5 POPULATION AND HUMAN HEALTH

5.1 Introduction

This Chapter of the EIAR has been prepared by AWN Consulting Limited (AWN) to assess the likely impacts associated with Population and Human Health during the construction and operational phases of the proposed residential development at Kilcarbery, Grange, Clondalkin, Dublin 22.

The proposed development will consist of 1,034no. residential units & ancillary uses within defined residential character areas, and all associated ancillary site development works including road and water services infrastructure, green infrastructure networks and amenity open spaces, all at a site of approximately 28.6 Ha.

In accordance with the Draft EPA EIAR Report Guidance (2017), this chapter has considered that:

> *"in an EIAR the assessment of impacts on population and human health should refer to the assessment of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under environmental factors of air, water soil etc"*.

The Guidelines also note:

> *"The legislation does not generally require assessment of land-use planning, demographic issues or details socio-economic analysis. Coverage of these can be provided in a separated Planning Application Report to accompany an application for planning permission"*

The environmental aspects examined in this Section include: -

- Chapter 9: Climate (Air Quality & Climate Change)
- Chapter 12: Air (Noise & Vibration)
- Chapter 13: Landscape & Visual Impact
- Chapter 14: Material Assets (Transportation)

In addition, health and safety was also considered.

Where these environmental aspects are dealt with in further detail elsewhere in this EIAR, the relevant chapters have been cross referenced here.

5.2 Assessment Methodology

The effects of the proposed development on population and human health are analysed in compliance with the requirements of the Draft EPA "Guidelines on Information to be Contained in Environmental Impact Assessment Reports" (2017).

This assessment is conducted by reviewing the existing health status in the areas close to the proposed development as well as the country as a whole. The proposed development site traverses both the electoral district of Clondalkin-Dunawley (ED ID 267049) and Clondalkin Village (ED ID 267053) (CSO, 2016).

5.3 Receiving Environment

The proposed development is located at Kilcarbery Grange, Clondalkin, Dublin 22. The site is greenfield and is currently used for tillage. There are residential developments to the east and north, a golf course to the west and undeveloped lands and parkland to the south of the site. The Central Remedial Clinic (CRC) Clondalkin and Scoil Mochua Special School are also to the north of the site.

The potential human receptors within the environs include residents of Clondalkin Village and Clondalkin Dunawley DED's (District Electrical Divisions). According to census 2016 results there are 20,411 people living within the study area.

5.3.1 Existing Health Status – Ireland

The Department of Health's Report 'Health in Ireland Key Trends 2018' (Department of Health, 2018) provides statistical analysis on health in Ireland over the Last Ten years. Chapters 1 and 2 of the report deal specifically with Life Expectancy and Health.

Life expectancy data shows that there has been a continual upward trend for women since 1996 currently standing at 83.6 years. Male life expectancy has shown a continual rise since 2006. It is also noted in the report that the gap between male and female life expectancy has continued to narrow over the last decade (See Figure 5.1). Overall life expectancy has increased by c. 27.2% at age 75 since 1996. An upward trend is evident in the life expectancy of older age groups reflecting decreasing mortality rates from major diseases. Older Irish people's life expectancy (65 years of age) to be lived in good health, is higher for both men and women compared with the EU average.

Overall improvements in mortality rates and relatively high levels of self-rated health can mask variations between religions, age groups and other population subgroups.

The report also states that "Ireland has the highest self-perceived status in the EU, with 83% of people rating their health as good or very good". Overall population health at the national level shows decreasing mortality and a rise in life expectancy over the last ten years. The health in Ireland report also goes on to state;

Age-standardised death rates for cancers and circulatory system diseases, the major causes of deaths in Ireland, have declined by 11% and 32% respectively over the past ten years" (Ref. Figure 5.2 below).

The number of transport accident mortality has fallen by 43.4%, infant mortality by 38.7% and suicide rates by 22.5% nationally between the years of 2007 – 2017.

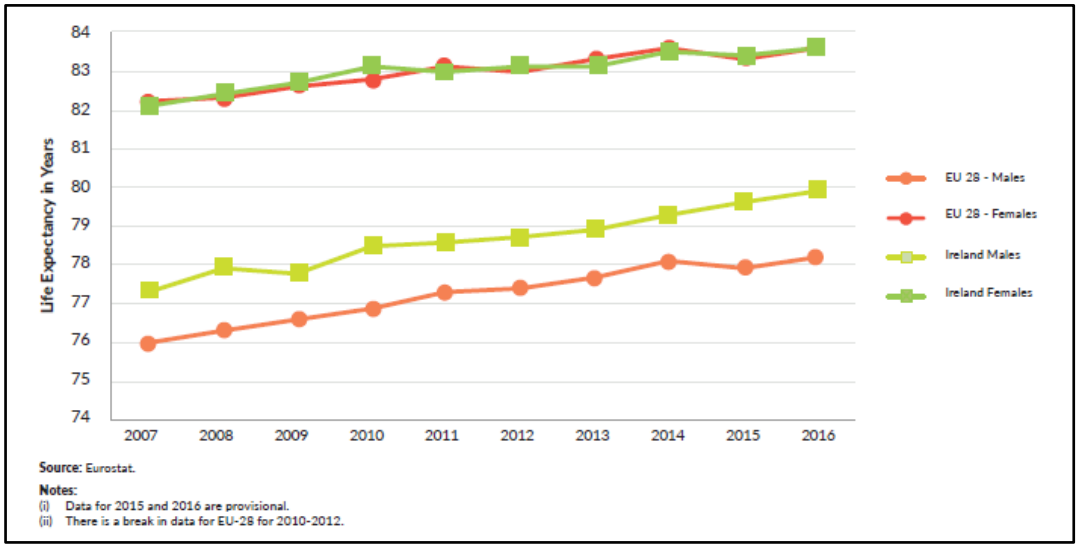

Figure 5.1: Life Expectancy at Birth, Ireland and EU-28 by Gender (Department of Health, 2018)

Figure 5.2 shows the principal causes of death and infant mortality rate: number and age standardised death rates per 100,000 population, 2008 – 2017.

						% change	
		2008	2012	2016	2017(p)	2008-2017	2016-2017
All Causes	Number	28,274	29,186	30,667	30,484	7.8	-0.6
	Rate	1125.0	1048.5	994.3	957.3	-14.9	-3.7
Diseases of the circulatory system							
All Circulatory System Diseases:	Number	9,956	9,480	9,237	8,927	-10.3	-3.4
	Rate	426.8	360.5	313.6	292.3	-31.5	-6.8
Ischaemic Heart Disease:	Number	5,185	4,758	4,449	4,238	-18.3	-4.7
	Rate	218.9	178.2	148.0	135.9	-37.9	-8.2
Stroke:	Number	2,142	1,935	1,830	1,710	-20.2	-6.6
	Rate	93.5	75.2	63.2	56.7	-39.4	-10.3
Cancer							
All Malignant Neoplasms:	Number	8,199	8,571	9,171	9,175	11.9	0.0
	Rate	306.2	290.1	279.7	271.7	-11.3	-2.9
Cancer of the Trachea, Bronchus and Lung:	Number	1,681	1,801	1,911	1,926	14.6	0.8
	Rate	62.2	60.6	57.6	56.7	-8.8	-1.6
Cancer of the Female Breast:	Number	736	689	755	752	2.2	-0.4
	Rate	46.8	40.2	40.7	39.3	-15.9	-3.4
Diseases of the Respiratory system*							
All Respiratory System Diseases:	Number	3,522	3,497	3,935	4,079	15.8	3.7
	Rate	156.4	137.6	135.8	136.7	-12.6	0.7
Chronic Lower Respiratory Disease	Number	1,365	1,587	1,712	1,610	17.9	-6.0
	Rate	57.3	59.8	57.3	52.3	-8.7	-8.6
Pneumonia	Number	1,356	1,086	1,086	1,109	-18.2	2.1
	Rate	63.9	45.8	39.9	39.1	-38.7	-1.8
External causes of injury and poisoning							
All Deaths from External Causes:	Number	1,721	1,577	1,323	1,315	-23.6	-0.6
	Rate	46.6	40.9	33.0	32.5	-30.1	-1.4
Transport Accidents:	Number	256	162	145	145	-43.4	0.0
	Rate	6.2	3.9	3.5	3.4	-44.5	-1.7
Suicide:	Number	506	541	437	392	-22.5	-10.3
	Rate	11.3	12.1	9.5	8.4	-26.0	-11.2
Infant deaths							
Infant Mortality Rate (per 1,000 live births)	Number	284	237	194	174	-38.7	-10.3
	Rate	3.8	3.3	3.0	2.8	-25.9	-6.7

Source: Central Statistics Office, Public Health Information System (PHIS) - Department of Health.

Notes:
(i) (p) The figures for 2017 are provisional. They should be treated with caution as they refer to deaths registered in these years and may be incomplete.
(ii) The rates provided in the table are age-standardised to the European standard population and are presented as rates per 100,000 population except for infant mortality rates which are expressed as deaths per 1,000 live births
(iii) *Excludes cancer of the trachea, bronchus and lung.

Figure 5.2: Principal Causes of Death and Infant Mortality Rate: Numbers and Age Standardised Death Rates Per 100,000 population 2008 to 2017 (Department of Health, 2017)

5.3.2 Existing Health Status – Local

Table 5.1 below shows the percentage of the population who stated their health was bad or very bad for the two DEDs identified in section 5.1.3.

District Electoral Division	Code	% of the population who stated their health was bad or very bad - 2016
Clondalkin-Dunawley	03006	2.1
Clondalkin Village	03010	1.5

Table 5.1: Percentage of Pop. Stating Health Bad or Very Bad 2016.

The results of the census in 2016 reported that the vast majority of people in South Dublin (87.4%) reported that their health was good and very good, 1.6% reported bad or very bad health.

5.4 Characteristics of the Proposed Development

It is proposed to locate the development on a 28.6 Ha greenfield site in Kilcarbery Grange, Clondalkin, Dublin 22. The proposed development will consist of a mix of high-density residential buildings including 3-4 bed houses and 1, 2 and 3 bed apartment and duplexes. The total proposed is 1,034no. residential units. Ancillary uses within defined residential character areas, and all associated ancillary site development works including road and water services infrastructure, green infrastructure networks and amenity open spaces are also proposed (See Chapter 3 – Description of Proposed Development for a full development description).

5.5 Potential Impact of the Proposed Development

This section provides as assessment of the predicted impacts of the proposed development in accordance with the Draft EPA Guidelines. The predicted/residual impacts from the construction and operational phases as set out in the other sections of this EIAR.

5.5.1 Air Quality

In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. The limit values are set for the protection of human health including the most vulnerable to health impacts due to poor air quality i.e. the infirm, elderly and children. These limit values provide short term (i.e. 24 hours or 1 hour) and long term (annual mean) limit values below which EU member states must keep the specified pollutants. Air Pollution is the single largest Environmental health risk in Europe. Heart disease and stroke are the most common reasons for early death and are responsible for 80% of cases. Health effects also include asthma, acute bronchitis, lung cancer, damage to nasal passages and respiratory tract inflammation. Links to cancers of the bladder, kidney, stomach, oral cavity, pharynx and larynx, multiple myeloma, leukaemia, Hodgkin's disease, and non-Hodgkin's lymphoma have also been linked to urban air pollutants. The pollutants of most concern in Dublin with respect to human health are NO2 and PM10 as they are the two pollutants most likely to exceed the annual mean limit values (40 µg/m3).

Air quality monitoring programs have been undertaken in recent years by the EPA at a number of locations in Dublin City centre. The most recent annual report on air quality "Air Quality in Ireland 2017 – Indicators of Air Quality" (EPA 2018), details the range and scope of monitoring undertaken throughout Ireland. The background concentration accounts for all non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Long term averages for NO2, PM10, PM2.5, CO and benzene indicate that concentrations in Dublin are below the limit values set for the protection of human health.

5.5.1.1 Construction Phase

As detailed in Chapter 9: Climate (Air Quality and Climate Change), best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the proposed development will ensure best dust mitigation practice based on the Institute of Air Quality Management (IAQM) Guidance. The mitigation measures that will be put in place during construction of the proposed development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the proposed development is likely to be negative, short-term and imperceptible with respect to human health.

5.5.1.2 Operational Phase

There is the potential for a number of human health impacts during the operational phase of the development. In particular, vehicle related air emissions may generate quantities of air pollutants such as NO2, PM10/PM2.5, CO and VOCs. The pollutants of most concern are NO2 and PM10, as these pollutants are generated as a direct result of vehicles and have the greatest potential to exceed the air quality standards. There are no other impacts on air quality associated with the operational phase of the proposed development.

Air dispersion modelling of operational traffic emissions was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the modelling results, emissions as a result of the proposed development are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

5.5.2 Air (Noise & Vibration)

Exposure to Excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report 'Noise Impacts on Health', (European Commission, 2015), the most common effects of noise on the vulnerable include: -

- Annoyance.
- Sleep Disturbance.
- Heart and circulation problems.
- Quality of Life.
- Cognitive Process.
- Hearing.

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes.

5.5.2.1 Construction Phase

It is predicted that the construction programme will create typical construction activity related noise on site. During the construction phase of the proposed development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators. A number of avoidance, remedial and reduction measures are included in Section 12.6 of Chapter 12 – Air (Noise & Vibration). The closest neighbouring noise sensitive properties to the proposed development are the residential, educational and health receptors to the north and east of the site, which are located approximately 10m from the site boundary at their closet point. BS 5228-1:2009+A1:2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 5.8.3 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors. It should be noted that the majority of construction activities will be undertaken at a distance >10m from neighbouring noise sensitive locations. The predicted noise levels detailed in section 12.6.1.1 indicate that for the likely range of the works, construction activities can operate within the limits outlined in Chapter 12: Air (Noise & Vibration).

Reference to Table 12.6 confirms that the addition of construction traffic to the existing traffic volumes are less than 1dB(A) which is just perceptible and of negligible impact. During the remaining construction periods, HGV volumes will be further reduced and hence no additional noise impacts are predicted. With consideration of the distance from site boundaries to nearby sensitive receptors, and the anticipated methods for constructing building foundations and for general construction, it is expected that vibration emissions to nearby receptors will not be significant.

5.5.2.2 Operational Phase

The predicted increase in traffic noise levels associated with the development is less than 1dB in the vicinity of the majority of roads for both the opening and design years. Making reference to Table 12.6 confirms that this increase is barely perceptible, and the resultant impact is negligible. The exception to this is along the western section of the Old Nangor Road where in there is an increase ranging from 1.3dB in the opening year to 4.2dB in the design year. Making reference to Table 12.6 confirms that this increase is ranging from barely perceptible with a resultant impact of negligible in the opening year to a perceptible increase with a resultant impact of minor in the design year.

In summary, the predicted increase in noise levels associated with vehicles at road junctions in the vicinity of the proposed development is of long-term imperceptible to minor impact.

The internal noise environment within the proposed residential units and the corresponding external amenity space will be, once mitigation is implemented, within the recommended levels for good residential amenity. The resulting impact is of neutral, long-term and not-significant.

5.5.3 Traffic

The World Health Organisation Report 'Health Effects and Risks of Transport Systems: The Hearts Project' (World Health Organisation, 2006) states that road traffic is a major cause of adverse health effects - ranking with smoking and diet as one of the most important determinants of health in Europe. The report states: -

> *"Traffic-related air pollution, noise, crashes and social effects combine to generate a wide range of negative health consequences, including increased mortality, cardiovascular, respiratory and stress-related diseases, cancer and physical injury. These affect not only transport users but also the population at large, with particular impact on vulnerable groups such as children and elderly people, cyclists and pedestrians."*

In the Department of Communications, Climate Action & Environment document Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy vehicle emissions are included as a key source of health impacts in Ireland (DOCCA&E, 2017).

An assessment of the additional traffic movements associated with the proposed development during the construction and operational phases is presented in Chapter 14: Material Assets (Transportation).

The impact of traffic generated by the proposed development on human health in relation to air quality and noise during the construction phase of the proposed development dealt with in Sections 5.5.2 & 5.5.3 and Chapters 9: Climate (Air Quality and Climate Change) and Chapter 12: Air (Noise & Vibration) of this EIAR.

5.5.3.1 Construction Phase

Construction traffic generated during the development works tends to be outside of peak hours. Such trips would generally be spread out over the full working day and will not be higher than the peak hour predicted volumes for the operational stage.

Provided mitigation measures and management procedures shown in Section 14.6.1.1 are incorporated during the construction phase, the predicted impact on human health will be temporary in nature and neutral in terms of quality and effect.

5.5.3.2 Operational Phase

As shown above in Sections 5.5.1 & 5.5.2 there is no significant impact on nearby sensitive receptors in regards air, noise and vibration associated with operational traffic of the proposed development.

5.5.4 Townscape & Visual

The report 'Health Impacts on the Built Environment: A Review' (The Institute of Public Health in Ireland, 2006) states that deteriorating physical features of the urban environment can harm health. Architecture Ireland has also shown the link between the Built Environment and Mental Health (Architecture Ireland, 2015). The World Health Organisation (WHO) has undertaken research that shows urban environments that are aesthetically pleasing and landscaped encourage people to explore and access their local community by foot or bicycle when compared to the same urban space prior to renovations (WHO, 2016).

5.5.4.1 Construction Phase

There will be moderate to significant negative townscape impacts during the construction stage of the proposed development due to reduction in open space, the removal of roadside hedgerows, scaffolding erection etc, however these will be short term in duration. Visual impact on the local area will also be considered to be negative but similar to above will be short term in duration.

5.5.4.2 Operational Phase

Once operational, the new development will contribute positively to the form and function of the local area. The improved town scape and visual settings will result in a positive impact on population and human health in area. This will result in a positive, significant and long-term effect on human health in the local area.

5.5.5 Health & Safety

The proposed development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. 299 of 2007) as amended and associated regulations. The proposed development has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience based on a number of similar existing facilities operated by the operator.

The proposed development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) to minimize the likelihood of any impacts on worker's health and safety.

5.5.6 Do Nothing Scenario

If the proposed development were not to go ahead at the Kilcarbery site there would be no change to its greenfield nature and no potential impact to the current background air quality, traffic and noise and vibration levels. The landscape would stay in its current suburban condition.

5.6 Ameliorative, Remedial or Reductive Measures

There are no specific mitigation measures proposed for Human Health. Mitigation measures proposed to minimise the potential impacts on human health in terms of air quality, landscape and visual impact and noise and vibration are discussed in the relevant sections of Chapters 9: Climate (Air Quality and Climate Change), Chapter 12: Air (Noise & Vibration) and Chapter 13: Landscape & Visual Impact respectively.

Chapter 14: Material Assets (Transportation), addresses mitigation measures proposed to reduce the impact of additional traffic movements to and from the development.

5.7 Residual Impact of the Proposed Development

It is expected that the proposed development will have a ***Neutral***, ***long-term*** & **imperceptible** impact on the human health of the local population.

There are no predicted adverse impacts with respect to human health.

All other environmental aspects relating to the human environment which have the potential to impact on the local population such as air quality and climate, noise and vibration, material assets and traffic are addressed in Sections 5.5.1 – 5.5.3 and in more detail in the relevant Sections of this EIAR.

Measures outlined in Section 5.5.5 will be put in place to ensure the health and safety of all site personnel during both construction and operational phases.

If additional large scale developments are proposed in the future, in the vicinity of the proposed development, this has the potential to impact of Human Health of the local population particularly in relation to the points highlighted above. However, it is unlikely that other future developments of similar scale would give rise to a significant impact during the construction and operational stages of those projects.

Future projects of a large scale would need to conduct an EIAR to ensure that no significant impacts associated with human health will occur as a result of those developments.

The cumulative impact of the development on the health of the surrounding area will be ***neutral, long-term & imperceptible.***

5.8 Monitoring

There is no specific monitoring required for human health during the construction or operational phases of the proposed development. Where monitoring is required for any environmental aspect, this is addressed in the individual Sections of the EIAR, where appropriate.

5.9 Reinstatement

Not Applicable.

5.10 Difficulties Encountered

No difficulties were encountered during the compilation of this chapter.