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## 4 POPULATION AND HUMAN HEALTH

### 4.1 Introduction

This chapter of the EIA Report considers the potential effects of the Proposed Development on human beings, living, working and visiting in the vicinity of the application site at Bannagagole, Old Leighlin, Co. Carlow. The chapter details the potential direct and indirect effects of the Proposed Development on population and human health.

This chapter also examines the socio-economic impacts of the development proposal focusing on pertinent issues such as residential amenity, economic activity, tourism and population levels.

The section on Population and Human Health is broad ranging and covers the existence, wellbeing, and activities of people through the format of considering people as 'groups' or 'populations'. The assessment of impacts on human beings involves the identification of relevant key populations that may be affected by the proposal and quantifiable documentary research. Health, as defined by the World Health Organization (WHO), is *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"*.

Key populations have been identified as persons residing and engaging in activities near the application site, persons with a stake in the general economy of the local and regional area, and persons enjoying the recreational and cultural amenities of the area.

#### 4.1.1 Quality Assurance and Competence

This Chapter was prepared by Louise Hewitt, Environmental Consultants, Enviroguide Consulting. Louise has a Master of Science (Hons) in Environmental Resource Management from University College Dublin and a Bachelor of Science (Hons) in Biology from Maynooth University. Louise has worked as an Environmental Consultant with Enviroguide since 2021 and has experience preparing Environmental Impact Assessment (EIA) Screening Reports, Introduction, Population and Human Health and Archaeology and Cultural Heritage Chapters of EIARs.

### 4.2 Study Methodology

A desk-based study was undertaken in January 2023 to assess information regarding population, age structure, economic activity, employment, and unemployment within the vicinity of the Proposed Development. This study was undertaken in accordance with the following guidance:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports, EPA (2022)

Technical chapters within the EIAR have also been reviewed when assessing the likely effects on population and human health. These include the relevant chapters relating to air quality, noise and vibration, hydrology, traffic and transport and landscape and visual.

The 2022 Census of Ireland was held on Sunday the 3rd of April 2022. The preliminary results were released on the 23rd of June 2022 however the main results will be published over several months starting in April 2023. The preliminary 2022 census results have been reviewed however they do not contain the required region-specific information for the purpose of this assessment of demographic profile. As such, the more robust and complete 2016 census results have been used in this assessment (Accessed June 2022). The remaining information analysed as part of the desktop study was accessed in June 2022. The scope of the evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and EIARs. The aim of the study was to assess the current baseline environment.

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The potential Impact of the Proposed Development on the local population is assessed in this EIAR in relation to:

- Population;
- Socio Economic impacts;
- Tourism and Amenity;
- Air quality;
- Water;
- Noise;
- Traffic; and
- Risk

#### 4.2.1 Information Sources

The principal sources of information are as follows.

- Census and employment information published by the Central Statistics Office (CSO). Available at <https://data.cso.ie/#>
- Carlow County Development Plan 2022-2028, Available at: <https://consult.carlow.ie/en/consultation/carlow-county-development-plan-2022-2028/chapter/volume-1-written-statement>
- Regional Planning Guidelines of the Greater Dublin Area 2010-2022, and
- Ordinance Survey Ireland (OSI) mapping and aerial photography.

The Institute of Public Health in Ireland has issued a document “*Health Impact Assessment Guidance*” (2021) which details the link between human health and the built environment (Figure 4-1). This document also details the negative health impacts associated with unemployment. Unemployment affects both physical and mental health and is an important determinant of health inequalities in adults of working age. Unemployed people have a higher

risk of lower levels of psychological wellbeing ranging from symptoms of depression and anxiety to self-harm and suicide. Unemployment can also impact other health determinants for example housing and nutrition. Based on this information, employment generated as a result of the Proposed Development has been assessed throughout this Chapter.

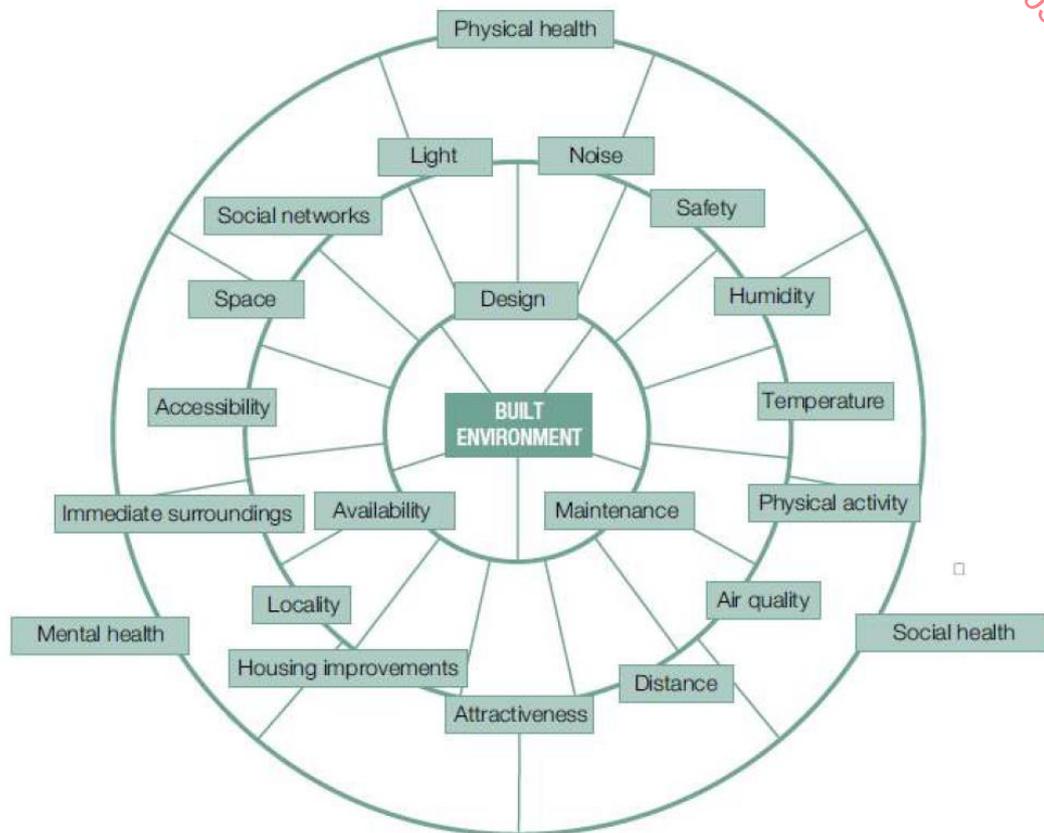


Figure 4-1: Health impact of the built environment

The European Commission (EC) has published the “*Guidance on The Preparation Of The Environmental Impact Assessment Report*” (EC, 2017). This document defines human health as “a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air”.

In line with the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) (the EPA Guidelines (EPA, 2022)), the following terms are defined when quantifying the quality of effects. See Table 4-1.

*Table 4-1: Definition of Quality of Effects*

Quality	Definition
Positive Effects	A change which improves the quality of the environment
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/Adverse Effects	A change which reduces the quality of the environment

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In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the significance of impacts. See Table 4-2.

*Table 4-2: Definition of Significance of Effects*

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects. See Table 4-3.

*Table 4-3: Definition of Duration of Effects*

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes.
Brief Effects	Effects lasting less than a day.
Temporary Effects	Effects lasting less than a year.
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.

Quality	Definition
Permanent Effects	Effects lasting over sixty years.
Reversible Effects	Effects that can be undone, for example through remediation or restoration.

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#### 4.2.2 Study Area

Muine Bheag (also known as the English translation of Bagenalstown) is a town located approximately 5km southeast of the Proposed Development and is the nearest large town for which population statistics are available. As such the town of Muine Bheag (Bagenalstown) has been chosen as the study area. Muine Bheag is located in County Carlow in the South East of Ireland.

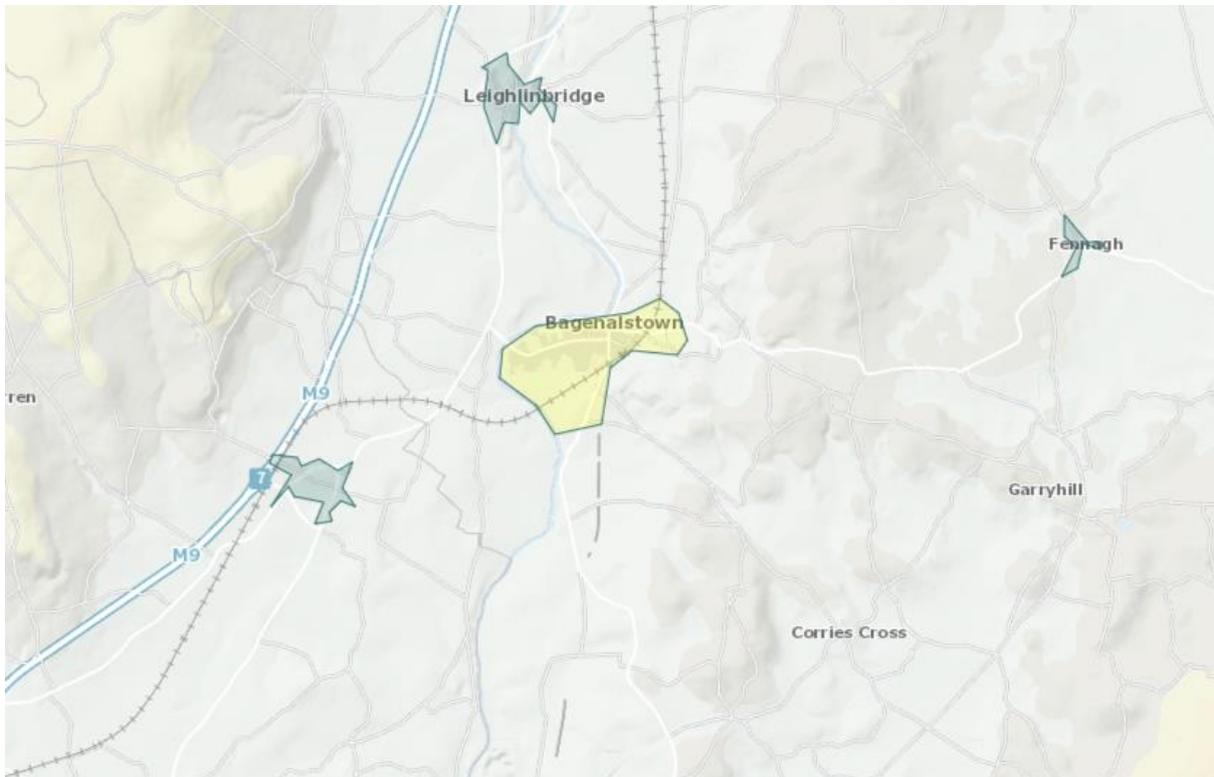


Figure 4-2 Map of Study Area (Source CSO 2016 Census)

### 4.3 The Existing and Receiving Environment (Baseline Situation)

#### 4.3.1 Population and Demographic Analysis

In terms of the locality, county, and state, population structure and change are more strongly influenced by migration and emigration rates than by birth and death rates. The mid to late 1980s in Ireland was a period of heavy population outflow, mainly due to the poor economic and employment situation in the country at that time.

The most recent population estimates (June 2022) published by the Central Statistics Office indicate that the combination of a net inward migration and high birth rates have resulted in the population of Ireland has exceeded five million for the first time since 1851. Population

projections for Ireland up to 2046 anticipate a population of approximately five million under the most pessimistic scenario and over 6.7 million under the most optimistic scenario. Population projections for Northern Ireland up to 2034 anticipate a population of approximately two million.

Population values for 2022 are currently available at a county and state-wide level. The population of Carlow has increased 8.78% from 2016 to 2022. As part of Project Ireland 2040, the Department of Housing, Planning and Local Government has estimated population projections for each region and county of Ireland. Based on these projections the population of Carlow will be 62,000-63,000 in 2026 and 64,000-65,500 in 2031 (rounded to the nearest 500 persons) (Source: NPF Implementation Roadmap – July 2018- DoHPLG).

*Table 4-4 Population Statistics for County Carlow in 2016 and 2022*

County	Population 2016 Census Data	Preliminary 2022 Census Data	Change in Number of Persons	Percentage change in Population
<b>Carlow</b>	56,932	61,931	4,999	+8.78%

### 4.3.2 Population and Age

The social and community needs are assessed based on consideration of the existing and potential population growth and best practice provision. Of most relevance to the Proposed Development are the Census data on population numbers and structure relating to the town of Muinebeag located approximately 5km southeast of the Proposed Development.

Table 4-5 shows the breakdown of the population of Muinebeag based on their age range during the 2016 Census against the County Carlow and State averages. This table is further broken down into percentages of the population within these age ranges.

As evident from Table 4-5, the population demographics for Muinebeag and County Carlow are in line with those for the State with each age group varying from the State average by maximum +/- 2%. Children aged 0-4 years make up 6.10% of the population which is slightly lower than the average for County Carlow (7.12%) and the State (6.96%). People aged 5-24 years make up the largest age group in Muinebeag representing 25.24% of the population. People in Muinebeag aged 25-34 (13.29%), 35-44 (14.73%) and 45-54 (12.7%) are slightly lower than the State averages. People aged 55-64 years in Muinebeag make up 13.11% of the population which is higher than the average for County Carlow (10.73%) and the State (10.69). People in Muinebeag aged 65-74 years (8.64%) is slightly higher than the average for County Carlow (7.65%) and the State (7.84%). People in Muinebeag aged 75 years and over (6.63%) is slightly higher than the average for County Carlow (5.27%) and the State (5.55%).

*Table 4-5: Population Categorisation by Age for Muinebeag, County Carlow and the State*

Age Range	Muinebeag		Carlow		Ireland	
	No. of People	% of People	No. of People	% of People	No. of People	% of People
0-4 years	173	6.10	4056	7.12	331,515	6.96
5-24 years	716	25.24	15,565	27.34	1,251,489	26.28
25-34 years	377	13.29	7,524	13.22	659,410	13.85

Age Range	Muinebeag		Carlow		Ireland	
	No. of People	% of People	No. of People	% of People	No. of People	% of People
35-44 years	418	14.73	8,795	15.45	746,881	15.68
45-54 years	348	12.27	7,525	13.22	626,045	13.15
55-64 years	372	13.11	6,110	10.73	508,958	10.69
65-74 years	245	8.64	4,355	7.65	373,508	7.84
75 years and over	188	6.63	3,002	5.27	264,059	5.55
<b>Total</b>	<b>2,837</b>		<b>56,932</b>		<b>4,761,865</b>	

### 4.3.3 Economic Activity and Employment

The labour force is defined as the number of people above the legal working age that are available to work. The labour force participation rate is the number of people who are employed and unemployed but looking for a job, divided by the total working-age population.

In 2016, there were 2,304,037 persons in the labour force in Ireland. This represented an increase of 71,834 (3.2%) on 2011 statistics. The substantial increase in retired persons (up 19.2% to 545,407) has impacted on the labour force participation rate, which fell to 61.4%.

Table 4-6 shows the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. This figure is further broken down into the percentages that were at work or unemployed. It also shows the percentage of the total population aged 15+ who were not in the labour force, i.e., those who were students, retired, unable to work or performing home duties.

When assessing the percentage of people in the labour force it is noted that 57.19% of people in Muinebeag are in the workforce. This reflects a high number of people working in the area and is higher than the average for County Louth (60.84%) and the State (61.35%).

The percentage of people who are in the workforce in Muinebeag in 57.19% which is lower than the average for County Carlow (59.75%) and the State (61.35%). Consequently, the number of people in Muinebeag who are *Unemployed having lost or given up previous job* (11.02%) is higher than the average for County Carlow (9.19%) and the State (7.08%). The number of people who are retired in Muinebeag is 16.56% which is slightly higher than the average for County Carlow (13.63%) and the State (14.52%). There is a lower than average number of *Students or pupils* in Muinebeag at 8.28% when compared with County Carlow (11.46%) and the State (11.37%).

Table 4-6: Economic Status of the Population Aged 15+ in 2016 (Source: CSO)

Status	Muinebeag		Carlow		Ireland	
	No. of People	% of People	No. of People	% of People	No. of People	% of People
% of population aged 15+ who are in the labour force						
Employer or own account worker	88	3.90	3669	8.28	313,404	8.35

	Status	Muinebeag		Carlow		Ireland	
% of which are:	Employee	922	40.81	18251	41.18	1,888,549	44.96
	Assisting a relative	0	0.00	53	0.12	4,688	0.12
	Unemployed looking for first regular job	33	1.46	434	0.98	31,434	0.84
	Unemployed having lost or given up previous job	249	11.02	4073	9.19	265,962	7.08
Total number of people in the labour force		<b>1,292</b>	<b>57.19</b>	<b>26,480</b>	<b>59.75</b>	<b>2,304,037</b>	<b>61.35</b>
<b>% of population aged 15+ who are not in the labour force</b>		<b>No. of People</b>	<b>% of People</b>	<b>No. of People</b>	<b>% of People</b>	<b>No. of People</b>	<b>% of People</b>
% of which are:	Student or pupil	187	8.28	5077	11.46	427,128	11.37
	Looking after home/family	256	11.33	4111	9.28	305,556	8.14
	Retired	374	16.56	6043	13.63	545,407	14.52
	Unable to work due to permanent sickness or disability	143	6.33	2467	5.57	158,348	4.22
	Others not in labour force	7	0.31	143	0.32	14,837	0.40
Total number of people not in the workforce		<b>967</b>	<b>42.81</b>	<b>17,841</b>	<b>40.25</b>	<b>1,451,276</b>	<b>38.65</b>
<b>All persons aged 15 years and over</b>		<b>2259</b>		<b>100.00</b>		<b>44321</b>	

The closest social welfare office to the Proposed Development which has figures available for the number of people on the Live Register is the Muine Bheag Branch Office. The monthly unemployment release contains a series of monthly unemployment rates and volumes. These series are based primarily on the Labour Force Survey and are compiled in accordance with agreed international practice. These statistics are the definitive measure of monthly unemployment. The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit or Jobseekers Allowance or for various other statutory entitlements at local offices of the Department of Social Protection. Table 4-7 details the most recent information available (February 2023) from the Central Statistics Office CSO is for January 2023. The number of people on the Live Register has decreased by 12.1% from July 2022 to January 2023.

Table 4-7: Number of people on the live register

Month	2022 July	2022 August	2022 September	2022 October	2022 November	2022 December	2023 January
Number of Persons on Live Register	602	605	536	534	531	561	529

Table 4-8 shows the broad range of industries that the people of Muinebeag are employed in; the top 5 no. groups are highlighted in blue and these are;

- Unemployed, having lost or given up previous job (19.27%)
- Wholesale and retail trade; repair of motor vehicles and motorcycles (13.54%)
- Manufacturing (13.31%)
- Human health and social work activities (7.66%)
- Industry not stated (6.58%)

Table 4-8: Broad Industrial Group (with the top 5 groups shaded blue)

Broad Industrial Group	Muine beag	%	Carlow	%	State	%
Agriculture, forestry, and fishing (A)	16	1.24	1615	6.10	89116	3.87
Mining and quarrying (B)	25	1.93	145	0.55	5055	0.22
Manufacturing (C)	172	13.31	2643	9.98	201315	8.74
Electricity, gas, steam, and air conditioning supply (D)	0	0.00	60	0.23	12919	0.56
Water supply; sewerage, waste management and remediation activities (E)	5	0.39	106	0.40	10259	0.45
Construction (F)	31	2.40	1254	4.74	101849	4.42
Wholesale and retail trade; repair of motor vehicles and motorcycles (G)	175	13.54	3360	12.69	266673	11.57
Transportation and storage (H)	46	3.56	727	2.75	81124	3.52
Accommodation and food service activities (I)	64	4.95	1210	4.57	116918	5.07
Information and communication (J)	17	1.32	459	1.73	90070	3.91
Financial and insurance activities (K)	36	2.79	594	2.24	90878	3.94
Real estate activities (L)	1	0.08	56	0.21	9044	0.39
Professional, scientific, and technical activities (M)	46	3.56	1044	3.94	113522	4.93
Administrative and support service activities (N)	19	1.47	660	2.49	71076	3.08
Public administration and defense; compulsory social security (O)	58	4.49	1059	4.00	105929	4.60
Education (P)	75	5.80	1975	7.46	176855	7.68
Human health and social work activities (Q)	99	7.66	2215	8.36	223725	9.71
Arts, entertainment, and recreation (R)	10	0.77	263	0.99	34165	1.48
Other service activities (S)	29	2.24	443	1.67	42489	1.84
Activities of households as employers producing activities of households for own use (T)	1	0.08	7	0.03	2803	0.12

Broad Industrial Group	Muine beag	%	Carlow	%	State	%
Activities of extraterritorial organizations and bodies (U)	0	0.00	2	0.01	868	0.04
Industry not stated	85	6.58	2076	7.84	159989	6.94
Unemployed looking for first regular job	33	2.55	434	1.64	31434	1.36
Unemployed, having lost or given up previous job	249	19.27	4073	15.38	265962	11.54
<b>Total in labour force</b>	<b>1292</b>		<b>26480</b>		<b>2304037</b>	

#### 4.3.4 Tourism and Amenities

Muine Bheag (also known as Bagenalstown) is located approximately 5km southeast of the Proposed Development and is situated on the River Barrow. Figure 4-3 shows a number of tourism and heritage sites of interest in Bagenalstown.

The Beam Barrow Experience gardens contain 10 interconnecting gardens which tell the history, folklore and heritage of the Barrow Valley. The River Barrow in this area is renowned for coarse fishing with wheelchair friendly fishing stands also available. The Royal Oak Distillery is located just outside the town centre is one of the largest working distilleries in Ireland which demonstrates how all three types of Irish whiskey are created.

There are a number of sports and outdoor facilities located in the vicinity of the Proposed Development including Bagenalstown Swimming Club, Bagenalstown Cricket Club, Bagenalstown Pitch & Putt, Leighlinbridge Gaelic Football Club and Vale Wanderers Soccer Club. The McGrath complex offers excellent sporting facilities including cricket, hurling, soccer and Gaelic football fields, tennis court and pitch and putt courses.

The Barrow Way long distance walking route, which passes through the town, is one of Ireland's most scenic long-distance trails. It is 114 km in length and takes in the towns of Monasterevin, Athy, Carlow, Leighlinbridge, Bagenalstown, Goresbridge, Graiguenamanagh and St Mullins.



Figure 4-3 Carlow Tourism Map of Bagenalstown

### 4.3.5 Travel and Commuting

Based on CSO Census information, an assessment of commuter times, duration and means of travel are summarised for the town, county, and state in Tables 4-9 to 4-11. A further breakdown is also provided detailing the different age groups travelling and commuting.

Table 4-9 shows that the most popular time to leave home for work or school is from 08:31-09:00 with 21.88% of people leaving during this time. This is followed by 09:01 - 09:30 with 18.41% of people leaving home during this time. A total of 20.04% of people leave home before 07:30.

Table 4-9: Time Leaving Home in Muinebeag

Time of Travel	No. of People in Muinebeag	% of people	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
Before 06:30	93	5.86	92	0	0	1
06:30 - 07:00	113	7.12	109	0	1	3
07:01 - 07:30	112	7.06	109	1	1	1
07:31 - 08:00	213	13.43	189	4	12	8

Time of Travel	No. of People in Muinebeag	% of people	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
08:01 - 08:30	230	14.50	134	17	63	16
08:31 - 09:00	347	21.88	130	82	114	21
09:01 - 09:30	292	18.41	63	217	8	4
After 09:30	128	8.07	123	0	1	4
Not stated	58	3.66	38	13	5	2
<b>All departure times</b>	<b>1586</b>		<b>987</b>	<b>334</b>	<b>205</b>	<b>60</b>

Table 4-10 shows that 858 people (54.10% of people) travel for less than 15 minutes on their commute to work, school or college. A total of 669 people (17.43% of people) travel between 15 minutes and 30 minutes and the remaining 1,695 people (44.2% of people) travel for longer than 30 minutes on their commute to work or school.

*Table 4-10 Duration of Journey*

Duration of Journey	All persons	% of people	Population aged 15 years and over at work	Children at school aged between 5 and 12 years	Students at school or college aged between 13 and 18 years	Students at school or college aged 19 years and over
Under 15 mins	858	54.10	426	259	163	10
1/4 hour - under 1/2 hour	358	22.57	253	56	26	23
1/2 hour - under 3/4 hour	136	8.58	115	1	5	15
3/4 hour - under 1 hour	47	2.96	42	0	4	1
1 hour - under 1 1/2 hours	62	3.91	59	0	0	3
1 1/2 hours and over	29	1.83	26	0	0	3
Not stated	96	6.05	66	18	7	5
<b>Total</b>	<b>1586</b>		<b>987</b>	<b>334</b>	<b>205</b>	<b>60</b>

Table 4-11 shows that travelling by car is the most popular means of transport with 39.09% of people commuting as the driver of a car and 17.78% of people commuting as a passenger

(56.87% in total). The next most popular means of travel is on foot with 29.77% of people walking to work, school or college.

Table 4-11: Means of Travel in Muinebeag

Means of Travel	All People	% of People	Popula- tion aged 15 years and over at work	Children at school aged be- tween 5 and 12 years	Students at school or college aged be- tween 13 and 18 years	Students at school or college aged 19 years and over
On foot	479	29.77	176	161	130	12
Bicycle	24	1.49	23	1	0	0
Bus, minibus or coach	36	2.24	10	2	12	12
Train, DART or LUAS	18	1.12	13	1	1	3
Motorcycle or scooter	2	0.12	2	0	0	0
Motor car: Driver	629	39.09	606	0	2	21
Motor car: Passenger	286	17.78	62	157	57	10
Van	64	3.98	64	0	0	0
Other, incl. lorry	3	0.19	3	0	0	0
Work mainly at or from home	23	1.43	23	0	0	0
Not stated	45	2.80	28	12	3	2
<b>All means of travel</b>	<b>1609</b>		<b>1010</b>	<b>334</b>	<b>205</b>	<b>60</b>

#### 4.3.6 Landscape and Visual

The setting is rural with surrounding land uses of agriculture, forestry and a number of one-off residential dwellings. The site lies immediately to the south of an existing limestone bedrock quarry at Bannagagole (Old Leighlin Quarry) which is operated by Kilkenny Limestone Quarries Ltd. Rock extraction, processing, and surplus rock storage is carried out at the existing quarry adjacent to the site.

#### 4.3.7 Human Health

Health, as defined by the World Health Organization (WHO), is "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". The Healthy Ireland Framework 2013-2025 defines health as 'everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'. This framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country affects the quality of everyone's lived experience.

Health is an essential resource for everyday life, a public good and an asset for health and human development. A healthy population is a major asset for society and improving the health and wellbeing of the nation is a priority for Government. Healthy Ireland Framework

2013-2025 is a collective response to the challenges facing Ireland's future health and wellbeing.

Table 4-12 shows that 86.6% of people in the 2016 Census have self-identified themselves as having "very good" or "good" health.

Table 4-12: Health Status of Muinebeag and County Carlow

Health Status	No. of People in Muinebeag	Percent of People	No. of People in Carlow	Percent of People
General health - Very good	1542	54.35	33050	58.05
General health - Good	915	32.25	16128	28.33
General health - Fair	299	10.54	4989	8.76
General health - Bad	42	1.48	792	1.39
General health - Very Bad	8	0.28	144	0.25
Not stated	31	1.09	1829	3.21
Total	2837		56932	

#### 4.3.8 Social Health

According to the World Health Organisation, poor social and economic circumstances affect health throughout life. Good health involves reducing levels of educational failure, reducing insecurity and unemployment, and improving housing standards. Health is influenced, either positively or negatively, by a variety of factors. Some of these factors are genetic or biological and are relatively fixed. 'Social determinants of health' arise from the social and economic conditions in which people live. They are not so fixed such as type of housing and environments, access to health or education services, incomes generated and the type of work people do, can all influence a person's health, and the lifestyle decisions people make.

A range of factors have been identified as social determinants of health. These can include the wider socio-economic context, inequality, poverty, social exclusion, socioeconomic position, income, public policies, health services, employment, education, housing, transport, the built environment, health behaviours or lifestyles, social and community support networks and stress.

People who are less well off or who belong to socially excluded groups tend to fare badly in relation to these social determinants. Being at work on the other hand provides not only an income, but also access to social networks, a sense of identity and opportunities for development or progression.

Figure 4-4 presents the social determinants of health adapted from Dalghren and Whitehead (1991) and Grant and Barton (2006) as presented in Healthy Ireland.

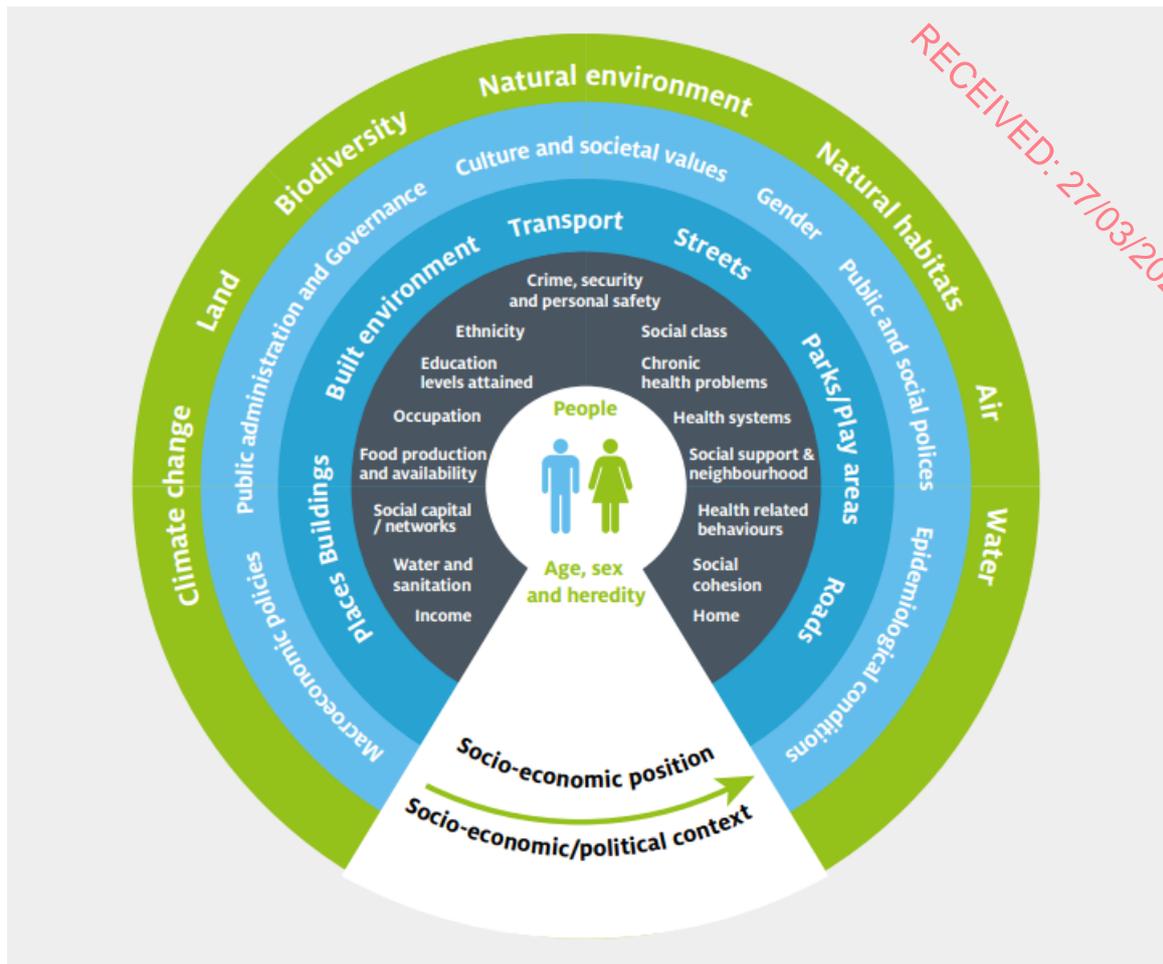


Figure 4-4: Social Determinants of Health (Healthy Ireland, DOH 2013)

Section 4.3.3 of this Chapter states that 57.91% of people in Muinebeag are in the labour force. This reflects the high number of people of a working profile living within the area which is expected due to the percent of people of a working age living in the area as identified in Table 4-6.

The Proposed Development will allow for the creation of new employment. It is proposed an approximately 5 no. jobs will be created during the Construction Phase and 3 no. jobs will be created during the Operational Phase of this development having both a direct and indirect positive impact on the local economy and employment.

#### 4.4 Characteristics of the Proposed Development

Milford Quarries Limited intend to apply for planning permission for the demolition of existing derelict buildings and the development of a dimension stone quarry at Bannagagole, Old Leighlin, Co. Carlow.

## 4.5 Potential Impact of the Proposed Development

### 4.5.1 Construction Phase

The construction phase will consist of the demolition activities. The adopted noise criteria will not be exceeded by the equipment listed in Chapter 9 at any of the noise sensitive levels (NSLs) during demolition works as such there will be no significant impacts on human health.

Therefore, due to the nature and duration of the proposed construction works, all impacts are likely to be localised, short-term and of temporary nature. Furthermore, appropriate mitigation measures will prevent any nuisances occurring.

### 4.5.2 Operational Phase

The Proposed Development is likely to give rise to a direct impact on the surrounding environment during the Operational Phase. The Operational Phase of the Proposed Development will potentially result in the movement of heavy vehicles and use of extraction machinery.

#### 4.5.2.1 Human Health

All workers employed during the operational phase of the Proposed Development will comply with the relevant Health and Safety Executive (HSE) guidelines.

Radon is a radioactive gas that causes lung cancer. It is formed in the ground by the radioactive decay of uranium which is present in all rocks and soils. Radon is a radioactive gas that causes lung cancer. It is formed in the ground by the radioactive decay of uranium which is present in all rocks and soils. When inhaled, these particles can be deposited in the airways and result in a radiation dose to your lungs. Over a long period of time, this exposure to radon can increase your risk of developing lung cancer. According to the Environmental Protection Agency's (EPA) Radon Risk Map the site of the Proposed Development is situated in an area where "About 1 in 5 homes in this area is likely to have high radon levels" which is classed as a high radon area. A proposed working area of c. 1.2 hectares to the south of the extraction zone will provide for the crushing / processing of the unusable stone and storage of dimensional stone and will include machinery storage shed, staff welfare, wastewater holding tank, weighbridge and parking area. The design and specification of the Proposed Development will be in accordance with current Building Regulations and therefore any potential issues associated with radon will be addressed and avoided. For buildings built since 1st July 1998 in High Radon Areas the installation of a radon membrane is required and all buildings will be fitted with a standby radon sump (Environmental Protection Agency, EPA). It is recommended that radon testing be carried out in the indoor welfare facilities. A radon detector should be installed for a period of 3 months after which time the detector should be sent to one of the testing services recommended by the EPA. The acceptable level, or Reference Level, for workplaces in Ireland is 300 becquerels per cubic metre (Bq/m<sup>3</sup>). If radon results are below 300 Bq/m<sup>3</sup> no further action is required unless major refurbishment work is carried out. As such the impact as a result of radon on human health will be neutral and imperceptible.

#### **4.5.2.2 Socio-Economic**

The Proposed Development will allow for the creation of new employment. It is proposed that 3 no. jobs will be created as a result of this development during the operational phase having a positive impact, both directly and indirectly to the local economy and employment.

The Proposed Development has the potential to increase the level of direct and indirect employment associated with the operational phase. The Proposed Development will have economic benefits such as positive effect in terms generating economic activity with spin-off economic activity created for local retail and service providers.

As per the baseline population assessment in Section 4.3 of this Chapter, Muinebeag has slightly higher than county and state average unemployment levels with 11.02% of the population aged 15+ unemployed. The Proposed Development, as detailed above, will have both a direct and indirect positive impact on the socio-economic health of the surrounding area through the creation of employment. The Proposed Development will have an imperceptible, positive and medium-term socio-economic effect.

#### **4.5.2.3 Hydrology**

Drinking water for employees will be provided from bottled water therefore there are no human health effects for site workers associated with consumption of groundwater. There will be no direct discharges to groundwater or surface water from the Proposed Development site.

As per Chapter 7 of this EIAR, surface water quality monitoring will be completed during the construction and operational phase of the Proposed Development. Groundwater level monitoring is also recommended throughout the operational phase of the Proposed Development. Groundwater level monitoring will be completed in the on-site monitoring wells (see locations BH1, BH2 and BH5 on Figure 6-2, Chapter 6). The recommended monitoring programmes will prevent and minimise emissions from the Proposed Development and ensure that there will be no negative impact on the receiving water environment (hydrological and hydrogeological) and thus there will be no significant negative impact on human health.

#### **4.5.2.4 Air Quality and Climate**

The main potential impact on ambient air quality from soil and stones processing activities will be that associated with the deposition of dust generated by mechanical processing and transfer operations. The primary sources of dust identified include stockpiling, handling, and placement of materials. The coarser dust associated with these effects may be referred to as 'nuisance dust'. Smaller dust particles remain airborne for longer and have the potential to increase local ambient air concentrations of suspended particulate matter (PM10 and PM2.5) which can be associated with a range of health concerns (IAQM, 2016). It is further noted that ambient air quality limit values for these pollutants are rarely exceeded in the vicinity of most quarrying sites as they are commonly located in rural areas where traffic pollution is significantly less than in urban areas.

According to the HSE, the health effects associated with the main pollutants of concern are:

- Nitrogen Dioxide, Sulphur Dioxide, Ozone - Irritate the airways of the lungs, increasing the symptoms of those suffering from lung diseases.
- Particles (PM10, PM2.5) - Can be carried deep into the lungs where they can cause inflammation and a worsening of heart and lung diseases.

- Carbon Monoxide - Prevents the uptake of oxygen by the blood and poses a greater risk to those suffering from heart disease.

Dust emissions associated with vehicular movements are largely due to the resuspension of particulate materials that are present on road surfaces. The movement of vehicles within the facility and to and from the facility to the external road network has the potential to cause dust. Chapter 8 of this EIAR has concluded it is unlikely for significant air quality impacts to occur as a result of increased traffic flow and a quantitative assessment is not required in this case.

All human health sensitive receptors positioned within a 400m radius of the site boundary area have been identified in Chapter 8 of this EIAR. All identified sensitive receptors are located more than 100m from the site boundary, aside from Sensitive Receptor 1 (SR1). As SR1 is not located downwind of prevailing conditions, appropriate mitigation measures are likely to eradicate the risk of potential impacts and it can therefore be concluded that dust emissions associated with the Proposed Development will not have a significant impact on the local sensitive receptors.

#### **4.5.2.5 Dust Containing Silica**

A health risk encountered by people working in the quarrying industry is exposure to fine respirable dust which contains silica. Silica is a natural substance found in varying amounts in most rocks, sand and clay, therefore workers within the quarrying industry are particularly susceptible. The dust is generated during construction tasks including cutting, drilling, grinding and polishing. The fine dust is known as respirable crystalline silica (RCS) and is too fine to see with normal lighting. It is commonly referred to as silica or silica dust.

Silica dust exposure to workers can arise from the quarrying of stone, crushing, screening and sizing of the product, recirculation of dust within the cabs of vehicles. Workers are at risk from fine airborne particles entering into the respiratory tract. As these fine particles are often not visible to the naked eye it may not be an obvious exposure risk to workers.

Exposure over a number of years can lead to the development of the condition known as silicosis. This is a form of scar tissue in the gas exchange region of the lungs that leads to difficulties in oxygen uptake into the bloodstream. Furthermore, new evidence suggests that long term exposure to silica can increase the risk of the development of lung cancer.

The dust mitigation measures detailed in Chapter 8 of this EIAR will also be applied to prevent negative impacts occurring as a result of dust containing silica. Mitigation measures relating to silica dust are detailed in Section 4.6 of this Chapter. Based on the implementation of these mitigation measures, the impact in relation to silica dust will be imperceptible, neutral, and medium term.

#### **4.5.2.6 Landscape and Visual**

The proposed changes to the site will alter the character of its immediate setting. The surrounding landscape and visual appearance can have an impact on the amenity of the area which in turn can affect the human health of those living and working the area surrounding the Proposed Development. The Proposed Development and mitigation measures will result in a neutral landscape impact in the long term. Chapter 10 of this EIAR has also carried out a visual impact assessment at five viewpoints. The significance of the impact on the viewpoints

ranges from imperceptible to minor to moderate. It was concluded that *“the viewpoints considered as having a minor or moderate impact, the mitigation measures will reduce this impact to an imperceptible impact in the medium-term.”*

Based on this conclusion the impact on human health as a result of landscape and visual impacts will be imperceptible in the medium term.

#### **4.5.2.7 Traffic and Transport**

A full assessment of traffic and transport effects are presented in Chapter 12 of this EIAR. Truck movements have the potential to negatively impact the surrounding road network by causing congestion thus impacting the human health of road users.

Based on an on-site assessment of the local road network, the local and regional roads and motorway which are proposed to form the haul routes to the site are appropriate to accommodate traffic associated with both the construction phase and operational phase of the Proposed Development. As such, there will be no significant negative impact on human health as a result of traffic.

#### **4.5.2.8 Noise and Vibrations**

Noise associated with traffic movements and Operational Phase activities can negatively impact the population and human health of the surrounding residents. Noise sensitive receptors have been identified as primarily residential properties and have been listed in Chapter 9 of this EIAR. The noise generating activities associated with the site are as follows:

- Extraction by hydraulic excavators and transfer to wash/screening plant by dumper trucks;
- Semi-mobile washing, crushing, and screening plant;
- Traffic movements on internal haul roads;
- Trucks entering and exiting the quarry.

Onsite activity will involve site clearance and construction. A variety of plant items will be used for the purposes of site clearance and construction. There is potential for the adopted criteria to be slightly exceeded during operational works by the handheld circular saw and the articulated lorry with the flatbed trailer at the nearest NSLs, however, there are hedgerows on the intervening lands between the operation works and the residential dwellings. When taking account of local terrain, predicted noise levels at the closest residential NSLs are expected to be lower than what is outlined in Table 9-4.

No traffic routes are predicted to experience increases of more than 25% in total traffic flows during the Operational Phase and as such Chapter 9 of this EIAR has concluded the impact of noise from operational traffic will be unnoticeable and will not have a negative impact. As such there will be no negative significant impact on population and human health as a result of operational traffic in terms of noise.

#### **4.5.3 Potential Cumulative Impacts**

Cumulative Impacts can be defined as “impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project”. Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed

as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

The cumulative effects of Proposed Development on Population and Human Health have been assessed taking other planned, existing, and permitted developments in the surrounding area into account. All planning applications which have been granted permission and are already developed have been incorporated into the baseline assessment of this application. This includes the already existing and operational Old Leighlin Quarry which is adjoined to the site (located directly north of the site). The potential cumulative impacts which may effect human health are primarily noise, air quality and traffic which have been assessed in their individual chapters. No cumulative impacts are predicted for population and human health.

#### **4.5.4 “Do Nothing” Impact**

If the Proposed Development were not to be developed there would be no jobs created, including those directly employed and indirectly employed. If the quarry were to remain undeveloped, this would be an under-utilisation of quarry lands from a sustainable planning and development perspective.

### **4.6 Avoidance, Remedial & Mitigation Measures**

#### **4.6.1 Construction Phase**

During the Construction Phase, a number of mitigation measures will be implemented to protect human health. HSE guidelines will be adhered to in relation to social distancing, cough and sneeze etiquette, face masks and hand washing. Appropriate welfare facilities will be provided at the facility. Frequently touched objects and surfaces such as door handles, machine steering wheels and gear levers will be cleaned and disinfected frequently.

- Construction traffic activity is expected to take place between 07:00 and 18:00, Monday to Friday.
- No construction activity will be carried out on Monday to Friday evenings after 18:00, on Sundays or on Bank Holidays.
- There will be no unnecessary revving of vehicles during arrival or departures to and from the site to ensure that construction related traffic does not give rise to unnecessary noise nuisances.
- All vehicles will be switched off when not in use on-site. There will be no unnecessary idling of vehicles or machinery on-site during the Construction Phase. This will reduce or eliminate any potential noise impacts.
- A speed limit of 15km per will be put in place on-site for the Construction Phase of the Proposed Development. This will ensure that traffic will not give rise to dust in periods of prolonged dry weather.
- In periods of prolonged dry weather, the entrance roadway will be dampened down with water to prevent dust if considered necessary during the Construction Phase.

No other specific mitigation measures are required during the Construction Phase of the Proposed Development in relation to population and human health, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation

measures in relation to air emissions (dust), noise, traffic, waste etc. are identified in their respective Chapters in this EIA Report.

#### 4.6.2 Operational Phase

Dust control measures will be in place at the quarry to ensure that dust does not cause any health impacts. These are detailed in Chapter 8 of this EIAR. General dust mitigation measures specified in Chapter 8 will also serve to protect human health in relation to dust containing silica. In addition;

- Safe systems of work such as wet methods for dust removal/suppression will be implemented.
- Engineering controls such as Local Exhaust Ventilation (LEV) or containment measures will be used where appropriate.
- Suitable PPE such as coveralls and appropriate gloves will be worn.
- Respiratory Protective Equipment (RPE) should either be a FFP3 disposable respirator or a P3 particulate filter fitted to a half or full-face mask to provide effective protection and be CE marked. All RPE should fit the employee correctly.
- Any RPE worn should be properly fit tested.
- All personnel will be obliged to undertake a programme of awareness training relating to the potential risk associated with dust containing silica.

It is recommended that a radon detector be installed for a period of 3 months after which time the detector should be sent to one of the testing services recommended by the EPA. The acceptable level, or Reference Level, for workplaces in Ireland is 300 becquerels per cubic metre (Bq/m<sup>3</sup>). If radon results are below 300 Bq/m<sup>3</sup> no further action is required unless major refurbishment work is carried out.

No other specific mitigation measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, mitigation measures in relation to air emissions, noise, traffic, water etc. are identified in their respective chapters in this EIA Report.

#### 4.6.3 “Worst Case” Scenario

In the worst-case scenario where mitigation measures fail for the Proposed Development, it is considered that localised nuisances such as noise, dust or water contamination may arise on site and local receptors. This is considered highly unlikely and indeterminable.

### 4.7 Residual Impacts

Residual Impacts are defined as *‘effects that are predicted to remain after all assessments and mitigation measures’*. They are the remaining ‘environmental costs’ of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

It is considered that the Proposed Development will have an imperceptible, positive and medium-term residual effect on population and socioeconomic aspects securing future employment and contributing positively to economic activity for residents living in the area.

## **4.8 Monitoring**

### **4.8.1 Construction Phase**

No specific monitoring measures are proposed or required in relation to Population and Human Health for the Construction Phase of the Proposed Development.

### **4.8.2 Operational Phase**

It is recommended that a radon detector be installed for a period of 3 months after which time the detector should be sent to one of the testing services recommended by the EPA. The acceptable level, or Reference Level, for workplaces in Ireland is 300 becquerels per cubic metre (Bq/m<sup>3</sup>). If radon results are below 300 Bq/m<sup>3</sup> no further action is required unless major refurbishment work is carried out.

No other specific monitoring measures are required in relation to population and settlements, given the lack of direct effects resulting from the Proposed Development. However, where required, monitoring in relation to air emissions, water, noise, and traffic are identified in their respective Chapters in this EIAR.

## **4.9 Interactions**

### **4.9.1 Hydrology**

Pollution events can impact the water quality and thus impact the human health of the surrounding population. Appropriate surface water control measures will be implemented as part of the Proposed Development. No public health issues associated with the water conditions at the site have been identified for the Construction Phase or Operational Phase of the Proposed Development. There are no likely significant adverse impacts as a result of Hydrology and as such there will be no significant impacts on population and human health. Hydrology has been fully assessed in Chapter 7 of this EIAR.

### **4.9.2 Air Quality and Climate**

Interactions with air quality during the construction and operational phase has the potential to cause issues relating to dust and traffic emissions impacting human health. However, Chapter 8 has concluded that there will be no significant air quality impacts. All ambient air quality legislative limits will be complied with and therefore the predicted impact is not significant with a neutral effect on human health. Air quality is discussed further in Chapter 8 of this EIAR.

### **4.9.3 Noise and Vibration**

Construction activities such as site clearance, building construction works, and trucks and vehicles entering and exiting the site have the potential to interact with the surrounding population and human health and cause noise disturbance. The impact assessment of noise and vibration has concluded that additional noise associated with the construction and operational phase will not cause a significant negative impact.

Operational Phase noise impacts have also been assessed in relation to traffic and plant equipment and no significant negative impacts will be experienced. As such, there will be no significant impact on population and human health. Noise is fully assessed in further detail in Chapter 9 of this EIAR.

#### 4.9.4 Landscape and Visual

The Proposed Development will alter the visual appearance of the site which is predominantly a greenfield site. It is not considered that the Proposed Development by virtue of its visual appearance and in the context of the proposed zoning of the site of the Proposed Development and the rural and residential nature of the surrounding landscape, will cause any significant impacts and as such there will be no significant impact on population and human health.

#### 4.9.5 Material Assets – Traffic and Transport

Construction and operational activities will result in an increased number of HGV movements. There is a potential impact on population and human health in relation to the capacity and operation of the surrounding road network. The overall impact of the Proposed Development on the transportation infrastructure in the local area will not be significant and subsequently there will be no significant impact on population and human health.

#### 4.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter of the EIAR.

#### 4.11 References

The Central Statistics Office (CSO)

Carlow County Development Plan 2022-2028

Ordinance Survey Ireland (OSI)

WHO. Ottawa Charter for Health Promotion First International Conference on Health

Promotion Ottawa, 21 November 1986 - WHO/HPR/HEP/95.1. 1986.

WHO. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June, 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. 1946.

Healthy Ireland Framework 2013-2025

Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999)

Carlow Tourism <https://carlowtourism.com/attraction/bagenalstown/>

Assessment of Health Impacts within National Environmental Regulation Process. Report commissioned by Environmental Protection Agency. Golder Associates. April 2015.

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