



Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 4, Chapter 2: Human Health

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Table of contents

2	Human Health	1
2.1	Introduction.....	1
2.2	Legislative and policy context	2
2.3	Consultation and engagement	12
2.4	Baseline Characterisation.....	17
2.5	Impact assessment methodology	36
2.6	Key parameters for assessment	39
2.7	Commitments adopted as part of the MHPGC Project	49
2.8	Assessment of impacts	56
2.9	Cumulative effects	70
2.10	Transboundary effects.....	86
2.11	Inter-related effects.....	86
2.12	Summary.....	86
2.13	References	89

List of tables

Table 2.1:	Summary of the NPS provisions relevant to Human Health	3
Table 2.2:	Summary of NPPF requirements relevant to Human Health	8
Table 2.3:	Marine planning policy relevant to Human Health	10
Table 2.4:	Local policy relevant to Human Health.....	11
Table 2.5:	Summary of scoping responses relevant to Human Health	12
Table 2.6:	Population density (ONS, 2024)	23
Table 2.7:	Self-Reported General Health Levels for various Study Areas (Source: ONS, 2021)	24
Table 2.8:	Population health characteristics for various Study Areas (Source: OHID, 2025)	27
Table 2.9:	Indices of Multiple Deprivation for various Study Areas (Source: MHCLG, 2025)	29
Table 2.10:	Population characteristics for various Study Areas (Source: ONS, 2021)	32
Table 2.11:	Ethnicities, as of 2021 Census (ONS, 2021).....	35
Table 2.12:	Definition of terms relating to the sensitivity of the receptor	37
Table 2.13:	Definition of terms relating to the magnitude of an impact	37
Table 2.14:	Matrix used for the assessment of the significance of the effect.....	38
Table 2.15:	Significance definitions	38
Table 2.16:	Impacts scoped into the assessment	40
Table 2.17:	Determinants scoped out of the Human Health assessment.....	43
Table 2.18:	Embedded commitments relevant to Human Health implemented as part of the MHPGC Project	50
Table 2.19:	Projects and plans screened in to Human Health CEA	71
Table 2.20:	MHPGC Project CEA for Air Quality and Dust	79

Table 2.21: MHPGC Project CEA for Noise and Vibration	80
Table 2.22: MHPGC Project CEA for Open Space, Leisure and Play	81
Table 2.23: MHPGC Project CEA for Water Quality	82
Table 2.24: MHPGC Project CEA for Land Quality.....	82
Table 2.25: MHPGC Project CEA for Transport Modes, Access and Connections	83
Table 2.26: MHPGC Project CEA for Employment and Income.....	84
Table 2.27: MHPGC Project CEA for perceptions of risk from EMF	84
Table 2.28: Summary of potential impacts and residual effects	87

List of figures

Figure 2.1: MHPGC Human Health Study Areas.....	19
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Glossary

Term	Meaning
Commitments	Measures (embedded mitigation & secondary) to be adopted during the construction, operation and maintenance, and decommissioning phases of the Morven Hawthorn Pit Grid Connection (MHPGC) Project.
Cumulative effect	For each environmental topic, the baseline environment will be characterised, and the likely significant effect will be described within a topic-specific Study Area. Specific Study Areas are defined for each topic and are based on the maximum spatial extent
Cumulative effects assessment	Assessment of the likely effects arising from the MHPGC Project alongside the likely effects arising from other proposed developments on the same receptor or resource.
Embedded mitigation	Measures included as part of the project design. Includes both primary and tertiary mitigation.
Environmental Impact Assessment (EIA)	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Inter-related effects	Effects that may arise from the interactions between different EIA topic effects considered within the alone assessment, potentially leading to more significant effects than if they were to be considered in isolation.
Landfall	The area in which the offshore export cables make landfall (come onshore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area between the trenchless technique exit pits and the transition joint bay inclusive of all construction works.
Magnitude	A combination of the spatial extent, duration, frequency and reversibility of an impact
Marine Directorate Licensing Operations Team (MD-LOT)	The part of the Scottish Government's Marine Directorate responsible for assessing and administering applications for marine licences for Scottish waters and Section 36 consent (offshore) in Scotland.
Marine Management Organisation (MMO)	The MMO, as a UK government body, is responsible for licensing, regulating and overseeing activities in the marine environment for English waters. For a Development Consent Order (DCO) and deemed marine licence, the MMO acts as a statutory consultee, advising on marine planning, environmental impacts, habitats and compliance with marine licensing regulations.
Maximum design scenario (MDS)	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the MHPGC Project.
Mean High Water Springs (MHWS)	The most inshore level location reached by the sea at high tide during mean high water spring tide. This is defined as the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	The average height of the low water levels of each pair of successive low waters during the periods of about 24 hours when the tidal range is at its greatest.

Term	Meaning
MHPGC Project Scoping Report	A Scoping Report for the MHPGC Project, scoping the likely significant effects of the project on the environment, was submitted and accepted by Planning Inspectorate (PINS) and submitted to the Scottish Ministers, via the MD-LOT in February 2025.
MHPGC Project Scoping Opinions	Separate scoping opinions received from the Planning Inspectorate (on behalf of the Secretary of State) and MD-LOT (on behalf of the Scottish Ministers) and the MMO in response to the MHPGC Scoping Report. The MHPGC Scoping Opinions contain the range of issues that the Planning Inspectorate, and MD-LOT in consultation with statutory stakeholders, have identified should be considered within the EIA process.
MHPGC Project	The MHPGC Project is comprised of the offshore export cables in Scottish and English waters from the Morven North or the Morven South offshore substation platform(s) (OSP), landfall, onshore export cables, the onshore land substation (LSS) and AC connection cables.
Morven North Offshore Wind Array Project (hereafter 'Morven North')	The Morven North Offshore Wind Array Project, which includes the wind turbines and foundations, OSPs and foundations, inter-array and inter-connector cables and associated infrastructure located within the Morven North Boundary.
Morven South Offshore Wind Array Project (hereafter 'Morven South')	The Morven South Offshore Wind Array Project, which includes the wind turbines and foundations, OSPs and foundations, inter-array and inter-connector cables and associated infrastructure located within the Morven South Boundary.
National Grid Hawthorn Pit Substation	The National Grid substation at Hawthorn Pit, County Durham, which the AC connection cables will connect into from the onshore land substation.
Offshore substation platforms (OSPs)	OSPs comprise the support structure, topside and electrical components used for collecting the electricity generated by the wind turbine generators for the passage or transmission to landfall. These OSPs can be divided into two types: • High Voltage Alternating Current (HVAC) collector substations; • High Voltage Direct Current (HVDC) converter substations.
Operations and maintenance phase (O&M)	The operational and maintenance phase of the MHPGC Project.
Planning Inspectorate (PINS)	The PINS is an executive agency of the UK Government responsible for administering and examining DCO applications for Nationally Significant Infrastructure Projects (NSIPs) in England. PINS manages the application process, oversees consultation and examination, and makes a recommendation to the relevant Secretary of State on whether consent should be granted.
MHPGC Preliminary Environmental Impact Report (PEIR)	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project, and which helps to inform consultation responses.
Primary mitigation	Measures included as part of the location or design of the MHPGC Project made during the pre-application phase that are an inherent part of the MHPGC Project and do not require additional action to be taken. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the MHPGC Project, the

Term	Meaning
	parameters and associated commitments secured by the DCO and marine licence, or both.
Residual effects	Effects that continue to exist after mitigation has been applied.
Secondary mitigation	Actions that will require further activity to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures both pre-mitigation and residual effects are presented.
Significance	Effect factor that is determined by the magnitude of impact along with the sensitivity of the receptor.
Tertiary mitigation	Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
The Study Area	For each environmental topic, the baseline environment will be characterised, and the potential environmental impacts will be described within a topic-specific Study Area. Specific Study Areas are defined for each topic and are based on the maximum spatial extent across which potential impacts of MHPGC Project may be experienced by the relevant receptors (i.e. Zone of Influence).
Transboundary impact	Potential impacts resulting from MHPGC Project and affecting another European Economic Area (EEA) state.
Transboundary effects	Assessment of potential significant effects resulting from MHPGC Project on the interests of another EEA state(s).

Acronyms

Acronyms	Meaning
CEA	Cumulative Effect Assessment
CEMP	Construction Environmental Management Plan
CoCP	Code of Construction Practice
COPD	Chronic Obstructive Pulmonary Disease
DCO	Development Consent Order
DECC	Department of Energy and Climate Change
DEFRA	Department for Environment, Food & Rural Affairs
DHSC	Department of Health and Social Care
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
EEA	European Economic Area
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
ES	Environmental Statement
EUPHA	European Public Health Association
HDD	Horizontal Directional Drilling

Acronyms	Meaning
HGV	Heavy Goods Vehicle
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAIA	International Association for Impact Assessment
IAQM	Institute of Air Quality Management
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEMA	Institute of Environmental Management and Assessment
IMD	Index of Multiple Deprivation
ISEP	Institute of Sustainability and Environmental Practitioners
LSOA	Lower Layer Super Output Area
LSS	Onshore Land Substation
MD-LOT	Marine Directorate – Licensing Operations Team
MDS	Maximum Design Scenario
MHCLG	Ministry of Housing, Communities and Local Government
MHPGC	Morven Hawthorn Pit Grid Connection
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MPS	Marine Policy Statement
MWIA	Mental Wellbeing Impact Assessment
NHS	National Health Service
NO ₂	Nitrogen dioxide
NPPF	National Planning Policy Framework
NPS	National Policy Statements
NSIP	Nationally Significant Infrastructure Project(s)
O&M	Operations and Maintenance
OEP	Office for Environmental Protection
ONS	Office of National Statistics
OSP	Offshore Substation Platform
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PHE	Public Health England
PPP	Pollution Prevention Plan
PRoW	Public Right of Way
QOF	Quality and Outcomes Framework
SAR	Standard Admission Ratio
SEMH	Social, Emotional and Mental Health
SSSI	Site of Special Scientific Interest
SoS	Secretary of State
SWGMP	Surface Water and Groundwater Management Plan
UKHSA	UK Health Security Agency
WHO	World Health Organization

Units

Unit	Meaning
dB	Decibel
GHz	Gigahertz
km	Kilometres
Km ²	Squared kilometres
m	Metre
μT	Micro tesla
%	Percentage

2 Human Health

2.1 Introduction

- 2.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary findings of the Environmental Impact Assessment (EIA) work undertaken to date for the Morven Hawthorn Pit Grid Connection Project (hereafter 'MHPGC Project'), as described in **Volume 1, Chapter 2: Project Description, of the PEIR**.
- 2.1.1.2 The chapter considers the potential impacts and effects on Human Health that could result from the construction, operation and maintenance (O&M) and decommissioning phases of the MHPGC Project. Specifically, the chapter relates to the onshore elements of the scheme because offshore health determinants have been scoped out of this health assessment. The offshore elements of the MHPGC Project consist of the offshore substation platform(s) (OSPs) within Morven North Offshore Wind Array Project or Morven South Offshore Wind Array Project (hereafter 'Morven North and Morven South') located within Scottish offshore waters, transiting through English offshore and inshore waters, to Mean High Water Springs (MHWS). The onshore elements of the MHPGC Project include the onshore export cable and AC connection cable corridor, junction boxes and link boxes and substation landward of Mean High Water Springs (MHWS) at landfall to the National Grid Hawthorn Pit Substation in England.
- 2.1.1.3 This chapter describes the methodology, datasets that have informed the preliminary assessment, baseline conditions, including future baseline, mitigation measures and the preliminary residual significant effects on Human Health that could result from the MHPGC Project.
- 2.1.1.4 The assessment is informed by the following chapters:
- **Volume 1, Chapter 2: Project Description, of the PEIR;**
 - **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR;**
 - **Volume 1, Chapter 5: Policy and Legislation, of the PEIR;**
 - **Volume 2, Chapter 2: Offshore Water and Sediment Quality, of the PEIR;**
 - **Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR;**
 - **Volume 3, Chapter 5: Traffic and Transport, of the PEIR;**
 - **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR;**
 - **Volume 3, Chapter 7: Onshore Air Quality, of the PEIR;**
 - **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR;**
 - **Volume 4, Chapter 3: Socio-economics, of the PEIR; and**
 - **Volume 4, Chapter 5: Inter-related Effects, of the PEIR.**
- 2.1.1.5 The chapter also draws on information contained within the following annexes:
- **Volume 1 Annex 2.1 Onshore EMF Compliance Statement, of the PEIR;**
 - **Volume 1, Annex 4.1: Draft Commitments Register, of the PEIR;**
 - **Volume 1, Annex 4.2: Transboundary Screening, of the PEIR;**
 - **Volume 1, Annex 4.3: Cumulative Screening and Location Plan, of the PEIR;**
 - **Volume 4, Annex 3.1: Economic Impact Technical Report, of the PEIR.**
- 2.1.1.6 This PEIR offers a comprehensive overview of the MHPGC Project's potential environmental impacts and mitigation measures, presenting essential data to stakeholders for review and feedback. The PEIR will also be informed by the ongoing pre-application consultation process.
- 2.1.1.7 Following statutory consultation, comments will be reviewed and considered, where appropriate, in preparation of the Environmental Statement (ES) that will accompany the application to the Planning Inspectorate (PINS) for development consent and a marine licence application to Marine Directorate Licensing Operations Team (MD-LOT).

2.2 Legislative and policy context

2.2.1 Overview

- 2.2.1.1 The full relevant legislation and policy context for the MHPGC Project has been detailed in **Volume 1, Chapter 5: Policy and Legislation, of the PEIR**. This section sets out the legislation and planning policy that is relevant to the preliminary Human Health assessment.

2.2.2 Legislation

The Health and Care Act 2022 (HM Government, 2022)

- 2.2.2.1 The Health and Care Act 2022 sets out details on National Health Service (NHS) reforms and strengthens statutory duties to reduce health inequalities for people belonging to vulnerable groups.

Environment Act 2021 (HM Government, 2021)

- 2.2.2.2 The Environment Act 2021 established The Office for Environmental Protection (OEP) as a public body in England and Northern Ireland. The OEP is responsible for the monitoring and enforcement of targets set by the Secretary of State (SoS) and takes enforcement action to prevent, or mitigate, serious damage to the natural environment or to human health. This includes reducing adverse impacts on public health. The OEP objective (OEP, 2022) is for environmental law (including EIA legislation) and its implementation to be well designed and delivered, so that positive outcomes for the environment and people's health and wellbeing are achieved.

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

- 2.2.2.3 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 sets out a framework for protecting water bodies in England and Wales.

The Bathing Water Regulations 2013

- 2.2.2.4 The Bathing Water Regulations 2013 aims to protect public health by ensuring bathing waters remain clean.

The Localism Act 2011 (HM Government, 2011)

- 2.2.2.5 The Localism Act 2011 devolves power to local councils, communities, and individuals to act on local priorities, giving greater control over decisions such as housing and planning.

The Equality Act 2010 (HM Government, 2010)

- 2.2.2.6 The Equality Act 2010 legally protects people defined as having 'protected characteristics' from discrimination in the workplace and wider society.

The AQS Regulations 2010 (HM Government, 2010).

- 2.2.2.7 The Air Quality Standard Regulations 2010 set out statutory health protection standards on ambient air quality.

The Countryside and Rights of Way Act 2000 (HM Government, 2000)

- 2.2.2.8 The Countryside and Rights of Way Act 2000 outlines public right of access to land mapped as 'open country' (mountain, moor, heath and down) or registered common land. These areas are known as 'open access land'.

The Environment Act 1995 (HM Government, 1995).

- 2.2.2.9 The Environment Act 1995 sets provisions for protecting certain environmental conditions of relevance to health in the UK.

The Environmental Protection Act 1990 (HM Government, 1990).

- 2.2.2.10 The Environmental Protection Act 1990 covers contaminated land and the control of emissions (including dust, noise and light) that may be prejudicial to health or a nuisance.

Public Health (Control of Disease) Act 1984

- 2.2.2.11 The Public Health (Control of Disease) Act 1984 establishes port health districts and authorities and grants them power to protect public health at ports and prevent the introduction of infectious diseases through UK ports.

The Health Safety at Work Act 1974

- 2.2.2.12 The Health Safety at Work Act 1974 states that it is the duty of employers to ensure the health, safety and wellbeing of their employees as far as reasonably practical. Additionally, employees have a duty to take reasonable care for the health and safety of themselves and other persons that may be affected by their actions at work.

The International Convention for the Prevention of Pollution from Ships (MARPOL) 1973

- 2.2.2.13 The International Convention for the Prevention of Pollution from Ships (MARPOL) 1973 is a global treaty aimed at preventing pollution from ships.

2.2.3 National policy context

National Policy Statements

- 2.2.3.1 National Policy Statements (NPS) set out the primary policy framework for a Development Consent Order (DCO) under which the MHPGC Project will be considered. This framework includes guidelines, requirements and criteria that the MHPGC Project must meet to obtain consent and proceed with development.
- 2.2.3.2 No further provisions of NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2025b) are applicable to this topic.
- 2.2.3.3 **Table 2.1** provides details of the NPS relevant to human health and how and where they are covered in the PEIR:
- NPS for energy (EN-1) (Department of Energy Security and Net Zero (DESNZ), 2025a);
 - NPS for Electricity Networks Infrastructure (EN-5) (DESNZ, 2025c).
- 2.2.3.4 No further provisions of NPS for Renewable Energy Infrastructure (EN-3) (DESNZ, 2025b) are applicable to this topic.

Table 2.1: Summary of the NPS provisions relevant to Human Health

Summary of relevant NPS provisions	How and where considered in the PEIR
NPS EN-1	
Paragraph 4.3.4 of EN-1 states that: <i>"To consider the potential effects, including benefits, of a proposal for a project, the applicant must set out information on the likely significant environmental, social and economic effects of the development, and show how any likely significant negative effects would be avoided, reduced, mitigated or compensated for, following the mitigation hierarchy. This information could include matters such as employment, equality, biodiversity net gain, community cohesion, health and wellbeing."</i>	Economic and social impacts including employment are considered within Volume 3, Chapter 3: Socio-economics, of the PEIR . Human Health references these as potential positive determinants of wellbeing, with the assessment presented in Section 2.8 .

Summary of relevant NPS provisions	How and where considered in the PEIR
Paragraphs 4.4.1 4.4.2 and 4.4.3 of EN-1 state that: <i>“Energy infrastructure has the potential to impact on the health and wellbeing (“health”) of the population. Access to energy is clearly beneficial to society and to our health as a whole. However, the construction of energy infrastructure and the production, distribution and use of energy may have negative impacts on some people’s health.”</i> <i>“The direct impacts on health may include</i> • Increased traffic; • Air or water pollution; • Dust; • Odour; • Hazardous waste and substances; • Noise; • Exposure to radiation; and • Increases in pests.” <i>New energy infrastructure may also affect the composition and size 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.</i>	The Human Health assessment consolidates health-relevant residual effects from technical chapters (Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR, Volume 3, Chapter 7: Onshore Air Quality, of the PEIR; Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR; Volume 3, Chapter 5: Traffic and Transport, of the PEIR; Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR). The assessment follows the Institute of Sustainability and Environmental Practitioners (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA)) (2022b) Determining Significance for Human Health In Environmental Impact Assessment guidance to interpret likely significance for population and vulnerable groups. Guidance used in the assessment is detailed in Section 2.4.3.
Paragraphs 4.4.4, 4.4.5 and 4.4.6 of EN-1 state that: <i>“As described in the relevant sections of this NPS and in the technology specific NPSs, where the proposed project has an effect on humans, the ES should assess these effects for each element of the project, identifying any potential adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate.</i> <i>“The impacts of more than one development may affect people simultaneously, so the applicant should consider the cumulative impact on health in the ES where appropriate.</i> <i>“Opportunities should be taken to mitigate indirect impacts by promoting local improvements to encourage health and wellbeing. This includes potential impacts on vulnerable groups within society and impacts on those with protected characteristics under the Equality Act 2010, i.e. those groups which may be differentially impacted by a development compared to wider society as a whole.”</i>	The Human Health assessment is provided in Section 2.8. This assessment identifies vulnerable groups and also provides mitigation measures where appropriate. Cumulative health effects are considered in Section 2.9.

Summary of relevant NPS provisions	How and where considered in the PEIR
Paragraphs 5.2.1, 5.2.3 and 5.2.7 of EN-1 state that: <i>“Energy infrastructure development can have adverse effects on air quality. The construction, operation and decommissioning phases can involve emissions to air which could lead to adverse impacts on health, on protected species and habitats [footnote 143], or on the wider countryside and species. Air emissions include particulate matter (for example dust) up to a diameter of ten microns (PM10) and up to a diameter of 2.5 microns (PM2.5) as well as gases such as sulphur dioxide, carbon monoxide and nitrogen oxides (NOx)...</i> <i>“For many air pollutants there is not a threshold below which there is no health impact so it is important that energy infrastructure schemes consider not just how a scheme may impact statutory air quality limits, objectives or targets but also measures to mitigate all emissions in order to minimise human exposure to air pollution, especially for those who are more susceptible to the impacts of poor air quality...</i> <i>“Proximity to emission sources can have significant impacts on sensitive receptor sites for air quality, such as education or healthcare sites, residential use or sensitive or protected ecosystems. Projects near a sensitive receptor site for air quality should only be proposed in exceptional circumstances if no viable alternative site is available. In these instances, substantial mitigation of any expected emissions will be required...”</i>	Construction and decommissioning emissions are assessed within the Volume 3, Chapter 7: Onshore Air Quality, of the PEIR. The Human Health assessment in this chapter interprets these effects and exposure profiles in terms of population-level health outcomes and vulnerable groups, with the assessment presented in Section 2.8.

Paragraphs 5.12.1, 5.12.2, 5.12.5 and 5.12.6 of EN-1 state that:

"Excessive noise can have wide-ranging impacts on the quality of human life and health such as annoyance, sleep disturbance, cardiovascular disease and mental ill-health. It can also have an impact on the environment and the use and enjoyment of areas of value such as quiet places and areas with high landscape quality.

"The government's policy on noise is set out in the Noise Policy Statement for England. It promotes good health and good quality of life through effective noise management. Similar considerations apply to vibration, which can also cause damage to buildings. In this section, in line with current legislation, references to "noise" below apply equally to the assessment of impacts of vibration....

"Factors that will determine the likely noise impact of a proposed development include:

- The inherent operational noise from the proposed development, and its characteristics;*
- The proximity of the proposed development to noise sensitive premises (including residential properties, schools and hospitals) and noise sensitive areas (including certain parks and open spaces);*
- The proximity of the proposed development to quiet places and other areas that are particularly valued for their soundscape or landscape quality;*
- The proximity of the proposed development to sites where noise may have an adverse impact on protected species or other wildlife, including migratory species; and*
- The potential presence of unexploded ordnance on the seabed.*

Where noise impacts are likely to arise from the proposed development, the applicant should include the following in the noise assessment:

- A description of the noise generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal characteristics, if the noise is impulsive, whether the noise contains particular high or low frequency content or any temporal characteristics of the noise;*
- Identification of noise sensitive receptors and noise sensitive areas that may be affected;*
- The characteristics of the existing noise environment;*
- A prediction of how the noise environment will change with the proposed development;*
 - In the shorter term, such as during the construction period;*
 - In the longer term, during the operating life of the infrastructure; and*

Noise and vibration effects are assessed for construction, O&M and decommissioning phases; The Human Health assessment in this chapter and **Chapter 6: Noise and Vibration, of the PEIR** translates predicted noise levels and exposure durations into potential health outcomes (annoyance, sleep disturbance, cardiovascular stress), with the assessment presented in **Section 2.8**.

Summary of relevant NPS provisions	How and where considered in the PEIR
At particular times of the day, evening and night (and weekends) as appropriate, and at different times of year. An assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and quality of life / wellbeing where appropriate, particularly among those disadvantaged by other factors who are often disproportionately affected by noise-sensitive areas; If likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and All reasonable steps taken to mitigate and minimise potential adverse effects on health and quality of life.	
Paragraphs 5.11.6 and 5.11.7 of EN-1 state that: <i>"The government's policy is to ensure there is adequate provision of high quality open space and sports and recreation facilities to meet the needs of local communities. Connecting people with 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.</i> <i>"Green and blue infrastructure can also enable developments to provide positive environmental, social, health and economic benefits. Green infrastructure includes green space such as parks and woodlands but also other environmental features such as street trees, hedgerows and green walls and roofs. It also includes blue infrastructure such as canals, rivers, streams, ponds, lakes and their borders. Well designed and managed green and blue infrastructure provides multiple benefits at a range of scales. It can contribute to biodiversity recovery, sequester carbon, absorb surface water, cleanse pollutants, absorb noise and reduce high temperatures. The Green Infrastructure Framework – Principles and Standards for England can be used to consider green infrastructure in development and plan for good quality and targeted creation or improvement."</i> Paragraph 5.11.30 of EN-1 goes on to state that: <i>"Public Rights of way, National Trails, and other rights of access to land are important recreational facilities for example for walkers, cyclists and horse riders. The Secretary of State should expect applicants to take appropriate mitigation measures to address adverse effects on coastal access, National Trails, other rights of way and open access land and, where appropriate, to consider what opportunities there may be to improve or create new access. In considering revisions to an existing right of way, consideration should be given to the use, character, attractiveness, and convenience of the right of way."</i>	The Human Health assessment in this chapter draws on Volume 3, Chapter 5 Traffic and Transport and Volume 3, Chapter 8 Land Use, Recreation and Tourism and considers temporary disruption to Public Right of Way (PRoW), cycle routes and recreational areas during cable installation and construction at the Landfall and land substation (LSS) sites; assessment focuses on physical activity and wellbeing determinants, with the assessment presented in Section 2.8.

Summary of relevant NPS provisions	How and where considered in the PEIR
Paragraph 5.16.2 of EN-1 states that: <i>During the construction, operation, and decommissioning phases, development 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 or on protected species and habitats (see Section 4.3) and could result in surface waters, groundwaters or protected areas [footnote 248] failing to meet environmental objectives established under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Marine Strategy Regulations 2010.</i>	The Human Health assessment in this chapter draws on Volume 3, Chapter 1 Geology, Hydrogeology and Ground Conditions, and considers changes to health as a result of water quality, with the assessment presented in Section 2.8.
NPS EN-5	
Paragraph 2.10.11 “The applicant should consider the following factors: • Height, position, insulation and protection (electrical or mechanical as appropriate) measures subject to ensuring compliance with the Electricity Safety, Quality and Continuity Regulations 2002; • That optimal phasing of high voltage overhead power lines is introduced wherever possible and practicable in accordance with the Code of Practice to minimise EMFs; and • Any new advice emerging from the Department of Health and Social Care relating to government policy for EMF exposure guidelines.”	EMF from underground cables and the onshore substation will be assessed and demonstrated to comply with International Commission on Non-Ionizing Radiation Protection (ICNIRP) (2020) guidelines and Government Code of Practice, with further detail provided in Volume 1, Annex 2.1: Onshore EMF Compliance Statement, of the PEIR. The Human Health assessment summarises this compliance and discusses the perception of EMF risks as part of the O&M phase assessment, presented in Section 2.8.

National Planning Policy Framework

- 2.2.3.5 The National Planning Policy Framework (NPPF) has the potential to be considered important and relevant to the Secretary of State (SoS) consideration of the MHPGC Project (Department for Levelling Up, Housing and Communities, 2025). **Table 2.2** provides details of the elements of the NPPF that are relevant to Human Health and how and where they are covered in the PEIR or will be covered within the ES.
- 2.2.3.6 The NPPF was updated in August 2026 and will be fully considered in the MHPGC Environmental Statement.

Table 2.2: Summary of NPPF requirements relevant to Human Health

NPPF section	How and where this is considered in the PEIR
Overarching Policy 16: Promoting healthy communities Policies HC6 to HC7 highlight the need to: Ensure that key community facilities and public service infrastructure would be retained. If retention is not possible, there should be sufficient alternative provision. (HC6).	The Human Health assessment considers Volume 3, Chapter 5: Traffic and Transport, of the PEIR to interpret residual effects on access to recreation, PRoW and active-travel routes as determinants of physical and mental wellbeing. Construction traffic and temporary closures are evaluated for potential severance. This assessment of recreational health determinants is included in Section 2.8.

NPPF section	How and where this is considered in the PEIR
Ensure development proposals do not result in the loss of existing open space, sports and recreational buildings and land. Where there is loss, this should be replaced by equivalent or better provision, in a location which offers comparable or improved accessibility (HC7).	
Overarching Policy 15: Promoting Sustainable Transport: Policy TR8 states that: <i>“Development proposals should:</i> <i>Protect and enhance the network of public rights of way, including through suitable diversions agreed with the highway authority; and</i> <i>Take opportunities to extend, link or improve the quality of existing routes where this enables one or more of the following:</i> <i>Improved access to green spaces and the countryside;</i> <i>New direct and circular routes and connections between local and long-distance footpaths, bridleways and cycle routes;</i> <i>The provision of accessible, safe and convenient links to services and facilities; and</i> <i>Improved connections with public transport stops and interchanges.”</i>	The MHPGC Project is not specifically for the creation of any active travel facilities. However, transport impacts are assessed for the construction phase in Volume 3, Chapter 5: Traffic and Transport, of the PEIR. The Human Health assessment in this chapter evaluates implications for active travel and accessibility to health-promoting services and amenities. This is included in Section 2.8. PRoW and coastal-path diversions during construction are assessed for temporary health impacts (loss of recreation, physical-activity reduction), as presented in Section 2.8 and informed by Volume 3 Chapter 5: Traffic and Transport, of the PEIR.
Overarching Policy 17: Pollution, public protection and security: Policy P3: Living conditions and pollution states that: Proposals for new development should demonstrate that they are appropriate for the location, taking account of the effects (including cumulative effects) of pollution on health, living conditions and the natural environment. Adverse health impacts should be avoided where possible and mitigated to an acceptable degree, particularly where they relate to noise, light and water quality.	Air-quality, noise, light, water and land-contamination assessments quantify potential exposure; the Human Health assessment in this chapter considers Volume 3, Chapter 1: Geology, Hydrogeology, and Ground Conditions, of the PEIR, Volume 3, Chapter 2: Water Recourses and Flood Risk, of the PEIR, Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR, Volume 3, Chapter 7: Onshore Air Quality, of the PEIR and Volume 4, Chapter 1: Landscape and Visual, of the PEIR and translates topic-level residuals to likely population-health outcomes and vulnerable-group implications, with the assessment presented in Section 2.8. Noise and vibration modelling informs the Human Health assessment conclusions on annoyance, sleep disturbance and stress, with the assessment presented in Section 2.8. Effects as a result of light pollution are considered in Volume 4, Chapter 1 Landscape and Visual Amenity, of the PEIR. The MHPGC Project includes embedded mitigation set out in Table 2.18.
Overarching Policy 4 Achieving Sustainable Development – The policies in this section seek positive improvements in quality of life and the natural	Cited as overarching justification for integrating health in EIA; this Human Health chapter summarises how embedded mitigation set out in

NPPF section	How and where this is considered in the PEIR
environment, through ensuring there is a presumption in favour of sustainable development.	Table 2.18 supports sustainable, health-protective outcomes

2.2.4 Marine planning policy context

2.2.4.1 The following marine plans are relevant to Human Health and have informed the assessment of preliminary effects in this chapter, their relevance to the MHPGC Project is outlined in **Table 2.3**:

- The UK Marine Policy Statement (MPS) (Department for Environment, Food & Rural Affairs (DEFRA), 2011);
- Scotland's National Marine Plan (Marine Directorate – Licencing Operations Team (MD-LOT), 2015);
- North East Inshore and North East Offshore Marine Plan (Marine Management Organisation (MMO), 2024).

Table 2.3: Marine planning policy relevant to Human Health

Marine plan description	How and where considered in the PEIR
UK Marine Policy Statement	
Although the UK Marine Policy Statement does not have a dedicated chapter to health, Chapters 2 and 3 of the UK Marine Policy Statement promote public health protection, pollution prevention and consideration of cumulative effects on coastal communities and recreation.	The Human Health assessment in this chapter uses the MPS principles to demonstrate that offshore and onshore construction and operation will not give rise to significant exposure or health-relevant emissions. It should be noted that offshore determinants of health have been scoped out as agreed with PINS and the MMO shown in Table 2.5 . Health pathways associated with marine water quality, shipping/marine users, and noise are assessed in offshore topic chapters; (see Volume 2, Chapter 2: Offshore Water and Sediment Quality, of the PEIR, Volume 2, Chapter 10: Infrastructure and Other Sea Users, of the PEIR and Volume 2, Annex 5.1: Underwater Sound Technical Report, of the PEIR) and where relevant, the residuals are interpreted for potential effects on near-shore communities and recreational users, with the assessment presented in Section 2.8 . Pollution prevention commitments are built into embedded mitigation as shown in Table 2.18 .
Scottish National Marine Plan	
Policy GEN 1 states that “there is a presumption in favour of sustainable development and use of marine environment when consistent with the policies and objectives of this plan” and GEN 3 (Social Benefit) GEN 13 (Noise), GEN 12 (Water Environment) require that marine developments safeguard human health, control underwater noise, and maintain water quality.	Offshore determinants have been scoped out of the Human Health assessment, as agreed with PINS and the MMO. Human Health relies on topic-level findings confirming compliance with water-quality for activities that take place in the nearshore area. These are informed by offshore chapters (see Volume 2, Chapter 2: Offshore Water and Sediment Quality, of the PEIR considered in in Section 2.8 .

Marine plan description	How and where considered in the PEIR
North East Inshore Marine Plan	
Policies NE-SOC-1 (Social benefits), NE-DEF-1 (Defence and safety), NE-WQ-1 (Water quality), NE-UWN-2 (Noise), NE-AIR-1 (Air Quality), NE-EMP-1 (Employment), NE-ACC-1 (Access Tourism), NE-REN-1 (Renewables) promote safe use of the marine area, prevention of pollution, and consideration of cumulative social and health effects on coastal communities.	Offshore determinants have been scoped out of the Human Health assessment, as agreed with PINS and the MMO. The water quality effects of the MHPGC Project to Human Health are discussed in Section 2.8 and informed by Volume 3, Chapter 3: Water Resources and Flood Risk, of the PEIR . The assessment draws on Water Quality topics and interprets residual risks for nearby coastal settlements and recreation areas (e.g. beaches, sailing clubs). No significant cumulative health effects are anticipated once embedded mitigation is implemented.

2.2.5 Local policy context

2.2.5.1 The MHPGC Project lies within the jurisdiction of Durham County Council. The following local policy that is relevant to Human Health and has informed the assessment of preliminary effects in this chapter, its relevance to the MHPGC Project is outlined in **Table 2.4**.

- County Durham Plan (Durham County Council, 2020); and
- Durham Heritage Coast Partnership (2018).

Table 2.4: Local policy relevant to Human Health

Policy description	How and where considered in the PEIR
Durham Local Plan	
Policy 6: Green Infrastructure, Landscape, Biodiversity and Geodiversity	Supports access to green/blue space, which is a determinant of physical and mental wellbeing. In Section 2.8 , any temporary disruption of open space, PRoW or amenity land is assessed for its health implications (physical activity, mental health, social interaction). The assessment is informed by Volume 3, Chapter 5: Traffic and Transport, of the PEIR and Volume 3, Chapter 8: Land Use Tourism and Recreation, of the PEIR .
Policy 22: Sustainable Travel – The Transport Network	Establishes that new development must encourage walking, cycling, and public transport. Although the MHPGC Project does not introduce new walking, cycling or public transport routes, Section 2.8 considers Volume 3, Chapter 5: Traffic and Transport, of the PEIR and assesses residual effects of construction traffic, diversion of travel routes, reduced active travel opportunities and any long-term changes to connectivity are evaluated in health terms.
Policy 5: Durham City Sustainable Urban Extension – Active Travel & Access	Although this policy focuses on the urban extension, the underlying principle of active travel and good access is applicable to the cable route/landfall context. Human Health draws on Volume 3, Chapter 5: Traffic and Transport, of the PEIR to assess whether the project design influences walking/cycling routes or access to services. The assessment is presented in Section 2.8 .

Policy description	How and where considered in the PEIR
Policy 31: Delivering development that results in no unacceptable impact to health, living or working conditions or the natural environment.	This policy requires planning proposals to demonstrate contribution to wellbeing, inclusive communities and the environment, which includes health. In the Human Health chapter this policy helps frame why health is assessed and why the mitigation of negative health impacts is necessary.
Durham Heritage Coast Management Plan	
Heritage Coast Management Plan (Section 8.44: Wellbeing)	This policy recognises the importance of access to the natural environment and associated recreational opportunities in supporting physical and mental health and wellbeing. The Plan seeks to improve access to the coast and encourage community use, acknowledging that coastal environments, access infrastructure and recreational activities contribute positively to the wellbeing of local communities and visitors. These principles have informed the assessment of Human Health presented in Section 2.8 , and also draws on Volume 3, Chapter 8: Land Use Tourism and Recreation, of the PEIR .

2.3 Consultation and engagement

2.3.1 Scoping

- 2.3.1.1 A Scoping Report for the MHPGC Project was issued to the Planning Inspectorate (PINS) and MD-LOT in February 2025 (RPS, 2025). Following consultation with the appropriate statutory bodies, PINS (on behalf of the SoS) and MD-LOT both provided Scoping Opinions in March 2025 (PINS, 2025; MD-LOT, 2025, respectively).
- 2.3.1.2 **Table 2.5** sets out the key comments raised during the scoping process specific to Human Health, with details of how these comments have been addressed within the PEIR.

Table 2.5: Summary of scoping responses relevant to Human Health

Comment	How and where considered in the PEIR
Scottish Ministers (MD-LOT)	
<i>The impacts proposed to be scoped in to the EIA Report during different phases of the Proposed Works are outlined in Table 9.13 of the Scoping Report, while the impacts proposed to be scoped out are outlined in Table 9.14. The Scottish Ministers are content with the impacts proposed to be scoped in and out of assessment.</i>	The Assessment of potential effects due to the MHPGC Project in regards to Human Health have remained the same as those set out in the Scoping Report, a summary of which is presented in Table 2.16 .
<i>The Applicant presents the study area and the data sources considered in Section 9.2 of the Scoping Report. The Scottish Ministers are content with the study area and data sources presented.</i>	The data sources and study area, as outlined in Section 2.4.2 of this chapter, used in the Scoping Report have been retained for the PEIR.

Comment	How and where considered in the PEIR
PINS	
ID 5.2.1 The Scoping Report proposes to scope out an assessment of offshore effects, specifically on the following matters: • Health related behaviours – physical activity; risk taking behaviour; diet and nutrition. • Economic environment – employment and income; education and training. • Social environment – housing; relocation; open space, leisure and play; transport modes, access and connections; community safety; community identity, culture, resilience and influence; social participation, interaction and support. • Bio-physical environment – climate change and adaptation; air quality; noise and vibration; water quality or availability; land quality; radiation. Institutional and built environment – health and social care services; built environment; wider societal infrastructure and resources. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that these matters can be scoped out of the ES.	The assessment of the potential effects of the MHPGC Project in regards to Human Health remain the same as those outlined in Tables 9.13 and 9.14 of the scoping report. A summary of this is set out in Table 2.17.
ID 5.2.2 The Scoping Report proposes to scope in an assessment of water quality during the construction and decommissioning phase as potential health impacts may arise from run off or spillages from construction areas into potable water sources. Table 9.13 scopes out an assessment of this matter during operation. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees to scope this matter out for operation.	The effects of the MHPGC Project on water quality during construction and decommissioning has been scoped into this Human Health Chapter. Construction and decommissioning effects of changes to onshore water quality are considered within Section 2.8, with cross-reference to Volume 3, Chapter 2: Water Resources & Flood Risk, of the PEIR.
ID 5.2.3 The Scoping Report proposes to scope in an assessment of public understanding of risk in relation to operational EMF. Given the nature of the potential effect, table 9.13 proposes to scope out an assessment during construction and decommissioning. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees to scope this matter out for operation.	The construction and decommissioning effects of the MHPGC Project remain scoped out a summary of which is set out in Table 2.17. As outlined in Table 2.16 operational phase impacts are addressed in Section 2.8.

Comment	How and where considered in the PEIR
ID 5.24, 5.2.5, 5.2.6 The Scoping Report proposes to scope out an assessment of onshore physical activity health effects for all phases, as any potential health impacts would be considered under the open space, leisure and play health determinant instead, as outlined in table 9.13. The Inspectorate is content with this approach. The Scoping Report proposes to scope out an assessment of the onshore health effects related to risk-taking behaviour for all project phases, on the basis that the workforce is expected to be relatively small, have a high proportion of workers from the regional area and risks are similar to other routine construction and shipping activities. The Inspectorate agrees that this matter can be scoped out of the ES. The Scoping Report proposes to scope out an assessment of the onshore health effects related to diet and nutrition for all project phases on the basis that construction and operation of the proposed development would not change population diet or food prices. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that this matter can be scoped out of the ES.	The effects of MHPGC Project on onshore physical activity, risk-taking behaviour and diet and nutrition remain scoped out as outlined in Table 2.17.
ID 5.2.7 The Scoping Report proposes to scope out an assessment of the onshore effects on employment and income for operation on the basis that employment opportunities associated with the operation of the proposed development are not expected to be on a scale that could have significant population level health effects. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that this matter can be scoped out of the ES provided that information is included within the ES with regards to likely employment numbers and to evidence how this conclusion was reached.	These determinants remain scoped out as set out in Table 2.17. Further information on employment numbers can be found in Volume 4, Annex 3.1: Economic Impact Technical Report, of the PEIR.
ID 5.2.8 The Scoping Report proposes to scope out an assessment of the onshore effects on education and training opportunities for all project phases on the basis that the proposed development is not anticipated to be of a nature, scale or duration that would result in significant effects to population health. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that this matter can be scoped out of the ES.	The effects of the MHPGC Project on education and training remain scoped out. This is set out in Table 2.17.

Comment	How and where considered in the PEIR
ID 5.2.9, 5.2.10, 5.2.11, 5.2.12, 5.2.13 The Scoping Report proposes to scope out an assessment of the onshore health effects related to housing for all project phases on the basis that there is not considered to be a significant effect associated with changes in the availability of housing. The Scoping Report proposes to scope out an assessment of the onshore effects on education and training opportunities for all project phases on the basis that the proposed development is not anticipated to be of a nature, scale or duration that would result in significant effects to population health. The Scoping Report proposes to scope out an assessment of the onshore effects related to housing for all project phases on the basis that the proposed development would not involve compulsory purchases of homes or community facilities. The Scoping Report proposes to scope out an assessment of the onshore effects on transport modes, access and connections for operation and decommissioning on the basis that the expected vehicle movements associated with the proposed development would have a minimal impact on road transport. The Scoping Report proposes to scope out an assessment of the onshore effects on community safety for all phases on the basis that appropriate management plans and fencing would be in place to manage security and safety risks to the public. The Scoping Report proposes to scope out an assessment of the onshore effects on community identity, culture, resilience and influence for all project phases on the basis that visual impacts associated with the proposed development are not expected to be of a scale that could affect population health or community identity. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that these matters can be scoped out of the ES.	The availability of housing, relocation, education, health and social care services and wider social infrastructure remain scoped out of this Health assessment as set out in Table 2.17

Comment	How and where considered in the PEIR
ID 5.2.16, 5.2.17, 5.2.18 The Scoping Report proposes to scope out an assessment of the onshore effects on air quality for the operation and maintenance phase on the basis that air emissions and odour from the proposed development are not expected to be on a scale that would affect population health. The Scoping Report proposes to scope out an assessment of the onshore effects on land quality for the operation and maintenance phase on the basis that activities requiring land excavations are considered unlikely and any risks would be managed by industry best practice contamination discover, avoidance and response measures. The Scoping Report proposes to scope out an assessment of the onshore effects on radiation for the construction and decommissioning phases on the basis that the proposed development would not use or make changes to major EMF producing electrical infrastructure, and for the operational phase on the basis that levels of exposure to EMF would not pose a risk to public health. Given the nature of the proposed development and the information provided within the Scoping Report, the Inspectorate agrees that this matter can be scoped out of the ES.	As outlined in Table 2.17, the impacts of the MHPGC Project on onshore air quality and land quality during operation and maintenance as detriments to health is scoped out. Air Quality is discussed further in Volume 3, Chapter 7: Onshore Air Quality, of the PEIR and land quality is discussed further in Volume 3, Chapter 1: Geology, Hydrogeology, and Ground Conditions, of the PEIR. The onshore effects on radiation during construction and decommissioning as a determinant of health is scoped out which is set out in Table 2.17.
ID 6.1.4 The Scoping Report states that any potential impacts from offshore airborne noise will be assessed in the offshore and intertidal ornithology, and human health aspect chapters. However, the Scoping Report proposes to scope out offshore matters in the human health aspect chapter. The justification for scoping out offshore airborne noise is given in table 9.14, stating that the cable laying activities are not anticipated to be of a nature, scale, or duration to cause LSE. On this basis the Inspectorate agrees that a standalone chapter can be scoped out of the ES. Impacts that are generated nearer to onshore receptors, i.e. activity associated with the laying/removal of nearshore cable, should be scoped into the ES where there is potential to result in likely significant effects. The Inspectorate is content that the main impacts from noise to ecological receptors occur from underwater noise, which is to be assessed in other relevant aspects chapters.	Offshore airborne noise as a determinant of health remains scoped out. Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR considers land-based noise receptors and has been considered in this chapter. Volume 3, Chapter 3: Terrestrial and Intertidal Ornithology, of the PEIR considers increased noise and vibration in Section 3.8.4.

Comment	How and where considered in the PEIR
ID 5.2.22 The proposed assessment methodology in the Scoping Report is high level and does not identify what would be considered a significant effect in EIA terms for the health assessment. The ES should make clear how any likely significant effects have been determined for socio-economic aspects of the proposed development and clearly describe the methodology adopted for the assessment.	Methodology (Section 2.5) expanded to include criteria for significance determination following ISEP (formerly IEMA) (2022b) Determining Significance for Human Health in EIA guidance.
UK Health Security Agency (UKHSA)	
Support for inclusion of a dedicated Human Health section summarising key information, risk assessments, mitigation, conclusions and residual impacts; refers to PHE/UKHSA NSIP guidance.	This chapter is structured in line with UKHSA advice and the Advice on the content of ES accompanying an application under the National Significant Infrastructure Planning (NSIP) Regime (Public Health England (PHE), 2021) has been considered. The Chapter is also compliant with NPS EN-1 §4.4 and ISEP (formerly IEMA) (2022b) Determining Significance for Human Health in EIA guidance.
Recommend that any air-quality modelling undertaken be used to inform assessment of health effects during decommissioning.	Decommissioning air emissions have not been modelled, as agreed in scoping. Justification is provided in Volume 3, Chapter 7: Onshore Air Quality, of the PEIR .
Request review of EMF health-impact scoping once onshore locations finalised, with reference to Government Code of Practice on EMF public exposure.	EMF exposure remains scoped out based on ICNIRP (2020) and UK Code of Practice; however, public understanding of risk retained as a scoped-in determinant and is assessed in Section 2.8 .
MMO	
Defers to Local Authority and UKHSA on scope and suitability of human-health assessment.	No further action required. The scope of the assessment is consistent with comments received from the UKHSA and Local Authorities.

2.3.2 Further consultation and engagement

- 2.3.2.1 No further formal consultation has been undertaken for the human health chapter. Informal non-statutory consultation has taken place and will continue throughout the DCO Application process.

2.4 Baseline Characterisation

2.4.1 Overview

- 2.4.1.1 **Volume 1, Chapter 2: Project Description, of the PEIR** sets out the description of the MHPGC Project and **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR** sets out the overarching approach that has been used in developing the preliminary environmental information.
- 2.4.1.2 This section describes the methods and data sources used to characterise the baseline for Human Health within the Study Area and describes the existing baseline characteristics.

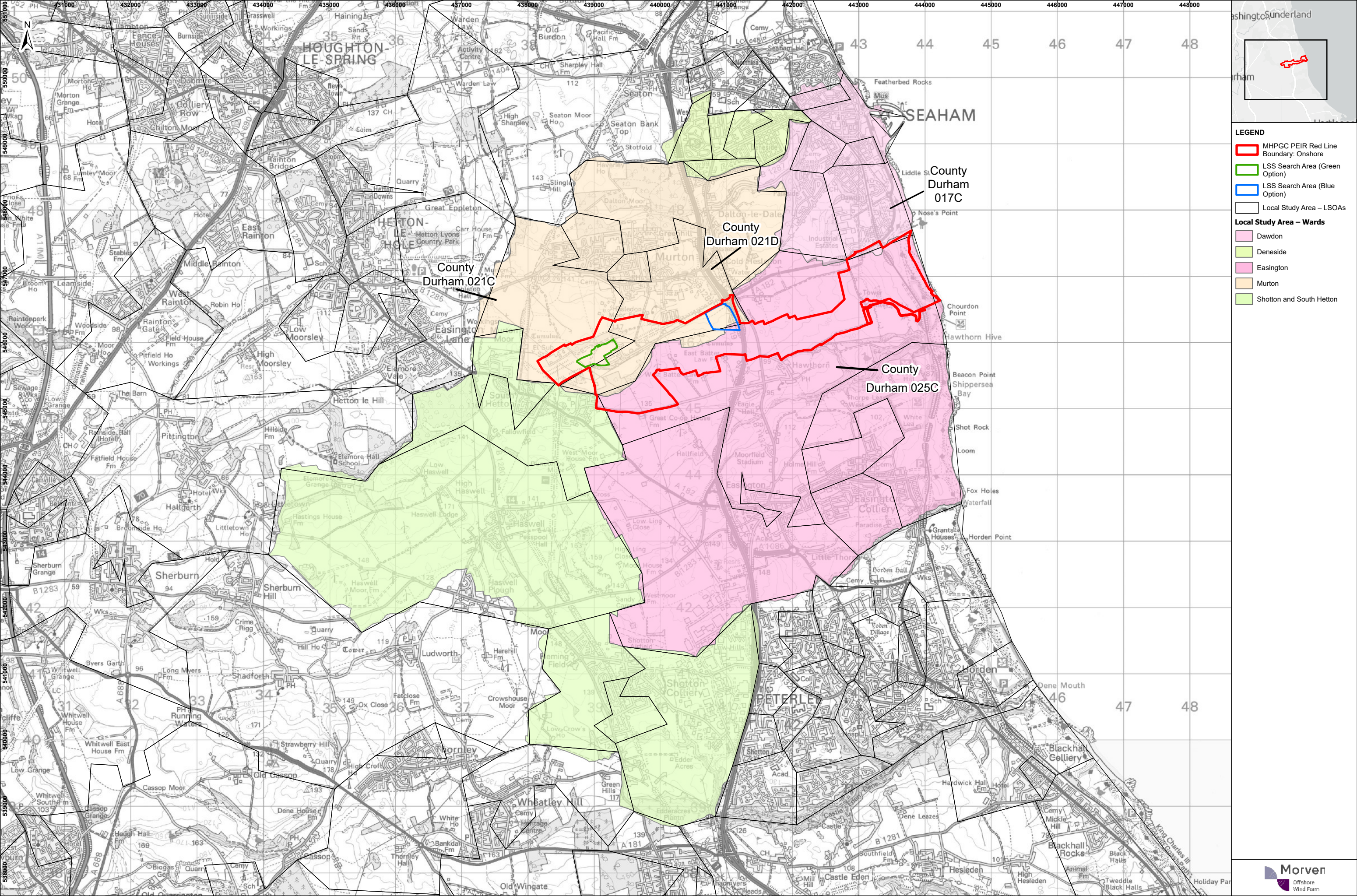
2.4.2 Human Health Study Area

- 2.4.2.1 A proportion of the MHPGC Project is located offshore, thus remote from the nearest mainland receptor population. Offshore determinants of the MHPGC Project have been scoped out of the human health assessment as described in **Table 2.16**, and in **Table 9.14** of the Scoping Report.

- 2.4.2.2 For human health effects, the relevant study areas are onshore. The local human health effects have been determined by the MHPGC Project PEIR Red Line Boundary: Onshore.
- 2.4.2.3 The specific Study Areas considered for Human Health (as shown in **Figure 2.1**) are:
- Sub-local Level: MHPGC Project PEIR Red Line Boundary: Onshore and associated Lower Layer Super Output Areas (LSOAs): County Durham 021C, County Durham 025C, County Durham 017C, County Durham 021D;
 - Local Level: MHPGC Project PEIR Red Line Boundary: Onshore and associated electoral wards¹: Dawdon (E05009054), Easington (E05009059), Murton (E05009069), Deneside (E05009057) and Shotton and South Hetton (E05009081);
 - District Level: County Durham; Sunderland²;
 - Regional Level: North East;
 - National Level: England.
- 2.4.2.4 The following population groups are present in the Human Health Study Areas and will be considered:
- The 'general population' including residents, workers, service providers, and service users;
 - The 'vulnerable group population' including potential vulnerability due to young age, old age, low income, poor health status, social disadvantage, restricted access, or geographic proximity to the MHPGC Project's activities.
- 2.4.2.5 The Study Areas above have been selected to enable health baseline indicators to be assessed and compared consistently across equivalent geographic scales, allowing population health characteristics within the Study Area to be benchmarked against district, regional and national averages. Human Health considers population groups, the 'general' and the 'vulnerable' population, rather than individual receptors. As such, the sub-local and local study areas characterise the general and vulnerable populations most likely to experience direct effects from the Project, while the district, regional and national study areas provide wider health benchmarks for comparison.

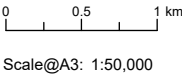
¹ It should be noted that the 2021 Census data used for electoral wards is based on the 2022 electoral ward boundaries, rather than the more recent 2025 ward boundaries. As such, the 2022 boundaries are presented as part of the Local Level Study Area in **Figure 2.1**.

² Although no works are taking place in Sunderland, it has been included as part of the District Level study areas due to its close proximity to the site (within 1 km of the west of the MHPGC Project PEIR Red Line Boundary: Onshore).



Project Name:
MORVEN HAWTHORN PIT GRID
CONNECTION PROJECT

Drawing Title:
FIGURE 2.1 HUMAN HEALTH STUDY AREAS



Geodetic Information:
Datum: OSGB 1936
Projection: British National Grid

Data Sources:
BP, Ordnance Survey, Historic England

Service Layer Credits:
Light Gray Reference: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
Light Gray Base: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community
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Drawing Number:
MHPGC-WSP-PEIR-HUM-91

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2.4.3 Relevant guidance

2.4.3.1 The preliminary assessment has been carried out in accordance with the following guidance documents:

- ISEP (formerly IEMA) 2022 guidance on health in EIA series, 'Effective Scoping of human Health in Environmental Impact Assessment' (IEMA, 2022a) and 'Determining Significance for Human Health in Environmental Impact Assessment' (IEMA, 2022b);
- Design Manual for Roads and Bridges (DMRB) LA 112 Population and Human Health. (National Highways, 2020a);
- National Planning Practice Guidance – Healthy and Safe Communities (Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government, 2022);
- International Associate for Impact Assessment (IAIA) and European Public Health Association (EUPHA). A reference paper for addressing human health in EIA (Cave *et al.*, 2020);
- International Association for Impact Assessment. Health Impact Assessment International Best Practice Principles, (Winkler *et al.*, 2021);
- PHE, Health Impact Assessment in spatial planning (Public Health England, 2020);
- PHE, Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime (PHE, 2021);
- The DEFRA Environmental Improvement Plan 2023 (DEFRA, 2023);
- Mental Wellbeing Impact Assessment (MWIA) – a toolkit for wellbeing, (National MWIA Collaborative (England), 2011);
- Guidelines For Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (Up To 300GHz), (ICNIRP, 1998) Baseline Data Sources

Desk study

2.4.3.2 A desk-based review was undertaken to collate existing information on the demographic, socio-economic, and health characteristics of populations that may be affected by the MHPGC Project. The desk study provides the evidence base for identifying key health determinants, receptors, and potential health inequalities in accordance with the approach agreed through the Scoping process.

2.4.3.3 The assessment draws primarily on publicly available, datasets at the most appropriate spatial scale (national, regional, local, and small-area) to reflect the population characteristics of the study area. Data sources and indicators were agreed with consultees during scoping and remain consistent with those identified in Section 9.2 of the Scoping Report (RPS, 2025).

2.4.3.4 The following data sources have informed the human health baseline:

- Office for National Statistics (ONS), Census 2021 (ONS, 2021);
- Department of Health and Social Care (DHSC), Fingertips – Local health, public health data for small geographic areas (DHSC, 2025);
- Office for Health Improvement and Disparities (OHID). (2025). Public Health Profiles (Fingertips).
- Ministry of Housing, Communities, Health and Local Government (MHCLG), Indices of Multiple Deprivation 2025 (MHCLG, 2025);
- Google Earth Pro (Google, 2026).

Site specific surveys

2.4.3.5 No site-specific surveys have been undertaken to inform the EIA for human health. This is because relevant population health data is publicly available and is sufficient for the assessment.

Data limitations and assumptions

2.4.3.6 This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was considered necessary and therefore none has been undertaken for the assessment.

2.4.3.7 This assessment has relied, in part, on data provided by third parties (e.g. Ordnance Survey mapping, ONS) which are the most up-to-date data available at the time of writing. No significant changes or

limitations in these datasets have been identified that would affect the robustness of the assessment. Baseline data will be kept under review throughout the production of the EIA in order to ensure that (where practicable) the most recently published data is utilised.

- 2.4.3.8 The health assessment partially draws from and builds upon, the technical outputs from inter-related technical disciplines, as set out in **paragraph 2.1.1.4**.
- 2.4.3.9 As such, the assumptions and limitations of these assessments also apply to any information used in this chapter. It is, however, considered that the information available provides a suitable basis for assessment.
- 2.4.3.10 Reducing uncertainty is a key element of impact assessment. Whilst not all uncertainty can be removed, the following steps have been taken to allow confidence in the health assessment conclusions:
- Where scientific literature reviews have been undertaken, these give priority to high quality study design, such as systematic reviews and meta-analyses;
 - The health assessment has been cautious and conservative, using a worst-case scenario method;
 - The health assessment has also been transparent in its analysis and follows good practice as per the guidance set out in **Section 2.4.3**.

2.4.4 Overview of baseline environment

Human health baseline

- 2.4.4.1 Where available, Ward- and LSOA-level health data has been included, however, some datasets are not available. Where this is the case, local authority level data has been compared against regional (North East) and national (England) datasets.

Population Density

- 2.4.4.2 Population density (usual residents per km²) varies considerably across the Study Area according to 2024 data as shown in **Table 2.6**. Recent data at the ward level is not available. The North East regional average population density (322 people per km²) is lower than the England average (450 people per km²). County Durham has a population density of 242 people per km², which is lower than both the regional and national averages, reflecting its predominantly rural character and dispersed settlement pattern.
- 2.4.4.3 In contrast, Sunderland has a population density of 2,101 people per km², which is substantially higher than both the North East and England averages. Sunderland's population density is almost five times greater than the national average and over eight times greater than that of County Durham. This reflects Sunderland's urban nature, with a large proportion of the population concentrated within the city and surrounding built-up areas, whereas County Durham contains a greater proportion of rural communities and open countryside, and only a few larger settlements, such as Durham.

Table 2.6: Population density (ONS, 2024)

Indicator	Sunderland	County Durham	North East (Regional)	England (National)
Population density (people per km ²)	2,101	242	322	450
Legend				
Significantly better than national average				
Significantly worse than national average				
Not significantly different to national average				

General health

- 2.4.4.4 As shown in **Table 2.7**, self-reported health outcomes for the local level, represented by the wards of Dawdon, Easington, Murton, Deneside, alongside Shotton and South Hetton show that 40.8% of residents report 'Very Good' health. This percentage at the local level is lower when compared with 43.1% across County Durham, 43% in Sunderland, 44.6% across the North East and 48.5% nationally. Similarly, 32.9% of residents report 'Good' health, which is broadly comparable with the wider study areas. However, the proportions of residents reporting 'Fair' (17.0%), 'Bad' (7.1%) and 'Very Bad' (2.2%) health are higher than those recorded across Sunderland, County Durham, the North East and England. This indicates comparatively poorer self-reported health outcomes at the local level and reflects the wider health inequalities experienced within parts of County Durham and the North East.
- 2.4.4.5 As shown in **Table 2.7**, at the local level, Deneside ward (E05009057) records the poorest self-reported health outcomes, with the lowest proportion of residents reporting 'Very Good' health (37.5%) and the highest proportions reporting 'Bad' (8.1%) and 'Very Bad' health (2.5%). This indicates comparatively poorer baseline health conditions within Deneside relative to the other wards comprising the Study Area.

Table 2.7: Self-Reported General Health Levels for various Study Areas (Source: ONS, 2021)

	Local Level						Local Authority Level		Regional Level	National Level
Self-Reported General Health (% of Population)	Dawdon (E05009054)	Easington (E05009059)	Murton (E05009069)	Shotton and South Hetton (E05009081)	Deneside (E05009057)	% of all the wards within the Study Area	Sunderland	County Durham	North East	England
Very Good (%)	42.4%	41.2%	40.4%	41.7%	37.5%	40.8%	43.0%	43.1%	44.6%	48.5%
Good (%)	32.6%	30.9%	34.1%	33.3%	33.5%	32.9%	33.9%	33.0%	33.5%	33.7%
Fair (%)	16.5%	18.2%	16.7%	15.8%	18.3%	17.0%	15.6%	15.9%	14.9%	12.7%
Bad (%)	6.2%	7.4%	6.9%	7.2%	8.1%	7.1%	5.8%	6.1%	5.4%	4.0%
Very Bad (%)	2.3%	2.4%	1.9%	2.0%	2.5%	2.2%	1.7%	1.9%	1.6%	1.2%
Legend										
Significantly better than national average										
Significantly worse than national average										
Not significantly different to national average										

Note: Percentage may not sum due to rounding

Life Expectancy

- 2.4.4.6 As shown in **Table 2.8**, life expectancy rates measured at birth (from 2025, the most recently published data at the time of writing) are generally lower for both men and women within Sunderland and County Durham compared to the North East and England averages. Male life expectancy is 77.3 years in Sunderland and 78.3 years in County Durham, compared with 78.4 years across both the North East region and England. Female life expectancy follows a similar pattern and is 82.0 years in Sunderland and 82.1 years in County Durham, compared with 82.3 years regionally and 83.8 years nationally.

Hospital Admissions

- 2.4.4.7 Hospital admissions data is not available at the regional level. At the local authority level, both Sunderland and County Durham have a slightly higher rate of emergency admissions (113.6 and 108.1 respectively) for all causes when compared with England (100.0). In terms of emergency admissions for self harm, the rate in Sunderland (152) is higher than the national rate (117), whilst County Durham has a lower rate (85.3).

Mortality

- 2.4.4.8 As shown in **Table 2.8**, mortality rates across the Study Area are generally higher than the national averages. Mortality from all causes among people aged under 75 years is 406.8 in Sunderland and 380.5 in County Durham, compared with 321.0 nationally. County Durham's rate is consistent with the wider North East regional average (380.5), while Sunderland records the highest rate across the comparator areas.
- 2.4.4.9 A similar pattern is evident for cardiovascular disease mortality among those aged under 75 years. Sunderland has the highest mortality rate (86.5), followed by the North East regional average (82.5) and County Durham (79.6). All three values exceed the England average of 71.5, indicating a greater burden of cardiovascular disease across the study area and the wider region. Sunderland records a cardiovascular mortality rate that is 15.0 higher than the national average, while County Durham's rate is 8.1 higher.
- 2.4.4.10 Mortality from cancer among people aged under 75 years is also higher within the study area than nationally. Sunderland records the highest rate (135.2), followed by County Durham (128.5) and the North East (128.4), compared with 114.6 across England.
- 2.4.4.11 Suicide rates are likewise higher across the study area than the national average. In 2024, the suicide rate was 16.0 in County Durham and 14.3 in Sunderland, compared with 14.1 across the North East and 10.9 nationally. County Durham records the highest rate, which is 5.1 unit rate higher than the England average, indicating poorer mental health outcomes relative to the national picture.

Child Health

- 2.4.4.12 As shown in **Table 2.8**, child obesity prevalence is higher within both Sunderland and County Durham than the regional and national averages. Among Reception-aged children (4-5 years), obesity prevalence is 13.3% in Sunderland and 12.8% in County Durham, compared with 12.4% across the North East and 10.5% nationally. Among Year 6 children (10-11 years), obesity prevalence is 27.1% in Sunderland and 25.0% in County Durham, compared with 25.0% regionally and 22.2% nationally.
- 2.4.4.13 Sunderland records the highest prevalence of childhood obesity across both age groups. Reception-age obesity prevalence in Sunderland is 2.8 percentage points higher than the England average, while Year 6 obesity prevalence is 4.9 percentage points higher. County Durham also exceeds the England average, by 2.3 percentage points for Reception-aged children and 2.8 percentage points for Year 6 children.
- 2.4.4.14 The elevated prevalence of childhood obesity across the Study Area may indicate underlying health inequalities and highlights the importance of access to opportunities for physical activity, active travel, recreation and healthy lifestyles. A noticeable trend is that obesity prevalence is notably higher among Year 6 children compared with reception aged children across all areas, suggesting that obesity levels increase as children progress through primary school.

Mental Health

- 2.4.4.15 Mental health is intrinsically linked to physical health and wellbeing as well as the wider determinants of health. Measurable mental health data relates to self-reported statistics on mental health symptoms such as anxiety and depression, as well as mental health services referrals.
- 2.4.4.16 Data on new referrals to secondary mental health services in 2023/24 (the most recently available data at the time of writing) indicate that rates both within Sunderland and County Durham are substantially higher than the regional and national averages at 13,310 and 10,968 respectively, compared with 8,602 across both the North East region and England.
- 2.4.4.17 As presented in **Table 2.8**, self-reported anxiety and low happiness scores show a higher percentage score in Sunderland (25.8%), compared with both the North East regional average (23.0%) and the England average (23.3%), indicating that a greater proportion of residents experience high anxiety levels. In contrast, County Durham reported a lower proportion of residents with high anxiety scores (22.0%) than both the regional and national averages.
- 2.4.4.18 For residents reporting low levels of happiness, both Sunderland and County Durham recorded the same proportion (9.9%), exceeding the North East average (9.4%) and the England average (8.9%). This suggests that, despite County Durham reporting comparatively lower levels of anxiety, both local authority areas experience poorer self-reported happiness outcomes than regional and national benchmarks.
- 2.4.4.19 The prevalence of depression in 2024/25 was higher within both Sunderland and County Durham than the England average (14.3%). Sunderland recorded the highest prevalence, at 17.0%, which was also higher than the North East regional average (16.1%). County Durham recorded a depression prevalence of 14.6%, which was marginally higher than the England average but lower than the regional average.
- 2.4.4.20 The percentage of pupils with social, emotional and mental health (SEMH) needs in 2024/25 was higher within the Study Area than the England average (4.0%). County Durham recorded the highest proportion of pupils with SEMH needs (4.4%), followed by Sunderland (4.3%). However, both local authority areas were slightly below the North East regional average of 4.6%, indicating that SEMH needs are more prevalent across the region as a whole than nationally.

Table 2.8: Population health characteristics for various Study Areas (Source: OHID, 2025)

Indicator	Local Authority Level		Regional Level	National Level
	Sunderland	County Durham	North East	England
Life Expectancy				
Life expectancy for males at birth (years)	77.3	78.3	78.4	78.4
Life expectancy for females at birth (years)	82.0	82.1	82.3	83.8
Hospital Admissions				
Emergency hospital admissions: All Causes (standardised admission ratio or SAR ³)	113.6	108.1	N/A	100.0
Intentional self-harm: emergency hospital admissions (SAR) (value per 100,000)	152.0	85.3	N/A	117.0
Mortality				
Mortality from all causes, aged under 75 (age-standardised rate per 100,000 population)	406.8	380.5	380.5	321.0
Mortality from cardiovascular disease, aged under 75 (age-standardised rate per 100,000 population)	86.5	79.6	82.5	71.5
Mortality from cancer, aged under 75 (age-standardised rate per 100,000 population)	135.2	128.5	128.4	114.6
Suicide rate (age-standardised rate per 100,000 population) (<i>note that data is from 2024</i>)	14.3	16.0	14.1	10.9
Mental Health				
Self Reported wellbeing, people with a high anxiety score (2022/2023)	25.8	22.0	23.0	23.3
Self-Reported 'Low Happiness' (2022/2023)	9.9	9.9	9.4	8.9
New referrals to secondary mental health services (per 100,000) (2023/2024))	13,310	10,968	8,602	8,602

³ Standard admission ratio (SAR) is a standardised measure of hospital admission rates that adjusts for differences in the age (and sometimes sex) structure of populations so that comparisons between areas are fair.

	Local Authority Level		Regional Level	National Level
Indicator	Sunderland	County Durham	North East	England
Percentage of pupils with social, emotional, and mental health needs (2024/2025)	4.3	4.4	4.6	4.0
Depression: Quality and Outcomes Framework (QOF) prevalence (%) (2024/2025))	17.0	14.6	16.1	14.3
Child Health (data from 2024/25)				
Reception prevalence of obesity (including severe obesity (4-5 years)) (% of total)	13.3	12.8	12.4	10.5
Year 6 prevalence of obesity (including severe obesity 10-11 years)) (% of total)	27.1	25.0	25.0	22.2
Legend				
Significantly better than national average				
Significantly worse than national average				
Not significantly different to national average				

Deprivation

Indices of Multiple Deprivation

- 2.4.4.21 The Indices of Multiple Deprivation (IMD) (MHCLG, 2025) provide a comprehensive measure of deprivation in the UK, at various geographical levels, across seven domains: income, employment, health deprivation and disability, education, crime, housing, and living environment. As an indicator of health resilience, IMD data highlights areas where residents face barriers to maintaining good health, with deprivation typically linked to poorer health outcomes. The health deprivation and disability domain also measures the risk of premature death and the reduction in quality of life through poor physical and mental wellbeing.
- 2.4.4.22 Deprivation within each local authority is ranked, with a score of 1 being the most deprived, and the least deprived ranked at 296. Sunderland is ranked 31 and is in the 10% most deprived local authority districts. County Durham is ranked 47 and is in the 20% most deprived local authority districts. In terms of the Health and Disability domain, both County Durham and Sunderland are ranked in the 10% most deprived local authorities, with a rank of 6 and 17 respectively.
- 2.4.4.23 At the neighbourhood level, LSOA are ranked from 1 to 33,755, with 1 being the most deprived. **Table 2.9** highlights the deprivation of the LSOAs which intersect with the draft Order Limits. County Durham 017C is the most deprived area, and is within the 20% most deprived neighbourhoods in England. In comparison, County Durham 025C, 021C and 021D all had overall IMD decile scores of 4 or 5, ranking within the 40% and 50% most deprived. Across the LSOAs, Durham 017C is the most deprived in terms of the Health indicator, whilst the other LSOAs are either in the 20% or 30% most deprived. Overall, the IMD suggests a high level of health deprivation across the local authorities and LSOAs, with health deprivation and disability also higher across the Study Areas compared to other geographies in England.

Table 2.9: Indices of Multiple Deprivation for various Study Areas (Source: MHCLG, 2025)

Sub – Local Study Area (LSOAs)				
Deprivation Ranking	County Durham 021C	County Durham 025C	County Durham 017C	County Durham 021D
Overall IMD Ranking	15,316	12,405	3,707	15,040
Neighbourhood Deprivation Ranking (%)	Within 50% most deprived	Within 40% most deprived	Within 20% most deprived	Within 50% most deprived
Health and Disability Domain	8,579 (30% most deprived)	5,764 (20% most deprived)	972 (10% most deprived)	5,913 (20% most deprived).

Vulnerable group population, including social disadvantage equality considerations

- 2.4.4.24 A vulnerable group may have a higher sensitivity to changes in health status, by virtue of factors such as age (for example, older people or children), ethnicity, economic factors, disability, sex, or gender. These have been considered in line with the protected characteristics within the Equality Act 2010 (HM Government, 2010). The data has been presented at the smallest level possible, with comparison made to the local authority level, regional level and national levels.

Sex and Gender Identity

- 2.4.4.25 Data on the distribution of males and females across the site-specific LSOAs and comparative areas indicated a broadly balanced sex profile (ONS, 2021). The sex profile across the study area is broadly consistent within Sunderland, County Durham, the North East and England, with females comprising a slightly higher proportion of the population than males. Female representation ranges from 49.6% in County Durham 017C to 53.2% in County Durham 025C, while male representation ranges from 46.8% to 50.4%, indicating only minor variation from wider geographic trends.
- 2.4.4.26 As shown in **Table 2.10**, the most detailed and up-to-date gender identity data available has been identified at the local authority level. More geographically refined datasets, such as ward or LSOA

level statistics, are not publicly available and therefore have not been included within this assessment.

2.4.4.27 Data on gender identity demonstrates a high degree of consistency across Sunderland, County Durham, the North East and England. In all areas, the overwhelming majority of residents reported that their gender identity was the same as their sex registered at birth, ranging from 93.5% in England to 95.3% in Sunderland. The proportion of residents reporting a gender identity different from their sex registered at birth was low across all areas, with each category accounting for less than 0.2% of the population. The proportion of residents identifying as a trans woman or trans man was approximately 0.1% or less across all Study Areas.

2.4.4.28 Residents reporting another gender identity, including non-binary identities, represented approximately 0.1% or less of the population in all comparative areas. The proportion of residents who did not answer the question ranged from 4.3% in Sunderland to 6.0% in England. Overall, the data indicates that gender identity profiles are broadly consistent across Sunderland, County Durham, the North East and England, with only a small proportion of the population reporting a gender identity different from their sex registered at birth.

Age

2.4.4.29 The age profile varies across the site-specific LSOAs. County Durham 017C has the highest proportion of children and young people aged 0-15 years (19.2%), which exceeds the County Durham (16.8%), North East (17.7%) and England (18.5%) averages. In contrast, County Durham 021C records the lowest proportion of residents aged 0-15 years (12.7%), substantially below the regional and national averages. The proportion of working-age residents (16-64 years) is highest in County Durham 021D (64.5%), exceeding the averages for Sunderland (62.0%), County Durham (61.8%), the North East (61.9%) and England (63.0%).

2.4.4.30 County Durham 021C and County Durham 025C have comparatively older population profiles, with 28.4% and 25.9% of residents aged 65 years and over respectively. Both values exceed the proportions recorded in Sunderland (20.5%), County Durham (21.3%), the North East (20.4%) and England (18.3%). Conversely, County Durham 021D (17.5%) and County Durham 017C (19.5%) have lower proportions of older residents than the County Durham and North East averages, suggesting comparatively younger populations.

Disability

2.4.4.31 The proportion of residents reporting no long-term physical or mental health conditions ranges from 66.9% in County Durham 017C to 72.0% in County Durham 021D, compared with 71.5% across the North East and 75.9% nationally. Overall, the data suggests that residents within the site-specific LSOAs, particularly County Durham 017C, experience a greater prevalence of long-term health conditions and disability than the regional and national populations.

Long-term health problems and disability are more prevalent within the site-specific LSOAs than across the North East and England. County Durham 017C records the highest proportion of residents classified as disabled under the Equality Act (26.8%), followed by County Durham 025C (25.8%) and County Durham 021C (23.8%). These figures are all higher than the averages recorded for Sunderland (23.1%), County Durham (22.4%), the North East (21.4%) and England (17.3%).

Income and Employment

2.4.4.32 Income levels show notable disparities across the comparative areas. Average gross weekly earnings are lower in Sunderland (£557.6) and County Durham (£576.9) than in the North East (£656.0) and England (£768.7). The difference is particularly pronounced when compared with the national average, with average earnings in Sunderland approximately £211.1 lower per week than in England. These findings indicate comparatively lower income levels within Sunderland and County Durham and may reflect greater socioeconomic disadvantage relative to regional and national averages (ONS, 2025).

2.4.4.33 The unemployment rate in those aged 16 and over between April 2025 and March 2026 is recorded in **Table 2.10** below. The unemployment rate in the North East (4.7%) is broadly in line with the England average of 4.6%. Sunderland has a slightly higher unemployment rate of 5.3%, whereas

County Durham has a slightly lower unemployment rate (4.1%). This reflects a mixed picture across the Study Area.

Language Proficiency

- 2.4.4.34 Language proficiency levels are generally high across the comparative areas, with only a small proportion of the population reporting that they cannot speak English well or at all. The proportion is lowest in County Durham (0.3%) and Sunderland (0.5%), both below the North East average (0.8%) and substantially below the England average (1.9%). This suggests that English language barriers are relatively uncommon within the local study area and are less prevalent than across England as a whole.

Table 2.10: Population characteristics for various Study Areas (Source: ONS, 2021)

	Sub-Local Level				Local Authority Level		Regional Level	National Level
Indicator	County Durham 021C	County Durham 025C	County Durham 017C	County Durham 021D	Sunderland	County Durham	North East	England
Sex and Gender Identity								
Male (% of total)	49.1	46.8	50.4	48.7	48.5	48.9	48.9	49.0
Female (% of total)	50.6	53.2	49.6	51.3	51.5	51.1	51.1	51.0
Gender identity the same as sex registered at birth (%)	N/A	N/A	N/A	N/A	95.31	95.07	94.70	94.70
Gender identity different from sex registered at birth but no specific identity given (%)	N/A	N/A	N/A	N/A	0.18	0.14	0.20	0.20
Trans woman (%)	N/A	N/A	N/A	N/A	0.07	0.07	0.10	0.10
Trans man (%)	N/A	N/A	N/A	N/A	0.10	0.08	0.10	0.10
All other gender identities (including non-binary(%))	N/A	N/A	N/A	N/A	0.06	0.08	0.10	0.10
Not answered (%)	N/A	N/A	N/A	N/A	4.28	4.56	4.70	4.70
Age								
Age 0-15 (% of total)	12.7	15.7	19.2	18.0	17.6	16.8	17.7	18.5
Age 16-64 (% of total)	58.8	58.4	61.4	64.5	62.0	61.8	61.9	63.0

	Sub-Local Level				Local Authority Level		Regional Level	National Level
Indicator	County Durham 021C	County Durham 025C	County Durham 017C	County Durham 021D	Sunderland	County Durham	North East	England
Age 65+ (% of total)	28.4	25.9	19.5	17.5	20.5	21.3	20.4	18.3
Long-Term Health Problem or Disability (ONS, 2023)								
Disabled under the Equality Act: Day to day activities limited a lot (% of total population – age-standardised)	11.5	12.9	14.3	10.1	11.2	10.4	9.9	7.3
Disabled under the Equality Act: Day to day activities limited a little (% of total population – age-standardised)	12.3	12.9	12.5	10.2	11.9	12	11.5	10
Not disabled under the Equality Act: Has long-term physical or mental health conditions but day-to-day activities are not limited (% of total population)	6.3	5.7	6.3	7.7	6.7	7.2	7.1	6.8

	Sub-Local Level				Local Authority Level		Regional Level	National Level
Indicator	County Durham 021C	County Durham 025C	County Durham 017C	County Durham 021D	Sunderland	County Durham	North East	England
Not disabled under the Equality Act: No long-term physical or mental health conditions (% of total population)	69.8	68.5	66.9	72.0	69.8	69.8	71.5	75.9
Lower Income and Employment Opportunities								
Average income (resident analysis, gross £ per week)(ONS, 2025c)	N/A	N/A	N/A	N/A	557.6	576.9	656.0	768.7
Model-based Unemployment (ONS, 2026)	N/A	N/A	N/A	N/A	5.3%	4.1%	4.7%	4.6%
Language Proficiency								
Population who cannot speak English well or at all (%)	N/A	N/A	N/A	N/A	0.5	0.3	0.8	1.9
Legend								
Significantly better than national average								
Significantly worse than national average								
Not significantly different to national average								

Ethnicity

2.4.4.35 Ethnicity data at the ward level from 2021 shows that there is a significantly higher proportion of White people across the local level, local authority level and regional level when compared with the national level as shown in **Table 2.11**. The proportion of people who are Black, Black British, Black Welsh, Caribbean or African is generally similar across all the geographies, with 0.1% to 0.2% identifying as such across the ward areas. In Sunderland, the proportion of People who are Black, Black British, Black Welsh, Caribbean or African is in line with the regional average (both 1.0%) and is higher than that recorded in County Durham (0.3%); however it is still lower than the England average (4.2%). Sunderland also has the highest proportion of those who are Asian, Asian British or Asian Welsh (3.0%) when compared with the local ward level data and County Durham (1.5%). Overall, this data suggests that the population is predominantly white across the Study Area, however there are slightly higher proportions of those from ethnic minorities in Sunderland.

Table 2.11: Ethnicities, as of 2021 Census (ONS, 2021)

	Local Level					Local Authority Level		Regional Level	National Level
	Dawdon (E05009054)	Easington (E05009059)	Murton (E05009069)	Shotton and South Hetton (E05009081)	Deneside (E05009057)	Sunderland	County Durham	North East	England
Asian, Asian British or Asian Welsh (% of population)	1.2	0.5	0.9	1.3	0.9	3.0	1.5	3.7	9.6
Black, Black British, Black Welsh, Caribbean or African (% of population)	0.2	0.2	0.1	0.2	0.1	1.0	0.3	1.0	4.2
Mixed or Multiple Ethnic Groups (% of population)	1.0	0.7	0.7	0.6	0.4	0.9	0.9	1.3	3.0
White (% of population)	97.3	98.5	98.1	97.7	98.3	94.6	96.8	93.0	81.0
Other ethnic group (% of population)	0.3	0.1	0.2	0.2	0.2	0.5	0.4	1.0	2.2

2.4.5 Future baseline conditions

- 2.4.5.1 During the 35-year operational lifetime of the MHPGC Project, the Human Health baseline can be expected to evolve both on a natural basis and in response to global trends such as climate change and other anthropogenic activities. The Infrastructure Planning (EIA) Regulations 2017, the Marine Works (Environmental Impact Assessment) Regulations 2007 and the Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017 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. Therefore, an assessment of future baseline conditions, in the absence of the MHPGC Project, has been undertaken and is described within this section.
- 2.4.5.2 It should be noted that population health data is only a singular snapshot in time. Such data relating to population health is subject to continual change, at both individual levels and wider geographical scales. A range of influences relating to the environment, such as seasonal change or disease prevalence, or macro socio-economic conditions, such as migration and job markets typologies, will continue to shape population health in the future.
- 2.4.5.3 Further to this, longer term macro trends in population health may influence the future baseline. Health and social care approaches, public health initiatives and government approaches such as the Government's 10 Year Health Plan for England (HM Government, 2025) aim to reduce health inequalities and improve quality of life, which would naturally impact health data. For example, the impact of COVID-19 on public health is expected to take several years before it is reflected in statistical data, however the pandemic will likely have exacerbated public health challenges, especially in certain population groups.
- 2.4.5.4 Quantitatively modelling future health outcomes would be both disproportionate, and inconsistent with the qualitative assessment approach due to the complexities involved in the interactions between various health determinants, and unpredictable macro-economic changes over the next decade.
- 2.4.5.5 For the purposes of this assessment, the current health baseline is considered to be a suitable proxy for the future baseline. The current baseline for the MHPGC Project incorporates relevant health indicators that reflect the potential health outcomes for the future population, such as those related to age and chronic conditions. The assessment methodology categorises vulnerable population groups, enabling the differentiation of effects between groups such as 'older people' and 'individuals with existing poor health' from the broader population. The sensitivity scores for each vulnerable group are determined independently of the population size within these groups, which would be the primary change between the current and future baseline. Therefore, these sensitivity scores accurately account for both current and future population characteristics.

2.5 Impact assessment methodology

2.5.1 Overview

- 2.5.1.1 **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR** sets out the overarching approach that has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the sensitivity of the receptors and magnitude of effects and sets out the significance criteria that have been used for the preliminary health assessment. The methodologies for assessing sensitivity, magnitude and significance for health are described in more detail below. It should be noted that the assessment draws upon the information presented in other topic chapters, however effects reported in these chapters may differ here due to the differing methodologies applied and due to the different classifications of human receptors.

2.5.2 Receptor sensitivity

- 2.5.2.1 When defining sensitivity, reference has been made to the criteria levels set out in ISEP (formerly IEMA) (2022b) Determining Significance for Human Health in Environmental Impact Assessment.

- 2.5.2.2 Sensitivity reflects the degree to which a human receptor (individuals or populations) may be affected by an environmental or socio-economic change. It considers both the vulnerability of the receptor (e.g. age, health status, deprivation) and its capacity to anticipate, cope with, resist and recover from adverse effects [see **Table 2.12**].
- 2.5.2.3 Population sensitivity has been determined in accordance with the principles of the ISEP (2022b) Determining Significance for Human Health in Environmental Impact Assessment, taking account of:
- **Population characteristics** – size, density, and proportion of vulnerable groups (e.g. children, older people, people with pre-existing health conditions, socio-economically deprived groups);
 - **Exposure potential** – likelihood of contact with or proximity to the impact source;
 - **Adaptive capacity** – ability of individuals or communities to respond, including access to healthcare, social support networks, and economic resilience.

Table 2.12: Definition of terms relating to the sensitivity of the receptor

Sensitivity	Definition
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 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
Very Low	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

2.5.3 Magnitude of impact

- 2.5.3.1 The magnitude of an impact that could affect Human Health is influenced by several key factors, including the scale of the change, the spatial extent the impact is likely to occur and the duration and frequency of the impact. When defining the magnitude of the impact, criteria detailed in ISEP (2022b) Determining Significance for Human Health in Environmental Impact Assessment, has been followed [see **Table 2.13**].

Table 2.13: Definition of terms relating to the magnitude of an impact

Magnitude	Definition
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

Magnitude	Definition
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

2.5.4 Significance of effect

- 2.5.4.1 The significance of the effect upon health is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is presented in **Table 2.14** and is based on the matrix included in ISEP (2022b) Determining Significance for Human Health in Environmental Impact Assessment.
- 2.5.4.2 Following the classification of an effect using this methodology, a clear statement will then be made as to whether that effect is significant or not significant. Major and moderate effects are considered to be significant, whilst minor and negligible effects are considered to be not significant. However, professional judgement will also be applied in reaching conclusions as to the significance of effects. Definitions for the classification of effects are shown in **Table 2.15**, in line with the ISEP (2022b) Determining Significance for Human Health in Environmental Impact Assessment.

Table 2.14: Matrix used for the assessment of the significance of the effect

Sensitivity of receptor	Magnitude of impact			
	Negligible	Low	Medium	High
Very Low	Negligible	Negligible	Negligible or minor	Negligible or minor
Low	Negligible	Minor	Minor	Minor or moderate
Medium	Negligible or minor	Minor	Moderate	Moderate or major
High	Negligible or minor	Minor or moderate	Moderate or major	Major

Table 2.15: Significance definitions

Significance classification	Definition	Significant effect
Major	- 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.	Significant

Significance classification	Definition	Significant effect
Moderate	- 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	Significant
Minor	- 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.	Not significant
Negligible	- 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); - 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.	Not significant

2.5.5 Assumptions and limitations of the assessment

- 2.5.5.1 The assessment has been undertaken based on the preliminary MHPGC Project design information. This information is iterative and will be updated in the ES as the design evolves. This may lead to changes which would be accounted for in the assessment presented in the ES.
- 2.5.5.2 The following limitations and assumptions have been identified for the assessment within this section:
- No site survey has been undertaken for the purpose of this chapter; this is not considered to be required or affect the robustness of the assessment for EIA purposes, due to baseline information being publicly available from published sources.

2.6 Key parameters for assessment

2.6.1 Scope of the assessment

- 2.6.1.1 The approach to assessment was presented in the MHPGC Project Scoping Report and has been refined in consultation with relevant statutory and non-statutory consultees as detailed in **Section**

2.3 and through the MHPGC Project Scoping Opinions received from the PINS, MD-LOT and the MMO.

2.6.1.2 **Table 2.16** summarises the impacts considered as part of the assessment, while a summary of health determinants that have been scoped out is included in **Table 2.17**.

Table 2.16: Impacts scoped into the assessment

Impact	Potential effects scoped into the assessment
Construction phase	
Air Quality and Dust (Onshore)	Short-term deterioration in local air quality arising from construction traffic, excavation, onshore export cable installation and AC connection cable installation, LSS construction and associated plant use, leading to temporary increases in particulate matter and exhaust emissions. These changes may affect respiratory and cardiovascular health in nearby residents and other sensitive receptors, particularly those with pre-existing conditions. The assessment draws upon Volume 3, Chapter 7: Onshore Air Quality, of the PEIR and UK statutory health protection standards.
Noise and Vibration (Onshore)	Temporary increases in environmental noise (and, where relevant, ground-borne vibration) from construction plant, piling, Heavy Goods Vehicle (HGV) movements and other site activities, with potential for annoyance, sleep disturbance and stress-related health effects for residential and other noise-sensitive receptors. The health assessment uses the residual conclusions from the Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR and interprets them in terms of potential population health outcomes.
Open space, leisure and play (Onshore)	Temporary restrictions, diversions or changes in access to publicly accessible green and blue spaces may arise during construction activities. Onshore effects may include changes to access to PRoW, coastal paths, beaches and other open spaces associated with landfall works, onshore cable installation and LSS construction. These changes may affect opportunities for outdoor recreation, physical activity and contact with nature for local residents and visitors, with potential implications for physical and mental wellbeing. The Human Health assessment considers the scale, duration and reversibility of any access restrictions, the availability of alternative access or temporary provision, and is informed by the Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR .
Water quality (Onshore)	Risk of accidental spills or polluted run-off during construction with potential to affect surface and groundwater bodies and, indirectly, users of drinking water sources or designated bathing waters. The health chapter relies on Volume 3, Chapter 2: Water Resources & Flood Risk, of the PEIR to characterise risk and mitigation.
Land quality (Onshore)	Disturbance of historic contamination, creation of new contamination pathways or accidental spills/leaks from construction compounds and working areas, with potential for human exposure via direct contact, ingestion or inhalation of dust/soil vapours. The assessment interprets Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR findings for public health, taking account of standard construction management and discovery procedures.

Impact	Potential effects scoped into the assessment
Transport modes, access and connections (Onshore)	Temporary changes in traffic flows and patterns on the local road network and on PRoW/cycle routes due to construction traffic, construction of new or modified junctions, temporary lane closures and construction compounds. These may affect journey times to healthcare and other key services, perceived road safety and opportunities for active travel. The health chapter draws on Volume 3, Chapter 5: Traffic and Transport, of the PEIR and interprets any residual access/severance issues in terms of population health.
Employment and Income (Onshore)	Creation of temporary construction employment and supply-chain opportunities associated with onshore cable works, landfall construction and the LSS. These may provide beneficial effects on income, employment security and associated determinants of health for workers and, where recruitment is local or regional, for communities in Sunderland and County Durham. The health chapter uses Volume 4, Chapter 3: Socio-economics, of the PEIR ; and Volume 4, Annex 3.1: Economic Impact Technical Report, of the PEIR to understand the scale of beneficial employment and interpret the potential health gains, particularly for more deprived communities.
O&M phase	
Noise and vibration (Onshore)	Changes in the noise environment associated with operation of the LSS and associated equipment, including transformers and cooling plant, which may influence annoyance, perceived tranquillity, sleep quality and wellbeing at nearby receptors over the long term. The health chapter draws on Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR and will consider both the general and vulnerable population.
EMF perception (Onshore)	Public understanding and perception of risk associated with EMF from buried onshore export cables and the LSS may give rise to anxiety or concern, particularly for residents living close to the infrastructure, even where actual EMF levels comply with guideline limits. The assessment does not re-evaluate EMF engineering design but qualitatively considers potential mental health and wellbeing effects related to perceived risk and the role of clear, non-technical information and design compliance with ICNIRP and government guidance in avoiding or reducing these effects, making reference to Volume 1 Annex 2.1 Onshore EMF Compliance Statement, of the PEIR .
Open space, leisure and play (Onshore)	Any permanent or long-term changes to the pattern of access to PRoW, coastal paths and publicly accessible open space resulting from the presence and secure operation of the onshore infrastructure (e.g. fencing, safety exclusion areas, long-term diversions). These may influence opportunities for walking, cycling, informal recreation and contact with nature. The assessment considers whether the operational layout maintains or enhances reasonable access to key recreational assets.
Decommissioning phase	
Air quality and dust (Onshore)	Short-term dust and emission generation associated with removal of onshore infrastructure, excavation, cable recovery (where relevant) and HGV movements, with potential for transient respiratory and cardiovascular health impacts in nearby sensitive receptors. The health chapter draws on Volume 3, Chapter 7: Onshore Air Quality, of the PEIR , specifically the assessment of decommissioning activities.

Impact	Potential effects scoped into the assessment
Noise and vibration (Onshore)	Temporary increases in noise from dismantling operations, HGV traffic and plant use during decommissioning, potentially leading to annoyance, sleep disturbance and short-term stress-related health effects where works occur close to sensitive receptors. The assessment interprets residual noise conclusions from Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR in health terms.
Open space, leisure and play (Onshore)	Temporary disruption to PRoW, coastal access and local open spaces during decommissioning works, similar in nature to construction, with short-term effects on recreation and physical activity opportunities. Any long-term reinstatement or improvement of access following decommissioning is also considered, with reference to Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR , where relevant.
Water quality (Onshore)	Risk of accidental spills or polluted run-off during decommissioning, with potential to affect surface and groundwater bodies and, indirectly, users of drinking water sources or designated bathing waters. The health chapter relies on Volume 3, Chapter 2: Water Resources & Flood Risk, of the PEIR to characterise risk and mitigation.
Land quality (Onshore)	Potential disturbance of residual contamination or creation of new pathways during decommissioning leading to short-term exposure risks, managed through standard best practice and management plans. Health implications are qualitatively considered, drawing on Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR .
Employment and income (Onshore)	Temporary employment associated with decommissioning may provide short-term beneficial effects on income and employment security for workers in the regional labour market. The health chapter qualitatively interprets Volume 4, Annex 3.1: Economic Impact Technical Report, of the PEIR and Volume 4, Chapter 3, Socio-economics, of the PEIR , specifically the scale of such benefits in population health terms.

Table 2.17: Determinants scoped out of the Human Health assessment

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Transport modes, access and connections	Operation and Decommissioning.	Onshore	During O&M, project-related traffic would be limited to occasional inspection and maintenance activities. As a result, no significant effects on access, community severance, road safety, or access to health-promoting goods and services are anticipated, and this determinant is therefore scoped out of the assessment.
Transport modes, access and connections	All phases	Offshore	No major transport routes are expected to be affected and offshore activities are not anticipated to alter marine access in a manner that could influence population health. Therefore, this determinant is scoped out of the assessment.
Employment and Income	Operation	Onshore	O&M activities are limited in scale and are not expected to generate employment opportunities or workforce effects capable of influencing population health. Standard employment, equality, and health and safety policies will be applied throughout the project and supply chain. Therefore, this determinant is scoped out of the assessment.
Employment and Income	All phases	Offshore	Offshore construction, operation, maintenance and decommissioning activities may generate some temporary employment; however, these opportunities are not anticipated to be of a scale, duration or nature sufficient to result in significant population health effects. Therefore, this determinant is scoped out of the assessment.
Air Quality	Operation	Onshore	During O&M, the MHPGC Project is not expected to generate onshore air quality emissions, even accounting for non threshold effects, that could affect onshore populations to a degree that there could be potentially significant effects. This is therefore scoped out.
Air Quality	All phases	Offshore	During construction, O&M and decommissioning, the MHPGC Project is not expected to generate offshore air quality emissions, even accounting for non-threshold effects, that could affect onshore populations to a degree that there could be potentially significant effects. This issue is therefore scoped out.
Noise and Vibration	All phases	Offshore	Offshore noise associated with construction, operation, maintenance and decommissioning activities is expected to be temporary, limited in scale and comparable to existing port activities. No significant population health effects are anticipated and therefore this determinant is scoped out of the assessment.

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Water Quality	Operation	Onshore	Operational activities are limited in scale and duration and are not expected to result in significant effects on surface water or groundwater quality. Embedded mitigation and standard environmental management measures will minimise the risk of pollution incidents, and no material pathway to human health effects has been identified.
Water Quality	All phases	Offshore	Potential effects on offshore water quality are predicted to be temporary, localised and reversible, with embedded mitigation ensuring no significant effects on water quality receptors. Consequently, no material pathway to human health effects has been identified.
Land Quality	Operation	Onshore	O&M activities are unlikely to require excavations or result in land quality related risks to public health. Any risks would be managed through standard best practice contamination discover, avoidance and response measures that would be secured through management plans. Therefore, this is scoped out.
Land Quality	All phases	Offshore	Offshore works at all phases of the MHPGC Project would not affect land quality. Port activities are unlikely to result in public exposures to contaminated soils. Any new or historic contamination that may be mobilised by activities will be managed by existing port consents standard best practice contamination avoidance and response measures. This issue is scoped out.
Radiation	All phases	Onshore and Offshore	No ionising radiation sources are proposed as part of the project. Potential effects associated with ionising and non-ionising radiation are therefore scoped out.
EMF Perception	Construction and Decommissioning	Onshore	Construction and decommissioning activities would not involve active major electrical infrastructure generating EMFs. Temporary electrical equipment would operate under relevant occupational and public safety controls. EMF effects and associated health risks are therefore scoped out.
Health related behaviours – physical activity	All phases	Onshore and Offshore	Temporary disruption of access to PRow and open spaces during construction and decommissioning as well as permanent disruptions during O&M; potentially affecting recreational activities and physical activity levels will be considered under 'Open space, leisure and play' and therefore are scoped out of this assessment.

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Health related behaviours-risk taking behaviour.	All phases	Onshore and Offshore	The project workforce is not anticipated to be of a scale sufficient to influence community health behaviours or place pressure on local communities. Appropriate health and safety measures will be implemented, including for communicable diseases, and workforce movements are consistent with routine construction, port and shipping activities. Therefore, this determinant is scoped out of the assessment.
Health related behaviours-diet and nutrition.	All phases	Onshore and Offshore	The MHPGC Project is not expected to affect food availability, access or affordability. Any impacts on agricultural land or commercial fisheries are not anticipated to result in changes to food supply sufficient to influence population health. Therefore, diet and nutrition are scoped out of the assessment.
Education and Training	All phases	Onshore and Offshore	The MHPGC Project may provide some workforce training and skills development opportunities; however, these are not anticipated to be of a scale sufficient to influence population health. Furthermore, no substantial workforce influx is expected and therefore no effects on local educational capacity or provision are anticipated. This determinant is therefore scoped out of the assessment.
Housing	All phases	Onshore and Offshore	No new housing is proposed and workforce accommodation requirements are expected to be met through existing local housing capacity. As a result, the MHPGC Project is not anticipated to affect housing availability or result in associated population health effects, and this determinant is therefore scoped out of the assessment.
Relocation	All phases	Onshore and Offshore	The MHPGC Project would not require the compulsory acquisition or relocation of homes or community facilities onshore or offshore. Therefore, no housing or relocation-related effects on population health are anticipated and this determinant is scoped out of the assessment.
Open Space, Leisure and Play	All phases	Offshore	Offshore infrastructure and construction activities associated with the MHPGC Project is not expected to change recreational or leisure opportunity on a scale that could affect population health. This issue is scoped out.

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Community Safety	All phases	Onshore and Offshore	The MHPGC Project requires skilled technical roles. There are not anticipated to be community safety or security issues associated with worker behaviour in ports or communities. The MHPGC Project would operate appropriate safeguarding and modern slavery policies. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is therefore scoped out. Where surface excavations are undertaken these would be within controlled work areas, including use of appropriate fencing and notifications as required (see CoT46). Best practice measures would be secured through suitable management plans. The risk to the public from accidental injury, (e.g. falls or drowning is scoped out). The potential for widespread actual or perceived crime that could affect population health is unlikely. Electrical risks to the public would be avoided through the design, including fencing of above ground electrical infrastructure. These issues are therefore scoped out.
Community Identity, culture, resilience and influence	All phases	Onshore and Offshore	Demographic changes that could affect community identity are not anticipated, as there would not be a large in-migration or outmigration of workers to local communities. Visual impacts of the MHPGC Project are expected to be limited. Onshore infrastructure, including at landfall and the LSS, are not expected to be of a scale of visual impact that could affect population health outcomes. Further commitment on visual screening will be factored into optioneering, and additional detail will be provided at PEIR/ES stage. Transient effects along the onshore export cable corridor, including due to temporary lighting and temporary changes in views, are not expected to influence community identity or disrupt community gatherings.
Social Participation, interaction and support	All phases	Onshore and Offshore	The MHPGC Project will not directly affect land used for community interaction (e.g. meeting places, village greens, community centres, etc.) that promote community voluntary, social, cultural or spiritual participation. This issue is therefore scoped out. Any indirect impacts on access to such spaces is addressed under the "Transport modes, access and connection" health determinant.
Climate change and adaptation	All phases	Onshore and Offshore	Embodied carbon and climate altering pollutant emissions associated with construction, O&M and decommissioning activities of the MHPGC Project are not of a scale to have the potential for population level health effects. This issue is therefore scoped out.

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Health and social care services	All phases	Onshore and Offshore	Onshore: The project workforce is expected to comprise largely existing local or regional workers and healthcare needs would be met through existing NHS provision and occupational health arrangements, therefore this determinant is scoped out of the assessment. Offshore: The majority of healthcare needs for offshore workers are expected to be met through occupational health provision and workers' usual healthcare providers during rotational leave. No significant effects on health or social care services are anticipated and therefore this determinant is scoped out of the assessment.
Built Environment	All phases	Onshore and Offshore	Onshore: This determinant is scoped out as the project would have a relatively low impact, including due to the use of trenchless techniques to avoid surface disruption at road crossings. Similarly, the position of existing services, such as water and sewer systems will be taken into account in planning the export cable corridor and techniques used. Appropriate diversions would occur to avoid disruption to such services. This issue is therefore scoped out. During O&M phase, the project's infrastructure would have a very limited long-term impact on land use patterns, with the main change relating to the converter stations. Appropriate buffer zones would be maintained between infrastructure and communities and the design is resilient to accidents and disasters. These issues are therefore scoped out. Offshore Offshore utilities disruption is unlikely, and any crossing of existing power or communications cables would be managed to avoid interruption. Appropriate waste management practices would be used, including regard to the International Convention for the Prevention of Pollution from Ships (MARPOL) regulations on waste at sea. Significant population health implications are not anticipated and are scoped out. The MHPGC Project would introduce new elements in the built environment; however, the distance offshore means there is very limited direct impacts on human receptors. Port or offshore operational activities are not considered to have waste management, land use or infrastructure use implications on a scale that could affect population health. These issues are scoped out.

Determinant scoped out of the assessment	Phase	Onshore or Offshore	Justification
Wider Societal Infrastructure and Resources	All Phases	Onshore and Offshore	The MHPGC project (given its transmission of renewable energy) provides a significant benefit to public health through contributing to energy security. However, public health benefits from improvements to wider societal infrastructure is scoped out, on the basis that this is covered in the Morven Offshore Array project. It is therefore not assessed as part of the MHPGC Project to avoid double counting.

2.6.2 Maximum design scenario

2.6.2.1 The maximum design scenario (MDS) for each impact identified in **Table 2.16** has been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. This assessment uses the residual effect of other technical chapters as the basis of the assessment. Therefore, any maximum design scenario has been considered as stated in the following technical chapters. To avoid duplication, these MDS have not been presented here:

- **Volume 2, Chapter 2: Offshore Water and Sediment Quality, of the PEIR;**
- **Volume 3, Chapter 7: Onshore Air Quality, of the PEIR;**
- **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR;**
- **Volume 3, Chapter 5: Traffic and Transport, of the PEIR;**
- **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR.**

2.6.2.2 With regards to EMF, the assessment is based on the fact that the design will be in accordance with the international exposure guideline level of below 360µT. Further information on EMF scheme is available in **Volume 1 Annex 2.1 Onshore EMF Compliance Statement, of the PEIR.**

2.7 Commitments adopted as part of the MHPGC Project

2.7.1.1 As set out in **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR** and **Volume 1, Annex 4.1: Draft Commitments Register, of the PEIR**, several measures have been adopted as part of the MHPGC Project to reduce the potential for impacts on health.

2.7.1.2 Embedded mitigation includes the following measures as identified in the ISEP (formerly IEMA) Guide to Shaping Quality Development (IEMA, 2015):

- Primary mitigation - measures included as part of the project design. ISEP (formerly IEMA) describes these as “*modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken*”. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO and marine licence, or both;
- Tertiary mitigation - ISEP describes these as “*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects*”.

2.7.1.3 Embedded mitigation measures that will form part of the final design (and are established legislative requirements/good practice, or both) have been taken into account as part of the initial assessment presented in **Section 2.8** (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures that the Applicant is committed to are considered in the assessment of effects.

2.7.1.4 Where an assessment identifies likely significant adverse effects, secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by ISEP (formerly IEMA) as “*actions that will require further activity to achieve the anticipated outcome*” and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures both pre-mitigation and residual effects are presented.

2.7.1.5 The measures relevant to health are outlined in **Table 2.18**. As there is a secured commitment to implementing these measures, they are considered inherently part of the design of the MHPGC Project and have therefore been considered in the assessment presented in **Section 2.8**.

Table 2.18: Embedded commitments relevant to Human Health implemented as part of the MHPGC Project

Commitment number	Measure adopted	How the measure will be secured
CoT02	An Onshore EMF Compliance Statement will be prepared and submitted with the application for development consent. The Applicant will design the MHPGC Project to ensure compliance with relevant EMF exposure public health protection standards, where appropriate, as specified in the International Commission on Non-ionizing Radiation Protection publication 'Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic And Electromagnetic Fields (Up To 300Ghz) (1998)' and the Department for Energy and Climate Change publication 'Power Lines: Demonstrating compliance with EMF public exposure guidelines A voluntary Code of Practice (2012).	An Onshore EMF Compliance Statement will be submitted with the application for development consent.
CoT05	An Operational Noise Management Plan, detailing methods of reducing and managing operational noise to comply with the noise limits established by the assessment, will be prepared and submitted for approval prior to the commencement of operations. It will include limits on noise from operation of the Onshore LSS associated with the MHPGC Project and an indication of the physical mitigation measures expected to be required and how compliance with these limits would be monitored.	The Operational Noise Management Plan will be secured via DCO Schedule and/or Requirement.

Commitment number	Measure adopted	How the measure will be secured
CoT06	An Outline Offshore Environmental Management Plan (OEMP) will be prepared and submitted with the application for development consent, and as part of the marine licence application(s) to the Scottish Ministers. A Detailed OEMP will be developed substantially in accordance with the Outline OEMP and submitted and approved by the MMO and MD-LOT. The Outline OEMP will include: • an Outline Marine Biosecurity Plan; • an Outline Marine Pollution Contingency Plan; • an Outline Marine Mammal Mitigation Protocol; • an Outline Vessel Traffic Management Plan; • an Outline Navigational Safety Plan; • a chemical risk assessment that includes information such as how chemicals will be used, stored, and transported, in line with recognised best-practice guidance; • a dropped-object protocol will be established to cover the reporting and recovery of any items lost overboard that could endanger other sea users; • a Marine Emergency Action Card outlining the steps to be followed in the case of a marine emergency; • - provisions for the handling and disposal of waste.	The Outline Offshore Environmental Management Plan will be secured via dML condition.
CoT10	The Outline Highways Access Management Plan will be prepared and submitted with the application for development consent. It will include details regarding temporary access points from the public highway that will be installed to facilitate vehicular access to the onshore export cable corridor, AC connection cable corridor and the Onshore Land Substation, during construction. A Detailed Highways Access Management Plan will be developed in accordance with the outline plan.	The Outline Highways Access Management Plan will be secured via DCO Schedule and/or Requirement
CoT16	An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable.	The Onshore Decommissioning Plan will be secured via DCO Schedule and/or Requirement.
CoT17	Where practicable, the siting of the temporary and permanent footprint of the MHPGC Project will avoid Flood Risk Zone 2 and 3, sensitive historic, cultural, ecological and other environmental receptors, both statutory and non-statutory, during the site selection process for the MHPGC Project.	Works Plans

Commitment number	Measure adopted	How the measure will be secured
CoT18	An Outline Code of Construction Practice (CoCP) will be prepared and submitted with the application for development consent. A Detailed CoCP will be developed in accordance with the Outline CoCP. The Outline CoCP will include (but is not limited to) measures to maintain and address: • Flood protection and control measures; • Water environment and drainage; • Noise and vibration management measures; • Air quality and dust management; • Pollution prevention and management; • Geology and ground conditions; • Soil and materials management; • Land use, tourism and recreational assets; • Waste management.	The Outline CoCP will be secured via DCO Schedule and/or Requirement.
CoT21	An Outline Dust Management Plan (DMP) will form part of the CoCP, which will be prepared and submitted as part of the application for development consent. A Detailed DMP will be developed in accordance with the Outline DMP. The measures in the Detailed DMP will accord with guidance set out by the Institute of Air Quality Management (IAQM, 2024) where appropriate and practicable, and will include measures for monitoring and reporting dust levels, and dust suppression and mitigation measures during construction.	The Outline DMP will be secured via DCO Schedule and/or Requirement
CoT23	An Outline Surface Water and Groundwater Management Plan (SWGMP) will form part of the Outline CoCP, will be submitted with the application for development consent. The Outline SWGMP will set out measures to protect surface water and groundwater during construction, covering surface water and drainage management measures, flood risk control measures, and management of foul water from construction compounds. A detailed SWGMP will be developed in accordance with the Outline SWGMP.	The Outline SWGMP will be secured via DCO Schedule and/or Requirement

Commitment number	Measure adopted	How the measure will be secured
CoT25	Construction site lighting will only operate when required and will be positioned and directed to avoid unnecessary illumination to residential properties, sensitive ecological receptors and footpath users, and minimise glare to users of adjoining public highways. Construction site lighting will be designed in accordance with latest relevant available guidance and legislation and the details of the location, height, design and luminance of lighting to be used will be covered within the Outline Construction Artificial Light Emissions Management Plan, will form part of the Outline CoCP, which will be prepared and submitted as part of the application for the development consent.	The Outline CoCP will be secured via DCO Schedule and/or Requirement.
CoT26	An Outline Construction Noise and Vibration Management Plan will form part of the Outline CoCP, which will be prepared and submitted as part of the application for development consent. It will include measures to mitigate noise from construction activities associated with the MHPGC Project. A Detailed Construction Noise and Vibration Management Plan will be developed in accordance with the Outline Construction Noise and Vibration Management Plan. Bespoke method statement(s) will be developed, where required, to ensure suitable noise limits can be met on specific sensitive noise receptors.	The Outline Construction Noise and Vibration Management Plan will be secured via DCO Schedule and/or Requirement.
CoT27	The onshore export cables and the AC connection cables will be completely buried underground for the entire length. No overhead pylons will be installed as part of the MHPGC Project.	The Design Principles will be secured via DCO Schedule and/or Requirement.
CoT33	An Outline Contaminated Land and Groundwater Discovery Strategy will form part of the Outline CoCP, which will be prepared and submitted with the application for development consent, to identify any suspected areas of contamination and any remedial measures which may be required. A Detailed Strategy will be developed in accordance with the Outline Strategy and will identify the construction protocol for discovery of any currently unknown contamination and any remedial measures that may be required.	The Outline Contaminated Land and Groundwater Discovery Strategy will be secured via DCO Schedule and/or Requirement.
CoT34	An Outline Pollution Prevention Plan (PPP) will form part of the Outline CoCP, which will be prepared and submitted with the application for development consent. A Detailed PPP will be developed in accordance with the Outline PPP. This will include details of emergency spill procedures and good practice guidance such as the Environment Agency's Pollution Prevention Guidance notes (including Pollution Prevention Guidance notes 01, 05, 08 and 21) will be followed where appropriate, or the latest relevant available applicable guidance.	The Outline PPP will be secured via DCO Schedule and/or Requirement.

Commitment number	Measure adopted	How the measure will be secured
CoT35	An Outline PRoW Management Plan will form part of the Outline CoCP, which will be prepared and submitted for development consent. A Detailed PRoW Management Plan will be developed in accordance with the Outline PRoW Management Plan. The Outline PRoW Management Plan will: • Set out the measures needed to keep PRoWs safe and usable during construction, such as clear signage, pre and post-work condition surveys; • Commit to reopening or reinstating any affected route as soon as reasonably practicable, thereby minimising the duration of closures; • Specify that, where full closure cannot be avoided, a temporary diversion or gated crossing will be provided unless demonstrably impracticable.	The Outline PRoW Management Plan will be secured via DCO Schedule and/or Requirement.
CoT37	An Outline Marine Pollution Contingency Plan (MPCP) will form part of the Outline Offshore Environmental Management Plan (OEMP), which will be prepared and submitted with the application for development consent and as part of the marine licence application(s) to the Scottish Ministers. The Outline MPCP will describe the hazards, response strategies, and step-by-step actions for handling spills, contaminant releases (including details of non-toxic, biodegradable drilling fluids), and vessel collisions during construction or operations below MHWS, and will include all essential emergency contacts and information. A Detailed MPCP will be developed substantially in accordance with the Outline MPCP.	The Outline Marine Pollution Contingency Plan will be secured via dML condition.
CoT41	An Outline Construction Traffic Management Plan (CTMP) will be prepared and submitted with the application for development consent. A Detailed CTMP will be developed in accordance with the Outline CTMP prior to construction. The Detailed CTMP will set out measures to include (but not limited to): • Managing the numbers, timing and routeing of HGVs during the construction phase; • Managing the movement of construction worker traffic during the construction phase; • Details of any traffic management measures necessary to ensure the safe passage of construction traffic via the local highway network; • Details of localised road improvements if and where these may be necessary to facilitate safe use of the existing road network.	The Outline CTMP will be secured via DCO Schedule and/or Requirement.

Commitment number	Measure adopted	How the measure will be secured
CoT44	An Offshore Decommissioning Programme will be developed and submitted to the MMO and MD-LOT prior to the commencement of any offshore construction. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable.	The Offshore Decommissioning Programme will be secured via dML condition.
CoT46	An Outline Construction Fencing Plan, will form part of the Outline CoCP, which will be prepared and submitted with the development consent application. All temporary working areas, including in relation to the Transition joint bays, onshore export cables, the preferred onshore LSS option, and the AC connection cables will be made clear through the use of signage and secured with appropriate fencing. A Detailed Construction Fencing Plan will be developed in accordance with the Outline Construction Fencing Plan.	The Outline Construction Fencing Plan will be secured via DCO Schedule and/or Requirement.
CoT60	An Outline Communications Plan will form part of the Outline CoCP, which will be prepared and submitted as part of the application for development consent. It will set out the Applicant's approach to communication with relevant and necessary parties (including local residents and businesses). A Detailed Communications Plan will be developed in accordance with the Outline Communications Plan.	The Outline Communications Plan will be secured via DCO Schedule &/or Requirement.

2.8 Assessment of impacts

2.8.1 Overview

2.8.1.1 This section includes the assessment of the impacts to Human Health arising from the construction, O&M and decommissioning phases of the MHPGC Project. A summary of the effects is presented in **Table 2.28**.

2.8.2 Construction phase

Air Quality and Dust (Onshore)

2.8.2.1 Short-term deterioration in local air quality arising from construction traffic, excavation, onshore export cable installation and AC connection cable installation, landfall activities and construction of the LSS, potentially affecting respiratory and cardiovascular health, especially among vulnerable groups.

Receptor sensitivity

2.8.2.2 The Sensitivity to air pollution varies across the population. The health effects of particulate matter (PM₁₀, PM_{2.5}), nitrogen dioxide (NO₂), and combustion-derived pollutants are well-established. World Health Organization (WHO) guidelines (WHO, 2021) and meta-analyses (Brook *et al.*, 2010; Schraufnagel *et al.*, 2019) show that elevated short-term exposure to PM and NO₂ is associated with:

- Increased respiratory symptoms and exacerbation of asthma;
- Worsening of chronic obstructive pulmonary disease (COPD);
- Increased cardiovascular hospital admissions and mortality;
- Increased systemic inflammation and oxidative stress.

2.8.2.3 Children, older adults, pregnant women, individuals with chronic heart or lung disease, and people living in deprived areas have higher vulnerability due to both biological susceptibility and cumulative environmental disadvantage (PHE, 2018). Deprived communities within the Human Health Study Area already experience higher rates of respiratory and cardiovascular disease than national averages, indicating reduced health resilience (see **Table 2.8**).

2.8.2.4 Construction-phase emissions are expected to be short term and intermittent, but potential exposure pathways exist for residents living closest to:

- Landfall works;
- Onshore export cable and AC connection cable corridor;
- LSS construction area;
- Construction traffic routes.

2.8.2.5 Given the presence of vulnerable groups and existing inequalities, the sensitivity of receptors is heightened across the vulnerable and general populations. Therefore, it is considered that the receptor sensitivity is considered to be high for vulnerable groups and medium for the general population.

Magnitude of impact

2.8.2.6 Construction activities (excavation, trenching, soil handling, HGV movements, plant operation and substation construction) are likely to generate temporary increases in dust and combustion emissions. Key pathways include:

- Short-term PM₁₀/PM_{2.5} increases during trenching and reinstatement;
- short-term NO_x emissions from plant and construction vehicles;
- localised dust deposition on properties and amenity areas, particularly under dry and windy conditions.

2.8.2.7 With regards to construction dust, **Volume 3, Chapter 7: Onshore Air Quality, of the PEIR** states that receptors most likely to be affected by dust are located to the northeast of the MHPGC Project PEIR Red Line Boundary: Onshore as the prevailing wind direction is from the southwest. With mitigation

in place in a Dust Management Plan (see measure CoT21), effects in **Volume 3, Chapter 7: Onshore Air Quality, of the PEIR** are reported as not significant.

- 2.8.2.8 As reported in **Volume 3, Chapter 7: Onshore Air Quality, of the PEIR** increases in construction traffic, particularly HGV movements, are predicted on a limited number of road links, including the access road between the A182 and Jade Business Park. The nearest residential properties, including those along Barwick Street, Forster Avenue, Hawkins Road and Oliver Street, are located approximately 100m from the affected road link. However, pollutant concentrations are expected to remain below relevant air quality assessment levels and effects are anticipated to be not significant.
- 2.8.2.9 Implementation of a Dust Management Plan (see CoT21) is expected to limit adverse significant effects. Given the temporary duration, intermittent nature, geographical extent and the presence of embedded mitigation, the magnitude of impact is considered to be low.

Significance of effect

- 2.8.2.10 Using the significance matrix, a High sensitivity population experiencing a low magnitude impact typically results in a minor to moderate effect. Applying professional judgement:
- Effects will be temporary, intermittent and controlled through embedded mitigation;
 - Vulnerable groups in localised areas may experience short episodes of worsened symptoms, particularly if they suffer from existing respiratory conditions, however this is not anticipated at population-level scale.
- 2.8.2.11 Overall, it is considered that the receptor sensitivity is High for vulnerable groups and medium for the general population and the magnitude of construction dust is low. Therefore, the effect of air quality and dust, during the construction phase, is considered to be **minor adverse (not significant)** for the general population, and **minor adverse (not significant)** for vulnerable populations. While vulnerable individuals may experience a temporary adverse effect, the scale, duration and nature of the change are insufficient to elevate the effect to moderate significance in EIA terms.

Additional mitigation and residual effect

- 2.8.2.12 No additional mitigation is required, therefore, the residual effect of air quality and dust during the construction phase, is considered to remain as **minor adverse (not significant)** for vulnerable groups and the general population.

Noise and Vibration (Onshore)

- 2.8.2.13 Temporary increases in noise and vibration arising from construction activities, including construction compounds, trenchless crossings, open-cut trenching, LSS construction and associated construction traffic, potentially affecting residential amenity, well-being, sleep and quality of life, particularly for nearby sensitive receptors and vulnerable groups.

Receptor sensitivity

- 2.8.2.14 The sensitivity to noise and vibration varies across the population. Human sensitivity to environmental noise is well established. Sustained or repeated exposure to elevated noise levels is associated with annoyance, sleep disturbance, cognitive impairment, cardiovascular effects and adverse mental health outcomes (Basner *et al.*, 2014; World Health Organisation (WHO), 2018).
- 2.8.2.15 Children, older adults, pregnant women, individuals with existing cardiovascular disease, people with sleep disorders, and residents in deprived communities are more vulnerable to noise-related health effects due to heightened susceptibility and reduced adaptive capacity. Deprived communities within the Human Health Study Area already experience higher rates of respiratory and cardiovascular disease than national averages, indicating reduced health resilience.
- 2.8.2.16 Construction-phase noise and vibration are expected to be short term and intermittent, but potential exposure pathways exist for residents living closest to:
- Haul road and access construction;
 - Erection of construction compound(s);
 - Operation of construction compound(s);
 - Trenchless cable installation (which may include Horizontal Directional Drilling (HDD));

- Open cut trenching cable installation;
- LSS construction.

2.8.2.17 Given the presence of vulnerable groups and existing inequalities, the sensitivity of receptors is heightened across the vulnerable and general populations. Therefore, it is considered that the receptor sensitivity is considered to be high for vulnerable groups and medium for the general population.

Magnitude of impact

- 2.8.2.18 Construction activities (vibratory compaction, vibratory piling, HGV movements, excavation, LSS construction, haul road construction, erection and operation of construction compound(s), alongside open-cut trenching cable installation) will generate temporary increases in onshore noise and vibration effects. The magnitude of construction related activity noise impacts has been assessed based on the difference between the predicted construction noise level and appropriate threshold values the LOAEL and SOAEL of DMRB LA 111 (National Highways, 2020).
- 2.8.2.19 With regards to construction noise, **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR** identifies that receptors within and adjacent to the Landfall, onshore export cable corridor and LSS Option Areas, particularly residential receptors within 300m of the works are the receptors most likely to be affected. These include R04 Hillcroft Residential, Kinley Hill Tower, Hawthorn Dene, Hesledon Moor, Cold Helsledon, South Hetton and individual farmland receptors. The assessment identifies a medium to high magnitude of impact for a number of residential receptors associated with the Landfall and onshore export cable corridor. In contrast, receptors associated with the LSS Option Areas are predicted to experience a negligible to low magnitude of impact. With mitigation in place in a CoCP and Construction Noise Management Plan, (see measures CoT18 and CoT26), effects are predicted to reduce to minor adverse or negligible and therefore not significant.
- 2.8.2.20 As reported in **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR**, construction activities with the potential to generate vibration include vibratory compaction, HGV movements and excavation works. Residential receptors within 100m of the Landfall and Onshore export cable and AC connection cable corridor are identified as the receptors most likely to be affected. A low magnitude of impact of predicted at Hillcroft Residential (R04) within the Landfall, while low to medium vibration impacts are predicted at a number of receptors along the onshore export cable corridor, including Kinley Hill Farm, Hawthorn Dene, Little Coop House Farm and South Hetton. No residential receptors are located within 100m of the LSS Option Areas and therefore no significant vibration effects are anticipated. Overall, according to **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR** the magnitude of impact is considered to range from medium to high, with significant effects identified at isolated receptors; however, the resulting vibration effects are reported as not significant in EIA terms.
- 2.8.2.21 For construction road traffic noise, **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR** highlights that the introduction of additional vehicles onto the local highway network has the potential to change road traffic noise levels at noise sensitive receptors located along or within close proximity to these receptors. The access roads to the Jade Business Park experience the highest noise level changes which, during peak construction, range between +2.2dB and +3.7dB. However, there are no residential properties within 50m of the access road. With embedded mitigation in place through the CoCP (CoT18) and associated management plans, including delivery timing and routing controls where required, (for example in a Construction Traffic Management Plan, see measure CoT41) effects reported in **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR** are anticipated to be not significant in EIA terms.
- 2.8.2.22 From a Human Health perspective, these effects are not considered significant; consistent with the methodology set out in **Section 2.5.3**, the impacts are of low magnitude, as only a small minority of the population are affected and the effects are temporary in nature. Furthermore, the affected receptors are geographically limited and the impacts are expected to be reversible following completion of the construction works, reducing the potential for significant adverse Human Health effects at population level.

- 2.8.2.23 Embedded mitigation is expected to limit adverse significant effects. Given the temporary duration, intermittent nature, geographical extent and the presence of embedded mitigation, the magnitude of impact for human health receptors is considered to be low.

Significance of effect

- 2.8.2.24 Taking into account the low magnitude of impact, characterised by short duration, reversibility and limited geographic extent, alongside the presence of high and medium sensitivity receptors, the assessment concludes that the overall effect remains **minor adverse (not significant)** for both vulnerable groups and the general population. While vulnerable individuals may experience a temporary adverse effect, the scale, duration and nature of the change are insufficient to elevate the effect to a moderate adverse and therefore significant effect.

Additional mitigation and residual effect

- 2.8.2.25 No additional mitigation is currently proposed beyond the embedded mitigation measures identified within the CoCP (CoT18) and associated management plans including the CNMP (CoT26). Therefore, the residual effect of construction noise and vibration is considered to remain **minor adverse (not significant)** for the general population and **minor adverse (not significant)** for vulnerable groups.

Open Space, Leisure and Play

Receptor sensitivity

- 2.8.2.26 Receptor sensitivity in relation to open space, leisure and play is influenced by both the degree of reliance on local recreational resources and the underlying health resilience of the population. **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR** identifies a network of recreational assets within the Study Area, including PRoW and coastal access land associated with the King Charles III England Coast Path, which extend beyond the immediate land-take required for construction but may nevertheless be affected by temporary access restrictions or diversions. Recreational activity can also take place off of the local beaches, including fishing and walking.
- 2.8.2.27 The Human Health baseline presented in **Section 2.4** indicates that parts of the Study Area, including Dawdon, Easington, Murton, Shotton and South Hetton and Deneside are characterised by higher-than-average levels of poor or fair self-reported health, higher prevalence of long-term illness and disability, and indicators of socio-economic deprivation. These characteristics are relevant in health terms because they suggest reduced adaptive capacity and a greater dependence on local, low-cost recreational opportunities to support physical activity and mental wellbeing.
- 2.8.2.28 Certain population groups are therefore considered more sensitive to temporary disruption of recreational access. Older people, disabled users, pregnant women and those with long-term health conditions may be less able to accommodate longer or more complex diversions, while children and carers may be more reliant on familiar, proximate spaces for informal recreation. For these vulnerable groups, sensitivity to changes in access to open space and recreational routes is assessed as high. For the wider population, who may have a greater ability to substitute recreational locations or adjust travel patterns, sensitivity is assessed as medium.

Magnitude of impact

- 2.8.2.29 Construction activities (excavation, trenching, soil handling, HGV movements, plant operation and substation construction) will generate some changes in amenity (as a result of increased noise and changes to visual amenity).
- 2.8.2.30 **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR** concludes that impacts on open space and recreational assets associated with the MHPGC Project are temporary and reversible, and no permanent severance or loss of recreational land or PRoW is proposed, and all land affected by construction activities will be reinstated following completion of works.
- 2.8.2.31 Where temporary diversions of PRoW or promoted recreational routes are required, particularly where open trench construction methods or an increase in construction traffic occurs, these will be managed through established access management measures, including the provision of alternative routes where practicable, clear signage, and communication with users. An Outline PRoW Management Plan (see CoT35) will be implemented to ensure that temporary diversions or gated

crossings will be provided where a closure cannot be avoided. As reported in **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR** these are anticipated to range from negligible to minor.

- 2.8.2.32 There may be some changes in amenity at locations such as the King Charles III Coast Path and the NCN Route 1, along the Durham Coastline and on footpaths near Nose's Point. There may be some temporary diversions of certain PRoW, an increase in construction traffic which may alter feelings of safety, alongside changes in visual amenity due to construction activity near these routes. Those vulnerable populations, such as those with mobility issues may use the accessible local footpaths and nearby car parks.
- 2.8.2.33 Access to the beach areas within the MHGCP PEIR Red Line Boundary is anticipated to be maintained, with no exclusion zones for those using the beaches for swimming or fishing. Changes to water quality as a result of offshore activities associated with cable installation at the landfall location are anticipated to be minor adverse (not significant), as reported in **Volume 2, Chapter 2: Offshore Water and Sediment Quality, of the PEIR**. Pollution prevention and management will be addressed through the Outline Offshore Environmental Management Plan (CoT06) and accompanying Outline Marine Pollution Contingency Plan (CoT37). As such, those who undertake recreational activities at the shoreline are unlikely to experience any wellbeing or health effects as a result of the works.
- 2.8.2.34 From a health perspective, the potential effects associated with these temporary changes relate primarily to short-term inconvenience or reduced use of specific recreational assets, which may in turn lead to a temporary reduction in physical activity for some users or minor effects on mental wellbeing, such as frustration or a reduced restorative experience. There may also be changes to amenity which may reduce enjoyment of these assets and reduce wellbeing benefits. These effects are expected to be localised and short-lived, reflecting the linear and transient nature of construction works and the availability of alternative recreational opportunities within the wider area. Changes to amenity such as increased noise and dust could also reduce the enjoyment of these outdoor spaces, therefore reducing the wellbeing benefit users may receive.
- 2.8.2.35 The effects on open space, leisure and play arise solely from temporary and localised disruption during the construction and decommissioning phases. Access restrictions or diversions are anticipated to be limited in duration, and a PRoW Management Plan will include measures to reopen or reinstate affected routes as soon as practicable (see measure CoT35).
- 2.8.2.36 From a health perspective, the likely consequences of these temporary changes are confined to short-term inconvenience or reduced use of specific recreational assets, with potential for minor, transient effects on physical activity levels or mental wellbeing (for example, frustration or reduced restorative benefit) among a small number of users. These effects do not represent a sustained change in behaviour, do not affect the population as a whole, and do not give rise to long-term or irreversible health outcomes.
- 2.8.2.37 Taking into account the temporary duration of effects, the absence of permanent loss, the availability of alternative routes and spaces, and the embedded mitigation to manage access and reinstate land, the magnitude of impact on health and wellbeing arising from changes to open space, leisure and play is assessed as low.

Significance of effect

- 2.8.2.38 In accordance with the significance criteria applied in this chapter, whereby sensitivity is classed as medium to high and magnitude of impact is classified as low, a **minor adverse (not significant)** effect is anticipated for both vulnerable groups and the general population. While vulnerable individuals may experience a temporary adverse effect, the scale, duration and nature of the change are insufficient to elevate the effect to Moderate significance in EIA terms. This conclusion reflects the absence of any long-term degradation of health determinants, the availability of alternative recreational opportunities, and the effectiveness of embedded mitigation in avoiding lasting adverse effects on physical activity or mental wellbeing.

Additional mitigation and residual effect

- 2.8.2.39 No additional mitigation measures are required, therefore the residual effect on human health and wellbeing is therefore assessed as **minor adverse (not significant)** for both the general population and vulnerable groups.

Water quality (Onshore)

- 2.8.2.40 Construction activities have the potential to affect water quality through temporary disturbance of sediments and the accidental release of pollutants. Changes in water quality could, in turn, affect human health through contact with surface waters.

Receptor sensitivity

- 2.8.2.41 Human receptors potentially affected by construction-phase changes in water quality include those whose water supply may come from underground aquifers, recreational water users and wider members of the public whose health and wellbeing may be influenced by perceived or actual deterioration in surface water conditions.
- 2.8.2.42 Sensitivity is elevated where receptors include frequent recreational users, vulnerable populations such as children, or areas where public perception of water quality may influence wellbeing or recreational behaviour. Aquifer types that are used for abstractions in the Geology, Hydrogeology and Ground Conditions Study Area include Secondary A and Secondary Undifferentiated, both supporting small or localised abstractions, and Principal Aquifers, which have significant water storage and can support larger abstractions. Across the MHPGC Project PEIR Red Line Boundary: Onshore, the groundwater vulnerability (the vulnerability of groundwater to a pollutant discharged at ground level based on hydrological, geological, hydrogeological and soil properties) varies, with High vulnerability is recorded within the MHPGC PEIR Red Line Boundary adjacent to the A19 and in the northeast corner of the Blue LSS Option Area (associated with Source Protection Zone 1). There are also four licenced abstraction points, three of which are operated by Northumbrian Water and are used for potable water supply.
- 2.8.2.43 Pathways for effects to groundwater include:
- The release of contaminants due to accidental spills of chemicals, fuel or oils;
 - Release of contaminants from wastes or other temporarily stored materials by runoff or windblown dust;
 - Changes to the level of risk to contaminated land receptors where the MHPGC Project interacts with existing land contamination.
- 2.8.2.44 There are no Environment Agency- managed main rivers located within the MHPGC PEIR Red Line Boundary: Onshore, however, there are a number of ordinary watercourses, including Dalton Beck, Hawthorn Burn and Coldwell Burn. There are a number of Sites of Special Scientific Interest (SSSI) which have the potential to interact with waterbodies. Overall, these waterbodies contribute to the setting of nearby natural open spaces and may link to the enjoyment of those using outdoor spaces for recreation.
- 2.8.2.45 The baseline data collected demonstrates that there are comparatively elevated levels of health vulnerability within the Study Area, including higher prevalence of long-term health conditions, disability and socio-economic deprivation relative to national averages. Such characteristics may reduce resilience to environmental stressors and increase sensitivity to perceived or actual environmental risk. Therefore, it is considered that the receptor sensitivity is considered to be high for vulnerable groups and medium for the general population.

Magnitude of impact

- 2.8.2.46 **Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR** assesses the effects of construction activities on surface water quality. Changes to water quality as a result of sediment mobilisation and potential contaminant pathways are anticipated to be localised, short term and controlled through embedded mitigation measures such as an Outline SWGMP (see measure CoT23). Effects as a result of changes to water quality are anticipated to be minor adverse for surface water receptors including Hawthorn Burn.
- 2.8.2.47 **Volume 3, Chapter 1 Geology, Hydrogeology and Ground Conditions, of the PEIR** assesses the effects of construction activities on groundwater quality. Mitigation measures such as the

implementation of an Outline SWGMP (see measure CoT23), as well as the lack of interaction between the construction works and the Principal Aquifer means that **Volume 3, Chapter 1 Geology, Hydrogeology and Ground Conditions, of the PEIR** assesses effects on groundwater quality as minor adverse (not significant) for human health receptors.

- 2.8.2.48 Given the temporary duration of activities and implementation of mitigation measures, the magnitude of impact on water quality relevant to human health receptors is assessed as low.

Significance of effect

- 2.8.2.49 Considering the sensitivity of human health vulnerable receptors is high and sensitivity of human health general population is medium, alongside a magnitude of impact of low, the overall significance of effect on human health arising from construction-related water quality impacts is assessed as **minor adverse (not significant)** for both the general population and vulnerable groups. The effect on vulnerable groups is not considered to be moderate as the effects would be short term, and would be managed best practice guidance to ensure minimal exposure.

Additional mitigation and residual effect

- 2.8.2.50 No additional mitigation is required, therefore residual effects remain **minor adverse and not significant**.

Land Quality (Onshore)

Receptor sensitivity

- 2.8.2.51 Potential effects on human health associated with land quality arise where construction activities interact with soils, groundwater or made ground and create pathways for exposure to contaminants. As described in **Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR**, the onshore export cable and AC connection cable corridor and land substation area comprise geological and anthropogenic deposits typical of the region, including areas where historic land uses may have resulted in localised contamination such as mining and other industrial uses.
- 2.8.2.52 The sensitivity of receptors is informed by both the potential for exposure and the baseline health profile of the local population. **Section 2.4.4** of this chapter identifies that parts of the Human Health Study Area demonstrate comparatively elevated levels of health vulnerability, including higher prevalence of long-term health conditions, disability and socio-economic deprivation relative to national averages. Such characteristics may reduce resilience to environmental stressors and increase sensitivity to perceived or actual environmental risk.
- 2.8.2.53 Potential receptors include residents located adjacent to the onshore export cable and AC connection cable corridor and land substation site, as well as users of nearby public routes during construction. While members of the public are not expected to enter active construction areas due to site controls, sensitivity remains relevant where indirect exposure pathways could occur. Taking these factors into account, receptor sensitivity is assessed as high for vulnerable groups and medium for the general population.

Magnitude of impact

- 2.8.2.54 Construction of the onshore cable route and land substation will involve excavation, trenching, soil handling and reinstatement works, which have the potential to disturb soils and, where contamination is present, temporarily alter exposure pathways. **Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR** assesses the likelihood of encountering contamination and identifies embedded mitigation measures designed to prevent uncontrolled release or exposure. These include site-specific contaminated land risk assessment, implementation of discovery strategies for unexpected contamination, adherence to pollution prevention measures, and management of excavated materials in accordance with regulatory guidance (CoT33).
- 2.8.2.55 Any potentially unacceptable existing land contamination risks would be mitigated through measures in the Outline Contaminated Land and Groundwater Discovery Strategy (CoT33). **Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR** concludes that, with embedded mitigation applied, risks associated with contamination and ground disturbance can be effectively controlled and that significant adverse effects relating to contamination pathways are not anticipated. From a human health perspective, this indicates that potential exposure would be limited

in duration, spatially localised and unlikely to result in sustained or widespread changes to environmental quality. Consequently, the potential for meaningful exposure of nearby human health receptors is limited, as is assessed as minor adverse (not significant).

- 2.8.2.56 Taking account of the temporary nature of works, the effectiveness of embedded mitigation described in **Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR**, and the limited spatial extent of potential disturbance, the magnitude of impact on human health is assessed as low.

Significance of effect

- 2.8.2.57 The significance of effect is determined through consideration of receptor sensitivity and magnitude in accordance with the methodology set out in **Section 2.5**. High sensitivity combined with Low magnitude would typically result in a Minor to Moderate effect, whereas Medium sensitivity combined with Low magnitude results in a Minor effect. In applying professional judgement, it is important to distinguish between theoretical exposure pathways and realistic health outcomes.
- 2.8.2.58 Although baseline population vulnerability within parts of the Study Area is relatively elevated, the Ground Conditions assessment demonstrates that potential contamination risks would be controlled through established regulatory frameworks and project-specific mitigation. Exposure pathways are temporary, indirect and subject to multiple layers of management. The construction phase does not introduce new long-term contamination sources, nor does it result in permanent degradation of soil quality affecting public receptors.
- 2.8.2.59 Overall, while short-term disturbance of ground conditions may occur, the scale and duration of potential effects are insufficient to result in measurable population-level health outcomes or sustained changes in environmental determinants of health. The overall effect on human health associated with land quality during construction is therefore assessed as **Minor adverse (not significant)** for both vulnerable groups and the general population.

Additional mitigation and residual effect

- 2.8.2.60 No additional secondary mitigation specific to human health is required beyond those already secured through project commitments. Therefore, the residual effect remains **Minor adverse (not significant)** for both vulnerable groups and the general population.

Transport Modes, Access and Connections (Onshore)

Receptor sensitivity

- 2.8.2.61 Receptor sensitivity in relation to transport modes, access and connections is influenced by the importance of transport maintaining health and wellbeing outcomes, alongside social connectedness and the ability of affected populations to adapt to changes in accessibility. Sensitivity may be increased where populations are vulnerable or deprived. For example, older people, people with disabilities and economically disadvantaged communities. Transport is a key mechanism in reducing social isolation and increasing connectivity, and poor transport links could therefore constrain people from accessing the services they need (Department for Transport, 2019). It has been shown that shorter travel times improve wellbeing, while commutes lasting between 60 and 90 minutes have the biggest negative impact on wellbeing (Office for National Statistics, 2014).
- 2.8.2.62 Construction-phase impacts are expected to be short term and intermittent, but relate to:
- Severance of Communities;
 - Non-Motorised User (NMU) Delay;
 - Driver Delay;
 - Non-Motorised User Amenity;
 - Fear and Intimidation on and by Road Users;
 - Road User and Pedestrian Safety.
- 2.8.2.63 Given the presence of vulnerable groups and existing inequalities, the sensitivity of receptors is heightened. Those belonging to vulnerable groups may be more sensitive to changes in their routes

and delays in access. Therefore, it is considered that the receptor sensitivity is considered to be high for vulnerable groups and medium for the general population.

Magnitude of impact

- 2.8.2.64 Construction activities are expected to influence traffic flow, pedestrian and cyclist severance, levels of fear and intimidation, alongside traffic composition and access routes.
- 2.8.2.65 As noted in **Volume 3, Chapter 5: Traffic and Transport, of the PEIR**, increases in construction traffic are predicted on a limited number of highway links, principally those associated with access to Jade Business Park. The largest changes in traffic flows are anticipated on the access road between the A182 and Jade Business Park, where relatively low existing traffic volumes result in percentage increases exceeding 100% during peak construction periods.
- 2.8.2.66 As concluded in **Volume 3, Chapter 5: Traffic and Transport, of the PEIR** for severance and non-motorised user delay, a high magnitude of impact is identified on the Access Road to the Jade Business Park, Jade Access Road 1 and Footpath 28 due to increases in construction traffic on these routes. The magnitude of impact for Jade Access Road 2, Bridleway 29 and National Cycle Route 1 are assessed as low to medium, whilst all the remaining assessed links are associated with a negligible magnitude of impact.
- 2.8.2.67 Given that impacts would be temporary, localised, short-term and reversible, and taking account of embedded mitigation secured through the Outline CTMP (CoT41) and Outline PRoW Management Plan (CoT35), the overall magnitude of impact on health determinants associated with traffic and transport is considered to be low.

Significance of effect

- 2.8.2.68 Using the significance matrix, a high sensitivity population experiencing a low magnitude impact would result in a minor adverse effect. Similarly, a medium sensitivity population experiencing a low magnitude impact would typically result in a minor adverse effect.
- 2.8.2.69 Therefore, the effect is considered to be **minor adverse (not significant)** for both the general population and vulnerable groups. While some individuals may experience temporary reductions in ease of access or connectivity during construction, the scale, duration and geographical extent of the impact are insufficient to elevate the effect to moderate significance in EIA terms.

Additional mitigation and residual effect

- 2.8.2.70 No additional mitigation is required beyond what is set out within the Outline CTMP and the Outline PRoW Management Plan. Therefore, it is considered to remain as **minor adverse (not significant)** for vulnerable groups and the general population.

Socio-economics, Employment and Income

- 2.8.2.71 This section assesses the potential effects of improved access to employment opportunities, and higher levels of income, on local and regional populations during the construction phase of the MHPGC Project. The assessment focuses on socio-economic health determinants, highlighting the potentially beneficial impacts of improved income levels through employment, on wellbeing and mental health.
- 2.8.2.72 The socio-economic, employment and income effects of the MHPGC Project are set out in **Volume 4, Chapter 3: Socio-economics, of the PEIR** and **Volume 4, Annex 3.1: Economic Impact Technical Report, of the PEIR**, which presents the economic impact that the MHPGC Project is expected to make in Durham County Council and Sunderland City Council, as well as the Scottish, English and UK economies. The assessment considers the Economic Impact Technical Report, alongside elements of the Human Health baseline.

Receptor sensitivity

- 2.8.2.73 Receptor sensitivity has been informed by local income levels, unemployment rates and the scale of construction-related employment and economic benefit expected to be generated by the MHPGC. As outlined in **Section 2.4**, average gross weekly income in Sunderland and County Durham, where some of the jobs generated by the MHPGC Project are expected to be taken up, is £557.6 and £576.9 respectively. This compares to weekly incomes of £656 in the North East, and £768.7 in England. As such, lower weekly income levels in Sunderland and County Durham, where the relative Human

Health Study Areas lie, will likely render populations somewhat sensitive to new income from employment opportunities generated by the MHPGC Project.

- 2.8.2.74 Further to this, unemployment levels in Sunderland and County Durham are most recently reported at 5.1% and 4.1% respectively. In comparison to the regional unemployment in the North East of 4.8%, and national levels of 4.2%, workers in Sunderland particularly, may be more sensitive to improved levels of income as a result of employment opportunities generated by the MHPGC Project. Overall, it is considered that there are medium levels of deprivation, associated with income and employment opportunities, for the general population in the Study Area being considered for Human Health and high levels of deprivation for vulnerable populations (low income individuals and those who are socio-economically vulnerable).
- 2.8.2.75 Therefore, it is considered that the receptor sensitivity is considered to be medium for the general population and high for vulnerable groups.

Magnitude of impact

- 2.8.2.76 **Volume 4, Chapter 3: Socio-economics, of the PEIR** describes the overall magnitude of economic effects arising from the MHPGC Project. During the construction phase, the socio-economics assessment identifies a low magnitude beneficial impact within the Socio-economics Local Study Area. The assessment concludes that, although several tourism and recreation assets may experience temporary noise, vibration or access-related effects, these are not expected to result in material changes in visitor activity for most receptors. Overall, effects on the tourism economy are assessed as negligible to minor for the majority of tourism and recreation assets, with no significant effects identified. Temporary construction-related restrictions on fishing activity would lead to only very small reductions in fisheries income and employment, with impacts on commercial fisheries at Blyth Port and North Shields Port assessed as negligible in magnitude.
- 2.8.2.77 There are a total of approximately 118,400 people in Sunderland in employment and 240,000 in employment across County Durham, meaning a combined 486,000 people in employment across Sunderland and County Durham (ONS, 2026).
- 2.8.2.78 Considering construction more closely, the construction industry across Sunderland and County Durham has a total GVA of £1.6bn, and employs approximately 18,000 people.
- 2.8.2.79 Peak construction employment is estimated at approximately 80 jobs as a result of the MHPGC Project across County Durham and Sunderland. This would incur a limited impact with respect to new employment and income, during the construction of the MHPGC Project.
- 2.8.2.80 Therefore, it is considered that the magnitude of socio-economic, employment and income effects for the Human Health during the construction phase is considered to be low.

Significance of effect

- 2.8.2.81 Applying the significance matrix, a low magnitude of impact combined with a high sensitivity (for vulnerable groups) and medium sensitivity (for the general population) results in a **minor beneficial (not significant)** effect.

Additional mitigation and residual effect

- 2.8.2.82 No additional mitigation measures are proposed in relation to employment and income effects during the construction phase. As such, the significance of effect remains unchanged as **minor beneficial (not significant)**.

2.8.3 O&M phase

Noise and Vibration (Onshore)

Receptor sensitivity

- 2.8.3.1 During the operational and maintenance phase, potential effects on human health may arise from noise generated by the LSS. Changes in noise levels have the potential to affect residential amenity, well-being, sleep and quality of life, particularly for nearby sensitive receptors and vulnerable groups.
- 2.8.3.2 Residential receptors located within the operational noise study area have been identified as having the potential to experience operational noise effects. Vulnerable groups, including older individuals,

children and those with underlying existing health effects, are more susceptible to adverse effects associated with changes in noise levels. Therefore, vulnerable groups are considered to have high sensitivity, whilst the general population is considered to have medium sensitivity.

Magnitude of impact

- 2.8.3.3 **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR**, identifies residential noise sensitive receptors within 600m of the LSS Option Areas and may have the potential to experience noise effects during the operation and maintenance of the LSS. At this stage, the final LSS location, detailed operational plant layout and equipment specification has not been confirmed; however, a preliminary operational noise assessment has been undertaken based on a reasonable worst-case plant strategy and representative background sound levels.
- 2.8.3.4 As reported in **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR**, operational noise associated with the LSS has the potential to exceed background sound levels at the nearest residential receptors, including Cold Hesledon Residential to the north of the Blue LSS Option area, Hesledon Moor Residential and East Batter Law Farm to the south of the Blue LSS Option area, alongside South Hetton (Windermere Road) to the south of the Green LSS Option area. The effects are assessed in **Volume 3, Chapter 6: Onshore Noise and Vibration, of the PEIR** as significant in EIA terms.
- 2.8.3.5 Operational noise mitigation will be incorporated into the design of the LSS, including the selection of low-noise plant, the positioning of equipment away from sensitive receptors, the use of sound-insulated buildings and acoustic barriers or enclosures, where required. These measures will be secured through the Operational Noise Management Plan (CoT05). Taking this into account, the magnitude of impact is anticipated to be low due to the low exposure and small proportion of the population affected.

Significance of effect

- 2.8.3.6 With vulnerable groups having a sensitivity of high and the general population having a sensitivity of medium, and the overall magnitude of change being low, it is anticipated that the resulting effect will be **minor adverse (not significant)** for both the general population and vulnerable groups. It is not anticipated to be a moderate effect for vulnerable groups due to the limited geographic nature of exposure.

Additional mitigation and residual effect

- 2.8.3.7 No additional mitigation is required. Therefore, the residual effect on human health during the operational phase is assessed as **minor adverse (not significant)** for vulnerable groups and the general population.

Open space, leisure and play (Onshore)

Receptor sensitivity

- 2.8.3.8 During the operational and maintenance phase, potential effects on human health associated with open space, leisure and play arise through changes to the ability to access and use recreational environments, and through any long-term qualitative changes in how those environments are experienced. Access to open space and recreational routes is a recognised determinant of both physical health, through enabling routine physical activity, and mental wellbeing, through opportunities for restoration, stress reduction and social interaction. These pathways are particularly relevant for populations with reduced mobility or limited access to alternative recreational resources.
- 2.8.3.9 Baseline evidence presented in **Section 2.4** of this chapter demonstrates that parts of the Human Health Study Area exhibit reduced health resilience, including higher proportions of residents reporting fair or poor health, elevated levels of long-term illness and disability, and indicators of socio-economic deprivation. These characteristics are relevant in determining sensitivity because they indicate a greater reliance on local, low-cost and easily accessible open space and recreational routes to support everyday physical activity and wellbeing. Older people, disabled residents, individuals with long-term health conditions, and carers are therefore more likely to be affected by changes in route convenience, accessibility or perceived usability.

- 2.8.3.10 On this basis, and consistent with the sensitivity criteria set out in **Table 2.12**, receptors within these vulnerable groups are assessed as having high sensitivity to changes in access to open space, leisure and play during operation. The wider population, while still benefiting from recreational assets, is generally more able to adapt through substitution of routes or spaces and is therefore assessed as having medium sensitivity.

Magnitude of impact

- 2.8.3.11 **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR** concludes that, following reinstatement of the land used for installing the cables the MHPGC Project does not result in the permanent loss of open space, PRoW or recreational land, nor does it cause permanent severance of the recreational network.
- 2.8.3.12 Recreational routes in the vicinity of Viewpoints 6 (Croup Hill), 9 (PRoW at Little Coop House Farm) and 14 (PRoW near South Farm) have been identified as experiencing moderate adverse visual effects as a result of views of the permanent LSS infrastructure. However, for all other viewpoints, effects range from neutral to minor adverse. Recreational assets associated with the Durham Heritage Coast, including Blast Beach, Ginny's Dene and Chourdon Point, are located in proximity to Viewpoint 2, which is anticipated to experience neutral effects during the O&M phase.
- 2.8.3.13 Operational activities associated with the onshore components are expected to be limited in frequency and duration, comprising periodic inspection and maintenance of buried cables and the land substation. As set out in **Volume 3, Chapter 8: Land Use, Tourism and Recreation, of the PEIR**, such activities do not require sustained closures of recreational assets. Importantly, the operational layout of the MHPGC Project (including the LSS Options) is designed so that public access is maintained.
- 2.8.3.14 Taking into account the limited spatial extent of operational infrastructure, the absence of permanent loss or severance of recreational assets, and the infrequent nature of maintenance activities, the magnitude of impact on health during the operation and maintenance phase is assessed as negligible.

Significance of effect

- 2.8.3.15 In combining receptor sensitivity and magnitude, the assessment applies the significance framework set out in **Table 2.14** and professional judgement. For vulnerable groups, a high sensitivity combined with a low magnitude of change has the potential to give rise to a minor or moderate effect, while for the wider population, medium sensitivity combined with low magnitude results in a minor effect.
- 2.8.3.16 Although vulnerable receptors may experience some sensitivity to localised changes, the scale and nature of the operational effects are insufficient to result in a sustained or population-level change in physical activity or wellbeing. Accordingly, the effect of the MHPGC Project on human health in relation to open space, leisure and play during the operation and maintenance phase is assessed as **negligible (not significant)** for the general population and vulnerable groups. A negligible adverse effect is not anticipated as access to open space and PROWs is expected to be maintained and therefore there are minimal effects on health outcomes.

Additional mitigation and residual effect

- 2.8.3.17 No additional mitigation is required. Therefore, the residual effect on human health during the operational phase is assessed as **negligible (not significant)** for the general population and vulnerable groups.

Perceptions of risk from Electromagnetic fields (Onshore)

Receptor sensitivity

- 2.8.3.18 Sensitivity for perceived EMF risk is driven less by toxicological susceptibility (because this is a *perception* pathway) and more by baseline health resilience, socio-economic context, and the capacity to absorb or resolve uncertainty and lack of understanding of EMFs.
- 2.8.3.19 The Human Health Study Areas include geographies with higher proportions of residents reporting bad health compared with the England average, higher rates of disability under the Equality Act compared with England; and indicators consistent with elevated deprivation and poorer health

outcomes (e.g. higher emergency admissions, higher referrals to secondary mental health services and higher prevalence of depression).

2.8.3.20 This baseline profile suggests reduced health resilience and potentially a higher likelihood that uncertainty-related stressors (including concerns about invisible hazards such as EMF) could contribute to adverse wellbeing outcomes for a subset of receptors.

2.8.3.21 Risk perception evidence specific to EMF and powerlines shows that perceived risk can be shaped by:

- Dread or “invisible” hazard characteristics, uncertainty and scientific disagreement in public discourse;
- Trust in the proponent or regulator and whether communication is transparent;
- Proximity of the infrastructure (e.g. visibility is often relevant for substations; for buried cables, salience is typically lower but may increase where there is local attention during construction and at energisation).

2.8.3.22 Given the above, the sensitivity conclusion for *perceived EMF risk* is high for vulnerable groups due to reduced baseline resilience and higher potential susceptibility to stress/anxiety impacts. For the general population, sensitivity is considered to be medium, noting that in this group concern is not expected to be universal, but may occur locally depending on communication and trust.

Magnitude of impact

2.8.3.23 Magnitude is determined by the likely scale, duration and intensity of concern, and the extent to which concern translates into material wellbeing effects (e.g. persistent anxiety, sleep disturbance due to worry, stress-related symptoms), rather than transient interest or curiosity.

2.8.3.24 Key project features influencing magnitude include:

- The onshore export and AC connection cables will be buried (see CoT27), which reduces visibility and eliminates public exposure to electric fields at ground level (burial provides shielding for electric fields; magnetic fields reduce rapidly with distance). This tends to reduce salience compared with overhead lines. The visibility of the substation may mean that nearby residents, users of businesses and recreational users have concerns over perceived effects.
- The MHPGC Project will be required to demonstrate compliance with health-based public exposure guidelines (ICNIRP) following the Government Code of Practice, which provides a recognised framework for reassurance where communicated effectively.

2.8.3.25 However, perception effects may still arise:

- At the point of energisation (renewed attention);
- Where receptors believe they are “directly above” or “very close” to cables;
- Where there is misinformation or heightened concern linked to wider media narratives about EMF;
- Where there is a perceived lack of transparency (e.g. Unclear cable depth/route, lack of plain-language explanation of compliance).

2.8.3.26 Taking account of the buried nature of the cables and secured compliance framework, the likely localisation of concern to a minority of receptors, and the potential for effective risk communication measures to reduce persistence and severity of anxiety, the magnitude is expected to be Low at population level. Additionally, an EMF Compliance Statement has been submitted as part of the Application and is presented in **Volume 1, Annex 2.1: Onshore EMF Compliance Statement, of the PIER** which provides further details on compliance with the guidelines and confirms that cables would not produce an external electric field at ground level due to the shielding of the cable sheath and burial material.

2.8.3.27 Therefore, the magnitude of impact perceived EMF risk is concluded as low.

Significance of effect

2.8.3.28 As set out above, receptor sensitivity is assessed as high for vulnerable groups, including individuals with reduced baseline health resilience, pre-existing anxiety or mental health conditions, and those living in areas of higher deprivation, and medium for the general population. The magnitude of impact associated with perceived EMF risk during the operation and maintenance phase is assessed as low.

- 2.8.3.29 Perception effects are primarily managed through communication, therefore consultees would be referred to **Volume 1, Annex 2.1: Onshore EMF Compliance Statement, of the PIER** for key information on EMF in relation to the project.
- 2.8.3.30 Perception-related anxiety is expected to be short-term and limited to a small number of receptors, reducing the likelihood of persistent wellbeing effects. Despite this, there may still be queries from within the community, and some perceived effects may persist due to long held beliefs or lack of participation in planned engagement.
- 2.8.3.31 Applying the significance matrix, a Low magnitude of impact combined with High sensitivity (for vulnerable groups) and Medium sensitivity (for the wider population) results in a **minor adverse effect**.
- 2.8.3.32 On this basis, the effect of EMF risk perception during the operation and maintenance phase is assessed as **minor adverse (not significant)**.
- Additional mitigation and residual effect
- 2.8.3.33 No secondary mitigation is proposed. Therefore, the residual effect of EMF risk perception during the O&M phase would remain **minor adverse (not significant)** in EIA terms.

2.8.4 Decommissioning phase

- 2.8.4.1 The offshore export and onshore export and AC connection cables are expected to remain in situ. Should the offshore cable be retrieved upon decommissioning, it is anticipated that effects relevant to human health will be no worse than those reported during construction. An Offshore Decommissioning Programme (CoT44) will be produced in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable .
- 2.8.4.2 The LSS will be deconstructed in the inverted sequence of installation, after the LSS has been decommissioned. The land at the LSS will be reinstated to its original use. Implementation of an Onshore Decommissioning Plan (see measure CoT16) will detail measures, including those for pollution prevention and protection of soils, and ensure that decommissioning of the site is completed in line with the latest relevant legislation and guidance. As such, it is anticipated that effects on human health will be no worse than those reported during construction.

2.9 Cumulative effects

2.9.1 Cumulative effects assessment methodology

- 2.9.1.1 The Cumulative Effects Assessment (CEA) considers the impacts associated with the MHPGC Project together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter, are based upon the results of a screening exercise (**Volume 1, Annex 4.43 Cumulative Screening and Location Plan, of the PEIR**). Each project or plan has been considered on a case-by-case basis for screening in or out of the Human Health CEA based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved. It should be noted that offshore cumulative projects have not been considered as there are no offshore health determinants that have been scoped into this assessment.
- 2.9.1.2 The Human Health CEA methodology has followed the methodology set out in **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR**. Tiers have been allocated reflecting the current stage of the other projects and plans within the planning and development process. This tiered approach is adopted to provide a clear assessment of the MHPGC Project alongside other projects and plans:
- Tier 1 includes projects, plans and activities at the following stages:
 - Under construction;
 - Permitted application;
 - Submitted application;
 - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an on-going impact.
 - Tier 2 includes projects, plans and activities at the following stage:
 - Scoping report has been submitted and is in the public domain.
 - Tier 3 includes projects, plans and activities at the following stages:
 - Scoping report has not been submitted and is not in the public domain;
 - Identified in the relevant Development Plan;
 - Identified in other plans and programmes.
- 2.9.1.3 The specific projects and plans screened into the Human Health CEA are outlined in **Table 2.19**.
- 2.9.1.4 While all impacts scoped into the project-level assessment were considered for inclusion in the CEA, a number were screened out at the CEA stage on the basis that they are localised, temporary, and/or event-based in nature, or have been assessed as negligible. These impacts are not considered capable of interacting cumulatively with similar changes arising from other plans or projects in a manner that could give rise to a cumulative impact and have therefore been scoped out of the cumulative assessment. These impacts include:
- Health effects in relation to the open space, leisure and play determinant during operation.
- 2.9.1.5 Similarly, some of the potential impacts considered within the MHPGC Project alone assessment are specific to a particular phase of development (e.g. construction, O&M or decommissioning). Where cumulative effects with other plans or projects only have potential to occur where there is spatial or temporal overlap with MHPGC Project during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no plans or projects have been identified that have the potential for cumulative effects during this period.
- 2.9.1.6 There are a number of Study Areas considered for the Human Health Chapter, however for the purposes of the cumulative assessment, the District Level Study Area has been used and encompasses County Durham and Sunderland.
- 2.9.1.7 Other developments have been screened in based on their proximity to the study areas and whether there are any likely common receptor pathways.

Table 2.19: Projects and plans screened in to Human Health CEA

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
Tier 1					
DCC1 DM/25/00948/FPA (Electric Vehicle Charging Hub)	Consented	0.73km	Change of use of land to electric vehicle charging hub including resurfacing, erection of electricity substation, installation of electric vehicle charging points, landscaping and associated external works	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Transport Modes, Access and Connections EMF
DCC2 DM/24/00594/FPA (Land To The West Of Elemore View 50 dwellings)	In Planning - Application submitted	0.73km	Erection of 50no. affordable dwellings with associated access and landscaping (amended description).	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Transport Modes, Access and Connections Employment and Employment
DCC3 DM/20/03591/FPA (Land West of Units 1-3 Admiralty Way)	Consented	0km	Erection of a petrol filling station and drive thru' coffee outlet (Class E), along with access, car parking, drive thru' lane,	Under construction	Potential for temporal and geographic overlap of effects in relation to the following determinants:

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
Seaham, Erection of a petrol filling station and drive thru' coffee outlet (Class E))			external seating area, refuse stores, hard and soft landscaping and associated works.		Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment
DCC4 DM/26/01109/FPA (EGL1 Visitor Centre)	In Planning - Application submitted	0km	Full planning application for a temporary visitor centre at the EGL1 site compound for a period of up to 5 years		Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment EMF
DCC5 DM/26/00964/CEU (Croup Hill Solar Farm)	Consented	0km	Commencement of Development for the creation of a solar farm	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
					Land Quality Transport Modes, Access and Connections Economy and Employment EMF
DCC6 DM/18/00829/OUT (Seaham Garden Village - 1500 dwellings)	Consented	0km	Garden village of up to 1500 dwellings, integrated community health and wellbeing village, commercial and leisure uses, business innovation hub, primary school, public open space, community allotments and associated infrastructure, including new pedestrian and vehicular access from A182.	Under construction, due to be complete 2030	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment
DCC7 DM/25/02692/RM (Phase 2 Jade Business Park)	Consented	0km	Application for reserved matters comprising the construction of 3 industrial units with associated access, parking, landscaping and drainage (Phase 2) pursuant to outline planning permission DM/21/002901/OUT (B2/B8 industrial development).	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
DCC8 DM/25/02485/FPA (Transport hub and active travel scheme)	Consented	0km	Transport hub and active travel scheme including improvements to bus, cycle and pedestrian facilities and access road, car parking and associated works including landscaping and biodiversity enhancement.	Under construction, due to be complete April 2027	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment
DCC9 DM/25/01835/FPA (Temporary installation of a battery energy storage system)	In Planning - Application submitted	0km	Temporary installation of a battery energy storage system, along with ancillary infrastructure, acoustic and security fencing, access, landscaping provision and ecological enhancements.	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment EMF

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
DCC10 DM/25/01345/FPA (Battery Energy Storage System)	In Planning - Application submitted	0km	The construction and installation of a Battery Energy Storage System, associated infrastructure, landscaping, fencing, access tracks, biodiversity net gain and underground cable corridor.	12 month construction programme	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment EMF
DCC11 DM/25/00128/RM (Eastern Green Link 1, Converter Station)	Consented	0km	Reserved Matters application (all matters, being details of the permanent access, appearance, landscaping, layout and scale) for the erection of a converter station, and the laying out of replacement public open space on land to the west and south of Jade Business Park pursuant to DM/22/01663/OUT	Under construction, works to be complete in 2029	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment EMF

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
DCC12 DM/24/03281/FPA (81 homes and a convenience store)	In Planning - Application submitted	0km	Erection of 81 no. homes, a convenience store (use class E) and associated infrastructure and landscaping	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment
DCC13 (149 homes, Land East of Seaham Garden Village)	In Planning - Application submitted	0km	Demolition of existing farm buildings and dwellings and erection of 149 dwellings (use class C3) with vehicle access, open space, landscaping, SUDS, and associated infrastructure works	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
DCC15 (South Sharpley Solar Farm)	In Planning - Application submitted	1.5km	Installation of a solar farm together with all associated works, equipment and necessary infrastructure including battery storage (Cross boundary site with Sunderland City Council)	Construction to span 12 months, with a project lifespan of 40 years	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Transport Modes, Access and Connections Economy and Employment EMF
DCC16 (Land At Former Forest Estate/South Of Murton Lane - Erection of 135 no. dwellings)	Consented	1.6km	Erection of 135 no. residential dwellings (Use Class C3) with associated access, parking, landscaping, sustainable drainage and associated infrastructure.	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Open Space, Leisure and Play (Onshore) Transport Modes, Access and Connections Economy and Employment
25/01432/OUT (Land Off North Road Hetton-le-Hole - Outline Planning application for the erection of up to 255 dwellings)	Refused - Appeal Lodged	n/a	Outline planning application (with all matters reserved except for means of access) for the erection of up to 255 dwellings, with public open space, landscaping, sustainable drainage system (SuDs) and associated infrastructure.	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality

Project/plan	Status	Distance from MHPGC Project (km)	Description of project/plan	Estimated dates of construction (If applicable)	Overlap with MHPGC PEIR Red Line Boundary: Onshore and Human Health Study Areas
					Transport Modes, Access and Connections Economy and Employment
Tier 2					
DCC14 SCR/25/00015 (Land North West Of Hallfield Farm Solar Farm)	Pre-application	0 km	Screening Opinion request for the construction, operation and decommissioning of a Battery Energy Storage System (BESS) with a storage capacity of up to 300 megawatts (MW).	Detail not available	Potential for temporal and geographic overlap of effects in relation to the following determinants: Air Quality Noise and Vibration Open Space, Leisure and Play (Onshore) Water Quality Land Quality Transport Modes, Access and Connections Economy and Employment EMF

2.9.2 Maximum design scenario – cumulative effects assessment

- 2.9.2.1 The MDSs identified in **Section 2.6.2** have been selected as those having the potential to result in the greatest effect on Human Health. The cumulative effects presented and assessed in this section have been based on **Volume 1, Chapter 2: Project Description, of the PEIR** alongside available information from other projects and plans to define an MDS for CEA.

2.9.3 Overview of cumulative effects assessment

- 2.9.3.1 A description of the significance of cumulative effects upon Human Health receptors arising from each identified impact is given below. The CEA for MHPGC Project is presented in **Table 2.20** to **Table 2.27**. It is considered that decommissioning effects will be no worse than construction effects.

2.9.4 Air Quality and Dust

- 2.9.4.1 There is potential for cumulative effects on human health from changes to air quality and dust as a result of activities associated with MHPGC Project and other projects that are under construction. The summary of the Cumulative Effects Assessment is presented in **Table 2.20**.

Table 2.20: MHPGC Project CEA for Air Quality and Dust

Cumulative Effects Assessment	
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, there is likely to be some changes to air quality as a result of construction activities. These are anticipated to be managed through mitigation measures such as a Dust Management Plan or other measures in a Construction Environmental Management Plan (CEMP) or equivalent document. With regards to the MHPGC Project, the receptors most likely to be affected by dust are located to the northeast of the scheme as the prevailing wind direction is from the southwest. Other projects located in the northeast such as DM/20/03591/FPA, DM/18/00829/OUT and DM/25/02485/FPA may contribute to changes in air quality for receptors in the northeast where their operation coincides with construction of the MHPGC Project.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction is considered to be isolated to receptors in the immediate vicinity of the northeast of the MHPGC Project. Additionally, the changes in air quality are anticipated to be controlled through embedded mitigation measures for both the MHPGC Project and the Tier 1 and Tier 3 projects, as well as being short term in nature. Therefore, the interaction in cumulative effects is considered to be minor adverse (not significant) .
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.9.5 Noise and Vibration

2.9.5.1 There is potential for cumulative effects on human health from changes to noise and vibration as a result of activities associated with MHPGC Project and other projects that are under construction, or in operation. The summary of the Cumulative Effects Assessment is presented in **Table 2.21**.

Table 2.21: MHPGC Project CEA for Noise and Vibration

Cumulative Effects Assessment	
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, there is likely to be some changes to noise and vibration as a result of construction activities, including construction traffic movements. These are anticipated to be managed through mitigation measures implemented in a Construction Environmental Management Plan (CEMP) or equivalent document. With regards to the MHPGC Project, the receptors most likely to be affected by changes in noise are residential receptors within 300m of the works, whereas those within 100m of the works are anticipated to experience vibration effects. Regarding construction traffic noise, the highest changes in noise are observed at Jade Business Park access roads, however there are no residential properties within 50m of this location. Effects as a result of noise and vibration are more likely to be experienced at isolated residential properties within the MHPGC Project Onshore PEIR Red Line Boundary, including Kinley Hill Farm and Little Coop House Farm and also in the village of South Hetton. Other projects located in proximity to these receptors such as DM/20/03591/FPA, DM/24/00594/FPA and DM/26/00964/CEU may contribute to changes in noise and vibration where their construction or operation coincides with the construction of the MHPGC Project.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction is considered to be isolated to receptors within 300m of the works (or 100m for vibration effects). Additionally, the changes in noise and vibration are anticipated to be controlled through embedded mitigation measures for both the MHPGC Project and the Tier 1 and Tier 3 projects, as well as being short term in nature. Therefore, the interaction in cumulative effects is considered to be minor adverse (not significant) for vulnerable groups and the general population.
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms
Operations and maintenance phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, where they are industrial in nature (such as DM/25/02692/RM), there may be potential for cumulative effects at noise sensitive receptors. For the MHPGC Project, operational noise associated with the LSS has the potential to exceed background sound levels at the nearest residential receptors. An Operational Noise Management Plan (CoT05) will be implemented to mitigate these exceedances.
Sensitivity of receptor	As reported in Section 8.2, the sensitivity of businesses and development land receptors ranges from Medium to Very High.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction between the effects as a result of the MHPGC Project and other projects is

	Cumulative Effects Assessment
	considered to be isolated due to the spatial distances between the projects and limited number of receptors experiencing effects. As such, the cumulative effect is minor adverse (not significant) .
Further mitigation and residual significance	At this stage, no additional mitigation measures have been identified, however this will be revisited as the design is developed and the assessment is finalised.

2.9.6 Open Space, Leisure and Play

2.9.6.1 There is potential for cumulative effects on human health in relation to changes in open space, leisure and play as a result of activities associated with MHPGC Project and other projects that are under construction or in operation. The summary of the Cumulative Effects Assessment is presented in **Table 2.22**.

Table 2.22: MHPGC Project CEA for Open Space, Leisure and Play

	Cumulative Effects Assessment
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, there is likely to be some changes to the availability of open space for leisure and recreational activities, however it is anticipated that for all schemes measures will be in place to maintain accessibility, especially along PROW routes. Additionally, there may be some changes in amenity due to cumulative views of construction works which could reduce enjoyment of open spaces. With regards to the MHPGC Project, embedded mitigation measures will be implemented to ensure that alternative routes are provided where practicable, and mitigation measures for noise and dust will help to limit changes to amenity.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction between the effects as a result of the MHPGC Project and other projects is considered to be extremely isolated due to the spatial distances between the projects, however some receptors may experience changes in amenity or a diversion on one part of the route and then experience changes as a result of another project later on in their journey. Due to the assumed limited nature of closures and the implementation of mitigation measures, the interaction in cumulative effects is considered to be minor adverse (not significant) for vulnerable groups and the general population.
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms

2.9.7 Water Quality

2.9.7.1 There is potential for cumulative effects on human health receptors in relation to changes in water quality as a result of activities associated with MHPGC Project and other projects that are under construction. The summary of the Cumulative Effects Assessment is presented in **Table 2.23**.

Table 2.23: MHPGC Project CEA for Water Quality

	Cumulative Effects Assessment
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, it is anticipated the construction activity could lead to effects such as sediment mobilisation and potential for contaminants to affect surface water and groundwater receptors. It is assumed that mitigation measures will be implemented to ensure that the effects to surrounding waterbodies are limited, and that any contaminants would not have an adverse effect on human health receptors. With regards to the MHPGC Project, embedded mitigation measures, including an Outline SWGMP (CoT23) will be implemented to ensure that changes to water quality do not cause adverse effects.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction between the effects as a result of the MHPGC Project and other projects is considered to be short term in nature. With the implementation of mitigation measures, the interaction in cumulative effects is considered to be minor adverse (not significant) for vulnerable groups and the general population.
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.9.8 Land Quality

- 2.9.8.1 There is potential for cumulative effects on human health as a result of changes to land quality as a result of activities associated with MHPGC Project and other projects that are under construction. The summary of the Cumulative Effects Assessment is presented in **Table 2.24**.

Table 2.24: MHPGC Project CEA for Land Quality

	Cumulative Effects Assessment
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, it is anticipated the construction activity could lead to effects such as uncontrolled release of exposure to contaminants. It is assumed that mitigation measures will be implemented to ensure that the effect to surrounding land is limited, and that any contaminants would not have an adverse effect on human health receptors. With regards to the MHPGC Project, any contamination sources will be mitigated through measures in the Outline Contaminated Land and Groundwater Discovery Strategy and Outline SWGMP (See measures CoT23 and CoT33).
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction between the effects as a result of the MHPGC Project and other projects is considered to be short term in nature, and changes in land quality are not anticipated to cause sustained effects on human health receptors. With the implementation of

	Cumulative Effects Assessment
	mitigation measures, the interaction in cumulative effects is considered to be minor adverse (not significant) for vulnerable groups and the general population.
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.9.9 Transport Modes, Access and Connections

2.9.9.1 There is potential for cumulative effects on health resulting from changes to transport modes, access and connections, as a result of activities associated with MHPGC Project and other projects that are under construction. The summary of the Cumulative Effects Assessment is presented in **Table 2.25**.

Table 2.25: MHPGC Project CEA for Transport Modes, Access and Connections

	Cumulative Effects Assessment
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, it is anticipated the construction activity could lead to increases in construction vehicles along key routes, which could increase driver delay and cause changes in access. Additionally, there may changes to severance and increases in delay for non-motorised users, particularly where non-motorised user routes intersect with access roads for the other projects. With regards to the MHPGC Project, increases in construction traffic are predicted on highway links that are associated with Jade Business Park, with the largest traffic flows on the access road between the A182 and Jade Business Park. Other projects such as DM/25/02692/RM which would also use the same access road, and those which may use the A182 (DM/18/00829/OUT and DM/20/03591/FPA) may cause cumulative effects on users of local roads and non-motorised user routes due to increases in traffic. Changes to transport modes and access may increase feelings of stress and anxiety in road users (due to delays for instance) or may discourage non-motorised users from using certain routes.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	The effect reported in Volume 4, Chapter 2: Human Health, of the PEIR is minor adverse (not significant) for both the general population and vulnerable groups. The cumulative interaction between the effects as a result of the MHPGC Project and other projects is considered to be short term in nature, and changes in transport modes, access and connections are not anticipated to cause sustained effects on human health receptors. With the implementation of mitigation measures, the interaction in cumulative effects is considered to be minor adverse (not significant) for vulnerable groups and the general population.
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.9.10 Employment and Income

2.9.10.1 There is potential for cumulative effects on human health receptors due to changes in employment and income as a result of activities associated with MHPGC Project and other projects that are under

construction, or in operation. The summary of the Cumulative Effects Assessment is presented in **Table 2.26**.

Table 2.26: MHPGC Project CEA for Employment and Income

Cumulative Effects Assessment	
Construction phase	
Magnitude of impact	For Tier 1 and Tier 3 projects, there is little information on the level of employment generated during construction. It is assumed that there will be jobs created during the construction phases of these projects, and some of these may utilise the local workforce, or those from the wider region (North East). The MHPGC Project is anticipated to create 80 jobs during the peak period of construction and could support £15 million GVA in the Sunderland and County Durham areas. Increased employment opportunities may help to improve a sense of wellbeing and self-esteem among the local communities.
Sensitivity of receptor	Sensitivity is considered to be high for vulnerable groups and medium for the general population.
Significance of effect	Effects reported for the MHPGC Project are minor beneficial (not significant). The cumulative interaction between projects will be short term, however there may be the potential for some workers to move from one project to another depending on construction skills required and construction programmes. Therefore, cumulative effects on the economy and income are anticipated to be minor beneficial (not significant) .
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.9.11 Perceptions of risk from Electromagnetic Fields

2.9.11.1 There is potential for cumulative effects on human health due to perceptions of risk from EMFs, as a result of activities associated with MHPGC Project and other projects that are under operation. The summary of the Cumulative Effects Assessment is presented in **Table 2.27**.

Table 2.27: MHPGC Project CEA for perceptions of risk from EMF

Cumulative Effects Assessment	
Operational phase	
Magnitude of impact	For Tier 1 and Tier 3 projects where electricity infrastructure is part of the scheme, there may be concerns from the public around exposure to EMFs even though exposure levels are within safe limits. This could exacerbate feelings of anxiety, particularly when there are multiple projects within proximity to each other. Regarding the MHPGC Project, it is considered that the buried nature of the cables and the submission of additional information on EMFs in Volume 1, Annex 2.1: Onshore EMF Compliance Statement, of the PEIR would help to reduce the magnitude of impact.
Sensitivity of receptor	Sensitivity ranges from low to medium, being low for vulnerable populations and medium for general populations.
Significance of effect	Effects reported for the MHPGC Project on its own are minor adverse (not significant). The cumulative interaction between projects will be in isolated locations, and it is assumed that with further communication and provision of information on EMFs and

	Cumulative Effects Assessment
	their health effects, cumulative effects on human health receptors would be minor adverse (not significant) .
Further mitigation and residual significance	No additional mitigation measures for human health receptors are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Table 2.18), is not significant in EIA terms.

2.10 Transboundary effects

- 2.10.1.1 A screening of transboundary impacts has been carried out and any potential for significant transboundary effects with regard to Human Health from the construction, O&M and decommissioning phases of the MHPGC Project upon interests of other states has been assessed as part of the PEIR.
- 2.10.1.2 Effects identified as part of the preliminary assessment in relation to human health as a result of the construction, O&M and decommissioning of the MHPGC Project, are anticipated to be limited in duration and not likely to occur beyond the immediate surrounding of the Human Health Study Areas which is located entirely within UK territory as defined within **Section 2.4.2**.
- 2.10.1.3 There are no identified pathways through which either direct or indirect impacts could result in significant transboundary effects on human health of an EEA state. Details will be updated as appropriate within the ES.

2.11 Inter-related effects

- 2.11.1.1 Inter-related effects are the combined impact of multiple aspects of the MHPGC Project on a single receptor. These are as follows:
- **Project lifetime effects:** Assessment of the scope for effects that occur throughout more than one phase of the MHPGC Project (construction, O&M and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases.
 - **Receptor led effects:** Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor.
- 2.11.1.2 Inter-related effects are assessed within **Volume 4, Chapter 5: Inter-related Effects, of the PEIR** and are summarised below.
- 2.11.1.3 [Author to summarise effects and conclusions from within **Volume 4, Chapter 5: Inter-related Effects, of the PEIR**]

2.12 Summary

2.12.1 Summary of effects

- 2.12.1.1 This chapter has assessed the potential impacts on Human Health from the construction, O&M and decommissioning phases of the MHPGC Project.
- 2.12.1.2 **Table 2.28** presents a summary of impacts and confirms the residual effects.

2.12.2 Summary of secondary mitigation and monitoring

- 2.12.2.1 **Table 2.28** presents a summary of the secondary mitigation and monitoring proposed.

Table 2.28: Summary of potential impacts and residual effects

Impact	Sensitivity of receptor	Magnitude of impact	Significance of effect	Secondary mitigation and monitoring	Residual effect
Construction and Decommissioning phase					
Air Quality and Dust	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Noise and Vibration (Onshore)	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Open Space, Leisure and Play (Onshore)	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Water quality (Onshore)	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Land Quality (Onshore)	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Transport Modes, Access and Connections	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No mitigation secondary and monitoring	Minor Adverse (Not Significant)
Employment and Income	High for vulnerable groups and Medium for the general population	Low	Minor Beneficial (Not Significant)	No mitigation secondary and monitoring	Minor Beneficial (Not Significant)
O&M phase					
Noise and Vibration (Onshore)	High for vulnerable groups and Medium for the general population	Low	Minor adverse (not significant)	No mitigation secondary is required.	Minor adverse (not significant)
Open Space, Leisure and Play (Onshore)	High for vulnerable groups and Medium for the general population	Negligible	Negligible (Not Significant)	No mitigation secondary is required.	Negligible (Not Significant)

Impact	Sensitivity of receptor	Magnitude of impact	Significance of effect	Secondary mitigation and monitoring	Residual effect
Perceptions of risk from Electromagnetic Fields	High for vulnerable groups and Medium for the general population	Low	Minor Adverse (Not Significant)	No secondary mitigation is required.	Minor Adverse (Not Significant)

2.13 References

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