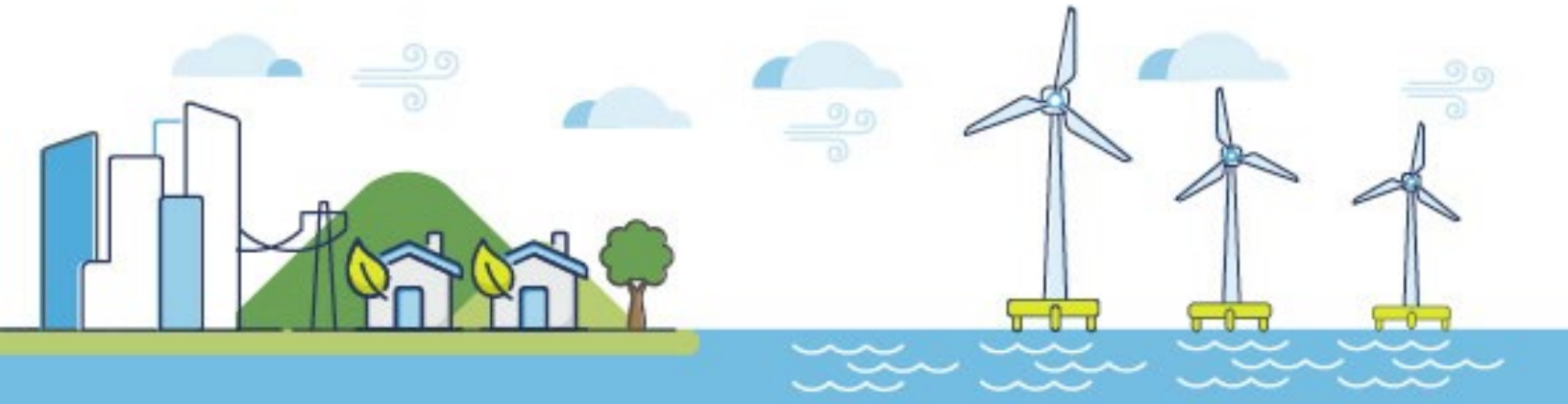
WHITE CROSS

White Cross Offshore Windfarm Environmental Statement

Chapter 22: Human Health



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Glossary of Acronyms

Acronym	Definition
AC	Alternating Current
AHAH	Access to Health Assets and Hazards
ALARP	As Low As Reasonably Practicable
AONB	Area of Outstanding Natural Beauty
BEIS	Department for Business, Energy and Industrial Strategy
BPM	Best Practicable Means
CEMP	Construction Environmental Management Plan
CEA	Cumulative Effect Assessment
CNVMP	Construction Noise and Vibration Management Plan
CRCE	Centre for Radiation, Chemical and Environmental Hazards
CTMP	Construction Traffic Management Plan
DC	Direct Current
EIA	Environmental Impact Assessment
ELF	Extremely Low Frequency
EMF	Electromagnetic fields
ES	Environmental Statement
GHG	Greenhouse Gas
HDD	Horizontal Directional Drilling
HIA	Health Impact Assessment
HPA	Health Protection Agency
HVAC	High Voltage Alternating Current
ICNIRP	Non-Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
IPC	Infrastructure Planning Commission
JSNA	Devon Joint Strategic Needs Assessment
LSOA	Lower Layer Super Output Area
LSOAs	Lower Super Output Areas
MARPOL	International Convention for the Prevention of Pollution from Ships
MHWS	Mean High-Water Springs
MHRA	Department of Health and Social Care's Medicines and Healthcare Products Regulatory Agency
MLWS	Mean Low-Water Springs
MMO	Marine Management Organisation
NDC	North Devon Council
NDDH	North Devon District Hospital
NPPF	National Planning Policy Framework

Acronym	Definition
NPS	National Policy Statement
NRMM	Non-Road Mobile Machinery
NRPB	National Radiological Protection Board
NSIP	Nationally Significant Infrastructure Project
NVSR	Noise and Vibration Sensitive Receptors
OCTMP	Outline Construction Traffic Management Plan
OHID	Office for Health Improvement and Disparities
ONS	Office for National Statistics
PHE	Public Health England
PRoW	Public Right of Way
UKHSA	UK Health Security Agency
WAID	WAter Incident Database

Glossary of Terminology

Defined Term	Description
Applicant	White Cross Offshore Windfarm Limited (WCOWL).
Blue space	The collective term for rivers, lakes and coastal waters.
Cumulative effects	The effect of the Offshore Project taken together with similar effects from a number of different projects, on the same single receptor/resource. Cumulative effects are those that result from changes caused by other past, present or reasonably foreseeable actions together with the Offshore Project.
Department for Business, Energy and Industrial Strategy (BEIS)	Government department that is responsible for business, industrial strategy, science and innovation and energy and climate change policy and consent under Section 36 of the Electricity Act.
Development Area	The area comprising the Onshore Development Area and the Offshore Development Area.
Environmental Impact Assessment (EIA)	Assessment of the potential impact of the proposed Project on the physical, biological and human environment during construction, operation and decommissioning.
Export Cable Corridor	The area in which the export cables will be laid, either from the Offshore Substation or the inter-array cable junction box (if no offshore substation), to the NG Onshore Substation comprising both the Offshore Export Cable Corridor and Onshore Export Cable Corridor.
High Voltage Alternating Current	High voltage alternating current is the bulk transmission of electricity by alternating current (AC), whereby the flow of electric charge periodically reverses direction.
High Voltage Direct Current	High voltage direct current is the bulk transmission of electricity by direct current (DC), whereby the flow of electric charge is in one direction.
Green infrastructure	A network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity (NPPF, p67).
Green space	Any area of vegetated land, urban or rural.
In-combination effects	In-combination effects are those effects that may arise from the development proposed in combination with other plans and projects proposed/consented but not yet built and operational.
Inter-array cables	Cables which link the wind turbines to each other and the Offshore Substation Platform, or at the inter-array cables junction box (if no offshore substation).
Jointing bay	Underground structures constructed at regular intervals along the Onshore Export Cable Corridor to join sections of cable and facilitate installation of the cables into the buried ducts.
Landfall (to MLWS)	Where the offshore export cables come ashore.

Defined Term	Description
Link boxes	Underground chambers or above ground cabinets next to the cable trench housing electrical earthing links.
Lower Layer Super Output Area	A geographic area that is automatically generated, across England and Wales, and which is as consistent in population size as possible. LSOAs have a minimum population of 1,000 and a mean population of 1,500.
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean low water springs	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean sea level	The average tidal height over a long period of time.
Mitigation	Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental effects, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels. For the purposes of the EIA, two types of mitigation are defined: • Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA • Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant effects. Additional mitigation is therefore subsequently adopted by WCOWL as the EIA process progresses.
National Grid Onshore Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of the electrical transformers.
National Grid Connection Point	The point at which the White Cross Offshore Windfarm connects into the distribution network at East Yelland substation and the distributed electricity network. From East Yelland substation electricity is transmitted to Alverdiscott where it enters the national transmission network.
Offshore Development Area	The Windfarm Site (including wind turbine generators, substructures, mooring lines, seabed anchors, inter-array cables and Offshore Substation Platform (as applicable)) and Offshore Export Cable Corridor to MHWS at the Landfall. This encompasses the part of the project that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009.
Offshore Export Cables	The cables which bring electricity from the Offshore Substation Platform or the inter-array cables junction box to the Landfall.
Offshore Export Cable Corridor	The proposed offshore area in which the export cables will be laid, from Offshore Substation Platform or the inter-array cable junction box to the Landfall.

Defined Term	Description
Offshore Infrastructure	All of the offshore infrastructure including wind turbine generators, substructures, mooring lines, seabed anchors, Offshore Substation Platform and all cable types (export and inter-array). This encompasses the infrastructure that is the focus of this application and Environmental Statement and the parts of the project consented under Section 36 of the Electricity Act and the Marine and Coastal Access Act 2009.
Offshore Substation Platform	A fixed structure located within the Windfarm Site, containing electrical equipment to aggregate the power from the wind turbines and convert it into a more suitable form for export to shore.
Offshore Transmission Assets	The aspects of the project related to the transmission of electricity from the generation assets including the Offshore Substation Platform (as applicable) or offshore junction box, Offshore Cable Corridor to MHWS at the landfall.
Offshore Transmission Owner	An OFTO, appointed in UK by Ofgem (Office of Gas and Electricity Markets), has ownership and responsibility for the transmission assets of an offshore windfarm.
Onshore Development Area	The onshore area above MLWS including the underground onshore export cables connecting to the White Cross Onshore Substation and onward to the NG grid connection at East Yelland. The onshore development area will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990.
Onshore Export Cables	The cables which bring electricity from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection at East Yelland.
Onshore Export Cable Corridor	The proposed onshore area in which the export cables will be laid, from MLWS at the Landfall to the White Cross Onshore Substation and onward to the NG grid connection at East Yelland.
Onshore Infrastructure	The combined name for all infrastructure associated with the Project from MLWS at the Landfall to the NG grid connection point at East Yelland. The onshore infrastructure will form part of a separate Planning application to the Local Planning Authority (LPA) under the Town and Country Planning Act 1990.
Onshore Transmission Assets	The aspects of the project related to the transmission of electricity from MLWS at the Landfall to the NG grid connection at East Yelland including the Onshore Export Cable, the White Cross Onshore Substation and onward connection to the NG grid connection at East Yelland.
Project Design Envelope	A description of the range of possible components that make up the Offshore Project design options under consideration. The Project Design Envelope, or 'Rochdale Envelope' is used to define the Offshore Project for Environmental Impact Assessment (EIA) purposes when the exact parameters are not yet known but a bounded range of parameters are known for each key project aspect.

Defined Term	Description
the Project	the Project is a proposed floating offshore windfarm called White Cross located in the Celtic Sea with a capacity of up to 100MW. It encompasses the project as a whole, i.e. all onshore and offshore infrastructure and activities associated with the Project.
Safety zones	A marine zone outlined for the purposes of safety around a possibly hazardous installation or works / construction area.
Transition bay	Underground structures at the Landfall that house the joints between the offshore export cables and the onshore export cables.
White Cross Offshore Windfarm	Up to 100MW capacity offshore windfarm including associated onshore and offshore infrastructure.
White Cross Onshore Substation	A new substation built specifically for the White Cross project. It is required to ensure electrical power produced by the offshore windfarm is compliant with NG electrical requirements at the grid connection at East Yelland.
Windfarm Site	The area within which the wind turbines, Offshore Substation Platform and inter-array cables will be present.
Works completion date	Date at which construction works are deemed to be complete and the windfarm is handed to the operations team. In reality, this may take place over a period of time.

22. Human Health

22.1 Introduction

1. This chapter of the Environmental Statement (ES) presents the potential impacts on human health of the White Cross Offshore Windfarm Project (the Onshore Project). Specifically it considers impacts landward of Mean Low Water Springs (MLWS) during its construction, operation and maintenance, and decommissioning phases.

2. The ES has been finalised with due consideration of pre-application consultation to date (see **Chapter 7: Consultation**) and the ES will accompany the application to North Devon Council (NDC) for planning permission under the Town and Country Planning Act 1990.

3. The components of the White Cross Offshore Windfarm Project seaward of MHWS ('the Offshore Project') are subject to a separate application for consent under Section 36 of the Electricity Act 1989, and for Marine Licences under the Marine and Coastal Access Act 2009. These applications are supported by a separate ES covering all potential impacts seaward of MHWS. T

4. This assessment has been undertaken with specific reference to the relevant policy, legislation and guidance, which are summarised in **Section 22.2** of this chapter. Further information on the international, national and local planning policy and legislation relevant to the Onshore Project is provided in **Chapter 3: Policy and Legislative Context**.

5. Details of the methodology used for the Environmental Impact Assessment (EIA) and Cumulative Effect Assessment (CEA), are presented in **Section 22.8** of this chapter and **Chapter 6: EIA Methodology**.

6. This assessment has been informed by impacts assessed in the following linked ES chapters (listed below) and impacts assessed in this chapter informs these chapters:

   - **Chapter 13: Air Quality**
   - **Chapter 15: Land Use**
   - **Chapter 21: Socio-Economics (including Tourism and Recreation)**
   - **Chapter 18: Noise and Vibration**
   - **Chapter 19: Traffic and Transport**
   - **Chapter 23: Climate Change.**

7. Inter-relationships with these chapters is further described in **Section 22.10.**

8. Additional information to support the human health assessment includes baseline information and summaries of peer-reviewed literature prepared for the Onshore Project. This is presented in **Appendix 22.A: Baseline Information**.

9. This ES chapter:

- Presents the existing environmental baseline established from desk studies, and consultation
- Presents the potential environmental effects on human health arising from the Onshore Project, based on the information gathered and the analysis and assessments undertaken
- Identifies any assumptions and limitations encountered in compiling the environmental information
- Highlights any necessary monitoring and/or mitigation measures which could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

22.2 Policy, Legislation and Guidance

10. **Chapter 3: Policy and Legislative Context** describes the wider policy and legislative context for the Onshore Project. The principal policy and legislation used to inform the assessment of potential impacts on human health for the Onshore Project are outlined in this section.

22.2.1 National Planning Policy Framework

11. The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, updated July 2021) is the primary source of national planning guidance in England. Sections relevant to this aspect of the ES are summarised below in **Table 22.1**.

Table 22.1 Summary of NPPF Policy relevant to human health

Summary	How and where this is considered in the ES
"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): […]	The potential for these effects was considered in the Scoping Report and are addressed in **Section 22.5.1** and **22.6.1** which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access).

Summary	How and where this is considered in the ES
b) a social objective – to support strong, vibrant and healthy communities … by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being." **– NPPF, Section 2, Paragraph 8**	Traffic is considered in **Chapter 19: Traffic and Transport** of the ES and its effects on journey times and access is considered in **Section 22.5.5** of this report.
"Planning policies and decisions should aim to achieve healthy, inclusive and safe places which: […] c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure[1] …" **– NPPF, Section 8, Paragraph 92**	The potential for these effects was considered in the Scoping Report and are addressed in **Sections 22.5.1** and **22.6.1** examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). **Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety.
"To provide the social, recreational and cultural facilities and services the community needs, planning policies and decisions should: […] b) take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community" **– NPPF, Section 8, Paragraph 93**	The potential for these effects was considered in the Scoping Report and are addressed in **Section 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access).
"Planning policies and decisions should support development that makes efficient use of land, taking into account: […] e) the importance of securing well-designed, attractive and healthy places." **– NPPF, Section 11, Paragraph 124**	The potential for these effects was considered in the Scoping Report and are addressed in **Section 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access).

[1] The NPPF defines green infrastructure as 'a network of multi-functional green and blue spaces and other natural features, urban and rural, which is capable of delivering a wide range of environmental, economic, health and wellbeing benefits for nature, climate, local and wider communities and prosperity (p67).

Summary	How and where this is considered in the ES
"Planning polices and decisions should ensure that developments: [….] f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesion and resilience." – **NPPF, Section 12, Paragraph 130**	The potential for these effects was considered in the Scoping Report and the Scoping Opinion (Case reference: EIA/2022/00002) and are addressed in **Section 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). **Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety.
"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life. [….]" – **NPPF, Section 15, Paragraph 185**	The potential for these effects was considered in the Scoping Report. Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report.
"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality	The potential for these effects was considered in the Scoping Report. Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4**

Summary	How and where this is considered in the ES
Management Areas and Clean Air Zones is consistent with the local air quality action plan." [….]" – **NPPF, Section 15, Paragraph 186**	
"Planning policies should: […] f) set out criteria or requirements to ensure that permitted and proposed operations do not have unacceptable adverse impacts on the natural and historic environment or human health, taking into account the cumulative effects of multiple impacts from individual sites and/or a number of sites in a locality" **– NNPF, Section 17, Paragraph 210**	The potential for these effects was considered in the Scoping Report. Cumulative effects are addressed in **Section 22.8** and throughout the ES.

22.2.2 Policies across Devon County

22.2.2.1 Devon's Joint Health and Wellbeing Strategy 2020–25 and Devon Joint Strategic Needs Assessment

12. Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) sets priorities and overall direction for the Devon Health and Wellbeing Board and local health, care and wellbeing organisations. The strategy is informed by the Devon Joint Strategic Needs Assessment (JSNA) which focus on three stages of life: Starting and developing well; living and working well; and ageing and dying well (Devon County Council, no date). The priorities of the Joint Health and Wellbeing Strategy relevant to this aspect of the ES are shown in **Table 22.2**.

Table 22.2 Summary of Devon's Joint Health and Wellbeing Strategy 2020–2025

Summary	How and where this is considered in the ES
2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn	
b. Create conditions for good health, physical activity and social interaction	The potential for these effects was considered in the Scoping Report and the Scoping Opinion and are addressed in **Sections 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access).

Summary	How and where this is considered in the ES
	Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report. Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4**
d. Help keep communities and individuals safe	The potential for these effects was considered in the Scoping Report and the Scoping Opinion Sections **22.5.1** and **22.6.1** examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). **Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety.
3. Focus on mental health [by] building good emotional health and wellbeing, happiness and resilience	
a. Reduce loneliness in all age groups	The potential for these effects was considered in the Scoping Report and the Scoping Opinion and are addressed in **Section 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). **Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety.
b. Identify people at risk and intervene to improve poor mental health as soon as possible	
d. Promote a positive approach to mental health and wellbeing	
4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible	
a. Prevent ill health by enabling people to live healthier lives	The potential for these effects was considered in the Scoping Report and the Scoping Opinion and are addressed in Section **22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report. Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4** Traffic is considered in **Chapter 19: Traffic and Transport** of the ES and its
c. Support those with long-term conditions to maintain a good quality of life	
d. Support carers to improve and maintain their own health & wellbeing	

Summary	How and where this is considered in the ES
	effects on journey times and access is considered in **Section 22.5.5** of this report.

22.2.2.2 North Devon Coast Area of Outstanding Natural Beauty (AONB) Management Plan 2019-2024

13. The North Devon Coast Area of Outstanding Natural Beauty (AONB) Management Plan 2019-2024 has one objective and one policy, relevant to the Onshore Project, for Open space, leisure and play (access) (North Devon Coast AONB, 2019). These are shown in **Table 22.3**.

Table 22.3 North Devon Coast AONB Management Plan 2019-2024

Summary	How and where this is considered in the ES
Access, Health and Wellbeing	
To ensure sustainable access to the AONB for the benefit of the health and wellbeing of local people and visitors, consistent with the designation	
H2 Support new opportunities and reduce barriers to improve the health and wellbeing of local people and visitors	The potential for these effects was considered in the Scoping Report and the Scoping Opinion and are addressed in **Section 22.5.1** and **22.6.1** below which examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access). Traffic is considered in **Chapter 19: Traffic and Transport** of the ES and its effects on journey times and access is considered in **Section 22.5.5** of this report.

14. The Management Plan notes the link between blue and green space and the health and wellbeing of the resident and visiting populations. It notes that North Devon is known for its water sports including but not limited to surfing and that AONB Partnership members seek to meet the needs of different groups within the population, including children in local schools and older isolated people (North Devon Coast AONB, 2019, 54).

22.2.2.3 Devon Suicide Prevention Action Plan 2021-2022

15. The Devon Suicide Prevention Action Plan 2021-2022 has eight strategic priorities (Public Health Devon and Devon County Council, no date). The relevant priority

is shown in **Table 22.2**. This action plan aligns with Public Health England (PHE) cross-government outcomes strategy to save lives (PHE, 2012).

Table 22.4 Devon Suicide Prevention Action Plan 2021-2022

Summary	How and where this is considered in the ES
Prevention of suicide in Public Places	The role of the Onshore Project in protecting the health of the public is addressed in **Sections 22.5.2** and **22.6.2**, which examine the construction effects and the operation and maintenance effects, respectively, for Community safety.

22.2.3 North Devon and Torridge Local Plan

16. Policy DM02 in the North Devon District and Torridge District Joint Local Plan covers environmental protection and makes explicit reference to health (Torridge District Council and North Devon District Council, 2018). The text that is relevant to the scope of this assessment is shown in **Table 22.5**.

Table 22.5 North Devon and Torridge Local Plan 2011-2031

Summary **Policy DM02: Environmental Protection**	How and where this is considered in the ES
Pollution (2) Development will be supported where it does not result in unacceptable impacts to:	
(a) atmospheric pollution by gas or particulates, including smell, fumes, dust, grit, smoke and soot	Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4**.
(b) pollution of surface or ground water (fresh and salt) including rivers, canals, other watercourses, water bodies, wetlands, water gathering grounds including catchment areas, aquifers, groundwater protection areas, harbours, estuaries or the sea	Water pollution is considered in **Chapter 14: Water Resources and Flood Risk.**
(c) noise or vibration	Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report.
(d) light pollution (sky glow, light intrusion and light spillage), where light overspills on to areas not intended to be lit. Areas particularly sensitive to light pollution include tranquil areas of open countryside, in particular areas of nature conservation value and Exmoor National Park's Dark Sky Reserve.	Light pollution associated with the Windfarm Site is considered within **Chapter 20: Onshore Landscape and Visual Amenity.**

22.2.4 National Policy Statement

17. The assessment of potential impacts upon human health has been made with specific reference to the relevant National Policy Statement (NPS). NPSs are statutory documents which set out the government's policy on specific types of Nationally Significant Infrastructure Projects (NSIPs) and are published in accordance with the Planning Act 2008.

18. Although the Offshore Project is not an NSIP, it is recognised that due to its size of up to 100MW and its location in English waters, certain NPS are considered relevant to the Offshore Project. Therefore, to align with the approach to the assessment of the Offshore Project, certain NPS are will also be considered as part of the Onshore Project.

19. Those relevant to human health are set out within the overarching NPS for Energy (EN-1), NPS for Renewable Energy Infrastructure (EN-3) and NPS for Electricity Networks Infrastructure (EN-5), which are summarised in **Table 22.6.**

20. It is noted that the NPS for Energy (EN-1), the NPS for Renewable Energy Infrastructure (EN-3) and the NPS for Electricity Networks Infrastructure (EN-5) are in the process of being revised. Draft versions of EN-1 and EN-3 were published for consultation in September 2021 (Department for Business Energy and Industrial Strategy (BEIS), 2021a, BEIS, 2021b) respectively) and of EN-5 in March 2023 (Department of Energy Security and Net Zero, 2023). A review of these draft versions has been undertaken in the context of this ES chapter.

21. **Table 22.6** includes a section for the draft version of NPS (EN-1, EN-3 and EN-5) in which relevant additional NPS requirements not presented within the current NPS (EN-1, EN-3 and EN-5) have been included. A reference to the requirement's location within the draft NPS and to where within this ES chapter or wider ES it has been addressed has also been provided.

22. Minor wording changes within the draft version which do not materially influence the NPS (EN-1, EN-3, EN-5) requirements have not been reflected in **Table 22.6.** EN-3 (current and draft version) does not specifically include details on the assessment of health in relation to offshore wind farm projects.

Table 22.6 Summary of NPS EN-1, EN-3 and EN-5 provisions relevant to human health

Summary	How and where this is considered in the ES
"The energy NPSs are likely to contribute positively towards improving the vitality and competitiveness of the UK energy market by providing greater clarity for developers which should improve the UK's security of supply and, less directly, have positive effects for health and well-being in the medium to longer term through helping to secure affordable supplies of energy and	Wider societal benefits from the Onshore Project are assessed in **Chapter 2: Need for the Project** and in **Section 22.6.4**.

Summary	How and where this is considered in the ES
minimising fuel poverty; positive medium and long term effects are also likely for equalities." **- EN-1 paragraph 1.7.2, bullet point 3**	
"To consider the potential effects, including benefits, of a proposal for a project, the Infrastructure Planning Commission (IPC) will find it helpful if the applicant sets out information on the likely significant social and economic effects of the development, and shows how any likely significant negative effects would be avoided or mitigated. This information could include matters such as employment, equality, community cohesion and well-being." **- EN-1 paragraph 4.2.2**	**Chapter 21: Socio-Economics (including Recreation and Tourism)** considers Tourism. Well-being is considered throughout this chapter.
"Issues relating to discharges or emissions from a proposed project which affect air quality, water quality, land quality and the marine environment, or which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes." **- EN-1 paragraph 4.10.1**	The potential for these effects was considered in the Scoping Report and are addressed in this chapter and: • Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4** • Noise is considered in **Chapter 18: Noise and Vibration** and in **Section 22.5.3** • Water pollution and hazardous waste and substances are considered in **Chapter 14: Water Resources and Flood Risk.**
"The planning and pollution control systems are separate but complementary. The planning system controls the development and use of land in the public interest. It plays a key role in protecting and improving the natural environment, public health and safety, and amenity, for example by attaching conditions to allow developments which would otherwise not be environmentally acceptable to proceed and preventing harmful development which cannot be made acceptable even through conditions. Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air and water quality meet standards that guard against impacts to the environment or human health." **- EN-1 paragraph 4.10.2**	The protection and improvement of the natural environment, public health and safety, and amenity are considered in **Section 22.5.1** and **Section 22.6.1**. **Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety. Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4**.

Summary	How and where this is considered in the ES
	Noise is considered in **Chapter 18: Noise and Vibration** and in **Section 22.5.3.** Water pollution and hazardous waste and substances are considered in **Chapter 14: Water Resources and Flood Risk**.
"Energy production has the potential to impact on the health and well-being ("health") of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy may have negative impacts on some people's health." **- EN-1 paragraph 4.13.1**	Cumulative effects are examined in **Section 22.8**.
"As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate. The impacts of more than one development may affect people simultaneously, so the applicant and the IPC should consider the cumulative effect on health." **- EN-1 paragraph 4.13.2**	Cumulative effects are examined in **Section 22.8**.
"The direct impacts on health may include increased traffic, air or water pollution, dust, odour, hazardous waste and substances, noise, exposure to radiation, and increases in pests." **- EN-1 paragraph 4.13.3**	The potential for these effects was considered in the Scoping Report and are addressed in this chapter and: • Air quality is considered in **Chapter 13: Air Quality** and in **Section 22.5.4** • Exposure to radiation (EMF) is considered **Section 22.6.3** • Water pollution and hazardous waste and substances are considered in **Chapter 14: Water Resources and Flood Risk** • Noise is considered in **Chapter 18: Noise and Vibration** and in **Section 22.5.3**

Summary	How and where this is considered in the ES
	• Traffic is considered in **Chapter 19: Traffic and Transport** of the ES and its effects on journey times and access is considered in **Section 22.5.5** of this report.
"New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport or the use of open space for recreation and physical activity." **- EN-1 paragraph 4.13.4**	The potential for these effects was considered in the Scoping Report and are addressed in this chapter and: • Traffic is considered in **Chapter 19: Traffic and Transport** of the ES and its effects on journey times and access is considered in **Section 22.5.5** of this report. • **Sections 22.5.1** and **22.6.1** of this report examine the construction effects and the operation and maintenance effects, respectively, for Open space, leisure and play (access)
"Generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example air pollution) which will constitute effective mitigation of them, so that it is unlikely that health concerns will either constitute a reason to refused consents or require specific mitigation under the Planning Act 2008. However, the IPC will want to take account of health concerns when setting requirements relating to a range of impacts such as noise." **- EN-1 paragraph 4.13.5**	The potential for these effects was considered in the Scoping Report. Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report.
"The Government's policy is to ensure there is adequate provision of high quality open space (including green infrastructure) and sports and recreation facilities to meet the needs of local communities. Open spaces, sports and recreational facilities all help to underpin people's quality of life and have a vital role to play in promoting healthy living. Green infrastructure in particular will also play an increasingly important role in mitigating or adapting to the impacts of climate change." **EN-1 paragraph 5.10.2**	Access to green infrastructure, which includes both green and blue space, is considered in this chapter in relation to Open space, leisure and play (access). See **Sections 22.5.1** and **22.6.1** of this report
"Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information	Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in

Summary	How and where this is considered in the ES
on assessment of particular noise sources may be contained in the technology-specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies." - **EN-1 paragraph 5.11.6**	**Section 22.5.3** of this report.
"The IPC should not grant development consent unless it is satisfied that the proposals will meet the following aims: • avoid significant adverse impacts on health and quality of life from noise • mitigate and minimise other adverse impacts on health and quality of life from noise • where possible, contribute to improvements to health and quality of life through the effective management and control of noise." - **EN-1 paragraph 5.11.9**	Noise is considered in **Chapter 18: Noise and Vibration** of the ES and in **Section 22.5.3** of this report.
"During the construction, operation and decommissioning phases, developments can lead to increased demand for water, involve discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment. There may also be an increased risk of spills and leaks of pollutants to the water environment. These effects could lead to adverse impacts on health." **- EN-1 paragraph 5.15.1**	Water pollution is considered in **Chapter 14: Water Resources and Flood Risk.**
NPS for Electricity Networks Infrastructure (EN-5) paragraphs 2.10.2 to 2.10.8	
[The text below has been updated in line with the draft NPS-5 (2023) to reflect the names of the relevant organisations and to remove references to European Union guidelines. Paragraph references are from NPS-5 (2011).**]** All overhead power lines produce EMFs, and these tend to be highest directly under a line, and decrease to the sides at increasing distance. Although putting cables underground eliminates the electric field, they still produce magnetic fields, which are highest directly above the cable (see para 2.10.12). EMFs can have both direct and indirect effects on human health. The direct effects occur in terms of impacts on the central nervous system resulting in its normal functioning being affected. Indirect effects occur through electric charges building up on the surface of the body producing a microshock on contact with a grounded object, or vice versa, which, depending on the field strength and other exposure factors, can range from barely perceptible to being an annoyance or even painful.	Exposure to electromagnetic fields (EMF) is considered **Section 22.6.3**.

Summary	How and where this is considered in the ES
To prevent these known effects, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) developed health protection guidelines in 1998 for both public and occupational exposure … The reference levels are such that compliance with them will ensure that the basic restrictions are not reached or exceeded. However, exceeding the reference levels does not necessarily mean that the basic restrictions will not be met; this would be a trigger for further investigation into the specific circumstances. For protecting against indirect effects, the ICNIRP 1998 guidelines give an electric field reference of 5kV m-1 for the general public, and keeping electric fields below this level would reduce the occurrence of adverse indirect effects for most individuals to acceptable levels. When this level is exceeded, there is a suite of measures that may be called upon in particular situations, including provision of information, earthing and screening, alongside limiting the field. In some situations there may be no reasonable way of eliminating indirect effects. The National Institute for Health Protection's (NIHP) Centre for Radiation, Chemical and Environmental Hazards (CRCE) provides advice on standards of protection for exposure to non-ionizing radiation, including the ELF EMFs arising from the transmission and use of electricity. In March 2004, the National Radiological Protection Board (NRPB) (now part of NIHP CRCE), published advice on limiting public exposure to electromagnetic fields. The advice recommended the adoption in the UK of the EMF exposure guidelines published by ICNIRP in 1998. These guidelines also form the basis of the Control of Electromagnetic Fields at Work Regulations 2016. Resulting from these recommendations, Government policy is that exposure of the public should comply with the ICNIRP (1998) guidelines. The electricity industry has agreed to follow this policy. Applications should show evidence of this compliance as specified in 2.10.9 below. The balance of scientific evidence over several decades of research has not proven a causal link between EMFs and cancer or any other disease. The NIHP CRCE keeps under review emerging scientific research and/or studies that may link EMF exposure with various health problems and provides advice to the Department of Health and Social Care on the possible need for introducing further precautionary measures.	

Summary	How and where this is considered in the ES
The Department of Health and Social Care's Medicines and Healthcare Products Regulatory Agency (MHRA) does not consider that transmission line EMFs constitute a significant hazard to the operation of pacemakers. There is little evidence that exposure of crops, farm animals or natural ecosystems to transmission line EMFs has any agriculturally significant consequences.	

22.2.5 Civil Society priority with regard to water safety

23. The National Water Safety Forum seeks to prevent accidental drowning fatalities in the UK by working in partnership to ensure consistent guidance for the safe enjoyment and management of activities in, on and around water (National Water Safety Forum, 2015). The priorities of its National Drowning Prevention Strategy include:

Table 22.7 National Drowning Prevention Strategy 2016-2026

Summary National Drowning Prevention Strategy	How and where this is considered in the ES
• Every community with water risks should have a community-level water safety risk assessment and water safety plan • To better understand water-related self-harm • Increase awareness of everyday risks in, on and around water."	**Sections 22.5.2** and **22.6.2**, examine the construction effects and the operation and maintenance effects, respectively, for Community safety.

22.2.6 Legislation

22.2.6.1 The Health and Safety at Work Act 1974

24. The Health and Safety at Work Act 1974 (HM Government of Great Britain & Northern Ireland, 1974) places duties on employers. Companies have a duty of care to persons in their employment and to persons not in their employment. In both cases, the requirement for the company to reduce risks to As Low As Reasonably Practicable (ALARP) is fundamental and applies to all activities within the scope of the Health and Safety at Work Act 1974.

22.2.6.2 The Control of Major Hazards Regulations 2015

25. The Control of Major Hazards Regulations 2015 relate to the management of threshold quantities of dangerous substances (HM Government of Great Britain & Northern Ireland, 2015).

22.2.6.3 The Health Protection Regulations 2010

26. The Health Protection Regulations 2010 provide local authorities with powers to deal with incidents or emergencies where infection or contamination presents, or could present, a significant risk to human health (HM Government of Great Britain & Northern Ireland, 2010b).

22.2.6.4 The Clean Air Act 1993 and The Air Quality Standards Regulations 2010

27. The Clean Air Act aims to reduce pollution from smoke, grit and dust and gives local authorities powers to designate smoke control areas (HM Government of Great Britain & Northern Ireland, 1993). The Air Quality Standards Regulations 2010 (HM Government of Great Britain & Northern Ireland, 2010a) transpose into English law the requirements of Directives 2004/107/EC and 2008/50/EC on ambient air quality (European Parliament and Council of the European Union, 2004, 2008) by the use of the Limit Values and Target Values in the directives.

22.2.6.5 Environmental Protection Act 1990

28. Part III of the Environmental Protection Act 1990 discusses control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance (HM Government of Great Britain & Northern Ireland, 1990).

22.2.6.6 Bathing Water Directive 2006/7/EC and Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended)

29. The revised Bathing Water Directive 2006/7/EC safeguards public health and clean bathing waters (European Parliament and Council of the European Union, 2006). Bathing waters are also protected under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended) (HM Government of Great Britain & Northern Ireland, 2017b) which transpose into English law the requirements of Water Framework Directive 2000/60/EC (European Parliament and Council of the European Union, 2000).

22.2.7 Guidance

30. In demonstrating adherence to industry good practice, this chapter has been compiled in accordance with the following relevant standards and guidance:

- Institute of Environmental Management and Assessment (IEMA) (Cave et al., 2017) Health in Environmental Impact Assessment: a primer for a proportionate approach
- IEMA (Pyper et al., 2022a) Guide to Effective Scoping of Human Health in Environmental Impact Assessment
- IEMA (Pyper et al., 2022b) Guide to Determining Significance For Human Health In Environmental Impact Assessment

- International Association for Impact Assessment and the European Public Health Association (Cave et al., 2020) Human health: ensuring a high level of protection. A reference paper on addressing Human Health in Environmental Impact Assessment as per EU Directive 2011/92/EU amended by 2014/52/EU
- Public Health England (Public Health England, 2020) Health Impact Assessment in spatial planning. A guide for local authority public health and planning teams
- Institute of Public Health in Ireland (Pyper et al., 2021). Health Impact Assessment Guidance: A Manual and Technical Guidance
- IEMA (2016) Environmental Impact Assessment. Guide to Delivering Quality Development

22.2.7.1 Electromagnetic Fields (EMFs)

31. The National Radiological Protection Board (NRPB), in March 2004, provided 'Advice on Limiting Exposure to Electromagnetic Fields (0-300 GHz)' (McKinlay et al., 2004). This replaced previously published advice, which recommended the adoption of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) 'Guidelines for Limits of Exposure to Static magnetic fields' guidance (ICNIRP, 1998).

22.3 Assessment Methodology

22.3.1 Study Area

32. Details of the location of the Onshore Project and the onshore components are set out within **Chapter 5: Project Description.**

33. The human health study area is defined by the distance over which impacts on human health might reasonably be expected from the Onshore Project components (i.e. Landfall, Onshore Export Cable Corridor, Compounds, Access Routes and Onshore Substation) may occur and by the location of any receptors that may be affected by those potential impacts.

34. This has been established using professional judgement and supported by review of baseline information and scientific evidence provided in **Appendix 22A: Baseline Information**. The study areas used in other chapters of the ES are of relevance, but do not necessarily define the boundaries of potential health impacts, including physical and mental health. The heath chapter uses study areas to broadly define representative population groups, relevant to determining sensitivity, rather than to set boundaries on the extent of potential effects. The study area has been divided into the following geographic area classifications:

- Site-specific:
  - Landfall (from MLWS to MHWS)
  - Onshore Export Cable Corridor
  - Onshore substation
  - Transportation route.
- Local: North Devon Council
- Regional: Devon County
- National: England.

35. The Lower Super Output Areas (LSOAs) selected are not intended to indicate the area of effect, but rather the profile of the population potentially affected by Landfall to MLWS, the installation of the Onshore Export Cable Corridor and the Onshore Substation respectively. The representative worst-case is chosen, to ensure that potential effects in other local authorities or across the county will be no greater than those assessed. This has been established using professional judgement and is shown in **Table 22.8**.

Table 22.8 Representative LSOAs for the Landfall (up to MHWS)

Onshore Infrastructure Element	LSOAs crossed by the Onshore Project	Representative LSOAs of Population	Justification
Landfall (from MLWS to MHWS)	North Devon 005B	North Devon 005B	The Landfall (from up to MLWS) is situated in North Devon 005B. This is the only LSOA at Landfall (from up to MLWS). It is in the Index of Multiple Deprivation (IMD) decile 9.*
Onshore Export Cable Corridor	North Devon 005B North Devon 005C North Devon 005D North Devon 005E North Devon 011B North Devon 011D	North Devon 011D	The onshore export cable corridor travels through six LSOAs. Of these, North Devon 011D is in the lowest IMD decile which is decile 5.*
Transportation Route	North Devon 005A North Devon 005B North Devon 005C North Devon 005C North Devon 005D North Devon 005E North Devon 006C North Devon 007A North Devon 009B North Devon 009C North Devon 009D	North Devon 009B	The transportation routes crosses 18 LSOAs. Of these, North Devon 009B is in the lowest IMD decile which is decile 4.*

Onshore Infrastructure Element	LSOAs crossed by the Onshore Project	Representative LSOAs of Population	Justification
	North Devon 011A North Devon 011B North Devon 011C North Devon 011D North Devon 012A North Devon 012B North Devon 012C		
Onshore substation	North Devon 011D	North Devon 011D	The Onshore Substation is sited in one LSOA, North Devon 011D. It is in IMD decile 5.*
*** Decile 1 represents the most deprived and decile 10 represents the least deprived.**			

22.3.2 Population Groups

36. Eleven broadly defined population groups have been identified within the study areas adopted by this ES. The population groups have been defined according to geography and potential vulnerability. The intention of categorizing populations in this way is to allow for consistent discussion across health issues. People falling into more than one group may be especially sensitive.

22.3.2.1 Geographic Population Groups

37. Six geographic population groups have been identified for this assessment. These range in scale from Site-specific to Regional. The geographic population groups align with the study areas in **Section 22.3.1**:

- The population at Landfall to MLWS (Site-specific)
- The population along the Onshore Export Cable Corridor (Site-specific)
- The population at the Onshore substation (Site-specific)
- The population along the Transportation route (Site-specific)
- The population of North Devon (Local)
- The population of Devon (Regional).

38. The most relevant geographic scale is used for each determinant of health. For localised effects this is the Site-specific level, where data availably allows this. For wider more diffuse effects, such as community safety a broader geographic scale is the most appropriate basis for assessment.

22.3.2.2 Vulnerable Population Groups

39. The following six population groups were identified as being particularly vulnerable to different aspects:

- Children and young people
- Older people
- People experiencing social isolation
- People on low income
- People with existing poor health (physical and mental health)
- People indirectly affected by self-harm attempts including family members and acquaintances of people who self-harm and project workers who may be involved in a rescue operation.

40. The role of first responders is acknowledged in dealing with people who attempt to self-harm and the toll a rescue, or a salvage operation, can have on their physical and mental health. Their role is not affected by the Onshore Project, and they are not considered further in this assessment.

22.3.3 Temporal scope

41. **Chapter 2: Need for the Project** states that the anticipated realistic worst-case for duration of the construction of the Onshore Project is 28 months. This allows 18 months for cable installation and 16 months for the White Cross Onshore Substation Construction. The operational phase of the Onshore Project will last for 50 years, and up to 18 months for decommissioning the Onshore Project.

42. The temporal scope has been defined in **Table 22.9**.

Table 22.9 Definitions of Timescales Used Within this Chapter

Timescale	Definition	Example
Very short-term	Effects measured in hours, days or weeks	Effects in the nearshore/intertidal zone due to open cut trenching.
Short-term	Effects measured in months	Effects in the nearshore/intertidal zone due to trenchless technique.
Medium-term	Effects measured in years	Local employment during construction of the Offshore and Onshore Projects.
Long-term	Effects measured in decades	The operational stage

22.3.4 Approach to Assessment

43. **Chapter 6: EIA Methodology** provides a summary of the general impact assessment methodology applied to the Onshore Project. The following sections outline the methodology used to assess the potential effects on human health.

44. The assessment approach uses the 'source-pathway-receptor' model. The model identifies likely environmental effects on human health for the general population and for vulnerable groups. In EIA terms these are the receptors. The

likely effects are identified from the following stages of the Project: construction, operation and maintenance, and decommissioning. This process provides an easy to follow assessment route between impact sources and potentially sensitive receptors, ensuring a transparent impact assessment.

- Source – the origin of a potential impact (noting that one source may have several pathways and receptors) e.g. an activity such as cable installation and a resultant effect such as trenching across a recreational route
- Pathway – the means by which the effect of the activity could impact a receptor e.g. for the example above, people's understanding of change in the usability of the recreational route
- Receptor – the population that is affected e.g. for the above example, people who use the recreational routes and who may reduce their levels of outdoor recreation.

45. For each impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of effect on given receptors.

46. The following key terms have been used in this assessment:

- Impact – used to describe a change via the Onshore Project
- Receptor – used to define the environment being exposed to the Impact
- Effect – the consequence of an Impact combining with a Receptor, defined in terms of Significance (exact significance dependant on magnitude of impact and the sensitivity of the receptor)
- Adverse effect – an alteration of the existing environment with negative implications for the affected receptor
- Beneficial effect – an alteration of the existing environment with positive implications for the affected receptor
- Mitigation – measures incorporated as part of the Onshore Project design in order to either avoid or reduce adverse effects, or to enhance beneficial effects.
- Residual effect – the effects remaining once all mitigation measures have been taken into consideration

47. This section outlines the methodology used for the identification and assessment of any likely significant effects by the Onshore Project on human health, as is required by the Town and Country Planning (Environmental Impact Assessment) Regulations (HM Government of Great Britain & Northern Ireland, 2017a).

48. The methods identify effects that either provide, or fail to provide, a high level of protection to human health. This includes reasoned conclusions in relation to health protection, health improvement and/or improving services.

49. A framework is presented to determine the 'likelihood' of a project having an effect on health, and the 'significance' of an effect in terms of the EIA Regulations. Effects are considered with regard to the general population and vulnerable groups.

50. The methodology in this chapter follows the best practice by Institute of Environmental Management and Assessment (IEMA) (Cave et al., 2017, Pyper et al., 2022a, Pyper et al., 2022b), IAIA & EUPHA (Cave et al., 2020), PHE (2020) and IPH (Pyper et al., 2021). A population health approach has been used, as it would be disproportionate to reach conclusions on the potential health outcomes of individuals. To take account of potential inequalities, where appropriate, conclusions on a particular health issue are presented for:

- the general population (or for a defined area)
- a second separate sub-population conclusion for relevant vulnerable group (as a single defined class of sensitivities for that issue)

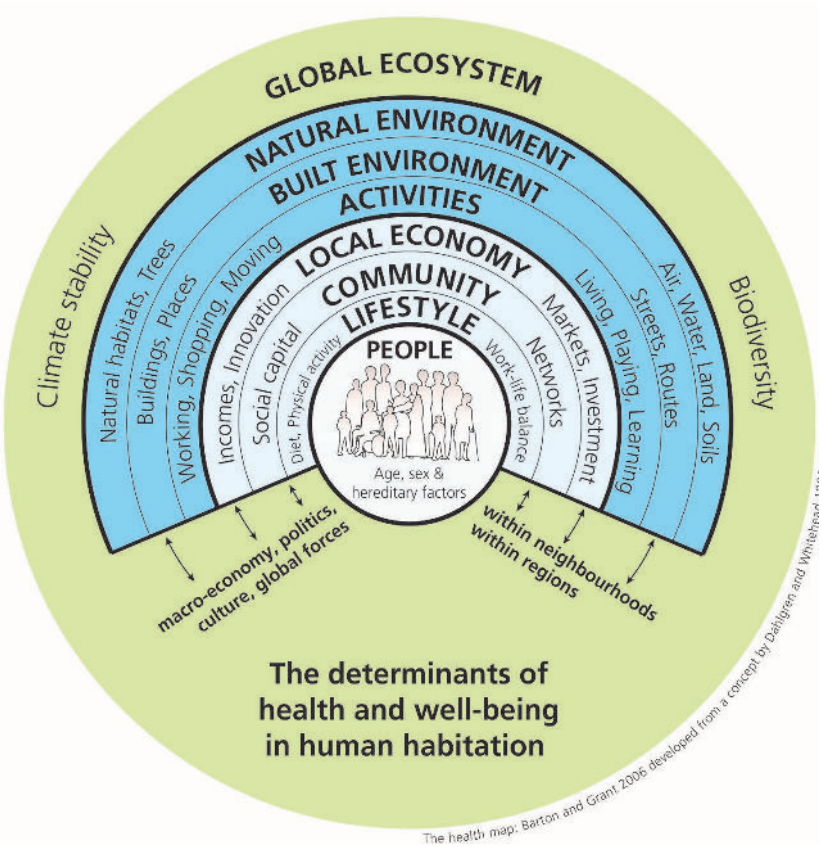
51. In the terminology of EIA, these populations are the receptors upon which the effects of the impacts are being assessed.

22.3.4.1 Health determinants

52. This chapter adopts the 'determinants of health' model, illustrated in **Plate 22.1** which shows how human health is affected by, and in turn affects, environmental, social, behavioural, economic and institutional factors. This is in line with Public Health England's Health Impact Assessment (HIA) guidance (Public Health England, 2020) and with the World Health Organization's definition of health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (World Health Organization, 1946). This encompasses physical and mental health.

53. Changes in determinants have the potential to cause beneficial or adverse effects on health outcomes, either directly or indirectly. Change in a determinant of health are experienced differently by different population groups. As noted above, the assessment considers inequalities in health.

Plate 22.1 Wider determinants of public health



Source: based on the Dahlgren and Whitehead (1991) diagram as amended by Barton and Grant (2006).

54. This assessment uses the following categories for the determinants of health (from Pyper et al., 2022a):

- Health related behaviours
- Social environment
- Economic environment
- Bio-physical environment
- Institutional and built environment

22.3.4.2 Likelihood

55. The likelihood of a project having an effect is the first issue to consider as part of an assessment. A likely effect should be both probable and plausible:

- Plausible means there is a relevant source, pathway and receptor. Plausible effects relate to whether a causal relationship is adequately supported by the scientific literature
- Probable relates to a qualitative judgement to exclude those effects that could only occur under certain very rare conditions, except where these relate to the

Onshore Project's vulnerability to major accidents or disasters (as required by regulation 5(4) of the EIA Regulations 2017).

56. Likelihood considers the strength of evidence for there to be a source-pathway-receptor linkage in the particular circumstance of the Onshore Project. Source, pathway and receptor are defined as follows:

- A 'source' represents the features of the Onshore Project from which change originates (i.e. facility, structure, process, activity, vehicle fleet or workforce) and could lead to health outcomes of a receptor population
- A 'pathway' describes the method or route by which the 'source' could affect the 'receptor' (either causation or association)
- A 'receptor' is the recipient of an effect from the 'source', via the 'pathway'.

57. **Table 22.10** presents the 'Source-Pathway-Receptor' criteria, based on the definitions above, and shows how they identify plausible health effects.

Table 22.10 The 'Source-Pathway-Receptor' Model Used to Identify Plausible Health Effects

Source	Pathway	Receptor	Is there a plausible effect?	Justification
✓	✓	×	No	No receptors which would be sensitive and vulnerable are present.
✓	×	✓	No	There is no means of transmission from the source to a population.
×	✓	✓	No	There is no source from which a potential effect could instigate.
✓	✓	✓	Yes	Identifying a source, pathway and receptor does not mean a health impact is a likely significant effect. The particular circumstance of the Onshore Project should also be considered, as should the potential significance of the effect.

From: Cave et al. (2017)

22.3.4.3 Definitions of magnitude of impact

58. For each of the impacts assessed in this Environmental Statement, a magnitude has been assigned. In doing so the spatial extent, duration, frequency and reversibility of the impact from the construction, operation and maintenance, or decommissioning phase of the Onshore Project have been considered, where applicable.

Table 22.11 Definition of terms relating to magnitude of an impact

Category/Score	Indicative criteria*
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.
*** Judgment based on most relevant criteria. It is likely in any given analysis that some criteria will span score categories).**	

From IPH (Pyper et al., 2021) and IEMA (Pyper et al., 2022b)

59. Where the assessment identifies that there is no loss or alteration of characteristics, features or elements, or no observable impact in either direction upon a given receptor or group of receptors from an Impact, for example due to implication of embedded mitigation or through an assessment of the potential pathway, then the assessment for that Impact upon those receptor(s) will be **No Change**.

60. Impacts assessed as **No Change** have no potential for a significance of effect and therefore are not assessed further.

22.3.4.4 Definitions of receptor sensitivity/value

61. The terms used to define sensitivity are outlined in **Table 22.12**.

Table 22.12 Definition of terms relating to receptor sensitivity

Category/Score	Indicative criteria
High	High levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	Moderate levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a

Category/Score	Indicative criteria
	community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	Low levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Negligible	Very low levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.
* Judgment based on most relevant criteria. It is likely in any given analysis that some criteria will span score categories.	

From IPH (Pyper et al., 2021) and IEMA (Pyper et al., 2022b)

22.3.4.5 General population and vulnerable populations

62. The following characteristics of how the 'general population' may differ from 'vulnerable group population' was considered when scoring sensitivity. These statements are not duplicated in each assessment and apply (as relevant) to the issues discussed for the Construction, Operation and Maintenance and Decommissioning phases.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant
- The general population can be characterised as experiencing low deprivation. However, the professional judgment is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas)
- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot

- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high, whilst the vulnerable group population can be characterised as having limited resilience
- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Onshore Project. For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources.

63. Following guidance from IAIA/EUPHA (Cave et al., 2020) and IPH (Pyper et al., 2021), the EIA human health assessment is a qualitative analysis which draws on qualitative and quantitative inputs from other EIA topic chapters. This is the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

64. The EIA health chapter conclusions comprise of EIA scores, such as major, moderate, minor or negligible. A narrative explaining this score with reference to evidence, local context and any inequalities is also provided.

22.3.4.6 Significance of effect

65. The potential significance of an effect for a given impact, is a function of the sensitivity of the receptor and the magnitude of the impact (see **Chapter 6: EIA Methodology** for further details). A matrix is used (**Table 22.13**) as a framework to determine the significance of an effect. Definitions of each level of significance are provided in **Table 22.13**. Impacts and effects may be deemed as being either positive (beneficial) or negative (adverse).

66. In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

Table 22.13 Significance of an effect - resulting from each combination of receptor sensitivity and the magnitude of the impact upon it

		Negative Magnitude				Beneficial Magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Minor	Minor	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

67. Where the matrix offers more than one significance option, professional judgement is used to decide which option is most appropriate. This is based on

recent guidance and can be applied consistently to all determinants of health. **Table 22.11** and **Table 22.12** guide the narrative conclusions. Considering the sensitivity of the receptor and the magnitude of the impact is consistent with other EIA topics. Other information sources also inform any professional judgement on significance to enable a reasoned and robust conclusion on population health. These are:

- scientific literature
- baseline conditions
- health priorities
- consultation responses
- regulatory standards
- policy context

68. The professional judgement on significance with respect to human health thus follows the European Commission definition of EIA significance that:

> *"the assessment of significance relies on informed experts' judgements about what is important, desirable or acceptable with regards to changes triggered by the Project in question. These judgements are relative and must always be understood in their context …" (European Commission, 2017: 42).*

Table 22.14 Health Significance Methodology Criteria

Category/Level	Indicative criteria (judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories)
Major (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to the project, have a substantial effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity levels), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show consensus on the importance of the effect • Change, due to the project, could result in a regulatory threshold or statutory standard being crossed (if applicable) • There is likely to be a substantial change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a causal relationship between changes that would result from the project and changes to health outcomes • In addition, health priorities for the relevant study area are of specific relevance to the determinant of health or population group affected by the project.

Category/Level	Indicative criteria (judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories)
Moderate (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to the project, have an influential effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show mixed views • Change, due to the project, could result in a regulatory threshold or statutory standard being approached (if applicable) • There is likely to be a small change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a clear relationship between changes that would result from the project and changes to health outcomes • In addition, health priorities for the relevant study area are of general relevance to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to the project, have a marginal effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that no relevant consultation themes emerge among stakeholders • Change, due to the project, would be well within a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable) • There is likely to be a slight change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a suggestive relationship between changes that would result from the project and changes to health outcomes • In addition, health priorities for the relevant study area are of low relevance to the determinant of health or population group affected by the project.
Negligible (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to the project, are not related to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having no responses on this issue among stakeholders • Change, due to the project, would not affect a regulatory threshold, statutory standard or guideline (if applicable)

Category/Level	Indicative criteria (judgement based on most relevant criteria, it is likely in any given analysis that some criteria will span categories)
	• There is likely to be a very limited change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an unsupported relationship between changes that would result from the project and changes to health outcomes • In addition, health priorities for the relevant study area are not relevant to the determinant of health or population group affected by the project.

From IPH (Pyper et al., 2021) and IEMA (Pyper et al., 2022b)

69. The assessment provides reasoned conclusions for the professional judgement as to whether in EIA terms an effect is significant, or not. Where appropriate, variation expressed in each evidence source has been reported. This approach is considered proportionate and in line with best practice for the consideration of human health in EIA.

70. Potential effects are described, followed by a statement of whether the effect is significant in terms of the EIA regulations. Potential effects identified within the assessment as major or moderate are regarded as significant in terms of the EIA regulations. Whilst minor effects (or below) are not significant in EIA terms in their own right, it is important to distinguish these, as they may contribute to significant effects cumulatively or through interactions.

71. Following initial assessment, if the effect does not require additional mitigation (or none is possible), the residual effect will remain the same. If, however, additional mitigation is proposed, there will be an assessment of the post-mitigation residual effect.

72. The residual effects represent the output of iterative assessment, and they include consideration of the mitigation measures.

73. The health assessment takes as its starting point the residual effects as assessed and determined in other relevant EIA topic chapters. This takes account of the relevant embedded and standard good practice mitigation.

22.3.5 Worst-Case Scenario

74. In accordance with the assessment approach to the 'Rochdale Envelope' set out in **Chapter 6: EIA Methodology**, the impact assessment for human health has been undertaken based on a realistic worst-case scenario of predicted impacts. The Project Design Envelope (PDE) for the Onshore Project is detailed in **Chapter 5: Project Description**.

75. Using the project design envelope approach means that receptor-specific potential effects draw on the options from within the wider envelope that represent the most realistic worst-case-scenario. It is also worth noting that under this approach the combination of project options constituting the realistic worst-case scenario may differ from one receptor to another and from one effect to another.

76. **Table 22.15** presents the realistic worst-case scenario considered for the assessment of human health.

Table 22.15 Definition of realistic worst-case scenario details relevant to the assessment of impacts in relation to human health

Impact	Realistic worst-case scenario	Rationale
Construction		
Restriction, or disruption, of access to nearshore/ intertidal zone at Landfall (up to MLWS).	Landfall constructed using open cut trenching on the beach. Maximum temporary works duration construction activities will take a maximum of 30 days and from MHWS to MLWS will require 1 x 24hr continuous working period.	Health and safety requirements will impede access to nearshore/ intertidal zone. Disruption from the single period of 24-hour working.
	Landfall to MLWS constructed using trenchless technology such as HDD. Maximum temporary works duration: 10 days mobilisation, 80 days drilling, 10 days de-mobilisation.	Disruption due to health and safety requirements will impede access to nearshore/ intertidal zone during the sub-tidal trenchless exit activity (which will take place during the 80-day work programme).
	Vehicle and plant access requirements	Health and safety requirements will impede access to nearshore/ intertidal zone
Minimal engagement of Project workforce with beach users at Saunton Sands	Member of public attempts to self-harm in water at Saunton Sands.	Include all scenarios in engaging with the public for safety of workforce and protection of the public.
Restriction, or disruption, of access to recreational routes due to construction of Onshore Export Cable Corridor	The parameters for the Onshore Export Cable Corridor are as follows • Construction corridor width: 30m	Disruption due to health and safety requirements will impede access to recreational routes. Disruption from the 18-month period of working along the route of the

Impact	Realistic worst-case scenario	Rationale
	• Construction corridor width at pinch points: 12m • Construction corridor width at trenchless crossings: 15m • Corridor length: 6km • Number of trenches: 2 • Cable trench width: 3m • Cable trench approximate depth: 1.9m • Approximate depth to top of duct / tile: 1.2m • Number of jointing bays: 30 • Jointing bay construction dimensions: 12 (l) x 4 (w) x 1.5m (h) • No. of link box locations: 30 • Link box construction dimensions: 2(h) x 3(w) x 3m (l) • Indicative HDD depth: 1.2m • HDD compound dimensions: 2,500m^2 • Access routes: 1 main access • Haul road: 6.5km in length, 5m width • Main construction compound: 2,500m^2 (50 x 50m) • Secondary construction compounds: 1,800m^2 (three compounds each 20 x 30m)	Onshore Export Cable Corridor.

Impact	Realistic worst-case scenario	Rationale
	• Material storage areas: yet to be determined • Duration: 18 months	
Restriction, or disruption, of access to recreational routes due to construction of Onshore Substation	The parameters for the Onshore Substation are as follows • Access road length: 250m • Access road width: 7.5m • Construction compound area: 5,000m^2 • Total construction area: • Duration: 16 months	Disruption due to health and safety requirements will impede access to recreational routes. Disruption from the 16-month period of work.
Operation and Maintenance		
Restriction, or disruption, of access to recreational routes due to maintenance of Onshore Export Cable Corridor	The works will be limited and will mainly consist of an occasional visit/inspection of the cable route by two engineers with no need for any closures or restrictions of access to green/blue infrastructure.	Disruption due to health and safety requirements will impede access to recreational routes
Restriction, or disruption, of access to recreational routes due to maintenance of Onshore Substation		
Decommissioning		
	The decommissioning policy for the Onshore Project infrastructure is not yet defined however it is anticipated that some infrastructure would be removed, reused or recycled; other infrastructure could be left in situ. The following infrastructure is likely be removed, reused, or recycled where practicable: • Onshore substation • Export Cables.	The detail and scope of the decommissioning works will be determined by the relevant legislation and guidance at the time. Decommissioning arrangements will be detailed in a Decommissioning Plan, which will be drawn up and agreed with the relevant consenting body/stakeholder prior to decommissioning. For the purposes of the worst-case scenario, it is

Impact	Realistic worst-case scenario	Rationale
	The following infrastructure is likely to be decommissioned and could be left in situ depending on available information at the time of decommissioning: • Transition joint bays • Cable joint bays • Cable ducting	anticipated that the impacts will be comparable to those identified for the construction phase.

22.3.6 Summary of Mitigation

77. This section outlines the mitigation relevant to the human health assessment, which has been incorporated into the design of the Onshore Project. Further information is detailed in **Chapter 5: Project Description**.

22.3.6.1 Embedded Mitigation

78. The embedded mitigation measures are those defined in the IEMA guidance as either primary or tertiary mitigation. Those measures relevant to the human health assessment are summarised in **Table 22.16**.

79. As these measures have been embedded the assessment of effects is undertaken on the basis that these forms of mitigation will definitely be delivered. Therefore, any effects that might have arisen without these forms of mitigation do not need to be identified as 'potential effects', as there should be no potential for them to arise.

Table 22.16 Embedded mitigation measures relevant to the human health assessment

Component/Activity	Mitigation embedded into the design of the Onshore Project
Strategic approach to delivering White Cross	The Onshore Project has been defined following an extensive site selection process, which has accounted for environmental, engineering, planning and land requirements to identify an optimal project location. The site selection process is described in detail in **Chapter 4: Site Selection and Assessment of Alternatives (Volume I)**.
Electromagnetic Fields (EMF)	Embedded design for EMF comprises the shielding part of the cable which is designed to the ICNIRP guidelines (2010, 2010). Embedded mitigation through the burial of cables, as EMF decreases rapidly with distance and by burying the cables,

Component/Activity	Mitigation embedded into the design of the Onshore Project
	eliminates the magnetic field and creates distance between any receptor at the surface (even directly above the cables).
Communication and engagement	Communication and engagement activities to ensure that visitors to Saunton Sands, and to the recreational routes, are aware of the timing and extent of construction and/or operation and maintenance activities in the nearshore/intertidal zone.
Access	The Outline Construction Traffic Management Plan (OCTMP) (**Appendix 19.B: Outline Construction Traffic Management Plan**) includes a commitment to undertaking any road works outside of the summer as well as specifying routes of travel for the construction traffic. Maintaining access to Saunton Sands, and to the recreational routes, during construction and/or operation and maintenance – no closures.
Health and safety requirements	Apply health and safety requirements proportionately: for example, balance the need to protect the public from accessing construction and/or operation and maintenance works with the need to maintain access to Saunton Sands and to the recreational routes.
Construction Environmental Management Plan (CEMP)	Measures set out in the CEMP that limit and manage the timing of construction and/or operation and maintenance activities.

26.1.1.1 Additional Mitigation

80. In addition to the embedded mitigation measures as outlined above, the Applicant has also committed to the following further mitigation measures summarised in **Table 22.17**. These are those identified within the IEMA guidance as secondary mitigation, and includes measures identified where potentially significant effects have been assessed.

Table 22.17 Additional mitigation measures relevant to the human health assessment

Component/Activity	Additional Mitigation
Protective and preventative measures for the protection of public health	Take protective and preventative measures for the protection of public health: increase capacity for human intervention if people are attempting or considering self-harm and provide signs and resources. For example, support local initiatives for non-health staff and members of the public to train and/or

Component/Activity	Additional Mitigation
	raise awareness about self-harm; provide signs with information about sources of help.

22.3.7 Baseline Data Sources

22.3.7.1 Desktop Study

81. A desk study was undertaken to obtain information on human health. Data were acquired within the study area through a detailed desktop review of existing studies and datasets.

82. Existing baseline statistics were obtained from publicly available data, such as from the Office of National Statistics (ONS) and Public Health England (PHE) and other publicly available sources, to provide information on population health (both general and vulnerable groups) in the study area. These are set out in **Appendix 22.A: Baseline Information**.

83. The sources of information presented in **Table 22.18** were consulted to inform the human health assessment.

Table 22.18 Data sources used to inform the human health assessment

Source	Summary
Scientific literature	A summary of scientific evidence of the relation between blue space and health (see **Appendix 22.A: Baseline Information**).
Baseline statistics	The following sources have been used: • Public Health Outcomes Framework (DoH, 2021) • Public Health England Local Authority Profile (PHE, 2019) • Office for National Statistics (ONS, no date) • Census 2011 and 2021, provided through Nomis* • Index of Multiple Deprivation (IMD) (MHCLG) • WAID (2021) • Devon Joint Strategic Needs Assessment (Devon County Council, no date)
Health priorities	• Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019)

Source	Summary
	• Devon Joint Strategic Needs Assessment (Devon County Council, no date) • Devon Suicide Prevention Action Plan 2021-2022 (Public Health Devon and Devon County Council, no date) • National Water Safety Forum (2015)
Project specific consultation responses	MMO Scoping Opinion relating to human health.
Policy context	• National Policy Statement (NPS) for Energy (EN-1), NPS for Renewable Energy Infrastructure (EN-3) and for Electricity Networks Infrastructure (EN-5) (BEIS, 2021b, BEIS, 2021a, Department of Energy Security and Net Zero, 2023) • Power Lines: Demonstrating compliance with EMF public exposure guidelines. A voluntary Code of Practice (DECC, 2012) • National Planning Policy Framework (NPPF) (Ministry of Housing, 2021) • North Devon and Torridge Local Plan (Torridge District Council and North Devon District Council, 2018) • North Devon Coast AONB Management Plan 2019-2024 (North Devon Coast AONB, 2019)
ES chapters	• Chapter 2: Need for the Project. • Chapter 12: Ground Conditions and Contamination • Chapter 13: Air Quality • Chapter 18: Noise and Vibration • Chapter 19: Traffic and Transport • Chapter 21: Socio-Economics (including Tourism and Recreation) • Chapter 23: Climate Change
* Nomis is a service provided by the Office for National Statistics (ONS). Nomis publishes statistics related to population, society and the labour market at national, regional and local levels. These include data from current and previous censuses **(Nomis, no date-k)**.	

22.3.8 Data Limitations

84. The key data limitations with the baseline data and their ability to materially influence the outcome of the EIA are

- lags in the release of publicly available statistics
- the effects of the COVID19 pandemic on longer-term trends
- applying scientific evidence from peer-reviewed literature to this specific Project.

85. Data from official statistical sources, such as the surveys carried out by the Office for National Statistics (ONS), are generally published with a lag of between one and two years. The Nomis local area reports are based on Census 2011 and so while based on the latest available data the local area reports may not reflect current status.

86. The COVID19 pandemic required social distancing and other non-pharmaceutical interventions (NPIs) to prevent and to control SARS-CoV-2 transmission in the community. This affected, and continues to affect, longer-term trends in health and health inequalities. This assessment specifies the source and timeframe for the data, and it provides context for the local data by including a national comparator.

87. Scientific evidence on health determinants was reviewed to inform this assessment. The review is not exhaustive and provides a summary of the key issues relevant to this Project and to the scope of this chapter. This review is provided in **Appendix 22.A: Baseline Information**.

88. None of the assumptions and limitations listed above is likely to affect the overall assessment of effects from the Construction, Operation and Maintenance and Decommissioning phases of the Onshore Project.

22.3.9 Scope

89. The scope has been finalised with consideration of the baseline environment, the project description outlined in **Chapter 5: Project Description** and the Scoping Opinion. Potential impacts upon human health that are "Scoped in" are shown in **Table 22.19**. The impacts that are "Scoped out" are presented, together with a justification for why they are not considered further, in, **Table 22.20**. The scope of the assessment of the Onshore Project has been presented to, and discussed with, Devon County Council.

Table 22.19 Summary of impacts scoped in relating to human health

Potential Impact	Justification
Open space, leisure and play (access) [Social environment]	Onshore Project activities will have an impact on people's access to the nearshore/intertidal zone and to existing Public Rights of Way (PRoWs), cycleways and bridleways. This can be through the actual Project activities, and it can be through people's understanding of the Onshore Project activities, for example assuming that construction activities have closed access to the beach. This includes consideration of the quality of the environment and of the ways in which people connect with nature. This is considered for the Construction phase and for the Operation and Maintenance phase.
Community Safety [Institutional and Built Environment]	The Onshore Project activities at Landfall to MLWS have the potential to contribute to community safety at Saunton Sands and to averting water-related injuries and fatalities through self-harm. This is considered for the Construction phase and for the Operation and Maintenance phase.
Journey times [Social environment]	The short-term and temporary increases in traffic are not expected to result in measurable increases in severance/connectivity. Construction traffic (and drivers) will be required, through their employers, to provide increased levels of consideration to local road users be they pedestrians, cyclists, equestrians, or vehicles. The Traffic and Transport topic considers local impacts on specific roads and junctions and incorporates any relevant mitigation measures to ensure improved road safety during construction. Results from the Traffic and Transport topic are reported in this human health chapter.
Electro-magnetic fields (EMF) [Bio-physical Environment]	Project electrical infrastructure will be built to comply with current standards, and it will be buried. There is also little scientific evidence linking EMF exposure to adverse health effects. This is indicated in many recent infrastructure projects and the application decisions. Information on EMF is presented in this human health chapter.
Emissions to air [Bio-physical Environment]	The scale of air quality impacts from the installation of the Landfall (from MLWS) and the Onshore Export Cable Corridor and the construction of the Onshore Substation during the Construction phase are negligible. In the worst case, there will be temporary disturbance. There are no planned disturbance works during the Operation and Maintenance phase and traffic volumes from the Onshore Project will be low, intermittent and for monitoring purposes only. There is high variability in the levels of traffic across the Local study area due to tourism and recreation and no measurable impact on air quality, from the Onshore Project, is identified. No significant health effect is likely during the Construction and the Operation and Management phases, and this is therefore scoped out from further assessment in this chapter.

Potential Impact	Justification
	Results from the Air Quality topic are reported in this human health chapter.
Noise [Bio-physical Environment]	The scale of noise impacts from installation of Landfall (from MLWS) and the Onshore Export Cable Corridor during the Construction phase is negligible for open cut trenching and low for a trenchless technique such as HDD. In the worst case, there will be temporary disturbance. The scale of noise impacts from the construction of the Onshore Substation during the Construction phase is negligible. In the worst case, there will be temporary disturbance. There are no planned disturbance works during the Operation and Maintenance phase, and traffic volumes from the Onshore Project will be low, intermittent and for monitoring purposes only. There is high variability in the levels of traffic across the Local study area due to tourism and recreation and no measurable impact, from the Onshore Project, on noise is identified. No significant health effect is likely during the Construction and the Operation and Management phases, and this is therefore scoped out from further assessment in this chapter. Results from the Noise topic are reported in this human health chapter.
Wider societal infrastructure and resources [Institutional and built environment]	There are potential gains to wider societal infrastructure and resources as a result of the Operation and Maintenance phase of the Offshore and Onshore Project. The benefits to human health are assessed in this chapter.
Cumulative effects	The intra-Project cumulative effects are considered.

Table 22.20 Summary of impacts scoped out relating to human health

Potential Impact	Justification
Water quality Ingestion of contaminants [Bio-physical Environment]	**Chapter 14: Water Resources and Flood Risk** considers risks to coastal waters and fluvial watercourses. The risks to coastal waters were scoped out of the Offshore Human Health chapter as any accidental release of pollutants in the intertidal zone would disperse and pose no danger to human health. IEMA Guidance (Pyper et al., 2022a) states that if "it is very likely that any pollutant linkage pathways would be broken by normal good practice mitigation, provide clear text that the findings of the EIA water chapter will be kept under review and will be scoped into the health chapter if there are significant effects to the water environment that relate to human receptors, drinking or bathing water". Embedded mitigation to reduce any potential impact on water quality is set out in **Chapter 14: Water Resources and Flood Risk** section 14.3.4 while further mitigation is set out in **Section 14.5** and **14.6**. The findings of the EIA water chapter have been kept under review. This topic has not been scoped into the health chapter as there are no significant effects to the water environment that relate to human receptors, drinking or bathing water.
Employment opportunities [Economic environment]	The Project will increase employment opportunities across the Region during the Construction and the Operation and Management phases. This will be a short-term and positive, but it will be across a wide scale and so its effect will be negligible. Due to the limited benefit on the Local population this impact is scoped out from further assessment in this chapter.
Influx of non-resident workforce (and loss of or increased pressure on existing health, education, recreation, or other community infrastructure or public services) [Institutional and built environment]	The Construction phase is short-term, and the Operation and Maintenance phase will require only an intermittent presence of workforce. In each phase, the workforce will be transient, and the study area experiences extensive annual tourism so the scale of any potential change would be negligible. This impact is scoped out from further assessment in this chapter.
Visual disturbance [Social environment]	The construction works associated with the installation at Landfall to MLWS and the Onshore Export Cable Corridor and the Onshore Substation will result in short-term and temporary visual disturbance and presence of workers and associated plant and machinery.

Potential Impact	Justification
	No significant health effect is likely, and this is therefore scoped out from further assessment. The Landscape and Visual topic considers any relevant mitigation measures to prevent significant localised visual impacts arising
Transboundary impacts	Given the localised nature of the work, impacts on human health will not extend outside the Local study area. Transboundary impacts are scoped out from further assessment in this chapter.

22.3.10 Consultation

90. Consultation has been a key part of the development of the Onshore Project. An overview of the project consultation process is presented within **Chapter 7: Consultation**. A summary of the key issues raised during consultation specific to human health is outlined below in **Table 22.21**, together with how these issues have been considered in the production of this ES.

Table 22.21 Consultation responses

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
MMO	Scoping Opinion	In paragraph 78, section 4.2.11, the MMO states that it supports the Applicant's Scoping Report, noting that it includes assessment of the potential impacts on air, land, water and traffic as well as the impacts on human health; that the assessment proposals appear to be in line with current UK practice and guidance; and that it considers Section 4.3 of the Scoping Report to demonstrate that a comprehensive assessment around determinants and impacts on human health will be carried out (paragraph 78).	Results from **Chapter 13: Air Quality** are reported in **Section 22.5.4**. Results from **Chapter 18: Noise and Vibration** are reported in **Section 22.5.3.** **Chapter 14: Water Resources and Flood Risk** has been kept under review. Significant adverse effects are not found and so this topic has not been assessed for impacts on human health. Results from **Chapter 19: Traffic and Transport** are reported in **Section 22.5.5**. The assessment of human health uses the determinants of health (**Section 22.3.4.1**). Open space, leisure and play (access) are considered in **Section 22.5.1** and **22.6.1** of this chapter. **Sections 22.5.2** and **22.6.2**, consider Community safety.
MMO	Scoping Opinion	The MMO recommends that in considering any impacts listed in the Scoping Report (section 4.3), that these should be in view of	The cumulative effects of socio-economic impacts, climate impacts and health

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
		wider implications on human health under socio-economic impacts and climate impacts (section 4.2 and 4.4, respectively)) (paragraph 78).	are considered in **Section 22.8**.
MMO	Scoping Opinion	The MMO states that the section [on human health] must summarise key information, risk assessments, proposed mitigation measures, conclusions and residual effects, relating to human health (paragraph 79).	This is replicated in the structure of this chapter.
MMO	Scoping Opinion	MMO scopes out 'Ingestion of contaminants' during operation (paragraph 8.2.7).	Ingestion of contaminants has been scoped out of the Onshore Environmental Statement (see **Table 22.20**).).
MMO	Scoping Opinion	The MMO recommends that consideration is given to measures that help people to better access the countryside for quiet enjoyment and opportunities to connect with nature (paragraph 8.2.12).	The impact of the Onshore Project on Open space, leisure and play (access) are considered in **Section 22.5.1** and **22.6.1** of this chapter.
MMO	Scoping Opinion	The MMO recommends that consideration is given to the contribution the development could make to relevant local environmental initiatives and priorities to enhance the environmental quality of the development and deliver wider environmental gains (paragraph 8.2.13).	The impact of the Onshore Project on Open space, leisure and play (access) are considered in **Section 22.5.1** and **22.6.1** of this chapter.
MMO	Scoping Opinion	The MMO sets out matters to "Scope In" and to "Scope Out" of the assessment (Section 8.2).	Potential impacts upon human health that are "Scoped in" are shown in **Table 22.19**. The impacts that are "Scoped out" are presented, together with a justification for why they are not considered further, in **Table 22.20**.

Consultee	Date, Document, Forum	Comment	Where addressed in the ES
Devon County Council	ETG	Construction traffic and traffic management including effects on tourist population	Construction traffic and driver delay is considered in **Chapter 19: Traffic and Transport** and in **Section 22.5.5**.
Devon County Council	ETG	Location of Onshore Substation and effect on Tarka Trail	The location of the Onshore Substation is provided in **Chapter 5: Project Description** and its effect on the Tarka Trail is considered in **Section 22.5.1** and in **Chapter 15: Land Use**.
Devon County Council	ETG	Composition of workforce and possible requirement for translation services	The workforce is considered in **Chapter 21: Socio-economics, Tourism and Recreation**. It is considered that translation services will not be required.
Devon County Council	ETG	Gain from the Project for the local area	The effects on local employment are considered in **Chapter 21: Socio-economics, Tourism and Recreation**. Potential gain with regard to the use of a renewable energy source is considered in **Section 22.6.4.**
Devon County Council	ETG	Presentation of EMF and importance of communications and engagement.	Exposure to EMF and the role of communications and engagement is considered in **Section 22.6.3.**
Devon County Council	ETG	Particulate matter during construction	Particulate matter during construction is considered in **Section 22.5.4** and in **Chapter 13: Air quality**.
Devon County Council	ETG	Visibility of turbines at night	The visual impact of the turbines is considered in **Chapter 20: Onshore Landscape and Visual Amenity**.

22.4 Existing Environment

91. This section describes the existing environment in relation to human health associated with the White Cross study area. It has been informed by a review of the sources listed in **Table 22.18**. Additional information can be found in **Appendix 22.A: Baseline Information.**

22.4.1 Current baseline

92. The baseline for population health that is relevant for impacts associated with the Onshore Project is provided below. It has been informed by a review of the sources listed in **Table 22.18**. The information used in this profile is provided in the references cited and in **Appendix 22.A: Baseline Information**.

93. The area where Landfall to MLWS occurs, through which the Onshore Export Cable Corridor runs, and where the Onshore Substation will be sited is rural. Data for the LSOA in which Landfall to MLWS occurs (North Devon 005B) is used (see **Table 22.8**). The representative LSOA for the Onshore Export Cable Corridor and the Onshore Substation is North Devon 011D. The representative LSOA for the transportation route is North Devon 009B. Data for North Devon, Devon and England are also reported.

22.4.1.1 Health and wellbeing

22.4.1.1.1 Population change

94. The projected population change for North Devon (100.8% i.e. a growth of 0.8 of a percentage point) between 2019 and 2029 is higher than the England National average (100.6% i.e. a growth of 0.8 of a percentage point) over the same time period (ONS, no date). The population of Devon county is approximately 800,000: it has an older population profile than England and population growth above the national average, influenced by the inward migration of people aged 40 to 75 (Devon Health and Wellbeing Board, 2019). In 2019, the population of Devon County was predicted to grow by 88,000 (11%) over the following 20 years, with low growth in under 65s (2%), with considerable growth in the older population (94% increase in people aged 85 and over) (Devon Health and Wellbeing Board, 2019). Between 2011 and 2021, the number of people aged 65 to 74 years rose by around 2,300 (an increase of 20.9%), while the number of residents between 35 and 49 years fell by around 2,100 (11.7% decrease) (ONS, 2023).

95. In 2011, LSOAs 005B and 011D had a higher percentage of retirement-aged people (65+) (25.9% and 29.4% respectively) when compared with North Devon local authority area (22.2%), Devon County (22.5%) and with the national UK average

(18.5%) (Nomis, no date-e, Nomis, no date-c, Nomis, no date-j, Nomis, no date-f). Figures from the 2021 Census from district to national level show that the percentage of people in the 0-19 and 20-64 age groups continues to be lower than the national averages in both LSOA 005B and 011D. The percentage of people in the older age group (65+) is higher in both LSOA 005B (31.6%) and 011D (35.3%) compared to the national average (18.4%) (see **Table 22.22**).

Table 22.22 Age profile: 2011 and 2021

Age structure	North Devon	Devon	England
2011			
Age 0 to 19	22.1%	21.4%	24.0%
Age 20 to 64	55.7%	56.0%	59.7%
Age 65 and over	22.2%	22.6%	16.3%
2021			
Age 0 to 19	20.6%	20.3%	23.1%
Age 20 to 64	53.6%	53.9%	58.5%
Age 65 and over	25.8%	25.8%	18.4%

Data: Nomis (Census 2011 and 2021) (Nomis, no date-e, Nomis, no date-c, Nomis, no date-j, Nomis, no date-f, Nomis, no date-i, Nomis, no date-b, Nomis, no date-d)

22.4.1.1.2 Self-reported health

96. The self-assessment of health is an indicator of general wellbeing and health-related quality of life across a population and data on this comes from the census. In 005B self-reported good health is close to the proportions reported at North Devon, Devon and national levels. In 005B, 34.9% of the population report good health compared to 33.8% in North Devon, 34.7% in Devon and 34.2% in England. A higher proportion of people report bad health in North Devon (5.2%) compared to 4.0% in Devon and 4.2% in England (Nomis, no date-e, Nomis, no date-c, Nomis, no date-j, Nomis, no date-f).

97. In 2021, 49.7% of North Devon residents described their health as "very good", increasing from 48.1% in 2011. Those describing their health as "good" fell from 33.6% to 33.0% (ONS, 2023).

22.4.1.1.3 Health inequalities

98. Socioeconomic and health deprivation decreases resilience and increases sensitivity to change and so is considered in the assessment. Health inequalities refer to differences in health between population groups and so they can be measured in different ways.

99. PHE states that, in the most deprived areas of North Devon, life expectancy at birth is 7.5 years lower for men and 3.1 years lower for women than in the least deprived

areas and that this is comparable to the regional and national indicators (PHE, 2019). At a national level, and looking at trends over time, life expectancy in England is improving for the top 60% of the population and not for the bottom 40% (Marmot, 2020) so health inequalities are growing.

100. Across Devon, fuel poverty and poor housing conditions, particularly in the private rented sector, are a major issue in many areas, especially in rural parts of Northern and Western Devon. This has effects on health and wellbeing and in 2019 the Devon Health and Wellbeing Board noted increases in child poverty and in the numbers of people accessing emergency food supplies (Devon Health and Wellbeing Board, 2019).

22.4.1.1.4 Unpaid care

101. 6.2% of people in 005B provide 1 to 19 hours of unpaid care a week; 1.2% provide 20 to 49 hours a week and 2.9% provide more than 50 hours a week. In North Devon, 7.1% provide 1 to 19 hours of unpaid care a week; 1.3% provide 20 to 49 hours a week and 2.6% provide more than 50 hours a week. Across Devon, 7.6% provide 1 to 19 hours of unpaid care a week; 1.3% provide 20 to 49 hours a week and 2.5% provide more than 50 hours a week. This is comparable to the national average which is 6.5%, 1.4% and 2.4% respectively (Nomis, no date-e, Nomis, no date-c, Nomis, no date-j, Nomis, no date-f).

102. In 2021, 4.6% of North Devon residents (aged five years and over) reported providing up to 19 hours of unpaid care each week. This figure decreased from 7.2% in 2011 (ONS, 2023).

22.4.1.1.5 Disability

103. The 2011 Census identified disability by asking "Are your day-to-day activities limited because of a health problem or disability which has lasted, or expected to last, at least 12 months?". People state the extent to which their activities are limited. The responses in 005B for the categories 'limited a lot' (8.0%) and limited a little' (12.0%), North Devon (limited a lot: 8.7%; limited a little: 10.9%) and in Devon (limited a lot: 8.6%; limited a little: 10.9%) are close to or higher than the national averages (limited a lot: 8.3%; limited a little: 9.3%).

104. In 2021, 7.2% of North Devon residents were identified as being disabled and limited a lot. This figure decreased from 7.9% in 2011 (ONS, 2023)

22.4.1.1.6 Social isolation

105. The percentage of adult carers who have as much social contact as they would like is lower in the South West than in England for adult carers who are 18 and over and those who are 65 and over. This measure draws on self-reported levels of social

contact as an indicator of social isolation for both users of social care and carers (OHID, 2023b, OHID, 2023a). There is no data for this indicator below the regional level.

22.4.1.1.7 Water-related fatalities

106. The Onshore Project construction activities at Landfall to MLWS have the potential to contribute to community safety at Saunton Sands and to averting water-related injuries and fatalities through self-harm. The WAter Incident Database (WAID) (WAID, 2021) report the following for England in 2021:

- There were 442 water-related fatalities
- There were 155 suicide suspected fatalities at or near water
- There were 182 accidental fatalities, of which 35% were at coastal waters
    - Recreational activities accounted for 56% of accidental fatalities
    - 27% of accidental fatality reports noted the presence of drugs or alcohol
    - 86% of accidental fatalities were male
    - Males 30-39 and 50-59 were the highest group for accidental fatalities
- The rate of accidental drowning is reducing (0.32 per 100,000 in 2021) compared to 0.45 in baseline
- When considering rates across 2017-2021, there is some variation by age groups for males.

22.4.1.1.8 Public Health Outcomes Framework

107. Unless otherwise stated, the information in this section is from OHID (no date). In this section 'significant' refers to a change that is statistically significant. OHID has compared the confidence intervals for the respective time points in the different indicators. If the confidence intervals do not overlap, OHID has flagged the change as statistically significant.

22.4.1.1.9 Wider determinants of health

108. In 2019-2020 the percentage of adults, in North Devon, who feel lonely often / always or some of the time was 17.6% which is lower than the national average of 22.3%.

22.4.1.1.10 Health improvement

109. The standardised admission ratio, between 2016/17 and 2020/21, for Emergency hospital admissions for intentional self harm is higher in North Devon than in Devon (OHID, 2022b). Both are higher than the national value. In 2020-2021 the rate for emergency hospital admissions for self-harm, in North Devon, was significantly

higher than the national average: 308.2 per 100,000 people compared to 181.2 at national level.

110. In 2020-2021 the rate for admission episodes for alcohol-related conditions, in North Devon, was significantly higher than the national average: 520.0 per 100,000 people compared to 455.9 at national level.

22.4.1.1.11 Healthcare and premature mortality

111. In 2020, the under 75 mortality rate, in North Devon, from causes considered preventable was 123.6 per 100,000 which was not significantly different to the national value of 140.5 per 100,00). This pattern is repeated for the other under 75 mortality rates.

112. The mortality rates for the same age group from respiratory disease (17.4 per 100,000), and from respiratory diseases considered preventable (8.93 per 100,000), were significantly lower than the national values (29.4 and 17.1 per 100,000 respectively).

113. In 2020-2021 the rate of hip fractures in people aged 65 and over, in North Devon, was 658.7 per 100,000. This was significantly higher than the national average of 528.7 per 100,000 people. Over the same time period, the rate of hip fractures for people in North Devon, aged 65-79 was not significantly different than the national average, but for people aged 80+ it was significantly higher (1,745 compared to 1,426).

114. In 2022, the estimated dementia diagnosis rate (aged 65+), in North Devon, is below the national average (55.8% and 62.0% respectively).

115. Public Health Devon and Devon County Council (no date) note that common mental health problems among the population increased during the COVID-19 restrictions and also that suicide increases when there is an economic downturn. The suicide rate per 100,000, from 2001 to 2019, for persons in North Devon went both below and above the national value and in Devon it remained close to or above the national value. OHID reports that the rate for North Devon, for 2019-2021, shows no significant change (OHID, 2022a).

22.4.1.1.12 Journey times and/or reduced access

116. The environmental baseline for traffic and transport has been provided in **Chapter 19: Traffic and Transport.**

117. The North Devon District Hospital (NDDH) provides emergency and urgent care for people in North Devon and the surrounding areas. It is the most remote acute hospital in mainland England, with over an hour and a half drive from its nearest

neighbouring acute hospital. NDDH, located in Barnstaple, provides 24-hour emergency and urgent care, seven days a week and has an intensive care unit, women's and children's services and full diagnostic and outpatient services including an endoscopy unit and pathology laboratories. The hospital also has a stroke unit, medical and surgical specialties, paediatric care, a maternity unit and a special care baby unit (Care Quality Commission, 2021).

118. The Access to Health Assets and Hazards (AHAH) combines indicators for access to health services and green spaces, unhealthy retail services and air pollution. It has three domains. The overall AHAH Index. **Table 22.23** shows that 005B, 011D and 009B are in the fourth, third and second deciles respectively of the AHAH Index. **Table 22.23** also shows how these LSOAs have relatively high scores in the health domain. This indicates poor accessibility to health services, including GPs, hospitals, pharmacies, dentists, leisure services.

Table 22.23. Baseline Site-Specific Statistics

	Landfall to MLWS	Onshore Export Cable Corridor and Onshore Substation	Transportation Route
Representative LSOA	North Devon 005B	North Devon 011D	North Devon 009B
Access to Health Assets & Hazards (AHAH) Index (1-10 decile)	4	3	2
The Health domain of the AHAH Index (1-100 value)	83	92	56

Source: Consumer Data Research Centre (CDRC, 2022)

119. In North Devon, 76% of people travel to work. The majority drive a car or van (52%) compared to travel on foot (13%) or by bicycle (2%). For shared transport to work, 4% are passengers in a car or van, and 2% use a bus, minibus or coach (Nomis, no date-h). 71% of people travel to work in Devon. 50% drive a car or van; 10% travel on foot, while 4% are passengers in a car or van, and 2% use a bus, minibus or coach (Nomis, no date-a).

22.4.1.2 Physical environment

22.4.1.2.1 Noise

120. The environmental baseline for noise is provided in **Chapter 18: Noise and Vibration**.

22.4.1.2.2 Air quality

121. The environmental baseline for air quality is provided in **Chapter 13: Air Quality**.

22.4.1.2.3 Electromagnetic fields

122. The magnetic field of a buried AC system has a strength of 20-24 μT (National Grid, EMFs.info, 2020) when standing directly over it. This is equivalent to approximately half of what is expected from a TV, washing machine or bedside clock (**Table 22.24**) at the same distance. The strength drops to 0.46 – 0.90 μT at 10m and to 0.12 – 0.23 μT at a 20m distance.

Table 22.24. Typical Magnetic Field Levels from Common Household Mains Appliances

Factor	Magnetic Field (mT) Close to Appliance	1m distant
Vacuum cleaner	800	2
TV, Washing machine, Microwave	50	0.2
Electric oven	10	0.02
Fridge	2	0.01

Source: (Energy Networks Association, 2017)

123. The high-voltage underground cables to be installed will be surrounded by a metal sheath/screen to provide mechanical protection. This also eliminates the electric field outside the cable, but it has no effect on the magnetic field.

124. Large electrical substations do not produce significant electric fields outside their boundary because the perimeter fence screens the electric field generated by any sources within the substation. There is equipment inside substations which produces magnetic fields. But the field falls rapidly with distance, and at the perimeter fence the magnetic field from inside the substation is usually approaching background levels.

22.4.1.2.4Wider societal infrastructure and resources

125. The environmental baseline is provided in **Chapter 23: Climate Change.**

126. The Project will contribute to a reduction in greenhouse gas (GHG) emissions compared to equivalent power generation from fossil fuel combustion (especially without carbon capture) and will contribute to the decarbonisation of the UK energy supply. It will provide a renewable source of electricity which contributes to the UK's goal of achieving net zero emissions by 2050 – the role of the offshore wind sector is a focus of action to contribute to meeting this target.

127. The baseline (**Section 22.4.1**) reflects the current state of the existing environment. The earliest possible date for the start of construction for the onshore infrastructure of the Onshore Project is 2025. From the point of assessment, over the course of the development and operational lifetime of the Onshore Project

(operational lifetime anticipated to be 50 years). Therefore, the baseline may change between the time of assessment and point of impact. Outside of short-term or seasonal fluctuations, changes to the baseline in relation to health usually occur over an extended period of time.

22.4.2 Do Nothing Scenario

128. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (HM Government of Great Britain & Northern Ireland, 2017a) require that "an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included within the ES (EIA Regulations, Schedule 4, Paragraph 3). From the point of assessment, over the course of the development and operational lifetime of the Onshore Project (operational lifetime anticipated to be 50 years), long-term trends mean that the condition of the baseline environment is expected to evolve. This section provides a qualitative description of the evolution of the baseline environment, on the assumption that the Onshore Project is not constructed, using available information and scientific knowledge of human health.

129. The health and wellbeing of the population within the study area is shaped by environmental, social, behavioural, economic and institutional factors as described in **Section 22.3.4.1**, above. In a Do Nothing Scenario, trends in population health would be expected to continue to be influenced by trends across wider society which show life expectancy reducing and health inequalities widening.

22.5 Potential Impacts During Construction

130. The potential impacts during construction of the Onshore Project have been assessed for human health. A description of the potential effect on human health caused by each identified impact is given in this section.

131. The focus is on human health effects associated with the Onshore Project activities from MLWS and therefore predominately relate to potential impacts in the nearshore and inter-tidal zone. Potential impacts relating to the Offshore Project are considered within the separate Offshore EIA.

22.5.1 Impact 1: Open space, leisure and play (access)

22.5.1.1 Assessment

132. The construction activities across the Site-specific areas of Landfall to MLWS and Onshore Cable Export Corridor have the potential to affect access to open space

(green and blue) and physical activity (including in natural habitats). This applies in the nearshore/intertidal zone where people engage in surfing and swimming and it applies along the recreational routes which include Public Rights of Way (PRoW), National Trails and Long Distance Paths (see **Section 19.4.1.5**). This green and blue infrastructure provides opportunities for people to connect with nature.

- Landfall to MLWS: There are different options for cable installation methodology in the nearshore/intertidal zone as set out in **Chapter 5**: **Project Description**. These include open cut trenching and trenchless techniques. Both open cut trenching and trenchless are considered for the intertidal zone. The trenchless technique would be from a point onshore above MHWS out to the subtidal zone. These have different implications. Open cut has the greatest effect on beach access but requires only one period of continuous activity over 24 hours to install the cable. The work programme for HDD is up to 100 days and has the potential to close a portion of the Saunton Sands car park
- Onshore Cable Export Corridor: the route is described in **Section 5.6** and summarised in **Section 22.3.1** above. The cable installation method will be mainly open-cut trenching with small sections of trenchless techniques for main watercourse, road, and sensitive habitat crossings.

22.5.1.1.1 Populations affected (receptors)

133. The populations affected are residents in the Site-specific areas. Visitors to Saunton Sands will be affected as will users of the recreational routes. They are each represented by the Local area (North Devon). The impact on these populations is due to the use of Saunton Sands and the recreational routes for leisure activities. The visitors to Saunton Sands will also engage in marine activities in the nearshore/intertidal zone such as surfing and swimming.

134. Populations that may be considered vulnerable are children and young people, older people, people experiencing social isolation and people with existing poor physical and mental health for whom swimming at Saunton Sands, and using the recreational routes, is an important part of their routine. Population groups that experience challenges regarding access will also be vulnerable, this includes children and young people, older people and people on low incomes.

22.5.1.1.2 Health effect

135. Health effects are likely to be associated with the actual changes effected by Project construction activities, for example, construction activity and safety marshals at Saunton Sands and disruption to access along the recreational routes. The way in which people understand how they will be affected by the construction activities will

also influence levels of leisure activity during construction, for example, the expectation of the closure of Saunton Sands or the recreational routes.

136. A potential health effect is considered *likely* because, based on the methods described in **Table 22.10**, there is a plausible source-pathway-receptor relationship where:

- Source – the construction areas and activities
- Pathway – people's understanding of change in the usability of Saunton Sands and the recreational routes
- Receptors – people who use Saunton Sands and/or the recreational routes and who may reduce their levels of outdoor recreation.

137. Furthermore, the potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.5.1.1.3 Scientific literature

138. The scientific literature shows that leisure activity in the ocean is associated with improved physical and mental health. The literature does not identify thresholds for effects, and it is inferred that interruptions to this could have adverse effects on physical and mental health. Much of the activity in blue spaces, at least in high income countries, is not water-based but occurs on land, e.g. beach walks; and it is this activity that predominantly explains any link between coastal proximity and health (White et al., 2020). The assessment has regard to the population groups identified in the literature that may be particularly sensitive: children and young people, older people, people experiencing social isolation; population groups that experience challenges regarding access, this includes the groups listed above and also people on low incomes. It is noted that the whole population benefits from a physically active lifestyle and this includes leisure activity in the ocean.

22.5.1.1.4 Baseline

139. Saunton Sands is a popular destination for swimming and surfing. The recreational routes are popular for walking and the Project area crosses numerous recreational routes such as PRoWS (including bridleways and footpaths), Tarka Trail (long distance walkers' route) and the South West Coast Path (National Trail). The baseline (see **Appendix 22.A: Baseline Information)** shows how the Site-specific areas and the Local area have an older population than the national average. The baseline for the Site-specific areas shows that the percentage of people reporting that their day-to-day activities are limited 'a little' is higher in the Site-specific areas (005B and 011D) and the Local area than in England. The measure for self-reported social isolation is higher in the South West than in England.

Maintaining levels of physical activity is important to maintain respiratory health and to reduce injuries, such as hip fractures. The baseline does not identify any geographic or population features that suggest effects could be unusually amplified.

22.5.1.1.5 Policy

140. Government policy sets the following expectations for access to open space (green and blue) and physical activity (including in natural habitats) in the local area:

- protecting and improving the natural environment (EN-1 paragraph 4.10.2)
- protection of the water environment (EN-1 paragraph 5.15.1).

22.5.1.1.6 Health priorities

141. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups; (b) identify people at risk and intervene to improve poor mental health as soon as possible; and (d) promote a positive approach to mental health and wellbeing
- 4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible and (c) support those with long-term conditions to maintain a good quality of life.

142. The North Devon Coast AONB wish to ensure sustainable access to the AONB for the benefit of the health and wellbeing of local people and visitors (North Devon Coast AONB, 2019).

22.5.1.1.7 Embedded mitigation

143. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of construction activities at Landfall to MLWS and the potential to affect access to open space (green and blue) and physical activity (including in natural habitats) in the nearshore/intertidal zone and along the Onshore Export Cable Corridor:

- Communication and engagement activities to ensure that visitors to Saunton Sands and the recreational routes are aware of the timing and extent of construction activities
- Maintaining access to Saunton Sands during construction – no closure of the beach

- Providing safety marshals for the protection of the public in the nearshore/intertidal zone
- Apply health and safety requirements proportionately: for example, balance the need for fencing/hoarding/barriers in nearshore/intertidal zone to protect swimmers and surfers from accessing construction and/or maintenance works with the need to maintain access to Saunton Sands. For the recreational routes, provide appropriately fenced (unmanned) crossing points; manned crossing points; and temporary alternative routes
- Communication and engagement activities to ensure that users of recreational routes are aware of the timing and extent of construction activities along the routes
- Measures set out in the CEMP that limit and manage the timing of construction activities.

22.5.1.2 Magnitude of impact

144. During construction, the magnitude of the change due to the Onshore Project at Landfall to MLWS is **negligible** for open-cut trenching and **low** for a trenchless technique such as HDD.

145. In relation to access to open space, leisure and play (access), the magnitude of impact ranges from **negligible** to **low** for the Site-specific and the Local population. In the nearshore/intertidal zone the duration is very short-term and a one-off frequency for open cut trenching (1 x 24 hour working period) and of short-term duration for a trenchless technique such as HDD (disruption for a short period in the sub-tidal area at one from the 80-day work programme). There would be a minor change in quality of life.

146. The onshore cable duct would be installed in sections up to 1km at a time, with a typical construction presence of up to four weeks along each 1km section (please see **Chapter 5: Project Description**). Where the Onshore Export Cable Corridor crosses recreational routes there would be a construction presence and open excavations. In the absence of mitigation, this would prevent public access and in effect would represent a temporary closure until the works along that stretch of the Onshore Export Cable Corridor are complete. There would be no permanent closures. Taking the temporal scale identified in **Section 22.3.3** this is a short-term effect. This represents a minor change in quality-of-life which will be reversed when the works move on. There would be no implications for healthcare services. It is therefore a **low** magnitude of impact.

147. The magnitude of impact on vulnerable groups also ranges from **negligible** to **low**, determined by the technology used, open-cut trenching or a trenchless technique such as HDD, respectively.

22.5.1.3 Sensitivity of the receptor

148. The sensitivity of the general population is considered to be **negligible**: the ways in which people report their health is broadly similar for the Site-specific area (005B), the Local area (North Devon) and England. The percentage of people reporting 'very good health' is lower in 011D. Visiting Saunton Sands and swimming in the nearshore/intertidal zone, would for most people be an occasional or seasonal event and it is reasonable to expect that people would have access to other beaches. The same applies to use of the recreational areas in terms of occasional or seasonal use. There will not be a requirement to use alternative paths as the recreational areas will not be closed.

149. The sensitivity of vulnerable groups is considered **low** (not significant): the baselines in the Site-specific areas (005B, 011D), the Local area (North Devon) and England for level of limitation to daily activities are broadly consistent. The sum of the percentages of people reporting that their day-to-day activities are limited 'a lot' and 'limited a little' differs between Site-specific areas. In 005B the percentage (17.1%) is close to the national percentage. In 011D (19.0%) the percentage is lower than the Local area and the Regional area, but all are higher than England (North Devon: 19.6%; Devon: 19.5% and England: 17.3% respectively).

150. The percentage of adult carers who have as much social contact as they would like is lower in the South West than in England for adult carers who are 18 and over and those who are 65 and over (OHID, 2023a, OHID, 2023b). It is estimated that, from a life stage perspective, a high proportion of swimmers and surfers in the Site-specific and Local area are young people and older people who go to the beach regularly. The populations in the Site-specific and the Local areas have moderate levels of deprivation. The level of public concern regarding this matter is not known.

22.5.1.4 Significance of effect

151. **Section 15.5.6.5** of **Chapter 15: Land Use** states that with the implementation of mitigation measures to proactively manage each crossing, the magnitude of impact would be negligible and so the significance of effect would be minor adverse for PRoWs, long distance walkers route (the Tarka Trail) and the National Trail which is deemed **not significant** in EIA terms.

152. Change to the population health baseline from open cut trenching is expected to be negligible and from a trenchless technique, such as HDD, it will be low. The assessment acknowledges that there is a causal pathway established in the scientific literature and there are relevant regional health priorities. No adverse effect is expected with regards to delivering local health policy.

153. There would be a differential effect between the general population and vulnerable groups, but the construction activities will have limited potential to widen inequalities due to the targeted use of mitigation. The conclusion is that the residual significance of the effect would be **negligible** for the general population and, allowing for the fact that communication and engagement activities seldom reach a whole population, up to **minor negative** (not significant) for vulnerable groups.

22.5.2 Impact 2: Community safety

22.5.2.1 Assessment

154. The Onshore Project construction activities at Landfall to MLWS have the potential to contribute to community safety at Saunton Sands and to averting water-related injuries and fatalities.

22.5.2.1.1 Populations affected (receptors)

155. The affected populations are residents in the Site-specific area 005B and visitors to Saunton Sands who are represented by the population of the Local area (North Devon). The population of Devon county is also considered as people who are intending to self-harm may travel to an area where they are not known. The impact on these populations is due to their access to Saunton Sands: this includes access to the sea for people who are considering self-harm.

156. People with existing poor mental health and who may be considering self-harm are considered vulnerable. Research evidence, summarised below, suggests that, within this population, older people and women may be particularly vulnerable. Family members and acquaintances of people who self-harm are considered vulnerable.

157. Construction workers and safety marshals will be affected if there is an incident at Saunton Sands whilst construction work is underway.

22.5.2.1.2 Health effect

158. Health effects will be associated with the actual changes brought about by Onshore Project construction activities, for example the increased signage and the presence of construction workers and safety marshals at Saunton Sands.

159. This assessment distinguishes between injuries and drowning from surfing and swimming (recreational marine activities in the nearshore/intertidal zone) and from attempts at self-harm. The construction activities of the Onshore Project will not have an effect on the risk of injury or drowning associated with surfing and swimming (recreational marine activities in the nearshore/intertidal zone). The embedded mitigation of the safety hoarding and safety marshals will ensure that surfers and swimmers are not at risk from the construction machinery and activities.

160. A potential health effect is considered *likely* for attempts at self-harm because, based on the methods described in **Section 22.3.2**, there is a plausible source-pathway-receptor relationship where:

- Source – the construction activities, signage and presence of safety marshals
- Pathway – increased capacity for human intervention
- Receptors – people with existing poor mental health who may be considering self-harm; family members and acquaintances of people who self-harm construction workers who may be involved in a rescue operation and in dealing with any aftermath.

161. The potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.5.2.1.3 Scientific literature

162. Drowning outcomes include death and a range of non-fatal outcomes ranging from survival with no lasting consequence to survival with permanent neurological impairment (Beerman et al., 2018).

163. Drowning can be an intentional act of self-harm; it is a relatively uncommon method of suicide in most high-income countries; there are challenges in establishing a baseline as it can be hard to distinguish between a suicide and unintentional drowning; and, as a method, it is more likely to be chosen by older people (Haw and Hawton, 2016). Research in the Netherlands concluded that living close to the coast is associated with greater suicide risk for women (Helbich et al., 2022). Research in Australia reported that people travelled to reach the coast for increased anonymity so as to reduce the chance of being interrupted, that coastal suicides were higher in males than females and that female decedents had a higher incidence of mental ill health or a history of suicidal behaviours (Lawes et al., 2021). Financial downturn leads to an increase in mental ill health across the population that can, in turn, translate into despair and self-harm (Hawton and Haw, 2013). It is estimated that, for every suicide, between six and 20 people, usually family members and

acquaintances of those who died, are adversely affected psychologically and emotionally (Andriessen et al., 2019).

164. Those who protect the public, such as first responders, are at greater risk for mental ill health and compromised well-being than the general population and strategies for supporting mental health and well-being need to be implemented early in the first responder career and then reinforced throughout and into retirement (Smith et al., 2021). This assessment applies this finding to the construction workers.

22.5.2.1.4 Baseline

165. Saunton Sands is a popular destination for swimming and surfing. The baseline (see **Appendix 22.A: Baseline Information**) shows how the Site-specific area, the Local area and the Regional area have an older population than the national average. The standardised admission ratio, between 2016/17 and 2020/21, for Emergency hospital admissions for intentional self-harm is higher in North Devon than in Devon (OHID, 2022b). Both are higher than the national value. The baseline does not identify any geographic or population features that suggest effects could be unusually amplified.

22.5.2.1.5 Policy

166. Government policy sets the following expectations for access to open space (green and blue) and physical activity (including in natural habitats) in the local area:

- protecting and improving the natural environment (EN-1 paragraph 4.10.2)
- protection of the water environment (EN-1 paragraph 5.15.1).

167. Section 8, Paragraph 92 of the NPPF (Ministry of Housing, 2021) states that planning […] decisions should aim to achieve healthy, inclusive and safe places which […] c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure.

22.5.2.1.6 Health priorities

168. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups;

(b) identify people at risk and intervene to improve poor mental health as soon as possible; and (d) promote a positive approach to mental health and wellbeing.

169. The North Devon Coast AONB wishes to ensure sustainable access to the AONB for the benefit of the health and wellbeing of local people and visitors (North Devon Coast AONB, 2019).

170. The England and Devon strategies for suicide prevention each include a priority of reducing access to means of suicide (PHE, 2012, Public Health Devon and Devon County Council, no date).

171. The priorities of the National Drowning Prevention Strategy (National Water Safety Forum, 2015) include:

- Every community with water risks should have a community-level water safety risk assessment and water safety plan
- To better understand water-related self-harm
- Increase awareness of everyday risks in, on and around water

22.5.2.1.7 Embedded mitigation

172. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of construction activities at Landfall to MLWS and the potential to affect community safety in the nearshore/intertidal zone:

- Maintaining access to Saunton Sands during construction – no closure of the beach
- Providing safety marshals for the protection of the public
- Apply health and safety requirements proportionately: for example, balance the need for fencing/hoarding/barriers in nearshore/intertidal zone to protect swimmers and surfers from accessing construction works with the need to maintain access to Saunton Sands.

22.5.2.2 Magnitude of impact

173. The magnitude of the impact of someone attempting to self-harm spans the entire range of scores (see **Table 22.11**). While the Construction Phase of the Onshore Project will not increase the likelihood of someone attempting to self-harm, it is reasonable to suppose that the presence of the construction workforce at Saunton Sands would increase the opportunity to deter someone from attempting to self-harm. This is considered below, once the different magnitudes of impact of someone attempting to self-harm are considered.

174. A self-harm event on Saunton Sands during the Construction Phase is considered to be rare and on this basis the impact for the general population is of **negligible**

magnitude. If an event were to occur, the health outcome, for the individual concerned could range from injuries with no lasting consequences (**negligible** magnitude) to permanent impairment or death (**high** magnitude). The family members and acquaintances of people who self-harm would be adversely affected psychologically and emotionally, and the magnitude would range from **low** to **high**.

175. The construction workforce would potentially become involved, and workers involved in rescue attempts and in dealing with any aftermath, may experience mental ill health and compromised well-being (**medium** magnitude). An event of this kind has implications for healthcare services that range from treatment of minor injury and the need for mental health services for the individual concerned (**low to medium** magnitude) to requirement for emergency care and longer-term need for mental health services for the individual, their wider network and the construction worker (**high** magnitude).

176. The magnitudes of the impacts of an event range from **negligible**, due to the rarity of this as an event, to **high** (negative) if such an event does occur. The presence of construction workers may act as a deterrent and would therefore avert injury or a fatality and would be **high** magnitude (beneficial).

22.5.2.3 Sensitivity of the receptor

177. The Site-specific, Local and Regional populations are considered **moderate** sensitivity due to the baseline indicating higher regional levels of self-harm than are reported nationally.

178. People with poor mental health are at increased risk of self-harm and suicide. Research indicates that women are at increased risk of suicide in coastal areas and that older people are more likely to choose drowning as a method of suicide. These groups are **highly** sensitive.

179. The outlook of family members and acquaintances of people who self-harm is one of uncertainty and concern and their sensitivity is **medium**.

180. Construction workers may become involved in prevention or rescue attempts or witness the aftermath. Their sensitivity ranges from **negligible** to **low** as they will have a good health status and a high capacity to adapt to a changing situation.

22.5.2.4 Significance of effect

181. The construction activities in the nearshore/intertidal zone would be very short-term (open-cut trenching) to short-term (a trenchless technique such as HDD). The assessment considers the mitigation that has been developed.

182. Fatality in coastal waters is a rare event with a very high impact (see **Section 22.4.1.1.6**). Change to the population health baseline is expected to be small as a result of the Onshore Project but the prevention of fatalities will make a positive contribution to regional priorities (Public Health Devon and Devon County Council, no date) and to the National Water Safety Form's Drowning Prevention Strategy (National Water Safety Forum, 2015). It will assist in ensuring that the Onshore Project contributes to Saunton Sands remaining a healthy, inclusive and safe place, *as per* Section 8, Paragraph 92 of the NPPF (Ministry of Housing, 2021). The assessment acknowledges that there is a causal pathway established in the scientific literature. No adverse effect is expected with regards to delivering local health policy.

183. The conclusion is that the effect would be **negligible** for the general population. The construction activities will have limited potential to widen inequalities as the events are rare.

184. The effect for people with mental ill health who are considering self-harm goes up to **minor beneficial** (not significant). This allows for the presence of the construction workers to provide a measure of deterrent. This **minor beneficial** (not significant) effect applies also to the family members and acquaintances of the person who is considering self-harm. The construction workers will be affected if an event does occur. The effect will depend upon the event and the effect will range from **minor negative** effect (not significant) to **moderate negative** (significant) for construction workers who witness, or become involved in, an event.

22.5.2.5 Additional enhancement

185. The Onshore Project has the opportunity to enhance community safety at Saunton Sands by providing resources and by increasing capacity for human intervention if people are attempting or considering self-harm. This is a professional judgement and is made with medium level of confidence based on academic and scientific studies. It is acknowledged that a self-harm event, leading to injury or fatality, is low probability but that it would also be very serious.

186. The additional enhancement would comprise of signs that provide information about safety and sources of help for those considering self-harm; and training for safety marshals to train increased awareness about self-harm and actions to take. The CEMP would include water safety risk assessment and water safety plans and relevant training for safety marshals and other operation and maintenance workers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.

22.5.2.6 Residual significance

187. There would be a differential effect between the general population and vulnerable groups. The construction activities, the signage and the presence of the workforce, will have limited potential to widen inequalities as the events are rare, but the targeted use of enhancement can have a deterrent or a protective effect. The conclusion is that the residual significance of the effect would be **negligible** for the general population and up to **moderate beneficial** (significant) for people with mental ill health who are considering self-harm, for their family members and acquaintances and for the construction workers.

22.5.3 Impact 3: Noise

22.5.3.1 Assessment

188. During the construction phase of the Onshore Project, there is the potential for noise to temporarily arise from construction activities, movement of Heavy Goods Vehicles (HGVs) and increased traffic from construction workers.

22.5.3.1.1 Populations affected (receptors)

189. The populations affected include residents in the Site-specific areas, including the population near landfall to MLWS at Saunton Sands, along the Onshore Export Cable Corridor and the population near the onshore substation, represented by the Site Specific LSOAs 005B and 011D. Other populations that may be affected are residents along the transportation routes, represented by the Local area (North Devon). Visitors to the area may also be affected and these are represented by the Regional area (Devon County).

22.5.3.1.2 Health effect

190. The key health outcomes relevant to noise as a determinant of health are cardiovascular health (as a result of chronic noise effects); mental health (including stress, anxiety or depression as a result of chronic noise effects); and cognitive performance of school children.

191. A potential health effect is considered *likely* because, based on the approach in **Table 22.10**, there is a plausible source-pathway-receptor relationship where:

- Source – the construction areas and transport operations
- Pathway – pressure waves through the air
- Receptors –people living and working in, and visiting, the area.

192. Furthermore, the potential effect is probable as no unusual conditions are required for there to be a link between source-pathway-receptor.

22.5.3.1.3 Scientific literature

193. Regarding noise and health, groups at risk most often mentioned in the literature are children, the elderly, the chronically ill and people with a hearing impairment. Other categories encountered are those of sensitive persons, shift-workers, people with mental illness (e.g., schizophrenia or autism), people suffering from tinnitus, and foetuses and neonates. Age-specific comparisons indicate that both young and older people are less at risk as far as annoyance and disturbance are concerned. But, possibly, the elderly are more vulnerable regarding cardiovascular effects, and this may be a combined effect of air pollution and noise (van Kamp and Davies, 2013).

194. Environmental noise is a psycho-social stressor that affects subjective well-being and physical health. Noise disturbs communication, concentration, relaxation and sleep. Chronic long-term exposure to transportation noise has been shown to be associated with the prevalence and incidence of cardiovascular diseases, including hypertension, ischemic heart diseases and stroke. Road traffic noise is a significant risk factor for cardiovascular diseases (Babisch, 2014).

22.5.3.1.4 Baseline

195. **Section 22.4.1** in **Chapter 18: Noise and Vibration** shows the Onshore Noise and Vibration Sensitive Receptors (NVSRs) included in the assessment. These include a hotel, commercial properties, some holiday lets and residential properties. A recreational NVSR is also identified. There are thirteen existing NVSR locations at Landfall to MLWS, eleven of which have the potential to be impacted by construction traffic. There are seven NVSR locations at the Onshore Substation

196. The baseline (see **Appendix 22.A: Baseline Information**) shows how the Site-specific areas and the Local area have an older population than the national average, who may spend extended periods at home. The baseline for the Site-specific areas shows that the percentage of people reporting that their day-to-day activities are limited 'a little' is higher in the Site-specific areas (005B and 011D) and the representative LSOA for transport (009B) than in England.

197. The population at the Site-specific area of landfall to MLWS (005B) is in the ninth decile of deprivation, i.e. among the least deprived neighbourhoods. The representative LSOA for the population along the Onshore Export Cable Corridor and at the Onshore Substation 011D is in the fifth decile of deprivation. The representative LSOA for the population along the transportation route, 009B, is in the fourth decile of deprivation. The 2021 census findings of the percentages of people reporting 'very good health' and 'good health' show that the national percentage is 82.2%. The Site Specific Areas (005B: 81.1%; 011D: 80.0%; 009B:

76.7%), the Local area (80.4%) and the Regional area (81.3%) are lower than the national percentage. The general health of the affected populations is lower than but close to the national percentage.

22.5.3.1.5 Policy

198. Government policy sets the following expectations for the effects on health from noise:

- Issues relating to discharges or emissions from a proposed project […] which include noise and vibration may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes. (EN-1 paragraph 4.10.1)
- The direct impacts on health may include increased […] noise […] (EN-1 paragraph 4.13.3)
- […] the IPC will want to take account of health concerns when setting requirements relating to a range of impacts such as noise. (EN-1 paragraph 4.13.5)
- Operational noise, with respect to human receptors, should be assessed using the principles of the relevant British Standards and other guidance. Further information on assessment of particular noise sources may be contained in the technology-specific NPSs. In particular, for renewables (EN-3) and electricity networks (EN-5) there is assessment guidance for specific features of those technologies. For the prediction, assessment and management of construction noise, reference should be made to any relevant British Standards and other guidance which also give examples of mitigation strategies. (EN-1 paragraph 5.11.6)
- […] avoid significant adverse impacts on health and quality of life from noise; mitigate and minimise other adverse impacts on health and quality of life from noise; and where possible, contribute to improvements to health and quality of life through the effective management and control of noise. (EN-1 paragraph 5.11.9).

199. Section 15, Paragraph 185 of the NPPF (Ministry of Housing, 2021) states that "Planning policies and decisions should also ensure that new development is […] taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid

noise giving rise to significant adverse impacts on health and the quality of life. [….]"

22.5.3.1.6 Health priorities

200. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction; (d) Help keep communities and individuals safe
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups; (b) identify people at risk and intervene to improve poor mental health as soon as possible; and (d) promote a positive approach to mental health and wellbeing
- 4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible and (c) support those with long-term conditions to maintain a good quality of life.

22.5.3.1.7 Embedded mitigation

201. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of construction activities and the potential to increase noise at Landfall to MLWS, the cable corridor, onshore substation as well as increases in traffic off-site:

- Mitigation by site selection: The Onshore Project has been defined following an extensive site selection process, which has accounted for environmental, engineering, planning and land requirements to identify an optimal project location. The site selection process is described in detail in **Chapter 4 Site Selection and Assessment of Alternatives (Volume I)**. The site selection process has included consideration of the nearby residential properties and other NVSRs, and distances to these have been maximised, particularly in relation to the location of the Onshore Substation
- Construction phase noise and vibration: Commitment to Best Practicable Means (BPM) implemented during the construction phase, detailed in the **Construction Noise and Vibration Management Plan (CNVMP)** which will be included as part of the CEMP secured through a planning condition. An Outline CEMP has been submitted with the planning application (refer to **Appendix 5.C**).

- Construction phase road traffic noise: An Outline Construction Traffic Management Plan (CTMP) is included in **Appendix 19.B: Outline Construction Traffic Management Plan (Volume III)**. The plan outlines methods to manage peak construction traffic flows and minimise significant traffic and transport impacts. The CTMP will also serve to reduce the associated construction traffic noise and the relative noise change. Traffic management measures are provided in **Chapter 19: Traffic and Transport.**
- Operational substation noise: Each main source of sound at the proposed onshore substation, which has the potential to emit tonal sound, can be fully enclosed if required; although this has the potential to introduce other environmental impacts (e.g. landscape and visual effects) which must be considered. Certain equipment, such as the transformers and the shunt reactors, can be fully enclosed for operational and engineering reasons and, as such, a high degree of noise control can be applied to this equipment. Using these embedded measures, the substation will be designed to achieve the operational noise limits identified through the assessment. The design includes for an enclosing structure, the attenuating effects of which have been included.

22.5.3.2 Magnitude of impact

202. The assessment of noise during construction finds that the magnitude of impact resulting from construction noise and noise from increased traffic is **negligible** to **low** across four impacts: Noise of construction works at landfall to MLWS; noise of cable corridor construction works; noise of onshore substation construction; and noise from off-site construction traffic.

- Noise of construction works at landfall to MLWS will mostly be resulting from day-time construction work, with occasional events of continuous evening, night- time and weekend drilling. The level of exposure is however low and will not affect any permanent residents. The predicted impact magnitude of the construction noise from the works at landfall to MLWS is **negligible** to **low**
- Noise of cable corridor construction works will mostly be resulting from day-time construction work, with occasional events of continuous evening, night-time and weekend drilling. The level of exposure is however low and will not affect any permanent residents. The predicted impact magnitude of the construction noise from the works along the cable corridor is **negligible** to **low**
- Noise of onshore substation construction is omitted from the assessment. The closest existing identified noise and vibration sensitive receptor (NVSR) to the onshore substation is more than 350m away, which is outside the construction noise study area

- Noise from off-site construction traffic is assessed regarding construction traffic peak flows as detailed in **Chapter 19: Traffic and Transport**. The overall increase in traffic is limited and will be immediately reversed to former levels once construction is completed. The noise impact will have a **negligible** to **low** impact.

22.5.3.3 Sensitivity of the receptor

203. The sensitivity of the general population, as represented by North Devon, is considered to be **low**. The North Devon population generally reports good health and low levels of deprivation. The Site Specific, Local and Regional populations are considered **medium** sensitivity. The baseline indicates an older population that has good access to health assets.

204. Some people are more sensitive to changes in noise and as a result their sensitivity is considered to be **medium**. This is linked to:

- Age (young people, working age and older people)
- Gender (women)
- People with existing poor physical and mental health
- Deprivation

205. Each of these factors heightens sensitivity and can also be a reason for people to spend more time in affected dwellings e.g. low economic activity, retirement, or ill health. Carers may also be affected. Women are likely to be the main providers of care. Home working and shift work apply to people of working age. It is also important to note that noise can cause stress and anxiety especially when people have strong views or high degrees of uncertainty about the Onshore Project. Health effects, for example stress and anxiety, can be brought on by noise thresholds that are generally considered to be acceptable.

22.5.3.4 Significance of Impact

206. The conclusion of the assessment for population health is that for the Onshore project the significance of the impact will be no more than **minor adverse** for the general population and the Site-specific, Local and Regional populations, as the magnitude of the impact is predominantly assessed as negligible or low. For the vulnerable populations this means a **minor adverse** impact.

207. Construction and increased traffic noise effects are short-term, temporary and will cease on completion of the works. Therefore, there would be no residual long-term health outcome.

22.5.4 Impact 4: Air quality

22.5.4.1 Assessment

208. During the construction phase of the Onshore Project there is the potential for air quality to be temporarily affected by dust and fine particulate from construction activities and emissions from construction vehicles.

22.5.4.1.1 Populations affected (receptors)

209. The population groups relevant to this assessment, due to either proximity or vulnerability are (as defined in **Section 22.3.1**) include residents in the Site-specific areas, including the population near landfall (to MLWS) at Saunton Sands, along the Onshore Export Cable Corridor and the population near the onshore substation, represented by the Site Specific LSOAs 005B and 011D. Other populations that may be affected are residents along the transportation routes, represented by the Local area (North Devon). Vulnerable groups along the transportation route are represented by LSOA North Devon 009B. Visitors to the area may also be affected and these are represented by the Regional area (Devon County).

22.5.4.1.2 Health effect

210. A potential health effect is considered *likely* because, based on the approach in **Table 22.10**, there is a plausible source-pathway-receptor relationship where:

- Sources - excavated materials (dust) and particulate or emissions (construction traffic)
- Pathway - dispersion through the air
- Receptors - communities of people

211. Furthermore, the potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.5.4.1.3 Scientific literature

212. Important outdoor air pollutants are particulate matter with diameters that are 2.5 micrometres and smaller ($PM_{2.5}$), ozone (O_3), nitrogen dioxide (NO_2) and carbon monoxide (CO). The main anthropogenic sources of PM are traffic and transportation, electricity generation and other combustion processes. NO_2 and CO are principally emitted from fossil fuel combustion in urban environments. O_3 is a secondary pollutant formed by photochemical reactions between sunlight and pollutant precursors, such as nitrogen oxides and volatile organic compounds. Increased pollution exposures have been associated with increased numbers of hospital admissions and emergency-room visits, mainly due to exacerbations of chronic obstructive pulmonary disease and asthma. In the atmosphere, different PM

sizes can be found. The coarse fraction (PM_{10}–$PM_{2.5}$) can penetrate the upper airways, but the fine fraction ($PM_{2.5}$-PM_1) can be deposited in the lung, especially in the alveoli, although it could pass to the systemic circulation. Besides the size of PM, the chemical composition is important to understand the health effects. There are differences in the individual susceptibility to air pollutants, for example, children are more affected than adults. Public health interventions aimed at mitigating the effects of air pollutants and targeted to the entire population might have significant benefits for the society (Orellano et al., 2017).

22.5.4.1.4 Baseline

213. **Section 13.4.2.1.1** in **Chapter 13: Air quality** shows that the area with the most human receptors potentially exposed to dust impacts within 350m of the Onshore Development Area is in Saunton. There are also additional isolated properties located along the cable route.

214. The proximity of construction compounds to receptors has been taken into consideration within the design of the Onshore Project and, therefore, the number of human receptors within 100m of the proposed construction compounds are limited. The following construction compounds have residential properties within 100m:

- Landfall to MLWS
- North of the River Taw Crossing (one residential property)

215. **Section 13.4.2.1.1** in **Chapter 13: Air quality** states that the construction compound located nearest the highest concentration of human receptors is at landfall to MLWS with between 10 to 100 receptors up to 100m from the construction compound boundary. The location of maximum impact along the onshore export cable corridor, i.e. dustiest activities and greatest number of receptors within close proximity of the construction works, has been determined to be at the landfall to MLWS construction compound. Therefore, this area has been the focus of the construction dust assessment for human receptors along the onshore export cable corridor, to provide a conservative assessment, as the combined sources of dust from both the construction compounds and cable trenching activities is considered to represent the worst case in terms of dust impact magnitude.

216. **Section 13.4.2.3.1** in **Chapter 13: Air quality** states that specified human receptors were not required as part of the air quality assessment as detailed modelling of road traffic emissions were scoped out. This is discussed in **Section 13.5.3** of **Chapter 13: Air quality**.

217. The baseline (see **Appendix 22.A: Baseline Information**) shows how the Site-specific areas and the Local area have an older population than the national average, who may spend extended periods at home. The baseline for the Site-specific areas shows that the percentage of people reporting that their day-to-day activities are limited 'a little' is higher in the Site-specific areas (005B and 011D) and the representative LSOA for transport (009B) than in England.

218. The population at the Site-specific area of landfall to MLWS (005B) is in the ninth decile of deprivation, i.e. among the least deprived neighbourhoods. The representative LSOA for the population along the Onshore Export Cable Corridor and at the Onshore Substation 011D is in the fifth decile of deprivation. The representative LSOA for the population along the transportation route, 009B, is in the fourth decile of deprivation. The 2021 census findings of the percentages of people reporting 'very good health' and 'good health' show that the national percentage is 82.2%. The Site Specific Areas (005B: 81.1%; 011D: 80.0%; 009B: 76.7%), the Local area (80.4%) and the Regional area (81.3%) are lower than the national percentage. The general health of the affected populations is lower than but close to the national percentage.

22.5.4.1.5Policy

219. Government policy states that "Issues relating to discharges or emissions from a proposed project which affect air quality … may be subject to separate regulation under the pollution control framework or other consenting and licensing regimes" - EN-1 paragraph 4.10.1.

220. Pollution control is concerned with preventing pollution through the use of measures to prohibit or limit the releases of substances to the environment from different sources to the lowest practicable level. It also ensures that ambient air … quality meet[s] standards that guard against impacts to the environment or human health" - EN-1 paragraph 4.10.2.

221. Section 15, Paragraph 186 of the NPPF states that "Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants … Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement."

22.5.4.1.6Health priorities

222. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction; (d) Help keep communities and individuals safe
- 4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible and (c) support those with long-term conditions to maintain a good quality of life.

22.5.4.1.7 Embedded mitigation

223. **Section 13.3.6** of **Chapter 13: Air Quality** sets out embedded mitigation covering emissions from Non-Road Mobile Machinery (NRMM). These will be outlined in the Onshore Project's Outline Construction Environmental Management Plan (CEMP) and will be secured within the final CEMP submitted post-consent. **Section 13.3.6** also sets out additional mitigation regarding the prevention and management of Construction Dust and Fine Particulate Matter and Construction Phase Traffic Emissions.

22.5.4.2 Magnitude of the impact

224. The magnitude of the change due to the Onshore Project can be characterised as **low** (based on the methods described in **Section 22.2.6**). For air pollutants that are respirable (e.g. $PM_{2.5}$), the change in air quality close to particular certain dwellings or other community receptors would be infrequent and of short duration (being predominantly limited to periods of trench work or vehicular traffic in proximity to receptors). The changes would be below all recognised statutory thresholds for health protection. For particles of non-respirable size, coarser (larger and heavier) fractions of dust are expected to rapidly reduce in concentration with distance from source due to precipitation. The potential for nuisance-type dust effects is therefore expected to be occasional and limited.

225. For finer fractions of dust precipitation rates would be slower, affecting a wider area and thus more people. However, exposure is expected to be low due to the finer dust particles dispersing with increased distance. At these levels it is unlikely that there would be changes in the risk of developing a new health condition or of exacerbating an existing condition. Given the baseline air quality is good, with a large portion of the Onshore Export Cable Corridor and landfall to MLWS significantly below the average for England, it is unlikely that there would be a significant change in population health outcomes for the neighbouring community during these periods.

226. The temporal scope for this effect varies depending on location. It is anticipated that the realistic worst-case for duration of the construction of the Onshore Project is 28 months. This allows 18 months for cable installation and 16 months for the White Cross Onshore Substation Construction.

- At landfall to MLWS, there is a short-term temporal scope due to long HDD and the presence of the landfall compound. The installation of the Onshore Export Cable would be over a period of approximately 18 months
- Along the cable corridor there is a very short-term temporal scope because (as described in **Chapter 5: Project Description**) works will be undertaken in sections. Therefore, any dust or emissions will be generated along the 1,000m intervals with a typical construction presence of up to four weeks before moving along the corridor and works are proposed to be undertaken during the day time
- At the Onshore Substation, there is a short-term temporal scope because the works are planned across several months
- With regard to traffic emissions, there is a medium-term temporal scope because this will be a requirement throughout the whole construction phase of the Onshore Project. However, locally, the impacts will be short-term as the movement of materials and machinery will be avoided in the summer months.

227. **Chapter 13: Air Quality** concludes that there is a low risk to human health due to dust and fine particulate arising from earthwork, construction, and temporary tracking. Following implementation of mitigation measures recommended in the chapter residual effects are not expected to be significant.

228. The conclusions of **Chapter 13: Air Quality** due to construction vehicle emissions are:

- Emissions from non-road mobile machinery (NRMM) after implementation of mitigation measures is considered **not significant**
- Emissions from road vehicle exhaust emissions after implementation of mitigation are considered **not significant**
- Predicted pollutant concentrations were below the relevant air quality objectives at all considered receptor locations
- Project-generated construction traffic was not predicted to cause a breach of any of the air quality objectives at any identified sensitive receptor location.

22.5.4.3 Sensitivity of the receptor

229. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in **Section 22.2.6**).

230. The sensitivity of the general population, as represented by North Devon, is considered to be **low**. The North Devon population generally reports good health and low levels of deprivation. The Site Specific, Local and Regional populations are considered **medium** sensitivity. The baseline indicates an older population that has good access to health assets.

231. The groups below are particularly sensitive to emissions to air and as a result their sensitivity is considered to be **medium**. This is linked to:

- Age (young people)
- Gender (women)
- People with existing poor physical health
- Deprivation

232. Each of these factors heightens sensitivity and can also be a reason for people to spend more time in affected dwellings e.g. low economic activity, retirement, or ill health. Carers may also be affected. Women are likely to be the main providers of care. Home working and shift work apply to people of working age.

22.5.4.4 Significance of effect

233. Under all construction scenarios the conclusion of the assessment for population health is that the significance of the effect would be **negligible** for the general population and **minor adverse** for vulnerable groups. Vulnerability in this case relates to, carers, young children, retirement aged population, those with long term illness, and those who are unemployed or shift workers who are most likely to spend more of their time at home and who are living adjacent to the Onshore Project. Any effects would be below all recognised statutory thresholds for health protection, and would be short-term, temporary and would cease on completion of the works. Therefore, there would be no residual long-term health outcome.

22.5.5 Impact 5: Journey times and / or reduced access effects

22.5.5.1 Assessment

234. During the construction phase of the Onshore Project there is the potential for journey times and access to be temporarily affected by an increase in the number of HGVs or employee vehicles on the road and temporary traffic management at

certain locations. Each of these has the potential to lead to temporary delays and to temporarily reduce access to local services.

22.5.5.1.1 Populations affected (receptors)

235. The populations affected include residents in the Site-specific areas. Other populations that may be affected are residents along the transport and access routes; and people travelling to and from Barnstable including the North Devon District Hospital. These populations affected are represented by the Site Specific area (009B) and the Local area (North Devon). Visitors to the area may be affected. These are represented by the Regional area (Devon County). The study areas are defined in **Section 22.3.1.**

22.5.5.1.2 Health effects

236. Health care underpins the management of illness or injury. The key health outcomes relevant to this determinant of health are emergency response times or non-emergency treatment outcomes associated with delays or non-attendance caused by increased traffic and journey times arising from additional project traffic.

237. A potential health effect is considered *likely* because, based on the approach in **Table 22.10**, there is a plausible source-pathway-receptor relationship where:

- Source – increased number of vehicles on the road network due to the movement of construction machinery and materials or the movement of construction workers; and temporary traffic management measures due to the Onshore Project
- Pathway – journey times or accessibility to amenities/services, particularly healthcare (emergency and non-emergency)
- Receptors - road users.

238. Furthermore, the potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.5.5.1.3 Scientific literature

239. Transport allows the movement of people and goods between places, enabling access to employment, economic and social opportunities as well as to essential services (Thomson et al., 2008). Transport infrastructure and facilities are important for enabling access to these goods and services for older people (Lamanna et al., 2020, Che Had et al., 2023) and for other populations.

22.5.5.1.4 Baseline

240. The baseline (see **Appendix 22.A: Baseline Information**) shows how the Site-specific areas and the Local area have an older population than the national average, who may spend extended periods at home. The baseline for the Site-specific areas

shows that the percentage of people reporting that their day-to-day activities are limited 'a little' is higher in the Site-specific areas (005B and 011D) and the representative LSOA for transport (009B) than in England.

241. The population at the Site-specific area of landfall to MLWS (005B) is in the ninth decile of deprivation, i.e. among the least deprived neighbourhoods. The representative LSOA for the population along the Onshore Export Cable Corridor and at the Onshore Substation 011D is in the fifth decile of deprivation. The representative LSOA for the population along the transportation route, 009B, is in the fourth decile of deprivation. The 2021 census findings of the percentages of people reporting 'very good health' and 'good health' show that the national percentage is 82.2%. The Site Specific Areas (005B: 81.1%; 011D: 80.0%; 009B: 76.7%), the Local area (80.4%) and the Regional area (81.3%) are lower than the national percentage. The general health of the affected populations is lower than but close to the national percentage.

242. **Table 22.23** shows how, on the AHAH index, LSOAs 005B and 011D score high on the health domain. 009B scores 56 out of 100. A score of 100 is the worst access so the population in 009B has access to health assets that is six percentage points below the national average.

22.5.5.1.5 Policy

243. Government policy sets the following expectations for the effects on health from (decreased) access to services:

- The direct impacts on health may include increased traffic … (EN-1 paragraph 4.13.3)
- New energy infrastructure may also affect the composition, size and proximity of the local population, and in doing so have indirect health impacts, for example if it in some way affects access to key public services, transport ... (EN-1 paragraph 4.13.4).

244. Section 2, Paragraph 8 of the NPPF (Ministry of Housing, 2021) states that "Achieving sustainable development means that the planning system has three overarching objectives […]" including "b) a social objective – to support strong, vibrant and healthy communities […] with accessible services […] that reflect current and future needs and support communities' health, social and cultural well-being."

245. Section 8, Paragraph 92 of the NPPF (Ministry of Housing, 2021) states that "Planning policies and decisions should aim to achieve healthy, inclusive and safe

places which: […] c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs […]"

22.5.5.1.6 Health priorities

246. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–2025 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups; and (b) identify people at risk and intervene to improve poor mental health as soon as possible
- 4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible and (a) Prevent ill health by enabling people to live healthier lives; and (c) support those with long-term conditions to maintain a good quality of life.

22.5.5.1.7 Embedded mitigation

247. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of construction and transport activities and the potential to affect journey times and access in relation to the project:

- Outline Construction Traffic Management Plan (OCTMP): an OCTMP has been submitted to ensure adequate control and monitoring of HGV movements and managing access (**Appendix 19.B: Outline Construction Traffic Management Plan**)
- Timing of roadworks: the OCTMP includes a commitment to undertake any road works outside of the summer (**Appendix 19.B: Outline Construction Traffic Management Plan**). The only road works required for the Onshore Project would be during the installation/removal of the temporary accesses and crossings
- Strategy for access: temporary access routes to avoid HGVs on narrow local roads.

22.5.5.2 Magnitude of the impact

248. The transport assessment finds that during construction the magnitude of impact resulting from increased traffic is **negligible** to **medium** across four impacts: severance, amenity, road safety and driver delay.

- Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The maximum peak daily change in

total traffic is up to 60%, and on this basis the magnitude of impact for the general population is of between **Negligible** and **Low** magnitude

- Amenity, broadly defined as the relative pleasantness of a journey, is affected by traffic flow and composition, pavement width and separation from traffic. It can affect non-motorised users such as pedestrians, cyclists and equestrians. In relation to this project, the magnitude of impact is calculated by looking at the forecasted traffic increase and peak hour vehicle trips. Across all accessed road links, the highest magnitude is **Medium** for peak hour traffic and **Low** for average traffic
- For road safety, the magnitude of impact to the general population is considered to be **Negligible**, because none of the assessed road links will experience an increase in traffic of more than 3%
- Driver Delay is assessed for both additional capacity and geometry, i.e. constrained road space. All assessed road links have spare capacity and very low background traffic. The average of 15 additional vehicles per hour (up to 34 in peak hours) will not negate the existing spare capacity and with opportunities for passing at regular intervals the magnitude of driver delay is overall assessed as **Low**.

249. These findings hold for human health as the impacts will range from very short-term to short-term.

22.5.5.3 Sensitivity of the receptor

250. The sensitivity of the general population is considered to be **low**. The proportion of the population of North Devon who report that their day-to-day activities are limited is similar to the proportion in Devon and in England. The North Devon population reports generally good health.

251. In addition, people that may be considered vulnerable to the effects of journey times and reduced access are:

- Older people
- People living in deprivation, including those on low incomes
- People with existing poor health (physical and mental health).

252. Vulnerability in this case relates to people living in deprived areas in the vicinity of the transportation route. Vulnerable population groups include people with long-term illnesses (and their carers) and users of ambulance services.

253. Vulnerable communities may be more affected by changes in access than the general population. As noted above, one LSOA (009B) along the transport route is in decile 4 for the Index of Multiple Deprivation. The more sensitive populations

include those accessing health services (emergency or non-emergency) at times and locations where there may be some increase in congestion. Similarly, ambulance services, and the recipients of their care, are particularly sensitive to delays. The AHAH health domain for the representative LSOA (009B) has a value of 56 for the health domain, placing it mid-range in terms of accessibility to healthy assets. The assessment notes that that the AHAH Health Domain shows that other LSOAs in the transport route have higher, i.e. worse scores, for access to health services. The sensitivity of vulnerable groups is considered **low**.

22.5.5.4 Significance of effect

254. The conclusion of the assessment for population health is that the significance of the effect would be **negligible** for the general population and **minor adverse** for vulnerable groups. Vulnerability in this case relates to people who are more likely to require urgent medical care and/or are required to make frequent use of the road networks primarily due to medical access needs and those who require at home medical assistance. People over the age of 60 and those with existing health conditions would be particularly sensitive to any change. The predicted effects would be short-term, temporary and would cease on completion of the works. Therefore, there would be no residual long-term health outcome.

22.6 Potential Impacts During Operation and Maintenance

255. The potential impacts of the operation and maintenance of the Onshore Project have been assessed on human health. A description of the potential effect on human health caused by each identified impact is given in this section.

22.6.1 Impact 6: Open space, leisure and play (access)

256. The operation and maintenance activities across the Site-specific areas of Landfall to MLWS and Onshore Cable Export Corridor have the potential to affect access to open space (green and blue) and physical activity (including in natural habitats). This applies in the nearshore/intertidal zone where people engage in surfing and swimming and it applies along the recreational routes which include Public Rights of Way (PRoW), National Trails and Long Distance Paths (see **Section 19.4.1.5**). This green and blue infrastructure provides opportunities for people to connect with nature.

257. The activities during the Onshore Project's Operation and Maintenance phase have the potential to affect access to blue space and physical activity (including in natural habitats). This applies in the nearshore/intertidal zone where people engage in surfing and swimming and it applies along the recreational routes which include

Public Rights of Way (PRoW), National Trails and Long Distance Paths (see **Section 19.4.1.5**). This green and blue infrastructure provides opportunities for people to connect with nature.

22.6.1.1.1 Populations affected (receptors)

258. The populations affected are residents in the Site-specific areas. Visitors to Saunton Sands will be affected as they will be users of the recreational routes. They are each represented by the Local area (North Devon). The impact on these populations is due to the use of Saunton Sands and the recreational routes for leisure activities. The visitors to Saunton Sands will also engage in marine activities in the nearshore/intertidal zone such as surfing and swimming.

259. Populations that may be considered vulnerable are children and young people, older people, people experiencing social isolation and people with existing poor physical and mental health for whom swimming at Saunton Sands, and using the recreational routes, is an important part of their routine. Population groups that experience challenges regarding access will also be vulnerable, this includes children and young people, older people and people on low incomes.

22.6.1.1.2 Health effect

260. Health effects are likely to be associated with the actual changes effected by the Onshore Project's Operation and Maintenance phase activities, for example, the replacement or reburial of any export cables in case of either failure or exposure.

261. The way in which people understand how they will be affected by the activities during the Operation and Maintenance phase will also influence levels of leisure activity at Saunton Sands during this phase, for example, the expectation of closure of Saunton Sands or the recreational routes.

262. A potential health effect is considered *likely* because, based on the methods described in **Section 22.3.2**, there is a plausible source-pathway-receptor relationship where:

- Source – the operation and maintenance areas and activities
- Pathway – people's understanding of change in the usability of Saunton Sands and the recreational routes
- Receptors – people who use Saunton Sands and who may reduce their levels of outdoor recreation.

263. Furthermore, the potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.6.1.1.3 Scientific literature

264. The scientific literature shows that leisure activity in the ocean is associated with improved physical and mental health. The literature does not identify thresholds for effects, and it is inferred that interruptions to this could have adverse effects on physical and mental health. White et al (2020) state that much of the activity in blue spaces, at least in high income countries, is not water-based but occurs on land, e.g. beach walks; and it is this activity that predominantly explains any link between coastal proximity and health. The assessment has had regard to the population groups identified in the literature that may be particularly sensitive: children and young people, older people, people experiencing social isolation; population groups that experience challenges regarding access will also be vulnerable, this includes the groups listed above and also people on low incomes. It is noted that the whole population benefits from a physically active lifestyle and this includes leisure activity in the ocean.

22.6.1.1.4 Baseline

265. Saunton Sands is a popular destination for swimming and surfing. The recreational routes are popular for walking. The baseline (see **Appendix 22.A: Baseline Information)** shows how the Site-specific areas and the Local area have an older population than the national average. The baseline for the Site-specific areas shows that the percentage of people reporting that their day-to-day activities are limited 'a little' is higher in the Site-specific areas (005B and 011D) and the Local area than in England. The measure for self-reported social isolation is higher in the South West than in England. Maintaining levels of physical activity is important to maintain respiratory health and to reduce injuries, such as hip fractures. The baseline does not identify any geographic or population features that suggest effects could be unusually amplified.

22.6.1.1.5 Policy

266. Government policy sets the following expectations for access to open space (green and blue) and physical activity (including in natural habitats) in the local area:

- protecting and improving the natural environment (EN-1 paragraph 4.10.2)
- protection of the water environment (EN-1 paragraph 5.15.1).

22.6.1.1.6 Health priorities

267. Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019):

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) Create conditions for good health, physical activity and social interaction
- 4. Maintain good health for all [by] supporting people to stay as healthy as possible for as long as possible and (c) support those with long-term conditions to maintain a good quality of life.

268. The North Devon Coast AONB wish to ensure sustainable access to the AONB for the benefit of the health and wellbeing of local people and visitors (North Devon Coast AONB, 2019).

22.6.1.1.7 Embedded mitigation

269. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of construction activities at Landfall to MLWS and the potential to affect access to open space (green and blue) and physical activity (including in natural habitats) in the nearshore/intertidal zone and along the Onshore Export Cable Corridor:

- Communication and engagement activities to ensure that visitors to Saunton Sands and the recreational routes are aware of the timing and extent of maintenance activities
- Maintaining access to Saunton Sands during maintenance – no closure of the beach
- Providing safety marshals for the protection of the public in the nearshore/intertidal zone
- Apply health and safety requirements proportionately: for example, balance the need for fencing/hoarding/barriers in nearshore/intertidal zone to protect swimmers and surfers from accessing maintenance works with the need to maintain access to Saunton Sands. For the recreational routes, provide appropriately fenced (unmanned) crossing points; manned crossing points; and temporary alternative routes
- Communication and engagement activities to ensure that users of recreational routes are aware of the timing and extent of maintenance activities along the routes
- Measures set out in the CEMP that limit and manage the timing of maintenance activities.

22.6.1.2 Magnitude of impact

270. During the Operation and Maintenance phase, the magnitude of the change due to the Onshore Project is **negligible**.

271. In relation to access to open space, leisure and play (access), the magnitude of impact ranges from **negligible** to low for the Site Specific and the Local population, with the duration being very short-term and a one-off frequency for open cut trenching (1 x 24 hour working period) and of short-term duration for a trenchless technique such as HDD (disruption for a short period in the sub-tidal area at one from the 80-day work programme). There would be a minor change in quality of life. There would be no implications for healthcare services.

272. The magnitude of impact on vulnerable groups also ranges from **negligible** to **low**, determined by the technology used, open-cut trenching or a trenchless technique such as HDD, respectively.

22.6.1.3 Sensitivity of the receptor

273. The sensitivity of the general population is considered to be **negligible** as the baseline for Site-specific area (005B) and for the Local area (North Devon) show that the self-reported health status and level of limitation to daily activities is broadly consistent with the North Devon and England averages. Furthermore, visiting Saunton Sands and swimming in the nearshore/intertidal zone, would for most people be an occasional or seasonal event and people could have access to other beaches.

274. The sensitivity of vulnerable groups is considered **low,** the baselines in the Site-specific areas (005B, 011D), the Local area (North Devon) and England for level of limitation to daily activities are broadly consistent. The sum of the percentages of people reporting that their day-to-day activities are limited 'a lot' and 'limited a little' differs between Site-specific areas. In 005B the percentage (17.1%) is close to the national percentage. In 011D (19.0%) the percentage is lower than the Local area and the Regional area, but all are higher than England (North Devon: 19.6%; Devon: 19.5% and England: 17.3% respectively). The populations in the Site-specific and the Local areas have moderate levels of deprivation. The level of public concern regarding this matter is not known.

22.6.1.4 Significance of effect

275. The operation and maintenance activities in the nearshore/intertidal zone would be short-term.

276. Change to the population health baseline is expected to be negligible as a result of the Onshore Project. The assessment acknowledges that there is a causal pathway established in the scientific literature and there are relevant regional health priorities. No adverse effect is expected with regards to delivering local health policy.

277. The assessment considers the mitigation that has been developed. This mitigation is listed in **Section 22.3.6**.

278. There would be a differential effect between the general population and vulnerable groups, but the construction activities will have limited potential to widen inequalities due to the targeted use of mitigation. The conclusion is that the residual significance of the effect would be **negligible** for the general population and, allowing for the fact that communication and engagement activities seldom reach a whole population, up to **minor negative** (not significant) for vulnerable groups.

22.6.2 Impact 7: Community safety

279. The Onshore Project operation and maintenance activities at landfall to MLWS have the potential to contribute to community safety at Saunton Sands and to averting water-related injuries and fatalities.

22.6.2.1.1 Populations affected (receptors)

280. The affected populations are residents in the Site-specific area 005B and visitors to Saunton Sands who are represented by the population of the Local area (North Devon). The population for Devon county is also considered as people who are intending to self-harm may travel to an area where they are not known. The impact on these populations is due to their access to Saunton Sands: this includes access to the sea for people who are considering self-harm.

281. People with existing poor mental health and who may be considering self-harm are considered vulnerable. Research evidence, summarised below, suggests that, within this population, older people and women may be particularly vulnerable. Family members and acquaintances of people who self-harm are considered vulnerable.

282. Operation and Maintenance workers, including safety marshals, will be affected if there is an incident at Saunton Sands whilst operation and maintenance work is underway.

22.6.2.1.2 Health effect

283. Health effects are likely to be associated with the actual changes brought about by Onshore Project activities, for example, extraction of cables, increased signage and the presence of safety marshals at Saunton Sands.

284. This assessment distinguishes between injuries and drowning from surfing and swimming (recreational marine activities in the nearshore/intertidal zone) and from attempts at self-harm. The operation and maintenance activities of the Onshore Project will not have an effect on the risk of injury or drowning associated with surfing and swimming (recreational marine activities in the nearshore/intertidal

zone). The embedded mitigation of the safety hoarding and safety marshals will ensure that surfers and swimmers are not at risk from machinery and activities.

285. A potential health effect is considered *likely* for attempts at self-harm because, based on the methods described in **Section 22.3.2**, there is a plausible source-pathway-receptor relationship where:

- Source – the operation and maintenance activities, signage and presence of safety marshalls
- Pathway – increased capacity for human intervention
- Receptors –people with existing poor mental health who may be considering self-harm; family members and acquaintances of people who self-harm; operation and maintenance workers who may be involved in a rescue operation and in dealing with any aftermath.

286. The potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.6.2.1.3 Scientific literature

287. Drowning outcomes include death and a range of non-fatal outcomes ranging from survival with no lasting consequence to survival with permanent neurological impairment (Beerman et al., 2018).

288. Drowning can be an intentional act of self-harm; it is a relatively uncommon method of suicide in most high-income countries; there are challenges in establishing a baseline as it can be hard to distinguish between a suicide and unintentional drowning; and, as a method, it is more likely to be chosen by older people (Haw and Hawton, 2016). Research in the Netherlands concluded that living close to the coast is associated with greater suicide risk for women (Helbich et al., 2022). Research in Australia reported that people travelled to reach the coast for increased anonymity so as to reduce the chance of being interrupted, that coastal suicides were higher in males than females and that female decedents had a higher incidence of mental ill health or a history of suicidal behaviours (Lawes et al., 2021). Financial downturn leads to an increase in mental ill health across the population that can, in turn, translate into despair and self-harm (Hawton and Haw, 2013). It is estimated that, for every suicide, between six and 20 people, usually family members and acquaintances of those who died, are adversely affected psychologically and emotionally (Andriessen et al., 2019).

289. Those who protect the public, such as first responders, are at greater risk for mental ill health and compromised well-being than the general population and strategies

for supporting mental health and well-being need to be implemented early in the first responder career and then reinforced throughout and into retirement (Smith et al., 2021). This assessment applies this finding to the operation and maintenance workers.

22.6.2.1.4 Baseline

290. Saunton Sands is a popular destination for swimming and surfing. The baseline (see **Appendix 22.A: Baseline Information**) shows how the Site-specific area, the Local area and the Regional area have an older population than the national average. The standardised admission ratio, between 2016/17 and 2020/21, for Emergency hospital admissions for intentional self harm is higher in North Devon than in Devon (OHID, 2022b). Both are higher than the national value. The baseline does not identify any geographic or population features that suggest effects could be unusually amplified.

22.6.2.1.5 Policy

291. Government policy sets the following expectations for access to open space (green and blue) and physical activity (including in natural habitats) in the local area:

- protecting and improving the natural environment (EN-1 paragraph 4.10.2)
- protection of the water environment (EN-1 paragraph 5.15.1).

292. Section 8, Paragraph 92 of the NPPF (Ministry of Housing, 2021) states that planning […] decisions should aim to achieve healthy, inclusive and safe places which […] c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible green infrastructure.

22.6.2.1.6 Health priorities

293. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups; (b) identify people at risk and intervene to improve poor mental health as soon as possible; and (d) promote a positive approach to mental health and wellbeing.

294. The North Devon Coast AONB wishes to ensure sustainable access to the AONB for the benefit of the health and wellbeing of local people and visitors (North Devon Coast AONB, 2019).

295. The England and Devon strategies for suicide prevention each include a priority of reducing access to means of suicide (PHE, 2012, Public Health Devon and Devon County Council, no date).

296. The priorities of the National Drowning Prevention Strategy (National Water Safety Forum, 2015) include:

- Every community with water risks should have a community-level water safety risk assessment and water safety plan
- To better understand water-related self-harm
- Increase awareness of everyday risks in, on and around water.

22.6.2.1.7 Embedded mitigation

297. The following mitigation forms part of the Onshore Project and has been taken into account as part of the assessment of operation and maintenance activities at Landfall to MLWS and the potential to affect community safety in the nearshore/intertidal zone:

- Maintaining access to Saunton Sands during operation and maintenance – no closure of the beach
- Providing safety marshals for the protection of the public
- Apply health and safety requirements proportionately: for example, balance the need for fencing/hoarding/barriers in nearshore/intertidal zone to protect swimmers and surfers from accessing operation and maintenance works with the need to maintain access to Saunton Sands.

22.6.2.2 Magnitude of impact

298. The magnitude of the impact of someone attempting to self-harm spans the entire range of scores (see **Table 22.11**). While the Operation and Maintenance Phase of the Onshore Project will not increase the likelihood of someone attempting to self-harm, it is reasonable to suppose that the presence of the operation and maintenance workforce at Saunton Sands would increase the opportunity to deter someone from attempting to self-harm. This is considered below, once the different magnitudes of impact of someone attempting to self-harm are considered.

299. A self-harm event on Saunton Sands during the Operation and Maintenance Phase is considered to be rare and on this basis is of **negligible** magnitude. If an event

were to occur, the health outcome, for the individual concerned could range from injuries with no lasting consequences (**negligible** magnitude) to permanent impairment or death (**high** magnitude). The family members and acquaintances of people who self-harm would be adversely affected psychologically and emotionally, and the magnitude would range from **low** to **high**.

300. The operation and maintenance workforce would potentially become involved. Operation and maintenance workers, involved in rescue attempts and in dealing with any aftermath, may experience mental ill health and compromised well-being (**medium** magnitude). An event of this kind has implications for healthcare services that range from treatment of minor injury and the need for mental health services for the individual concerned (**low to medium** magnitude) to requirement for emergency care and longer-term need for mental health services for the individual, their wider network and the operation and maintenance worker (**high** magnitude).

301. The magnitudes of the impacts of an event range from **negligible**, due to the rarity of this as an event, to **high** (negative) if such an event does occur. The presence of operation and maintenance workers may act as a deterrent and would therefore avert injury or a fatality and would be **high** magnitude (beneficial).

22.6.2.3 Sensitivity of the receptor

302. The Site Specific, Local and Regional populations are considered **moderate** sensitivity due to the baseline indicating higher regional levels of self-harm than are reported nationally.

303. People with poor mental health are at increased risk of suicide and research indicates that women are at increased risk of suicide in coastal areas and that older people are more likely to choose drowning as a method of suicide. These groups are **highly** sensitive.

304. The outlook of family members and acquaintances of people who self-harm is one of uncertainty and concern and their sensitivity is **medium**.

305. Operation and maintenance workers may become involved in prevention or rescue attempts or witness the aftermath. Their sensitivity is **medium**.

22.6.2.4 Significance of effect

306. The operation and maintenance activities in the nearshore/intertidal zone would be infrequent and short-term. The assessment considers the mitigation that has been developed.

307. Fatality in coastal waters is a rare event with a very high impact. Change to the population health baseline is expected to be small as a result of the Onshore Project but reduction in, and prevention of, fatalities will make a positive contribution to regional priorities (Public Health Devon and Devon County Council, no date) and to the National Water Safety Form's Drowning Prevention Strategy (National Water Safety Forum, 2015). It will assist in ensuring that the Onshore Project contributes to Saunton Sands remaining a healthy, inclusive and safe place, *as per* Section 8, Paragraph 92 of the NPPF (Ministry of Housing, 2021). The assessment acknowledges that there is a causal pathway established in the scientific literature. No adverse effect is expected with regards to delivering local health policy.

308. The conclusion is that the effect would be **negligible** for the general population.

309. The effect for people with mental ill health who are considering self-harm is **minor beneficial** (not significant) as the presence of operation and maintenance workers will provide some measure of deterrent. This applies also to their family members and acquaintances. The operation and maintenance workers will be affected if an event does occur. The effect will depend upon the event and the effect will range from **minor negative** effect (not significant) to **moderate negative** (significant) for operation and maintenance workers who witness, or become involved in, an event.

22.6.2.5 Additional enhancement

310. The Onshore Project has the opportunity to enhance community safety at Saunton Sands by providing resources and by increasing capacity for human intervention if people are attempting or considering self-harm. This is a professional judgement and is made with medium level of confidence based on academic and scientific studies. It is acknowledged that a self-harm event, leading to injury or fatality, is low probability but that it would also be very serious.

311. The additional enhancement would comprise of signs that provide information about safety and sources of help for those considering self-harm; and training for safety marshals to train increased awareness about self-harm and actions to take. The CEMP would include water safety risk assessment and water safety plans and relevant training for safety marshals and other operation and maintenance workers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.

22.6.2.6 Residual significance

312. There would be a differential effect between the general population and vulnerable groups. The operation and maintenance activities, the signage and the presence of the workforce, will have limited potential to widen inequalities as the events are rare, but the targeted use of enhancement can have a deterrent or a protective effect. The conclusion is that the residual significance of the effect would be **negligible** for the general population and up to **moderate beneficial** (significant) for people with mental ill health who are considering self-harm, for their family members and acquaintances and for the operation and maintenance workers.

22.6.3 Impact 8: EMF effects

22.6.3.1 Assessment

22.6.3.1.1 Populations affected (receptors)

313. The onshore transmission infrastructure and onshore substation will generate EMFs when the Off- and Onshore Project is in operation. The 50 Hz EMFs generated by this type of electricity transmission are often referred to as power frequency or extremely low frequency (ELF) EMFs. ELF EMFs are produced wherever electricity is generated, transmitted or used.

314. The population groups relevant to this assessment, due to either proximity or other sensitivity are:

- The population along the Onshore Export Cable Corridor (Site-specific)
- The population near the onshore substation (Site-specific).

315. The following vulnerable groups;

- Children and young people
- Older people
- People with existing poor health (physical and mental health)
- People living in deprivation (including those experiencing income and/or access/geographic vulnerability).

22.6.3.1.2 Health effect

316. The temporal scope for potential effects would likely to be long term due to the operation of the infrastructure being 50 years.

317. The Offshore and Onshore Project will only design and install equipment that is compliant with the relevant exposure limits. To ensure this, all of the equipment for the Offshore- and Onshore Project capable of producing EMFs will be assessed in accordance with the provisions of the UK Government's Code of Practice on

Compliance, which is compliant with ICNIRP guidance (International Commission on Non-ionizing Radiation Protection, 1998).

318. The government, acting on the advice of the authoritative scientific bodies, has put in place appropriate measures to protect the public from EMFs.

319. Based on the approach in **Table 22.10**, there is no plausible source-pathway-receptor relationship as:

- Source – Onshore Export Cable Corridor, cable crossing points, and onshore substation. These sources are all below regulatory exposure limit
- Pathway – electric and magnetic fields. However, such fields will be designed within regulatory standards, avoid a plausible pathway of effect
- Receptor – people living close to the onshore substation and cable corridor.

320. As there is no plausible source-pathway-receptor relationship, there would be no likely significant population health effects, for the general population or for vulnerable groups, from EMF from the Onshore Export Cable Corridor or Onshore Substation.

321. Other OWF projects have assessed the proposed technology options for the export cables and third-party crossing points. Even under worst case conditions where circuits were carrying the maximum load producing the highest magnetic fields possible, would be fully compliant with the government policy. Specifically, all the fields produced would be significantly below the relevant exposure limits. Therefore, it is considered unlikely that there would be a significant EMF effect resulting from the Onshore Project.

22.6.3.1.3 Mitigation

322. Non-technical information about the electrical infrastructure and its compliance with UK guidance will be provided if concerns are expressed due to EMF risk. It is recognised that this can occur at any time and need not be restricted to the Operation and Maintenance phase. This information will explain that any potential EMF risks have been examined and do not pose a risk to public health. This will contribute to avoiding adverse health outcomes from the public understanding of EMF risk and negative impacts on mental health.

22.6.4 Impact 9: Wider societal infrastructure and resources

22.6.4.1 Assessment

323. There are potential gains for wider society as a result of the operation and maintenance of the Onshore Project.

22.6.4.1.1 Populations affected (receptors)

324. The population groups relevant to this assessment, due to either proximity or vulnerability, are

- The Site Specific, Local, Regional and National populations
- People with existing poor health (physical and mental health)
- Children and young people
- Working age
- Older people
- People living in deprivation (including those experiencing income and/or access/geographic vulnerability).

22.6.4.1.2 Health effect

325. The temporal scope is long-term as it relates to the Operation and Maintenance phase.

326. A potential health effect is considered *likely* because, based on the approach in **Table 22.10**, there is a plausible source-pathway-receptor relationship where:

- Source – renewable energy created during the operation of the Off- and Onshore Project
- Pathway – (national) energy security, potential to contribute to affordable energy and reduction in air pollutant and greenhouse gas emissions
- Receptor – all population groups listed in the section above

327. Furthermore, the potential effect is probable as no unusual conditions are required for the source-pathway-receptor linkage.

22.6.4.1.3 Scientific literature

328. The generation of power through offshore wind would reduce air pollutants and greenhouse gas emissions that are produced from the generation of electricity from non-renewable sources of energy (i.e. coal, oil, gas, etc.). The associated key health outcomes are reductions in premature deaths, heart attacks, asthma exacerbations, and hospitalizations for cardiovascular or respiratory issues (Buonocore et al., 2016).

22.6.4.1.4 Baseline

329. The baseline shows the Local, North Devon (12.3%) and Regional, Devon (11.4%) levels of fuel poverty to be lower than the national average (13.2%) (**Appendix 22.A: Baseline Information**). The Devon Community Foundation cautions that Devon has an elderly population, a high proportion of rural households, a generally low-wage economy, and a lack of good quality, affordable housing, and concludes that

fuel poverty will remain an issue in Devon for some time (Devon Community Foundation, no date).

22.6.4.1.5 Policy

330. The policy context that informs the assessment of potential impacts on climate change is set out in **Section 23.2** of **Chapter 23: Climate Change**.

22.6.4.1.6 Health priorities

331. Devon County Council considered the links between climate change and health (MacHale, 2020) and while it does not explicitly mention offshore wind it notes the role played by renewable energy in contributing to reducing emissions.

332. Relevant priorities from Devon's Joint Health and Wellbeing Strategy 2020–25 (Devon Health and Wellbeing Board, 2019) are provided below:

- 2. Healthy, safe, strong and sustainable communities [by] creating conditions for good health and wellbeing where we live, work and learn and (b) create conditions for good health, physical activity and social interaction
- 3. Focus on mental health, building good emotional health and wellbeing, happiness and resilience [by actions that] (a) reduce loneliness in all age groups; (b) identify people at risk and intervene to improve poor mental health as soon as possible; and (d) promote a positive approach to mental health and wellbeing.

22.6.4.2 Magnitude of impact

333. The magnitude from a health perspective is considered **low to medium (beneficial)**, driven by the longer term regional, national and international wider benefits to society, which could contribute to minor to moderate beneficial changes in quality of life for a large proportion of the population. The benefits of providing renewable infrastructure through the Onshore Project would add to national energy security, which is relevant to wider public health supporting technologies, services and living standards as well as the potential contribution to affordable energy which is relevant to those on low incomes. In addition, renewable sources of energy reduce the adverse health effects of climate change experienced internationally, particularly in low and middle income countries.

22.6.4.3 Sensitivity of the receptor

334. The sensitivity of the general population and vulnerable groups (collectively grouped) is determined separately and characterised below (based on the methods described in **Section 22.3.4.3**). Sensitivity in this case is related to how likely it is a population could benefit from energy security and from the generation of renewable energy as part of the Onshore Project.

335. The baseline shows the Local, North Devon (12.3%) and Regional, Devon (11.4%) levels of fuel poverty to be lower than the national average (13.2%) (**Appendix 22.A: Baseline Information**).

336. The sensitivity of the general population can be characterised as **medium**, and the sensitivity of vulnerable population groups can be characterised as **high**.

22.6.4.4 Significance of Impact

337. The conclusion of the assessment for population health is that any change due to White Cross would be a **low** to **medium beneficial** magnitude of change on a receptor of **medium** to **high** sensitivity. This represents an impact of **minor beneficial** significance, i.e. not significant for both the general population and vulnerable groups. Vulnerability in this case may particularly relate to people on low incomes or who are experiencing fuel poverty.

338. Scientific literature shows that decarbonising the energy sector and switching to renewable energy helps to reduce air pollution and greenhouse gas emissions, which are associated with premature deaths, heart attacks, asthma exacerbation and hospitalisation for cardiovascular or respiratory issues.

339. There are no regulatory standards with regard to wider societal benefits as a determinant of health. The NPS for Overarching Energy (EN-1) (DECC, 2011) states that "energy production has the potential to impact on the health and well-being ("health") of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the production, distribution and use of energy may have negative impacts on some people's health".

340. The Project is likely to have a positive, albeit marginal, effect on delivering health policy on standards of living and fuel poverty, as well as supporting a marginal reduction in inequalities. Overall, a slight beneficial effect on the population health baseline would be expected.

22.7 Potential Impacts During Decommissioning

341. No decision has been made regarding the final decommissioning policy for the Onshore Project as it is recognised that industry best practice, rules and legislation change over time.

342. The anticipated decommissioning activities are outlined in **Section 22.3.5**. The potential impacts of the decommissioning of the Onshore Project have been assessed for human health on the assumption that decommissioning methods will

be similar or of a lesser scale than those deployed for construction. The types of impact would be comparable to those identified for the construction phase:

- Impact 1: Open space, leisure and play (access)
- Impact 2: Community safety
- Impact 3: Noise
- Impact 4: Air quality
- Impact 5: Journey times and/or reduced access effects

343. The magnitude of impacts would be comparable to or less than those identified for the construction phase.

22.8 Potential cumulative effects

344. The approach to cumulative effect assessment (CEA) is set out in **Chapter 6: EIA Methodology**. Only projects which are reasonably well described and sufficiently advanced to provide information on which to base a meaningful and robust assessment have been included in the CEA. Projects which are sufficiently implemented during the site characterisation for the Onshore Project have been considered as part of the baseline for the EIA. Where possible the Applicant has sought to agree with stakeholders the use of as-built project parameter information (if available) as opposed to consented parameters to reduce over-precaution in the cumulative assessment. The scope of the CEA was therefore be established on a topic-by-topic basis with the relevant consultees.

345. The cumulative effect assessment for human health was undertaken in two stages. The first stage was to consider the potential for the effects assessed as part of the Onshore Project to lead to cumulative effects in conjunction with other projects. The first stage of the assessment is detailed in **Table 22.25**.

346. Only potential impacts assessed in **Sections 22.5**, **22.6** and **22.7** as negligible or above are included in the CEA (i.e. those assessed as 'no impact' are not taken forward as there is no potential for them to contribute to a cumulative impact).

Table 22.25 Potential cumulative impacts considered for human health

Impact	Potential for cumulative effect	Rationale
Construction		
Impact 1: Open space, leisure and play (access)	Yes	Onshore construction activities could overlap with construction activities in other projects.

Impact	Potential for cumulative effect	Rationale
Impact 2: Community safety		
Impact 3: Noise		
Impact 4: Air quality		
Impact 5: Journey times and access	Yes	Onshore construction activities could overlap with construction activities in other projects.
Operation and Maintenance		
Impact 6: Open space, leisure and play (access)	Yes	Onshore operation and maintenance activities could overlap with activities in other projects.
Impact 7: Community safety		
Impact 8: EMF effects	No	No EMF effects with significant effects on human health are expected.
Impact 9: Wider societal infrastructure and resources	Yes	This effect applies to society in general and so is inherently cumulative.

347. The second stage of the CEA is to evaluate the projects considered for the CEA to determine whether a cumulative impact is likely to arise. The list of considered projects (identified in **Chapter 6: EIA Methodology**) and their anticipated potential for cumulative impacts are summarised in **Table 22.26**). In all cases but one, the projects are several 10s of kilometres away from the Onshore Project and there is therefore no potential for cumulative impact on the identified receptors.

Table 22.26 Projects considered in the cumulative effect assessment on human health

Project	Status	Distance from windfarm site (km)	Included in the CEA?	Rationale
White Cross Offshore Project	Planned	0 (Landfall to MLWS)	Yes	This is included as part of the assessment as it is interrelated with the onshore components considered in this chapter.
Sandy Lane dwelling	Approved	Within Area of Search (AoS)	Yes	This is included in the assessment because it falls within the Area of Search.
Sandy Lane Farm Lane	Approved	Within AoS	Yes	This is included in the assessment because it

Project	Status	Distance from windfarm site (km)	Included in the CEA?	Rationale
Over Swanpool Bridge				falls within the Area of Search.
Orchard Lodges Lower Yelland Farm	Approved	Within AoS	Yes	This is included in the assessment because it falls within the Area of Search.
20 West Yelland Yelland Barnstaple	Pending	Within AoS	Yes	This is included in the assessment because it falls within the Area of Search.
The Stables South Hole Farm	Approved	Within AoS	Yes	This is included in the assessment because it falls within the Area of Search.
Yelland Quay Development	Appeal – Approved	0.2km to substation RLB	Yes	This is included in the assessment because it falls within the Area of Search.

348. It is noted that the first project listed is the Section 36 consent application for the offshore components of the White Cross OWF which are a separate element to the onshore Town and Country Planning Application for which this ES is prepared. The specific combined project components are assessed cumulatively first and then cumulatively with all other projects.

22.8.1 Cumulative Impact 1: [Construction] Open space, leisure and play (access)

349. There is potential for temporal overlap of offshore export cable construction across the landfall zone of northern Saunton Sands and the onshore installation of the cables.

22.8.1.1 Magnitude of impact and significance of the effect

350. Based on an assumption that the installation of the landfall cable across Saunton Sands would take place over a period of up to two days, a temporal overlap in cable construction activities is unlikely. The installation of the export cable in the subtidal zone and the installation of the onshore cable landwards would have no interaction and the move from the Offshore to the Onshore Project would necessitate neither new equipment nor a change in workforce. The magnitude of impact on access to

open space and to leisure is therefore considered negligible. The overall significance of the effect under a worst case scenario on the identified receptors is deemed **negligible**.

22.8.1.2 Further Mitigation

351. No further mitigation is required.

22.8.2 Cumulative Impact 2: [Construction] Community safety

352. There is potential for temporal overlap of offshore export cable construction across the landfall zone of northern Saunton Sands and the onshore installation of the cables.

22.8.2.1 Magnitude of impact and significance of the effect

353. Based on an assumption that the installation of the landfall cable across Saunton Sands would take place over a period of up to two days, a temporal overlap in cable construction activities is unlikely. The installation of the export cable in the subtidal zone and the installation of the onshore cable landwards would have no interaction and the move from the Offshore to the Onshore Project would necessitate neither new equipment nor a change in workforce. The magnitude of impact on community safety is therefore considered negligible. The overall significance of the effect under a worst case scenario on the identified receptors is deemed **negligible**.

22.8.3 Cumulative Impact 3: [Construction] Noise

354. The onshore developments identified within the cumulative list are different in nature compared to the Onshore Project's Infrastructure. They are all relatively small in scale and have limited complementarities with it. The majority of the projects are likely to be constructed by the time construction starts on the Onshore Infrastructure.

22.8.3.1 Magnitude of impact and significance of the effect

355. The magnitude of this impact is currently expected to be **negligible**.

22.8.3.2 Further Mitigation

356. No further mitigation is required.

22.8.4 Cumulative Impact 4: [Construction] Air quality

357. The onshore developments identified within the cumulative list are different in nature compared to the Onshore Project's Infrastructure. They are all relatively small in scale and have limited complementarities with it. The majority of the

projects are likely to be constructed by the time construction starts on the Onshore Infrastructure.

22.8.4.1 Magnitude of impact and significance of the effect

358. The magnitude of this impact is currently expected to be negligible.

22.8.4.2 Further Mitigation

359. No further mitigation is required.

22.8.5 Cumulative Impact 5: [Construction] Journey times and access

360. The onshore developments identified within the cumulative list are different in nature compared to the Onshore Project's Infrastructure. They are all relatively small in scale and have limited complementarities with it. The majority of the projects are likely to be constructed by the time construction starts on the Onshore Infrastructure.

22.8.5.1 Magnitude of impact and significance of the effect

361. The magnitude of this impact is currently expected to be negligible.

22.8.5.2 Further Mitigation

362. No further mitigation is required.

22.8.6 Cumulative Impact 6: [Operation and Maintenance] Open space, leisure and play (access)

363. The onshore developments identified within the cumulative list are different in nature compared to the Onshore Project's Infrastructure. They are all relatively small in scale and have limited complementarities with it.

22.8.6.1 Magnitude of impact and significance of the effect

364. The operation and maintenance activities for the export cable in the subtidal zone and for the onshore cable landwards are not likely to have any interaction. The magnitude of impact on access to open space and to leisure is therefore considered negligible. The overall significance of the effect under a worst case scenario on the identified receptors is deemed **negligible**.

22.8.6.2 Further Mitigation

365. No further mitigation is required.

22.8.7 Cumulative Impact 7: [Operation and Maintenance] Community safety

366. The onshore developments identified within the cumulative list are different in nature compared to the Onshore Project's Infrastructure. They are all relatively small in scale and have limited complementarities with it. The operation and maintenance activities for the export cable are not likely to have any interaction with the onshore developments identified within the cumulative list.

22.8.7.1 Magnitude of impact and significance of the effect

367. The magnitude of impact on community safety is therefore considered negligible. The overall significance of the effect under a worst case scenario on the identified receptors is deemed **negligible**.

22.8.7.2 Further Mitigation

368. No further mitigation is required.

22.8.8 Cumulative Impact 8: [Operation and Maintenance] Wider societal resources and infrastructure

369. The operation and maintenance activities for the export cable and the onshore developments identified within the cumulative list are not likely to have any interaction.

22.8.8.1 Magnitude of impact and significance of the effect

370. The magnitude of impact on wider societal resources and infrastructure is therefore considered negligible. The overall significance of the effect under a worst case scenario on the identified receptors is deemed **negligible**.

22.8.8.2 Further Mitigation

371. No further mitigation is required.

22.9 Potential Transboundary Impacts

372. The Scoping Report identified that there was no potential for significant transboundary effects regarding human health from the Onshore Project upon the interests of other EEA States and this is not discussed further.

22.10 Inter-relationships

373. Inter-relationship impacts are covered as part of the assessment and consider impacts from the construction, operation or decommissioning of the Onshore Project

on the same receptor (or group). A description of the process to identify and assess these effects is presented in **Chapter 6: EIA Methodology**. The potential inter-relationship effects that could arise in relation to human health include both:

- **Project lifetime effects:** Effects arising throughout more than one phase of the Onshore Project (construction, operation, and decommissioning) to interact to potentially create a more significant effect on a receptor than if just one phase were assessed in isolation
- **Receptor led effects:** Assessment of the scope for all relevant effects to interact, spatially and temporally, to create inter-related effects on a receptor (or group). Receptor-led effects might be short term, temporary or transient effects, or incorporate longer term effects.

374. **Table 22.27** serves as a sign-posting for inter-relationships.

Table 22.27 Human Health Inter-relationships

Topic and description	Related chapter	Where addressed in this Chapter	Rationale
Impact 1: Open space, leisure and play (access)	**Chapter 15: Land Use**	**Section 22.5.1**	Access to blue and green space is a determinant of health
Impact 3: Noise	**Chapter 18: Noise and Vibration**	**Section 22.5.3**	Noise is a determinant of population health.
Impact 4: Air quality	**Chapter 13: Air Quality**	**Section 22.5.4**	Air quality is a determinant of population health.
Impact 5: Journey times and / or reduced access effects	**Chapter 19: Traffic and Transport**	**Section 22.5.5**	Transport is a determinant of population health.
Impact 6: Open space, leisure and play (access)	**Chapter 15: Land Use**	**Section 22.6.1**	Access to blue and green space is a determinant of health
Impact 9: Wider societal infrastructure	**Chapter 23: Climate Change**	**Section 22.6.4**	Climate Change is a determinant of population health.

22.11 Interactions

375. The population health effects of individual determinants of health identified and assessed in this chapter have the potential to be experienced by the same populations, potentially giving rise to additive or synergistic effects.

376. The areas of interaction between impacts are presented in **Table 22.28**, **Table 22.29** and **Table 22.30** along with an indication as to whether the interaction may give rise to synergistic impacts. This provides a screening tool for which impacts have the potential to interact.

Table 22.31 then provides an assessment for each receptor (or receptor group) related to these impacts in two ways. Firstly, the impacts are considered within a development phase (i.e., construction, operation, maintenance or decommissioning) to see if, for example, multiple construction impacts could combine. Secondly, a lifetime assessment is undertaken which considers the potential for impacts to affect receptors across development phases. The significance of each individual impact is determined by the sensitivity of the receptor and the magnitude of impact; the sensitivity is constant whereas the magnitude may differ. Therefore, when considering the potential for impacts to be additive it is the magnitude of impact which is important – the magnitudes of the different effects are combined upon the same sensitivity receptor.

Table 22.28 Interaction between impacts during construction

Construction	Potential impact Impact 1: Open space, leisure and play (access)	Impact 2: Community safety	Impact 3: Noise	Impact 4: Air quality	Impact 5: Journey times and access
Impact 1: Open space, leisure and play (access)		Yes	Yes	Yes	Yes
Impact 2: Community safety	Yes		No	No	No
Impact 3: Noise	Yes	No		Yes	Yes
Impact 4: Air quality	Yes	No	Yes		Yes
Impact 5: Journey times and access	Yes	No	Yes	Yes	

Table 22.29 Interaction between impacts during operation and maintenance

Operation and maintenance	Potential impact Impact 6: Open space, leisure and play (access)	Impact 7: Community safety	Impact 8: EMF effects	Impact 9: Wider societal infrastructure and resources
Impact 6: Open space, leisure and play (access)		Yes	No	Yes
Impact 7: Community safety	Yes		No	Yes
Impact 8: EMF effects	No	No		No
Impact 9: Wider societal infrastructure and resources	Yes	Yes	No	

Table 22.30 Interaction between impacts during decommissioning

Decommissioning	Potential impact Impact 10: Open space, leisure and play (access)	Impact 11: Community safety	Impact 12: Noise	Impact 13: Air quality	Impact 14: Journey times and access
Impact 12: Open space, leisure and play (access)		Yes	Yes	Yes	Yes
Impact 13: Community safety	Yes		No	No	No
Impact 14: Noise	Yes	No		Yes	Yes
Impact 15: Air quality	Yes	No	Yes		Yes
Impact 16: Journey times and access	Yes	No	Yes	Yes	

Table 22.31 Potential interactions between impacts on human health.

Receptor	Construction	Operation and Maintenance	Decommissioning	Lifetime Assessment
Population near landfall at Saunton Sands (Site-specific)	Negligible	Negligible	Negligible	Negligible
Population along the Onshore Export Cable Corridor (Site-specific)	Negligible	Negligible	Negligible	Negligible
Population resident at the Onshore substation (Site-specific)	Negligible	Negligible	Negligible	Negligible
Population resident along the Transportation route (Site-specific)	Negligible	Negligible	Negligible	Negligible
Population of North Devon (Local)	Negligible	Negligible	Negligible	Negligible
Population of Devon (Regional)	Negligible	Negligible	Negligible	Negligible
Children and young people	Negligible	Negligible	Negligible	Negligible
Women	Negligible	Negligible	Negligible	Negligible
Older people	Negligible	Negligible	Negligible	Negligible
People experiencing social isolation	Negligible	Negligible	Negligible	Negligible
People on low income	Negligible	Negligible	Negligible	Negligible
People with existing poor health (physical and mental health)	Negligible to high beneficial	Negligible to high beneficial	Negligible to high beneficial	Negligible to high beneficial

Receptor	Construction	Operation and Maintenance	Decommissioning	Lifetime Assessment
People indirectly affected by self-harm attempts	n/a	n/a	n/a	n/a

22.12 Potential transboundary impacts

377. The Scoping Report identified that there was no potential for significant transboundary effects regarding human health from the Onshore Project upon the interests of other EEA States and this is therefore **scoped out**.

22.13 Summary

378. This chapter has investigated the potential effects on human health receptors arising from the potential impact of the Onshore Project landward of Mean Low-Water Springs (MLWS), along the Onshore Export Cable Corridor and to the Onshore Substation. The Construction phase, the Operation and Maintenance phase, and the Decommissioning phase have been considered. The range of potential impacts and associated effects considered has been informed by the Scoping Opinion as well as reference to existing policy and guidance. The impacts considered include those brought about directly as well as indirectly.

379. The representative LSOAs for the Site-specific study areas are LSOA 005B and 011D and the Local area is North Devon. LSOA 009B is the representative LSOA for vulnerable groups along the transportation route. LSOA 005B is in the ninth decile for the IMD, and thus has low levels of deprivation. LSOA 011D is in the fifth decile for the IMD and so is close to the national average for deprivation. LSOA 009B is in the fourth decile for the IMD and so is above the national average for deprivation The populations of North Devon district and of Devon county have a higher percentage of older people than the population of England. The county has a population growth above the national average, influenced by the inward migration of people aged 40 to 75 (Devon Health and Wellbeing Board, 2019). The population is set to grow by 88,000 over the next 20 years, with low growth in under 65s and with considerable growth in the older population (Devon Health and Wellbeing Board, 2019).(Devon Health and Wellbeing Board, 2019) LSOA 005B and 011D have a higher percentage of retirement-aged people (65+) when compared with North Devon local authority area, Devon and with the national UK average (Nomis, no date-e, Nomis, no date-c, Nomis, no date-j, Nomis, no date-f, Nomis, no date-g).

380. **Table 22.32** presents a summary of the impacts assessed within this ES chapter, any commitments made, and mitigation required and the residual effects. Adverse significant residual effects have not been identified. The potential for limited beneficial impacts arising from Community Safety measures have been identified.

381. The assessment of cumulative effects from the Onshore Project, and its embedded mitigation, and other developments and activities concluded that effects would be

negligible for the general population. For relevant vulnerable groups, combined proximity and increased sensitivity may result in a range of effects from minor adverse (not significant) to minor beneficial (not significant). The final conclusion is that the cumulative effects will be negligible for vulnerable groups.

382. The screening of transboundary impacts was not required.

Table 22.32 Summary of potential impacts for human health during construction, operation, maintenance and decommission of the Onshore Project

Potential impact Construction	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
Impact 1: Open space, leisure and play (access)	Site-specific area 005B	Negligible	Negligible to low	Negligible to minor negative (not significant)	Communication and engagement activities to ensure that visitors to Saunton Sands and the recreational routes are aware of the timing and extent of construction activities. Maintaining access to Saunton Sands during construction – no closure of the beach. Providing safety marshals for the protection of the public in the nearshore/intertidal zone. Apply health and safety requirements proportionately: for example, balance the need for fencing/hoarding/barriers in nearshore/intertidal zone to protect swimmers and surfers from accessing construction and/or maintenance works with the need to maintain	Negligible
	Local area (North Devon)	Negligible	Negligible to low	Negligible to minor negative (not significant)		Negligible
	Children and young people	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	Older people	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People experiencing social isolation	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People on low incomes	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People with existing poor physical and mental health	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
					access to Saunton Sands. For the recreational routes, provide appropriately fenced (unmanned) crossing points; manned crossing points; and temporary alternative routes. Measures set out in the CEMP that limit and manage the timing of construction activities. Fencing/hoarding/barriers in nearshore/intertidal zone to prevent access to construction works and to protect swimmers and surfers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.	
Impact 2: Community safety	Site-specific area 005B	Medium	Low	Minor beneficial (not significant)	Providing resources and increasing capacity for human intervention if people are attempting or considering self-harm. This would comprise of	Moderate beneficial (significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Local area (North Devon)	Medium	Low	Minor beneficial (not significant)	signs with information about safety, to reduce accidental fatality, and sources of help for those considering self-harm; support to local initiatives for non-health staff and members of the public to train and/or raise awareness about self-harm. The CEMP will include water safety risk assessment and water safety plan and other relevant training for safety marshals and other construction workers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.	Moderate beneficial (significant)
	Regional (Devon)	Medium	Low	Minor beneficial (not significant)		Moderate beneficial (significant)
	People with existing poor physical and mental health (including women and older people)	High	High	Minor beneficial (not significant)		Moderate beneficial (significant)
	People indirectly affected by self-harm attempts	Medium	Low to high	Up to moderate negative (significant) to minor beneficial (significant)		Moderate beneficial (significant)
Impact 3: Noise	Site-specific area 005B	Medium	Negligible to low	Negligible to minor negative (not significant)	Embedded and further mitigation covering Construction phase noise and vibration; Construction phase road traffic noise; Operational substation noise and further good practice, as	Negligible to minor negative (not significant)
	Site-specific area 011D	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
					summarised in **Section 22.5.3.1.7** and set out in **Chapter 18: Noise and Vibration Section 18.5**.	(not significant)
	Site-specific area 009B	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)
	Children and young people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Working age	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Older people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Women	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	People with existing poor physical and mental health	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Gender (Women)	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Deprivation	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
Impact 4: Air quality	Site-specific area 005B	Medium	Negligible to low	Negligible to minor negative (not significant)	Embedded and further mitigation covering NRMM and further good practice, as summarised in **Section 22.5.4.1.7** and set out in **Chapter 13: Air Quality Sections 13.3.6**, and **13.5**.	Negligible to minor negative (not significant)
	Site-specific area 011D	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)
	Site-specific area 009B	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)
	Children and young people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Women	High	Negligible to low	Minor negative (not significant)		Negligible to minor

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
						negative (not significant)
	People with existing poor physical and mental health	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Deprivation	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
Impact 5: Journey times and/or reduced access effects	Site-specific area 005B	Low	Negligible to medium	Negligible	Outline Construction Traffic Management Plan (OCTMP): an OCTMP has been submitted to ensure adequate control and monitoring of HGV movements and managing access (**Appendix 19.B: Outline Construction Traffic Management Plan**) Timing of roadworks: the OCTMP includes a commitment to undertake any road works outside of the summer (**Appendix 19.B: Outline**	Negligible
	Site-specific area 011D	Low	Negligible to medium	Negligible		Negligible
	Site-specific area 009B	Low	Negligible to medium	Negligible		Negligible
	Local	Low	Negligible to medium	Negligible		Negligible
	Regional	Low	Negligible to medium	Negligible		Negligible
	Older people	Low	Negligible to medium	Minor adverse (not significant)		Minor adverse (not significant)
	People with existing poor health (physical and mental health);	Low	Negligible to medium	Minor adverse (not significant)		Minor adverse (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	People living in deprivation	Low	Negligible to medium	Minor adverse (not significant)	**Construction Traffic Management Plan**). The only road works required for the Onshore Project would be during the installation/removal of the temporary accesses and crossings Strategy for access: temporary access routes to avoid HGVs on narrow local roads.	Minor adverse (not significant)
Operation and Maintenance Phase						
Impact 6: Open space, leisure and play (access)	Site-specific area 005B	Negligible	Negligible to low	Negligible to minor negative (not significant)	Maintaining access to Saunton Sands during operation and maintenance – no closure of the beach. Communication and engagement activities to ensure that visitors to Saunton Sands are aware of the timing and extent of operation and maintenance activities in the nearshore/intertidal zone. Measures set out in the Environmental Management Plan that limit and manage the	Negligible
	Local area (North Devon)	Negligible	Negligible to low	Negligible to minor negative (not significant)		Negligible
	Children and young people	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	Older people	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People experiencing social isolation	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	People on low incomes	Low	Negligible to low	Minor negative (not significant)	timing of operation and maintenance activities. Fencing/hoarding/barriers in nearshore/intertidal zone to prevent access to operation and maintenance works and to protect swimmers and surfers.	Minor negative (not significant)
	People with existing poor physical and mental health	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
Impact 7: Community safety	Site-specific area 005B	Medium	Low	Minor beneficial (not significant)	Providing resources and increasing capacity for human intervention if people are attempting or considering self-harm. This would comprise of signs with information about safety, to reduce accidental fatality, and sources of help for those considering self-harm; support to local initiatives for non-health staff and members of the public to train and/or raise awareness about self-harm. The CEMP will include water safety risk assessment and water safety plan and other relevant training for safety marshals and other construction	Moderate beneficial (significant)
	Local area (North Devon)	Medium	Low	Minor beneficial (not significant)		Moderate beneficial (significant)
	Regional (Devon)	Medium	Low	Minor beneficial (not significant)		Moderate beneficial (significant)
	People with existing poor physical and mental health (including women and older people)	High	High	Minor beneficial (not significant)		Moderate beneficial (significant)
	People indirectly affected by self-harm attempts	Medium	Low to high	Up to moderate negative (significant) to minor beneficial (significant)		Moderate beneficial (significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
					workers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.	
Impact 9: Wider societal infrastructure and resources	Site-specific area 005B	Medium to high	Low to medium beneficial	Minor beneficial (not significant)	No mitigation measures required.	Minor beneficial (not significant)
	Site-specific area 011D	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	Site-specific area 009B	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	Regional	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	National	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	People with existing poor health (physical and mental health);	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Children and young people	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	Working age	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	Older people	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	People living in deprivation	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
	Site-specific area 005B	Medium to high	Low to medium beneficial	Minor beneficial (not significant)		Minor beneficial (not significant)
Decommissioning						
Impact 10: Open space, leisure and play (access)	Site-specific area 005B	Negligible	Negligible to low	Negligible to minor negative (not significant)	Maintaining access to Saunton Sands during decommissioning – no closure of the beach. Communication and engagement activities to ensure that visitors to Saunton Sands are aware	Negligible
	Local area (North Devon)	Negligible	Negligible to low	Negligible to minor negative (not significant)		Negligible

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Children and young people	Low	Negligible to low	Minor negative (not significant)	of the timing and extent of decommissioning activities in the nearshore/intertidal zone. Measures set out in the Construction Environmental Management Plan that limit and manage the timing of decommissioning activities. Fencing/hoarding/barriers in nearshore/intertidal zone to prevent access to decommissioning works and to protect swimmers and surfers	Minor negative (not significant)
	Older people	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People experiencing social isolation	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People on low incomes	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
	People with existing poor physical and mental health	Low	Negligible to low	Minor negative (not significant)		Minor negative (not significant)
Impact 11: Community safety	Site-specific area 005B	Medium	Low	Minor beneficial (not significant)	Providing resources and increasing capacity for human intervention if people are attempting or considering self-harm. This would comprise of signs with information about safety, to reduce accidental fatality, and	Moderate beneficial (significant)
	Local area (North Devon)	Medium	Low	Minor beneficial (not significant)		Moderate beneficial (significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Regional (Devon)	Medium	Low	Minor beneficial (not significant)	sources of help for those considering self-harm; support to local initiatives for non-health staff and members of the public to train and/or raise awareness about self-harm. The CEMP could include water safety risk assessment and water safety plan and other relevant training for safety marshals and other decommissioning workers. An Outline CEMP is provided in **Appendix 5.A: Outline Construction Environmental Management Plan**.	Moderate beneficial (significant)
	People with existing poor physical and mental health (including women and older people)	High	High	Minor beneficial (not significant)		Moderate beneficial (significant)
	People indirectly affected by self-harm attempts	Medium	Low to high	Up to moderate negative (significant) to minor beneficial (significant)		Moderate beneficial (significant)
Impact 12: Noise	Site-specific area 005B	Medium	Negligible to low	Negligible to minor negative (not significant)	Embedded and further mitigation covering Construction phase noise and vibration; Construction phase road traffic noise; Operational substation noise and further good practice, as summarised in **Section 22.5.3.1.7** and set out	Negligible to minor negative (not significant)
	Site-specific area 011D	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
	Site-specific area 009B	Medium	Negligible to low	Negligible to minor negative (not significant)	in **Chapter 18: Noise and Vibration Section 18.5**.	Negligible to minor negative (not significant)
	Children and young people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Working age	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Older people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Women	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	People with existing poor physical and mental health	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	Gender (Women)	High	Negligible to low	Minor negative (not significant)		Negligible to minor

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
						negative (not significant)
	Deprivation	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
Impact 13: Air quality	Site-specific area 005B	Medium	Negligible to low	Negligible to minor negative (not significant)	Embedded and further mitigation covering NRMM and further good practice, as summarised in **Section 22.5.4.1.7** and set out in **Chapter 13: Air Quality Sections 13.3.6**, and **13.5**.	Negligible to minor negative (not significant)
	Site-specific area 011D	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)
	Site-specific area 009B	Medium	Negligible to low	Negligible to minor negative (not significant)		Negligible to minor negative (not significant)
	Children and young people	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
	People with existing poor physical and mental health	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
						(not significant)
	Deprivation	High	Negligible to low	Minor negative (not significant)		Negligible to minor negative (not significant)
Impact 14: Journey times and/or reduced access effects	Site-specific area 005B	Low	Negligible to medium	Negligible	Outline Construction Traffic Management Plan (OCTMP): an OCTMP has been submitted to ensure adequate control and monitoring of HGV movements and managing access (**Appendix 19.B: Outline Construction Traffic Management Plan**) Timing of roadworks: the OCTMP includes a commitment to undertake any road works outside of the summer (**Appendix 19.B: Outline Construction Traffic Management Plan**). The only road works required for the Onshore Project would be during the installation/removal	Negligible
	Site-specific area 011D	Low	Negligible to medium	Negligible		Negligible
	Site-specific area 009B	Low	Negligible to medium	Negligible		Negligible
	Local	Low	Negligible to medium	Negligible		Negligible
	Regional	Low	Negligible to medium	Negligible		Negligible
	Older people	Low	Negligible to medium	Minor adverse (not significant)		Minor adverse (not significant)
	People with existing poor health (physical and mental health);	Low	Negligible to medium	Minor adverse (not significant)		Minor adverse (not significant)
	People living in deprivation	Low	Negligible to medium	Minor adverse (not significant)		Minor adverse (not significant)

Potential impact	Receptor	Sensitivity	Magnitude	Significance	Mitigation measure	Residual effect
					of the temporary accesses and crossings Strategy for access: temporary access routes to avoid HGVs on narrow local roads.	

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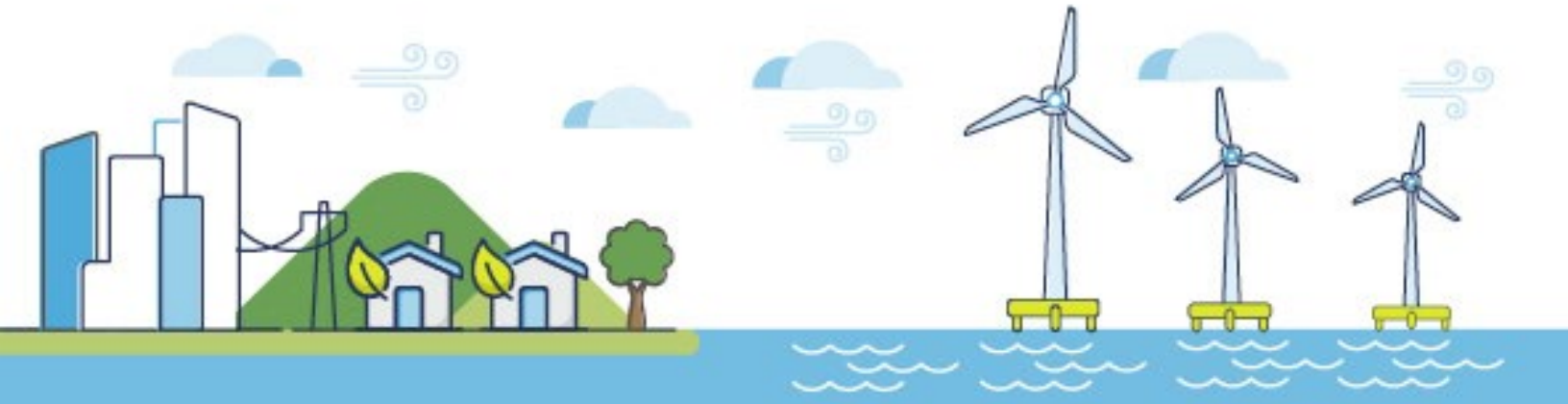
WHITE CROSS

White Cross Offshore Windfarm Environmental Statement

Appendix 22.A: Baseline Information



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Glossary of Acronyms

Acronym	Definition
CVD	Cardiovascular Diseases
EE	Energy Efficiency
GBD	Global Burden of Disease
GHG	Greenhouse Gas
HAB	Harmful Algal Bloom
MHWS	Mean High-Water Springs
MLWS	Mean Low-Water Springs
OHID	Office for Health Improvement and Disparities
ONS	Office for National Statistics
RE	Renewable Energy
RNLI	Royal National Lifeboat Association

Glossary of Terminology

Defined Term	Description
Landfall	Where the offshore export cables come ashore
Mean high water springs	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mean low water springs	The average tidal height throughout a year of two successive low waters during those periods of 24 hours when the range of the tide is at its greatest.
Mitigation	Mitigation measures have been proposed where the assessment identifies that an aspect of the development is likely to give rise to significant environmental effects, and discussed with the relevant authorities and stakeholders in order to avoid, prevent or reduce impacts to acceptable levels. For the purposes of the EIA, two types of mitigation are defined: • Embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA • Additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant effects. Additional mitigation is therefore subsequently adopted by WCOWL as the EIA process progresses.
National Grid Onshore Substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of the electrical transformers.
the Onshore Project	The Onshore Project for the onshore TCPA application includes all elements onshore of MLWS. This includes the infrastructure associated with the offshore export cable (from MLWS), landfall, onshore export cable and associated infrastructure and new onshore substation (if required).

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Appendix 22.A: Human Health: Baseline Information

1 Introduction

1. This Appendix sets out additional information relevant to human health within the Onshore Project study area. It needs to be read in conjunction with the **Chapter 22: Human Health**.

2. The first section provides census data and other baseline information components.

3. The second section provides summaries from academic and scientific studies examining the links between human health and blue spaces.

1.1 Census data

4. The study area has been divided into the following geographic area classifications:

   - Site-specific: Landfall (from Mean Low Water Springs (MLWS) to Mean High Water Springs (MHWS)): Lower Super Output Area (LSOA): North Devon 005B
   - Site-specific: Onshore cable corridor: LSOAs: North Devon 005B, 005C, 005D, 005E, 011B and 011D
   - Site-specific: Onshore substation: LSOA: North Devon 011D;
   - Site-specific: Transportation route: LSOAs: North Devon 005A, 005B, 005C, 005C, 005D, 005E, 006C, 007A, 009B, 009C, 009D, 011A, 011B, 011C, 011D, 012A, 012B, 012C
   - Local: North Devon
   - Regional: Devon County
   - National: England.

5. Data from the 2011 and the 2021 censuses are provided below.

1.1.1 Census 2011

Table 1.1 Local area reports relevant to Human Health (2011)

Geography	North Devon		Devon		England
Measures	No.	%	No.	%	%
All categories: Long-term health problem or disability	93,667	100	746,399	100.0	100
Day-to-day activities					
limited a lot	8,180	8.7	63,834	8.6	8.3
limited a little	10,219	10.9	81,345	10.9	9.3
not limited	75,268	80.4	601,220	80.5	82.4
Day-to-day activities (age 16 to 64)					
limited a lot	3,023	3.2	23,609	3.2	3.6
limited a little	4,382	4.7	34,116	4.6	4.6
not limited	49,165	52.5	397,074	53.2	56.5
Health					
Very good	43,441	46.4	344,059	46.1	47.2
Good	31,704	33.8	259,032	34.7	34.2
Fair	13,264	14.2	104,498	14.0	13.1
Bad	4,064	4.3	30,137	4.0	4.2
Very bad	1,194	1.3	8,673	1.2	1.2
Unpaid care per week					
Provides no unpaid care	83,324	89	661,515	88.6	89.8
Provides 1 to 19 hours	6,634	7.1	56,528	7.6	6.5
Provides 20 to 49 hours	1,260	1.3	9,868	1.3	1.4
Provides 50+ hours	2,449	2.6	18,488	2.5	2.4

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-e, Nomis, no date-c, Nomis, no date-m, Nomis, no date-f)

Table 1.2 Local area reports relevant to Human Health –LSOAs (2011)

Geography	N Devon 005B		N Devon 005C		N Devon 005D		N Devon 005E		N Devon 011B		N Devon 011D	
Measures	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All categories: Long-term health problem or disability	1,296	100	1,421	100	1,412	100.0	2,673	100.0	1,130	100.0	1,501	100.0
Day-to-day activities												
limited a lot	104	8	141	9.9	131	9.3	162	6.1	143	12.7	137	9.1
limited a little	155	12	197	13.9	193	13.7	176	6.6	140	12.4	159	10.6
not limited	1,037	80	1,083	76.2	1,088	77.1	2,335	87.4	847	75.0	1,205	80.3
Day-to-day activities (age 16 to 64)												
limited a lot	27	2.1	47	3.3	42	3.0	51	1.9	26	2.3	41	2.7
limited a little	50	3.9	47	3.3	59	4.2	80	3.0	54	4.8	58	3.9
not limited	677	52.2	641	45.1	703	49.8	1,612	60.3	512	45.3	770	51.3
Health												
Very good	596	46	625	44.0	597	42.3	1,565	58.5	423	37.4	669	44.6
Good	452	34.9	490	34.5	501	35.5	782	29.3	434	38.4	520	34.6
Fair	172	13.3	239	16.8	234	16.6	249	9.3	188	16.6	226	15.1
Bad	67	5.2	56	3.9	65	4.6	54	2.0	61	5.4	67	4.5
Very bad	9	0.7	11	0.8	15	1.1	23	0.9	24	2.1	19	1.3
Unpaid care per week												
Provides no unpaid care	1,162	89.7	1,260	88.7	1,262	89.4	2,481	92.8	941	83.3	1,283	85.5
Provides 1 to 19 hours	80	6.2	111	7.8	111	7.9	131	4.9	113	10.0	161	10.7
Provides 20 to 49 hours	16	1.2	17	1.2	10	0.7	19	0.7	14	1.2	23	1.5
Provides 50+ hours	38	2.9	33	2.3	29	2.1	42	1.6	62	5.5	34	2.3

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-k, Nomis, no date-j, Nomis, no date-i, Nomis, no date-h, Nomis, no date-g, Nomis, no date-f)

Table 1.3 Local area reports relevant to Human Health – Transportation route LSOAs (2011)

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Measures	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All categories: Long-term health problem or disability	2,276	100.0	1,879	100.0	1,805	100.0	1,449	100.0	1,364	100.0	1,286	100.0	1,505	100.0	1,675	100.0	1,502	100.0	1,514	100.0
Day-to-day activities																				
limited a lot	196	8.6	122	6.5	157	8.7	154	10.6	126	9.2	118	9.2	133	8.8	215	12.8	145	9.7	107	7.1
limited a little	221	9.7	184	9.8	200	11.1	169	11.7	158	11.6	174	13.5	161	10.7	233	13.9	191	12.7	162	10.7
not limited	1,859	81.7	1,573	83.7	1,448	80.2	1,126	77.7	1,080	79.2	994	77.3	1,211	80.5	1,227	73.3	1,166	77.6	1,245	82.2
Day-to-day activities: Age 16 to 64																				
limited a lot	55	2.4	46	2.4	48	2.7	56	3.9	27	2.0	34	2.6	40	2.7	57	3.4	45	3.0	27	1.8
limited a little	91	4.0	77	4.1	69	3.8	76	5.2	67	4.9	55	4.3	67	4.5	78	4.7	75	5.0	64	4.2
not limited	1,230	54.0	1,045	55.6	960	53.2	725	50.0	721	52.9	624	48.5	768	51.0	733	43.8	723	48.1	767	50.7
Health																				
Very good	1,115	49.0	988	52.6	846	46.9	656	45.3	610	44.7	501	39.0	723	48.0	715	42.7	695	46.3	720	47.6
Good	745	32.7	581	30.9	570	31.6	457	31.5	482	35.3	492	38.3	492	32.7	504	30.1	474	31.6	518	34.2
Fair	296	13.0	232	12.3	288	16.0	241	16.6	206	15.1	226	17.6	208	13.8	314	18.7	249	16.6	204	13.5
Bad	92	4.0	71	3.8	86	4.8	73	5.0	55	4.0	52	4.0	58	3.9	114	6.8	63	4.2	51	3.4
Very bad	28	1.2	7	0.4	15	0.8	22	1.5	11	0.8	15	1.2	24	1.6	28	1.7	21	1.4	21	1.4
Provision of unpaid care																				
Provides no unpaid care	2,036	89.5	1,597	85.0	1,610	89.2	1,256	86.7	1,192	87.4	1,127	87.6	1,355	90.0	1,444	86.2	1,310	87.2	1,315	86.9
Provides 1 to 19 hours unpaid	157	6.9	209	11.1	131	7.3	110	7.6	114	8.4	99	7.7	82	5.4	151	9.0	120	8.0	142	9.4

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
care a week																				
Provides 20 to 49 hours unpaid care a week	36	1.6	26	1.4	20	1.1	33	2.3	17	1.2	21	1.6	20	1.3	28	1.7	22	1.5	15	1.0
Provides 50 or more hours unpaid care a week	47	2.1	47	2.5	44	2.4	50	3.5	41	3.0	39	3.0	48	3.2	52	3.1	50	3.3	42	2.8

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-k, Nomis, no date-j, Nomis, no date-i, Nomis, no date-h, Nomis, no date-g, Nomis, no date-f)

Table 1.4 Age profile (2011)

Age structure	North Devon		Devon		England	
	No.	%	No.	%	No.	%
All usual residents	93,667	100.0	746,399	1	53,012,456	1
Age 0 to 4	5,014	5.4	37,479	5.0	3,318,449	6.3
Age 5 to 7	2,930	3.1	22,022	3.0	1,827,610	3.4
Age 8 to 9	1,871	2.0	14,310	1.9	1,145,022	2.2
Age 10 to 14	5,286	5.6	40,518	5.4	3,080,929	5.8
Age 15	1,188	1.3	8,845	1.2	650,826	1.2
Age 16 to 17	2,317	2.5	17,586	2.4	1,314,124	2.5
Age 18 to 19	2,070	2.2	18,977	2.5	1,375,315	2.6
Age 20 to 24	4,821	5.1	42,929	5.8	3,595,321	6.8
Age 25 to 29	4,565	4.9	36,415	4.9	3,650,881	6.9
Age 30 to 44	16,192	17.3	126,570	17.0	10,944,271	20.6
Age 45 to 59	19,366	20.7	154,693	20.7	10,276,902	19.4
Age 60 to 64	7,239	7.7	57,629	7.7	3,172,277	6.0
Age 65 to 74	10,937	11.7	86,420	11.6	4,552,283	8.6
Age 75 to 84	6,856	7.3	56,246	7.5	2,928,118	5.5
Age 85 to 89	1,911	2.0	16,645	2.2	776,311	1.5
Age 90 and over	1,104	1.2	9,115	1.2	403,817	0.8
Age 0 to 19		22.1		21.4		24.0
Age 20 to 64		55.7		56.0		59.7
Age 65 and over		22.2		22.6		16.3

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-e, Nomis, no date-c, Nomis, no date-m, Nomis, no date-f)

Table 1.5 Age profile – LSOAs (2011)

Age structure	N Devon 005B		N Devon 005C		N Devon 005D		N Devon 005E		N Devon 011B		N Devon 011D	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All usual residents	1,296	100.0	1,421	100.0	1,412	100.0	2,673	100.0	1,130	100.0	1,501	100.0
Age 0 to 4	59	4.6	51	3.6	84	5.9	240	9.0	38	3.4	52	3.5
Age 5 to 7	45	3.5	25	1.8	46	3.3	110	4.1	20	1.8	35	2.3
Age 8 to 9	20	1.5	20	1.4	19	1.3	62	2.3	11	1.0	22	1.5
Age 10 to 14	65	5.0	61	4.3	63	4.5	131	4.9	42	3.7	65	4.3
Age 15	17	1.3	19	1.3	24	1.7	18	0.7	6	0.5	17	1.1
Age 16 to 17	28	2.2	28	2.0	30	2.1	36	1.3	15	1.3	32	2.1
Age 18 to 19	25	1.9	23	1.6	23	1.6	69	2.6	17	1.5	23	1.5
Age 20 to 24	55	4.2	48	3.4	58	4.1	364	13.6	38	3.4	54	3.6
Age 25 to 29	43	3.3	37	2.6	87	6.2	301	11.3	33	2.9	37	2.5
Age 30 to 44	235	18.1	212	14.9	303	21.5	547	20.5	129	11.4	215	14.3
Age 45 to 59	251	19.4	259	18.2	214	15.2	318	11.9	240	21.2	375	25.0
Age 60 to 64	117	9.0	128	9.0	89	6.3	108	4.0	120	10.6	133	8.9
Age 65 to 74	184	14.2	242	17.0	154	10.9	187	7.0	237	21.0	246	16.4
Age 75 to 84	112	8.6	187	13.2	144	10.2	136	5.1	123	10.9	143	9.5
Age 85 to 89	24	1.9	51	3.6	55	3.9	22	0.8	44	3.9	24	1.6
Age 90 and over	16	1.2	30	2.1	19	1.3	24	0.9	17	1.5	28	1.9
Age 0 to 19		20.0		16.0		20.5		24.9		13.2		16.4
Age 20 to 64		54.1		48.1		53.2		61.3		49.6		54.2
Age 65 and over		25.9		35.9		26.3		13.8		37.3		29.4

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-k, Nomis, no date-j, Nomis, no date-i, Nomis, no date-h, Nomis, no date-g, Nomis, no date-f)

Table 1.6 Age profile – Transportation route LSOAs (2011)

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Measures	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All usual residents	2,276	100.0	1,879	100.0	1,805	100.0	1,449	100.0	1,364	100.0	1,286	100.0	1,505	100.0	1,675	100.0	1,502	100.0	1,514	100.0
Age 0 to 4	119	5.2	87	4.6	87	4.8	71	4.9	44	3.2	46	3.6	93	6.2	57	3.4	86	5.7	70	4.6
Age 5 to 7	63	2.8	60	3.2	59	3.3	48	3.3	29	2.1	24	1.9	47	3.1	52	3.1	36	2.4	46	3.0
Age 8 to 9	53	2.3	39	2.1	32	1.8	26	1.8	22	1.6	19	1.5	34	2.3	29	1.7	42	2.8	28	1.8
Age 10 to 14	138	6.1	115	6.1	102	5.7	78	5.4	68	5.0	49	3.8	93	6.2	80	4.8	106	7.1	87	5.7
Age 15	23	1.0	20	1.1	18	1.0	24	1.7	14	1.0	15	1.2	21	1.4	14	0.8	16	1.1	15	1.0
Age 16 to 17	46	2.0	48	2.6	45	2.5	49	3.4	29	2.1	26	2.0	35	2.3	32	1.9	29	1.9	31	2.0
Age 18 to 19	51	2.2	33	1.8	19	1.1	44	3.0	38	2.8	22	1.7	40	2.7	31	1.9	23	1.5	26	1.7
Age 20 to 24	103	4.5	92	4.9	89	4.9	70	4.8	76	5.6	49	3.8	87	5.8	66	3.9	64	4.3	59	3.9
Age 25 to 29	106	4.7	55	2.9	104	5.8	61	4.2	67	4.9	43	3.3	83	5.5	60	3.6	58	3.9	57	3.8
Age 30 to 44	468	20.6	300	16.0	347	19.2	225	15.5	199	14.6	192	14.9	254	16.9	195	11.6	289	19.2	265	17.5
Age 45 to 59	461	20.3	448	23.8	326	18.1	281	19.4	296	21.7	252	19.6	281	18.7	335	20.0	275	18.3	312	20.6
Age 60 to 64	141	6.2	192	10.2	147	8.1	127	8.8	110	8.1	129	10.0	95	6.3	149	8.9	105	7.0	108	7.1
Age 65 to 74	258	11.3	232	12.3	216	12.0	185	12.8	182	13.3	205	15.9	177	11.8	244	14.6	189	12.6	246	16.2
Age 75 to 84	168	7.4	111	5.9	147	8.1	99	6.8	124	9.1	155	12.1	114	7.6	227	13.6	139	9.3	129	8.5
Age 85 to 89	51	2.2	32	1.7	48	2.7	40	2.8	40	2.9	34	2.6	38	2.5	64	3.8	31	2.1	26	1.7
Age 90 and over	27	1.2	15	0.8	19	1.1	21	1.4	26	1.9	26	2.0	13	0.9	40	2.4	14	0.9	9	0.6
Age 0 to 19		21.6		21.5		20.2		23.5		17.8		15.7		24.2		17.6		22.5		19.8
Age 20 to 64		56.3		57.8		56.1		52.7		54.9		51.6		53.2		48.0		52.7		52.9
Age 65 and over		22.1		20.7		23.9		23.8		27.2		32.6		22.8		34.4		24.9		27.0

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-k, Nomis, no date-j, Nomis, no date-i, Nomis, no date-h, Nomis, no date-g, Nomis, no date-f)

1.1.2 Census 2021

Table 1.7 Local area reports relevant to Human Health (2021)

Geography	North Devon		Devon		England	
	No.	%	No.	%	No.	%
General health						
Total: All usual residents	98,611	100.0	811,640	100.0	56,490,046	100.0
Very good health	46,135	46.8	382,463	47.1	27,390,829	48.5
Good health	33,154	33.6	277,928	34.2	19,040,735	33.7
Fair health	13,705	13.9	109,469	13.5	7,147,346	12.7
Bad health	4,352	4.4	32,648	4.0	2,248,255	4.0
Very bad health	1,265	1.3	9,132	1.1	662,881	1.2
Disability						
Total: All usual residents	98,611	100.0	811,640	100.0	56,490,048	100.0
Day-to-day activities limited a lot	7,866	8.0	62,303	7.7	4,140,357	7.3
Day-to-day activities limited a little	11,432	11.6	96,027	11.8	5,634,153	10.0
Has long term physical or mental health condition but day-to-day activities are not limited	7,665	7.8	65,128	8.0	3,856,029	6.8
No long term physical or mental health conditions	71,648	72.7	588,182	72.5	42,859,509	75.9
Provision of unpaid care						
Total: All usual residents aged 5 and over	94,098	100.0	776,300	100.0	53,413,098	100.0
Provides no unpaid care	85,130	90.5	701,556	90.4	48,734,833	91.2

Geography	North Devon		Devon		England	
Provides 19 hours or less unpaid care a week	4,459	4.7	39,271	5.1	2,303,725	4.3
Provides 20 to 49 hours unpaid care a week	1,662	1.8	13,465	1.7	969,769	1.8
Provides 50 or more hours unpaid care a week	2,847	3.0	22,008	2.8	1,404,771	2.6

Data: Nomis Area Profile (based on Census 2021) (Nomis, no date-l, Nomis, no date-b, Nomis, no date-d)

Table 1.8 Local area reports relevant to Human Health – LSOAs (2021)

Geography	N Devon 005B		N Devon 005C		N Devon 005D		N Devon 005E		N Devon 011B		N Devon 011D	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
General health												
Total: All usual residents	1,253	100.0	1,406	100.0	1,442	100.0	2,895	100.0	1,339	100.0	1,467	100.0
Very good health	589	47.0	671	47.7	667	46.3	1,714	59.2	577	43.1	654	44.6
Good health	427	34.1	454	32.3	478	33.1	785	27.1	480	35.8	520	35.4
Fair health	188	15.0	225	16.0	205	14.2	268	9.3	198	14.8	217	14.8
Bad health	39	3.1	40	2.8	66	4.6	101	3.5	69	5.2	64	4.4
Very bad health	10	0.8	16	1.1	26	1.8	27	0.9	15	1.1	12	0.8
Disability												
Total: All usual residents	1,255	100.0	1,408	100.0	1,442	100.0	2,895	100.0	1,337	100.0	1,468	100.0
Day-to-day activities limited a lot	76	6.1	100	7.1	112	7.8	196	6.8	107	8.0	112	7.6
Day-to-day activities limited a little	138	11.0	179	12.7	178	12.3	236	8.2	176	13.2	168	11.4
Has long term physical or mental health condition but	100	8.0	103	7.3	97	6.7	181	6.3	112	8.4	135	9.2

Geography	N Devon 005B		N Devon 005C		N Devon 005D		N Devon 005E		N Devon 011B		N Devon 011D	
day-to-day activities are not limited												
No long term physical or mental health conditions	941	75.0	1,026	72.9	1,055	73.2	2,282	78.8	942	70.5	1,053	71.7
Total: All usual residents aged 5 and over	1,216	100.0	1,371	100.0	1,393	100.0	2,683	100.0	1,269	100.0	1,426	100.0
Provides no unpaid care	1,110	91.3	1,224	89.3	1,266	90.9	2,477	92.3	1,117	88.0	1,256	88.1
Provides 19 hours or less unpaid care a week	62	5.1	82	6.0	65	4.7	110	4.1	66	5.2	99	6.9
Provides 20 to 49 hours unpaid care a week	14	1.2	21	1.5	24	1.7	43	1.6	36	2.8	26	1.8
Provides 50 or more hours unpaid care a week	30	2.5	44	3.2	38	2.7	53	2.0	50	3.9	45	3.2

Data: Nomis local area reports (based on Census 2011) (Nomis, no date-k, Nomis, no date-j, Nomis, no date-i, Nomis, no date-h, Nomis, no date-g, Nomis, no date-f)

Table 1.9 Local area reports relevant to Human Health – Transportation route LSOAs (2021)

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Measures	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
General health																				
Total: All usual residents	2,210	100.0	2,223	100.0	1,695	100.0	1,446	100.0	1,394	100.0	1,327	100.0	2,268	100.0	1,626	100.0	1,380	100.0	n/a	n/a
Very good health	1,164	52.7	1,169	52.6	763	45.0	646	44.7	581	41.7	555	41.8	1,122	49.5	644	39.6	605	43.8	n/a	n/a

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Good health	676	30.6	726	32.7	547	32.3	463	32.0	489	35.1	484	36.5	749	33.0	586	36.0	449	32.5	n/a	n/a
Fair health	268	12.1	248	11.2	275	16.2	224	15.5	234	16.8	208	15.7	298	13.1	286	17.6	241	17.5	n/a	n/a
Bad health	78	3.5	58	2.6	89	5.3	84	5.8	68	4.9	64	4.8	78	3.4	82	5.0	67	4.9	n/a	n/a
Very bad health	24	1.1	22	1.0	21	1.2	29	2.0	22	1.6	16	1.2	21	0.9	28	1.7	18	1.3	n/a	n/a
Disability																				
Total: All usual residents	2,210	100.0	2,223	100.0	1,695	100.0	1,446	100.0	1,394	100.0	1,330	100.0	2,265	100.0	1,628	100.0	1,381	100.0	n/a	n/a
Day-to-day activities limited a lot	156	7.1	134	6.0	135	8.0	148	10.2	112	8.0	92	6.9	132	5.8	159	9.8	128	9.3	n/a	n/a
Day-to-day activities limited a little	214	9.7	188	8.5	194	11.4	180	12.4	181	13.0	185	13.9	270	11.9	219	13.5	180	13.0	n/a	n/a
Has long term physical or mental health condition but day-to-day activities are not limited	168	7.6	166	7.5	158	9.3	104	7.2	114	8.2	108	8.1	162	7.2	137	8.4	118	8.5	n/a	n/a
No long term physical or mental health conditions	1,672	75.7	1,735	78.0	1,208	71.3	1,014	70.1	987	70.8	945	71.1	1,701	75.1	1,113	68.4	955	69.2	n/a	n/a
Total: All usual residents aged 5 and over	2,123	100.0	2,134	100.0	1,630	100.0	1,382	100.0	1,342	100.0	1,287	100.0	2,110	100.0	1,571	100.0	1,313	100.0	n/a	n/a
Provides no unpaid care	1,933	91.1	1,933	90.6	1,494	91.7	1,226	88.7	1,212	90.3	1,148	89.2	1,923	91.1	1,406	89.5	1,173	89.3	n/a	n/a
Provides 19 hours or less unpaid care a week	97	4.6	108	5.1	61	3.7	67	4.8	66	4.9	67	5.2	84	4.0	74	4.7	71	5.4	n/a	n/a
Provides 20 to 49 hours unpaid care a week	36	1.7	35	1.6	26	1.6	35	2.5	14	1.0	25	1.9	38	1.8	31	2.0	28	2.1	n/a	n/a
Provides 50 or more hours unpaid care a week	57	2.7	58	2.7	49	3.0	54	3.9	50	3.7	47	3.7	65	3.1	60	3.8	41	3.1	n/a	n/a

Data: Nomis (2021)

Table 1.10 Age profile (2021)

Geography	North Devon		Devon		England	
	No.	%	No.	%	No.	%
Total: All usual residents	98,608	100.0	811,638	100.0	56,490,045	100.0
4 years and under	4,512	4.6	35,345	4.4	3,076,950	5.4
5 to 9 years	5,226	5.3	41,294	5.1	3,348,701	5.9
10 to 15 years	6,680	6.8	51,534	6.3	4,057,443	7.2
16 to 19 years	3,925	4.0	36,500	4.5	2,574,781	4.6
20 to 24 years	4,237	4.3	44,202	5.4	3,414,450	6.0
25 to 34 years	10,418	10.6	84,568	10.4	7,667,865	13.6
35 to 49 years	16,289	16.5	134,032	16.5	10,978,437	19.4
50 to 64 years	21,867	22.2	174,769	21.5	10,970,118	19.4
65 to 74 years	13,221	13.4	109,049	13.4	5,564,143	9.8
75 to 84 years	8,738	8.9	71,152	8.8	3,464,857	6.1
85 years and over	3,495	3.5	29,193	3.6	1,372,300	2.4

Data: Nomis Area Profile (based on Census 2021) (Nomis, no date-l, Nomis, no date-b, Nomis, no date-d)

Table 1.11 Age profile – LSOAs (2021)

Geography	N Devon 005B		N Devon 005C		N Devon 005D		N Devon 005E		N Devon 011B		N Devon 011D	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total: All usual residents	1,254	100.0	1,404	100.0	1,442	100.0	2,896	100.0	1,338	100.0	1,467	100.0
4 years and under	37	3.0	33	2.4	50	3.5	213	7.4	68	5.1	42	2.9
5 to 9 years	73	5.8	69	4.9	80	5.5	213	7.4	41	3.1	60	4.1
10 to 14 years	67	5.3	74	5.3	99	6.9	160	5.5	60	4.5	53	3.6
15 to 19 years	67	5.3	59	4.2	75	5.2	262	9.0	31	2.3	41	2.8
20 to 24 years	48	3.8	41	2.9	46	3.2	111	3.8	47	3.5	42	2.9
25 to 34 years	101	8.1	68	4.8	130	9.0	564	19.5	97	7.2	116	7.9
35 to 49 years	213	17.0	211	15.0	279	19.3	556	19.2	149	11.1	184	12.5
50 to 64 years	252	20.1	322	22.9	298	20.7	399	13.8	312	23.3	411	28.0
65 to 74 years	200	15.9	237	16.9	171	11.9	194	6.7	242	18.1	272	18.5
75 to 84 years	158	12.6	212	15.1	139	9.6	166	5.7	212	15.8	179	12.2
85 years and over	38	3.0	78	5.6	75	5.2	58	2.0	79	5.9	67	4.6
Age 0 to 19		19.4		16.7		21.1		29.3		14.9		13.4
Age 20 to 64		49.0		45.7		49.0		56.3		45.2		51.3
Age 65 and over		31.6		37.5		26.7		14.4		39.8		35.3

Data: Nomis, based on Census 2021, (Nomis, no date-a)

Table 1.12 Age profile – Transportation route LSOAs (2021)

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Measures	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All usual residents	2,209	100.0	2,221	100.0	1,695	100.0	1,444	100.0	1,394	100.0	1,328	100.0	2,271	100.0	1,625	100.0	1,384	100.0	n/a	n/a
Age 0 to 4	85	3.8	89	4.0	64	3.8	64	4.4	47	3.4	40	3.0	158	7.0	55	3.4	67	4.8	n/a	n/a

Geography	N Devon 005A		N Devon 006C		N Devon 007A		N Devon 009B		N Devon 009C		N Devon 009D		N Devon 011A		N Devon 011C		N Devon 012A		N Devon 012C	
Age 5 to 9	157	7.1	121	5.4	67	4.0	77	5.3	56	4.0	46	3.5	130	5.7	53	3.3	52	3.8	n/a	n/a
Age 10 to 14	137	6.2	150	6.8	91	5.4	95	6.6	65	4.7	66	5.0	158	7.0	69	4.2	60	4.3	n/a	n/a
Age 15 to 19	131	5.9	133	6.0	78	4.6	78	5.4	48	3.4	58	4.4	102	4.5	59	3.6	58	4.2	n/a	n/a
Age 20 to 24	67	3.0	82	3.7	66	3.9	69	4.8	60	4.3	38	2.9	85	3.7	57	3.5	64	4.6	n/a	n/a
Age 25 to 34	189	8.6	178	8.0	188	11.1	113	7.8	126	9.0	91	6.9	283	12.5	109	6.7	145	10.5	n/a	n/a
Age 35 to 49	431	19.5	379	17.1	327	19.3	203	14.1	203	14.6	180	13.6	393	17.3	187	11.5	201	14.5	n/a	n/a
Age 50 to 64	467	21.1	533	24.0	325	19.2	341	23.6	304	21.8	306	23.0	447	19.7	377	23.2	306	22.1	n/a	n/a
Age 65 to 74	261	11.8	317	14.3	214	12.6	205	14.2	213	15.3	248	18.7	254	11.2	292	18.0	202	14.6	n/a	n/a
Age 75 to 84	199	9.0	183	8.2	189	11.2	146	10.1	176	12.6	188	14.2	193	8.5	233	14.3	159	11.5	n/a	n/a
Age 85 and over	85	3.8	56	2.5	86	5.1	53	3.7	96	6.9	67	5.0	68	3.0	134	8.2	70	5.1	n/a	n/a
Age 0 to 19		23.1		22.2		17.7		21.7		15.5		15.8		24.1		14.5		17.1		n/a
Age 20 to 64		52.2		52.8		53.5		50.3		49.7		46.3		53.2		44.9		51.7		n/a
Age 65 and over		24.7		25.0		28.8		28.0		34.8		37.9		22.70		40.60		31.20		n/a

Data: Nomis (2021)

1.1.3 Changes 2011 to 2021: LSOAs in North Devon

6. The Office for National Statistics (ONS) summarise changes for populations of the LSOAs between the censuses of 2011 and 2021. We discuss the relevant changes below.

- Across all LSOAs, the working age (20-65 years) population decreased, whereas the 65+ population increased between 2011 and 2021. In four of the six LSOAs (ND 005C, 005D, 005E, 011B), the youngest age group (0-19 years) increased from 2011 to 2021. In North Devon 005B and 011D, the youngest group decreased in the same period
- Regarding people with disabilities and limitations in their day-to-day life, the situation has generally improved across the LSOAs since 2011, however for both categories, 'Day-to-day activities limited a lot' and 'Day-to-day activities limited a little', the percentage increased from 2011 to 2021 in North Devon 005E
- In four of the six LSOAs (ND 005B, 005C, 011B and 011D) the percentage of people reporting to be of fair, good or very good health as a total has increased since 2011. In the two remaining LSOAs (ND 005 and 005E), the percentage decreased from 94.4% to 93.6% and from 97.1% to 95.6%, respectively
- The majority (>88%) of residents in all the LSOAs provide no unpaid care to relatives etc. There are however more people providing unpaid care in LSOAs N Devon 005E and 011D compared to 2011.

1.1.4 Changes 2011 to 2021: Transportation route LSOAs

7. The ONS summarise changes for populations of the transportation route LSOAs between the censuses of 2011 and 2021. There is no data on LSOA 012C for 2021, it is therefore left out. We discuss the relevant changes below.

- Across all LSOAs, except one (011A), the working age (20-65 years) population decreased from 2011 to 2021, whereas the 65+ population increased between 2011 and 2021. In 011A the percentage of working age people stayed the same and the 65+ population decreased a little between 2011 and 2021. In four of the transportation route LSOAs (ND 005A, 006C, 007A, 09D), the youngest age group (0-19 years) increased from 2011 to 2021. In the rest of the LSOAs, the youngest age group decreased in the same period.
- Regarding people with disabilities and limitations in their day-to-day life, the the percentage of people reporting a to have a lot of limitations has decreased for all LSOAs between 2011 and 2021. For LSOA 006C and 011C, the percentage of people experiences 'a little' limitation in their day-to-day life, has also decreased, in 005A the percentage remained the same.

- In five of the nine LSOAs the percentage of people reporting to be of fair, good or very good health as a total has increased since 2011. In the remaining four LSOAs, the percentage of people reporting to be of fair, good or very good health as a total decreased since 2011.
- The majority (>88.7%) of residents in all the LSOAs provides no unpaid care to relatives etc, and this figure has increased since 2011. However, in all the LSOAs, there has been an increase in the percentage of people providing more than 20 hours of unpaid care a week since 2011.

1.1.5 Changes 2011 to 2021: North Devon

8. The ONS summarises notable changes for the population of North Devon between the censuses of 2011 and 2021 (ONS, 2023).

- The population of North Devon increased by 5.3%, from around 93,700 in 2011 to around 98,600 in 2021
- The average (median) age of North Devon increased by three years, from 45 to 48 years of age. The number of people aged 65 to 74 years rose by around 2,300 (an increase of 20.9%), while the number of residents between 35 and 49 years fell by around 2,100 (11.7% decrease)
- In 2021, 7.2% of North Devon residents were identified as being disabled and limited a lot. This figure decreased from 7.9% in 2011. The ONS advises caution, for this indicator, when making comparisons between 2011 and 2021 because of changes in question wording and response options
- In 2021, 4.6% of North Devon residents (aged five years and over) reported providing up to 19 hours of unpaid care each week. This figure decreased from 7.2% in 2011. The ONS advises caution, for this indicator, when making comparisons between 2011 and 2021 because of changes in question wording and response options
- In 2021, 49.7% of North Devon residents described their health as "very good", increasing from 48.1% in 2011. Those describing their health as "good" fell from 33.6% to 33.0%. The ONS advises that the pandemic may have influenced how people perceived and rated their health, and therefore may have affected how people chose to respond.

1.2 Public Health Outcomes Framework

9. **Figure 1.1** to **Figure 1.6** are from the Public Health Outcomes Framework and are published by the Office for Health Improvement and Disparities (no date) (OHID). OHID notes the following (no date):

- Indicators that are shaded blue rather than red/amber/green are presented in this way because it is not straightforward to determine for these indicators whether a high value is good or bad
- The *Change from previous* column shows whether there has been a change in value compared to the previous data point. Statistically significant changes highlighted in this column have been calculated by comparing the confidence intervals for the respective time points. If the confidence intervals do not overlap, the change has been flagged as significant
- Recent trend refers to the analysis done in the Fingertips tool which tests for a statistical trend. Changes in this column are calculated using a chi-squared statistical test for trend. This is currently only available for certain indicator types; full details are available in the tool
- Increases or decreases are only shown if they are statistically significant. Where no arrow is shown, no comparison has been made. This may be due to the fact that the required data to make the comparison is not available for the time point, or that no confidence interval values are available for the indicator.

Figure 1.1 Key to OHID Public Health Outcomes Framework

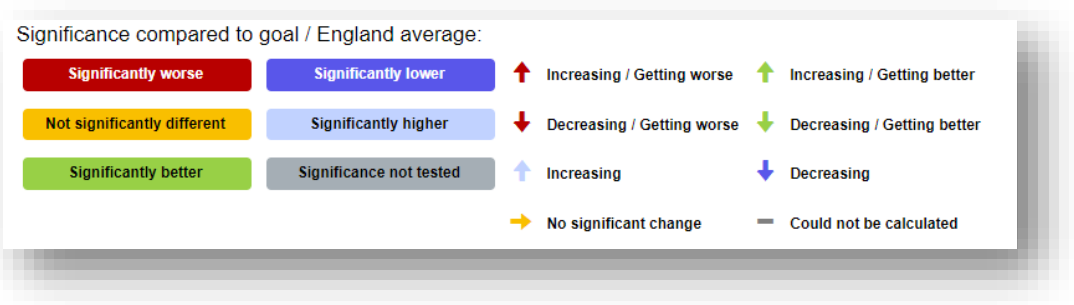


Figure 1.2 OHID Public Health Outcomes Framework: A. Overarching indicators – North Devon

The

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
A01b - Life expectancy at birth	All ages	Male	2020	79.7	78.7	Years	–	→
A01b - Life expectancy at birth	All ages	Female	2020	84.7	82.6	Years	–	→
A02a - Inequality in life expectancy at birth	All ages	Male	2018 - 20	6.40	9.70	Years	–	→
A02a - Inequality in life expectancy at birth	All ages	Female	2018 - 20	2.70	7.90	Years	–	→
A01b - Life expectancy at 65	65	Male	2020	19.1	18.1	Years	–	→
A01b - Life expectancy at 65	65	Female	2020	22.3	20.7	Years	–	→
A02a - Inequality in life expectancy at 65	65	Male	2018 - 20	2.40	5.20	Years	–	→
A02a - Inequality in life expectancy at 65	65	Female	2018 - 20	2.30	4.80	Years	–	→

Figure 1.3 OHID Public Health Outcomes Framework: B. Wider determinants of health – North Devon

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
B01b - Children in absolute low income families (under 16s)	<16 yrs	Persons	2020/21	13.2	15.1	%	→	→
B01b - Children in relative low income families (under 16s)	<16 yrs	Persons	2020/21	16.6	18.5	%	→	→
B03 - Pupil absence	5-15 yrs	Persons	2020/21	4.75	4.62	%	→	→
B08a - Gap in the employment rate between those with a physical or mental long term health condition (aged 16 to 64) and the overall employment rate	16-64 yrs	Persons	2020/21	21.3	10.7	Percentage points	–	→
B08a - The percentage of the population with a physical or mental long term health condition in employment (aged 16 to 64)	16-64 yrs	Persons	2020/21	61.5	64.4	%	–	–
B08b - The percentage of the population who are in receipt of long term support for a learning disability that are in paid employment (aged 18 to 64)	18-64 yrs	Persons	2020/21	-	5.14	%	–	–
B08d - Percentage of people in employment	16-64 yrs	Persons	2020/21	82.8	75.1	%	→	→
B09a - Sickness absence - the percentage of employees who had at least one day off in the previous week	16+ yrs	Persons	2018 - 20	1.36	1.92	%	–	→
B09b - Sickness absence - the percentage of working days lost due to sickness absence	16+ yrs	Persons	2018 - 20	0.79	1.02	%	–	→
B12a - Violent crime - hospital admissions for violence (including sexual violence)	All ages	Persons	2018/19 - 20/21	25.7	41.9	per 100,000	–	→
B12b - Violent crime - violence offences per 1,000 population	All ages	Persons	2020/21	18.8 ~	29.5 &	per 1,000	–	→
B12c - Violent crime - sexual offences per 1,000 population	All ages	Persons	2020/21	1.77 ~	2.29 &	per 1,000	–	→
B13a - Re-offending levels - percentage of offenders who re-offend	All ages	Persons	2019/20	22.2	25.4	%	–	–
B13b - Re-offending levels - average number of re-offences per re-offender	All ages	Persons	2019/20	3.21	3.74	per re-offender	–	–
B14a - The rate of complaints about noise	All ages	Persons	2019/20	4.06	6.37 x	per 1,000	→	→
B15a - Homelessness - households owed a duty under the Homelessness Reduction Act	Not applicable	Not applicable	2020/21	23.7	11.3	per 1,000	–	→
B15c - Homelessness - households in temporary accommodation	Not applicable	Not applicable	2020/21	0.83	4.03	per 1,000	–	→
B17 - Fuel poverty (low income, low energy efficiency methodology)	Not applicable	Not applicable	2020	12.3	13.2	%	–	–
B19 - Loneliness: Percentage of adults who feel lonely often / always or some of the time	16+ yrs	Persons	2019/20	17.6	22.3	%	–	–
1.01i - Children in low income families (all dependent children under 20)	0-19 yrs	Persons	2016	13.1	17.0	%	→	→

Figure 1.4 OHID Public Health Outcomes Framework: C. Health improvement – North Devon

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
C01 - Total prescribed LARC excluding injections rate / 1,000	All ages	Female	2020	59.7	34.6	per 1,000	→	↓
C02a - Under 18s conception rate / 1,000	<18 yrs	Female	2020	13.3	13.0	per 1,000	→	→
C04 - Low birth weight of term babies	=37 weeks gestational age at birth	Persons	2020	1.92	2.86	%	→	→
C06 - Smoking status at time of delivery	All ages	Female	2020/21	11.0	9.60	%	→	→
C09a - Reception: Prevalence of overweight (including obesity)	4-5 yrs	Persons	2019/20	19.4 $	23.0	%	→	→
C09b - Year 6: Prevalence of overweight (including obesity)	10-11 yrs	Persons	2019/20	29.1	35.2	%	→	→
C10 - Percentage of physically active children and young people	5-16 yrs	Persons	2020/21	47.7	44.6	%	–	→
C11a - Hospital admissions caused by unintentional and deliberate injuries in children (aged 0-14 years)	<15 yrs	Persons	2020/21	69.5	75.7	per 10,000	↓	↓
C11a - Hospital admissions caused by unintentional and deliberate injuries in children (aged 0-4 years)	0-4 yrs	Persons	2020/21	96.5	108.7	per 10,000	→	→
C11b - Hospital admissions caused by unintentional and deliberate injuries in young people (aged 15-24 years)	15-24 yrs	Persons	2020/21	177.4	112.4	per 10,000	→	→
C14b - Emergency Hospital Admissions for Intentional Self-Harm	All ages	Persons	2020/21	308.2	181.2	per 100,000	→	→
C15 - Proportion of the population meeting the recommended '5-a-day' on a 'usual day' (adults)	16+ yrs	Persons	2019/20	61.9	55.4	%	–	→
C16 - Percentage of adults (aged 18+) classified as overweight or obese	18+ yrs	Persons	2020/21	64.1	63.5	%	–	→
C17a - Percentage of physically active adults	19+ yrs	Persons	2020/21	71.2	65.9	%	–	→
C17b - Percentage of physically inactive adults	19+ yrs	Persons	2020/21	20.3	23.4	%	–	→
C18 - Smoking Prevalence in adults (18+) - current smokers (APS) (2020 definition)	18+ yrs	Persons	2020	10.3	12.1	%	–	–
C19d - Deaths from drug misuse	All ages	Persons	2018 - 20	6.33	5.02	per 100,000	–	→
C21 - Admission episodes for alcohol-related conditions (Narrow): New method. This indicator uses a new set of attributable fractions, and so differ from that originally published.	All ages	Persons	2020/21	520.0	455.9	per 100,000	→	→
C22 - Estimated diabetes diagnosis rate	17+ yrs	Persons	2018	71.8	78.0	%	–	→
C23 - Percentage of cancers diagnosed at stages 1 and 2	All ages	Persons	2019	57.3	55.0	%	→	→
C24a - Cancer screening coverage: breast cancer	53-70 yrs	Female	2021	50.6	64.1 &	%	↓	↓
C24b - Cancer screening coverage: cervical cancer (aged 25 to 49 years old)	25-49 yrs	Female	2021	75.6	68.0 &	%	→	↓
C24c - Cancer screening coverage: cervical cancer (aged 50 to 64 years old)	50-64 yrs	Female	2021	77.4	74.7 &	%	↓	→
C24d - Cancer screening coverage: bowel cancer	60-74 yrs	Persons	2021	69.5	65.2 &	%	↑	↑
C24e - Abdominal Aortic Aneurysm Screening Coverage	65	Male	2020/21	85.8	55.0 &	%	→	→
C27 - Percentage reporting a long-term Musculoskeletal (MSK) problem	16+ yrs	Persons	2021	18.7	17.0	%	–	→
C29 - Emergency hospital admissions due to falls in people aged 65 and over	65+ yrs	Persons	2020/21	1859	2023	per 100,000	→	→
C29 - Emergency hospital admissions due to falls in people aged 65-79	65-79 yrs	Persons	2020/21	824.4	936.6	per 100,000	→	→
C29 - Emergency hospital admissions due to falls in people aged 80+	80+ yrs	Persons	2020/21	4859	5174	per 100,000	→	→

Figure 1.5 OHID Public Health Outcomes Framework: D. Health protection – North Devon

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
D01 - Fraction of mortality attributable to particulate air pollution (new method)	30+ yrs	Persons	2020	4.43	5.64	%	–	–
D02a - Chlamydia detection rate per 100,000 aged 15 to 24	15-24 yrs	Persons	2021	1120	1334	per 100,000	↓	→
D02a - Chlamydia detection rate per 100,000 aged 15 to 24	15-24 yrs	Male	2021	912.6	859.8	per 100,000	→	→
D02a - Chlamydia detection rate per 100,000 aged 15 to 24	15-24 yrs	Female	2021	1347	1762	per 100,000	↓	→
D02b - New STI diagnoses (exclude chlamydia aged under 25) per 100,000	All ages	Persons	2021	266.9	394.5	per 100,000	↓	→
D04d - Population vaccination coverage - Flu (primary school aged children)	4-11 yrs	Persons	2021	- *	57.4 *	%	–	–
D07 - HIV late diagnosis in people first diagnosed with HIV in the UK	15+ yrs	Persons	2019 - 21	100.0 *	43.4 *	%	–	→
D08b - TB incidence (three year average)	All ages	Persons	2018 - 20	1.04	7.96	per 100,000	–	→
D10 - Adjusted antibiotic prescribing in primary care by the NHS	All ages	Persons	2021	0.75 *	0.74 *	per STAR-PU	–	↓

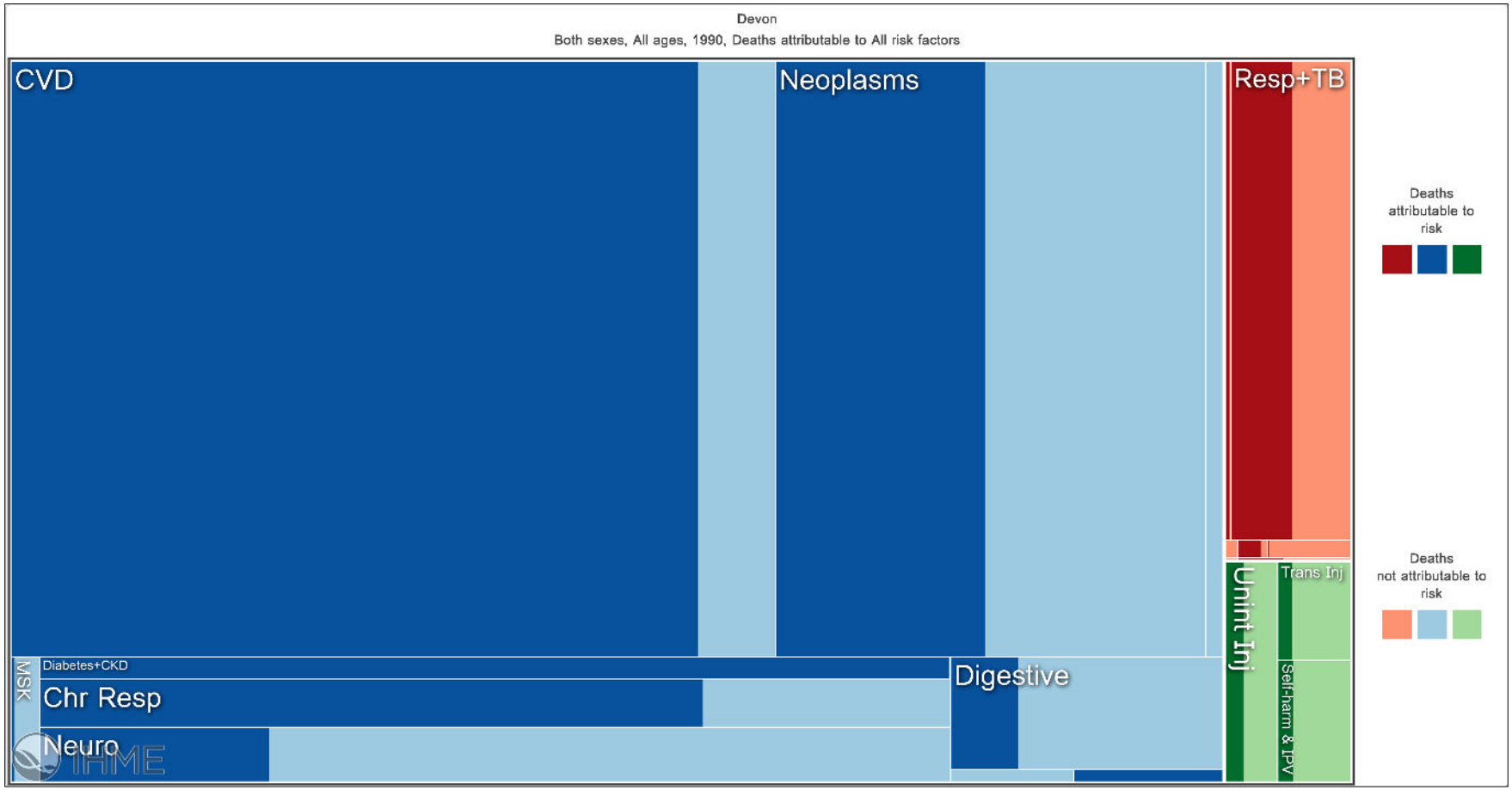
Figure 1.6 OHID Public Health Outcomes Framework: E. Healthcare and premature mortality – North Devon

Indicator	Age	Sex	Period	Value	Value (England)	Unit	Recent trend	Change from previous
E01 - Infant mortality rate	<1 yr	Persons	2018 - 20	2.05	3.90	per 1,000	–	→
E02 - Percentage of 5 year olds with experience of visually obvious dental decay	5 yrs	Persons	2018/19	22.5	23.4	%	–	→
E03 - Under 75 mortality rate from causes considered preventable (2019 definition)	<75 yrs	Persons	2020	123.6	140.5	per 100,000	→	→
E04a - Under 75 mortality rate from all cardiovascular diseases	<75 yrs	Persons	2020	73.1	73.8	per 100,000	→	→
E04b - Under 75 mortality rate from cardiovascular diseases considered preventable (2019 definition)	<75 yrs	Persons	2020	27.9	29.2	per 100,000	→	→
E05a - Under 75 mortality rate from cancer	<75 yrs	Persons	2020	114.7	125.1	per 100,000	→	→
E05b - Under 75 mortality rate from cancer considered preventable (2019 definition)	<75 yrs	Persons	2020	45.8	51.5	per 100,000	→	→
E06a - Under 75 mortality rate from liver disease	<75 yrs	Persons	2020	14.4	20.6	per 100,000	→	→
E06b - Under 75 mortality rate from liver disease considered preventable (2019 definition)	<75 yrs	Persons	2020	13.6	18.2	per 100,000	→	→
E07a - Under 75 mortality rate from respiratory disease	<75 yrs	Persons	2020	17.4	29.4	per 100,000	→	→
E07b - Under 75 mortality rate from respiratory disease considered preventable (2019 definition)	<75 yrs	Persons	2020	8.93	17.1	per 100,000	→	→
E08 - Mortality rate from a range of specified communicable diseases, including influenza	All ages	Persons	2020	- ^	8.25	per 100,000	–	–
E10 - Suicide rate	10+ yrs	Persons	2019 - 21	11.0	10.4	per 100,000	–	→
E11 - Emergency readmissions within 30 days of discharge from hospital	All ages	Persons	2020/21	15.6	15.5	%	–	→
E13 - Hip fractures in people aged 65 and over	65+ yrs	Persons	2020/21	658.7	528.7	per 100,000	→	→
E13 - Hip fractures in people aged 65-79	65-79 yrs	Persons	2020/21	283.9	219.3	per 100,000	→	→
E13 - Hip fractures in people aged 80+	80+ yrs	Persons	2020/21	1745	1426	per 100,000	→	→
E14 - Excess winter deaths index	All ages	Persons	Aug 2019 - Jul 2020	10.4	17.4	%	–	→
E14 - Excess winter deaths index (age 85+)	85+ yrs	Persons	Aug 2019 - Jul 2020	10.5	20.8	%	–	→
E15 - Estimated dementia diagnosis rate (aged 65 and over)	65+ yrs	Persons	2022	55.8 *	62.0 *	%	→	→

1.3 The Devon Joint Strategic Needs Assessment (JSNA) 2021

The Devon JSNA 2021 includes the 2019 Global Burden of Disease (GBD) study to visualise the leading causes of death and ill-health in Devon, see **Figure 1.7**. Almost half (47.17%) of all deaths in Devon are attributable to cardiovascular diseases (CVD). Neoplasms, i.e. abnormal cell growth including cancer, is the second leading cause of deaths in Devon. The leading causes of deaths in Devon are similar to England generally.

Figure 1.7 Causes of death and ill-health in Devon



1.4 Social isolation

10. There is a clear link between loneliness and poor mental and physical health. The percentage of adult carers who have as much social contact as they would like is lower in the South West than in England for adult carers who are 18 and over and those who are 65 and over. This measure draws on self-reported levels of social contact as an indicator of social isolation for both users of social care and carers (OHID, 2023c, OHID, 2023b).

Table 1.13 Social Isolation: percentage of adult carers who have as much social contact as they would like

Area Name	Age	Value	CI 95.0 limit*		Count
			Lower	Upper	
England	18+ yrs	28.0%	27.4%	28.6%	90,255
South West region	18+ yrs	23.9%	21.8%	26.0%	13,935
England	65+ yrs	28.8%	27.9%	29.7%	48,805
South West region	65+ yrs	26.0%	23.1%	28.9%	9,100

* CI 95.0 limit: the upper and lower levels of the 95% confidence interval.
(OHID, 2023a)

1.5 Mental ill health

11. OHID uses an indicator of intentional self-harm to present mental health and well-being. OHID recognises that it is not possible to include a suitable indicator representing all aspects of mental health and well-being (OHID, 2022a). The standardised admission ratio, between 2016/17 and 2020/21, for Emergency hospital admissions for intentional self harm is higher in North Devon than in Devon (OHID, 2022d). Both are higher than the national value.

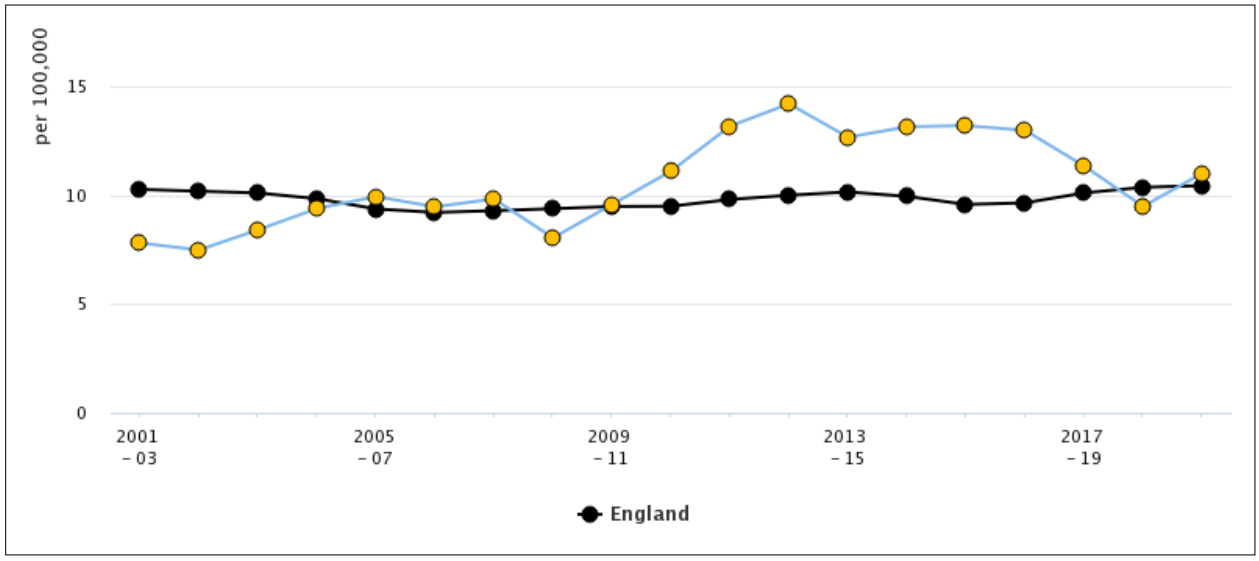
Table 1.14 Emergency hospital admissions for intentional self harm, standardised admission ratio (2016/17 - 2020/21)

Area Name	Sex	Value	CI 95.0 limit	
			Lower	Upper
England	Persons	100	99.729	100.2715
Devon	Persons	116.0724	113.5372	118.65
North Devon	Persons	169.6631	160.7904	178.8981

Data for all ages. (OHID, 2022d)

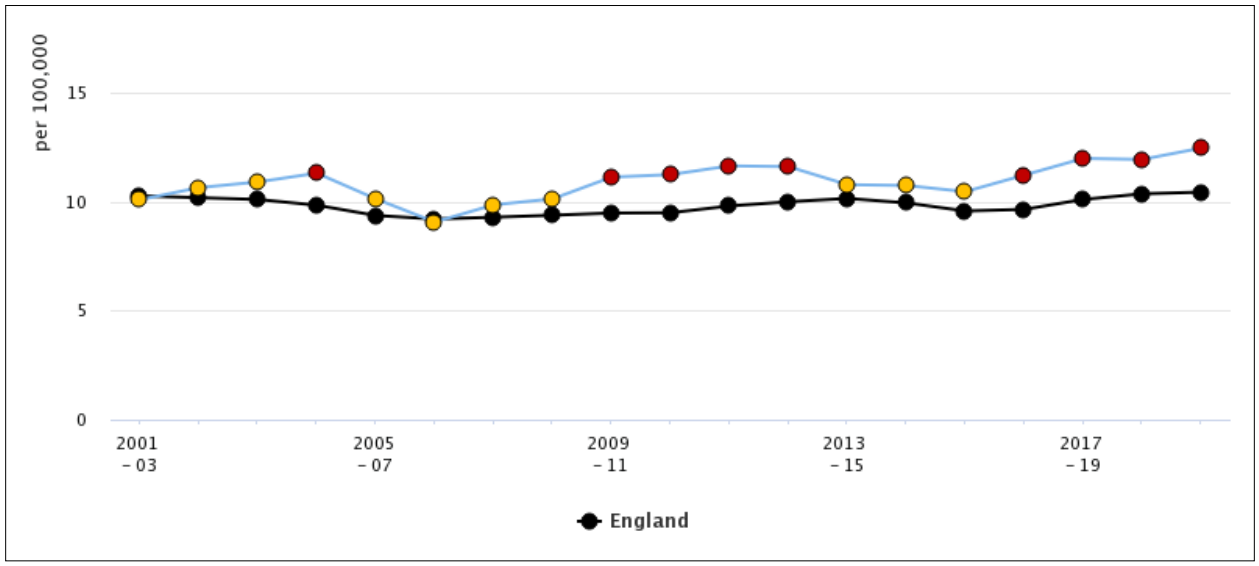
12. OHID states that suicide is a significant cause of death in young adults, and is seen as an indicator of underlying rates of mental ill-health. Suicide is a major issue for society and a leading cause of years of life lost. Suicide is often the end point of a complex history of risk factors and distressing events, but there are many ways in which services, communities, individuals and society as a whole can help to prevent suicides (OHID, 2022b). The suicide rate per 100,000, from 2001 to 2019, for persons in North Devon (**Figure 1.8**) went both below and above the national value and in Devon (**Figure 1.9**) it remained close to or above the national value. OHID reports that the rate for North Devon, for 2019-2021, shows no significant change (OHID, 2022c).

Figure 1.8 Suicide rate (Persons) for North Devon



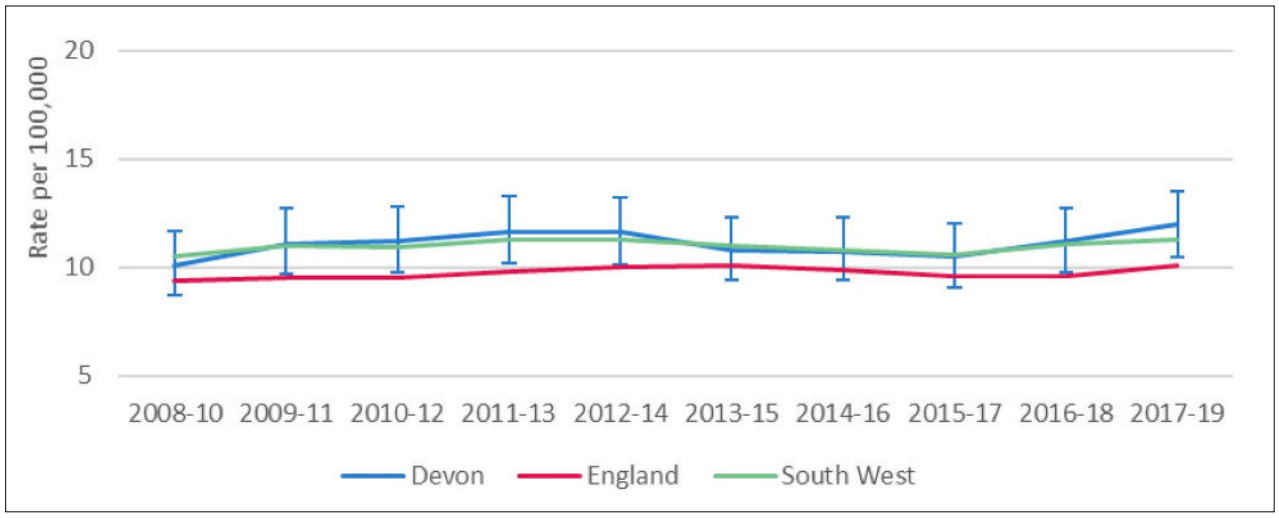
(OHID, 2022f)

Figure 1.9 Suicide rate (Persons) for Devon



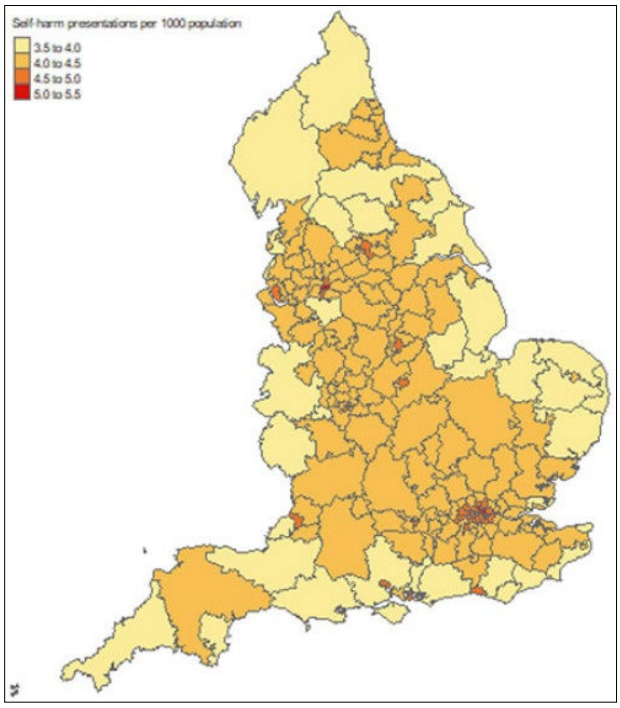
(OHID, 2022e)

Figure 1.10 Trend in mortality from suicide and undetermined intent – Devon, 2008-2019



Extracted from Public Health Devon and Devon County Council (no date)

Figure 1.11 Estimated self-harm episodes in England in 2013



From Tsiachristas et al (2020)

2 Human health: Scientific Evidence

2.1 Blue space and health

2.1.1 Climatic and non-climatic stressors

13. Dermawan et al., (2022) state that ocean life forms are fundamentally well adapted to natural environmental variations, and they can even tolerate extreme conditions for a short time. They identify anthropogenic stressors that are causing drastic changes in the ocean ecosystem. The review outlines the impact of climatic and non-climatic stressors on ocean life, and it also outlines the synergistic impact of both stressors. The points are summarised below and are not all equally relevant to the current Project.

    - Non-climatic stressors can directly affect human health by poisoning humans. For example, Harmful Algal Blooms (HABs) and microplastics can enter the food chain, which will be dangerous to human health. Non-climatic stressors can produce potentially toxic compounds that cause harm to humans by direct contact, inhalation, or consumption of contaminated seafood
    - Climatic stressors reduce the ocean ecosystem services by delivering an appropriate environment for the growth of HABs and broadening the spread of HABs, pathogens, hazardous chemicals, and microplastic. Climatic stressors may impact HAB events, their intensity, and their consequences
    - Synergistic impact: human health consequences linked to the ocean are typically linked to the consumption of toxin-contaminated, pathogen contaminated, or chemically contaminated seafood; exposure to toxins from HABs; and the effects of weather and climate on the rates, modes of transmission, and severity of infectious diseases. The combined effect of climatic and non-climatic stressors can worsen the ecosystem services and amplify and broaden the impact of non-climatic stressors.

2.1.2 Blue space, health and well-being

14. White et al (2020) explore exposure through five mechanisms:

    - Proximity & other exposures: people who live closer to blue spaces tend to have greater indirect, intentional and incidental exposure
    - Proximity and health and well-being outcomes: some evidence that living near the coast or inland water bodies is associated with better mental health, better evidence to suggest people report better mental and general health in the years

when they live close to the coast (<5 km) versus inland and the modifying role played by income

- Indirect & incidental exposure and health and well-being outcomes: blue space views from home may be particularly important to older adults with poorer mobility
- Intentional exposure and health and well-being outcomes: visiting a blue space for recreation at least once a week was associated with longer-term better mental health and individuals who swim outdoors regularly report experiencing increased connection to place and the natural environment, which may in turn lead to behaviours aimed at protecting the health promoting aspects of these blue spaces
- Exposure, planetary health and pro-environmental behaviours: an English study with over 24,000 participants found that living near the coast (<5 km vs. >20 km) was associated with higher likelihoods of a number of pro-environmental behaviours including: recycling, buying local/seasonal produce, walking/cycling instead of using a car for short journeys, and being a member of an environmental organisation.

15. White et al., (2020; 5) state that much of the activity in blue spaces, at least in high income countries, is not water-based but occurs on land, e.g. beach walks; and it is this activity that predominantly explains any link between coastal proximity and health.

16. A review for Natural England (Lovell et al., 2020; 11-12) reports that the availability of natural spaces and attractive views of nature in the living environment is a determinant of physical activity behaviours, and notes variation in impact between socio-demographic group and between areas. Blue space is noted as supporting higher rates of participation and greater intensity of activity. A 2018 survey monitoring engagement with the natural environment showed differences in access with regard to natural spaces: younger people (age 16-24) were the most frequent visitors, compared to other age groups; people aged 65 and over, black, and minority ethnic groups and residents living in the most deprived areas of England were the least frequent visitors.

2.1.3 Oceans and human health

17. Fleming et al (2021) state that healthy oceans foster healthy people. For more than 4.5 billion people, approximately 15% of their daily per capita intake of animal protein comes from marine products. … Studies over the past 10 years have demonstrated that spending time in high quality "blue" spaces (through leisure

activities or living in a coastal environment) directly supports and enhances health and well-being, combatting obesity and mental health problems, particularly in deprived populations. This highlights an enormous potential for these well-being promotion initiatives and healthcare interventions to address both pre-existing and emerging health issues beyond the lifetime of the pandemic.

18. Fleming et al., (2021) also state that dangers to health and well-being arising in coastal waters, regional seas, and the global ocean have long been recognized by marine scientists but less so by the medical and public health community. Worldwide, more than 250 million clinical cases of gastroenteritis and respiratory disease are linked annually to swimming in contaminated seas. Other direct health threats arise through disease transmission and ingestion of toxic substances.

2.1.4 Injury and drowning

19. Injuries associated with marine activities in the nearshore/intertidal zone such as surfing and swimming include lacerations and bruising (Moran and Webber, 2013). Drowning outcomes include death and a range of non-fatal outcomes from survival with no lasting consequence to survival with permanent neurological impairment (Beerman et al., 2018).

20. Koon et al., conducted a scoping review of coastal drowning (Koon et al., 2021). They define drowning as the process of respiratory impairment from submersion or immersion in liquid and they state that it is a major global health problem. The burden of drowning is disproportionally high in low-income countries and, of direct relevance to the current assessment, among males, children and young people (Franklin et al., 2020). Koon et al., (2021) state that the individual, community and societal cost of drowning is immense, multi-faceted and worthy of research that informs robust prevention efforts

21. The health of people living in coastal areas is also affected by macroeconomic factors and financial downturns lead to an increase in mental ill health across the population that can, in turn, translate into despair and self-harm (Hawton and Haw, 2013). Suicide is a rare event with a large impact. It is estimated that, for every suicide, between six and 20 people, usually family members and acquaintances of those who died, are adversely affected psychologically and emotionally (Andriessen et al., 2019).

22. In 2016, it was reported that drowning is a relatively uncommon method of suicide in most high-income countries, that there are challenges in establishing a baseline and that older age groups are more likely to choose drowning as a method (Haw and Hawton, 2016). Analysis of data from 16-64 year-olds in the Netherlands

concluded that living close to the coast is associated with greater suicide risk for women (Helbich et al., 2022). The health-supportive effects of coastal areas may not hold for woman facing suicide risk.

23. Research in Australia reported that people travelled to reach the coast for increased anonymity so as to reduce the chance of being interrupted, that coastal suicides were higher in males than females and that female suicide deaths reported a higher incidence of mental ill health or a history of suicidal behaviours (Lawes et al., 2021).

2.1.4.1 Occupational exposure to self-harm

24. First responders are at greater risk for mental ill health and compromised well-being than the general population and strategies for supporting mental health and well-being need to be implemented early in the first responder career and then reinforced throughout and into retirement (Smith et al., 2021).

2.1.4.2 Prevention

25. The complexity surrounding suicide prevention, and the interrelated contributing factors within these incidents, suggests that individual and community-level strategies that aim to reduce suicidal behaviours through the incorporation of multiple protective factors are required to make communities and individuals more resilient and to reduce suicidal behaviour (Lawes et al., 2021).

26. The England and Devon strategies for suicide prevention each include a priority of reducing access to means of suicide (PHE, 2012, Public Health Devon and Devon County Council, no date). Protective and preventative measures include increasing capacity for human intervention and the provision of signs and resources. For example, training and/or awareness-raising for non-health staff and members of the public in addition to including advice such as 'Dial 999 and ask for the Coastguard' on Royal National Lifeboat Association (RNLI) signage (Chadwick et al., 2019) if people are attempting or considering self-harm.

2.1.5 Actions to protect and promote health

27. In **Table 2.1** Fleming et al., (2021) provide actions that would be beneficial to Ocean(s) and Human Health (Fleming et al (2021) state that). These have been addressed through the assessment process and taken into account in the design and in the embedded, and other, mitigation for the Onshore Project.

Table 2.1 Possible First Steps to Improve OHH Interactions for the Public Health and Other Communities, Not Exhaustive

Actors	Possible (First) Steps [a]
Medical and social care sector (doctors, nurses, mental health experts, social workers), public health experts	Integrate with individual and community health promotion activities, "Blue prescriptions" (and monitoring)[b]
	Include OHH in medical curriculum
	Work with environmental and city planners to seek co-benefits in planning for humans and the environment
	Get involved in advice and activities at local, national, and global levels
Researchers	Build on the OHH Strategic Research Agenda (a first step)[b]
	Research the evidence gaps and provide evidence to policymakers
	Promote transdisciplinary training
	Design and support implementation of dedicated OHH indictors, data streams, and repositories
	Get involved in community cocreation and listen!
	Get involved in science advice activities at local, national, and global levels to facilitate evidence-based policy
Citizens (local residents and tourists)	Enjoy the sea, coasts, and blue spaces safely and sustainably
	Encourage school projects on ocean literacy, respect for the sea, sustainability, and citizen responsibility and involvement
	Participate in clean-up activities (e.g. Plogging, Sweden; Surfers Against Sewage, United Kingdom)
	Seek out science activities near your home involving citizens (monitoring, counting)
	Listen to stories from the elderly and others about the sea
Private organizations (tourism operators, holiday rentals, camp sites, etc.), businesses, and nongovernmental organizations	Inform clients on what a stay by the sea can do for their health and the importance of ocean health for their health
	Involve clients in citizen science projects
	Ask their feedback on their experiences including impact on their health and well-being
	Share these experiences (Web site, OHH platform)
Large international and local businesses*	Review and act on the impacts of supply chain, waste, and other business activities on ocean health
	Share these actions within and beyond the individual business (Web site, OHH platform)
	Support employee and local community activities that support ocean health
	Join with other similar businesses and supply chains to share best practices and drive innovation toward a healthy ocean
Local planners and policymakers*	Integrate OHH as part of your local programming
	Engage in listening and cocreation events with local citizens
	Secure equitable access to the coasts and sea in spatial plans with environmental sustainability and quality at the forefront

Actors	Possible (First) Steps [a]
	Work with public health and environment officers on benefits and risks from the ocean
National and regional ministries (health, water, environment, fisheries and agriculture, industry) *	Monitor continuously the effects on downstream usages in policy development (system-based approach) on health of humans and the environment
	Assess environment and human health in collaboration with citizens and experts
	Develop a common language and work with diverse stakeholders
Policymakers*	Prioritize the OHH agenda and work on awareness across different directorates
	Develop a common language on OHH
	Facilitate interdisciplinary discussions and funding for OHH research and training cocreated with communities
	Include the interdependencies of environment and health in all policy development
Diverse groups	Consider coming together to propose specific local, regional, and global UN Ocean Decade Actions (e.g., networks, dedicated resources, research programs, etc.)[c]
a Examples can be found at https://sophie2020.eu; https://en.unesco.org/biosphere; https://www.blueclimateinitiative.org. b Examples can be found at https://sophie2020.eu/strategic-research-agenda. c Examples can be found at https://www.oceandecade.org/events/134/United-Nations-Decade-of-Ocean-Science-for-Sustainable-Development-2021–2030–Call-for-Decade-Actions-No-012020.	
* Addressed through the assessment process and taken into account in the design and in the embedded, and other, mitigation for the Onshore Project.	

Table adapted from Fleming et al (2021)

2.2 Noise

28. Noise, defined as undesirable sound, in one of the most common hazards at occupational and environmental level. Harmful health effects of noise exposure may be further increased by the duration of exposure, the intensity and frequency of the sound, other risk factors of the exposed population and cumulative exposure to other factors. Hearing loss in construction workers could be prevented through a combination of silencing equipment, regular audiometric tests, effective hearing protective training, and encouraging workers to use hearing protectors (Domingo-Pueyo et al., 2016).

29. Regarding noise and health, groups at risk most often mentioned in the literature are children, the elderly, the chronically ill and people with a hearing impairment. Other categories encountered are those of sensitive persons, shift-workers, people with mental illness (e.g., schizophrenia or autism), people suffering from tinnitus, and foetuses and neonates. The available evidence shows that children are less vulnerable for annoyance than adults, but more vulnerable for cognitive effects of noise. They are not *per se* more vulnerable as a group, but more at risk because of less-developed coping strategies, and they are in a sensitive developmental period. This is indicative of a life phase effect rather than an age effect. Children seem to be less vulnerable for awakenings due to noise but more vulnerable for physiological effects during sleep and related motility. Evidence does not indicate that the elderly are more vulnerable to noise in terms of annoyance and sleep disturbance. Age-specific comparisons rather show an inverted U-shaped relation and indicate that both young and older people are less at risk as far as annoyance and disturbance are concerned. But, possibly, the elderly are more vulnerable regarding cardiovascular effects, and this may be a combined effect of air pollution and noise (van Kamp and Davies, 2013).

30. Environmental noise is a psycho-social stressor that affects subjective well-being and physical health. Noise disturbs communication, concentration, relaxation and sleep. Chronic long-term exposure to transportation noise has been shown to be associated with the prevalence and incidence of cardiovascular diseases, including hypertension, ischemic heart diseases and stroke. Road traffic noise is a significant risk factor for cardiovascular diseases (Babisch, 2014).

2.3 Air quality

31. Air pollution is an important public health problem in Europe and there is evidence that it exacerbates health inequities. General regulations on air quality control, road traffic emission control, energy generation emission control and climate change

greenhouse gas emission control are all associated with improvements in air quality and public health. The health co-benefits obtained across these control strategies indicated that there was a strong case for promoting Health in All Policies. In areas affected by traffic, low emission zones are particularly effective in reducing ambient nitrogen dioxide and particulate matter levels. Air quality control strategies can address air pollution related health inequity by targeting two major pathways: the uneven distribution of concentration of pollutants at various geospatial levels, and the different susceptibilities among population groups. Embedding these two factors into air quality control strategies is advisable for improving the assessment of health equity (Wang et al., 2016).

32. In occupational settings low exposure to mineral dust, and high exposure to gases/fumes are associated with an increased risk of Chronic Obstructive Pulmonary Disease. Both low and high exposure to biological dust and mineral dust are also associated with increased risk of chronic bronchitis (Alif et al., 2016).

33. Air pollution is associated with moderate or severe asthma exacerbation. Important outdoor air pollutants are particulate matter with diameters that are 2.5 micrometres and smaller ($PM_{2.5}$), ozone (O_3), nitrogen dioxide (NO_2) and carbon monoxide (CO). The main anthropogenic sources of PM are traffic and transportation, electricity generation and other combustion processes. NO_2 and CO are principally emitted from fossil fuel combustion in urban environments. O_3 is a secondary pollutant formed by photochemical reactions between sunlight and pollutant precursors, such as nitrogen oxides and volatile organic compounds. Increased pollution exposures have been associated with increased numbers of hospital admissions and emergency-room visits, mainly due to exacerbations of chronic obstructive pulmonary disease and asthma. In the atmosphere, different PM sizes can be found. The coarse fraction (PM_{10}–$PM_{2.5}$) can penetrate into the upper airways, but the fine fraction ($PM_{2.5}$-PM_1) can be deposited in the lung, especially in the alveoli, although it could pass to the systemic circulation. Besides the size of PM, the chemical composition is very important to understand the health effects. There are differences in the individual susceptibility to air pollutants. Children are more affected than adults and boys more affected than girls, while a diet high in fruits and vegetables and of antioxidant vitamin supplements may be a protective factor, and obesity may increase susceptibility to the adverse effects of air pollution. The relatively small risks and odds ratios for health outcomes due to air pollutants may lead one to assume that the potential effect of outdoor air pollutants at a population level is negligible, and thus the impact of public health measures could be dismissed. However, a large number of people are susceptible to moderate and severe exacerbations related to outdoor air pollution, and a very large number of people

are exposed to outdoor pollutants, for example by living near polluted roads. Considering these two facts, a combination of small relative risks and high prevalence of exposure can contribute to a moderate population attributable fraction. Thus, a public health intervention aimed at mitigating the effects of air pollutants and targeted to the entire population might have significant benefits for the society (Orellano et al., 2017).

34. Air pollution is a heterogeneous and a complex mixture of dust, particulate matter, fumes, gases, carbon monoxide, nitrogen dioxide, sulphur dioxide and ozone. Environmental air pollution is associated with increased risk of cardiovascular diseases. Environmental pollution exerts its detrimental effects on the heart by developing pulmonary inflammation, systemic inflammation, oxidative stress, endothelial dysfunction and prothrombotic changes (Meo and Suraya, 2015).

35. $PM_{2.5}$ exposure during pregnancy is associated with lower birth weight, and late pregnancy may be the critical exposure period. As $PM_{2.5}$ is a mixture of multiple inorganic and organic constituents its health effects can vary depending on different constituents and origins Some specific $PM_{2.5}$ constituents may have larger toxic effects on foetal weight. For instance, birth weight was negatively associated with zinc, nickel, titanium, vanadium, organic carbon, nitrate and elemental carbon, which might indicate their toxic effects were larger than those of other constituents. Furthermore, borderline effects were found of some constituents, such as sulphate and silicon (Sun et al., 2016).

2.4 Journey times

36. Delays to treatment are a considerable concern for patients when first accessing health services. Common barriers in accessing healthcare include waiting lists and appointments delays; poor service availability; difficulties with parking; poor transport options; and distance to the outpatient clinic (Fradgley et al., 2015).

37. People with multiple chronic conditions have greater reliance on health care providers, but convenient access to providers is often limited both for urgent and non-urgent concerns (Liddy et al., 2014).

38. Rurality can contribute to the vulnerability of people with chronic diseases. Geographic distance from services poses access barriers, worsened by transportation problems or weather conditions. Community supports and rurally located services can help overcome these challenges. The limited availability of health care professionals increases the feeling of vulnerability. A rural culture of self-reliance and community belonging may mitigate feelings of vulnerability but reduce willingness to seek distant care (Brundisini et al., 2013).

2.5 EMF

39. EMFs are common and an essential part of the physical world and of life itself. Their sources are the fundamental particles of matter with charge (typically electrons and protons). EMFs occur naturally within the body and are associated with nerve and muscle activity. Other examples of EMFs include the natural magnetic field of the Earth and natural electric fields in the atmosphere.

40. Electric fields are produced by voltage and measured in volts per metre (V/m). Atmospheric static electric field at ground level is typically around 100 V/m in fine weather and during thunderstorms can rise to many thousands of volts per metre. Electricity within homes is at a voltage of 230 V. However, outside of houses, electricity is distributed at much higher voltages ranging from 11,000 V (11 kV) up to 400,000 V (400 kV). Generally, the higher the voltage the higher the electric field. Most buildings materials and trees are effective at screening electric fields.

41. Magnetic fields are produced by current and measured in microteslas (μT). The Earth's static magnetic field varies over the surface of the globe and is about 50 μT in the UK. Anything which uses or carries mains electricity is a potential source of power-frequency magnetic fields, which modulate the Earth's steady natural fields. The strength of the magnetic-field modulation depends on the current carried by the equipment. In the case of a power line, this varies according to the demand for power at any given time. Unlike electric fields, magnetic fields are little affected by trees and ordinary building materials.

42. Both Alternating Current (AC) and Direct Current (DC) fields exist in addition to the Earth's steady natural fields. In AC, the voltage, current and corresponding EMF switches direction. Most transmission infrastructure in the UK uses AC. Within the UK, the frequency of AC mains electricity is 50 hertz (Hz, or 50 cycles per second). Any alternating magnetic field will induce an electric field, which in turn produces a current in a conducting medium. The human body is conducting and will therefore have a current induced in it, albeit, usually, a very small one.

43. Mains-powered AC appliances produce elevated magnetic fields whenever they draw current. Such fields generally fall as the inverse cube of distance, and thus are significant only within a metre or two of the appliance, as shown in **Chapter 22: Human Health, Table 22.25**.

44. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guidelines (ICNIRP, 1998) are designed to prevent external exposure to EMFs, with a large safety margin, that could cause currents to be induced in the body that are large enough to cause effects on nerves. The guidelines are based on current

density. The ICNIRP guidelines recommend that the general public are not exposed to levels of EMFs able to cause a current density of more than 2mA/m^2 within the human central nervous system. This recommendation is described as the "basic restriction".

45. The ICNIRP guidelines also contain "reference levels". For the public, the reference level for electric fields is 5kV/m, and the reference level for magnetic fields is 100μT. The recommended values are summarised in **Table 2.2**.

Table 2.2 Recommended Values for Power Frequencies

Public exposure level	Electric fields	Magnetic Fields
Power frequency		
Basic restriction (induced current density in central nervous system)	2 mA/m^2	
Reference level (external unperturbed field)	5,000V/m	100μT
Field corresponding to the basic restriction	9,000V/m	360μT
Static		
Basic restriction	None	40,000μT

46. Under the ICNIRP guidelines, the limits adopted are the basic restrictions. The reference levels are used as guides to when detailed investigation of compliance with the basic restrictions is required. If the reference level is not exceeded, the basic restriction cannot be exceeded, and no further investigation is required. If the reference level is exceeded, the basic restriction may or may not be exceeded. The Code of Practice on compliance (DECC, 2012) endorses this approach and gives the values of field corresponding to the basic restriction.

47. For some, scientific evidence is not persuasive as EMF can be understood as a risk to health. The way in which different communities respond to similar threats to their health can vary, from outrage to indifference and public health agencies are often taken by surprise leading to potential loss of public confidence. Potential explanatory drivers included: prior experience and visibility of threat, sociodemographic characteristics, volume and type of media coverage, government reaction and availability of social support (Greene et al., 2014).

2.6 Wider societal infrastructure and resources

48. Energy efficiency and renewable energy (EE/RE) can produce benefits to the environment and public health by displacing electrical generation sources that emit greenhouse gases (GHGs) or other air pollutants, as well as by having impacts

across the full life cycle of electrical generation (Epstein et al., 2011, Jaramillo et al., 2007).

49. The associated key health outcomes are reducing premature deaths, heart attacks, asthma exacerbations, and hospitalizations for cardiovascular or respiratory issues (Buonocore et al., 2016).

50. Offshore wind has total health and climate benefits fairly similar to its market cost, using a value of the social cost of carbon that is likely an underestimate. Another way of describing that is that the entire cost of an offshore wind facility would be justified in the health and carbon benefits, before considering the value of selling the electricity (Buonocore et al., 2016).

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