7 AIR AND CLIMATE

7.1 INTRODUCTION

This chapter describes the potential impacts on ambient air quality in the environs of the site from the proposed development of the Kilcumber Bridge 110kV substation. The proposed development is described in detail in Chapter 2. The construction and operational activities have been examined to identify those that have the potential to significantly impact on air quality and climate. Climate Change is also discussed, and the potential contributing effects of the project are considered, both positive and negative.

The assessment comprises:

- a description of the existing environment;
- prediction and characterisation of impacts;
- evaluation of impact significance;
- consideration of mitigation measures, where appropriate.

Information has been gathered from publicly available sources, including the EPA Envision website and EPA Air Quality webpages containing air quality data, maps and health index.

7.1.1 Scope of Assessment

This assessment focuses on the potential impacts the proposed development will have on air quality. It will also explore the potential cumulative effects of the proposed development in combination with other developments would be likely to result in significant air quality impacts.

The assessment of impacts on local air quality for the current proposal involved a desk study to identify the main aspects of the proposed development that could generate emissions into the atmosphere, and the key pollutants associated with these emissions.

7.1.2 Methodology

The methodology to assess the impacts on air quality and climate involved a site visit, assessment of baseline air quality, a review of the project construction and operation practices to determine the likelihood and significance of any emissions, and a desktop assessment of all relevant guidance, best practice and legislation.

The following legislation and published guidance has been consulted in undertaking this assessment:

- EU EIA Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (2014 EIA Directive);
- Revised (draft) EPA Guidelines on the Information to be Contained in Environmental Impact Reports (EPA, August 2017);
- Revised (draft) EPA Advice Notes for Preparing Environmental Impact Assessments (EPA, September 2015);

7.1.2.1 Desktop Assessment

Mapping, aerial photography and a site visit identified the nearest sensitive receptors, the land use in the area and the local topography and existing sources of air pollution.

A desktop assessment involving a review of the following was also undertaken:

- Existing EPA air quality monitoring data to characterise existing baseline air quality;
- identification of sensitive receptors within the site and in close proximity to the area;
- relevant assessment criteria, guidelines and best practice to assess the potential impact of the proposed development on air quality (at sensitive receptors) and climate;
- the construction methodology and its potential for dust generation.

7.1.3 Assessment Criteria

7.1.3.1 Climate change and policy context

The Paris Agreement, 2016, an internationally agreed treaty, attempts to limit global emissions of greenhouse gases. The overall aims of the Agreement are to limit global warming to no more than 2°C above pre-industrial levels, and to attempt to limit warming to no more than 1.5°C above pre-industrial levels.

The Paris Agreement takes a different approach to the Kyoto Protocol, with participating nations choosing their own emissions targets. Ireland committed to two renewable energy targets for 2020. These targets are set out in the National Energy Efficiency Action Plan (NEARP). The targets are as follows:

- 16% of final energy use from all sectors must be from renewable sources
- 10% of energy use in the transport sector must come from renewable source

Sub-targets for heat and energy have also been set out to help achieve this goal:

- 12% heat from renewable sources
- 40% electricity from renewable sources

In line with the Agreement, Ireland set an ambitious target of a reduction from 2005 emission levels of greenhouse gas (GHG) by 40% in 2030 and by 80% to 95% in 2050. Achieving these targets forms part of an overall EU ambition.

With a view towards strengthening the country's resolve towards meeting its targets, the Irish Government published the Climate Action Plan 2019. The plan defines a roadmap for achieving a net zero carbon energy system. Included within this plan is a detailed sectoral roadmap, designed to deliver a cumulative reduction in emissions between 2021 and 2030. Within the context of this report, the plan outlines targets for the energy sector, the details for which are as follows:

- Increase reliance on renewable energy from 30% to 70% adding 12GW of renewable energy capacity (with peat and coal plants closing) with some of this delivered by private contracts;
- Put in place a coherent support scheme for micro-generation with a price for selling power to the grid;
- Open up opportunity for community participation in renewable generation as well as community gain arrangements;
- Streamline the consent system, the connection arrangements, and the funding supports for the new technologies on and off shore.

Additional details on the plan are available at https://www.gov.ie/en/publication/5350ae-climate-action-plan.

Reducing emissions of powerful GHG's such as carbon dioxide (CO_2), methane (CH_4), carbon monoxide (CO), sulphur dioxide (SO_2) and nitrogen oxides (NO_x) is important for contributing to Irelands emissions targets.

7.1.3.2 Local Air Quality and Dust Deposition

The potential for a significant impact to air quality may arise from emissions of fugitive dust during construction. The National Roads Authority (NRA) has published guidance for assessing dust impacts from road construction projects ('*Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes*'). This has been consulted to determine the potential impacts from the proposed construction activities.

Table 7-1 lists the distances at which dust could be expected to result in a nuisance from construction sites for impacts such as soiling, particulate matter $(PM)_{10}$ deposition and vegetation effects. These distances present the potential for dust impact with standard mitigation in place.

Table 7-1 Assessment Criteria for the impact of dust from construction with standard mitigation in place

Source		Potential distance for significant effects (distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation**
Major	Large construction sites, with high use of haul roads	100m	25m	25m
Moderate	Moderate sized construction sites, with moderate use of haul roads	50m	15m	15m
Minor	Minor construction sites, with limited use of haul roads	25m	10m	10m

7.1.4 Statement on Limitations and Difficulties Encountered

Quantifying the exact impact on local or general air quality and associated impacts to climate change in Ireland and further afield is a complicated and difficult process. This is largely due to the size of air sheds, the associated difficulty in defining atmospheric borders and the complex nature of the Earths atmospheric system.

There are also difficulties associated with quantifying cumulative effects in relation to lifetime carbon usage of works vehicles, concrete material and all other planning, construction and operational equipment which may be associated with the proposed development.

7.2 EXISTING ENVIRONMENT

The proposed development site is in the townlands of Ballykilleen, Cloncreen and Ballinowlart North, Co. Offaly. See **Figure 7-1** below for location map. The proposed development is opposite the Edenderry power station and approximately 6km south of Edenderry on the R401.

The site is currently an agricultural field and is in a rural location. It is accessed via the R401 which is adjacent to the site. To the northeast of the site there is the R401 and the Edenderry power station.

The Figile River is approximately 70 meters to the east of the substation. The land to the south, west and north of the site is made up of agricultural fields and cutaway peatland. The topography of the site is relatively flat and is at an elevation of approximately 67 metres above Ordnance Datum (mOD).

The total site area is approximately 4 hectares, of which approximately 2 hectares make up the substation compound and 2 hectares make up the grid connection route. Existing land-use at the site is agriculture.

The closest residential property is approximately 200m to the east of the substation on the R401. There is a further cluster of residential dwellings approximately 220m to the east of the southernmost pylon.

The largest nearby urban centre to the site is Edenderry which has a total population of 6,490 (CSO, 2016).

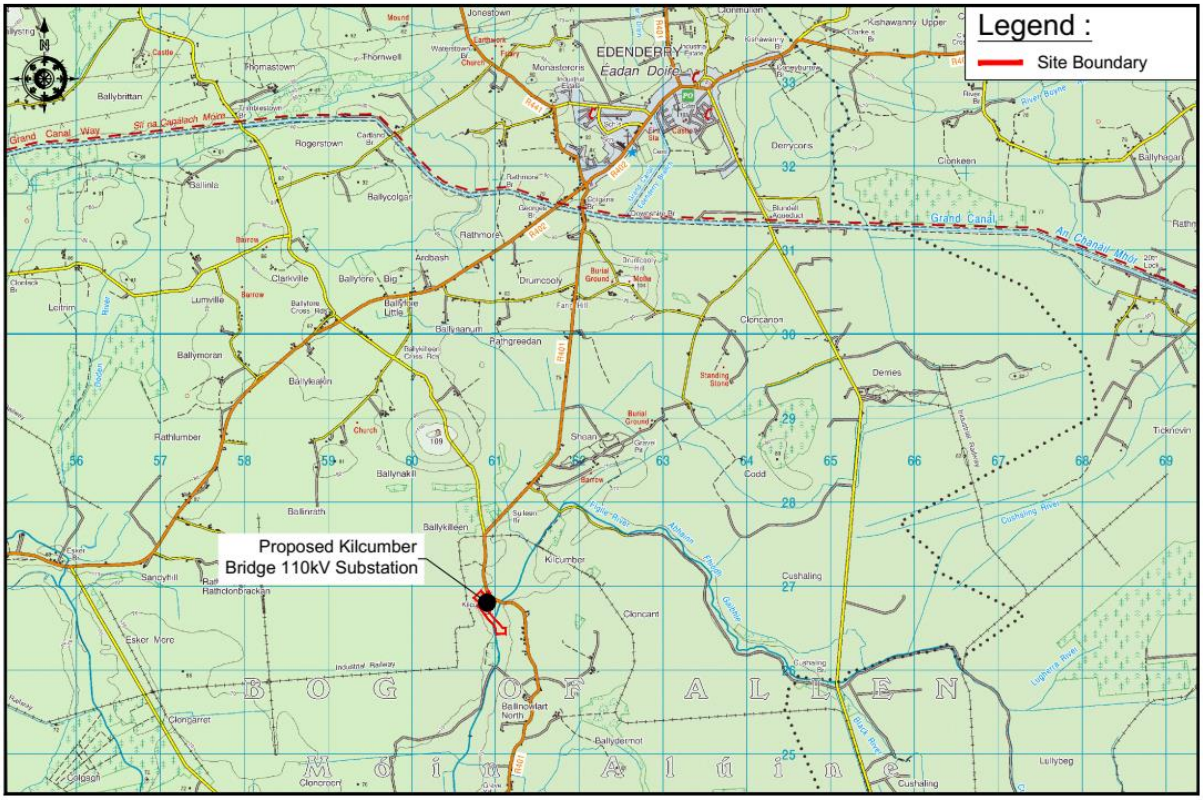

Figure 7-1 Site Location

The largest potential source of pollution in the vicinity of the proposed site is the Edenderry Power Plant, located opposite the proposed development at a distance of 60m. The Plant holds an EPA Greenhouse Gas Permit which was issued on 06/02/2017 (Permit No. IE-GHG007-10339-3). The permit allows the plant to emit atmospheric CO_2 subject to monitoring and reporting requirements, with emissions reports required for submission to the EPA within four months of the end of each calendar year. The estimated annual CO_2 emissions from the power plant are 680,652t/CO_2E.

Further potential sources of pollution in the area are works vehicles associated with the power plant and a nearby quarry, from commuting traffic on nearby roads, and from emissions of methane and nitrogen associated with agriculture.

Representative Environmental Protection Agency (EPA) ambient air quality data has been used to characterise the existing air quality and meteorological conditions in the area. The sensitive receptors include houses and ecologically sensitive areas.

7.2.1 EPA Air Quality Index for Health (AQIH)

The Environmental Protection Agency's (EPA) Air Quality Index for Health (AQIH) is a number from one to 10 that describes the current air quality in a region. There are 6 regions as follows: Dublin, Cork, Large Towns (>15,000 population), Small Towns (5,000 – 15,000 population), Rural East and Rural West.

The AQIH is calculated on an hourly basis using representative sampling from each region. Each region is ranked 1 – 10, with 1 being 'Good' and 10 being 'Very Poor' based on the worst case pollutant in that region. A ranking of 10 means the air quality is 'Very Poor' and a ranking of 1 – 3 inclusive means that the air quality is 'Good'. The AQIH is calculated every hour. The index was accessed via the EPA's website (https://gis.epa.ie/EPAMaps/) on the 16th July 2019. The air quality for the region where the wind farm is proposed (Rural East AQIH Region 5) is currently ranked as '2 - Good', as shown in **Figure 7-2** below.

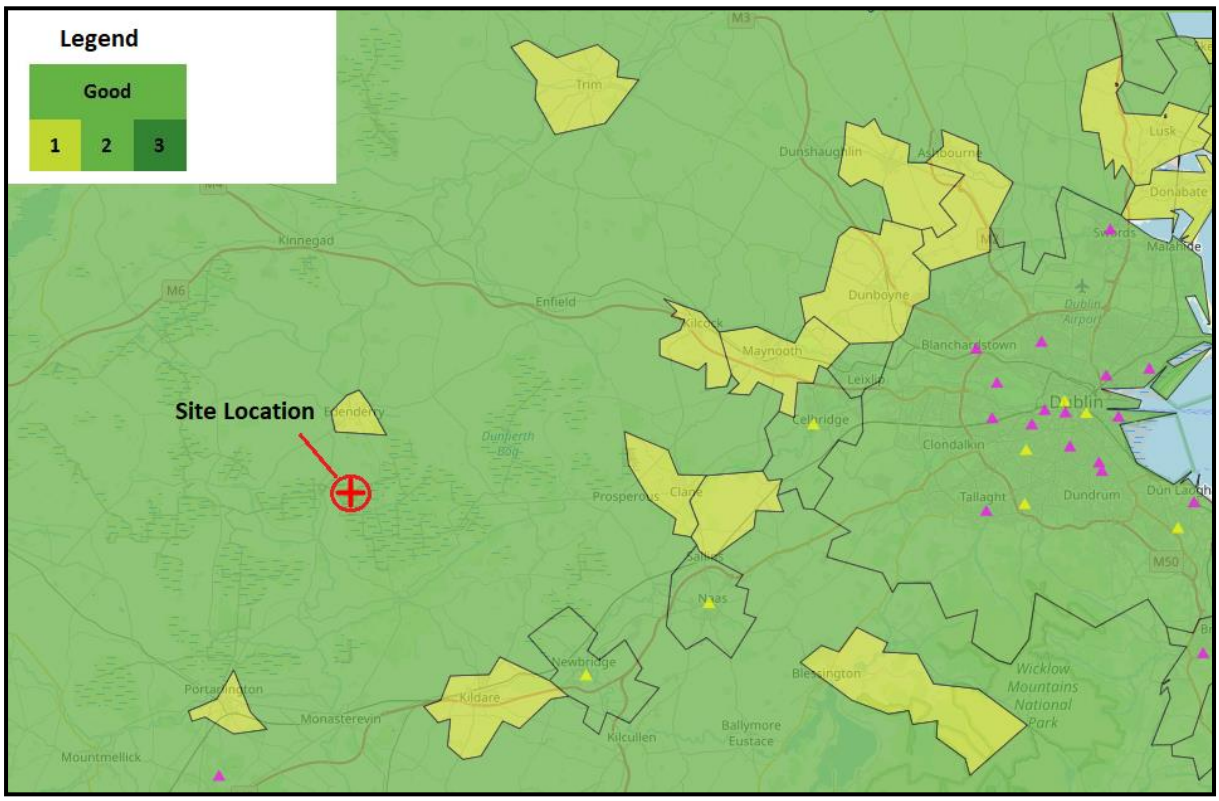

Figure 7-2 Existing Air Quality Index for Health (AQIH)

The closest EPA Air Quality Monitoring Station is located approximately 20km south-west at Emo Court, Emo, County Laois. The Station monitors levels of NO_2 and O_3. Another station which

continuously monitors NO_2, SO_2, CO and PM_{10} is located in Portlaoise, approximately 10km southwest of the Emo Court Station. There were no exceedances detected at either of these sites in 2020 or 2021.

7.3 LIKELY SIGNIFICANT EFFECTS

7.3.1 Construction Phase

The main potential impact of the proposed development on air quality in the receiving environment would be temporary during the construction stage from fugitive dust and vehicle emissions associated with the following activities:

- Stripping of topsoil in compound area and placement of hardcore surfacing;
- Placing of tarmac at site entrance and internal roads;
- Construction of control building, compound infrastructure and perimeter fence;
- Works associated with the construction of the proposed grid route connection.

The movement of machinery, construction vehicles and the use of generators during the construction phase will generate exhaust fumes containing predominantly sulphur dioxide (SO_2), nitrogen oxides (NO_x), carbon monoxide (CO), and particulate matter (PM_{10}).

7.3.1.1 Dust Emissions

Earthworks associated with the stripping of topsoil and the laying of hardcore surfacing in the proposed substation compound have the potential to generate fugitive dust emissions.

Using the NRA criteria listed in **Table 7-1** based on the precautionary principle, the development can be characterised as a minor-sized construction site. Therefore, dust is unlikely to cause an impact at sensitive receptors beyond 25m of the source, with standard mitigation measures in place. Given the separation distance of approximately 200m between the proposed development and nearest dwellings, dust is unlikely to be a significant impact at these receptors, with standard mitigation measures in place. Standard mitigation measures for dust prevention and control are presented in **Section 7.4**.

In summary, given that there is an intervening distance of 200m between sensitive receptors and dust emissions sources, with recommended mitigation in place it is very unlikely that any receptors will be affected by fugitive dust emissions during construction or that the emissions will have an adverse impact on local ambient air quality.

In terms of impact on ecosystems, dust can be deposited on the leaves of plants reducing their photosynthetic potential. It is anticipated that once standard mitigation measures are in place there will be no significant impacts on ecosystems from dust. These are outlined in the project CEMP provided in **Appendix 4.**

7.3.1.2 Vehicle Emissions

Exhaust emissions from construction and delivery vehicles during construction are unlikely to have an adverse impact on local air quality, and will not impact significantly on local, regional or national air quality standards given the high levels of dispersion and the existing air quality in the area.

The principal pollutants of concern to sensitive ecosystems are nitrogen oxides. Nitrogen oxides may have a positive or negative impact by acting as a fertiliser or a phytotoxicant. The potential impact of exposure of plants to nitrogen oxides are mainly on growth, photosynthesis, and nitrogen assimilation/metabolism.

The National Roads Authority (NRA) has developed guidelines for the assessment of the significance of impact of construction projects on sensitive ecosystems. These guidelines state that should the predicted concentrations exceed a NOx limit of 30µg/m^3, then the sensitivity of the relevant species should be assessed by the project ecologist. It is not possible to accurately estimate vehicle emissions associated with the construction phase of the project. However, data taken from an EPA monitoring station in Winetavern Street in Dublin City Centre, an urban area that experiences a large amount of traffic congestion, indicates an hourly NO_2 emissions value of 17.75 µg/m^3. This value is well below the 30µg/m^3 value outlined in the NRA guidelines. It is highly unlikely that traffic associated with the construction phase of the project will exceed or reach this level. It can therefore be assumed that emissions associated with the proposed development will not have a significant impact on sensitive ecosystems in the region.

7.3.2 Operational Phase

7.3.2.1 Climate change

Once operational the Kilcumber Bridge 110kV substation will operate as a grid connection for renewable energy projects in the locality. The enabling of these renewable energy projects will have a positive effect on climate change.

7.3.2.2 Air Quality

Once operational, the substation will not generate any greenhouse gas emissions. Any emissions associated with the development during the operational phase will solely relate to vehicles needed for maintenance of the substation. This level of activity is not expected to cause any significant impacts on air quality.

7.3.3 Risk of Major Accidents and Disasters

This section will briefly assess both the potential for the project to cause accidents or disasters, and also the potential vulnerability of the project to disasters and accidents. This can include the risk to the project from both natural and man-made disasters, for example flooding or technological disasters.

In the case of the proposal the greatest risk to the substation is from potential flood events. In order to assess this risk, a flood risk assessment (**Appendix 3**) was undertaken. The assessment made an allowance for any possible future climate change impacts, including potential sea level rise and increased rainfall events. As part of the report, mitigation measures were proposed to prevent an increase in flood level due to the development. The report concluded that the construction of the proposed substation will not increase flood risk within or outside the site.

7.3.4 Cumulative Effects

Cumulative effects can occur as a result of emissions associated with existing operational developments and planned developments which are in the vicinity of the proposed development. The proposed development will not cause any significant impacts to air and climate in the region.

Therefore, there is no potential for the proposal to result in cumulative and/or in combination effects on the existing environment.

7.4 MITIGATION MEASURES

Best practices will be adhered to during the construction phase in order to minimise fugitive dust emissions.

Outlined below is a series of mitigation measures and good working practices to ensure that any potential impacts during the construction phase are minimised and to ensure there will be no adverse impact on the receiving environment. The mitigation measures have been sourced from national and international best practice guidance documents such as;

- '*Control of Dust from Construction and Demolition Activities'*, UK British Research Establishment (BRE).
- '*Environmental Good Practice on Site'*, Construction Industry Research and Information Association (CIRA).
- '*Environmental Management Plans'*, Institute of Environmental Management and Assessment (IEMA).
- '*Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan'* National Roads Authority of Ireland (NRA).

7.4.1 Construction Phase

A outline Construction and Environmental Management Plan (CEMP) has been developed specifically for this project and outlines construction practices and environmental management measures which will be implemented during the construction phase, in order to ensure that the project is constructed in accordance with best practice, with the minimum impact on receptors. A copy of the outline CEMP is included in **Appendix 4.**

7.4.1.1 Dust Generation

Construction phase generated dust can be minimised by the following measures:

- The use of water as a dust suppressant, e.g. a water bowser to spray access tracks during any extended dry periods when fugitive dust emissions could potentially arise;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods if dust becomes a nuisance on site;
- Control of vehicle speeds passing over access roads within the site;
- Wheel wash facilities at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads;
- Where necessary, site stockpiling of materials will be designed and laid out to minimise exposure to wind;
- Daily site inspections should take place to examine dust measures and their effectiveness.

7.4.1.2 Construction Traffic Emissions

Construction traffic emissions can be reduced using the following measures:

- Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently;
- All site vehicles and machinery to be switched off when not in use - no idling.

7.4.2 Operational Phase

It is not expected that any negative impacts will occur during the operational phase, therefore no mitigation measures are required.

7.5 RESIDUAL IMPACTS

Once operational, there will be no negative residual impacts on air quality.

7.6 CONCLUSION

There is the potential for dust nuisance to occur during the construction phase. However, considering the separation distance to nearby dwellings in addition to strict adherence to best practice measures, any impact on local air quality will not be significant. There are no impacts associated with the operational phase of the development.