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CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE DEMOLITION OF AGRICULTURAL STRUCTURES AND THE DEVELOPMENT OF A MATERIALS RECOVERY FACILITY AT DERRYARKIN, RHODE, CO. OFFALY

VOLUME 2 – MAIN BODY OF THE EIAR

CHAPTER 16 – INTERRELATIONSHIPS AND INTERACTIONS

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16. INTERRELATIONSHIPS AND INTERACTIONS

16.1 Introduction

This chapter has been developed to identify potential interrelationships and interactions between environmental aspects addressed in this EIAR i.e. interactions between one environmental aspect and another environmental aspect which can result in an environmental impact.

The previous chapters have described the potential impact of the proposed development under a variety of different topic headings. An assessment of impact inter-relationships and interactions is already embedded in these chapters. The purpose of this Chapter is to take a more holistic view of the inter-relations and interactions between different aspects of the project and topics discussed in other chapters. This ensures that there is adequate coverage in this EIAR of the potential for the development to cause overall effects and cumulative impacts. This process examines whether interactions between the different effects themselves may cause impacts that are greater than those discussed individually. As such, this chapter responds to the requirement of the legislation governing the EIA process for the inter-relationship or interaction between the various environmental aspects and impacts to be fully considered, described and assessed.

This Chapter considers the identified potential impact interactions between the following environmental aspects/EIAR Topic Chapters:

- Chapter 7 - Population and Human Health
- Chapter 8 - Biodiversity
- Chapter 9 - Soils, Geology and Hydrogeology
- Chapter 10 - Surface Water and Hydrology
- Chapter 11 - Air Quality and Climate
- Chapter 12 - Noise and Vibration
- Chapter 13 Traffic and Transportation
- Chapter 14 - Archaeological, Architectural and Cultural Heritage
- Chapter 15 - Landscape and Visual Impacts

A description of potential impacts associated with the construction, operation, and decommissioning phases of the proposed development, in the absence of mitigation, is provided in the EIAR Topic Chapters listed above.

A description of Residual Impacts associated with the construction, operation, and decommissioning phases of the proposed development, with the adoption of mitigation considered, is also provided in the EIAR Topic Chapters listed above.

For a project of this nature, there is also the potential for interaction amongst these impacts that may not be perceived when examined individually. Therefore, it is necessary to consider the relationships between the impacts. The result of interactive impacts may either exacerbate the magnitude or ameliorate the extent of impact.

Numerous impact interactions and inter-relationships have been identified and are discussed in this chapter.

Table 16.1 provides a matrix indicating the key interactions and inter-relationships between the environmental aspects discussed previously in this EIAR.

Table 16.2 presents, describes, and assesses the impact inter-relationships and interactions associated with the proposed development. Where appropriate, cross-referencing of other preceding chapters take place.

Table 16-1: Summary of Interactions and Inter-relationships between the Key Environmental Aspects of the proposed development

	Population and Human Health	Biodiversity	Soils, Geology and Hydrogeology	Hydrology and Surface Water	Air Quality and Climate	Noise and Vibration	Traffic and Transport	Cultural Heritage	Landscape and Visual
Population and Human Health									
Biodiversity									
Soils, Geology and Hydrogeology									
Hydrology and Surface Water									
Air Quality and Climate									
Noise and Vibration									
Traffic and Transport									
Cultural Heritage									
Landscape and Visual									

Note: Green highlighting indicates a potential interrelation / interaction.

Table 16-2: Description of Interaction Between Environmental Aspects

INTERACTION	DESCRIPTION
Population and Human Health and Biodiversity	The proposed development has the potential to negatively impact biodiversity elements (I.e. eco-systems, habitats and species). Such impacts may negatively affect ecological value in the local area which in turn may affect recreational value attained by humans experiencing nature such as walkers, hikers, bird watchers or fishers. Comprehensive mitigation measures to prevent the occurrence of negative impacts on biodiversity because of the proposed development have been defined in Chapter 8 - Biodiversity, of Volume 2 of this EIAR. Consequently, there will be no significant residual negative impact on biodiversity elements associated with the proposed development. Consequently, there will be no significant impact on the recreation and amenity value gained by humans experiencing nature in the local area because of the proposed development.
Population and Human Health & Soils, Geology and Hydrogeology	Potential, accidental, aqueous emissions from the proposed development (e.g. foul water discharges, release of fuels or oils) may negatively impact receiving ground and groundwater. This may affect the quality status of affected ground and groundwater which in turn can affect the health of humans who source their drinking water from potentially affected groundwaters. The Soils, Geology and Hydrogeology chapter of this EIAR has defined construction phase and operational mitigation measures to prevent the discharge of polluting material to ground/groundwater (E.g. spill prevention and containment measures, triennial integrity testing of underground foul and wash water retention tank). The potential for an uncontrolled direct effect on ground and groundwater as a result of the proposed development is unlikely given the following: • The adoption of a robust set of mitigation measures to protect soil, geology, and hydrogeology in the receiving environment. • The proposed facility will be designed in accordance with relevant Best Available Techniques for waste facilities defined in the Commission Implementing Decision (EU) establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council. • The proposed facility will operate in accordance with a Waste Facility Permit (WFP) (during Phase 1 of operations) and an Industrial Emissions (IE) Licence (during Phase2 of operations). • Groundwater monitoring will be carried out on an ongoing basis in accordance with the terms of the WFP and IE licence, which will serve to demonstrate the proposed development is not having an impact on groundwater quality. The Geology and Hydrogeology Chapter has therefore concluded there will be no significant impact on the receiving grounds or groundwaters because of the proposed development.

INTERACTION	DESCRIPTION
	As such, there will be no deterioration in the quality status of groundwater contained in the receiving environment. Humans who could potentially utilise such groundwater for farming or drinking water purposes will not be negatively affected by the proposed development therefore.
Population and Human Health & Hydrology and Surface Water	Potential, accidental, aqueous emissions from the proposed development (e.g. foul water discharges, release of fuels or oils) may negatively impact the receiving surface water environment Such impacts may negatively affect the quality status of the receiving waters downstream, which in turn may negatively impact upon the recreation and amenity value attained by humans who downstream surface waters including bathers, anglers and water sports enthusiasts. A comprehensive set of mitigation measures to prevent such impacts has been defined in the Hydrology and Surface Water Chapter. The Hydrology and Surface Water Chapter has concluded there will be no significant impact on receiving surface waters because of the proposed development. As there will be no deterioration in the quality status of the drainage channel to the south of the site, or the Yellow River downstream, human users of the river will experience no diminution of recreation or amenity value gained from the river.
Population and Human Health and Air Quality and Climate	Dust, odour, and climate impacts associated with the construction and operational phases of the proposed development may have a negative impact on human receptors. Dust generated during construction and operational phase activities may cause nuisance to sensitive human receptors in the local area. Odour generated during the operational phase of the proposed development may cause nuisance and disturbance sensitive human receptors in the local area. The Air and Climate Chapter states that it there will not be an adverse impact on air quality and climate at nearby sensitive receptors in the vicinity of the proposed development. Dust mitigation measures will be adopted during the construction and operational phases to prevent negative dust impacts affecting humans. Odour modelling based on the USEPA approved AERMOD model has found that the worst-case scenario for the 98th%ile of 1-hour concentrations occurs in 2017 where the maximum off-site concentration is less than 1% of the guideline value at the worst-case receptor. Based on these results, no nearby human receptors are predicted to experience odour nuisance issues because of the proposed development. The proposed development will not have any significant adverse impact in terms of climate change. The proposed development has the potential to have a residual benefit with respect to climate by diverting biodegradable waste from landfill and therefore reducing the wastes embodied carbon and the generation of landfill gas, reducing the potential for greenhouse gas emissions . This potential residual benefit is of benefit to society and humans.
Population and Human Health and Noise and Vibration	Noise generation during the construction and operational phases of the proposed development has the potential to negatively impact upon sensitive human receptors.

INTERACTION	DESCRIPTION
	Noise Prediction Modelling has been carried out under the Noise and Vibration Chapter to assess potential noise impacts on sensitive human receptors associated with the construction and operational phases of the proposed development The combined predicted and measured noise impact at sensitive human receptors due to the carrying out of construction phase activities does not exceed either relevant construction noise limits, which were set for the protection of human receptors. The combined predicted and measured noise impact at sensitive human receptors due to the carrying out of operational phase activities does not exceed relevant EPA prescribed noise limits, which were set for the protection of human receptors. Noise associated with the construction and operational phases of the proposed development will therefore not have any significant effect on humans present at noise sensitive receptors.
Population and Human Health & Traffic and Transport & Noise and Vibration	The proposed development will generate traffic during both the construction and operational phases of the proposed development. Increased traffic movements have the potential to; impact on the structural integrity of the road, cause increased congestion, present increased health and safety risks (associated with road traffic accidents) and generate excessive noise at sensitive human receptors. Such impacts may negatively affect the experience of road users and create increased health and safety risks to road users. The Traffic and Transportation assessment has however concluded that there will be an impartible impact in terms of traffic on local roads during both the construction and operational phases of the proposed development. Consequently, the residual effect on road user experience and health and safety risk on the local road network will not be significant. As regards noise impacts associated with increased traffic due to the proposed development – The Noise chapter of this EIAR has concluded that development related traffic noise will have a short-term imperceptible impact at most locations. At locations along the R400, south of Rhode, and by the M6 eastbound off slip there is a short-term minor impact. In the long term there is an imperceptible impact at all properties along all adjacent roads. Traffic related noise will not have any significant effect on sensitive human receptors.
Geology and Hydrogeology, Population and Human Health & Cultural Heritage Impact Assessment	Groundworks undertaken during the construction phase of the proposed development have the potential to have negative effect on any previously unrecorded archaeological remains that may exist within the development site. Damage or deterioration caused to such archaeological remains may negatively affect the historic, social or cultural heritage value associated with the remains. This loss of value would be experienced by humans. The Cultural Heritage chapter of this EIAR proposes that archaeological monitoring of all groundworks associated with the construction phase of the proposed development is carried out. Monitoring will be carried out under licence to the Department of Housing, Local Government and Heritage and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring.

INTERACTION	DESCRIPTION
	With the adoption of this mitigation measure the groundworks required during construction are unlikely to have a negative impact upon any archaeological remains within the footprint of the proposed working area or the associated historic, social or cultural heritage value attached to such remains by humans.
Population and Human Health & Landscape and Visual Impact Assessment	The proposed development may have the potential to material alter landscape character and visual amenity in the local area. This in turn has the potential to reduce recreation or amenity value for humans experiencing outdoors in the local area such as walkers, hikers, or bird watchers. The Landscape and Visual Impact chapter of this EIAR has concluded the following: • In terms of construction stage impacts, there will be intense construction-related activity within and around this area, including approach roads, and this includes the demolition and removal of the existing agri-industrial buildings and structures within the site. Thus, the overall significance of construction stage landscape impacts was considered to be Slight. • In terms of operational stage impacts, the proposed development will represent the replacement of one set of relatively large agri-industrial buildings and structures with a comparably scaled set of industrial buildings and structures, in an immediate vicinity that is characterised by extractive activities and large agro-industrial buildings, set in a wider post-industrial context of vast cutaway bogs. Thus, the overall significance of operational stage landscape impacts is Slight-imperceptible. As a consequence, there will be no diminution in recreation or amenity value gained by humans experience the physical landscape and visual context around the proposed development.
Population and Human Health & Geology and Hydrogeology, Hydrology and Surface Water Quality & Biodiversity	The potential susceptibility of the proposed development to major accidents and natural disasters is considered in the Population and Human Health Chapter. Potential major accidents which may occur on-site during facility operations include a major fire, (associated with malfunctioning/defective combustion processes/operations; improper storage of, or fire spread to, large quantities of combustible waste material; and improper delivery, storage and/or use of flammables), contaminated firewater run-off (mixing of hazardous or waste material with firewater applied during a fire and subsequent discharge to the environment, a major plant or traffic accident (associated with associated plant and vehicle operations) and chemical/environmental spillage (associated with bulk diesel storage). These events have potential to impact on soils, geology and hydrogeology, hydrological regimes, water quality, human health and safety of workers and the public, material assets including property, roads and infrastructure and natural resources, and biodiversity. With the adoption of the comprehensive set of mitigation measures contained in the Population and Human Health chapter, including mitigation measures from other chapters which have been cross-referenced in the Population and Human Health chapter, health and safety specific mitigation measures and major accident-related mitigation measures, it is not envisaged that the proposed development will have any significant effect on any population or human health element.

INTERACTION	DESCRIPTION
Hydrology and Surface Water Quality & Geology and Hydrogeology & Population and Human Health & Biodiversity	Environmental pathways exist between land, groundwater and surface water. Pollution affecting one medium at or around the proposed development site has the potential to disperse or migrate to another (I.e. polluting material can be discharge from a site to lands before making its way into groundwater and then surface water, and vice versa. In turn, such pollution may impact upon Population and Human Health and/or Biodiversity elements. Both the Hydrology and Surface Water Quality & Geology and Hydrogeology Chapters have concluded that, with the adoption of appropriate mitigation measures, there is no significant risk to receiving lands, groundwater or surface water at development site.
Hydrology and Surface Water Quality and Biodiversity	As detailed in the Biodiversity chapter, impacts on hydrology and surface water quality on the receiving water bodies (the drainage channel to the south of the site and the Yellow River) may negatively impact on the ecological quality status of the receiving surface waters and eco-systems, habitats and species within or reliant on these surface waters (I.e. Polluting discharges). The adoption of the mitigation measures defined in the Hydrology and Surface Water Quality Chapter will ensure that there will be no significant negative impact on the receiving surface waters associated with the proposed development. Consequently, there will be no negative impacts on eco-systems, habitats and species within or reliant on the river.
Biodiversity & Air Quality and Climate & Geology and Hydrogeology & Traffic and Transport	Dust emissions associated with the construction phase of the proposed development have the potential to negatively impact ambient air quality which in turn can result in a negative impact on ecological receptors surrounding the site. The Dust Impact Assessment undertaken in the Air and Climate Chapter of this EIAR has determined that there are no sensitive ecological sites in the immediate vicinity of the proposed development site, having regard the relevant ecological receptor screening distances for construction dust (as defined the Institute of Air Quality Management (IAQM), (2014) Guidance on the assessment of dust from demolition and construction). As such, construction phase dust generation will not have a significant effect on any ecological receptor.
Biodiversity and Noise	Noise emissions associated with the proposed development may negatively impact surrounding ecological receptors. A comprehensive set of construction phase noise mitigation measures will be adopted to prevent noise from construction activity having a significant impact on local ecological receptors. Noise levels are expected to rise during the day, evening and night due to the operation of the proposed development. The predicted operational phase daytime, evening and night-time noise levels will all fall significantly below noise limits for licensed activities prescribed by the EPA in their Noise Guidance document NG4, however. The level of increase is therefore unlikely to have any significant effect on ecological receptors therefore (E.g. wintering bird populations of the surrounding area).
Traffic and Transport & Air Quality and Climate & Population and Human Health	Traffic emissions associated with development related traffic may lead to a deterioration of local air quality which in turn may negatively impact upon human tory health. The significance of potential air quality impacts from increased traffic associated with the proposed development been determined within the Air and Climate Chapter.

INTERACTION	DESCRIPTION
	It is predicted that in 2024 the proposed development will increase CO2 emissions by 0.0005% of the EU 2020 target. In 2039 CO2 emissions will increase by 0.0006% of the 2030 target. Therefore, the climate impact of the proposed development is considered imperceptible.
Landscape and Visual Impact Assessment & Cultural Heritage Impact Assessment & Population and Human Health	The proposed development at has the potentially to material alter landscape character and visual amenity in the local area. This in turn has the potential to affect social or cultural heritage value attached to a landscape or a visual context by humans. The Landscape and Visual Impact chapter of this EIAR has concluded the following: • In terms of construction stage impacts, there will be intense construction-related activity within and around this area, including approach roads, and this includes the demolition and removal of the existing agri-industrial buildings and structures within the site. Thus, the overall significance of construction stage landscape impacts was Slight. • In terms of operational stage impacts, the proposed development will represent the replacement of one set of relatively large agri-industrial buildings and structures with a comparably scaled set of industrial buildings and structures, in an immediate vicinity that is characterised by extractive activities and large agro-industrial buildings, set in a wider post-industrial context of vast cutaway bogs. Thus, the overall significance of operational stage landscape impacts was Slight-imperceptible. As a consequence there will be no diminution in cultural heritage value, or recreation or amenity value gained by humans experience the physical landscape and visual context around the proposed development.

16.2 Conclusions

The proposed development has the potential to impact on various environmental aspects as detailed throughout this EIAR. As outlined in this Chapter, there are inter-relationships and interactions between these aspects. The impact inter-relationship and interaction assessments undertaken throughout this EIAR and within this chapter have concluded that environmental aspect interactions will not result in any residual significant adverse environmental impacts however (having regard to the mitigation measures defined in this EIAR which will be implemented).

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