

5.2 Human Health

5.2.1 Introduction

This chapter of the EIAR has been prepared by AWN Consulting Limited (AWN) to assess the likely impacts associated with Human Health during the demolition, construction and operational phases of the proposed development at Parnell Square Cultural Quarter, Dublin 1. Parnell Square Cultural Quarter will be a mixed cultural facility and public realm works, anchored by a new City Library, provided in a combination of new building and renovated historic buildings at Parnell Square North, Dublin 1.

In accordance with the Draft EPA "Guidelines on Information to be Contained in Environmental Impact Assessment Reports" (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 topics contained within this EIAR examined in this section include:

- Chapter 5.5: Material Assets – Transportation
- Chapter 5.6: Landscape & Visual Impact
- Chapter 5.10: Air - Noise & Vibration
- Chapter 5.11: Climate & Climate Change - Air Quality
- Health & Safety

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

5.2.2 Methodology

The effects of the proposed development on 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 wider island. The proposed development is located in the vicinity of a number of District Electoral Divisions (DED), including Rotunda A, Rotunda B, North City, Inns Quay C and Inns Quay B (CSO, 2016).

The extent of the DED's are illustrated and discussed under Chapter 5.1: Population, of this EIAR.

5.2.3 Receiving Environment (Baseline Situation)

The proposed development is located at Parnell Square North, Dublin 1.

The potential human receptors within the environs include residents of Parnell Street north the surrounding area. According to census 2016 results there are 21,344 people living within the study area.

5.2.3.1 Existing Health Status - Ireland

The Department of Health's report 'Health in Ireland Key Trends 2017' (Department of Health, 2017) provides statistical analysis on health in Ireland over the Last Ten years. Sections 1 and 2 of the report deal specifically with Life Expectancy and Health.

Life expectancy data shows that for women in Ireland, there has been a minor decrease between 2014 and 2015. Male life expectancy has shown a continual rise since 2009. 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 5.2.1). Overall life expectancy has increased by c. 2.5% since 2005. An upward trend is also 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 variation between religions, age groups and other population subgroups.

In the last decade Ireland had “high rates of self-perceived good or very-good health compared to its EU counterparts”. 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:

“Mortality rates from diseases of the circulatory system fell by 28.4% between 2007 and 2016 and cancer mortality rates decreased by 9.9% over the same period. When cancer of the trachea, bronchus and lung are included, respiratory diseases accounted for 19% of all registered deaths in 2016.” (Figure 5.2.1 below).

Transport accident mortality have fallen by 54.1%, infant mortality by 9.6% and suicide rates by 12.6% between the years of 2007-2016.

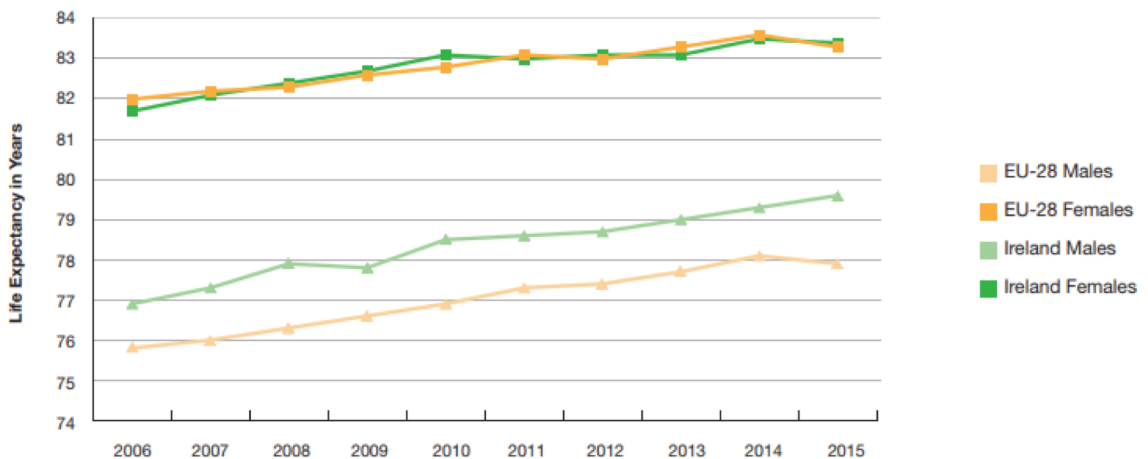


Figure 5.2.1: Life Expectancy at birth, Ireland and EU-28 by Gender (Department of Health, 2016)

Figure 5.2.2 shows the number and age-standardised death rates per 100,000 population, 2007-2016.

		2007	2011	2015	2016(p)	% Change	
						2007-2016	2015-2016
ALL CAUSES	Number	28,117	28,456	30,127	30,389	8.1	0.9
	Rate	1,151.6	1,037.8	1,008.9	983.8	-14.6	-2.5
DISEASES OF THE CIRCULATORY SYSTEM							
All Circulatory System Diseases:	Number	9,956	9,236	9,371	9,205	-7.5	-1.8
	Rate	436.1	358.7	330.0	312.2	-28.4	-5.4
Ischaemic Heart Disease:	Number	5,375	4,707	4,492	4,405	-18.0	-1.9
	Rate	232.0	181.0	154.6	146.2	-37.0	-5.4
Stroke:	Number	2,078	1,993	1,920	1,825	-12.2	-4.9
	Rate	93.0	78.4	68.7	63.0	-32.3	-8.3
CANCER							
All Malignant Neoplasms:	Number	7,917	8,666	8,877	9,023	14.0	1.6
	Rate	304.9	299.6	277.6	274.6	-9.9	-1.1
Cancer of the Trachea, Bronchus and Lung:	Number	1,668	1,850	1,828	1,864	11.8	2.0
	Rate	63.2	63.6	56.7	56.2	-11.1	-0.8
Cancer of the Female Breast:	Number	611	690	678	726	18.8	7.1
	Rate	40.3	41.8	37.3	39.0	-3.4	4.5
DISEASES OF THE RESPIRATORY SYSTEM *							
All Respiratory System Diseases:	Number	3,324	3,438	3,865	3,856	16.0	-0.2
	Rate	152.3	138.0	138.9	132.7	-12.9	-4.5
Chronic Lower Respiratory Disease:	Number	1,496	1,504	1,701	1,711	14.4	0.6
	Rate	64.8	57.8	59.0	57.1	-12.0	-3.4
Pneumonia:	Number	1,125	1,057	1,165	1,049	-6.8	-10.0
	Rate	55.5	45.4	44.3	38.4	-30.8	-13.4
EXTERNAL CAUSES OF INJURY AND POISONING							
All Deaths from External Causes:	Number	1,759	1,693	1,316	1,344	-23.6	2.1
	Rate	47.9	43.7	33.5	33.7	-29.6	0.5
Transport Accidents:	Number	305	189	124	140	-54.1	12.9
	Rate	7.6	4.4	2.9	3.3	-56.8	13.5
Suicide:	Number	458	554	425	399	-12.9	-6.1
	Rate	10.4	12.1	9.5	8.8	-15.4	-7.4
INFANT DEATHS							
Infant Mortality Rate (per 1,000 live births):	Number	230	262	225	208	-9.6	-7.6
	Rate	3.2	3.5	3.1	3.3	3.1	6.5

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

Notes:
 (i) (p) The figures for 2016 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 5.2.2: Principal Causes of Death and Infant Mortality Rate: Numbers and Age Standardised Death Rates per 100,000 population 2007 to 2016 (Department of Health, 2017)

5.2.3.2 Existing Health Status - Local

Table 5.2.1 below shows the percentage of population who stated their health was bad or very bad for the proposed development and surrounding area DED's in 2016 (CSO, 2016).

Table 5.2.1: Percentage of Population stating Health Bad or Very Bad 2016

District Electoral Division (DED)	DED Code	% of the population who stated their health was bad or very bad - 2016
Rotunda A	02088	1.8
Rotunda B*	02089	1.7
North City	02075	0.9
Inns Quay A	02066	2.6
Inns Quay B.	02067	2.2

5.2.4 Characteristics of the Proposed Development

The proposed development entails approximately 11,198 m² of cultural facilities, including a high-quality City Library facility to be accommodated in a combination of new buildings and renovated historic buildings at the former Colaiste Mhuire site (nos. 23-28) and nos. 20-21 Parnell Square (site area c. 0.99ha, including protected structures). Associated works to the public realm to result in alterations to the traffic network, existing on street car parking and city bikes facility. Both the former Colaiste Mhuire building and 20-21 Parnell Square have been unused for some time with parts of the internal structures of both properties in a state of disrepair or dereliction.

Further detailed description of the proposed development is set out under Chapter 3: Description of Proposed Development.

5.2.5 Potential & Predicted Impacts of the Proposed Development

This Section provides an assessment of the predicted impacts of the proposed development in accordance with the Draft EPA guidelines 2017. The assessment of impacts on human health make reference to the assessments of those factors under which human health effects might occur. Environmental factors of, air, noise, traffic etc. are addressed elsewhere in this EIAR.

5.2.5.1 Population

There is a number of international studies illustrating the positive impact cultural amenities such as the proposed development have on the local populations.

According to the Arts Council of England Report 2015 (Arts Council of England, 2015);

“Library use is positively associated with subjective wellbeing after controlling for a wide range of other factors, with Library users having higher life satisfaction, higher happiness and higher sense of purpose in life compared to non-users....In sum, library services play an important role in the quality of life of both Library users and non-users. As for society as a whole, library usage is associated with reduced medical expenditures.”

A current government led initiative “Healthy Ireland” is a national strategy to improve health and wellbeing throughout the country by placing a focus on prevention, individual awareness and improving the general health of people. DCC currently run the Healthy Ireland service in all local libraries and this initiative will be continued at the proposed development.

Further detail in relation to the impacts on the Population are examined under Chapter 5.1: Population, of this EIAR.

5.2.5.2 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 hour 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 Monitoring Annual Report 2016" (EPA 2017), 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, PM_{2.5}, CO and benzene indicate that concentrations in Dublin are below the limit values set for the protection of human health.

5.2.5.2.1 Demolition and Construction Phase

As detailed in Chapter 5.11: Climate & Climate Change - Air Quality, best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the proactive 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 Institute of Air Quality Management (IAQM) Guidance.

Therefore, the impact of construction of the proposed development is likely to be **short-term and imperceptible** with respect to human health. As the site is within close proximity of a number of sensitive receptors it is recommended that dust monitoring (Bergerhoff Method) should be conducted during the construction phase as this will ensure the efficiency of the dust mitigation measures and also highlight when more measures may need to be implemented.

Construction phase impacts on human health due to construction phase vehicles are predicted to be imperceptible as volumes fall

below the scoping levels for impact, as discussed in Chapter 5.11: Climate & Climate Change - Air Quality.

As detailed in Chapter 5.14: Material Assets - Waste Management, a number of asbestos surveys have been carried out at 20-21 Parnell Square and the former Colaiste Mhuire site. These identified a number of locations within the buildings where asbestos containing materials are present (ASM). All forms of asbestos, have the ability to cause lung cancer, mesothelioma, cancer of the larynx and ovary, and asbestosis (fibrosis of the lungs) (WHO, 2018), if not correctly managed.

All asbestos containing materials are to be removed as part of the construction demolition phase of the proposed development by a suitably qualified contractor and transported and disposed of by a licenced contractor to a licenced facility. Please see Chapter 5.14: Material Assets - Waste Management and the Outline Construction Management and Waste Management Plan, Volume 2, Appendix 3.1.

5.2.5.2.2 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/PM_{2.5}, 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.

However, as outlined in Chapter 5.5: Material Assets - Transportation, traffic modelling indicates that low number of additional traffic will be generated due to the proposed development. It is envisaged that there will be increases of up to 60 annual average daily traffic movements (AADT) on the link close to Parnell Square due to the proposed development. However, this is significantly below the level of increased daily traffic flow of 1,000 AADT which is deemed to cause any impact on human health. Therefore, using the air quality screening criteria, no road links can be classed as 'affected' by the proposed development and no significant short or long term human health impacts are predicted due to the proposed development.

5.2.5.3 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.

5.2.5.3.1 Demolition and Construction Phase

As detailed in Chapter 5.10 Air - Noise & Vibration, the primary sources of construction vibration are believed to emanate from piling and ground/rock breaking. The range of vibration levels is typically below a level which would cause any disturbance to occupants the nearest residential dwellings highlighted in Section 5.10.3 of Chapter 5.10: Air – Noise & Vibration. Any rock breaking undertaken as part of the construction activities onsite will be required to operate below the recommended vibration criteria set out in Table 5.10.1 of Chapter 5.10: Air – Noise & Vibration. This should ensure. No predicted significant adverse impact arising from vibration during construction provided works are carried out so as to fall under the relevant vibration criteria.

Noise emissions associated with the construction phase of the development predict construction noise levels are above the adopted criterion at distances of 10m or less, and that a negative impact on nearby receivers will occur. A number of avoidance, remedial and reduction measures are included in section 5.10.6 of Chapter 5.10 Air Noise & Vibration. Due to the nature of construction noise and the proximity of noise sensitive receivers, it is predicted construction noise levels will be above the relevant criteria while works are within 10m of receptors and that there will be a short term, negative and significant impact on these sensitive receivers. As works move further away, the predicted noise levels are within the relevant criteria impact is "moderate, negative and

short term (Ref. Section 5.10.7.1 of Chapter 5.10: Air – Noise & Vibration.).”

The impact of noise in relation to the clinical buildings located within the curtilage of the Rotunda Hospital to the south of the proposed development were also considered. Due to the distance of these buildings from the area of works (120m) the predicted construction noise levels are within the relevant criteria used (Health Technical Memorandum 08-01: Acoustics). Vibration levels are also expected to be below their corresponding criteria due to the distance from construction works (BS 6841 (1987)). Based on the evaluation in Chapter 5.10 Air Noise & Vibration, the impact from noise and vibration on the human health of employees and visitors to the clinical building of the Rotunda Hospital from the proposed development will be neutral, imperceptible and short term in duration.

5.2.5.3.2 Operational Phase

As detailed in Chapter 5.10: Air – Noise & Vibration, careful design has been carried out to ensure that the locations of external noise emitting plant will be screened off by vertical elements that will ensure that any noise emission will spread vertically mitigating hemispherical noise spread to adjacent properties. In addition, acoustic attenuation will be provided where required to keep within existing background noise levels in occupied, and in particular residential, surrounding areas.

The impact from operating external plant will be designed and located so that emissions will be within the noise criteria set for day and night-time periods and is not expected to generate any significant impact at any noise sensitive locations. No other significant noise or vibration sources are anticipated during the operational phase of the development.

5.2.5.4 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 5.5: Material Assets – Transportation.

The impact of traffic generated by the proposed development on human health in relation to air quality and noise during both the construction and demolition phases of the proposed development dealt with in Sections 5. and Chapter 5.10: Air – Noise & Vibration, and Chapter 5.11: Climate & Climate Change - Air Quality, of this EIAR.

5.2.5.5 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 have also shown the link between the Built Environment and Mental Health (Architecture Ireland, 2015). The World Health Organisation (WHO) has undertaken research that show 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).

5.2.5.5.1 Demolition and Construction Phase

There will be moderate negative townscape impacts during the construction stage of the proposed development due to the use of scaffolding, 2no. construction cranes, hoardings etc, however these will be short term in duration. Visual impact on the Parnell Square north area will also be considered to be negative but similar to above will be short term in duration.

5.2.5.5.2 Operational Phase

Once operational, the new cultural quarter will contribute positively to the form and function of Parnell Square and will strengthen this area as a cultural centre of the city. The improved town scape and visual settings will result in a positive impact on population and

human health in area. Works to facilitate easier pedestrian and bicycle access should result in increased physical activity of the local population and visitors alike. This will result in a positive, significant and long-term effect on human health in the local area.

5.2.5.6 Health and 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 cultural quarter 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.

During the operational phase of the development, the operator will implement an Environmental Safety and Health (EH&S) Management System and associated procedures at the proposed development. Full training in the EH&S Management System and relevant procedures will be provided to all employees.

5.2.5.7 Do-Nothing Scenario

If the proposed development were not to go ahead the result may be that the buildings at Nos. 20-21 & Nos. 23-28 Parnell Square would fall further into disrepair as they would remain unoccupied and may have a negative impact on the mental and physical health of the local population.

5.2.6 Mitigation Measures

The impacts on the local population in terms of residents and businesses are mainly positive in the sense of renovating previously derelict buildings, the creation of a cultural quarter for public use and assertion of public services in the Dublin North City Centre area.

There is no specific mitigation measures proposed for Human Health. Mitigation measures proposed to minimise the potential impacts on human health in terms of landscape & visual impact, noise & vibration and air quality are discussed in the relevant sections of Chapters 5.5: Material Assets - Transportation, Chapter 5.10: Air – Noise & Vibration & Chapter 5.11: Climate & Climate Change - Air Quality, respectively.

Chapter 5.5: Material Assets - Transportation, addresses mitigation measures proposed to reduce the impact of additional traffic movements to and from the development.

5.2.7 Predicted Impact of the Proposed Development

It is expected that the proposed development will have a **positive, long-term & imperceptible impact** on the immediate area through health and social benefits.

There are no predicted adverse impacts with respect to health factors primarily due to the location of the proposed development and the characteristics of the proposed cultural quarter.

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 Section 5.2.5 above and in more detail in the relevant Chapters of this EIAR.

Measures outlined in Section 5.2.5.6 of this Chapter will be put in place to ensure the health and safety of all site personnel during both construction and operational phases.

The cumulative impact of the development on the health of the surrounding area will be positive, long-term & imperceptible due to the integration of the library and cultural facilities and enhanced public realm with the similar types of recreational uses in the immediate surrounding are: Hugh Land Gallery, Garden of Remembrance creating a new cultural quarter.

Interactions are addressed in Chapter 8: Interactions & Cumulative Impacts, of this EIAR.

5.2.8 Monitoring

There is no specific monitoring required for Human Health during the construction or operational phase of the proposed development. Specific monitoring for each of the environmental topics mentioned above are addressed in the individual Chapters.

5.2.9 Difficulties Encountered

No difficulties were encountered during the compilation of this chapter.

5.2.10 Bibliography

- Architecture Ireland (2015) The Built Environment and Mental Health
- Arts Council of England (2015) The Health and Wellbeing Benefits of Public Libraries Full Report.
- Central Statistics Office Ireland (CSO) (2016) Census Results
- Department of Communications, Climate Action & Environment (2017) Cleaning Our Air – Public Consultation to Inform the Development of a National Clean Air Strategy
- Department of Health (2017) Health in Ireland, Key Trends.
- Dublin City Council (2016) Dublin City Local Economic Plan and Community Plan 2016-2022
- EPA (2017) Guidelines on Information to be Contained in Environmental Impact Assessment Reports (Draft).
- EPA (2017) Air Quality in Ireland 2016
- European Commission (2015) Noise Impacts on Health
- ISOVARP (2010) Urban Planning and Human Health in the European City – Report to the World Health Organisation
- The Institute of Public Health in Ireland (2006), Health Effects of the Built Environment: A Review
- World Health Organisation (2016) Urban Green Spaces and Health – A Review of Evidence
- World Health Organisation (2006) Health Effects and Risks of Transport Systems; the Hearths Project.

5.2.11 Consultations

Consultation was required with the authors of the Air, Noise and Traffic chapters of this EIAR along with project engineers.