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CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED COOM GREEN ENERGY PARK, COUNTY CORK

VOLUME 2 – MAIN EIAR

CHAPTER 11 – POPULATION, HUMAN HEALTH & MATERIAL ASSETS

Prepared for: Coom Green Energy Park Limited

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Date: December 2020

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11 POPULATION, HUMAN HEALTH & MATERIAL ASSETS

11.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) examines the potential effects of the proposed Coom Green Energy Park (CGEP) on Population, Human Health and Material Assets. The chapter includes a description of the existing environment in respect of population, human health, and material assets, and considers the likely effects arising from the proposed development during construction, operations and decommissioning under the following headings:

- Population;
- Socio-Economics, Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health and Safety;
- Renewable Resources, Non-Renewable Resources, and Utility Infrastructure.

There are a number of sources of effects from the proposed development with potential to impact on population, human health, and material assets (renewable and non-renewable sources, and utility infrastructure). These include noise, visual, shadow flicker, air quality, and transportation. The potential effects on population, human health and material assets with respect to air quality, noise, traffic, shadow flicker, and landscape and visual impacts are addressed separately in Chapters 6, 7, 12, 13 and 15 of Volume 2 of this EIAR. Potential hydrological and water quality impacts are discussed in Chapter 10 and potential impacts to lands, soil and geology are discussed in Chapter 9 of this EIAR.

Material assets relating to transport infrastructure are dealt with in Chapter 13: Traffic and Transportation. Material assets with respect to natural resources are considered in Chapter 9: Lands, Soil and Geology, Chapter 10 Hydrology and Water Quality, Chapter: 6 Air Quality and Climate, and Chapter 8: Biodiversity. Assets of Archaeological, Architectural, and Cultural Heritage are considered in Chapter 14 of Volume 2 of this EIAR.

Throughout this chapter the 'proposed development' refers to the elements of the project for which consent is being sought as set out in Chapter 3. This comprises the main energy park including turbines, met masts, substations, battery storage, access tracks, associated infrastructure and works associated with the Turbine Delivery Route (TDR). The 'project' refers all elements including the proposed development, grid route connection and replant lands.

11.2 Methodology

This chapter of the EIAR regarding population, human health and material assets has been prepared following a review of the National Planning Framework, 2040, Regional Spatial and Economic Strategy for the Southern Region , and the Cork County Development Plan, 2014-2020.

This chapter of the EIAR has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA), in particular, the Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, August 2017),

The Government of Ireland's Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August, 2018) and the European Union's guidance document: Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report as per Directive 2011/92/EU as amended by 2014/52/EU. The determination of significance of impact is in line with the EPA's Draft Guidelines on the 'Information to be Contained in Environmental Impact Assessment Reports' (EPA, August 2017).

Demographic data has been sourced from the Central Statistics Office (CSO)'s Census of Ireland (2016) records. Demographic information relating to the State, Cork, and the 'Study Area' has been assessed to establish the existing demographic trends. The 'study area' for the demographic analysis of this Chapter is focused on the proposed development area and is defined in terms of Electoral Divisions (EDs), within which the site boundary is contained and within which the grid connection works are contained. The site of the proposed development lies within the EDs of Ballynamona, Rahan, Carrignavar, Carrig, Glenville, Monanimy, Kildinan, and Kilcummer. The grid connection element is located in the EDs of Kildinan, Rathcormac, Castle Hyde and Castlelyons. The total area of these EDs is approximately 325 square kilometres. The site location and study area are identified in Figure 11-1.

Eircode data (2020), Geodirectory data (2012), and planning application lists have been assessed to identify any commercial or residential receptors in proximity to the proposed development. This information was ground-proofed with a house survey where a surveyor travelled the study area and identified locations of all residential receptors in proximity to the proposed development. The data gathered has informed the considerations on existing populations within the immediate environs of the proposed development and allows for a comprehensive assessment of the potential effects on population trends which may occur during construction, operational, and decommissioning phases of the proposed development.

A socio-economic profile of the existing environment was established using live register data and Census 2016 data to outline an employment profile of the study area. Peer reviewed research was referred to in order to estimate the employment which the proposed development has the potential to create through the construction, operation and decommissioning phases of the proposed development, and the impact this employment will have on the study area.

Land use in the area was examined to determine potential impacts on existing land use patterns which may arise as a result of the proposed development. Corine Land Cover data (2018) was studied and observation was carried out throughout the ground-proofing survey to determine land uses in the study area. The impact of the proposed development was then considered with regard to these land uses.

With regard to Recreation, Amenity and Tourism, Fáilte Ireland published a guideline document on tourism and environmental impacts in 2011 entitled 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement'. This document has been considered, as recommended by Fáilte Ireland, during consultation for the preparation of this EIAR (as discussed in Chapter 5: EIA Scoping, Consultation, and Key Issues) and is referred to in Section 11.6 of this chapter specifically. The document informed the methodology used in assessing potential impacts on Recreation, Amenity and Tourism. A profile of tourism in the region was established through examination of Fáilte Ireland Statistics in order to indicate the strength of Recreation, Amenity and Tourism in the surrounding region. Recreation and amenity facilities and attractions in the area were identified through a desktop study and distances from the proposed development were established. Potential impacts as a result of the proposed development were then considered in relation to the tourism profile and amenity and recreation facilities and attractions of the area.

The assessment on human health and safety has regard to the Environmental Protection Agency's (EPA US) Human Health Risk Assessment process which provides information on potential human health impact.

CSO data (2016) and reports published by the Department of Health were examined to establish a baseline health profile of the study area. Peer reviewed literature was also assessed in considering potential impacts on human health and comments from the HSE received as part of the scoping process informed the assessment. Criteria of potential impacts on human health was extracted from this literature in order to assess potential effects on human health as a result of the proposed development. A desktop examination of potential hazardous land uses in the study area was carried out and vulnerability of the project to natural disaster was assessed through a desktop geographical study and literature review. The assessment was further informed by field surveys and slope stability assessment which were completed as part of the EIA process.

An examination of material assets was carried out which includes renewable and non-renewable resources and utility infrastructure. A desktop study established material assets of the area such as quarries and peat bogs. Infrastructure and various telecommunications companies were contacted during the scoping process to identify infrastructure in the area. Potential impacts on the identified material assets as a result of the proposed development were then examined.

As outlined in Chapter 5: EIA Scoping, Consultation, and Key Issues, prior to preparing the EIAR, statutory authorities and other relevant bodies were consulted. Key items of relevance to Population, Human Health and Material Assets, as raised by these parties have been addressed and referenced within this Chapter of the EIAR where relevant. Consultation responses of relevance to the population, human health and material assets assessment were received from Fáilte Ireland and the HSE as well as from the wider community through public consultation. The consultation responses received have been given due consideration in the formation of this chapter.

In relation to cumulative impacts for Population, Human Health, and Material Assets, the potential effect of the proposed development 'in combination' with other projects, constructed, proposed or permitted has been assessed. The cumulative impact assessment provides a baseline from which a full environmental assessment of the potential effects arising from the project in combination with other plans and projects can be considered comprehensively. A planning search was carried out for major infrastructure projects within the vicinity of the proposed development, development within the immediate environs of the site boundary and/or large residential, renewable energy or commercial developments as well as an examination of relevant plans for the area as detailed in Chapter 4: Policy. Cumulative impact is further detailed in Section 11.10. Where potential significant impact has been identified, mitigation measures have been proposed. Residual impact is then considered which details potential impacts following implementation of mitigation measures.

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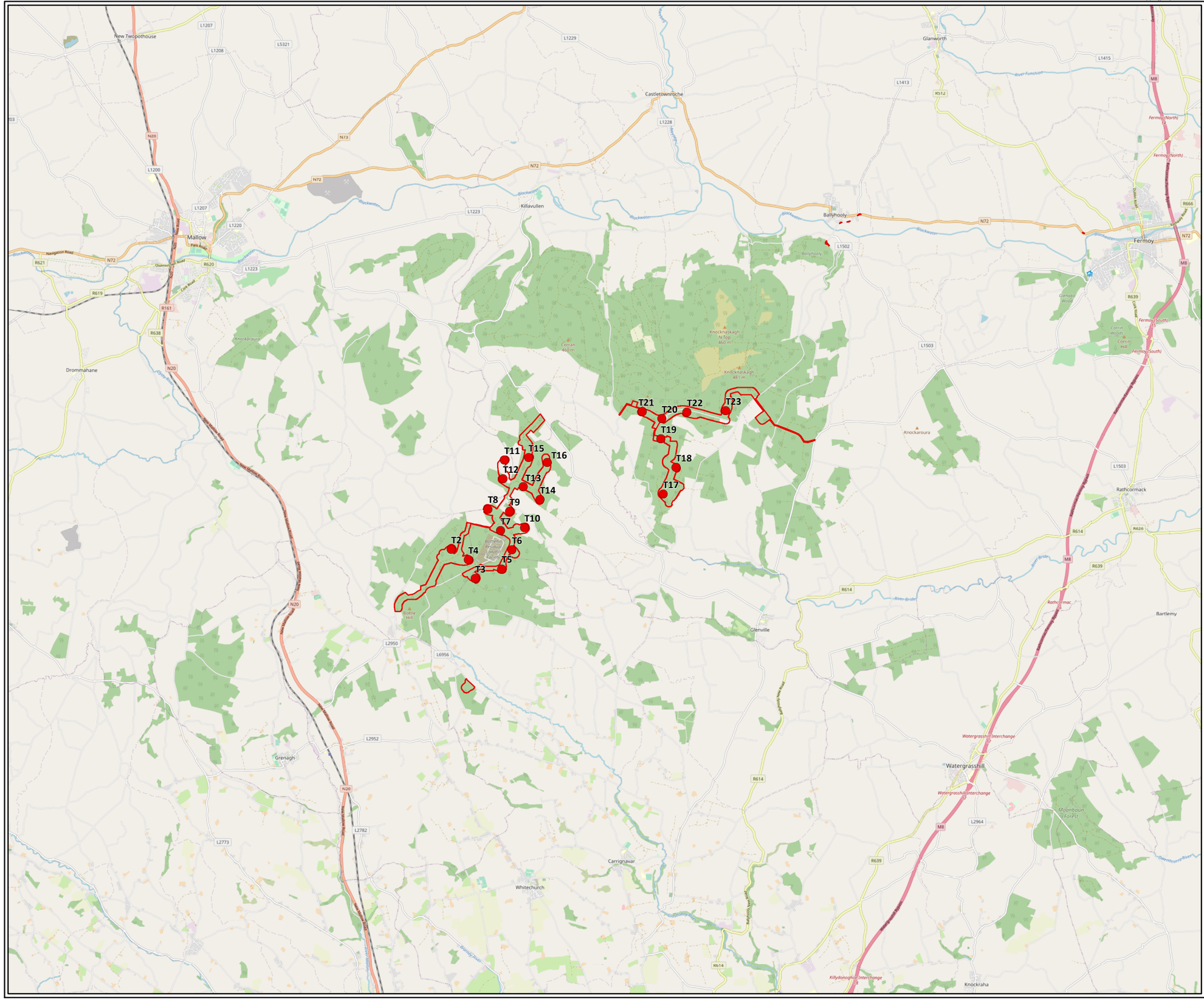

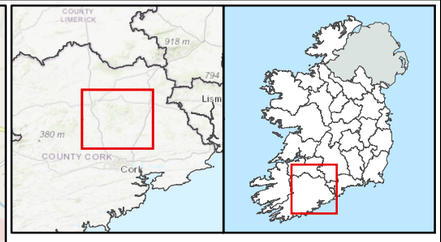

Proposed Turbine Layout

Proposed Development Boundary

TITLE:	Site Location		
PROJECT:	Coom Green Energy Park, Co. Cork		
FIGURE NO:	11.1		
CLIENT:	Coom Green Energy Park Ltd.		
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11.3 Population

Population relates to the people living in an area. Assessing the demographic makeup of an area can reveal insightful information to guide environmental considerations of a proposed development. This section provides a comprehensive overview of the population profile for the study area, Cork City, Cork County and the State between 2006 and 2016 in order to create a baseline demographic profile of the receiving environment and identify potential impacts on demographic trends arising as a result of the proposed development.

The study area for the purpose of assessing population has been chosen based on Electoral Divisions (EDs) within which the proposed development and the associated grid connection is located. This incorporates the EDs of Ballynamona, Rahan, Carrignavar, Carrig, Glenville, Monanimy, Kildinan and Kilcummer. The EDs which the grid connection route passes through include Kildinan, Rathcormac, Castle Hyde and Castlelyons. Directly adjacent EDs of relevance are also included in the study area. The relevant EDs are illustrated in Figure 11-1.

11.3.1 Existing Environment – Population

The proposed energy park is located south of the Nagle Mountains. The main cities, towns and villages within the vicinity of the proposed development are as follows[1]:

Table 11-1: Hierarchy of settlements in the vicinity of the Coom Green Energy Park

City
Cork City
Towns
Mallow, Fermoy
Villages
Castletownroche, Rathcormac, Watergrasshill, Glenville, Carrignavar, Grenagh, Drommahane
Other settlements
Killavullen, Monanimy, Ballyhooly, Bottlehill, Glashaboy, Burnfort, Ballyknockane, Grange, Kilworth, Glanworth, Castlelyons / Bridebridge, Mourneabby, Rathduff

There are 53 no. residential receptors, 35 no. residential/commercial receptors and 3 commercial receptors within 1.38km of turbine locations[1]. Furthermore, there are 2 no. planning consents for single dwellings located within 1.38km of turbine locations which have not yet been constructed.

[1] Based on straight line distances.

This information is based on a desktop study of planning applications, GIS data of Eircodes and a ground-proofing house survey carried out by Fehily Timoney & Company (FTC).[2] Figure 11-2 below illustrates the receptors within the vicinity of the proposed development according to Eircode (2017) and Geodirectory (2012) data and is supported by the ground-proofing survey and planning application searches.

[2] Buffer area determined by 10x the maximum rotor diameter of 138m.

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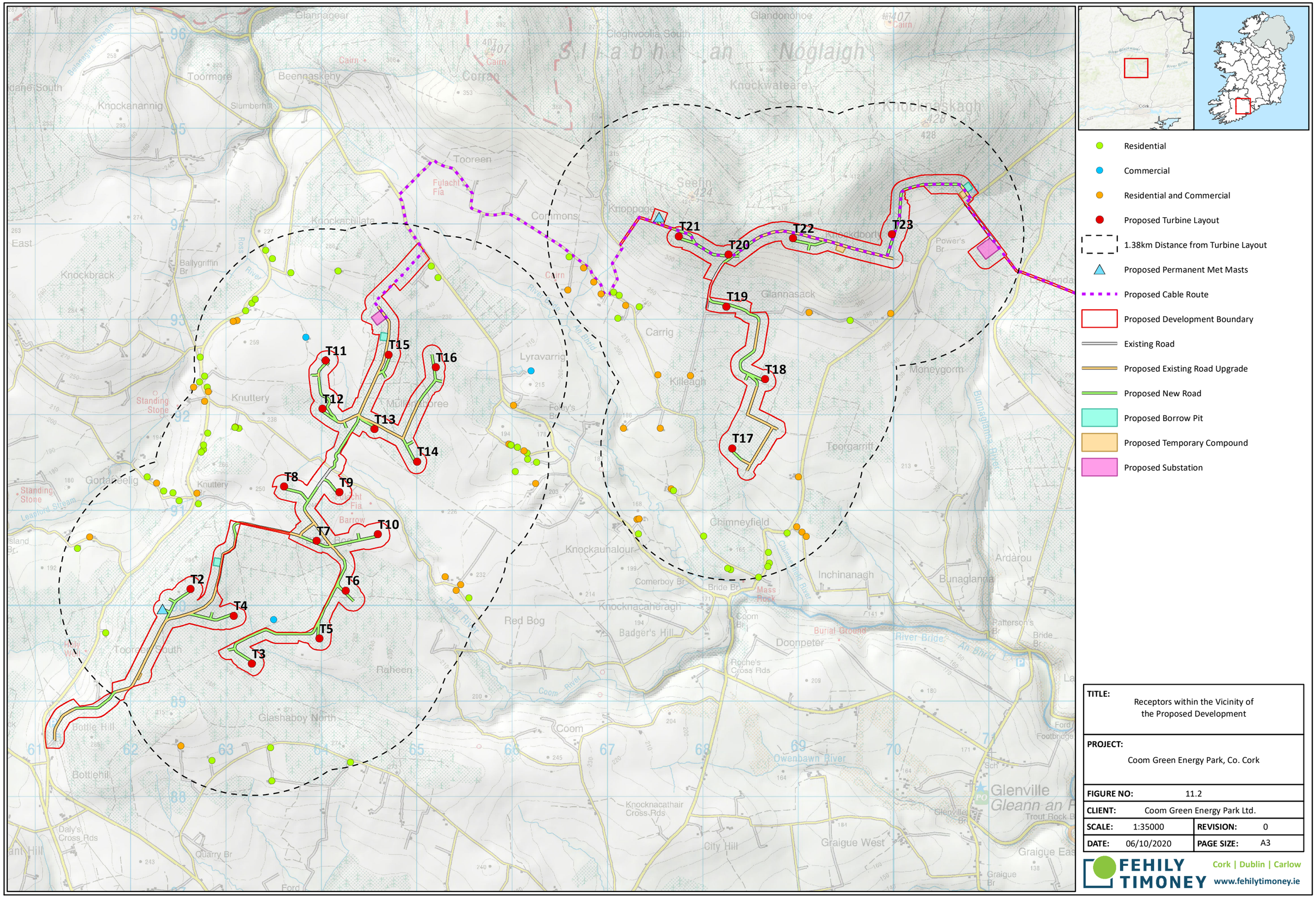

TITLE:	Receptors within the Vicinity of the Proposed Development		
PROJECT:	Coom Green Energy Park, Co. Cork		
FIGURE NO:	11.2		
CLIENT:	Coom Green Energy Park Ltd.		
SCALE:	1:35000	**REVISION:**	0
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Population statistics for the State, Cork City, Cork County, the 'Study Area' (EDs of Ballynamona, Rahan, Carrignavar, Carrig, Glenville, Monanimy, Kildinan and Kilcummer) and the grid connection route (EDs of Kildinan, Rathcormac, Castle Hyde and Castlelyons) are set out in Table 11-2 below.

Figure 11-3 identifies the percentage population change of the EDs within the study area.

Table 11-2: Population 2006-2016

	Population			% Population Change		
Area	**2006**	**2011**	**2016**	**2006-2011**	**2011-2016**	**2006-2016**
State	4,239,848	4,588,252	4,761,865	8.2%	3.8%	12.3%
Cork City	119,418	119,230	125,657	-0.2%	5.4%	5.2%
Cork County	361,877	399,802	417,211	10.5%	4.4%	15.3%
Study Area	4,917	5,451	5,606	10.8%	2.8%	14%
Grid Route	3,868	4,503	4,932	16.4%	9.5%	27.5%

The data presented in Table 11-2 demonstrates that the population of the study area increased by 10.8% between 2006 and 2011, and increased by 2.8% between 2011 and 2016, demonstrating an overall increase of 14% over a 10-year period. This is similar to the population trends witnessed across Cork County and the State between 2006 and 2016. However, the study area had a lower rate of growth in the last inter-census period compared with the State, County and City with 2.8% growth in population between 2011 and 2016.

The population of Cork County has had a higher percentage increase from 2006 to 2016 over the State's population growth, with the Study Area experiencing similar growth of 14% between 2006 and 2016, higher than the state average.

The EDs which the grid route passes through show the highest percentage population increase, far above that of the study area, county or state.

Population Density

The population densities recorded within the State, Cork City, Cork County, the Study Area and the Grid Route area during the 2006, 2011 and 2016 Census are set out hereunder in Table 11-3. The population density of the study area has increased from 19.4 persons per square kilometre in 2006, to 22.3 persons per square kilometre in 2016, representing an overall increase in population density of 14% over the past 10 years. The population density of the study area has consistently been lower than the population density of Cork County overall, which increased from 48.9 persons per square kilometre in 2006 to 56.0 persons per square kilometre in 2016, a 14.5% increase over the past 10 years which indicates a similar growth rate in density to that of the Study Area. The State increased from 62 persons per square kilometre in 2006 to 70 persons in 2016, representing a 13% increase in density, slightly lower than the study area.

The grid route area shows a clear increase in population density over the past 10 years, representing a higher rate of increase than that of the study area, county or state. The 27.5% increase in the population density between 2006 and 2016 is attributed to the population centres located within the EDs including Rathcormac and Castlelyons.

Figure 11-4 demonstrates the population density for the surrounding ED's recorded in the 2016 Census:

Table 11-3: Population Density between 2006 – 2016

Area	Population Density (Persons per square kilometre) 2006	Population Density (Persons per square kilometre) 2011	Population Density (Persons per square kilometre) 2016
State	62	67	70
Cork County	48.9	53.6	56
Cork City	3062	3,012.4	3,174.7
Study area	19.4	21.7	22.2
Grid Route	34	39.6	43.4

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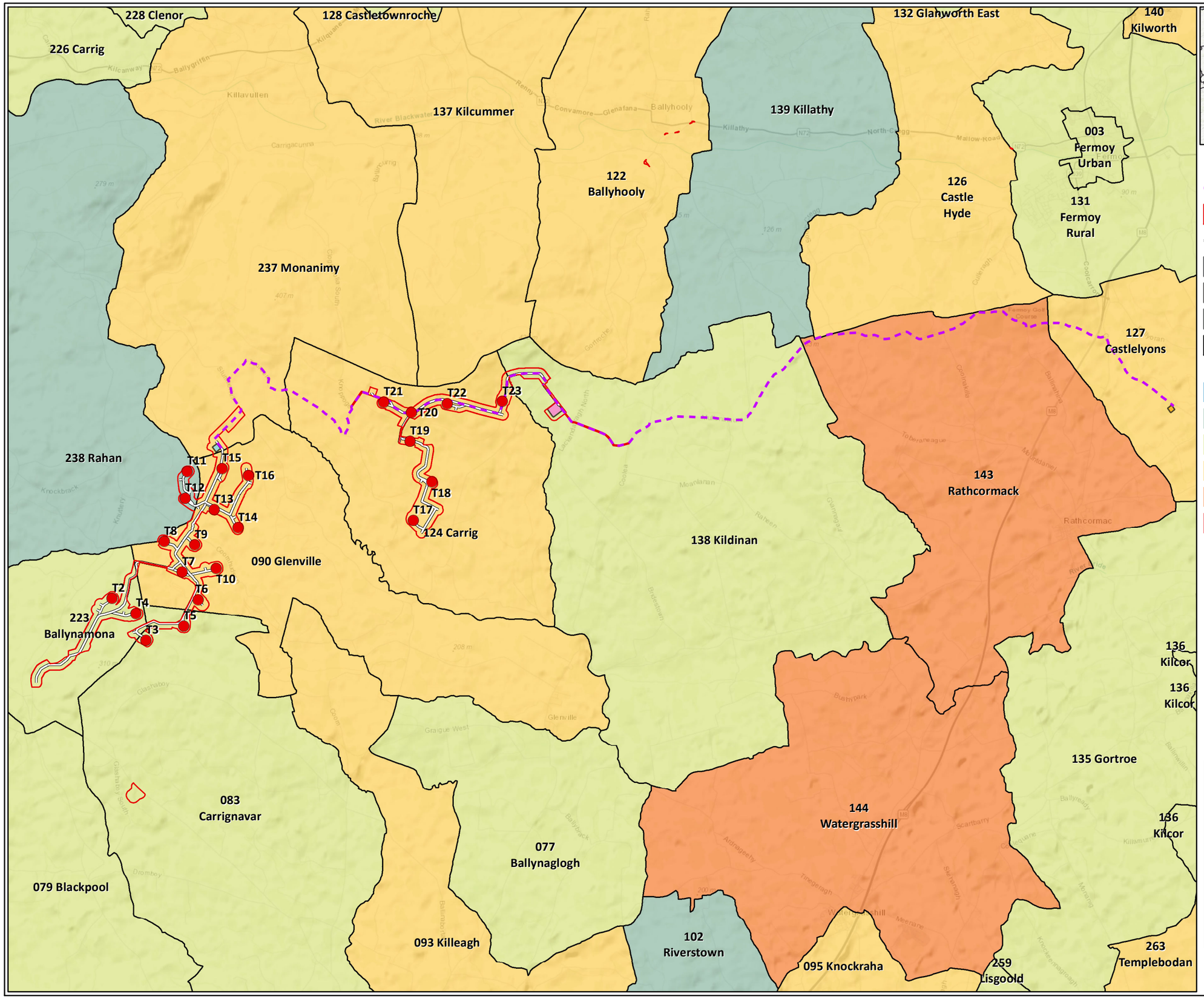

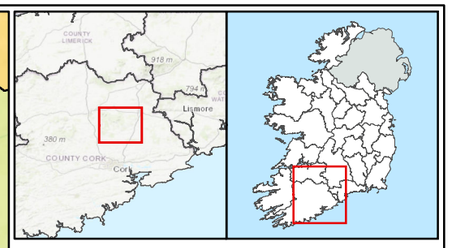

- Proposed Turbine Layout
- Proposed Cable Route
- Proposed Development Boundary
- Proposed Access Roads
- Existing Barrymore 110kV Substation
- Proposed Substation at Knockacullata
- Proposed Substation at Lackendarragh
- Electoral Divisions

Population Change 20011-2016

- < -10.0%
- -9.9 - 0.0%
- 0.1 - 5.0%
- 5.1 - 10.0%
- 10.1 - 20.0%
- +20.1%

N W E S

Kilometers
0 0.5 1 2

TITLE:	Percentage Population Change 2011-2016		
PROJECT:	Coom Green Energy Park, Co. Cork		
FIGURE NO:	11.3		
CLIENT:	Coom Green Energy Park Ltd.		
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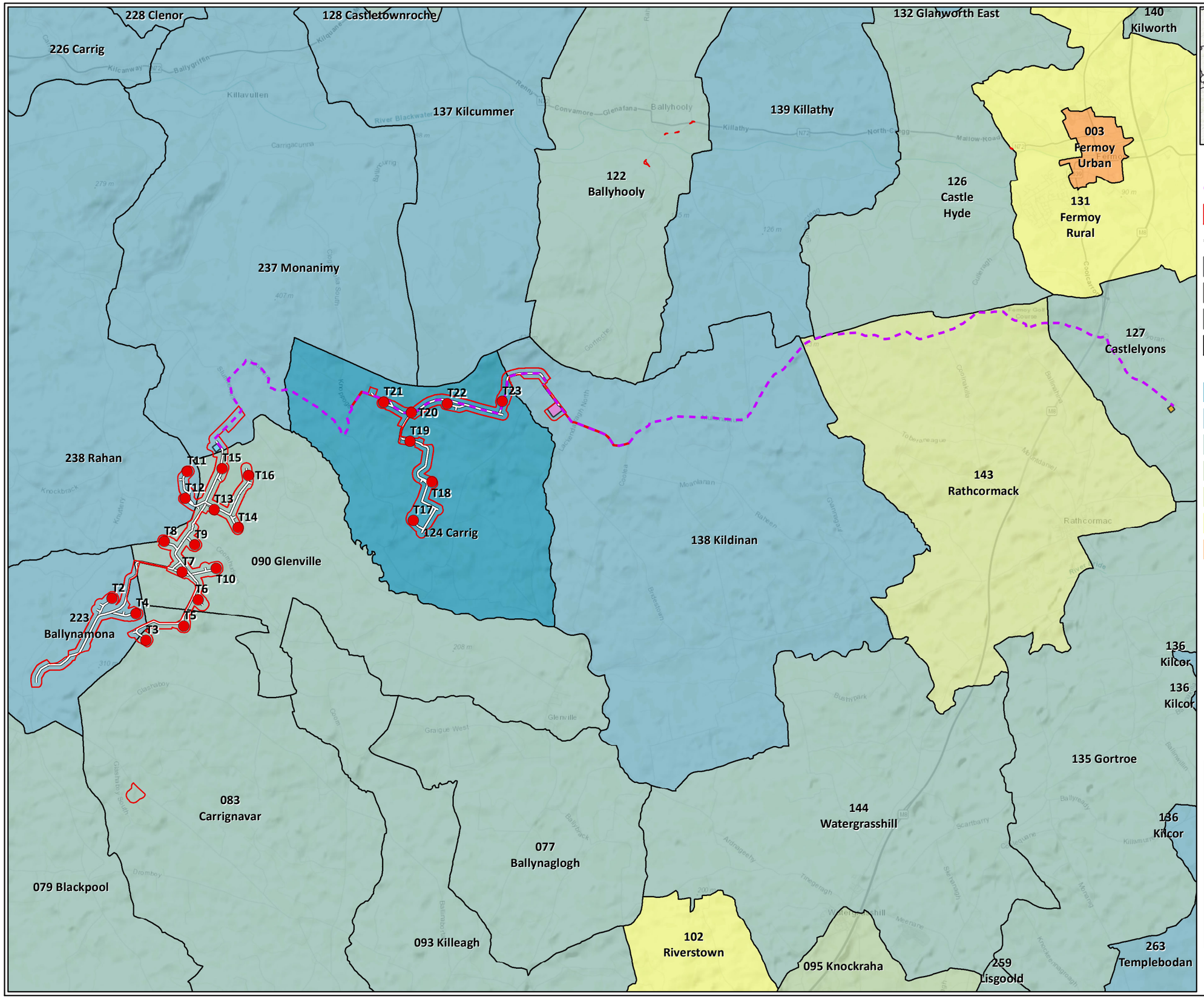

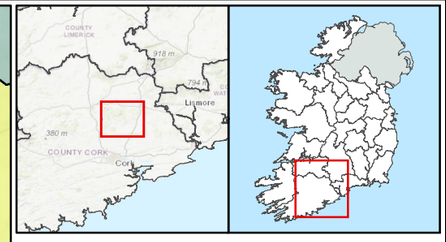

- Proposed Turbine Layout
- Proposed Cable Route
- Proposed Development Boundary
- Proposed Access Roads
- Existing Barrymore 110kV Substation
- Proposed Substation at Knockacullata
- Proposed Substation at Lackendarragh
- Electoral Divisions

Population Density 2016 by ED

- 1 - 10
- 11 - 25
- 26 - 50
- 51 - 75
- 76 - 100
- 101 - 250
- 1001 - 2000

Kilometers
0 0.5 1 2

TITLE:	Population Density		
PROJECT:	Coom Green Energy Park, Co. Cork		
FIGURE NO:	11.4		
CLIENT:	Coom Green Energy Park Ltd.		
SCALE:	1:70000	**REVISION:**	0
DATE:	06/10/2020	**PAGE SIZE:**	A3

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11.3.1.1 Household Statistics

Table 11-4 sets out the number of households and average household size (in persons) for the State, Cork City, Cork County and the Study Area for 2006, 2011 and 2016.

Table 11-4: Number of Households and Average Household Size 2006-2016

Area	2006		2011		2016	
	No. of Households	Avg. Size (persons)	No. of Households	Avg. Size (persons)	No. of Households	Avg. Size (persons)
State	1,469,521	2.9	1,654,208	2.8	1,702,289	2.9
Cork City	43,939	2.7	47,163	2.5	49,411	2.5
Cork County	123,295	2.9	140,856	2.8	146,442	2.8
Study Area	1,576	3.1	1,785	3.1	1,834	3.1
Grid Route	1,309	2.9	1,556	2.9	1,652	3

The total number of households within the study area increased from 1576 to 1834 between the 2006 and 2016 Census, representing an increase of 16.4%. The greatest growth was between 2006 and 2011 where a 13.3% increase occurred. However, the rate of growth slowed down between 2011 and 2016, accounting for a 2.7% increase in households in the study area. Similar trends were recorded in County Cork with slightly higher increases of 18.8% between 2006 and 2016. The larger increase recorded was also between 2006 and 2011 with 14.2%. The increase in households recorded between 2011 and 2016 was 4% showing similarities between the study area and County. Similar growth rates were also recorded for the State with a 15.8% increase in households between 2006 and 2016. Similarly, the grid route area saw its greatest increase in households between 2006 and 2011 with a 18.9% increase. The increase of households recorded between 2011 and 2016 in the grid route area was 6.2%.

Average size of households (in persons) has generally remained the same for each area examined. The study area has remained at approximately 3.1 persons per household over the past 3 census reports. Similar trends were recorded for the State and County Cork with minor decreases. Cork City showed a decline between 2006 and 2011 and has maintained its average household size between the last inter-census period, 0.6 persons lower than that of the study area. The average household size in the grid route area is slightly less than that of the study area but has shown a slight increase in the 2016 census.

Age Structure

The age structure of the Study Area and the Grid Route Area recorded in 2006, 2011 and 2016 is largely in line with that of the national age structure and age structure of Cork County as detailed in Table 11-5, Table 11-6 and Table 11-7 below. The age profile of Cork City is slightly older to that of the Study Area and Grid Route Area. This can be attributed to the smaller household size of residences within the city environs.

Table 11-5: Percentage Population per Age Category in 2006

Area	Age Category				
	0-14	15-24	25-44	45-64	65+
State	20%	15%	32%	22%	11%
Cork City	15%	20%	29%	22%	14%
Cork County	22%	13%	32%	22%	11%
Study Area	23%	13%	32%	22%	10%
Grid Route	23%	13%	35%	20%	9%

Table 11-6: Percentage Population per Age Category in 2011

Area	Age Category				
	0-14	15-24	25-44	45-64	65+
State	21%	13%	32%	23%	12%
Cork City	15%	17%	31%	23%	15%
Cork County	23%	11%	31%	23%	11%
Study Area	25%	11%	30%	23%	10%
Grid Route	25%	10%	35%	21%	9%

Table 11-7: Percentage Population per Age Category in 2016

Area	Age Category				
	0-14	15-24	25-44	45-64	65+
State	21%	12%	30%	24%	13%
Cork City	14%	16%	31%	22%	16%
Cork County	23%	11%	28%	25%	13%
Study Area	25%	11%	27%	25%	12%
Grid Route	26%	10%	31%	22%	11%

In 2016, the age profile of the study area showed no change in percentage of persons aged 24 and under to that of 2011. The percentage of the population aged over 45 increased by 4% between 2011 and 2016. This is set out in Table 11-8 which shows the percentage changes for the different age categories between 2011 and 2016 for the State, Cork City, Cork County, the Study Area and the Grid Route Area.

Table 11-8: Percentage change of population percentages 2006-2011 and 2011-2016

Area	Age Category – Population change 2006 to 2011 as expressed in a percentage				
	0-14	15-24	25-44	45-64	65+
State	+1%	-2%	0%	+1%	+1%
Cork City	0%	-3%	-2%	+1%	+1%
Cork County	+1%	+2%	-1%	+1%	0%
Study Area	+2%	-2%	-2%	+1%	0%
Grid Route	+2%	-3%	0%	+1%	0%
Area	**Age Category – Population change 2011 to 2016 as expressed in a percentage**				
	0-14	**15-24**	**25-44**	**45-64**	**65+**
State	0%	-1%	-2%	+1%	+1%
Cork City	-1%	-1%	0%	-1%	+1%
Cork County	0%	0%	-3%	+2%	+2%
Study Area	0%	0%	-3%	+2%	+2%
Grid Route	+1%	0%	-4%	+1%	+2%

As demonstrated in Table 11-8 above, whilst it is unclear to what extent the volatility of migration patterns has impacted population trends, overall, it would appear that the State, Cork City, Cork County, the Study Area and The Grid Route Area have a moderately ageing population with the greatest percentage of population between the ages of 25 and 44 as per Census 2006, 2011 and 2016 figures.

Overall, the demographic patterns of the Study Area and Grid Route Area show similarities to that of the State and County Cork with particular correlations in growth rates. However, the greatest disparity observed is the population density when compared to the State and the County. Set out in Table 11-3, as of the 2016 Census, Cork County has an average population density 2.5 times greater than that of the Study Area while the State has an average population density over 3 times greater than the Study Area. Similarly, Cork County has an average population density 1.4 times greater than that of the grid route area while the state has an average population density 1.8 times greater than the Grid Route Area. On average, this indicates low population and low population density within the Study Area and Grid Route Area.

11.3.2 Potential Impacts on Population - Construction

The potential effects on population and demographic trends arising from the proposed development during its construction phase relate to potential population increase or decrease.

During the construction phase of the proposed development, it is likely that many of the workers travelling to the site will do so from outside of the study area. This is due to the large numbers expected to be employed at the site.

It is expected that workers from the locality within the study area will be employed, however, the relatively low population available in the study area, combined with a high percentage of employed persons, as identified in Table 11-10 in the following section, indicates that there is a limited available work force in the study area and therefore many workers employed at the construction site are likely to travel from the surrounding towns and city.

This will give rise to brief/short-term population growth in the study area during working hours. This is associated with the direct employment of construction workers, trades people, labourers and specialised contractors. The construction phase of the proposed development has potential to create between approximately 126 and 168 jobs. These employment projections are set out in section 11.4.2.

The population of the Study Area recorded in the 2016 Census was 5,606 persons. An estimate of between 126 and 168 jobs associated with the construction works has potential to increase the population of the study area by between 2.2% and 3%. However, this increase is associated with daily construction work and therefore the population of the study area will increase daily during construction hours and return back to normal outside of working hours. As construction work is temporary it is unlikely that workers will take up residence in the Study Area, however, it is likely that some workers will stay in accommodation within the Study Area. Workers may also stay in accommodation in the Cork County or Cork City area resulting in potential temporary population increases in these areas also. Overall, this will result in a slight, temporary increase in population resulting in a slight temporary impact.

The construction works associated with the grid route will be undertaken on a rolling basis with short sections of road closed for short periods before moving onto the next section. It is expected that these works will be conducted over a 10-month period. Population of the Grid Route Area will receive a slight increase in numbers during working hours. However, due to the transient nature of the grid route works, this is expected to have an insignificant and temporary impact on population of the Grid Route Area.

It is unlikely that permanent impact to population in the Study Area or Grid Route Area will occur, in terms of changes to population trends, density, household size, or age structure as a result of the construction phase.

11.3.3 Potential Impacts on Population – Operational

Once constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the proposed development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the project will arise.

As set out in section 11.4.3 it is expected that the operational phase of the proposed development could create between 31 and 42 long term jobs (with an installed capacity of approximately 105MW). These jobs include operations and maintenance, back office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.

Although only a small proportion of these jobs are likely to be based in the study area, the operational phase will give rise to temporary, slight population increase in the study area during working hours as a result of operations and maintenance. This impact is expected to be imperceptible.

11.3.4 Potential Impacts on Population – Decommissioning

The decommissioning phase of the proposed development is described in Section 3.9 of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with the decommissioning phase in relation to population and demographics will be similar to those associated with construction phase but of a reduced magnitude.

A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the project is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase, the population of the study area will increase daily during working hours and return back to normal outside of working hours.

As removal works will be of relatively short duration, it is unlikely that workers will take up residence in the Study Area, however, it is likely that some workers will stay in accommodation within the Study Area. Workers may also stay in accommodation in the Cork County or Cork City area during the decommissioning phase resulting in potential temporary population increases in these areas also. The decommissioning phase is therefore likely to result in a slight, temporary increase in population within the study area, producing a slight temporary impact on population trends. It is not likely that the decommissioning phase will result in any permanent impact to population in terms of changes to population trends, density, household size, or age structure.

The grid route element of the project will remain in situ following decommissioning. There is no expected impact on population trends, density, household size, or age structure in the grid route area as a result of the decommissioning phase.

11.3.5 Mitigation Measures – Population

As there will be no significant impact on population trends, density, household size or age structure, no mitigation measures are required.

11.3.6 Residual Impacts – Population

The residual effects of the proposed development with respect to population are associated with operation and maintenance jobs during the operational phase of the CGEP. This is likely to result in a temporary slight population increase in the study area during working hours. As per the assessment of operational impacts, any impact to the population of the study area in terms of changes to population trends, density, household size, or age structure will be imperceptible. It is therefore unlikely that long term residual impacts will occur to population and demographic trends as a result of the proposed development.

11.4 Socio-economics, Employment and Economic Activity

This section provides a comprehensive overview of the socio-economic, employment and economic activity associated with the receiving environment ('Study Area'), Cork City, Cork County, and the State, in order to provide an understanding of the overall socio-economic profile of the receiving environment and the potential effects arising from the proposed CGEP.

11.4.1 Existing Environment – Socio-economics, Employment and Economic Activity

The State and Cork's Economic Status

Live register data (CSO, 2019) provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data.

Table 11-9: Live Register Data for Cork County, Cork City and the State 2016 – 2019 (Yearly Average)

	2016	2017	2018	2019	2020[3]
Cork County	27,676	23,297	19,341	16,104	16,580
Cork City	11,988	9,962	8,115	6,502	6,782
State	302,661	258,580	220,065	195,370	211,492

Note: Month 1 to 9 available only for 2019

Between 2016 and 2019, the average number of people on the live register has steadily dropped in Cork County, Cork City and the State. Cork City has seen the largest percentage drop in registered unemployment with a 46% decrease since 2016. Cork County has seen a 42% decrease in registered unemployment since 2016 and the State's figures show a 35% decrease in registered unemployment since 2016. Taking the numbers registered as unemployed in 2019 and comparing it to the population figures for each area (Census 2016), this shows that County Cork has the lowest registered unemployment rate of the three areas with 3.8% unemployed. This is followed by the State at 4.1% and Cork City at 5.2%. Note that this has not taken into account population increase since 2016.

Between 2019 and 2020, numbers on the live register have risen, likely due to the economic downturn associated with the COVID-19 pandemic. The state has seen a higher rise in unemployment in 2020 with an 8.25% rise, whereas Cork City and Cork County have experienced a 4.3% and 4.6% increase in unemployment respectively.

The CSO (2016) has published figures of Ireland's working population aged 15 to 64. The basic indicator for employment is the proportion of the working age population aged 15-64 who are employed. Table 11-10 below sets out the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. Table 11-10 also sets out those who were not in the labour force, this includes students, retired people, those unable to work, persons performing home duties etc.

[3] Totals for 2020 do not include persons in receipt of the Pandemic Unemployment Payment (PUP)

Table 11-10: Economic Status of the Total Population Aged 15+ in 2016

	Status	State	Cork City	Cork County	Study Area
% of Population aged 15+ which are:	At work	53%	47%	56%	60%
	First time job seeker	1%	1%	1%	0%
	Unemployed	7%	7%	5%	4%
	Student	11%	15%	11%	11%
	Home duties	8%	7%	9%	8%
	Retired	15%	16%	14%	13%
	Unable to work	4%	6%	4%	4%
	Other	0%	1%	0%	0%

Overall, the principle economic status of those in Cork City and County (47% and 56% respectively) and within the Study Area (60%) is 'at work', with the National average at 53%. Those retired within the study area is lower than the National average (15%) at 13%.

The employment make-up of an area is an important element of its socio-economic profile. The CSO Census of Population 2016 (Small Area Population Statistics 2016) shows that employment within the Study Area is weighted towards professional services (24%), Commerce and Trade (19%), manufacturing (14%) and agriculture (13%) as indicated in Table 11-11 below. Within Cork County, professional services is the largest industry employer (24%), followed by commerce and trade (21%) and agriculture (14%). The State's share of agriculture is 4%, lower than that of Cork County and the Study Area.

Table 11-11: Industry distribution for the State, Cork City, Cork County and the Study Area, 2016

Persons at work by industry	State	Cork City	Cork County	Study Area
Agriculture forestry and fishing	4%	0%	16%	13%
Building and construction	5%	4%	6%	6%
Manufacturing industries	11%	14%	10%	14%
Commerce and trade	24%	22%	21%	19%

Persons at work by industry	State	Cork City	Cork County	Study Area
Transport and communications	9%	9%	6%	6%
Public administration	5%	4%	6%	5%
Professional services	24%	25%	24%	24%
Other	18%	21%	12%	11%

11.4.2 Potential Impacts - Socio-economics, Employment and Economic Activity - Construction

The site preparation and installation of CGEP will provide employment for technical consultants, contractors and maintenance staff.

According to Institute for Sustainable Futures document (2015), 3.2 job years are created per MW of wind energy development during the construction and installation phase. Based on this employment estimate and an approximate two-year construction phase, approximately 168 jobs could be created during the construction phase (for an installed capacity of approximately 105MW).

According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009), 1.2 jobs per MW are created during installation of wind energy projects. Using this figure, a projection of approximately 126 jobs could be created as a result of the construction of the proposed development (for an installed capacity of approximately 105MW).

Therefore, it is considered that between approximately 126 and 168 staff/contractors could be employed during the construction phase of the project. The employment of tradespeople, labourers, and specialised contractors for the construction phase will have a direct short-term, positive impact on the local economy, bringing significant benefits to local service providers and businesses with a direct and indirect financial benefit to the local community.

It is likely that there will be direct employment for people living in the Study Area who may be qualified for construction related roles. Materials will also be sourced in the locality where possible. This will assist in sustaining employment in the local construction trade. As a result, the construction phase of the proposed development will have a short-term, positive impact on the employment profile of the area and a short-term, positive impact on local businesses and services in the study area and in nearby towns located in County Cork.

11.4.3 Potential Impacts - Socio-economics, Employment and Economic Activity – Operational

11.4.3.1 Economic Value & Employment Potential

The proposed CGEP will contribute to achieving Ireland's energy target as set out in the Climate Action Plan 2019, which has a target of 70% electricity generated from renewable energy sources by 2030. With a target increase in onshore wind capacity of 8.2GW by 2030, the CGEP has the potential to produce 1.3% of this total.

The Sustainable Energy Authority of Ireland (SEAI) Renewable Energy in Ireland Report 2020 states that wind energy provided Ireland with 28% of its electricity in 2018. The use of renewables in electricity generation reduced CO2 emissions by 4.9 million tonnes in 2018, avoiding approximately €623 million in fossil fuel imports for that year. It is estimated that wind energy alone resulted in a reduction of 3.1 million tonnes of CO2 emissions, displacing consumption of 1.3 million tonnes of fossil fuels and resulting in the avoidance of €432 million in fossil fuel imports in 2018 (SEAI, 2020 & 2020a). These savings will continue to rise with the installation of further renewable energy developments.

Once the CGEP is constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the proposed development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the project will arise.

According to the European Wind Energy Association's (EWEA) Report 'Wind at Work' (2009), 0.4 long-term jobs are created per MW of total installed capacity. These jobs include operations, maintenance, back office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultants, research institutions, universities and financial services.

A study carried out by the Institute for Sustainable Futures (2015) estimates that the operational and maintenance job output for a wind farm is 0.3 jobs per MW of total installed capacity based on an average of 6-7 studies. Based on this estimate, the proposed development (with an installed capacity of approximately 105MW) could be expected to contribute to between 31 and 42 long term direct and indirect jobs.

Although only a small proportion of these jobs are likely to be directly based in the study area, it is likely that the indirect jobs the operational phase will support, such as consultants, research institutions, universities and financial services, will provide an indirect benefit the economy of Cork City and Cork County. It is likely that there will be direct employment available for people living in the Study Area who may be qualified for jobs associated with operation and maintenance. It is therefore considered that the operational phase of the proposed development has potential for a slight positive indirect impact on employment in the study area, Cork City and Cork County.

Rates and development contributions paid by the developer will contribute significant funds to Cork County Council which will be used to improve the services available to the people of the County. The Cork County Council General Development Contribution Scheme (2018-2021) indicates a charge of €1,000 per 0.1 MW of capacity will apply to wind turbine installations generating greater than 0.5 MW of energy. This suggests that a Development Contribution of up to €1.05 million will be made payable by the applicant prior to construction (with an installed capacity of approximately 105MW). Business rates will also contribute significantly.

General council services will benefit from rates and development contributions including road upkeep, fire services, environmental protection, street lighting, footpath works etc., along with other local community initiatives and supports. Local landowners will also benefit from lease agreements and wayleave agreements associated with the lands of the proposed development. The payment of rates and development contributions is likely to have a significant benefitting impact on service provision in the County Cork Area.

The terms of the Renewable Energy Support Scheme (RESS) state that all projects looking for support under the new RESS will need to meet pre-qualification criteria including the provision of a community benefit fund. This is discussed further in the following section.

11.4.3.2 Proposed Community Benefit Scheme

An important part of renewable energy development is its Community Benefit Scheme. The concept of directing benefits from renewable energy developments to the local community is promoted by the National Economic and Social Council (NESC) and the Irish Wind Energy Association (IWEA) among others.

As set out in the terms of the Renewable Energy Support Scheme (RESS), all renewable energy projects applying for RESS will require a Community Benefit Fund prior to commercial operations of the project. The contribution for RESS 1 (2020), the first renewable energy auction under the new support program, required a contribution of €2/MWh for all projects. Furthermore, as part of RESS 1, the Community Benefit Fund will provide a minimum payment of €1,000 to all dwellings located within a distance of 1 kilometre radius from RESS 1 projects and a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, focusing on education, energy efficiency, sustainable energy and climate action. The characteristics of the Community Benefit Fund are not expected to change significantly in future RESS auctions.

A Good Practice Principles Handbook will be published by the Minister in 2021 setting out a range of principles, including the need to ensure community participation in fund decision-making via the establishment of a local committee which should ensure successful dispersal of funds throughout the community.

Brookfield Renewable Ireland Ltd and Coillte aim to develop long-life assets in such a way to ensure long-term benefits to the local community and economy are created and sustained. They believe that making a positive contribution to the communities in which they operate is fundamental to the way they do business. Brookfield and Coillte are both committed to the Irish Wind Energy Association (IWEA) Good Neighbour Best Practice Principles in Community Engagement & Community Commitment policy that was launched in March 2013 consisting of community contribution rates of a minimum of €1,000 per Mega Watt of installed capacity on other wind farm developments prior to the introduction of the Renewable Energy Support Scheme.

As detailed in Chapter 5 of this EIAR, public consultation with the local community began at a very early stage in the development process, with engagement commencing during the initial project feasibility and scoping stages. Through this process, feedback was actively sought on ideas regarding the form that the Community Benefit Scheme should take and how best to achieve maximum potential benefit from the available funding. This will pave the way for the establishment of a local committee to ensure dispersal of the fund throughout the community.

Assuming that the export capacity of the proposed development will be approximately 105MW and is contracted under the RESS, it is anticipated that the community benefit fund for the CGEP could deliver over €500,000 per year for the duration of the Renewable Energy Support Scheme which is expected to be for the first 15 years following the commissioning of the project. Following public consultation, it was made clear that part of this fund should be ring-fenced to provide support to the residences in closest proximity to the project, a Near Neighbour scheme. The extent of the overall benefit fund to be allocated to the Near Neighbour scheme and the distribution of the balance of community benefit funds is to be further discussed and agreed with the community in future engagement. The total fund per annum will depend on the power output of the project overall which may vary due to the installed turbine output and the number of permitted/constructed turbines.

The proposed Coom Green Energy Park Community Benefit Fund will provide a meaningful new investment into the local community directly targeting and passing on the benefit of renewable energy development to those in the immediate locality of Coom Green Energy Park.

Building strong partnerships in the communities is critical to the success of every project.

From project development through construction and into operations Brookfield Renewable Ireland Ltd and Coillte strive to involve the public and other stakeholders in consultation and maintain the relationship for the lifetime of the project.

11.4.4 Potential Impacts – Socio-economics, Employment and Economic Activity - Decommissioning

The potential impacts associated with the decommissioning phase in relation to socio-economics, employment and economic activity will be similar to those associated with the construction phase but of a reduced magnitude.

A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the project is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase employment opportunities will be available in the study area and outlying areas of County Cork and Cork City. The influx of construction workers to the study area will have an indirect impact on local businesses and services contributing to the local economy, similar to that of the construction phase but of lesser magnitude.

There will be a slight, positive temporary impact to socio-economics, employment and economic activity in the study area associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.

11.4.5 Mitigation Measures – Socio-economics, Employment and Economic Activity

Given that the potential impacts of the proposed development at construction, operation and decommissioning phases are predominantly positive in respect of socio-economics, employment and economic activity, no other mitigation measures are considered necessary.

11.4.6 Residual Impacts – Socio-economics, Employment and Economic Activity

The residual impact of the development with respect to socio-economics is considered to be slight positive impact with respect to employment. This is as a result of the employment opportunities associated with the operation and maintenance of the development. There will also be a slight positive economic impact from income spent by construction and operations workers in the local area.

As detailed in Section 11.4.3.2, the community benefit fund associated with the Renewable Energy Support Scheme (RESS) will provide a long-term significant positive impact to the study area and wider community. As set out in the terms of the first RESS auction (RESS 1, 2020), the Community Benefit Fund provides for payments to near-neighbours of the RESS 1 projects and will provide funding to benefit the surrounding community as a whole, in support of UN Sustainable Development Goals, in particular education, energy efficiency, sustainable energy and climate action initiatives.

Payments made to local landowners for lease agreements and wayleaves will provide a significant residual economic benefit to local landowners.

Rates payments and development contributions have potential to improve service provision throughout County Cork and in the local area. This is considered a significant positive residual impact.

A slight long-term positive impact is also envisaged in that wind energy decreases the cost of electricity. A cost benefit analysis of wind energy in Ireland was published by Baringa in association with IWEA in January 2019. The study indicates that the more renewable energy (low-cost) produced, the less dependency on fossil fuels is required which costs more per MW. The report states that the savings involved with wind energy outweigh the amount of funding provided to support wind energy through the public service obligation levy, therefore the more wind power produced, the less electricity will cost, resulting in a slight long-term positive impact for electricity users throughout the country.

Overall, the residual impact associated with socio-economics, employment and economic activity as a result of the proposed development is considered significantly positive.

11.5 Land Use

This section assesses the compatibility of the proposed use with the current land use at the proposed CGEP site. The determination of the potential effects on the existing land use is assessed for the construction, operation and decommissioning phases of the proposed development.

11.5.1 Existing Environment – Land Use

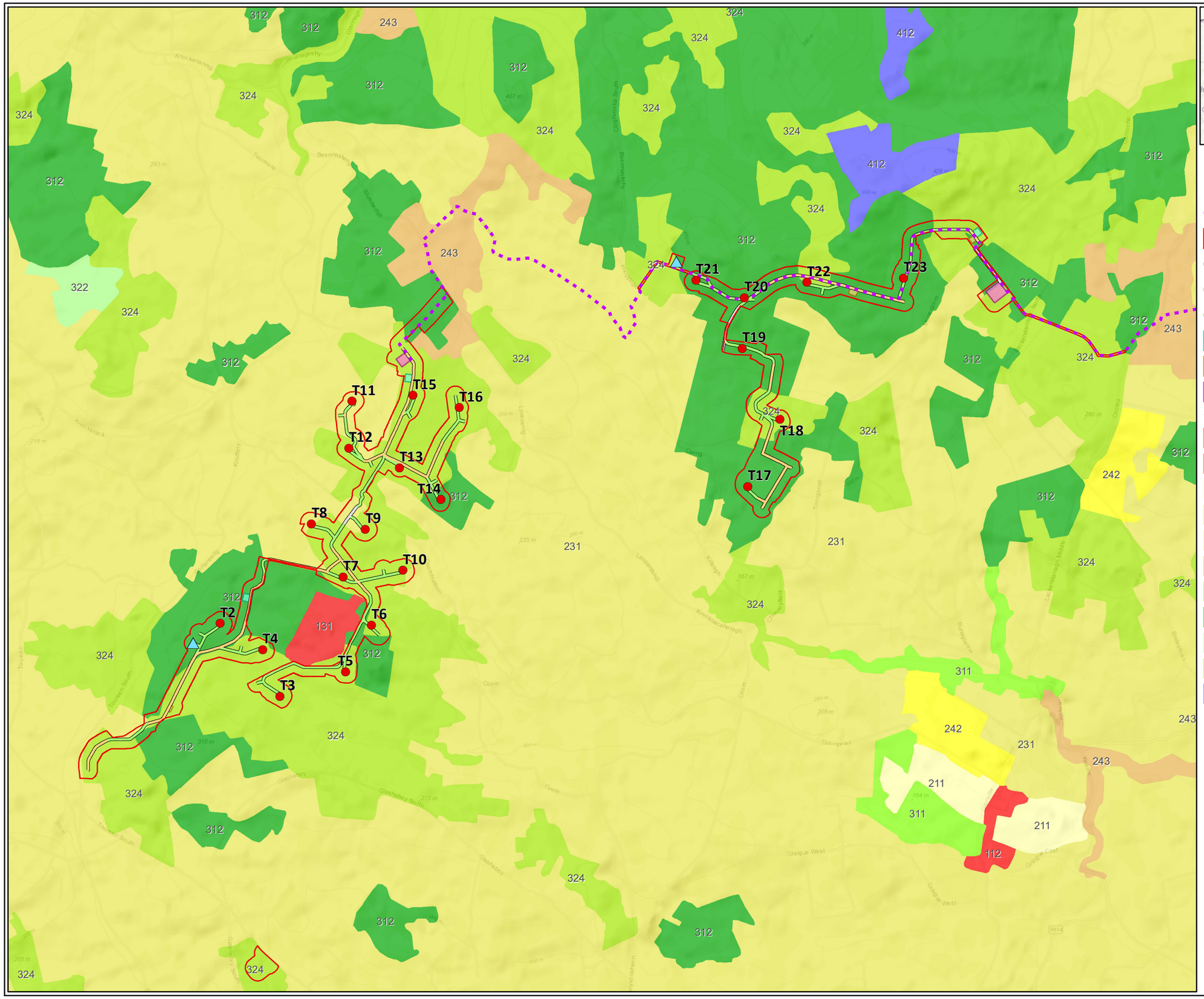
The area surrounding the proposed development is predominantly agricultural lands and forestry. The proposed development site covers an area of approximately 443ha and primarily comprises commercial forestry and small areas of agricultural pasture lands. The site has elevations ranging from 190m to 390m above sea level.

The CORINE land cover data for the proposed development site is illustrated in Figure 11.5. According to the CORINE land cover data (2018) the land cover is classified as 231 Pastures; 312 Coniferous Forest; and 324 Transitional Woodland scrub. A section of the site located at the south west of the development lies adjacent to CORINE designation 131 Mineral Extraction Sites. This represents the Bottlehill Landfill site, constructed but currently not in use.

The landfill footprint is approximately 45.8 hectares which provides a landfill capacity for 5,391,600 tonnes of waste for disposal over its permitted 20-year lifespan. The landfill incorporates leachate and landfill gas collection, and is designed to consist of eight lined phases, each consisting of five separate cells. The average depth of the landfill is 20m. Currently, four of the lined phases have been constructed. Lands for the remaining four lined phases remain undeveloped within the landfill footprint.

The land use along the grid route area and TDR area are generally agricultural pasture lands with intermittent forested areas and dispersed one-off dwellings along each route. The grid connection runs adjacent the Fermoy Golf Club, the Corrin Wood Forest Recreation Area and various commercial premises in proximity to the Barrymore Substation.

Path: R:\Map Production\2020\P20-099\Workspace\EIAR\P20-099_GIS_Fig11-5_CORINELandCover_A3.mxd



- Proposed Turbine Layout
- Proposed Permanent Met Masts
- Proposed Cable Route
- Proposed Development Boundary
- Existing Road
- Proposed Existing Road Upgrade
- Proposed New Road
- Proposed Borrow Pit
- Proposed Temporary Compound
- Proposed Substation

CORINE Land Cover 2018

- 112 Discontinuous urban fabric
- 131 Mineral extraction sites
- 211 Non-irrigated land
- 231 Pastures
- 242 Complex cultivation patterns
- 243 Agriculture with areas of natural vegetation
- 311 Broad-leaved forest
- 312 Coniferous forest
- 322 Moors and heaths
- 324 Transitional woodland scrub
- 412 Peat bogs

N W E S

0 0.5 1 2 Kilometers

TITLE:	CORINE Land Cover		
PROJECT:	Coom Green Energy Park, Co. Cork		
FIGURE NO:	11.5		
CLIENT:	Coom Green Energy Park Ltd.		
SCALE:	1:40000	**REVISION:**	0
DATE:	06/10/2020	**PAGE SIZE:**	A3

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11.5.2 Potential Impacts - Land Use - Construction

The existing land-uses in proximity to the proposed CGEP, will remain broadly unchanged during the construction phase of the project, however, some land use in close proximity to the site may be temporarily disrupted during the construction phase of the proposed development. This is likely to occur on agricultural and forestry lands. The small proportion of agricultural lands supporting access tracks and turbine hardstands will result in a slight, temporary negative impact to this land use as access may be restricted to areas of the land.

21no. turbines are located within forestry and consequently tree felling will be required as part of the project. Felling of approximately 62.8 hectares of coniferous forestry is required within and around the wind farm infrastructure to accommodate the construction of turbines, hardstands, crane pads, access tracks and the proposed onsite substation. This will result in a moderate, permanent impact to forestry in the area, if unmitigated.

Temporary effects on land use will arise as a result of the installation of the 110kV grid route connection which will be constructed partially on forestry lands, with the majority to be installed within the public road corridor. This may temporarily affect access to forestry and agricultural lands. This impact is likely to be slight, temporary as the installation works for cable trenching will be completed quickly and in sections, resulting in limited disruption.

TDR node upgrade activity has potential for non-significant, temporary impacts to agricultural activity along the TDR route as accommodation works will be required at a number of points. This is likely to have non-significant impact due to the small extent of the works and may cause temporary inconvenience due to traffic restriction measures. Turbine delivery may impact on land use temporarily due to the transportation of oversized loads on the public road. This is likely to have a slight temporary negative impact on residential land-use due to noise nuisance as a result of machinery. The impact of noise is further considered in Chapter 7 – Noise and Vibration.

11.5.3 Potential Impacts - Land Use – Operational

Given that the footprint of the proposed development will occupy a small proportion of the development site area when operational, as illustrated in figure 11-5, it is anticipated that there will be minimal impact on existing land uses arising from the operational phase.

The CGEP will involve a change of land use in areas where access tracks, wind turbine bases, hardstanding areas, substations, met mast bases, battery storage, borrow pits, and associated drainage works are required. The lands impacted are currently in use for commercial forestry and agriculture. A replanting scheme is proposed as detailed in Section 3.5.15 of this EIAR. This will offset the loss of forestry assets and will result in an overall temporary insignificant impact on forestry land use. An assessment of the impact of the replant lands is included in Appendix 3.4.

There is one turbine proposed to be located on agricultural lands which will result in the replacement of approximately 1 hectare of pasture with gravel, hard stands and new access tracks. Other turbines located in forestry areas will also require access tracks and hard standing areas which will occupy agricultural lands. This will have a slight, negative impact on agricultural land use due to the removal of small areas of grazing lands for the duration of the project.

The operational phase of the CGEP is not expected to negatively impact on agricultural practices on lands adjacent to the site. There are no peer reviewed studies which indicate that wind energy development has a negative impact on the health of livestock.

There are numerous examples of renewable energy developments throughout the country and internationally where livestock coexist and routinely graze in the same fields as wind turbines (AWEA, 2019). Existing land-use, such as grazing livestock or crops can continue on the site as normal. As such, there will be no significant impact to livestock farming practice as a result of the proposed development.

The Bottlehill Landfill site is located adjacent the proposed CGEP. The proposed turbines and associated infrastructure avoids encroachment on the landfill facility. The design of the CGEP has ensured that the future permitted use of the site as a functioning landfill will not be negatively impacted.

Traffic relating to operation and maintenance of the wind farm is not expected to be significant and therefore, if the landfill facility were to come online during the operational phase of the CGEP, impact to the use of the facility would be slight and imperceptible as detailed in the cumulative impacts, Section 11.10. Chapter 13: Traffic & Transportation assesses potential cumulative traffic & transportation impacts with the Bottlehill Landfill.

11.5.4 Potential Impacts – Land Use – Decommissioning

The decommissioning phase of the proposed development is described in Section 3.9 of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude.

Decommissioning works will include removal of all above ground structures including the turbines, mountings and fencing. Substations are likely to be taken in charge by Eirgrid or ESB and become part of the national grid and will therefore remain in situ. The turbine foundations will be covered over and allowed to re-vegetate naturally if required and access tracks will be left in situ. These works will require a construction crew on-site and may cause temporary disruption to surrounding land uses. Removal of infrastructure from the site may temporarily impact on forestry practices. During decommissioning works forestry access tracks may be in use by construction crews which may temporarily prohibit access to certain areas of forestry. Impact is expected to be slight and temporary.

Following decommissioning, areas of the site cleared of forestry may be replanted if suitable. Forestry practices will also benefit from the upgraded access tracks left in situ throughout the site resulting in a moderate, positive impact on the forestry industry in the site area.

The underground grid connection will remain in situ following decommissioning and form part of the national grid. Therefore, impact to land use along the grid route during the decommissioning phase is unlikely.

11.5.5 Mitigation Measures – Land Use

The proposed development will alter the land use of undeveloped land where proposed works will take place. Mitigation measures for land use are primarily related to preliminary design stage, which has allowed for the prevention of unnecessary or inappropriate ground works or land use alterations to occur. The construction footprint has been kept to the minimum necessary to avoid impact on existing land uses in so far as possible.

Existing forestry and agricultural tracks have been incorporated into the design in order to minimise the construction of new tracks and roads and minimise the removal of forested areas. Where new access tacks are required, these have been sensitively designed in order to minimise impact on forestry and agricultural lands.

Electricity cables will be installed underground to avoid impact on agricultural and forestry practices. The grid connection cable, as assessed in this EIAR, is to be installed along forestry tracks and the public road. Once the cable is laid, the sections of forestry track and public road will be reinstated. Upon decommissioning, the cable will remain in situ and form part of the national grid, thus avoiding further excavation which would cause temporary impacts on adjacent land uses as described in 11.5.2.

The construction and decommissioning works will be planned and controlled by a Construction and Environmental Management Plan, included in Appendix 3.2, which will provide details on day to day works and methodologies. As part of these works, the public and other stakeholders will be provided with updates on construction activities which may impact on their properties or agricultural practices. This will be communicated to members of the public through a community liaison officer. Prior to the grid connection installation works within public roads, it is proposed that all access points (domestic, business, farm) are considered when finalising the temporary road closures and diversions, to maintain local access as much as possible and avoid impacts on various land uses. All proposed works and deliveries along the TDR route will also be controlled by a Construction and Environmental Management Plan to avoid undue impact to adjacent land uses.

As it is proposed to fell approximately 62.8ha of coniferous forestry for the proposed CGEP development, replant lands of the same area are required. Potential replanting sites have been identified at Moneygorm, Co. Cork and Ballard, Co. Wicklow. This will mitigate against loss of forestry land use. An assessment of replant lands is included in Appendix 3.4.

11.5.6 Residual Impacts – Land Use

Once mitigation measures are in place and the appropriate design measures are incorporated, as proposed, there will be no significant adverse negative residual effects arising from the project on land use. Benefits to forestry practices as a result of the upgrading of access tracks throughout the site will cause a moderate, positive impact for forestry.

Other infrastructure that will remain in situ includes turbine foundations and hardstands which will be covered over and vegetated. The on-site substations located at Knockacullata and Lackendarragh North are likely to be taken in charge by Eirgrid or ESB and the grid route will remain in situ and likely become part of the national grid. This will result in a slight, imperceptible residual impact on land use as the presence of the substations and underground cable will unlikely impact on exiting land use.

11.6 Recreation, Amenity and Tourism

This section provides a comprehensive overview of the recreation, amenity and tourism value for the study area, County Cork and the State in order to assess the potential effects arising from the proposed development. As 2020 has experienced an unprecedented negative impact on international tourism due to the COVID-19 epidemic, this section focuses on statistics from 2018 and 2019 as a reasonable scenario for tourism potential for the County. This section had regard to Fáilte Ireland's 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement' in line with the recommendations of the scoping response received from the prescribed body.

Of note from Fáilte Ireland's Guidelines in respect of the assessment of potential effects arising from a proposed development on tourism, the following has been considered:

- Indicate the numbers of premises and visitors likely to be directly and indirectly affected by the proposed development.
- Identify and quantify, where possible, their potential receptors of impacts, noting in particular transient populations, such as drivers, walkers, seasonal and other non-resident groups.
- Describe any significant trends evident in the overall growth or decline of these numbers, or of any changes in the proportion of one type of activity relative to any other.
- Indicate any commercial tourism activity which is likely to be directly affected, with resultant environmental impacts.

11.6.1 Existing Environment – Recreation, Amenity and Tourism

Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment. Tourism statistics for 2019 as published by Fáilte Ireland (August 2020) state that in 2019 overseas tourism grew by 0.9% on 2018 figures with over 9.6 million visitors. Expenditure from overseas tourism was estimated to be down by -0.9% remaining strong at €5.1 billion. Fáilte Ireland's 2019 survey results indicate that the most popular recreation activity for tourists was hiking and cross country walking.

Tourism is considered an important industry for County Cork. Chapter 8: Tourism, of the Cork County Development Plan (2014), identifies that:

> *'Tourism in County Cork is based on its rich natural and built heritage. The principle features of the area's tourism product include; mountains and upland habitats; rivers and lakes, over 1100 km's of scenic rugged coastline and peninsulas with long stretches of sandy beaches, fertile agricultural land and many upland peatlands and forest/woodland areas. These natural assets combined with a rich heritage of archaeological and historical sites, built environment including manor homes and gardens, attractive towns and villages offer a unique tourism product.* [Section 8.1.11: Tourism Product in County Cork].

Regional Tourism performance figures for 2018 have been made available by Fáilte Ireland (September, 2019) for the South West Region which includes the Counties of Cork and Kerry. As demonstrated in Table 11.12 below, overseas tourist numbers for the South West region totalled 2,512,000 in 2018. Tourist revenue accounted for €987 million from overseas tourists. Domestic visitors from Ireland and Northern Ireland accounted for 2,473,000 visits to the region in 2018, with €522 million in revenue generated from domestic visitors.

Table 11-12: South West Regional Performance (Tourists in 2018)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
South West[4]	Tourists (000s)	616	924	803	169	2,512	72	2,401
South West	Tourist Revenue (€mn)	179	347	384	77	987	48	474

Doneraile Park, Blarney Castle & Gardens, Fota Wildlife Park and Crawford Art Gallery were the most visited tourist attractions in the Cork area in 2018. Doneraile Park was visited by 490,000 persons, Blarney Castle & Gardens was visited by 460,000 persons, Fota Wildlife Park by 425,000 persons and the Crawford Art Gallery by 230,990 persons (Fáilte Ireland, 2019a).

As per Fáilte Ireland statistics, the main tourist attractions in the adjacent counties are Muckross House Gardens and Traditional Farm in Co. Kerry (550,649 visitors in 2018), and the Rock of Cashel in Tipperary (374,092 visitors in 2018).

Other recreation and tourism amenities located within the receiving environment that have been considered include:

- Munster Vales – (incorporating Nagle Mountains), is located c. 0 km from the site boundary and incorporates 1110km of scenic walkway throughout Munster
- Glenville Holy Well, located c. 2km from the site boundary
- Island Wedge Tomb, located c. 3km from the site boundary
- Ard An Rabhaidh / Ardarou trail, located c. 3 km from the site boundary
- Killavullen Loop trail, located c. 4 km from the site boundary
- Castleblagh - Woodland Trail, located c. 4 km from the site boundary
- Fermoy Rifle Club, located c. 4 km from the site boundary
- The Blackwater Valley, located c. 4 km from the site boundary
- Blackwater Valley Drive, located c. 4 km from the site boundary
- Blackwater Outdoor Activities, located c. 5 km from the site boundary
- Nano Nagle Centre, located c. 7 km from the site boundary
- Mallow Golf Club, located c. 8 km from the site boundary
- Mallow Castle, located c. 9 km from the site boundary
- Fermoy Golf Club, located c. 9 km from the site boundary
- Labbacallee Wedge Tomb, located c. 10 km from the site boundary
- Corrin Wood and Corrin Wood Cross, located c. 10 km from the site boundary

[4] Cork and Kerry

- Glenabo Park, located c. 10 km from the site boundary
- Fermoy Red Bridge, located c. 11 km from the site boundary
- Blarney Caravan and Camping Park, located c. 12 km from the site boundary
- Adventure Park at Kartworld, Watergrasshill, located c. 12 km from the site boundary
- Doneraile Park, located c. 13 km from the site boundary
- Blarney Castle, located c. 13 km from the site boundary
- Moanbaun Woods – walking trail, located c. 14 km from the site boundary
- Cork City Gaol, located c. 17 km from the site boundary

It is noted that the Coillte forestry tracks throughout the site are currently used by walkers for recreation purposes. Taking into account the large amount of forestry tracks open to the public, and the most proximate recreation amenities to the site as listed above, it is considered that the main tourism and recreation potential for the area is trail walking and hiking.

11.6.2 Potential Impacts - Recreation, Amenity and Tourism - Construction

During the construction phase of the proposed CGEP, construction works have potential to cause impacts on recreation, amenity and tourism activities within the vicinity of the site. This is likely to occur in close proximity to the construction site and has potential to impact on Munster Vales trail, a network of trails throughout Munster which includes the Nagle Mountains at its southern-most extent. However, no waypoints or routes traverse the CGEP site. It is therefore unlikely that the construction phase of the proposed development will directly impact on the Munster Vales recreation trails.

It is understood that walkers and hikers use Coillte forest tracks as part of Coillte's Open Forest Policy. The construction phase of the proposed development will involve the temporary closure of forestry tracks within the site, some of which are located on the southern slopes of the Nagle Mountains at the north eastern section of the development. This is expected to last the duration of the construction phase of 18-24 months. Therefore, a moderate, temporary impact to this section of trail will occur due to closure during the construction phase.

Other recreation trails in proximity to the site include Ard An Rabhaidh / Ardarou trail, the Killavullen Loop, Castleblagh Trail and the Blackwater Valley Drive which are located between 3km and 4km from the site. Although the tracks associated with these trails will not be closed to the public, there is potential for indirect impact due to increased construction traffic which may cause dust and noise nuisance in proximity to these recreation trails.

Transport and haul routes have been proposed so construction related traffic approaches the site from appropriate routes. These transport routes are outlined in Chapter 13: Traffic and Transportation and are illustrated in figure 13.5. The transport routes come in close proximity to the Ard An Rabhaidh / Ardarou trail, the Killavullen Loop, Castleblagh Trail and the Blackwater Valley Drive. These transport routes have potential to carry more traffic than usual during the construction stage of the CGEP which may cause heightened noise. However, this is not expected to cause significant impact to the amenity of the trails. Impact on these trails as a result of the construction phase of the CGEP is expected to be insignificant and temporary during the 18-24 month construction period.

The forestry area and associated tracks surrounding the Bottlehill Landfill site is a popular walking trail used by the local community. This area will be closed to the public during the construction period of the CGEP. This will cause a moderate and temporary impact to the amenity of this area for the 18-24 month construction period.

The proposed grid route element of the project comes in proximity to the Fermoy Golf Club and Corrin Woods Recreation Trail. The installation of the grid route element of the project will not likely impact on the enjoyment of these recreation facilities, however, access to these facilities may be impacted for a temporary period during the construction phase if mitigation is not put in place.

Detail in relation to potential traffic impacts as a result of the construction of the CGEP is provided in Chapter 13: Traffic and Transportation. Detail of potential visual impacts during construction phase are dealt with in Chapter 15: Landscape and Visual, and potential noise and vibration effects discussed in Chapter 7: Noise & Vibration.

11.6.3 Potential Impacts - Recreation, Amenity and Tourism – Operational

In relation to tourism and wind energy development, the Wind Energy Development Guidelines for Planning Authorities (2006) states the following:

> *"Wind Energy developments are not incompatible with tourism and leisure interests, but care needs to be taken to ensure that insensitively sited wind energy developments do not impact negatively on tourism potential. The results of survey work indicate that tourism and wind energy can co-exist happily"*

The Draft Revised Wind Energy Development Guidelines (2019) also maintain that wind energy development "can co-exist happily" with tourism and go on to detail the survey results also cited in the 2006 guidelines.

The survey work referred to in the guidelines is the Sustainable Energy Ireland's (SEI's) Attitudes towards the Development of Wind Farms in Ireland (2003). The SEI (now SEAI) report found that the overall attitude towards wind farms is positive.

> *"The overall attitude to wind farms is very positive, with 84% of respondents rating it positively or very positively (Chart 2.6). Only 1% rate it negatively ('fairly bad'), with 14% not having an opinion either way, and no one rating wind farms 'very negatively'. Interestingly, this time it is those from Dublin who are most positively disposed; this could arise from the fact that Dubliners are less likely than others to have a wind farm built in their locality."*

Where negative attitudes were voiced towards wind farms, the visual impact of the turbines on the landscape was the strongest influence. The report also notes however that the findings obtained within wind farm catchment areas showed that impact on the landscape is not a major concern for those living near an existing wind farm (SEI, 2003).

With regard to the economic and environmental impacts of wind farm development, the national survey reveals that attitudes towards wind energy are influenced by a perception that wind is an attractive source of energy:

> *"Over 8 in 10 recognise wind as a non-polluting source of energy, while a similar number believe it can make a significant contribution to Ireland's energy requirements. People therefore seem to have little difficulty with the concept of wind energy".*

This report concludes that based on the detailed study of attitudes, it is clear that there is "widespread goodwill towards wind farm developments".

Recent independent research conducted by BiGGAR Economics in 2016 entitled 'Wind Farms and Tourism Trends in Scotland', assessed the relationship between wind farm developments and the tourist industry in Scotland. An analysis was carried out on eight local authorities which had witnessed a higher increase in wind energy developments than the Scottish average. Of the eight local authorities, five also witnessed a greater increase in sustainable tourism employment than that of the National Average with just three witnessing less growth than the Scottish average. The research concluded that at local authority level, no detrimental impact occurred on the tourism sector as a result of wind energy development, rather that, in the majority of cases, sustainable tourism employment performed better than other areas.

Fáilte Ireland conducted research titled "Visitor Attitudes on the Environment", which was first published in 2008 and updated in 2012. The research surveyed both domestic (25%) and overseas (75%) holidaymakers to Ireland to determine their attitudes to wind farms. The survey results indicate the following:

- Most visitors are broadly positive towards the idea of building more wind farms on the island of Ireland. A minority (one in seven) were negative towards wind farms in any context.
- Despite the fact that almost half of the tourists interviewed had seen at least one wind farm on their holiday, most felt that their presence did not detract from the quality of their sightseeing.
- The largest proportion (45%) said that the presence of the wind farm had a positive impact on their enjoyment of sightseeing, with 15% claiming that they had a negative impact.
- Almost three quarters of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or would have a positive impact on future visits to the island of Ireland.

The updated survey, 2012, found that over half of tourists surveyed had seen a wind turbine while travelling the country. The survey results were as follows:

- 32% said that the wind turbines enhanced the surrounding landscape.
- 47% said that it made no difference to the landscape.
- 21% claimed wind turbines had a negative impact on the landscape.
- 71% of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or have a positive impact on future visits to the island of Ireland.

In 2011, Fáilte Ireland's guidelines on tourism and environmental impacts stated in Chapter 4 titled 'Project factors affecting tourism' that *'some types of new or improved large scale infrastructure – such as roads – can improve the visitor experience – by increasing safety and comfort or can convey a sense of environmental responsibility – such as wind turbines.'*

Further research has been undertaken in Scotland in 2011 by Visit Scotland who have produced a Wind Farm Consumer Research report which showed that 83% of those surveyed said a wind farm would not affect their decision about where to stay when on a holiday or short break in Scotland. Also, against a backdrop of increased wind farm deployment, Visit Scotland's statistics showed the number of visits to Scotland last year and the amount of spending by visitors both increased while their 'Scotland National Visitor Survey 2011' made no mention of the issue of wind farms affecting tourism in Scotland.

Renewable energy projects have also proven to be visitor attractions in their own right. Since opening in September 2009, the visitor centre at Whitelee Wind Farm in Scotland, the largest on-shore wind farm in the United Kingdom, attracts 200,000 visitors per year (Scottish Power, 2019).

From a review of literature as detailed above, it is concluded that the majority of tourists surveyed had a generally positive view on wind energy development in the landscape. Furthermore, when considering sensitive landscape in the area, the Cork County Development Plan details a landscape character assessment for the county. Section 13.6.3 of the CDP sets out the methodology and criteria on how this value is appropriated to each area. "The Value of each landscape character type is defined as the environmental or cultural benefits, including services and functions, which are derived from various landscape attributes".

With respect to the CDP landscape designations, the site is located south of an area of High Value Landscape which covers the Blackwater Valley. In designing the CGEP, careful consideration was given to the potential impact the proposed turbines may have on this high value landscape. As such, the design removed major views of the development from this important landscape designation, to avoid impact on its high value landscape amenity. Further details of potential landscape impact are set out in Chapter 15: Landscape and Visual.

During the early design stages of the proposed Coom Green Energy Park, key landscape and visual constraints were identified including tourist attractions as detailed in section 11.6.1. The most sensitive of these were deemed to be the Black Water Valley, for reasons of both landscape character and scenic designations as well as Blarney Castle and associated demesne because of its tourism, heritage and amenity value. Following a visual impact assessment, the design of the project was substantially altered to remove many of the relevant turbines from view and limit the visual exposure of those remaining turbines so as to minimise landscape and visual impacts on the Blackwater Valley and views from Blarney Castle. This is detailed in section 15.6.1 of this EIAR. Furthermore, an assessment of impact on cultural heritage resource was carried out in Chapter 14. No significant impact to recorded monuments was identified.

Due to the low magnitude of impact on the Blackwater Valley high value landscape, the temporary impact on walking trails and the availability of other walking trails in the wider area, the CGEP is expected to have a temporary, non-significant impact on recreation and amenity in the CGEP area, maintaining the area's strengths in trail walking and hiking in the long-term.

11.6.4 Potential Impacts – Recreation, Amenity and Tourism – Decommissioning

The decommissioning phase of the proposed development is described in Section 3.9 of this EIAR and provides for the removal of turbines and associated infrastructure from the site.

The potential impacts associated with the decommissioning phase in relation to recreation, amenity and tourism will be similar to those associated with construction phase but of a reduced magnitude.

Decommissioning works will include removal of above ground structures including the turbines, mountings and fencing. During the works, forestry tracks and amenity trails in proximity to the site will be closed to the public to assure public safety. Similar to the construction phase, this is expected to have a moderate temporary impact on recreational trail walking and hiking at the CGEP site.

Furthermore, the increased traffic associated with decommissioning works has the potential to create an indirect impact on the nearby Ard An Rabhaidh / Ardarou trail, the Killavullen Loop, Castleblagh Trail and the Blackwater Valley Drive which are located between 3km and 4km from the site. Although the tracks associated with these trails will not be closed to the public, there is potential for indirect impact due to increased construction traffic which may cause dust and noise nuisance at the amenity trail locations. The use of designated transport routes and haul routes will avoid significant impact on these locations. Impact on nearby amenity trails as a result of the decommissioning phase of the CGEP is expected to be insignificant and temporary.

Due to the temporary nature of both the construction and decommissioning phases, the overall development of the CGEP is expected to have an insignificant and temporary impact on recreation, amenity and tourism.

11.6.5 Mitigation Measures – Recreation, Amenity and Tourism

Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the CGEP, which has allowed for the prevention of unnecessary or inappropriate development to occur that would significantly affect any recreational or tourist amenity. In designing the CGEP, careful consideration was given to the potential impact the proposed turbines may have on high value landscape located to the north of the Nagle Mountains along the Blackwater Valley. As such, the design removed major views of the development from this high value landscape, which includes designated scenic routes and tourism and heritage sites, in order to protect its high value amenity. The magnitude of visual impact on the Blackwater Valley is considered to be low, as set out in Chapter 15.

The area's potential for tourism and amenity was identified as trail walking and hiking. The development of the proposed CGEP has the potential to increase the amenity value of the area by making the area more accessible to recreational users than at present, providing both new and improved tracks in and around the site which can be used for walking and hiking. This provision is in keeping with the character of recreational activities popular in the area.

In providing for public safety, appropriate signage and safety measures will be put in place where forestry tracks will be closed to the public due to construction and decommissioning activities.

11.6.6 Residual Impacts – Recreation, Amenity and Tourism

While there is potential for a slight, temporary impact to recreation, amenity and tourism due to the closure of existing forestry tracks during the construction and decommissioning phases of the proposed development, there will be no significant, adverse impacts to recreation, amenity and tourism in the surrounding area as a result of the CGEP.

A long-term positive residual impact to recreation, amenity and tourism will occur as a result of the CGEP, with the provision of new and improved tracks throughout the CGEP site which will improve walking and hiking infrastructure in the area as part of Coillte's open forestry policy.

11.7 Human Health

This section provides a comprehensive overview of the health profile of the receiving environment and the State, in order to provide for the assessment of potential impacts of the proposed development may have on human health. An assessment of peer reviewed literature has been carried out to provide a sound, scientific basis for the potential impacts arising from the proposed CGEP.

11.7.1 Existing Environment – Human Health

Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans. In the context of existing human health, The Department of Health (2016) has published a report entitled 'Health in Ireland, Key Trends 2016' which provides statistics relating to human health in Ireland over the last 10 years. Generally speaking, Ireland has a high level of good health as demonstrated in self-evaluation statistics included in Census data (see Table 11.13 below).

Approximately 91% of the responses recorded for the Study Area in 2016 indicated that they had very good or good health which is above average when compared to the State (87%) and greater than County Cork's response (83%) for 2016. 1% of the study area, County Cork and the State is reported to have 'bad' general health whilst 2% of the population for Cork City indicated that they had bad health.

Table 11-13: Population by general health 2016

General Health	Study Area 2016	Cork City 2016	Cork County 2016	State 2016
Very good	66%	54%	63%	59%
Good	25%	29%	26%	28%
Fair	6%	10%	7%	8%
Bad	1%	2%	1%	1%
Very bad	0%	0%	0%	0%
Not stated	2%	4%	2%	3%

The Census data indicates that the population of the study area is generally in good health.

With respect to health and safety, the Health and Safety Authority of Ireland monitor fatal workplace injuries throughout Ireland. In relation to construction activities, in the past 10 years (2010 to 2019) an average of 8.1 fatal workplace injuries have occurred per year throughout Ireland.

This is above average in relation to other economic sectors. The average number of fatal workplace injuries throughout all economic sectors for the past 10 years in Ireland has been 4.5 fatal workplace injuries per year. This indicates the above average danger levels which workers are exposed to on construction sites.

With regard to the control of major accident hazards involving dangerous substances, on examination of upper and lower tier Seveso Establishments in the surrounding region of the proposed development, no Seveso Establishments were identified in proximity to the site.

11.7.2 Potential Impacts - Human Health - Construction

Potential Health and Safety Impacts during Construction

The construction phase of the proposed development has potential to create health and safety hazards for both construction workers and the general public. This is as a result of construction activities and the associated impacts including increased traffic, transport of heavy or bulky materials, noise emissions, dust emissions, construction on public roads, excavation and general site-safety.

Aspects of the construction works that may present health and safety issues, are as follows:

- General construction site safety (e.g., slip/trip, moving vehicles etc.);
- Lifting of heavy loads overhead using cranes;
- Working with electricity during commissioning;
- Working at heights;
- Working in confined spaces;
- Ground conditions and soil stability;
- Substation construction;
- Road safety due to increased traffic numbers and transport of oversized loads to the site along turbine delivery routes and proposed haul routes;
- Pedestrian and recreation user safety;
- Installation of electrical cables on-site and in the public road corridor;
- Potential emissions impacting air quality and noise;

The works proposed as part of the CGEP will pose a risk to construction workers on-site especially during adverse weather conditions. This has potential to cause significant impact on human health if proper construction and safety protocols are not followed.

At the time of preparation of this chapter, the COVID-19 virus represents a significant risk to human health. Similar to any construction site, potential for spread of the virus during the construction phase of the proposed development may occur due to potential transmission from worker to worker due to construction activities and potential for close quarter working conditions. Up to date HSE guidance will be consulted regularly in line with HSA recommendations and all reasonable on-site precautions will be taken if COVID-19 remains a significant health issue during the construction phase.

Potential health and safety hazards may occur on public roads and adjacent land uses including agricultural lands and forestry lands and associated recreation uses (forestry tracks). Existing forestry tracks within the site will be closed to the public during the construction stage which may cause confusion for recreation users. Construction works taking place on the public road and the delivery of heavy/bulky goods (TDR) and machinery on narrow roads may lead to temporary limited access to farmlands and forestry lands creating a potential hazard. This may cause a potential moderate, temporary impact on public safety.

The delivery of turbines will require transport of heavy/bulk goods from Ringaskiddy Port to the wind farm site via the N25, N20, M8, N72 and local roads approaching the CGEP site. Due to the abnormal size of the turbine components, there is potential human safety risks associated with their delivery including traffic safety and pedestrian safety at special manoeuvring points. This has potential for significant impacts to human safety if unmitigated.

Potential impacts on air quality has the potential to affect human health. This has been assessed in Chapter 6: Air and Climate Change. No significant impacts on air quality have been identified with regard to the emissions of construction related traffic. The impact on air quality due to emissions from construction works (construction machinery) has been identified as negligible. Therefore, the construction phase of the CGEP will not have a significant impact on air quality. Due to the distance between the nearest receptor and source of emissions at the wind farm site, the impact on air quality at nearby dwellings will be Imperceptible.

Construction works associated with the grid connection have potential to impact on nearby dwellings with regard to air quality. Due to the nature of construction along the proposed grid route, which works as a “rolling” construction site, meaning that these works will not be concentrated in any one area of the route, these effects are considered to be short term, temporary and slight. Therefore, the construction phase of the CGEP will not have a significant impact on air quality.

The potential impacts from noise during the construction phase are expected to have a slight and temporary impact on nearby residential receptors. The works will remain below the construction noise limit of 65dB as detailed in Chapter 7: Noise and Vibration. Vibration is not expected to be perceived at nearby residences.

Potential impacts on human health associated with land, soils and geology during the construction phase relate to potential contamination of ground water which can be caused by hydrocarbon spills, siltation and landslide/slope failure. Furthermore, trench collapse and landslides/slope failure have the potential to cause injury and fatality if unmitigated. A slope stability assessment has been carried out and mitigation measures have been detailed to avoid these potential impacts. Considering the mitigation measures as set out in Chapter 9: Land, Soils and Geology, the impact on human health during construction works is expected to be negligible.

Potential impacts on human health associated with hydrology during the construction period relate to standing water caused by blocked drains, water collecting in excavated areas or diverted water resting in an undrained area. This has potential to cause drowning with particular risk to on-site staff. There is also potential for blockage of roadside drains causing potential hazard to traffic. A flood risk assessment has been carried out and a drainage design has been incorporated into the proposed development as detailed in Chapter 10: Hydrology and Water Quality. As a result, the proposed development is expected to have a minimal impact on flood risk in the surrounding area. The increased surface water runoff due to development is negligible and these flows are further reduced with the proposed drainage system. Mitigation measures have been set out in Chapter 10: Hydrology and Water Quality to avoid impacts to human health and safety and avoid negative impacts on water quality.

Overall, if unmitigated, the construction phase of the proposed project has potential for significant impact to human health and safety for construction workers and members of the public in proximity to the site, if proper construction safety protocols and traffic management are not applied. Mitigation measures to prevent potential impact to human health and safety are set out in section 11.7.5.

11.7.3 Potential Impacts - Human Health – Operational

11.7.3.1 Site access and usability of lands

The proposed CGEP is designed to last a minimum of 30 years. During the operational period, there is potential impacts to human health and safety if appropriate mitigation measures are not put in place.

Under normal conditions, turbines do not pose a threat to public safety or the safety of animals. Coillte will maintain its Open Forest Policy and this has worked well at the location of operating wind farms at various locations in Ireland. With respect to safety aspects, Section 5.7 of the Wind Energy Development Guidelines (2006) state the following:

> *"There are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are not necessary for safety considerations. People or animals can safely walk up to the base of the turbines. There is a very remote possibility of injury to people or animals from flying fragments of ice or from a damaged blade."*

Throughout the operational phase of the proposed development, trails within Coillte lands will be open for recreational walking and hiking. Many of these tracks will be upgraded during the construction phase improving amenity for walkers. The trails will not come in proximity to electrical infrastructure. The off-road trails will provide a safe area for children and adults to exercise. No likely significant impact to public safety will occur due to the use of forest trails.

The use of forest trails will provide opportunities for health gain through encouragement of exercise. This is in line with recommendations from the Health Service Executive as detailed in Chapter 5 of this EIAR. This has potential to provide a moderate positive impact to human health in the locality.

Potential human safety issues can occur due to the falling ice as a result of the icing of turbine blades in cold weather conditions. This is unlikely to present safety problems as wind turbines are fitted with anti-vibration sensors. These sensors detect any imbalance caused by the icing of the blades. The sensors will cause the turbine to shut down until the blades are de-iced prior to beginning operation again.

Appropriate site safety measures will be utilised during the operational phase by all permitted employees. High visibility clothing, hard hats and safety boots will be worn at all times to avoid potential injury. Access to the turbines inner structure will be locked at all times and only accessed by licenced employees for maintenance.

Battery storage units, to facilitate on site energy storage and to provide ancillary services to the electricity grid, will be situated next to the onsite substation compound at Lackendarragh North. Lithium-ion battery storage technology is a common, globally used energy storage option utilised to provide storage services to the grid at a local level. These batteries are comparable to ones found in electrical appliances from laptops to mobile phones. The battery storage unit will be subject to adequate measures and standards for fire detection and management to allow for detection of issues, control of temperatures, identification of potential fire risk and will house fire suppression systems.

Batteries will be located on a battery rack and sealed within a container where they will be monitored and controlled for performance, temperature and other safety factors. The battery management system (BMS) shall be capable of detecting problems using cell and module voltage measurements and select temperature measurements within the batteries. Automatic disconnect of the batteries will occur if any unusual parameters are measured. In the event of a fault, the system will shut down. The battery containers are sealed, fireproof and house all the necessary control and safety systems to ensure optimum performance of the safety measure protocol.

The battery containers will comprise high-quality galvanised metal with a separate external Heating, Ventilation and Air Conditioning (HVAC) unit for each container providing climate control. In the extremely rare instance of a fire occurring within an individual container, the internal fire suppression technology will ensure the isolation of the fire within the fireproof container. Firewater or extinguished contaminates will be contained within the specific container that can be removed and disposed of at a later stage. The internal fire suppression technology is considered robust in nature and will act as the first response in the unlikely event of a fire incident.

Considering the inherently low risk of fire associated with the proposed development, and the quality and extent of the proposed facility and fire suppressions system, the potential risk posed to public safety and air emissions is considered negligible. Further information regarding battery storage safety is included in section 11.7.3.4 and in the CEMP in Appendix 3.1 of Volume 3 of this EIAR.

There are no expected works to take place along the grid route or TDR during the operational phase of the proposed development. If maintenance works are required in these areas or bulk equipment is required to be delivered, proper safety protocols will be put in place in line with the mitigation measures set out in section 11.7.5.

11.7.3.2 Health and Safety Standards and Procedures

Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risks posed to humans are negligible. 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts. In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system.

Equipment within high voltage substations presents a potential hazard to health and safety. The proposed substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards.

Potential impacts to the safety of operation and maintenance staff are associated with working at heights, working at steep gradients or uneven ground, moving vehicles and machinery and working with high-voltage electricity. Properly qualified staff will be employed at the wind farm site and safety protocols will be followed at all times.

As part of the human health assessment of the proposed CGEP, an analysis of peer-reviewed literature on potential health impacts arising from wind energy projects was undertaken. Anecdotal reports were identified of negative health impacts in people living in close proximity to wind turbines, however, the literature review demonstrates that peer-reviewed research has generally not supported these statements.

The review of literature did not find any published, credible scientific sources that link wind turbines to adverse health effects. The key documents that have been taken into consideration with respect of potential effects on human health are as follows:

- 'Wind Turbine Syndrome – An independent review of the state of knowledge about the alleged health condition', *Expert Panel on behalf of Renewable UK*, July 2010.
- 'Wind Turbine Sound and Health Effects - An Expert Panel Review', *American Wind Energy Association and Canadian Wind Energy Association*, December, 2009.
- 'A Rapid Review of the Evidence', *Australian Government National Health and Medical Research Council (NHMRC) Wind Turbines & Health*, July 2010.
- 'Position Statement on Health and Wind Turbines', *Climate and Health Alliance,* February 2012.
- 'Wind Turbine Health Impact Study - Report of Independent Expert Panel' – *Massachusetts Departments of Environmental Protection and Public Health*, 2012.
- 'Wind Turbines and Health, A Critical Review of the Scientific Literature Massachusetts Institute of Technology', *Journal of Occupational and Environmental Medicine*, Vol. 56, Number 11, November 2014.
- 'Wind Turbine Noise and Health Study', Health Canada, 2014.
- 'Wind Turbines and Human Health', Front Public Health, 2014
- 'Position paper on wind turbines and public health', Health Service Executive, February 2017.

An Expert Panel undertook a review on behalf of Renewable UK in July 2010 to assess the available scientific evidence relating to infrasound generated by wind turbines. This report was entitled 'Wind Turbine Syndrome – An Independent Review of the State of Knowledge about the Alleged Health Conditions'. This report followed a previous publication by Dr. Pierpont entitled 'Wind Turbine Syndrome' in 2009. The 2010 report assesses the impact of low-frequency noise from wind turbines on humans. The principle conclusions drawn by this expert panel are:

- "The scientific and epidemiological methodology and conclusions drawn (in the 2009 book) are fundamentally flawed;
- The scientific and audiological assumptions presented by Dr. Pierpont relating infrasound to 'wind turbine syndrome' are wrong; and
- Noise from Wind Turbines cannot contribute to the symptoms reported by Dr. Pierpont's respondents by the mechanisms proposed"

'Infrasound' has been cited as a cause of potential health impacts as a result of wind turbine development. This is discussed in detail in Chapter 7: Noise and Vibration, Section 7.2.4. It states that infrasound is noise occurring at frequencies below that at which sound is normally audible, that is, less than about 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it must be at very high amplitude, and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance. However, wind turbines do not produce infrasound at amplitudes capable of causing annoyance as outlined in the following paragraphs.

Research was published in 2020 by the Finish Government aimed at assessing whether wind turbine infrasound has harmful effects on human health. The study found that scientific evidence on the potential association or studies focusing directly on the health effects of wind turbine infrasound are lacking. The study included a questionnaire, sound measurements, and provocation experiments. The study found that participants who had previously reported wind turbine infrasound related symptoms were unable to perceive infrasound in noise samples and did not find samples with infrasound more annoying than those without previous wind turbine infrasound related symptoms. Further, wind turbine infrasound exposure did not cause physiological responses in either participant group (Maijala et al, 2020).

The UK Department of Trade and Industry study, 'The Measurement of Low Frequency Noise at Three UK Windfarms' , concluded that:

> *"infrasound noise emissions from wind turbines are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion."*

It goes on to state that, based on information from the World Health Organisation, 'there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects' and that 'it may therefore be concluded that infrasound associated with modern wind turbines is not a source which may be injurious to the health of a wind farm neighbour'.

Health Canada published findings of a study in 2014 titled: 'Wind Turbine Noise and Health Study'. The study considered physical health measures that assessed stress levels using hair cortisol, blood pressure and resting heart rate, as well as measures of sleep quality. More than 4,000 hours of wind turbine noise measurements were collected and a total of 1,238 households participated. The results of the study did not support a link between wind turbine noise and illness or chronic conditions. No association was found between the multiple measures of stress and exposure to wind turbine noise. However, an association was found between increased levels of wind turbine noise and individuals reporting being annoyed.

The HSE published a report in 2017 titled 'Position paper on wind turbines and public health'. The paper discuses case studies which describe a range of health effects that have been associated with wind turbine development as a result of shadow flicker, noise and electromagnetic radiation. The paper highlights the lack of high-quality scientific evidence to support adverse impacts on health as a result of wind turbine development, and states that current scientific evidence connecting wind turbines to health impacts is weak, inconsistent or absent. The paper recommends appropriate set-back distances and meaningful community engagement to mitigate against potential health impacts, in line with the Wind Energy Development Guidelines 2006.

The proposed development has been designed in compliance with the Wind Energy Development Guidelines (2006). We note that the Draft Revised Wind Energy Development Guidelines (2019) is currently at draft stage and has not yet been formally adopted by the government. However, the design and assessment of the CGEP project has had regard to the draft guidelines and has provided for key elements as set out in the guidelines such as the provision of 4-times the tip height setback distance between turbines and the nearest point of curtilage of nearby residential properties. The CGEP provides a minimum 750m setback between turbines and dwelling structures allowing for 4-times the tip height of the proposed turbines and additional distance to allow for curtilage. Extensive community engagement was also conducted as recommended by the HSE report and is detailed in Chapter 5: EIA Scoping, Consultation and Key Issues. Chapter 7: Noise and Vibration sets out mitigation measures to maintain appropriate noise levels and avoid potential impact to human health at nearby receptors.

With regards to turbine infrastructure, the Department of the Environment, Heritage and Local Government's Wind Energy Development Guidelines for Planning Authorities, 2006 identifies no specific safety considerations in respect of the operations of wind turbines. The DoEHLG's Guidelines note a limited possibility for injury arising from flying ice fragments or a damaged blade. Turbine technology will prevent the infrastructure from operating in the event that ice is present or in the event that a blade is damaged, minimising the potential for possible injury.

In terms of perceived effects from shadow flicker and noise, a shadow flicker assessment has been conducted and is included in Chapter 12 of this EIAR and a Noise assessment is included in Chapter 7. In relation to shadow flicker, there will be no exceedances to the guideline limits as the Developer has committed to zero shadow flicker - the turbines will be programmed to cease operating when there is a potential for shadow flicker. In terms of noise, operational wind farm noise levels meet the derived night and daytime noise limits at all residential properties surrounding the CGEP.

In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the site which requires emergency services, incident information will be provided in the 'ETHANE' format.

- Exact location
- Type of incident
- Hazards
- Access and egress
- Number of casualties (if any) and condition
- Emergency services present and required.

Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. With respect to safety, only trained and licenced employees will be permitted to access the turbines. Appropriate training will be provided for potential emergencies; therefore, the operational phase of the proposed development will have a negligible impact on public health and safety.

11.7.3.3 Potential Health and Safety Impacts from Proposed Cables and Electromagnetic Interference

Wind turbines, like all electrical equipment, produce electro-magnetic radiation. The provision of underground electricity cables similar to the proposed capacity is however commonplace throughout Ireland and the installation to the required specification does not give rise to health concerns. The following research outlines the potential for health impacts caused by electromagnetic interference.

The EirGrid document 'EMF & You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland' (EirGrid, 2014) provides information on studies which have been carried out on the health impact of electromagnetic fields (EMF). This report notes that since 1979, many scientific studies have been carried out on the possible effects of EMF on people. Agencies include the World Health Organisation (2006), the National Radiological Protection Board of Great Britain (2004), and the International Agency for Research on Cancer (IARC) (2002).

In 2009 the international commission on Non-Ionising Radiation Protection (ICNIRP) issued guidelines for exposure for members of the public to DC magnetic fields.

Other more recent reviews have been performed for the UK's Health Protection Agency (2012) and the European Union's Scientific Committee on Emerging and Newly Identified Health Risks (2015). The Eirgrid (2014) report notes that:

> *"These agencies concluded that exposure to only very strong DC magnetic fields can cause biological effects. The exposures required to produce such effects, however, are extraordinarily high relative to levels of DC magnetic fields produced by common sources."*

The Eirgrid (2014) report concludes that exposure to extremely low frequency (ELF)-EMF from power lines or other electrical sources is not a cause of any long-term adverse effects on human, plant, or animal health. An 2019 Eirgrid report titled 'The Electricity Grid and Your Health' states that:

> *"The consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk."*

To ensure such adverse effects do not occur, the WHO (World Health Organisation) monograph recommended that policy-makers establish guidelines for ELF-EMF exposure for both the general public and workers, and that the best source of guidance is the ICNIRP guidelines.

In 2010, ICNIRP issued updated guidelines, which reviewed the research since the 1998 report and replaced previous recommendations given by ICNIRP for this frequency range. The revised range is detailed in table 11-14. The underground cable to be installed complies with these ICNIRP guidelines.

- ICNIRP Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) Health Physics 99(6):818-836; 2010.

Magnetic flux densities for Alternating Current (AC) magnetic fields are reported using units of microtesla (**µT**) and electric fields in kilovolts per metre (kV/m). The ICNIRP guidelines formed the basis of the EU guidelines for human exposure to EMF (EU, 1999) and the EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs.

Table 11-14: ICNIRP Guidelines

Exposure Characteristics	Electric Field Strength (kV/m)	Magnetic Flux Density (µT)
ICNIRP 2010 General Public Reference Level	5	100

The magnetic fields associated with underground cables decrease rapidly with distance. For underground cables, the fields decrease with the square of distance. The electric field emissions from underground cables are negligible as the ground absorbs the field.

As the proposed cable does not pass under housing, the exposure levels will be extremely low. Most homes have average magnetic field levels in the range 0.2 µT to greater than 0.4 µT.

These magnetic fields are attributable to low voltage sources such as wiring, appliances, and distribution circuits (Mastanyi et al, 2007). In dwellings and other properties with electricity, the levels will not exceed the ICNIRP guidelines by a significant margin.

Based on the details of the proposed development, there will be no impact on residential properties at any distance from the proposed development as the ICNIRP guidelines are not exceeded at all relevant distances including directly above the cables. The magnetic field associated with an underground 110kV cable is 0.13 µT directly above ground (ESB, 2017), significantly below the ICNIRP Guidelines levels of 100 µT. The ESB state that exposure to electrical fields associated with underground cables are considered negligible (ESB, 2017).

The HSE, in their 2017 report 'Position paper on wind turbines and public health' state the following with regard to Electromagnetic radiation:

> *"There is no direct evidence from which to draw any conclusions on an association between electromagnetic radiation produced by wind farms and health effects. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind farms that might be relevant to health. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to wind farms is less than average levels measured inside and outside suburban homes."*

In the case of the proposed grid connection between the CGEP and the Barrymore substation, the electric and magnetic fields expected to be associated with the operation of the proposed cable fully complies with the ICNIRP and EU guidelines on exposure of the general public to ELF EMF. Therefore, the potential impact to human health as a result of electromagnetic interference associated with the operational CGEP will be negligible and imperceptible.

EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs was transposed into Irish law on 1st July 2016 by the Safety, Health and Welfare at Work (Electromagnetic Fields) Regulations 2016 (S.I. No. 337 of 2016). The regulations impose a number of duties on employers to maintain safety during work procedures. This includes the carrying out of risk assessment, avoiding and reducing risk, employee information, training and consultation and health surveillance where appropriate. The proposed development will comply with both EU and Irish law and will result in a negligible impact to human health on employees at the CGEP.

11.7.3.4 Vulnerability of the Project to Major Accidents and Natural Disasters

EU Directive 2014/52/EU which amends Directive 2011/92/EU states the following in relation to vulnerability of a project to natural disaster:

> In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment.

The following section considers the proposed project's vulnerability to major accidents and natural disasters, potential adverse impacts on human health and the environment, the magnitude of potential impacts, the likelihood of potential impacts and considers the preparedness of the project in case of accident, disaster or emergency.

Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction and operational phases of the Coom Green Energy Park are limited. The primary sources with the potential to cause significant environmental pollution and associated negative impacts on human health and the environment include the bulk storage of hydrocarbons, chemicals and wastes. In the case of the proposed CGEP development site, the storage of chemicals of this kind are very limited.

There is limited potential for significant natural disasters to occur at CGEP as Ireland does not suffer from extreme temperatures like that of many countries at a similar latitude due to the dominant influence of the Gulf Stream. This provides Ireland with a mild temperate climate. Potential natural disasters that may occur are therefore limited to:

- Flooding;
- Fire;
- Major incidents involving dangerous substances;
- Catastrophic events; and
- Landslides.

Flooding

In the event of extreme weather conditions there is potential for the proposed development to impact on human health in the surrounding environment due to increased surface water runoff as a result of additional impermeable surfaces. This has potential to add to flood risk which may impact on human safety (including traffic), water quality, biodiversity, soil stability, material assets and archaeological or architectural heritage. It is unlikely that potential increase in flood risk will impact on noise and vibration, air and climate, landscape and visual and telecommunication and aviation. If unmitigated, the magnitude of these consequences has potential to be significant resulting in potential injury or fatality, property damage, infrastructure damage and damage to ecosystems.

Due to inclusion of mitigation by design, the increased surface water runoff produced by the proposed project is considered negligible and therefore in the event of extreme weather conditions, it is unlikely that the proposed development will result in increased flood risk and will not result in effects on human safety (including traffic), water quality, biodiversity, soil stability, material assets and archaeological or architectural heritage, as a result of increased flood risk.

The risk of flooding is addressed in Chapter 10: Hydrology and Water Quality, which concludes that the proposed development has a minimal impact on flooding risk in the surrounding area and therefore the increased risk of flooding as a result of the proposed development is negligible. In the event of extreme weather conditions, the proposed surface water drainage will manage storm water avoiding significant impact on the project's infrastructure.

During the construction phase of the proposed development, emergency protocol will be in place in the unlikely occurrence of a flooding event.

An emergency response plan is set out in Section 6 of the Construction Environmental Management Plan (CEMP) included in appendix 3-1. As set out in Chapter 9, earthworks are will not be scheduled during forecast severe weather conditions in order to avoid potential effect on water quality and aquatic biodiversity due to soil erosion. Proposed mitigation measures for flood risk are set out in Chapter 10: Hydrology and Water Quality.

Fire

In respect of fire, in May 2017 a major gorse/ground vegetation fire incident took place in proximity to the 169MW Galway Wind Park. This incident highlights fire as a potential impact for the CGEP, in particular, given that the majority of the site is adjacent to forestry. It should be noted that a significant number of wind farms are built within forestry in Ireland. In order to avoid impact from potential forest fires, an internal Coillte fire and security management plan is in place to control the potential spread of forest fires. This is achieved through the implementation of fire breaks within the lands and the training of staff in firefighting. Fire plans are reviewed and updated where necessary and firefighting is checked annually. Furthermore, the proposed infrastructure including turbines, substations, battery storage and met masts will be appropriately set back from the surrounding treelines.

In the event that electrical equipment catches fire at the proposed CGEP, and is confined to the proposed development, there is potential for impact on air quality due to additional CO2 being released from the burning of material. This is likely to have an imperceptible impact on air quality, human health and biodiversity and will be offset by the carbon dioxide savings associated with the proposed development which will displace up to 137,371 tonnes of CO2 per annum.

In the event that electrical equipment catches fire at the proposed CGEP and spreads to the surrounding forested areas there is potential for impact on human health and safety, air quality, water quality, biodiversity, soils, material assets, archaeological or architectural heritage and landscape and visuals. The magnitude of these consequences has potential to be significant, resulting in potential injury or fatality, property damage, infrastructure damage, loss of forested lands and damage to ecosystems. It is unlikely that potential fire at the CGEP will have an effect on noise and vibration and telecommunication and aviation.
As set out in Section 11.7.3.1 and Section 11.7.3.2, safety measures are built in to the proposed infrastructure to monitor and detect potential fires to allow quick containment. The battery storage units will be subject to adequate measures and standards for fire detection and management to allow for detection of issues, control of temperatures, identification of potential fire risk and will house fire suppression systems. Considering the inherently low risk of fire associated with the proposed development, and the quality and extent of the proposed facility and fire suppressions system, the potential risk posed to public safety and air emissions is considered negligible.

In line with IWEA Health and Safety Guidelines for the Onshore Wind Industry (2011), Emergency Response Plans will include emergency response procedures for initial actions in the event of a fire. Records will be kept for testing of fire alarms and drills and maintenance/inspection of fixed and portable firefighting equipment. Information will be provided to employees on fire safety and fire prevention, including risks of and control measures to prevent fire outbreak, evacuation procedures and those responsible for their implementation, and the use of firefighting equipment, in line with HSA guidance.

During the construction phase of the proposed development, an emergency response plan will be in place as set out in Section 6 of the CEMP.

Major incidents involving dangerous substances

Major industrial accidents involving dangerous substances pose a significant risk to human health and to the environment both on and off the site of the accident. The Health and Safety Authority (HSA) of Ireland list all upper and lower tier SEVESO establishments throughout Ireland. The proposed CGEP site is not close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO site, that would fall within the consultation radius distance from a SEVESO site as per Development Plan policy.

LPG Cylinder Filling Ltd. is located at Quarterstown, Industrial Estate, Mallow, Co. Cork, c. 10.5km north-west of the site boundary. The site is categorised as a lower tier SEVESO site. The proposed CGEP is located outside of the consultation distance of LPG Cylinder Filling Ltd. and therefore, no further consultation is required. Given the nature of the proposed development, coupled with the distance to Seveso sites, there is no likely impact from major incidents involving dangerous substances as a result of the proposed CGEP with respect to all environmental topics detailed in this EIAR.

Catastrophic Events

According to the Health and Safety Authority (HAS), operation wind farms are still considered a workplace (albeit not permanently occupied). All persons who have control to any extent over the wind-farm have duties to ensure, so far as reasonably practicable, that the wind-farm does not pose a risk to those working there or to anyone not employed there but who may be affected by activities on the wind-farm.

Each wind-turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle are considered to be machines under the European Machinery Directive [2006/42/EC]. The duties on designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations [S.I.No.407/2008]. All wind turbines should be CE marked, which is in effect, a mark of assurance that the wind-turbine complies with the essential health and safety requirements (EHSRs) of EU supply law. In all cases, the manufacturer or the manufacturer's authorised representative must compile information in a technical file confirming how the machine complies with these requirements. The maintenance of turbines and ancillaries must only be carried out by competent, trained and qualified personnel. The system of work for operation and maintenance must be planned, organised, maintained and revised to ensure safety of personnel.

Potential catastrophic events associated with operational wind turbines and battery energy storage systems include:

- Wind turbine toppling (due to foundation or tower failure);
- Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure); and
- Fire.

The primary mitigation against a catastrophic event that may endanger the health and safety of the public implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of impact in the event of wind turbine collapse.

The maximum proposed tip height for wind turbines at the CGEP is 169m. No wind turbine is located within 750m of a residential dwelling or 400m of the nearest commercial building. No turbines have been located within 2 x tip height of the proposed on-site substations in accordance with Eirgrid general functional specifications. A minimum setback distance of 3.5 x rotor diameter has been imposed between wind turbines and existing HV overhead lines in accordance with Eirgrid general functional specifications.

Turbines have been sited with consideration for existing ground conditions to minimise the risk of turbine foundation failure, toppling and landslide. Intrusive site investigations have been carried out to confirm ground conditions at turbine locations as well as slope stability analysis for turbines located on sloped ground. Other design mitigation measures employed for the siting of wind turbines include the following:

- Areas mapped by GSI as having a high susceptibility to landslides have been avoided;
- Turbine locations have been assessed by site investigation and visually by geotechnical engineers prior to confirmation of final siting;
- If turbines are located on sloped ground, particular care has been taken in design of road and hard standing alignments, cutting and filling and drainage;
- Peat probing has been carried out at turbine locations. Locating turbines in peat has been avoided where possible.

See Chapter 9: Land, Soil and Geology for more information on ground conditions.

Wind turbines are fitted with sophisticated remote monitoring and control systems to manage rotational speed. Turbines also have the capability to shut down in storm conditions through adjustment of blade pitch. Turbines are also fitted with emergency power supply (EPS) units to provide backup power in the event of a loss of mains power supply that could impact the control system.

Wind turbines shall be fitted with fire suppression systems and will have emergency escape procedures in place for operational staff in the event of fire in a wind turbine. An emergency response plan is contained in the CEMP included in Appendix 3.1 of Volume 3 of this EIAR.

Battery energy storage units have been sited next to the main onsite substation at Lackendarragh North in a secure compound. The compound has been located to provide adequate separation distance from occupied buildings and shall be fitted with fire warning and suppression systems.

The proposed facility shall include the following minimum safety measures:

- A battery management system (BMS) shall be capable of detecting problems using cell and module voltage measurements and select temperature measurements within the batteries. Automatic disconnect of the batteries will occur if any unusual parameters are measured;
- The BMS shall maintain strict control of charging and discharging of the batteries. Voltage, current, temperature and state of charge are all measured and controlled to ensure safe charging and discharging to prevent electrical abuse of the system;
- Cells shall be kept at an optimal operating temperature and will not exceed safe temperature ranges. An automatic trigger system will be incorporated to foldback power if safe temperature ranges are exceeded;

- A fire suppression system shall be incorporated into the facility's design. The system shall include the following elements at a minimum:
    - Battery storage containers shall have dedicated fire detection and suppression system;
    - The system shall include ionization smoke sensors and a linear heat sensor cable to detect presence of a fire;
    - The system shall include strobe light/horn to provide indication of smoke and fire detection for personnel inside the container, and external warning lights for personnel outside the container;
    - The system shall use a gaseous, clean firefighting agent to suppress fire;
- Regular visual inspections and testing of battery system equipment shall be incorporated into the project's operation and maintenance schedule as per manufacturers requirements;
- Fire safety measures and equipment in the facility must be kept in effective working order. This includes all fixtures and fittings such as fire doors, staircases, corridors, fire detection and alarm systems, fire-fighting equipment, notices and emergency lighting. Regular checks, periodic servicing and maintenance must be carried out, whatever the size of the workplace. Any defects should be put right as quickly as possible;
- A nominated competent person shall carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will kept on site at all times;
- The system shall include an abort switch that can be operated at any time with overriding manual abort system.

Further information on the safety features associated with the proposed battery storage system can be found in the CEMP in Appendix 3.1.

Landslides

Landslides pose a risk to a range of environmental receptors including human safety (including traffic), hydrology and water quality, biodiversity, land, soil, geology and hydrogeology, material assets and archaeological and cultural heritage. These impacts can have a significant to profound impact on environmental sensitivities, depending on the scale of the landslide and the receiving environment.

Chapter 9: Land. Soils and Geology considers the susceptibility of the proposed CGEP to landslides. The GSI Landslide Susceptibility database indicates that the proposed development and proposed infrastructure locations are generally located within areas of 'Low' susceptibility with 2 no. turbines located in areas considered 'Moderately High' susceptibility and 1 no. turbine locate on lands considered 'Low to Moderately Low' susceptibility.

As detailed in Chapter 9: Land, Soils and Geology, a slope stability assessment was carried out at the CGEP site to investigate potential slope failure. Safety ratios for potential slope failures indicates that the slopes are considered stable in the long-term drainage conditions. A shallow Peat/Peaty Topsoil deposit limited in extent and thin with typical thicknesses of between 0.1 – 0.4m was identified on site. As <0.5m of peat has been recorded, a peat stability assessment is not considered to be relevant for the proposed development. Therefore, it is concluded that the potential risk of landslide at the CGEP is negligible.

Mitigation by design has been incorporated into the project to avoid potential effects from landslides. Mitigation measures for potential landslide/slope failure is set out in Chapter 9: Land, Soils and Geology. Mitigation measures relating to flood risk which could have a bearing on potential landslides are detailed in Chapter 10: Hydrology and Water Quality.

During the construction phase of the proposed development, an emergency response plan will be in place as set out in Section 6 of the CEMP in the unlikely event of a landslide/slope failure.

11.7.4 Potential Impacts – Human Health – Decommissioning

The decommissioning phase of the proposed development is described in Section 3.9 of this EIAR provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with decommissioning phase in relation to human health will be similar to those associated with construction phase as detailed in Section 11.7.2.

Decommissioning works will include removal of above ground structures including the turbines, mountings, and fencing. The proposed substations will likely be taken in charge by Eirgrid or ESB following decommissioning. During the decommissioning works there is potential for significant impact to human health and safety for construction workers on site. These impacts are similar to those set out in section 11.7.2. Potential impacts to human health and safety on-site will be prevented through best practice methods and will include staff training and knowledge of the site-specific decommissioning plan. Once mitigation measures and best practice construction site methods are followed, potential impact on human health and safety is expected to be non-significant and temporary.

During the decommissioning works there is potential for impact on health and safety of the public. Similar to Section 11.7.2, impacts are associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is moderate and temporary. However, a Construction and Environmental Management Plan for decommissioning works will be followed, clear signage will be utilized on public roads and walkways and the community will be informed of works prior to commencement to avoid any potential impact to public health and safety. Once good practice is followed, the potential for impact on public health and safety is expected to be temporary and non-significant.

11.7.5 Mitigation Measures – Human Health

11.7.5.1 Health and Safety Mitigation Measures – Construction & Decommissioning

To maintain safety and avoid health impacts on construction workers and the general public, best practice site safety and environmental management will be maintained. The proposed development will be designed, constructed, operated and decommissioned in accordance with the following:

- Safety, Health & Welfare at Work (Construction) Regulations 2013
- Safety, Health & Welfare at Work Act 2005
- Safety, Health & Welfare at Work (General Applications) Regulations 2007

All construction staff will be adequately trained in health and safety and will be informed and aware of potential hazards. Furthermore, a Construction and Environmental Management Plan is included in appendix 3.2, will be circulated to all construction workers which will detail safety protocol and methodology. Furthermore, site investigation has been completed and mitigation has been proposed as detailed in Chapter 9: Lands, Soils and Geology and Chapter 10: Hydrology and Water Quality.

A site-specific Safety and Health Management Plan has been prepared for the project in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 and is included in the CEMP contained in Appendix 3.2 of Volume 3 of this EIAR. The Safety and Health Management Plan shall be finalised in accordance with this outline plan following the appointment of the contractor for the main construction works. Similarly, a site-specific Safety and Health Management Plan will be prepared for the decommissioning works.

All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project.

FÁS Safe Pass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required.

The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety & Health Management Plan.

Up to date HSE guidance will be consulted regularly in line with HSA recommendations and all reasonable on-site precautions will be taken to reduce the spread of COVID-19 on construction sites if COVID-19 remains a significant health issue during the construction phase.

Once mitigation measures and health and safety measures are followed, the potential for impact on human health on the construction site during construction and decommissioning is expected to be non-significant and temporary.

Public safety will be addressed by restricting access to the public in the vicinity of the site works during the construction stage. Appropriate warning signs will be posted at the construction site, directing all visitors to the site manager. Appropriate signage will be provided on public roads approaching site entrances and along haul routes. Extra safety measures will be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery and a comprehensive turbine delivery plan will be utilised to avoid potential impact to human safety for road users and pedestrians.

For the installation of the grid connection cable in the public road, a detailed traffic management plan will be developed in discussion with locals who will be directly impacted by the works. and the local authority. Public consultation will be conducted along the grid cable route to inform local residents ahead of construction works.

Appropriate safety measures, traffic management, signage and communication with the public will be utilized to maintain safety and mitigate against potential danger. A traffic and transport assessment has been completed and is detailed in Chapter 13: Traffic and Transportation.

Once mitigation measures and health and safety measures are followed, the potential for impact on human health for members of the public during construction and decommissioning of the proposed project is expected to be not significant and temporary

11.7.5.2 Health and Safety Mitigation Measures - Operational

For operation and maintenance staff working at the proposed wind farm, appropriate site safety measures will be utilised during the operational phase by all permitted employees. All personnel undertaking works in or around the turbines will be fully trained and will use appropriate Personal Protective Equipment (PPE) to prevent injury.

Access to Coillte lands will remain open during the operational phase, however, access to the towers and the substation compound will be restricted to approved and appropriately trained personnel. The substation and battery storage area will be enclosed by palisade fencing and will be remotely monitored and equipped with intruder and fire alarms, in line with ESB and EirGrid standards.

Adequate clearance of structures from overhead lines will be provided. All on-site electrical connections are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESBN.

Lightning conductors will be installed on each turbine as all structures standing tall in the sky require this protection. Turbines specifically require this to prevent power surges to electrical components.

Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade. This aims to prevent ice throw which can cause injury.

11.7.5.3 Human Health Mitigation Measures - Operational

Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risks posed to humans are negligible. 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts. In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system.

All maintenance work will only be carried out by people with the appropriate training and qualifications for the task at hand. All maintenance and operations work will be carried out in accordance with the relevant health and safety legislation with the appropriate planning and preparation.

Regular visual inspections and testing of battery system equipment shall be incorporated into the project's operation and maintenance schedule as per the battery storage manufacturers' requirements.

Fire safety measures and equipment in the battery storage facility shall be kept in effective working order. This includes all fixtures and fittings such as fire doors, fire detection and alarm systems, fire-fighting equipment, notices and emergency lighting. Regular checks, periodic servicing and maintenance shall be carried out. Any defects will be put right as quickly as possible.

A nominated competent person shall carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times.

Shadow flicker detection systems will be installed on all turbines in order to achieve zero shadow flicker on nearby receptors. This is further detailed in Chapter 12: Shadow Flicker.

In certain wind conditions, turbines will run at reduced modes of operation in order to maintain appropriate daytime and night-time noise levels so as not to impact on residential amenity, as required. Details of these measures are set out in Chapter 7: Noise and Vibration.

The wind farm system shall include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency.

In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the site which requires emergency services, incident information will be provided in the 'ETHANE' format.

- Exact location
- Type of incident
- Hazards
- Access and egress
- Number of casualties (if any) and condition
- Emergency services present and required

The design of the proposed wind farm has considered the susceptibility to natural disasters. The proposed site drainage will mitigate against any potential flooding with the use of swales as described in Chapter 10 – Hydrology and Water Quality. Coillte fire plans are reviewed and updated on a regular basis.

11.7.6 Residual Impacts – Human Health

Through various aspects of the design process for the CGEP, negative residual impact on human health is expected to be imperceptible. This is due to the significant setback distance from nearby dwellings, elimination of shadow flicker on neighbouring dwellings and noise control measures to reduce potential impacts on nearby receptors. Furthermore, the mitigation measures as set out throughout the EIAR will prevent any potential significant impacts on human health during the construction and decommissioning phases.

Long-term positive residual impacts will occur due to the provision of clean, renewable electricity. The operation of the CGEP will result in the net displacement of 137,371 tonnes of CO_2 per annum which would otherwise be emitted through the burning of fossil fuels.

The use of upgraded forest tracks for recreational activity will provide opportunities for health gain through encouragement of exercise. This has potential to provide a long-term moderate positive residual impact to human health in the locality.

11.8 Renewable, Non-Renewable Resources and Utility Infrastructure

This section provides a comprehensive overview of the material assets (renewable and non-renewable resources, and utility infrastructure) of the receiving environment in order to provide an understanding of the potential effects of the proposed development on Material Assets.

11.8.1 Existing Environment – Renewable, Non-Renewable Resources and Utility Infrastructure

According to Geological Survey Ireland there are a number of operational and disused quarries and pits in the vicinity of the site with Lyrevarrig Quarry being located between the two turbine clusters of the CGEP.

It is proposed to haul construction materials from batching plants, quarries and pits within the vicinity of the proposed development. The quarries and pits within the vicinity of the proposed development provide sources of aggregates, hardcore, fill materials, washed sand and gravel, pebble sand aggregates and mortar. Ready mix concrete will be sourced from batching plants.

Other non-renewable resources within the site area includes peat boglands located north of the western turbine cluster.

Renewable resources at the site include extensive commercial forestry at both the eastern and western turbine clusters. Wind resource is above average at the site location and averages above 8 metres/second at 100m (SEAI Wind Atlas, 2013).

No major utility infrastructure was identified at the CGEP site or along the grid connection route. Minor infrastructure including telephone lines and poles were identified along the turbine delivery route (TDR).

11.8.2 Potential Impacts - Renewable, Non-Renewable Resources and Utility Infrastructure - Construction

11.8.2.1 Non-renewable Resources

The construction of the CGEP will impact on natural resources such as aggregates which will be sourced from quarries and pits within the area. An estimated total of 60,460m^3 of imported material will be required for the roads, hardstands and compound/substations and the temporary upgrade areas associated with the TDR. It is estimated that up to 44,800m^3 of site-won material will be required for the construction of the proposed development.

The proposed 3 no. borrow pits have potential to provide a total of 44,800m^3 of site won general fill as detailed in Chapter 9: Land Soils and Geology. Existing tracks have been used where possible and the layout was designed to minimise the length of new track required in order to reduce the requirement for such stone material. In addition, it is likely that a small amount of granular material may be required to maintain access tracks during operation which could impact the source quarry. The use of site-won and imported materiel will have a slight, permanent impact on non-renewable resources of the area. This is not considered to be significant.

11.8.2.2 Renewable Resources

The proposed development is intended to capture the renewable wind resource at the site. There will be no negative effects on the renewable energy resource of the receiving environment.

It is considered that the proposed development will have an overall positive impact in terms of carbon reduction and climate change. It will assist Ireland in meeting its target of producing 70% of electricity from renewable sources by 2030 as set out in the Climate Action Plan 2019.

Trees felled for development purposes will be replanted at another unplanted location as set out in Irish Forest Service Guidelines.

The proposed development will require the felling of forestry within and around the infrastructure to accommodate the construction of turbine foundations, hard stands, crane pads, access tracks, permanent met masts, site compounds, borrow pits and substation. The estimated area of tree clearing required for the proposed development will be approximately 62.8 ha. A felling licence will be sought from the Forest Service prior to any tree felling and will include the provision of relevant replant lands. The overall effect of the proposed development on renewable timber resources will be neutral. Replant lands have been identified at Moneygorm, Co. Cork and Ballard, Co. Wicklow. The total area for replanting is approximately 62.8 ha. Full details of replant lands and the associated assessment is included in Appendix 3.4 of Volume 3 of this EIAR.

11.8.2.3 Utilities Infrastructure

As detailed in the Turbine Delivery Route Assessment Report, telephone poles may require to be relocated due to oversail. This has the potential to cause a non-significant temporary impact on nearby dwellings and commercial/industrial activities. This potential impact is likely to be imperceptible. The Turbine Delivery Route Assessment Report is included in Appendix 13-2. Grid route works will avoid existing services as detailed in Chapter 13: Traffic and Transportation. Potential effects on telecommunications are discussed in Chapter 16: Telecommunications and Aviation.

The construction of the cable trenches along public roads will have a slight, negative temporary impact on the roads concerned during construction, with some roads likely to require re-surfacing. Importation of materials and equipment for the CGEP will also increase shipping traffic at the ports being used and increase freight on the motorway, national primary routes and regional road network. This is assessed in Chapter 13: Traffic and Transportation.

There is potential for turbine delivery to negatively impact on major road infrastructure if unmitigated. Turbine delivery could potentially cause traffic disturbance and damage to road infrastructure if not properly planned and assessed. This has potential to cause significant negative impact to existing roads infrastructure if unmitigated.

11.8.3 Potential Impacts - Renewable, Non-Renewable Resources and Utility Infrastructure – Operational

Once the CGEP is operational, the potential for negative effects on material assets is minimal. Maintenance of access tracks and infrastructure may require small amounts of imported fill, however, the impact of this is likely to be imperceptible.

The direct effect of electricity generated by the proposed development will give rise to a reduction in the quantity of fossil fuels required for electricity generation across the State. This will give rise to a long-term positive impact on renewable energy resource and will contribute to reducing Ireland's dependency on imported fuel resources.

11.8.4 Potential Impacts – Renewable, Non-Renewable Resources and Utility Infrastructure – Decommissioning

The potential impacts associated with decommissioning will be similar to those associated with construction but of a reduced magnitude.

Decommissioning works will include removal of above ground structures including the turbines, mountings, and fencing. Turbine foundations and access tracks will be left in situ. The two proposed substation buildings are expected be taken in charge of by Eirgrid or ESB which will have a slight positive impact on electricity infrastructure. Similarly, the underground grid cable will remain in situ and will become a part of the national grid resulting in slight positive impact on electricity infrastructure.

There will be no significant negative impact on renewable and non-renewable sources during the decommissioning phase. No likely negative impacts on utility infrastructure are expected during the decommissioning phase.

11.8.5 Mitigation Measures – Renewable, Non-Renewable Resources and Utility Infrastructure

Existing services along the proposed cable route have been predicted through a desktop study and will be confirmed in the pre-construction surveys prior to construction. This will minimise the impact in terms of disruption or damage to existing utilities. It is not intended to divert existing services but instead, where possible, the cable will be laid above or below existing services. Communication with service providers will be maintained for the duration of the construction works where required.

Non-renewable resources of stone and fill will be sourced locally and will be excavated from on-site borrow pits insofar as possible to minimise transportation distances, reducing CO^2 emissions.

The 62.8 hectares of forestry which will be felled at the CGEP site will be replanted at alternative lands under a felling licence.

To manage potential impact to roads infrastructure, a Turbine Delivery Report has been prepared and is included in Appendix 13.2.

11.8.6 Residual Impacts – Renewable, Non-Renewable Resources and Utility Infrastructure

Non-renewable resources such as aggregates, and cement are required onsite during the construction phase. This will result in an imperceptible residual impact on non-renewable resources.

the proposed development will result in a positive residual impact on non-renewable resources by offsetting the use of fossil fuels in electricity generation over the lifetime of the project.

The two proposed substations and underground grid connection are expected to be taken in charge of by Eirgrid or ESB following decommissioning, providing a slight positive residual impact on electricity infrastructure in the area.

11.9 Do-Nothing Scenario

In the event that the CGEP does not proceed, the existing land use will continue for agricultural and forestry purposes for the foreseeable future.

In the absence of renewable energy development, it is possible that there will be a continuance of excessive greenhouse gas emissions and consumption of fossil fuels.

The opportunity to harness the wind energy capacity of County Cork would be lost, further constraining the State from achieving its renewable energy targets of 70% by 2030. The net displacement of c. 137,371 tonnes of CO_2 per annum will not be achieved.

Overall renewable energy supply was 11% of gross final consumption in Ireland in 2018 (SEAI, 2020). The remaining 89% of energy came from fossil fuels indicating Ireland's heavy dependency on the importation of fossil fuels to meet its energy needs in transport, heat and electricity. This dependency on energy imports leaves Irish consumers exposed to fluctuating international oil and gas prices. Harvesting renewable, indigenous resources such as wind will help diversify the Irish generation portfolio and reduce Ireland's dependency on imported fuel resources.

It is also envisaged that if the CGEP does not proceed, there will be no employment opportunities relating to the construction, operation and decommissioning of the proposed development, resulting in a net loss of economic activity in the Cork Area. No rates or development contributions will be made payable to Cork County Council by the developer and no Community Benefit Fund Scheme will be put in place in the locality.

11.10 Cumulative Impacts

For the assessment of cumulative impacts, any other existing, permitted or proposed projects in proximity to the site (wind energy or other) have been considered where they have the potential to generate an in-combination or cumulative impact with the proposed CGEP.

Potential has been identified for the proposed project to produce a cumulative impact with the Bottlehill Landfill site, if the landfill site becomes operational during the construction, operational or decommissioning phases of the CGEP project.

In the event that the landfill facility proceeds to construction phase (further development of the facility and maintenance of existing infrastructure) simultaneously with the CGEP, there is potential for a cumulative impact in terms of construction jobs associated with the construction phase which is likely to have a positive economic impact on the study area and surrounding areas of Cork City and Cork County.

If the construction phases of both projects were to proceed simultaneously there is also a potential for cumulative nuisance impacts due to increased traffic, noise and dust in the vicinity which may impact on public health and safety. A traffic impact assessment is included as part of Chapter 13: Traffic and Transportation of this EIAR. An Traffic Management Plan is set out in the CEMP included in Appendix 3.2.

In the event that planning permission is granted for the proposed development, any condition(s) relating to a TMP or CEMP which may be attached by the Board to such a permission, will be implemented in accordance with the requirements of the condition. A dust minimisation plan will be in place for each development, which is generally a standard condition of planning. This will minimise dust effects.

The planning conditions and waste licence conditions attached to the landfill facility have been considered with respect to land use compatibility. No impact has been identified with respect to the land use of the landfill site as a result of the CGEP project.

If the Landfill site were to come online during the operational phase of the proposed development, no significant adverse cumulative impacts are envisaged in terms of population and human health.

A planning consent exists for a wind energy development in the townland of Moneygorm, 1km from the CGEP site near Glannasack (planning ref. 11/6168). This consists of a single wind turbine of a smaller scale to those proposed at CGEP. Potential in combination impact was considered with respect to construction activities and impact on residential amenity. This includes impacts on traffic and noise. In the unlikely scenario that this project is constructed at the same time as CGEP, negative or adverse effects on the receiving environment associated with these activities are considered to be short-term in duration and not significant.

Furthermore, potential in combination impact of the consented wind turbine with the CGEP during operation was considered with respect to noise and shadow flicker with potential impact on human health. As detailed in Chapter 12: Shadow Flicker, there will be no potential cumulative impact of shadow flicker on sensitive receptors as a result of the CGEP, in combination with the permitted wind turbine at Moneygorm. The noise limits for the consented wind turbine in combination with the predicted noise limits of the proposed development are within the threshold set by the Wind Energy Development Guidelines (2006) as set out in Chapter 7 – Noise and Vibration, and appropriate setback distances to dwellings have been applied. It is therefore considered that cumulative impacts of the CGEP in combination with the permitted wind turbine at Moneygorm will have no significant impact on population, human health and materiel assets.

11.11 Conclusion

The assessment of Population, Human Health and Material Assets has established the existing environment of the study area and compared the study area to Cork City, Cork County and the State to establish a baseline for the impact assessment. Potential impacts were considered for the construction, operational and decommissioning phases of the proposed development as well as potential residual and cumulative impacts. Mitigation measures have been proposed where relevant. The Population, Human Health and Material Assets chapter has been subdivided into the following topics for the purpose of the assessment:

- Population and Demographics;
- Socio-Economics, Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health;
- Renewable, Non-Renewable Resources and Utilities Infrastructure

The population of the study area was found to be low density and dispersed. Short-term slight temporary population growth was identified due to the influx of construction workers during the construction and decommissioning phases. However, permanent impact on the population of the study area is considered unlikely as a result of the CGEP due to the temporary nature of the construction works.

The employment profile of the study area was found to be similar to that of the surrounding County and the State. Positive direct and indirect benefits to economic activity were identified during the construction and decommissioning phases due to the creation of construction jobs based in the area which may provide employment for those living in the study area and surrounding areas of Cork City and Cork County. The construction and decommissioning phases are likely to have a temporary positive economic impact on local businesses and services.

The operational phase of the proposed development has been identified as having a positive economic and social impact on the study area with the provision of a Community Benefit Fund which will contribute to social infrastructure in the area and financially benefit those in closest proximity to the proposed CGEP. Other positive economic benefits as a result of the operational phase of the proposed CGEP includes reducing the State's reliance on fossil fuels which will reduce electricity prices, economically benefiting the consumer in the long-term throughout the State.

Land use in the study area is primarily commercial forestry and agriculture. Land use will be effected as a result of the development of the CGEP due to a change of use from forestry and agriculture to a renewable energy development. Approximately 62.8 hectares of forestry will be removed to provide for the proposed development, while approximately 1 hectare of agricultural land will be required to accommodate a wind turbine. It is proposed to replant 62.8 hectares of forestry on identified lands at Moneygorm, Co. Cork and Ballard, Co. Wicklow. Once operational, the CGEP is not expected to have a significant negative impact on agricultural or forestry practices. Furthermore, the existing Bottlehill Landfill facility is not expected to be significantly negatively impacted by the construction, operation or decommissioning of the CGEP.

With respect to Recreation, Amenity and Tourism, trail walking and hiking was identified as the main tourism and recreation potential for the study area. The construction and decommissioning phases are expected to have an non-significant, temporary impact on recreation, amenity and tourism in the area due to the temporary closure of existing forestry tracks at the site during construction and decommissioning and the potential slight impact on existing trails in the area due to construction traffic. However, the operational phase will provide new and improved forestry tracks throughout the site which will be open to the public and will contribute to the main tourism and recreation potential for the study area resulting in a long-term positive residual impact on recreation, amenity and tourism.

Potential impacts on human health and safety have been identified for both construction workers and the general public as a result of the construction and decommissioning of the CGEP. Best practice construction methods and improved safety measures on public roads have been identified as measures to prevent potential accidents during the construction and decommissioning works. Peer reviewed literature regarding potential health impacts as a result of operational wind turbines have been assessed. It was concluded that there is no scientific consensus to support the association between negative health impacts and wind energy developments with particular regard to noise and electromagnetic interference.

It is anticipated that the CGEP will avoid significant negative impact on renewable and non-renewable resources by sourcing local building materials where possible and providing site-won materials, therefore reducing the requirement for transport and reducing CO^2 emissions. Replant lands will be provided to replace forestry lands required for the development of the CGEP. The CGEP was found to have an overall positive impact on utility infrastructure providing clean energy and reducing dependency on fossil fuels.

In conclusion, once mitigation measures set out throughout this EIAR are implemented, no significant negative effects on population, human health and material assets will occur as a result of the development of the proposed CGEP.

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