18.0 INTERACTIONS OF THE FOREGOING

18.1 INTRODUCTION

The potential effects of the proposed Baldonnell 110kV substation and the measures proposed to mitigate these effects have been outlined in this EIAR. However, in any development with the potential for environmental effect there is also the potential for interaction between effects of the different environmental aspects.

The result of these interactions may either exacerbate the magnitude of the effect or may in fact ameliorate it. As part of the requirements of an EIAR, the interaction of the effects on the surrounding environment needs to be addressed.

Table 18-1 outlines the different environmental aspects which have potential to interact as a result of the proposed Baldonnell Substation. Interactions have been clearly identified in the early stages of the project and where the potential exists for interaction between environmental impacts, the EIAR specialists have taken the interactions into account when making their assessment. Potential interactions (both positive and negative) have been considered for the construction, operation and decommissioning phases of each of the different environmental aspects. It is noted that the operational life of the proposed development is expected to be at least 25 no. years and consideration has been made for the full duration of this time period with regards to an assessment of potential impacts and interactions.

Table 18-1: Interaction between Environmental Topic (positive and negative)

Interaction Matrix Corresponding Topic Heading Interaction No Interaction	Population and Human Health	Land, Soils and Geology	Hydrology and Hydrogeology	Air Quality and Climate	Noise and Vibration	Biodiversity	Cultural Heritage	Landscape / Townscape and Visual	Traffic and Transport	Material Assets	Major Accidents and Disasters
Population and Human Health											
Land, Soils and Geology											
Hydrology and Hydrogeology											
Air Quality and Climate											
Noise and Vibration											
Biodiversity											
Cultural Heritage											
Landscape / Townscape and Visual											
Traffic and Transportation											
Material Assets											
Major Accidents and Disasters											

18.2 DISCUSSION OF INTERACTIONS

In addition to Table 18-1, the following section summarises the primary interrelationships of aspects of the environment with the potential for significant effects as a result of the proposed 110kV substation.

18.2.1 Population and Human Health

Interactions with Land, Soils and Geology and Hydrology and Hydrogeology

During the construction phase of the development, there is potential for short-term interaction between Population and Human Health and Land, Soils and Geology and Hydrology and Hydrogeology.

This interaction is primarily associated with the disturbance of ground within the proposed substation site as a result of excavation works which may have potential for a negative effect on the Baldonnell Stream as a result of the erosion of soil and the inappropriate storage of excavated materials. There is also the potential for release of hydrocarbons, concrete and other pollutants which have the potential to result in pollution to soil, groundwater and surface waters. These potential impacts, along with detailed mitigation measures, are discussed in detailed in Chapter 8 and Chapter 9. With mitigation, these works will have no significant impacts on Population and Human Health.

During operation, the potential for interaction with Land, Soils and Geology and Hydrology and Hydrogeology is reduced. Any potential interactions are mitigated as set out in the respective chapters. A positive interaction is noted given that the operation of the substation will enable provide electricity to the neighbouring power plant, which in turn will regularise energy provision in the electricity grid especially in the context of an increase in use of renewable energy technologies, such as solar and wind power. This will accommodate and support Ireland's transition to a low-carbon economy and mean that Ireland can continue to invest in renewable sources of power in order to meet future national and EU targets.

The decommissioning phase of the proposed substation will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will remain in-situ. There is an opportunity for positive impacts once decommissioned as these lands will be covered with earth and allowed to revegetate and reseed while the access roads will be used for the operation of commercial uses across neighbouring lands.

Interactions with Air Quality and Climate

During construction there is potential for air quality impacts from construction dust emissions as a result of excavation works, infilling and landscaping activities and storage of soil in stockpiles. This leads to the potential impacts on human health due to nuisance dust and the release of CO_2, N_2O, PM_{10} and $PM_{2.5}$ emissions. While construction dust tends to be deposited within 350 m of a construction site, the majority of the deposition occurs within the first 50 m (IAQM, 2014). The objective of dust control at the site is to ensure that no significant nuisance occurs due to low established sensitivity of the area. In order to develop a workable and transparent dust control strategy will be developed and incorporated into the CEMP as set out in Chapter 10 Air Quality and Climate.

The potential impact to air quality during the operational phase of the substation is long-term, neutral and imperceptible as there are no operational emissions from the proposed development.

The decommissioning phase of the proposed substation will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will remain in-situ.

Interactions with Noise

Some 16 no. noise assessment locations have been identified that are representative of the nearest residential, commercial and amenity locations. The nearest occupied noise sensitive locations (NSL) are located some 400 m to the south of the approved gas fired peaking power plant (i.e., R001) and some 450 m to the north east (i.e., R014). The closest amenity to the development is Grangecastle Golf Course (i.e., R015) which is located to the east of the proposed plant.

Subject to good working practice as recommended in Chapter 11 Noise and Vibration, noise associated with the construction phase is not expected to exceed the recommended limit values and thus, it is not expected to cause any significant effects.

During the operational phase, in terms of the proposed substation element of the proposed development a computer-based prediction model has been prepared to quantify the potential noise level associated with the operational phase of this aspect of the substation on the receiving environment. Assuming the proposed substation installation has comparable noise emissions to the 110kV unit at Dunfirth (as discussed in Chapter 11) and considering the distance between the 110kV substation and the nearest off site locations (i.e., >220m) noise from this installation is not predicted to be an issue off site.

There will be no noise emissions from the operation of the proposed underground grid connection during its day to day operation. Consequently, there is no requirement to assess any noise emissions associated with this aspect of the proposed development.

The decommissioning phase of the proposed substation will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will remain in-situ.

Interactions with Biodiversity

With the implementation of the CEMP during construction the proposed substation will not result in likely significant effects on any of the key ecological receptors at any geographic scale, with the exception of permanent loss of wet grassland and bare ground habitat within the proposed development site.

Interactions with Cultural Heritage

All topsoil/overburden stripping has already taken place on site and will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH).

There are no potential impacts on the cultural heritage resource as a result of the proposed development, as such mitigation measures are not required at operational phase.

Interactions with Landscape / Townscape & Visual Impacts

The landscape / townscape sensitivity of Profile Park is considered Medium-Low. As such at construction stage the impacts on landscape/townscape will be short term as the site is already modified and there already exists frequent vehicular movement. The construction works will inherently by screened and will cause only minor impacts on the character of the Grange Castle Golf Club.

At operational stage, due to existing and / or imminent screening by the permitted Profile Park Power Plant and its associated landscape mitigation planting, the proposed substation is only visible from VP2 and VP4 where it is seen as a modest ancillary development against the backdrop of the Power Plant. The visual impact significance at both of these viewpoints is deemed to be 'Slight-imperceptible' and of a 'Neutral-Negative' quality. At all of the other viewpoints, the significance of visual impact is deemed 'Imperceptible'.

Decommissioning stage impacts arising are likely to be similar to the construction stage impacts and of a shorter duration with an overall neutral and temporary impact within its context.

Overall, the proposed substation will not result in any townscape or visual impacts.

Interactions with Traffic and Transport

Public perception of the construction phase will be influenced primarily from the impact of traffic movement. When taken in context with the existing traffic flows in the area, the operational traffic from the proposed substation is expected to result in 5 vehicle movements per day and therefore potential impacts are considered negligible. Any increase will be short-term in nature (expected duration of construction phase is approximately 18 months) and once the substation is operational, traffic movements to and from the site will be negligible.

Interactions with Materials Assets

There are material assets along the proposed routes associated with the electrical grid and gas connection. However, these assets which relate to public utilities primarily are development in built up 'made' land. Short term impacts may will arise due to the requirement for access to third party properties to facilitate construction. Aviation impacts on Casement Aerodrome have also been assessed and not considered to be significant in relation to impacts on military operations. There will not be a significant interaction therefore between Population and Human Health with Material Assets during the construction, operational or decommissioning phases of development.

18.2.2 Land, Soils and Geology

Interaction with Hydrology and Hydrogeology; and Biodiversity

During construction, this interaction is primarily associated with the disturbance of ground within the proposed substation site as a result of excavation works which may have potential for a negative effect on the Baldonnel Stream as a result of the erosion of soil and the inappropriate storage of excavated materials. There is also the potential for release of hydrocarbons, concrete and other pollutants which have the potential to result in pollution to soil, groundwater and surface waters.

During operation no new impacts will arise. Some construction traffic may be necessary for maintenance of the site (power plant and tank farms) which could result in minor accidental leaks or spills of fuels/ oils affecting the groundwater and potential surface waters also.

The decommissioning phase of the proposed substation will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will remain in-situ.

Mitigation measures/standard design measures and management controls as set out in Chapter 8 Land, Soils and Geology will negate any potential impacts.

Interaction with Cultural Heritage

Although archaeological test trenching at Profile Park and neighbouring Ballybane substation discovered a series of historic remains, ground disturbances during construction associated with the proposed substation site may have a direct negative impact on archaeological remains that may survive within the site. In order to mitigate this, all topsoil/overburden stripping associated with the proposed substation will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH). No significant operational or decommissioning phase interactions are predicted.

Interaction with Traffic and Transportation

During the construction phase, topsoil and subsoil removal will be required to a 'competent founding layer' and will be willed with structural and/or concrete to the appropriate finished floor level. Additionally, grid connection will be laid beneath the ground surface and/or private road. As such, a verification condition survey will be carried out over the full extent of the route and the excavated material will be cast to the side to be used as backfilling material and will be smoothed with the back of an excavator bucket to minimise runoff.

At all stages there is a risk of contamination of soils due to potential spills or leaks from infrastructure and equipment on site. However, the operational team on site will follow appropriate mitigations measures such as minimal refuelling or maintenance of operational vehicles and use of impermeable bunded areas where leaks are prone to occur which will help minimise any potential negative effects on soils.

When taken in context with the existing traffic flows in the area, this traffic will be short-term in nature with no significant impact predicted. No significant operational or decommissioning phase interactions are predicted.

Interaction with Material Assets

During construction, potential impacts mainly occur with existing neighbouring properties, road network, public utilities, aviation, and raw materials.

Potential impacts to third party properties will be in relation to requiring access to allow for construction works and any further impacts will be minimised.

In terms of impacts on utilities, hey laying of electrical, gas, water, wastewater and telecommunications pipelines and cabling may lead to 'slight negative temporary impacts' as

there could be potential damage caused to unidentified utilities. As such it is proposed that utilities will be further identified and mapped at the detailed design stage.

The neighbouring Casement Aerodrome located approximately 1km to the south may be impacted due to the use of cranes during construction activities. In order to avoid any potential issues, the Department of Defence will be consulted 30 days prior to use of equipment on site. However, it is unlikely that any cranes used during construction will reach the aerodrome's Inner Horizontal Surface.

There is potential for 'imperceptible, negative and permanent impacts' due to the sourcing of some raw materials from outside Ireland as some of the equipment parts may not be manufactured in Ireland which will in turn result in the use of some non-renewable materials. However, it is proposed that much consideration will be given to the selection and sourcing of materials to promote sustainability and reuse of materials. No potential impacts are perceived on the local rail and canal network, recreational facilities, pedestrian ways, land resources, geological sources, and natural amenities.

During the operational phase, the main impacts arising from the development proposal are long term positive effects on the public utilities as the proposed substation will facilitate the powering of the neighbouring powerplant and support renewable energy integration to the grid network while also providing power to data centres.

18.2.3 Hydrology and Hydrogeology

Interaction with Biodiversity

At a local scale, the Baldonnell Stream flows through the site from in a north-south direction. The Baldonnell stream continues to flow northwards, discharging into the Griffeen River which then discharges into the River Liffey at Lucan. Minor surface water ponding occurs on the site. The proposed development is not located within a catchment which has identified ecological habitats such as NHAs, SACs and SPAs.

In order to mitigate potential effects during the construction phase, best practice construction methods will be implemented in order to prevent water (surface and groundwater) pollution. A drainage system has been designed for the site including a number of features such as check interceptor drains, and swales during the construction phase, and surface water pumps, petrol interceptors, and down pipes/gullies during the operational phase. These are designed to maintain discharge rates at existing levels and remove any sedimentation arising from excavation works.

A Construction and Environmental Management Plan (CEMP) was developed for the project to ensure adequate protection of the water environment. All personnel working on the project will be responsible for the environmental control of their work and will perform their duties in accordance with the requirements and procedures of the CEMP. Operational maintenance works include regular scheduled maintenance works, regular inspections of all project elements with any unscheduled repairs or maintenance arising to be undertaken.

Interaction with Major Accidents and Disasters

Baldonnell Stream is located within the site boundary. There are no streams in close proximity to the substation location. There is, therefore, no risk of significant impact on the surface water from substation fire.

It is noted that the risk of major accidents associated with this development and hydrological/hydrogeological factors is very low and would not cause unusual, significant or adverse effects on the hydrological or hydrogeological environment during the construction, operational and decommissioning phases.

18.2.4 Noise and Vibration

Interaction with Biodiversity

Construction related noise and the physical presence of machinery and construction personnel could result in the disturbance of breeding birds from habitats located in close proximity to the proposed substation. However, since the proposed construction works is considered small scale and short term in nature, it is likely that the birds will acclimatise to human presence over time. In the event that any nests are identified the appointed ECoW will provide recommendations as to whether a license is required for vegetation removal and will detail the process for obtaining such derogation from the NPWS.

During the operational phase, disturbance during the operational phase will be limited and will not result in significant noise or vibration impacts on the receiving environment as it will be operated remotely with occasional site and maintenance visits due to minimal increase in vehicular movements.

The decommissioning phase of the proposed substation will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will remain in-situ. No vibration interfaces are predicted at any stage of the project.

18.2.5 Major Accidents

Interaction with Multiple Topics

In respect of adverse climatic events, it should be noted that the proposed substation will be constructed, operated and decommissioned in accordance with all relevant planning, building and environmental licencing codes. The substation is not considered to be at risk during storms or during extreme heat or cold event, any more so than other significant buildings or structures. The potential significant environmental effects relating to major accidents are set out in detail in Chapter 17 Major Accidents and Disasters. Substantial mitigation and monitoring measures are proposed to ensure the potential for these effects to occurs is not realised. No significant impacts are predicted during the construction, operation or decommissioning phases of the proposed substation.

18.3 CONCLUSION

All environmental factors are interrelated to some extent. However, the most common interactions are between Population and Human Health and visual perception, noise, air quality and biodiversity. Having studied the interaction of potential impacts during the construction, operational and decommissioning phases it has been determined that no amplification effect is anticipated. The proposed substation will have some positive impacts on an international, national, regional and local level, particularly in terms of helping to achieve renewable energy targets. It is important to note that many of the physical, environmental and landscape and visual impacts are reversible upon decommissioning of the substation.