Act 2005, including a fire safety risk assessment. The design of the Proposed Development has incorporated features to minimise scenarios and prevent harm in the event of a major accident or disaster. Thus, having regard to the low likelihood of major accidents or disasters occurring at this development and the proposed scheme, no negative likely significant direct, indirect cumulative effects are identified with regards major accidents and disasters.</p>
<b>18940 Crag Digital Avoca Limited</b>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p>Only one Crag Digital data centre development will be built – either the one described in application Ref 201285 or the one described in this application. The cumulative effects, as outlined for Ref 201285, apply to this application.</p>
<b>306662 (Arklow Bank Onshore Grid Infrastructure , Co. Wicklow.)- Pre-Application Only, Not Submitted</b>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in</b></p>	<p><b>Traffic and Transportation:</b> This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project. Due to the location of the proposed development and the relatively low traffic generation associated with the proposed development, there will be no negative likely significant direct, indirect cumulative effects with regards to the receiving transport networks with Arklow. However, due to the concentration of the works to the north of</p>

<p><b>combination with the proposed scheme.</b></p>	<p>Arklow there is likely to be some slight direct cumulative effects on traffic flows on Dublin Road. Thus, likely significant cumulative effects are not predicted</p> <p><b>Resource and Waste Management:</b> This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Thus, likely significant cumulative effects are not predicted</p> <p>Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Thus, likely significant cumulative effects are not predicted</p> <p><b>Material Assets</b> This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<p><b>Parade Ground (Part 8)</b></p>	
<p><b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b></p>	<p><b>Traffic and Transportation:</b> This project relates to public realm improvement works at Parade Ground, Arklow. Due to the nature of this development and the requirement to implementation temporary traffic management measures to manage the construction of the works there is likely to be some slight negative direct cumulative effects with regards to the receiving transport networks. Likely significant cumulative effects are not predicted.</p> <p><b>Resource and Waste Management:</b> This project relates to public realm improvement works at Parade Ground, Arklow. Due to the nature of this development, there is potential for a cumulative resource and waste management effect on the capacity of waste management facilities and waste industry trends in Ireland during the construction of the proposed scheme. Should the construction of this project proceed in parallel or overlap with the construction of the proposed scheme, this could give rise to short term, slight resource and waste management effects on the capacity of waste management facilities and waste industry trends in Ireland due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted. Having regard to the imperceptible resource and waste management effect of the proposed scheme on the capacity of waste management facilities and waste industry trends in Ireland during operation, no negative likely significant cumulative resource and waste management</p>

	<p>effects on the capacity of waste management facilities and waste industry trends in Ireland are identified during the operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Population and Human Health:</b> This project relates to proposed public realm improvement works at Parade Ground, Arklow. Should the construction phase of this project be carried out concurrently with the proposed scheme- there may be some minor cumulative negative effects on population through disturbance from increased traffic management in the town. However, these are expected to be temporary and not significant in nature. Likely significant cumulative effects are not predicted. The operational phases of both projects are expected to result in an overall positive cumulative effect on population through the achievement of an overall enhanced public realm in Arklow.</p> <p><b>Material Assets</b> This project relates to the development of onshore transmission connection infrastructure related to the Arklow Bank Wind Park offshore wind energy project. Should construction of this development happen concurrently with the construction of the proposed scheme, there is potential for cumulative effects on material assets by means of greater demand on existing services and utilities in the Arklow area. A potential slight negative and temporary direct cumulative effect is therefore identified, under this scenario. Likely significant cumulative effects are not predicted.</p>
<b>FORESHORE</b>	
<b>Application Name and Number</b>	<b>FS007049 Sure Partners Site Investigations at Arklow Bank</b>
<b>Potential for significant direct and indirect cumulative effects of projects listed in combination with the proposed scheme.</b>	<p><b>Biodiversity:</b> Arklow Wind Park Project - SSE/ Sure Partners have proposed site investigations to inform the engineering and design of an offshore wind farm. The objectives of the site investigation are to gather geotechnical and wind resource information. The site investigation surveys proposed are:</p> <ol style="list-style-type: none"> <li>1. Array Area Preliminary Site Investigation:             <ol style="list-style-type: none"> <li>a. Boreholes x 25 locations</li> <li>b. Cone Penetration Testing (CPT)'s x 40 locations</li> <li>c. Vibrocores (VC)'s or Grab samples x 30 locations</li> </ol> </li> <li>2. Cable Route Site Investigations:             <ol style="list-style-type: none"> <li>a. CPTs every 500m along each route</li> <li>b. VCs or Grab samples every 500m along each route</li> </ol> </li> <li>3. Floating LiDAR Deployment x 2 locations</li> <li>4. Sediment Dynamic Measurements             <ol style="list-style-type: none"> <li>a. Benthic Flume x 9 locations</li> <li>b. Benthic Lander x 4 locations</li> </ol> </li> <li>5. Nearshore Landfall Site Investigation:             <ol style="list-style-type: none"> <li>a. Landfalls: Boreholes x 4 locations at each landfall</li> </ol> </li> </ol>

	<p>b. CPT's x 8 locations at each landfall c. Trial Pits on the beach x 5 at each landfall</p> <p><b>6.</b> Arklow Harbour Site Investigation for O&amp;M Base</p> <p>a. 6 x boreholes locations</p> <p>Given the nature of the investigations proposed for the Arklow Wind Park Project the only impact mechanism associated with the Arklow FRS development that could result in cumulative effects is noise emissions from geotechnical survey proposed for 1, 2, 4, 5 and 6, (<i>i.e.</i> coring, borehole, trial pits excavation <i>etc.</i>).</p> <p>Site investigations proposed for 1, 2, 4, and 5 are all located outside of the Arklow FRS development area in nearshore areas; given the location, nature and scale of the works there is no potential for cumulative effects with the Arklow FRS project.</p> <p>Site investigations proposed at sites and harbour marina on the south shore immediately adjacent to works proposed at the marina for the Arklow FRS development area. There are site investigations proposed in the harbour marina on the south shore immediately adjacent to works proposed at the marina for the Arklow FRS development area. The biological receptors of concern with regard impact of noise emissions are:</p> <ul style="list-style-type: none"> <li>● Marine Mammals</li> <li>● Fish</li> <li>● Otter</li> <li>● Bats</li> </ul> <p>It was demonstrated that as the Arklow FRS development area is highly unlikely to support significant number of marine mammal species it is possible to rule out the potential for significant noise disturbance effects. Consequently, it is concluded that likely significant cumulative effects will not occur.</p> <p>Given the hearing biology of the fish species and the fact that individual fish are unlikely to stay in the vicinity noise sources, significant adverse effects from injurious noise from construction noise and vibration are unlikely occur.</p> <p>Otter have been recorded a significant distance upstream from the site of the proposed operations at harbour marina. Given this distance it is concluded that likely significant cumulative effects will not occur.</p> <p>Underwater noise from the operations do not pose a risk to bats. Consequently, it is concluded that likely significant cumulative effects will not occur.</p> <p><b>Heritage:</b> FS007049 SSE/Sure Partners Site Investigations at Arklow Bank – Site investigations proposed at the site and the harbour marina on the south shore immediately adjacent to works proposed at the marina for the Arklow FRS development area. No likely significant cumulative effects will occur.</p>
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	<p><b>Population and Human Health:</b> This Site Investigation (SI) work was assessed for potential to give rise to cumulative effects with the proposed scheme as it relates to a range of geotechnical and other surveys within the foreshore of Arklow- including Arklow Harbour, which is within the working area of the proposed scheme. As outlined in the Foreshore Licence application (FS007049), no restrictions of public use of the foreshore are expected as a result of the SI. Public access to the beach/foreshore will not be disrupted, and there will be limited interactions with members of the public.</p> <p>The SI proposed is of a nature- and location, where it is not expected to give rise to significant human health effects from noise, vibration, air quality, disturbance etc.</p> <p>Having regard to the above, and the low likelihood of population and human health effects occurring in either the construction or operational phase of the proposed scheme. Likely significant cumulative effects are not predicted.</p> <p><b>Material Assets:</b> Due to the offshore location and nature of this development, no likely significant negative direct or indirect cumulative effects with the proposed scheme are identified with regards material assets.</p>
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**Table 20.5 Overall Cumulative Effects**

<b>Potential Cumulative Impacts on Environmental Factors</b>	
<b>Cumulative impact assessment of all projects listed in Table 20.1 together with the proposed scheme.</b>	<b>Traffic and Transportation:</b> Overall, taking all of the projects together in-combination with the proposed scheme there are slight, negative, direct, indirect effects to traffic and transport expected during the construction phase of the proposed scheme due to additional traffic generated by other schemes in the study area. Likely significant cumulative effects are not predicted.
	<b>Air Quality and Odour:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there is the potential for soiling, odour, PM10 and vegetation effects arising from the cumulative construction activities, however, with the implementation of mitigation measures, no significant negative effects to air quality or odour are expected. Likely significant cumulative effects are not predicted.
	<b>Noise and Vibration:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there is the potential for moderate, negative and short-term effects in combination with the proposed scheme. However, construction works associated with the adjacent developments will be monitored to ensure compliance with their own noise and vibration limits. Likely significant cumulative effects are not predicted.
	<b>Biodiversity:</b> Overall, taking all of the projects together in-combination with the proposed scheme, with the implementation of mitigation measures there are no significant cumulative effects to biodiversity predicted as result of cumulative effects with the proposed scheme. Likely significant cumulative effects are not predicted.
	<b>Heritage:</b> Overall, taking all of the projects together in-combination with the proposed scheme, with the implementation of mitigation measures there are no significant cumulative effects to archaeology, architecture and cultural heritage predicted as a result of in combination effects with the proposed scheme. Likely significant cumulative effects are not predicted.
	<b>Landscape and Visual:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there will be some slight adverse cumulative effects to landscape and visual impact in combination with the WwTP, however, this is not expected to be significant. There are no significant cumulative effects predicted to landscape and visual impact as a result of the other cumulative projects. Likely significant cumulative effects are not predicted.
	<b>Land and Soils:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there is potential for cumulative effects to land and soil due to in combination effects with the WwTP in the common works areas, however this is not expected to significant and will be minimised through a Memorandum of Understanding. There are no significant cumulative effects predicted to land and soil as result of the other cumulative projects, with the implementation of mitigation measures. Likely significant cumulative effects are not predicted.
	<b>Water:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there is potential for cumulative effects to water due to in combination effects with the WwTP in the common works areas, however this is not expected to significant and will be minimised through a Memorandum of Understanding. There are no significant cumulative effects predicted to water as result of the other cumulative projects, with the implementation of mitigation measures. Likely significant cumulative effects are not predicted.
	<b>Resource and Waste Management:</b> Overall, taking all of the projects together in-combination with the proposed scheme, it is considered that these projects could give rise to short term, slight resource and waste management effects on the capacity of waste



<b>Potential Cumulative Impacts on Environmental Factors</b>	
	management facilities and waste industry trends in Ireland during the construction phase of the proposed scheme due to an increased demand on waste recovery and/or disposal sites. Likely significant cumulative effects are not predicted.
	<b>Population and Human Health:</b> Overall, taking all of the projects together in-combination with the proposed scheme will result in a significant positive long term effect to population and human health due the improvement works to the public realm and the improvement in water quality as a result of in combination effects with the Parade Ground Project and the Arklow WwTP respectively. Likely significant cumulative effects are not predicted.
	<b>Material Assets:</b> Overall, taking all of the projects together in-combination with the proposed development there is the potential for temporary direct and in-direct cumulative effects on material assets by means of increased demands on utilities and services during the construction phase of the proposed scheme. Likely significant cumulative effects are not predicted.
	<b>Major Accidents and Disasters:</b> Overall, taking all of the projects together in-combination with the proposed scheme, there is not considered to be any cumulative risk of major accidents and disasters occurring during the construction and operational phase due to the nature of the proposed scheme and its proximity to other projects. Likely significant cumulative effects are not predicted.
	<b>Climate:</b> There are no significant cumulative effects to climate predicted in combination with the proposed scheme. Likely significant cumulative effects are not predicted.

## 20.5 References

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