Prosiect Maen Hir

Solar a Storio Ynni

Preliminary Environmental Information Report
Volume I, Chapter 17: Health

Prosiect Maen Hir - September 2024

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17.1 Introduction

17.1.1 This chapter assesses the potential likely significant environmental effects of the Project upon health during the Construction, Operation and Decommissioning Phases.

17.1.2 The requirement to consider human heath in Environmental Impact Assessment (EIA) was introduced in the EIA Regulations. However, there is no statutory guidance on assessing health impacts in the context of an EIA. This chapter has the dual role of being a Health Impact Assessment (HIA) and reporting the likely significant human health effects for the purposes of EIA.

17.1.3 Human health is defined in line with the World Health Organization's (WHO's) definition of health as: (Ref 17-1)

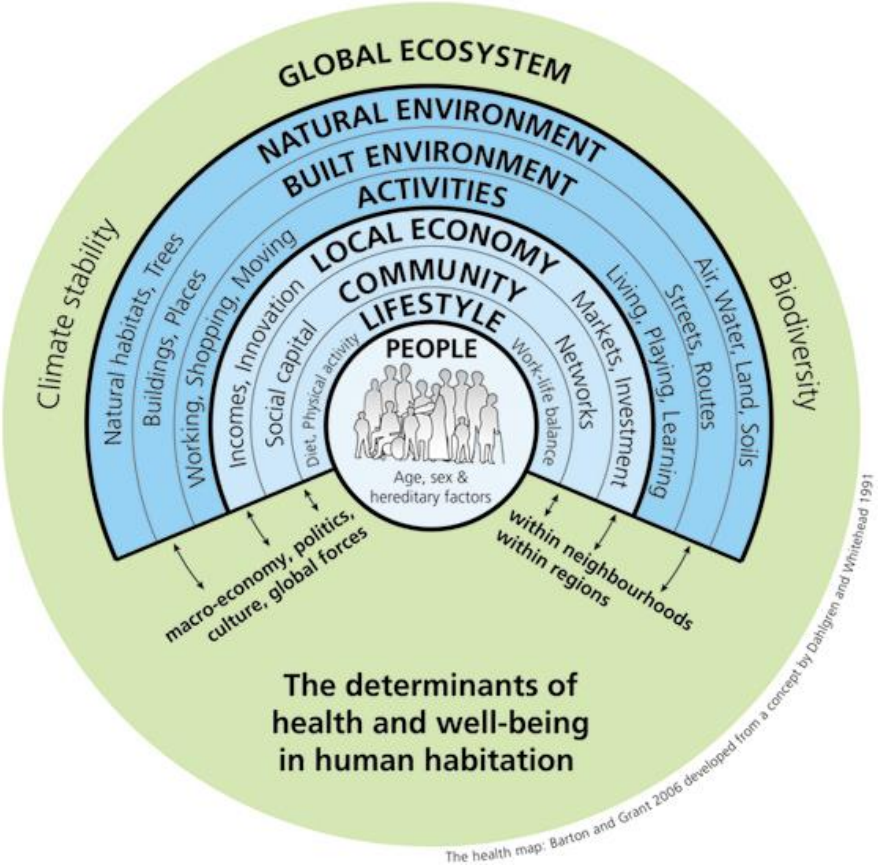
'*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity'*.

17.1.4 The key word in this definition is 'wellbeing', which is explicitly linked with health by the WHO. 'Wellbeing' refers to a positive rather than neutral state, framing health as a positive aspiration in the definition. In this assessment, changes to mental health outcomes are considered alongside changes to physical health outcomes. It should be acknowledged that literature around the impact of determinants of health on mental health is less well established compared to that related to impacts on physical health. For this reason, the literature around the impact of determinants on mental health often shows mixed findings, with differing impacts that vary from individual to individual, often due to personal (and in some cases subjective) experiences. For this reason, the impact on mental health is considered inherently uncertain, however as consultation with relevant stakeholders continues, more localised findings around mental health implications relating to the Project are likely to be drawn out and will therefore be considered further in the ES.

17.1.5 Development can play a role within the wider determinants of health and well-being. This assessment considers the ways in which the Project may affect these

determinants of health and wellbeing. It also considers health inequalities and how the Project may affect different groups in different ways.

Figure 17-1 Determinants of health (Ref 17-2)



Source: Barton, H. and Grant, M. (2006) A health map for the local human habitat. The Journal for the Royal Society for the Promotion of Health, 126 (6). pp. 252-253.

17.1.6 This chapter describes which health determinants are relevant to the Project and sets out the health effects that will be assessed. The Scoping Report (Appendix 2-1) and this chapter has used the Institute of Environmental Management and Assessment (IEMA) Effective Scoping of Human Health as a guide to identify the relevant health determinants and health effects associated with the Project (Ref 17-3).

17.1.7 This preliminary assessment identifies temporary and permanent, beneficial and adverse, direct, indirect and induced health effects on residents and workers, as well as vulnerable groups, as a result of the construction, operation and decommissioning of the Project.

17.2 Assessment Methodology

Assessment Scope

Scoped In

17.2.1 Table 17-1 outlines the potential effects of the Project by each phase of development that are considered in this preliminary assessment. The content and assessment methodology contained within this chapter has been informed by the Scoping Opinion from PINS dated 19 December 2023. Table 17-1 sets out the scope of the assessment which is in accordance with the Scoping Opinion.

Table 17-1 Scoped in Effects

Phase	Health effect
Construction and Decommissioning phase	Diet and nutrition
	Housing
	Transport modes, access and connections
	Community, identity, culture, resilience and influence
	Education and training
	Employment and income
	Water quality or availability
	Noise and vibration
	Health and social care services
Operational phase	Diet and nutrition
	Open space, leisure and play
	Community, identity, culture, resilience and influence
	Education and training
	Employment and income
	Climate change and adaptation
	Noise and vibration
	Bio-physical environment (radiation)

Phase	Health effect
	Wider societal infrastructure and resources

17.2.2 Table 17-2 outlines the effects which have been scoped out of the assessment which has been informed by the Scoping Opinion.

Table 17-2 Scoped out effects

Phase	Health effect
All phases	Physical activity
	Risk-taking behaviour (including use of alcohol, cigarettes, non-prescribed drugs, sexual activity and other risk-related activity)
	Relocation
	Community safety
	Social participation, interaction and support
	Air quality
	Land quality
	Built environment
Construction and Decommissioning phase	Open space, leisure and play
	Social participation, interaction and support
	Climate change and adaptation
	Radiation
	Electromagnetic Fields
	Wider societal infrastructure and resources
Operational phase	Housing
	Transport modes, access and connections
	Water quality or availability
	Health and social care services

17.2.3 Table 2-1 in Appendix 2-1 details the feedback received within the Scoping Opinion, and how it is addressed within this preliminary assessment. In summary, the Inspectorate agrees with the majority of the scoped effects, where further

detail is required on the proposed scope (air quality,[1] land quality[2] and climate change and adaptation[3]), this is addressed appropriately within this chapter and details can be found in Table 2-1 in Appendix 2-1.

Legislation, policy and guidance

17.2.4 A full review of the relevant national, regional and local policy and guidance pertinent to health, is provided within Appendix 17-1.

Consultation and engagement

17.2.5 The Applicant is actively engaging with various stakeholders within the Study Area (refer to Table 17-6 for Study Area definitions) and other local organisations to gain insights and understand further the priorities of the local community. This engagement in relation to health is ongoing and will include the statutory consultation that this PEIR informs. The engagement to date is presented in Table 17-3.

[1] Note: The Inspectorate is content to scope air quality out on the basis that impacts on human health from the Construction and Decommissioning Phase road traffic emissions are to be assessed in the Air Quality section of the Chapter: 'Other Environmental Topics' ES Chapter and state that the Health ES Chapter should provide clear cross referencing to where the relevant impacts on human health are considered. PEIR Chapter 15: Other Matters provides an overview of the air quality assessment to be undertaken in the ES. This includes details of the existing baseline conditions within the Study Area and with regard to current air quality objectives. The scope would include Construction Phase road traffic assessment and a qualitative assessment of fugitive dust emissions. Similarly, the Air Quality section of PEIR Chapter 15: Other Matters proposed to scope out the assessment of Operational Phase road traffic emissions (refer to PEIR Chapter 15: Other Matters for the scope of the Air Quality Assessment). The Inspectorate is content to scope air quality out on the basis that the impacts on human health from dust emissions during construction and decommissioning are assessed in the Air Quality section of the 'Other Environmental Topics' ES Chapter (as per the Inspectorate's comments above). The Health ES Chapter should provide clear cross-referencing to where the relevant impacts on human health are considered. PEIR Chapter 15: Other Matters provides an overview of the air quality assessment to be undertaken in the ES. This includes details of the existing baseline conditions within the Study Area and with regard to current air quality objectives. The scope would include Construction Phase road traffic assessment and a qualitative assessment of fugitive dust emissions. Similarly, the Air Quality section of PEIR Chapter 15: Other Matters proposed to scope out the assessment of Operational Phase road traffic emissions (refer to PEIR Chapter 15: Other Matters for the scope of the Air Quality Assessment).

[2] Note: The Inspectorate is content to scope this matter out on the basis that agricultural land quality or soil resource is unlikely to be significantly affected during any phase of the Proposed Development. However, the Inspectorate states that if significant adverse effects are identified in ES Chapter 13 (Soils and Agriculture), "consideration will be given" to scoping these effects into the human health assessment. Should significant adverse effects be identified in ES Chapter 13 (Soils and Agriculture) for any phase, the ES should assess impacts on health where significant effects are likely. PEIR Chapter 12: Soils and Agriculture states that during operation there will be no significant adverse effects on soil resources or agricultural land quality and hence have been scoped out for this assessment.

[3] The Scoping Report proposes to scope out health effects resulting from Bio-physical environment (climate change and adaption) on the basis that carbon and climate altering pollutant emissions are not expected to be of the scale to have likely significant health effects during these temporary phases, as a CEMP would be prepared to ensure that harmful machinery emissions are minimised.
On the basis that impacts on human health from Construction and Decommissioning Phase road traffic emissions are to be assessed in the Air Quality section of the Chapter: 'Other Environmental Topics' ES Chapter, the Inspectorate is content to scope this matter out of the Health ES Chapter. The Health ES Chapter should provide clear cross referencing to where the relevant impacts on human health are considered.

Table 17-3 Key findings from engagement

Stakeholder and meeting topic	Key findings
Executive manager for the leadership team (IoACC) Chief Public Protection Officer (IoACC) Corporate programme manager (IoACC)	Date: 6th March 2024 The IoACC team noted the importance of engaging with Betsi Cadwaladr University Health Board (BCUHB) and PHW for health-specific engagement. For the local health needs, IoACC highlighted issues relating to the rural nature of the PEIR Boundary and surrounding environment (particularly transport access) and issues relating to the cost-of-living crisis. For opportunities relating to the scheme, IoACC were interested in ways of reducing poverty, including the Community Solar Project and other hyper local solutions such as vegetable growing patches on-site.
Wales Health Impact Assessment Support Unit (WHIASU) Director, general health impact assessment expert PHW consultant PHW project health specialist Environmental Public Health Scientist at PHW	Date: 10th April 2024 PHW provided support for the wider determinants assessment of health. The engagement also highlighted several operational concerns from stakeholders and suggested to get in touch with the local Public Health Team at the BCUHB. Transport issues, particularly during the Construction Phase, were raised as a concern by stakeholders. Furthermore, there was a discussion about battery management and the necessity of a fire management plan, with the Applicant confirming that such a plan would be implemented. Access to services during construction was identified as a key area of interest by stakeholders. It was recommended by stakeholders that the approach should align with Wales' Health Impact Assessment framework, especially considering upcoming regulatory changes next year, possibly related to Section 6 duties. PHW suggested that maintaining a proportionate approach is crucial, especially when addressing specific concerns. It was recommended to the Applicant that future engagements should involve both PHW and the local health board simultaneously, leveraging their different areas of expertise – PHW's knowledge of wider contamination issues and local teams' understanding of services.

Stakeholder and meeting topic	Key findings
Local services lead (BCUHB)	Date: 29th April 2024 BCUHB emphasised the importance of following the Welsh guidance structure for the Health Impact Assessment (HIA). Key health determinants of interest include lifestyle, social and cultural links, and linguistic factors. There is a particular concern from BCUHB for vulnerable groups, such as the ageing population in Anglesey, who may be less accepting of change compared to younger people. The high obesity rates among children in Anglesey, almost the highest in Europe, were noted by BCUHB, whilst they also raised specific concerns about the impact on Public Rights of Way (PRoW) and active transport options. Environmental health impacts and ecological considerations were raised by BCUHB, supporting the need for Mitigation strategies.

Relationship with other aspects of the PEIR

17.2.6 This health assessment seeks to understand whether Likely Significant Effects, identified in other relevant PEIR chapters, would result in health effects for the population. This chapter is informed by the following technical assessments, though other documents are also considered:

- Chapter 6: Landscape and Visual
- Chapter 9: Transport and Access
- Chapter 10: Noise
- Chapter 12: Soils and Agriculture
- Chapter 13: Water Resources
- Chapter 14: Climate Change
- Chapter 15: Other Matters
- Chapter 16: Socio-economics

17.2.7 The health assessment considers the residual effects of the other technical assessments – i.e. it only considers the effects post-Mitigation.

Receptors

17.2.8 The Receptors that could experience likely significant health effects are outlined in Table 17-4.

17.2.9 Receptor groups include the general population and vulnerable groups, and have been identified with reference to the Welsh Health Impact Assessment Support Unit's Health Impact Assessment: A Practical Guide (Ref 17-4) and Isle of Anglesey County Council's Health Impact Assessment Toolkit. (Ref 17-5). Engagement to determine other relevant vulnerable groups is ongoing, and any further feedback on population groups vulnerable to health effects will be incorporated into the assessment in the ES.

17.2.10 This document uses the following definitions:

- Health Receptors: the population of Receptors identified by technical assessments throughout the PEIR chapters; and
- Receptor population: the make-up of the Study Area (refer to Table 17-6), including the groups listed in Table 17-4.

17.2.11 Short term visitors are not considered in this health chapter. It is not expected they would experience any health effects when visiting Anglesey for a short period of time. GB tourism statistics estimate that the average duration of trips to Wales is three nights (Ref 17-6).[4] Therefore, it is not likely that visitors will be impacted by the Project from a health perspective.

Table 17-4 Receptor populations

Receptor population group	Receptor population
General population	Existing and future residents
	Existing and future workers
Vulnerable groups	Children and young people (aged under 18)
	Older people (aged over 65)
	Income-related groups: low-income groups, unemployed, economically inactive, people unable to work due to ill health
	People with disability and long-term illness (including mental health issues, dementia, autism and epilepsy)

[4] The Wales average is used as a proxy since tourism duration statistics for IoACC is not available.

Receptor population group	Receptor population
	Single-parent families
	Ethnic minority groups
	Religious groups

Identification of Potential Effects

17.2.12 Table 17-5 outlines the potential effects of the Project by phase of development.

Table 17-5 Potential health effects and phase of assessment

Health determinant	Health effect	Construction	Operation	Decommissioning
Diet and nutrition	Potential health effect of a loss of agricultural land	Yes	Yes	Yes
Housing	Potential health effect of the impact of construction workers for the Project on housing accommodation	Yes	No	Yes
Open space	Potential health effect of changes in access to open space and public rights of way	No	Yes	No
Transport modes, access and connections	Potential health effect of the generation of vehicle traffic and changes in access	Yes	No	Yes
Community identity, culture, resilience and influence	Potential health effect of the presence of the workforce and changes in visual amenity	Yes	Yes	Yes
Education and training	Potential health effect of changes in access to education and training opportunities	Yes	Yes	Yes
Employment and income	Potential health effect of changes in access to employment opportunities on-site	Yes	Yes	Yes

Health determinant	Health effect	Construction	Operation	Decommissioning
Climate change	Potential health effect of the provision of renewable energy and community power	No	Yes	No
Water quality or availability	Potential health effect of contamination of water sources	Yes	No	Yes
Noise and vibration	Potential health effect of changes in the level of noise and vibration	Yes	Yes	Yes
Health and social care	Potential health effect of changes in the demand for healthcare by on-site workers	Yes	No	Yes
Wider societal infrastructure	Potential health effect of changes in access to electricity	No	Yes	No
Bio-physical environment (radiation)	Potential health effect of changes in exposure to electro-magnetic field	No	Yes	No

Study Areas

17.2.13 Health effects are considered at varying spatial levels. The relevant technical assessments for PEIR influence the Study Area for health impacts relating to each technical area. For example, where noise impacts are examined within a Study Area in Chapter: 10 Noise, this informs the Study Area used for the assessment of health effects.

17.2.14 For the assessment of potentially likely effects on health, Study Areas have been informed by the geographic extent to which potentially likely significant health effects may be reasonably expected to occur as a result of the Project. The Study Area does not necessarily capture where the Receptor population originates from, rather it indicates where the health effect is expected to occur.

17.2.15 The table below outlines the various geographical Study Areas used in this assessment, either as direct Study Areas or geographical comparators. These are identified in Figure 17-2.

Table 17-6 Geographical Study Areas

Geographical Study Area	Definition	Justification
The PEIR Boundary	The boundary around the area of land that makes up the Project for the purposes of the PEIR including the Solar PV Site, Mitigation and Enhancement Areas, Cable Route Corridor and the Highways Works.	N/A
Neighbourhood Impact Area (NIA)	A 3km radius from the PEIR Boundary, aligning with the Zone of Theoretical Visibility (ZTV) - the maximum area of assessment for landscape and visual impact within Chapter 6: Landscape and Visual. This area is used for the assessment of impacts on amenity, including changes in noise and vibration, open space, leisure and play, and the bio-physical environment.	This area represents the maximum extent of the area assessed for changes in amenity within other technical chapters. No other Likely Significant Effects on amenity are anticipated beyond this area, and as a result the assessment of health effects considers the impact within this Study Area.
Northern and Central Anglesey (NCA)	The PEIR Boundary is located within four electoral wards – Talybolion, Twrcelyn, Lligwy and Canolbarth Môn. No effects are assessed at this spatial scale, although this area is used for the presentation of baseline data.	The NCA represents the closest area to the NIA for which much publicly available health data is available.
Local Authority (IoACC)	The Isle of Anglesey County Council. This area is used for the assessment of changes in health determinants that are anticipated to occur at a wider spatial scale than the NIA and below the national level including housing and education and training.	Anglesey reflects the area at which local policy decisions on housing, education and employment training are made.
National	Wales and the UK. Baseline data uses Wales as the national level for comparative purposes. The UK is used for the assessment of effects occurring at wider geographies, including	The national area reflects the area at which national policy decisions on infrastructure are made. Climate change is assessed at the UK level as changes to the impact of

Geographical Study Area	Definition	Justification
	climate change and adaptation and wider societal infrastructure and resources.	climate change are felt more widely than a local level.

17.2.16 The Study Areas for each health effect have been determined by aligning with the relevant technical assessments that influence those health effects. For effects not related to other technical chapters, professional judgment and policy have been used to identify the appropriate Study Area. Table 17-7 shows the Study Area at which each effect is assessed.

Table 17-7 Proposed Study Areas proposed for each effect

Determinant of health	Health effect	Study Area
Diet and nutrition	Potential health effect of a loss of agricultural land	Anglesey
Housing	Potential health effect of the impact of workers on housing accommodation	Anglesey
Open space, leisure and play	Potential health effect of changes in access to open space and public rights of way	NIA
Transport modes, access and connections	Potential health effect of the generation of vehicle traffic and changes in access	NIA
Community identity, culture, resilience and influence	Potential health effect of the presence of the workforce and changes in visual amenity	Anglesey
Education and training	Potential health effect of changes in access to education and training opportunities	Anglesey
Employment and income	Potential health effect of changes in access to employment opportunities on-site	Anglesey
Climate change and adaptation	Potential health effect of the provision of renewable energy and community power hub	National
Water quality or availability	Potential health effect of contamination of water sources	NIA

Determinant of health	Health effect	Study Area
Noise and vibration	Potential health effect of changes in the level of noise and vibration	NIA
Health and social care services	Potential health effect of changes in the demand for healthcare by on-site workers	NIA
Wider societal infrastructure and resources	Potential health effect of changes in access to electricity	National
Bio-physical environment (radiation)	Potential health effect of changes in exposure to electro-magnetic field	NIA

Temporal scope (assessment years)

17.2.17 This section discusses the temporal scope that will be considered in the assessment of health effects. Health effects are assessed during the Construction, Operational, and Decommissioning Phases of the Project. The Construction Phase could take place over up to two phases.

17.2.18 Construction phasing for the Project is currently being developed in response to evolving technical requirements including but not limited to Grid Connection timescales. The Project could be delivered in up to two phases.

17.2.19 Under a single-phase construction programme, enabling works could start in Q4 2026, with the Project being energised in Q4 2028. It is anticipated the Construction Phase for this scenario would be approximately 24 months long.

17.2.20 Under a two-phase construction programme, enabling works for the first phase could start in Q4 2026, with the first phase being energised in Q4 2028. The second phase would be constructed at a later date and energised at a date to be agreed with NGET and not later than 2037. In this scenario, part of the Project would be constructed and operational before the remaining part. It is anticipated that each of the Construction Phases under this scenario would be approximately 24 months long.

17.2.21 More information on the likely construction phasing will be provided in the ES, where each likely significant health effects will be assessed on their respective worst-case scenarios, with justification set out.

17.2.22 For this assessment the worst-case scenario has been assumed to be the single phase of construction. A single phase of construction is considered the worst-case scenario because it involves higher exposure over a long-term duration with continuous frequency expected to result in bigger health impacts across a larger portion of the population. For the purposes of PEIR, the assessment of all health effects is therefore based on a one-phased construction period lasting approximately 24 months. More information on the likely construction phasing will be provided in the ES, where each health effects will be assessed on their respective worst-case scenarios, with justification set out.

17.2.23 The temporal scope will vary depending on the nature of the effect. The assessment establishes parameters that are likely to result in the maximum adverse effect (the worst-case scenario). For example, any change to the existing baseline conditions is expected to occur during the Construction Phase (approximately 2026 - 2028) and therefore 2027 is considered as the worst case for this effect, as this is when the peak construction period is likely to occur.

17.2.24 The Operational Phase of the project is proposed to be 60 years. The effects are expected to be largely consistent across the Operational Phase. Although replacement activities for the solar panels will occur during this time, these activities are not anticipated to be significant and will only be temporary. Operational effects are considered at the first year of operation which is therefore expected to be representative across the whole 60-year period. However, there may be instances where changes occur over the course of the 60 years, such as when Mitigation or enhancement measures have not fully established or matured, these changes will be mentioned where appropriate.

17.2.25 Decommissioning is anticipated to take approximately 12 months. The Decommissioning Phase is anticipated to last for a shorter period, involve fewer workers on-site, and involve less activity than that during the Construction Phase. For the purposes of this assessment, health effects during the Decommissioning

Phase are assumed to be no greater than those during the Construction Phase, and the health effect during construction and decommissioning is assessed jointly.

Summary of effects

17.2.26 The following table summarises the above information, showing the Receptors, Study Area and temporal scope for each effect.

Table 17-8 Potential health effects, Receptors, Study Areas and assessment phases

Determinant of health	Receptor population	Study Area	Assessment phases/year(s)
Diet and nutrition	Residents, workers	Anglesey	Construction, Operational and Decommissioning 2026-2088
Housing	Residents	Anglesey	Construction and Decommissioning 2026-2028 2088
Open space, leisure and play	Residents	NIA	Operational 2028-2088
Transport modes, access and connections	Residents, workers	NIA	Construction and Decommissioning 2026-2028 2088
Community identity, culture, resilience and influence	Residents	Anglesey	Construction, Operational and Decommissioning 2026-2088
Education and training	Residents, workers	Anglesey	Construction, Operational, and Decommissioning 2026-2088
Employment and income	Residents, workers	Anglesey	Construction, Operational, and Decommissioning 2026-2088
Climate change and adaptation	Residents	National	Operational 2028-2088

Determinant of health	Receptor population	Study Area	Assessment phases/year(s)
Water quality or availability	Residents	NIA	Construction and Decommissioning 2026-2028 2088
Noise and vibration	Residents	NIA	Construction, Operational, and Decommissioning 2026-2088
Health and social care services	Residents	NIA	Construction and Decommissioning 2026-2028 2088
Wider societal infrastructure and resources	Residents	National	Operational 2028-2088
Bio-physical environment (radiation)	Residents, workers	NIA	Operational 2028-2088

Assumptions and limitations

17.2.27 The assessment methodology in this chapter is preliminary and is subject to review following engagement with key stakeholders, that will take place before the production of the ES. Further assessment work will be undertaken between statutory consultation and the preparation of the ES.

17.2.28 There is no UK legislation or statutory guidance for the assessment of human health effects. However, there are some well-established guides available for HIAs, including Health in Environmental Impact Assessment: A Primer for a Proportionate Approach (Ref 17-7); Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime (Ref 17-8); Health Impact Assessment: a practical guide (Ref 17-9); and the Healthy Urban Planning Checklist (Ref 17-10).

17.2.29 Effects are identified from the interaction between the magnitude of impacts and the sensitivity of Receptors. Specifically, the assessment of significance of impacts is based on the magnitude of the predicted change to the baseline

position, as well as the sensitivity of the health Receptors. A summary of the assessment methodology is provided below.

Receptor sensitivity

17.2.30 Receptor sensitivity is the ability of a given Receptor to respond to change. Sensitivity is determined by the number of people exposed to the health effect and the extent to which the exposed population experiences inequalities in health or can access services and facilities.

17.2.31 Table 17-9 sets out the criteria used to determine the sensitivity of Receptors. These criteria are drawn from the IEMA's (2022) Determining Significance for Human Health In Environmental Impact Assessment (Ref 17-11).

Table 17-9 Sensitivity criteria

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

Magnitude of impact

17.2.32 The magnitude of impact is the degree of change in the health determinant compared to the baseline conditions. The magnitude of impact is determined with reference to the baseline conditions, using the criteria provided in Table

17-10Table 17-10 and classified as high, medium, low, or negligible. These criteria are drawn from the IEMA's (2022) Determining Significance for Human Health In Environmental Impact Assessment (Ref 17-12).

Table 17-10 Magnitude of impact

Magnitude of impact	Description
High	High exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/ injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	Low exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	Very low exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	Negligible exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Significance of effects

17.2.33 Health effects are a reflection of the relationship between the sensitivity of the affected Receptor and the magnitude of the impact. Table 17-11 shows how the assessment of the significance of effects has been determined.

Table 17-11 Significance matrix

Magnitude of Impact	Sensitivity of Receptor		
	High	**Medium**	**Low**
High	Major	Major	Moderate
Medium	Major	Moderate	Minor

Low	Moderate	Minor	Negligible
Negligible	Minor	Negligible	Negligible

17.2.34 Moderate or major effects are generally classed as significant, minor and negligible effects are generally classed as not significant (although minor effects may be a matter of local concern).

Assumptions and limitations

17.2.35 This preliminary assessment has been carried out using professional judgement, based on available information.

17.2.36 The preliminary assessment has been assessed against current population and health baseline conditions prevailing around the Project. As with any dataset, these may be subject to change over time, which may influence the findings of the assessment. Many datasets do not reflect the short-term or long-term consequences of the Covid-19 pandemic. Where these consequences may influence a finding of the assessment, this has been identified and methods to validate the information applied.

17.2.37 The preliminary health assessment builds upon the technical outputs from other PEIR chapters to investigate changes in health determinants directly attributable to the Project. As a consequence, any limitations of the supporting preliminary assessments are inherent to the preliminary assessment of health.

17.3 Baseline conditions

17.3.1 This section summarises the baseline of health conditions of Anglesey using a combination of publicly available data, local guidance and policy documents from stakeholders including NHS Wales and the BCUHB.

Current population baseline

17.3.2 The National Survey for Wales is the key source for information relating to health outcomes at a sub-national level across Wales. Table 17-12 presents a summary (national) level drawn from this data.

17.3.3 Overall, the Anglesey population generally performs marginally better than the national average on most health indicators. However, there are key issues which

have been identified in policy and through engagement such as child obesity, an ageing population, and poverty rates.

17.3.4 Anglesey performs on par with the national averages with respect to life expectancy. For women and men in Anglesey, life expectancy is 82 and 79, respectively, compared to 82 and 78 nationally (Ref 17-13). The proportion of residents in Anglesey considered to be in bad or very bad health is 7%, marginally lower than the national average of 8% (Ref 17-14). A third (36%) of adults in Anglesey are limited by a longstanding illness, which is the same as the national average. A lower proportion of Anglesey resident's report having each of: musculoskeletal illnesses (15%), heart and circulatory complaints (9%), respiratory illnesses (7%), and mental health conditions (11%) than the national average (Ref 17-15).

17.3.5 Residents of Anglesey generally report relatively fewer behaviours that expose them to poor health. Self-reported rates of harmful levels of alcohol consumption and smoking are below the levels across Wales. Beyond physical health, 69% of adults in Anglesey agree that there is good community cohesion in their local area, compared to the national average of 64% (Ref 17-16). IoACC also has the 2nd highest proportion of residents that possess Welsh language skills across all local authorities in Wales - 56% of Anglesey residents report speaking Welsh fluently, compared to the national average of 18% (Ref 17-17). However, despite Anglesey having some of the highest rates of Welsh language speaking, these levels have declined from 62% of residents being fluent in 1981 (Ref 17-18).

17.3.6 Although Anglesey performs marginally better compared to the national rate on the indicators above, there are health issues across Anglesey. Although marginally lower than the national rate, 58% of adult residents were categorised as overweight or obese as of 2022/23 (compared to 62% nationally) (Ref 17-19). In addition to this, the most recent data from prior to the pandemic shows that 30% of 4–5-year-olds in Anglesey were obese compared to 26% nationally (Ref 17-20). Elsewhere in the UK, more recent evidence suggests that this figure is likely to be rising.

17.3.7 The proportion of children living in poverty in Anglesey (29%) is marginally higher than the national average of 28% (Ref 17-21). 12% of adults in Anglesey report struggling to eat enough food on a regular basis. 4.4% of all adults in Anglesey report having experienced hunger because they could not afford food (Ref 17-22). Consultation feedback from the Anglesey Well-Being Assessment 2022 frequently raised issues of poverty for Anglesey residents. Given the cost-of-living crisis and rising prices for energy costs, the assessment highlights poverty as a priority for addressing well-being in Anglesey. The main driver of deprivation across Anglesey stems from access to services, with half of the Lower Layer Super Output Areas (LSOAs) making up Anglesey falling in the top 25% most deprived for this determinant (Ref 17-23).

17.3.8 Anglesey also has an ageing population with the number of older adults receiving some form of care rising in recent years (Ref 17-24). There is also a rising number of individuals with health conditions and disabilities (Ref 17-25). Between 2015 and 2020 alone, the proportion of people reporting their health as poor in Anglesey rose from 15% to 25% (Ref 17-26). This is also reflected in rising numbers of patients registered at GP practices with a chronic health condition. Additionally, out of every 100 residents in Anglesey, 12 report feeling lonely. High rates of loneliness are particularly the case in Holyhead and the areas to the west of Anglesey.

Table 17-12 Summary health profile for LA and Wales

Health measure	IoACC	National
Life expectancy - male	79	78
Life expectancy - female	82	82
% of residents reporting bad or very bad health	87%	8%
% of residents reporting having a long-standing illness	48%	48%
% of residents limited by a longstanding illness	36%	36%
% of residents with musculoskeletal illnesses	15%	17%
% of residents with heart and circulatory complaints	9%	11%
% of residents with metabolic diseases	8%	8%

Health measure	IoACC	National
% of residents with respiratory illnesses	7%	8%
% of residents with mental health conditions	11%	12%
% of adults who smoke	9%	13%
% of adults reporting drinking harmful levels of alcohol weekly	1%	2%
% of adults reporting eating no fruit or vegetables yesterday	2%	6%
% of adults reporting being active for less than 30 minutes the previous week	47%	31%
% of adults reporting participating in sport at least three times per week	34%	39%
% of adults overweight or obese	58%	62%
% of adults who agree there is good community cohesion in their local area	69%	64%
% of adults reporting an ability to speak fluent Welsh	48%	18%
% of adults reporting an ability to speak some Welsh	12%	16%
% of households deemed in fuel poverty	17%	12%
% of children living in poverty (after housing costs)	29%	28%
All data is taken from the National Survey for Wales, with the exception of (i) fuel poverty data, which is taken from House of Commons Library (2023) Fuel Poverty in the UK and (ii) the child poverty data, which is taken from End Child Poverty (2023) Child poverty in your area. All data relate to 2022/23, apart from fuel poverty data (modelled estimates for 2018), and the proportion of adults who agree there is good community cohesion in their local area (taken from 2021/22 as 2022/23 data is unavailable).		

Future baseline conditions

17.3.9 Future baseline conditions are informed by national trends. Where forecasts are identified, they inform the future baseline; where they are not, the most accurate expectation of future baseline conditions is the continuation of the existing trends outlined below.

Life expectancy

17.3.10 Although life expectancy has continued to increase across Anglesey and Wales, recent years have seen a slowdown in these improvements (Ref 17-27). This has

been more prominent in the UK than elsewhere in Europe, where the UK has been sliding in the life expectancy tables for both males and females.

General health

17.3.11 The national survey for Wales is a national survey which involves around 12,000 people each year and covers a wide range of topics (Ref 17-28). The results have shown an overall decline in the percentage of people who say they are in good or very good health in Anglesey, however, the opposite has occurred nationally. For individuals with long standing illnesses, Wales has seen a slight increase, whereas, Anglesey has seen a significant increase showing that people are experiencing poorer health.

Demography

17.3.12 Wales's population has steadily increased over recent decades, with the population continually ageing. Anglesey Well-Being Assessment 2022 finds that there is forecast to be an overall decline in the Anglesey population from 70,440 in 2020 to 69,575 in 2043 (Ref 17-29). However despite this, a significant rise in older people is anticipated. In Anglesey, the population within every age group under 65 is predicted to fall, while every age group above 65 is predicted to rise.

Lifestyle

17.3.13 Obesity and smoking are among the leading risk factors for ill health and are associated with a range of conditions. Since 2007 there has been an upward trend in adult obesity, but smoking prevalence continues to decline (Ref 17-30) (Ref 17-31).

Welsh language

17.3.14 The Welsh language continues to face longstanding challenges, particularly in retaining young people within Anglesey areas due to migration pressures. (Ref 17-32) Despite Anglesey having some of the highest rates of Welsh language speakers, these levels are falling and have declined from 62% of residents being fluent in 1981 to 56% in 2021 (Ref 17-33).

Vulnerable populations

17.3.15 This section summarises the vulnerable populations present in each Study Area, where this can be determined. The population share of vulnerable groups is

compared to the shares in the NCA, Anglesey and the national average areas, to determine if these groups are present in relatively larger numbers in the area. The relative presence of vulnerable population for each effect informs the sensitivity of the Receptor population. It is noted that data is often not available at the NIA level and therefore vulnerable groups found within the NCA are also assumed for the NIA level.

17.3.16 Table 17-13 summarises the data on the presence of vulnerable populations within each of the Study Areas. Vulnerable population groups for the NCA and Anglesey are shaded dark blue where the vulnerable population takes up a larger share of the population than the national average, and light blue where a group takes up a smaller share.

17.3.17 Both the NCA and Anglesey share a similar profile of vulnerable population groups present. Each area contains a relatively lower share of most of the vulnerable populations for which data is available, with the exception of two population groups: older people (a 28% share of the resident population in the NCA and 26% across Anglesey compared to 20% nationally), and people with a religious belief (a self-reported 58% of the NCA population and 56% of the Anglesey population compared to 50% nationally).

Table 17-13 Vulnerable populations in the Study Areas

Vulnerable group	Measure used	NCA	Anglesey	National
Children and young people	% of residents aged under 18	18%	19%	20%
Older people (Aged 65 or over)	% of residents aged 65+	28%	26%	21%
Income-related groups	Unemployment rate	5.3%	5.4%	5.5%
People with disability and long-term illness	% of residents disabled under the Equality Act	21%	21%	22%

Vulnerable group	Measure used	NCA	Anglesey	National
Single-parent families	Single-parent households as % of households with dependent children	27%	28%	29%
Ethnic minority	% of residents	2.9%	3.7%	9.4%
Religious groups	% of residents identifying as having a religious belief	58%	56%	50%
All data presented is drawn from National Census 2021 except the proportion of neighbourhoods ranking within the top 20% most deprived, which is drawn from the Welsh Index of Multiple Deprivation (2019).				

Community facilities and open spaces

17.3.18 Both the NIA and Anglesey contain a range of community facilities that support social and economic activities for local residents and workers. The Anglesey community buildings directory identifies a total of 61 community buildings across the Island, including community centres, village halls, and places of worship. In addition, there are a total of 48 nursery, primary and secondary schools currently operational in Anglesey .

17.3.19 Figure 17.3 presents a map of the community facilities in the NCA and NIA. Within the NIA there are three GP practices (Meddygfa Cemaes Surgery, Canolfan Lechyd Amlwch Surgery and Glan Menai Surgery), nine schools (all primary schools) and one nursery (Little Ladybirds in Pen-y-sarn). The closest community facilities to the PEIR Boundary are the Glan Menai Surgery and Ysgol Gymuned Llannerch-y-medd, both within Llannerch-y-medd and approximately 200m from the PEIR Boundary.

17.3.20 Appendix 6-4 Amenity and Recreation Assessment (ARA) assesses the impacts on users of recreational assets comprising Public Rights of Way (PRoW) including public footpaths, bridleways, restricted byways, and byways open to all traffic; Permissive Paths; open access and common land; cycle routes, recreational facilities, nature reserves, parks and waterbodies used for amenity and recreation.

Figure 6-5 identifies a number of amenity and recreational resources within the NIA.

Construction and decommissioning

17.3.21 This section provides a summary of the baseline conditions critical for assessing the sensitivity of each health effect during the Construction and Decommissioning Phases. It concludes by specifying the Receptor sensitivity determined for evaluating each health effect. The Receptor sensitivity for each health effect remains consistent across both the Construction and Decommissioning Phases.

Diet and nutrition

17.3.22 As identified in the current population baseline, Anglesey has a high rate of residents aged 16 and above and 4-5 year olds categorised as overweight or obese. The National Survey for Wales identified that only 16% of adults in Anglesey ate at least 5 portions fruit and vegetables the previous day, which is significantly lower than the national average of 29% (Ref 17-34). This is the second lowest percentage of all local authorities in Wales. However, Anglesey performs better than the national average in other indicators. When compared to other indicators such as eating no fruit and vegetables and eating some fruit and vegetables, Anglesey does perform better than national levels. Only 2% of adults 16 and over ate no fruits and vegetables the previous day, compared to 6% nationally.

17.3.23 The Anglesey Locality Needs Assessment 2022-23 identified 12% of adults in Anglesey report struggling to eat enough food on a regular basis (Ref 17-35). 4.4% of all adults in Anglesey report having experienced hunger because they could not afford food. Overall, diet and nutrition in Anglesey is likely relatively poorer than the national average.

17.3.24 However, PHW finds that Wales does not have its own separate, independent and explicit food system, but is part of the UK internal and international food system (Ref 17-36). Therefore, as a large part of diet and nutrition is mostly dictated by trade, and so it is not likely that residents would be very sensitive to changes in diet and nutrition on this basis.

17.3.25 The following population groups are considered vulnerable to changes to diet and nutrition: young people, young people with obesity, older people, low income groups, and people with long-term illness or disability. Existing data shows that Anglesey has a high presence of older people and people with long-term illness or disability.

17.3.26 The Receptor population has a medium sensitivity to changes in diet and nutrition.

Housing

17.3.27 In 2023, the average house price in Anglesey was £225,000, which is 6.9 times the average local income, higher than the Welsh average of 6.1 (Ref 17-37).

17.3.28 The 2021 Census reported that only 1.6% of households in Anglesey were classified as overcrowded, below the Welsh national average of 2.2%. This suggests a relatively lower sensitivity to housing access issues in Anglesey (Ref 17-38). Fuel poverty rates in Anglesey are also notably high as mentioned in the current population baseline. This indicates that housing costs in Anglesey may be less affordable for some residents. The Anglesey Locality Needs Assessment 2022-23 highlights housing affordability and associated fuel poverty as key concerns (Ref 17-39).

17.3.29 Overall, housing in Anglesey is less affordable than the national average. Although low overcrowding rates and high home vacancy, as reported in the 2021 Census, suggest relatively easier access to housing, affordability remains a significant issue, which can strain residents and impact mental health (Ref 17-40).

17.3.30 The following population groups are considered vulnerable to changes in access to housing: young people, older people, low income groups, and people with long-term illness or disability. Existing data shows that Anglesey has a high presence of older people and people with long-term illness or disability. The Receptor population has a medium sensitivity to changes in housing.

Transport modes, access and connections

17.3.31 The current emphasis in health policy on obesity highlights the potential sensitivity of local residents' health outcomes to changes in transport modes, access, and connections. Residents of the NCA, who live in more rural settings, rely heavily on private vehicles and existing transport links in Anglesey. This reliance

underscores the importance of considering how changes in transport can impact public health, particularly in relation to physical activity levels and obesity. Similarly, changes to transport can impact mental health from increased stress levels from commuter traffic, changes to known transport routes and isolation due to lack of transport.

17.3.32 As discussed above, levels of obesity are recognised as a key health issue for Anglesey in local policy. Other sources of surveyed data show that Anglesey residents have relatively high rates of physical activity, however obesity remains an issue for Anglesey and within the NCA.

17.3.33 Both the NCA and the broader region are predominantly rural, leading to a relatively higher reliance on cars and other private vehicles for transportation. In the NCA, 13% of residents do not have access to a car, compared to 15% in Anglesey and 19% across Wales overall (19%) (Ref 17-41).

17.3.34 As of the 2021 Census, 36% of working residents in the NCA report travelling over 10km to work for the majority of working days. This compares to 31% across Anglesey and 24% across Wales (Ref 17-42).

17.3.35 As the area faces a relatively high level of car dependency, the rate of road traffic accidents is relatively high. Over the five-year period 2019-2023, Anglesey faced an average of 21 killed and seriously injured (KSI) road accidents each year. This corresponds to 3.1 per 10,000 residents, compared to the equivalent figure of 2.9 for the whole of Wales (Ref 17-43).

17.3.36 Chapter 9: Transport provides a summary of the baseline conditions with relation to the surrounding highway and walking and cycling networks. This summary highlights that there is limited provision of footways and no dedicated cycling lanes within the PEIR Boundary.

17.3.37 The following population groups are considered vulnerable to changes in transport modes, access and connections: young people, young people with obesity, older people, low income groups, and people with long-term illness or disability. Existing data shows that the NCA has a high presence of older people and people with long-term illness or disability.

17.3.38 As a result, the Receptor population is deemed to have high sensitivity to change in transport modes, access and connections.

Community identity, culture, resilience and influence

17.3.39 In communities where social bonds and cultural identity are strong, alterations in demographic composition or disruptions to social connections can impact health. For instance, the cancellation of a community event could disproportionately affect the well-being of individuals who heavily depend on such gatherings for social support and engagement.

17.3.40 Poor community cohesion and integration are often seen as contributing factors to loneliness and mental wellbeing. The role of a local community plays heavily in shaping residents' social lives. In particular, 'social capital' - which refers to the ties between individuals and the trust, mutual reciprocity and support that these networks provide - that is fostered within local communities has important implications for mental health and wellbeing and associated with reduced loneliness.

17.3.41 There is evidence that local residents in Anglesey have strong ties to their local community and to their cultural identity. 69% of Anglesey residents agree that their local area has a good sense of community cohesion compared to 64% across Wales (Ref 17-44).

17.3.42 Local health policy for Anglesey similarly highlights the importance of the promotion of the Welsh language to Anglesey residents (Ref 17-45). Anglesey has some of the highest rates of Welsh speaking and proficiency in the country, and the Anglesey Well-Being Assessment 2022-23 shows its continued importance for many residents. The distinctive culture of Anglesey is noted throughout their strategy documents (Ref 17-46).

17.3.43 The following population groups are considered vulnerable to changes in community identity, culture, resilience and influence: older people, ethnic minority groups, and religious groups. Existing data shows that Anglesey has a high presence of older people.

17.3.44 Overall, the Receptor population is deemed to have a high sensitivity to change.

Education and training

17.3.45 As noted in Chapter 16: Socio-economics, Anglesey is facing a number of skills shortages with a decline in previously dominant industries and loss of major employers. There is a lack of high-paid jobs in Anglesey and skills gaps around green skills. There is considered relatively high demand for apprenticeships across Anglesey and residents have qualification levels broadly in line with the Wales average.

17.3.46 The following population groups are considered vulnerable to changes in education and training: low income groups, people with a long-term illness or disability, and single-parent families. Existing data shows that Anglesey has a high presence of people with long-term illness or disability.

17.3.47 Overall, the Receptor populations are deemed to have a medium sensitivity to change.

Employment and income

17.3.48 Creating high quality jobs is one of IoACC's key priorities. The North Anglesey Socio-economic Impact Report (2024) provides a detailed view of the challenges facing North Anglesey's economy (Ref 17-47), which includes closures of major employers leading to concerns around a lack of jobs coupled with high inactivity rates from an ageing population and youth flight.

17.3.49 As noted in Chapter 16: Socio-economics, construction is considered a dominant industry for North Anglesey and construction workers in Anglesey have above-average earnings.

17.3.50 PEIR Chapter 16: Socio-economics presents a detailed future baseline on employment, suggesting there would be approximately 1,700 construction jobs in Anglesey in 2028 - a 12% uplift on baseline construction job levels.

17.3.51 The following population groups are considered vulnerable to changes in employment and income: low-income groups, people with a long-term illness or disability, single-parent families, and ethnic minority groups. Existing data shows that Anglesey has a high presence of people with long-term illness or disability.

17.3.52 Overall, the Receptor populations are deemed to have a medium sensitivity to change.

Water quality or availability

17.3.53 Chapter 13: Water Resources presents a detailed baseline for local water sources and flood risk. According to the Welsh Government's Flood Map for Planning (FMfP), the PEIR Boundary is predominantly situated within a Zone 1 flood risk area, indicating little or no risk of flooding. However, some sections fall within Zone 2 (medium risk) and Zone 3 (high risk). These zones, as defined by Technical Advice Note 15 (TAN15), guide local authorities in determining the suitability of developments based on flood risk (Ref 17-48).

17.3.54 In addition, the Development Advice Map (DAM), a separate tool for assessing flood risk, though generally considered less current than the FMfP, shows that most of the PEIR Boundary lies within Zone A, which is associated with little or no risk of fluvial or tidal/coastal flooding. There are areas within Zone B, where historical flooding has occurred, and Zone C2, representing parts of the floodplain that lack significant flood defence infrastructure, corresponding to an extreme flood event with a likelihood of 1 in 1,000 years or greater.

17.3.55 Within the catchment area for the potential impact of the Project on water quality (identified in Chapter 13: Water Resources) there are six water body catchments with identified water quality ranging from moderate to good.

17.3.56 The following population groups are considered vulnerable to changes in water quality or availability: young people, older people, and people with a long-term illness or disability. Existing data shows that the NCA has a high presence of older people and people with long-term illness or disability.

17.3.57 Overall, the Receptor populations are deemed to have a low sensitivity to change.

Noise and vibration

17.3.58 Across Anglesey there is some evidence that issues of noise are relatively uncommon. The Chartered Institute of Environmental Health's 2019/20 Noise Survey reports that of all local authorities in Wales, Anglesey had the lowest rate of noise complaints per resident in 2018/19 (with 10 complaints per 10,000 residents compared to an average of 65 across Wales) (Ref 17-49).

17.3.59 The baseline findings from PEIR Chapter 10: Noise observed that the noise climate in the NIA typically comprised natural and wildlife noise such as birdsong, and occasional operational noise from agricultural land and farm buildings. There was some additional distant road traffic noise from rural road networks was observed to be audible, but infrequent.

17.3.60 Within 500m of the PEIR Boundary (the area for which an assessment of the impact of noise and vibration changes is undertaken in PEIR Chapter 10: Noise), there are two identified community facilities. These are the Glan Menai Surgery GP practice and the Ysgol Gymuned Llannerch-y-medd primary school, both located in Llannerch-y-medd and within 300m of the PEIR Boundary.

17.3.61 The following population groups are considered vulnerable to changes in noise and vibration: young people, older people, and people with a long-term illness or disability. Existing data shows that the NCA has a high presence of older people and people with long-term illness or disability.

17.3.62 Overall the Receptor populations are deemed to have a medium sensitivity to change.

Health and social care services

17.3.63 Receptor populations can be more impacted by changes in access to health and social care services where limited options are available, or where existing services face constraints, for example in their ability to meet demand.

17.3.64 There are three GP practices located within the NIA: Glan Menai Surgery, Canolfan Iechyd Amlwch Surgery, and Meddygfa Cemaes Surgery. These practices jointly serve 17,365 patients (Ref 17-50). The nearest hospital is the Betsi Cadwaladr University Hospital, located approximately 20km from the NIA in Bangor.

17.3.65 As of July 2023, the BCUHB is operating at a ratio of 1,420 patients for every fully qualified GP (Ref 17-51). This is marginally above the level across Wales of 1,345.

17.3.66 As of the year to September 2023, 69% of accident and emergency patients attending the Betsi Cadwaladr University Hospital were seen within the four-hour

target waiting time. (Ref 17-52) This figure is in line with the average for hospitals across Wales (also 69%).

17.3.67 There is evidence that Anglesey residents are located further away from GP practices than other parts of Wales. Return public and private travel time to both the nearest GP practice and pharmacy is higher in Anglesey than it is in Wales, and lack of time access to GP provision is raised as a priority within the Anglesey Locality Needs Assessment 2022-23 (Ref 17-53).

17.3.68 Overall, the high-level indicators that are available in public data do not show that health and social care services are experiencing levels of demand that affect their service delivery. This conclusion will be reviewed for the ES application as more engagement is undertaken with health organisations.

17.3.69 The following population groups are considered vulnerable to changes in access to health and social care services: young people with obesity, older people, people with a long-term illness or disability, single-parent families, and ethnic minority groups. Existing data shows that the NCA has a high presence of older people, and people with long-term illness or disability.

17.3.70 Overall, the Receptor populations are deemed to have medium sensitivity to change.

Operation

17.3.71 This section provides a summary of the baseline conditions for the effects assessed during the Operational Phase.

Diet and nutrition

17.3.72 The baseline for the changes to the diet and nutrition effect is the same for both the Construction and Operational Phase and as such the baseline and Receptor sensitivity for this effect remains the same as above.

Open space, leisure, and play

17.3.73 Receptor populations may be more sensitive to changes in access to open spaces, leisure, and play areas, particularly in areas where existing access to such facilities is limited or where specific population groups rely heavily on them

for their health needs. For example, younger children, who disproportionately use play spaces, would be significantly impacted by the closure of these areas

17.3.74 As described above, levels of obesity are recognised as a key health issue for Anglesey in local policy. Other sources of survey data show that Anglesey residents have relatively high rates of physical activity, however obesity remains an issue across Anglesey and within the NCA.

17.3.75 The ARA identifies local open spaces which comprises of outdoor recreation resources such as recreation and playing fields, golf courses, allotments and cemeteries. (see Figure 1). The spaces are predominantly located within or near to settlements, principally at the southern edge of Amlwch to the north and northwestern edge of Llannerch-y-medd at Maen Hir South A. While the primary focus of users may be on the relevant activity, the wider amenity offering of the space will also contribute significantly to their experience.

17.3.76 The ARA highlights a number of Public Rights of Way (PRoW) which provide access to the countryside in the north of the NIA with a more limited network evident in the central and southern parts. No PRoW are within Maen Hir South B, and many of the routes in Maen Hir North, notably around the Rhosgoch site and Bodewryd are not passable, either as a result of overgrown vegetation or no legible route on the ground. In Maen Hir Central, there is one PRoW, but it extends beyond the PEIR Boundary, and there are four PRoW in Maen Hir South A.

17.3.77 The Anglesey and Gwynedd Joint Local Development Plan Topic Paper 14: Open Space Assessment (2016) provides the latest assessment of the provision of open space within the Isle of Anglesey (Ref 17-54). This assessment compares the provision of open space in each settlement in Anglesey to the Fields in Trust target of 2.4ha of open space per 1,000 residents. The results, shown in Table 17-14 highlight that overall settlements in both the NCA and the Isle of Anglesey have a greater provision of open space than the Fields in Trust standard, however there are some settlements, including Benilech and Cemaes, where provision falls below the target level given their population size.

Table 17-14 Summary of open space provision compared to target

Settlement	Total open space (ha)	Fields in Trust 2.4 hectare standard (ha)	
		Target provision	Actual provision
Amlwch	21.6	8.2	11.9
Llangefni	65.8	12.2	18.0
Benilech	5.1	5.5	2.8
Cemaes	6.0	3.0	3.4
All settlements in the NCA	98.6	28.9	36.1
All settlements in Anglesey	333.6	90.8	93.8

Source: IoACC, 2016. Anglesey and Gwynedd Joint Local Development Plan Topic Paper 14: Open Space Assessment.

17.3.78 Given the local policy objectives to reduce obesity and improve connectivity across Anglesey, access to open space, leisure and play is considered to play an important role in determining health outcomes.

17.3.79 The following population groups are considered vulnerable to changes in access to open space, leisure and play: young people, young people with obesity, older people, people with a long-term illness or disability, and single-parent families. Existing data shows that the NCA has a high presence of older people and people with long-term illness or disability.

17.3.80 The sensitivity of the Receptor population is deemed medium to change.

Community identity, culture, resilience and influence

17.3.81 The baseline for the changes to the community identity, culture, resilience and influence effect is the same for both the Construction and Operational Phase and as such the baseline and Receptor sensitivity for this effect remains the same as above.

Education and training

17.3.82 Chapter 16: Socio-economics provides a detailed baseline of education and training at the LCA level during operation. In summary, Anglesey faces a mixed

picture regarding education, skills, and training. Most apprenticeships are at foundation or level 3, with only 13% at level 4 or above, which is below the national average of 19%. There is a higher concentration of jobs requiring level 3 skills in the LA compared to Wales (29% compared to 24%), but fewer jobs demanding level 4 skills (37% compared to 42%). The North Wales Skills and Employment Plan identifies significant skills shortages, particularly in renewable energy, engineering, and STEM fields, with 37% of vacancies in North Wales being hard to fill. Additionally, the North Anglesey Socio-Economic Impact Report highlights a lack of high-paying jobs, risking outward migration, and emphasises the need for initiatives like Energy Island to attract employment opportunities.

17.3.83 Chapter 16: Socio-economics also provides a detailed future baseline of operational employment across the LCA. Residents will have access to a range of operational opportunities associated with nuclear and energy related developments as part of the Energy Island Framework.

17.3.84 The following population groups are considered vulnerable to changes in education and training: low-income groups, people with a long-term illness or disability, single-parent families, and ethnic minority groups. Existing data shows that Anglesey has a high presence of people with long-term illness or disability.

17.3.85 Overall, the Receptor populations are deemed to have a medium sensitivity to change.

Employment and income

17.3.86 Chapter 16: Socio-economics provides a detailed baseline of employment and income at the LCA level during operation. In summary, employment growth has been relatively slow since 2015 to 2022 (only 1% growth), however employment and economic activity rates are marginally better than the Welsh average. Economic inactivity rates remain an issue, which raises further concerns based on a reduction of young people in Anglesey coupled with an ageing population. Earnings across the LCA are broadly in line with the Wales average, however there is inequality in earnings across the Study Area, with a £10,000 difference in average earnings between Pwllheli and Porthmadog and Bangor and Holyhead.

17.3.87 Chapter 16: Socio-economics also provides a detailed future baseline of operational employment across the LCA. This suggests that employment in the LCA could decrease by up to -2%, indicating a lack of future jobs.

17.3.88 The following population groups are considered vulnerable to changes in employment and income: low-income groups, people with a long-term illness or disability, single-parent families, and ethnic minority groups. Existing data shows that Anglesey has a high presence of people with long-term illness or disability.

17.3.89 Overall, the Receptor populations are deemed to have a medium sensitivity to change.

Climate change and adaptation

17.3.90 Climate change is identified as a key issue for the future of health and well-being in Anglesey in a number of local policy documents include the Anglesey Well-Being Assessment and the Anglesey Locality Assessment 2022-23. The Anglesey Energy Island vision has been created in part to address the increasing risks of climate change for Anglesey.

17.3.91 In Anglesey, the impacts and risks of climate change are heightened, with the well-being assessment identifying flooding, landslides and risks to the natural environment as the main challenges across the Island.

17.3.92 In 2022 to 2023, 74% of Wales residents are very or fairly concerned about climate change (Ref 17-55). In Anglesey, the impacts and risks of climate change are heightened, with the well-being assessment identifying flooding, landslides and risks to the natural environment as the main challenges for the LA. As of 2022, 2,826 Anglesey properties are at risk of coastal flooding (Ref 17-56).

17.3.93 Chapter 14: Climate Change outlines the baseline conditions within the PEIR Boundary. The current land use, predominantly agricultural fields, may act as a carbon sink. These areas have relatively low levels of greenhouse gas (GHG) emissions compared to overall emissions in the wider region, given that the land is largely arable.

17.3.94 The future baseline identifies that the land use within the PEIR Boundary will have minor levels of associated GHG emissions from agricultural activities and minor

carbon sequestration from vegetation and embodied GHG emissions are considered zero in the baseline.

17.3.95 The following population groups are considered vulnerable to changes in climate change and adaptation: young people, older people, people with a long-term illness or disability, and low-income groups.

17.3.96 At the national level addressing the impacts of climate change is key to much of the policy and legislation that underpins the future vision for Wales. To reflect this, and the priorities outlined within local Anglesey policy, the Receptor populations are deemed to have high sensitivity to change.

Noise and vibration

17.3.97 The baseline for the changes to noise and vibration effect is the same for both the Construction and Operational Phase and as such the baseline and Receptor sensitivity for this effect remains the same as above.

Wider societal infrastructure and resources

17.3.98 Enhancing the wider societal infrastructure and resources will have an impact on health. IEMA guidance defines this determinant of health as energy, transport, waste management, water, communication and other infrastructures that contribute towards good population health (Ref 17-57). Based on this description, the focus of this determinant of health is on the impact of energy infrastructure on health given the scope of the Project.

17.3.99 Energy infrastructure impacts physical and mental health by influencing healthy indoor living environments. For example, thermal discomfort and fuel poverty are found to have negative mental health impacts (Ref 17-58).

17.3.100 The Project would support local and community-owned energy infrastructure, which can contribute to addressing local challenges. PPW sets out the Welsh Government's targets around renewable energy projects, specifically related to new energy projects to have at least one element of local ownership (Ref 17-59). This is the vision for the Welsh Government's publicly owned Ynni Cymru renewable energy initiative located on Anglesey.

17.3.101 The Anglesey Well-Being Assessment highlights the cost-of-living crisis as a key issue for many of the residents on Anglesey. The existing economic challenges faced by Anglesey residents (and residents across Wales) have meant some people are unable to keep up with rising costs for food, energy and other essentials.

17.3.102 Across Wales there is a need for residents to have access to affordable energy. 77% of Welsh residents surveyed by Public Health Wales report in 2023 being worried about the rising cost of living. The most common change made to address the cost-of-living crisis is reducing energy use (Ref 17-60).

17.3.103 The following population groups are considered vulnerable to changes in access to wider societal infrastructure and resources: elderly, young people and low-income groups.

17.3.104 Overall, the Receptor populations are deemed to have medium sensitivity to change.

Bio-physical environment (radiation)

17.3.105 Guidance defines major electrical infrastructure as overhead lines, underground cables and substations at 132kV and above (Ref 17-61). There are some material sources of electrical generation within the NIA, such as the recently operational Porth Wen solar farm. There are power lines, and two substations located within the NIA (Figure 17.4). The two substations are currently located in Wylfa and Amlwch, with three power lines running through various areas within the PEIR Boundary.

17.3.106 The following population groups are considered vulnerable to changes in radiation: young people and people with a long-term illness or disability. Existing data shows that the NCA has a high presence of older people and people with long-term illness or disability.

17.3.107 There is limited available information regarding existing health conditions related to EMF. The NIA does not contain any major sources of EMF exposure. Existing literature highlights the uncertainty surrounding the health effects of EMF exposure (Ref 17-62).

17.3.108 The overall sensitivity of the Receptor population to changes in the bio-physical environment as a result of EMF radiation is deemed low.

17.4 Embedded Mitigation

17.4.1 Currently, the following embedded Mitigation measures have been integrated into the design of the Project that are relevant to the determinants of human health during construction:

- Siting of the PV Arrays, BESS and Project Substation, and the 33kV/132kV Substations away from sensitive landscape and visual Receptors including the exclusion of PV Arrays within a range of fields near to sensitive assets; details off parameters and offsets are provided in Appendix 5-1.
- The cabling within the Grid Connection Corridor will be buried underground at a suitable depth and set back from sensitive Receptors in accordance with relevant guidance (Ref 17-86); details off parameters and offsets are provided in Appendix 5-1.
- Good practice measures will be implemented to reduce disturbance associated with noise and vibration on sensitive Receptors during construction as far as reasonably practicable, which will be detailed in the outline Construction Environmental Management Plan (oCEMP).
- Designing, constructing and implementing the Project to reduce the creation of waste and increase the use of alternative materials with lower embodied carbon, such as locally sourced products and materials with a higher recycled content where practicable.
- Implementation of an outline Travel Plan to reduce the use of private car journeys to the PEIR Boundary.
- The outline Travel Plan will encourage the use of lower carbon modes of transport by identifying and communicating low carbon transport options, including local bus services and pedestrian and cycle routes to and from the PEIR Boundary to all decommissioning staff and providing facilities for the safe storage of cycles.

The following embedded Mitigation measures relate to the Operational Phase:

- Enhancement measures also relate to the Community Solar Project. The Applicant will provide a 5MWp Community Solar Project as part of the Project. It is anticipated that the Community Solar Project will be owned and managed by Menter Môn. Income generated by the Community Solar Project will be used to finance projects that directly benefit local communities and the environment in proximity to the site of the Project.
- The location of the Community Solar Project will be a distinct area within the wider Project and not physically different from the rest of the Project.
  - Public rights of way (PRoW) - key tourism assets in Anglesey, when well-maintained - within the PEIR Boundary and passing through the Solar PV Site would be buffered within hedge-lined corridors within 15m minimum width corridors to reduce any perceived channelling of visual effects along these routes. Furthermore, the Project will seek to improve access to green and natural places either by enhancing existing public rights of way or creating new routes and features in the landscape
  - Improvements to access and the green and natural spaces by enhancing existing PRoWs and creating new Permissive Paths that are connected to communities.
  - Multi-functional Green Infrastructure: In order to maximise benefits the project will seek to create Green Infrastructure that delivers multiple beneficial outcomes for people and nature. This will be achieved by developing proposals informed by multiple sources and referring to guidance such as ‘The Ecosystem Resilience Practitioners Guide’ produced by Natural Resources Wales (NRW) and the ‘Building with Nature Standards’ which are identified as representing good practice for developers in Planning Policy Wales 12 (PPW12).

17.4.2 The following management plans will also be prepared in support of the ES, following further assessment and design evolution:

- Outline Construction Environmental Management Plan (oCEMP)
- Outline Landscape and Ecological Management Plan (oLEMP)
- Outline Operational Environmental Management Plan (oOEMP)

- Outline Soil Management Plan (oSMP)
- Outline Employment, Skills and Supply Chain Plan (oESSCP)
- Outline Decommissioning Environmental Management Plan (oDEMP)

17.4.3 Mitigation measures related to health impacts are covered in the related technical assessments. For instance, Chapter 10 outlines noise Mitigation strategies, which also inform the assessment of related health effects. However, the specific embedded Mitigation measures discussed in each chapter are not repeated here.

17.4.4 Mental health considerations are a crucial aspect during the pre-application stage and beyond of the Project. The Applicant recognises that mental wellbeing impacts can arise even before consent is granted due to uncertainty. To address this, an engagement programme has been established to give the local community opportunities to talk with the team and discuss their concerns which may help mitigate mental health and wellbeing impacts throughout the pre-application stage. Consultation events have previously been held around the previous Mon Solar plans for the PEIR Boundary, details of these events can be found in Table 4-1 of Chapter 4: Reasonable Alternatives and Design Evolution. The Applicant will ensure transparent communication through regular updates and accessible information, as well as community engagement through consultation meetings and feedback mechanisms. The table below outlines the engagement programme in the run up to Statutory Consultation.

Table 17-15 Engagement programme, outside of Statutory Consultation

Programme/activity	**Date**
Community newsletter	26th July 2024
Informal engagement event (Cemaes Village Hall)	6th August 2024
Informal engagement event (Brynteg Village Hall)	7th August 2024
Informal engagement event (Station Café , Llannerch-y-medd)	8th August 2024

Programme/activity	Date
Stand at Anglesey Show	13-14th August 2024
Informal engagement event (Llangefni Town Hall)	20th August 2024

17.5 Preliminary assessment of Likely Significant Effects

17.5.1 The consideration of health impacts with respect to solar farms is a relatively new and emerging area of knowledge. In broad terms, the likely significant adverse health effects of solar farms are typically considered to be related to harms that could arise on residential amenity, visual amenity and the loss of land uses that the land could have been used for otherwise (such as agricultural land). From a beneficial perspective, the likely significant health effects of solar farms are related to positive impacts on climate change outcomes, the impacts associated with opportunities to improve both access to public rights of ways through good design, and access to employment. The assessment of Likely Significant Effects on health refers to other technical assessments and their conclusions on Likely Significant Effects, considering embedded Mitigation.

Construction and Decommissioning

Diet and nutrition

17.5.2 Literature has shown the effect of a poor diet on mental health (Ref 17-63). Processed foods can lead to inflammation throughout the body and brain, which may contribute to mood disorders, including anxiety and depression. Healthy foods, typically fruits and vegetables which are often grown on agricultural land (although can be grown by other means), also play a part in an individual's mental wellbeing

17.5.3 The majority of the agricultural land within the PEIR Boundary is grazed by livestock with some areas of crop cultivation of which a large proportion is silage. As such, it is not expected that the cessation of agricultural production during construction and decommissioning has the potential to affect diet and nutrition of Anglesey residents. Furthermore, solar farms are found not to severely impact

farming, often giving the agricultural land a benefitted break in intensive cultivation, improved soil health and biodiversity gains (Ref 17-64).

17.5.4 As noted in the baseline, PHW finds that Wales does not have its own separate, independent, and explicit food system, which is largely dictated by trade; therefore, any loss of agricultural land is unlikely to have a significant impact in this instance.

17.5.5 As a result, the magnitude of impact of the effect of the Project on changes in diet and nutrition is deemed negligible during both the Construction and Decommissioning Phases. Given the medium sensitivity, this results in a negligible (not significant) effect on health.

Housing

17.5.6 There is substantial evidence highlighting the impact of access to high quality and affordable housing on human health. The WHO has found that 'poor housing and indoor environments cause or contribute to many preventable diseases and injuries', such as respiratory, nervous system and cardiovascular diseases and cancer (Ref 17-65).

17.5.7 A lack of affordable housing affects families' ability to meet other essential expenses, with the potential to result in financial strain and affecting mental health. Studies report housing affordability's impact on both mental (Ref 17-66) and physical health issues (Ref 17-67).

17.5.8 The Project would have the potential to impact health outcomes through changes in access to housing as a result of the additional demand generated by on-site construction workers.

17.5.9 As presented in PEIR Chapter 16: Socio-Economics, the Construction Phase of the Project is estimated to support 1,320 jobs with a maximum peak of 650 construction jobs on-site. This would occur during period three of the Construction Phase (see Chapter 16 for further information). A number of the new workers on-site may choose to move to the LCA during the Construction and Decommissioning Phases. Chapter 16: Socio-economics estimates that (for the purposes of the PEIR) between 50%-75% of the construction workers would come from outside of the LCA and therefore may require temporary accommodation

during the Construction Phase. There are expected to be a maximum of 325-490 workers who require temporary accommodation. For context (noting temporary accommodation demand would not likely be centred around standard housing stock given the construction period duration), this is only between 0.3% and 0.4% of all households in the LCA. This shows that the number of construction workers requiring temporary accommodation is small compared to the number of households in the Study Area.

17.5.10 Given the temporary nature of the Construction Phase, it is unlikely that construction workers would purchase homes; instead, they would primarily seek rental accommodations. If there is a material impact on demand for housing, rental prices could increase. However, while it is acknowledged that the new construction workers moving into temporary homes could affect demand and access to housing in the Isle of Anglesey, any impact on housing affordability, and therefore health, is expected to be minimal in the context of the existing provision of accommodation. Chapter 16 concludes that there is sufficient housing capacity in Anglesey, even under a worst-case scenario of the peak number of construction workers onsite. As such, it concludes that the changes in temporary workers' accommodation would result in a temporary, minor adverse effect on housing affordability, which is considered not significant.

17.5.11 As a result, the magnitude of impact of the effect of the Project on changes in access to housing is deemed low during both the Construction and Decommissioning Phases. Given the medium sensitivity, this results in a temporary minor adverse (not significant) effect on health.

Transport modes, access and connections

17.5.12 There is a reasonable body of evidence linking poor transport access to adverse health outcomes (such as isolation, depression, and stress) and increased risk-taking behaviour, but the evidence is particularly strong regarding the link between reduced active travel methods and positive health outcomes which aren’t realised, such as increased physical activity (Ref 17-68).

17.5.13 Chapter 9: Transport assesses the impacts of construction and decommissioning traffic on severance, driver and pedestrian delays, non-motorised user amenity,

fear and intimidation, and road safety. These effects could influence health by affecting community mobility, safety, and overall well-being.

17.5.14 The increase in traffic, affecting non-motorised users, will be temporary and localised. It is unlikely there would be likely significant impacts, only related to exceptional circumstances or emergencies that would be ad-hoc. Driver delays are anticipated to be local, temporary, medium term and negligible, as the majority of construction traffic will occur outside peak hours, maintaining the health and well-being of drivers by avoiding significant stress or time delays.

17.5.15 Pedestrian delay and non-motorised user amenity will experience negligible adverse effects. Temporary road closures would be would be effectively mitigated through traffic management measures where appropriate, ensuring continued pedestrian access and minimising any health impacts from disrupted movement. The Project's impact on fear and intimidation levels is also negligible. Initial assessments of road safety suggest minimal adverse impacts, with further detailed audits planned for the ES to ensure a comprehensive safety management. Overall, the project will maintain a safe and accessible environment, minimising any potential health risks associated with transport and access disruptions.

17.5.16 There would be no permanent closures of diversions in relation to the PRoW network. However, temporary closures and / or diversions may be required. All details will be set out within the Outline Construction Environmental Plan and Outline Construction Traffic Management Plan (OCTMP) submitted with the DCO Application. On this basis, the effects on severance on non-motorised users are considered to be negligible adverse and not significant.

17.5.17 The disruption caused by construction activities associated with the Project will be managed within the OCTMP. For further information around the changes in road traffic and disruption to existing pedestrian and cycling routes see PEIR Chapter 9: Transport.

17.5.18 Overall, it is considered that the changes to local traffic and the use of active models will result in a negligible impact at the NIA level during construction for both the general population and vulnerable groups. This is because the change

is temporary and geographically limited. The severity is predominantly related to minor changes in quality-of-life for a small minority of the population. Given the high sensitivity, this results in a temporary minor adverse (not significant) effect on health at the NIA level.

Community identity, culture, resilience and influence

17.5.19 Strong evidence links community identity, culture, resilience and influence to health outcomes, such as isolation and depression. Changes in these community aspects can significantly impact mental health. Disruptions to community identity and culture can lead to a loss of social cohesion and increased stress, while weakening community resilience can make populations more susceptible to mental health issues. The IoACC Health Impact Tool identifies wider social support and community identity as two key influences on health (Ref 17-5).

17.5.20 The evidence for how development and renewable energy projects affect community identity, culture, resilience and influence is emerging and less robust. Existing evidence highlights the potential impact of an increase in construction workers on community cohesion, with some studies finding that the presence of construction workers causes some groups to feel intimidated (Ref 17-69).

17.5.21 The impact of the Project on community identity, culture, resilience, and influence is multi-faceted. Changes may occur through the temporary presence of construction workers in the area, changes to the landscape character and visual impacts, and impacts on cultural assets and the community, such as the Welsh language. This effect considers all these changes to provide an overall assessment and the associated health effect. This assessment is likely to evolve following statutory consultation ahead of preparing the ES.

Presence of construction workers

17.5.22 During the Construction Phase of the Project, an estimated maximum peak of 650 jobs would be supported on-site. This figure would include construction workers who are already resident locally and construction workers who would live in temporary accommodation to near the PEIR Boundary during construction.

17.5.23 Certain vulnerable groups could have the potential to feel intimidated as a result of this presence. However, literature does not support this as although there is

anecdotal evidence of perceptions of adverse impacts associated with large construction workforces, there is limited causal evidence suggesting that the presence of construction workers is likely to have likely significant health impacts (Ref 17-70). In the context of the existing population of the NCA (23,651 respectively in 2021), the inflow of new construction workers would represent a relatively low and temporary uplift on the existing population and activity.

Changes to visual amenity and cultural assets

17.5.24 Health is considered more sensitive to changes in visual amenity than to changes in landscape character, and as such the former is the focus of this section. Visual amenity pertains to how residents perceive alterations in their environment, influencing their wellbeing and mental health. Changes to an individual's visual environment can lead to feelings of discomfort, stress, or reduced satisfaction with their surroundings. In contrast, landscape character in relation to health focuses on how individuals and communities feel about changes to the broader character and appearance of the landscape around them. This is often shaped by how individuals are connected to their surrounding landscape, which influences their sense of identity and place—a feeling that is personal and subjective.

17.5.25 Appendix 6-6: Summary Landscape and Visual Effects Schedule presents the effects of the Project on landscape character and visual amenity during the Construction Phase. In summary, there is not expected to be many significant effects on visual Receptor groups during construction, with most Receptor groups experiencing low-negligible effects. There are some major-moderate significant effects identified in close proximity to the Solar PV Sites, relating to visual Receptors within Maen Hir North, Maen Hir Central and Maen Hir South. However, the visual amenity of cultural assets like Parys Mountain are not expected to experience significant effects on visual amenity during construction.

Effects on the Welsh language

17.5.26 The Welsh Language Promotion Strategy (2021-2026) identifies that the Welsh language continues to face the historical challenges of migration with Anglesey struggling to retain its young people (Ref 17-71). Any impact the Project has on the Welsh language could have implications for community cohesion and cultural

resilience. The Preliminary Employment, Skills and Supply Chain Plan prepared alongside the PEIR outlines measures through which Applicant will support the Welsh language, specifically in the Construction Phase, which will be beneficial for supporting the culture.

Preliminary conclusion

17.5.27 While the Project is expected to result in positive and negative changes to the community, and a range of views are expected from residents nearby, the influence on health outcomes related to community identity, culture, resilience and influence is, at this stage, conservatively described as negative. The health effects will be indirect and relate to a mix of interrelated physical and mental health and wellbeing outcomes.

17.5.28 Construction activities are likely to be localised in discrete areas at particular times. The construction effect will also be short term and temporary in nature and therefore limited in terms of the health impact. The severity predominantly relates to minor changes in quality-of-life, affecting a small portion of the population. Consequently, the magnitude of impact is deemed to be negligible during both the Construction and Decommissioning Phases. Given the high sensitivity, this results in a temporary minor adverse (not significant) effect on health at the LA level.

Education and training

17.5.29 There is a strong link between education and training attainment and health outcomes in existing literature. Existing research suggests that lower education attainment is commonly associated with self-reported poorer health and shorter life expectancy. A lack of adult numeracy and literacy skills have been shown to be linked to worse health outcomes by the Department for Business, Innovation and Skills (Ref 17-72).

17.5.30 The construction of the Project will support local jobs and provide opportunities for upskilling and training. The Applicant has provided an estimated skills overview of direct jobs opportunities during construction at this early stage in the Preliminary Employment, Skills and Supply Chain Plan. Further detail will be provided around construction employment, skills, training and supply chain opportunities created by the Project in the ES.

17.5.31 The Project will provide an opportunity for local residents to acquire new skills and training within the construction industry. The Preliminary Employment, Skills and Supply Chain Plan provides an initial outline of the range of broad commitments the Applicant will look to make towards supporting skills, including supporting apprenticeship opportunities during the duration of the Project, engaging local education providers to maximise opportunities for local residents, and offering local procurement opportunities to businesses.

17.5.32 The Construction Phase of the Project, however, is not particularly long in the context of the lengths of residents' careers. To create legacy benefits, the Project will focus on providing residents in the LA with transferable skills that they can take to future opportunities coming forward through the Energy Island Programme.

17.5.33 The proposals are designed to address the key issues and priorities in the area, and are expected to increase local benefits. This strategy will be submitted in outline with the DCO Application and will be an evolving document. Specifically, the methods of implementation for this strategy will continue to evolve following ongoing engagement with stakeholders, which will be reflected in the ES. The outline document will provide more detail on the exact commitments to be secured under the DCO Application.

17.5.34 This effect will be reviewed at ES stage to reflect the results of engagement and the development of education and training measures. At this stage, the likely significant effect is provisionally deemed to have a medium magnitude of impact, combining with a medium sensitivity, resulting in a moderate beneficial (significant) effect at the LA level.

Employment and income

17.5.35 The Marmot Review (2018), commissioned by the Department of Health, looks at the relationship between health inequalities and economic status (Ref 17-73). The review concludes that greater economic status is predictive of better health outcomes and unemployment contributes to poor health outcomes. This conclusion is echoed by Public Health Wales (2014), which states that unemployment is negatively correlated with good health outcomes (Ref 17-74).

Employment and income are also important determinants of mental health for both vulnerable groups and the existing population (Ref 17-75). The link between common mental health problems such as depression resulting from job loss is well-documented. Similarly, moving into employment has a positive effect on mental health.

17.5.36 The construction and decommissioning stages of the Project would result in the creation of new employment opportunities both on and off-site.

17.5.37 Chapter 16: Socio-Economics presents estimates of the scale of the direct and indirect jobs that would result from the Project. This assessment estimates that during the construction period, the Project would support between 330-660 gross direct jobs (after considering leakage outside of the LCA) for workers within the LCA. This figure is equivalent to a 2%-5% uplift on both the current and future baseline position for construction jobs.

17.5.38 In the context of the existing construction workforce across Anglesey, the number of additional jobs generated by the Project is material. Considering the significant link in existing literature between the provision of new employment opportunities on physical and mental health, the generation of employment opportunities by the Project would have a medium magnitude of impact on health. At this stage, the likely significant effect is provisionally deemed to have a medium magnitude of impact, combining with a medium sensitivity, resulting in a moderate beneficial (significant) effect.

Water quality or availability

17.5.39 Changes in water quality or availability have the potential to significantly affect health outcomes where residents are exposed to water quality levels in excess of guidelines. During construction, water quality has the potential to be temporarily affected by construction site run-off or temporary impoundment of water courses

17.5.40 Chapter 13: Water Resources highlights that the PEIR Boundary is located in a low flood risk area (Flood Zone 1), with infrastructure designed to avoid higher risk zones. The Project during the Construction Phase is not anticipated to significantly affect surface water runoff, peak discharge, or flood risk. Potential soil compaction from heavy machinery will be mitigated by measures in the outline

Soil Management Plan to be submitted with the DCO Application. Sustainable drainage systems will manage any increased runoff from impermeable areas, ensuring minimal impact on flood risk. The Solar PV Site is largely located within Flood Zone 1, which is an area classed as having a low probability of flooding. As such the effect of the Project on flood risk is negligible and not significant.

17.5.41 Regarding water quality, the Construction Phase poses risks from accidental spillages of chemicals and increased sedimentation. Measures in the outline Water Management Plan and outline Construction Environmental Management Plan to be submitted with the DCO Application will mitigate these risks, including using Horizontal Directional Drilling to avoid disturbing watercourses. With these Mitigation strategies, the impact on water quality and flood risk is considered negligible and not significant, implying minimal health risks to residents.

17.5.42 Overall, it is not likely that the changes in water quality will have a significant impact on health. Therefore, the magnitude of impact on health through changes in water quality is anticipated to be negligible. Given the low sensitivity, this results in a negligible (not significant) impact at the NIA level.

Noise and vibration

17.5.43 There is strong evidence of links between noise and vibration and health in existing literature. The WHO note that “excessive noise seriously harms human health and interferes with people’s daily activities at school, at work, at home and during leisure time. It can disturb sleep, cause cardiovascular and psychophysiological effects, reduce performance and provoke annoyance responses and changes in social behaviour” (Ref 17-76).

17.5.44 The Project has the potential to result in the generation of new noise and vibration during the construction and decommissioning stage through the generation of new vehicle traffic and the use of on-site machinery. Any effects associated with the construction and decommissioning of the Project are likely to be short-term and temporary in nature. Preliminary assessments indicate that Receptors within 50 metres may experience moderate to major adverse effects, while those 150 metres or more away will likely face minor adverse or negligible impacts. Vibration effects are anticipated to be minor or negligible beyond 17 metres from the source.

17.5.45 Overall, it is not likely that the changes in noise will have a significant impact on health. Therefore, the magnitude of impact on health through changes in noise and vibration is anticipated to be negligible. Given the medium sensitivity, this results in a negligible (not significant) effect on health at the NIA level.

Health and social care services

17.5.46 Existing evidence links the increase of construction workers with increase demand placed on local health and social care services and facilities. Increased demand on local health facilities and longer waiting times, where applicable, could reduce access to health services for existing users. This may exacerbate health outcomes, unmet health needs and place financial burdens upon vulnerable individuals.

17.5.47 Chapter 16: Socio-Economics presents estimates of the inflow of construction workers during the Construction Phase. This assessment estimates that the Project would result in a maximum of 650 jobs on-site during the peak of the Construction Phase.

17.5.48 The additional workers on-site could affect local demand for healthcare through: additional registration and use of local primary healthcare, additional use of emergency and healthcare as a result of accidents on-site, or additional registration and use of other forms of health and social care services, such as mental health services.

17.5.49 The baseline conditions section identifies that the three GP practices within the NIA (Glan Menai Surgery, Canolfan Iechyd Amlwch Surgery, and Meddygfa Cemaes Surgery) currently serve 17,365 patients. Were the maximum of 650 on-site construction workers to register with these three practices, this would increase the number of registered patients by 3.7%. In reality, however, very few of the on-site construction workers are expected to register with local GP practices given the temporary duration of the construction period and a proportion of the construction workers would be expected to commute on a daily basis from their homes. Any impact on local practices is expected to be minimal.

17.5.50 On average, construction workers have a relatively higher injury rate at work compared to the average worker (on average, 2.6% of construction workers per

year are injured compared to 1.7% across all industries) (Ref 17-77). This average injury rate would imply that at peak, the construction workforce on-site would result in 17 injuries, placing pressure on local A&E services. Even assuming this rate of injury, any additional demand placed on local healthcare would be minimal. The Project would ensure compliance with health and safety regulations to minimise this impact further.

17.5.51 In addition, the presence of non-home-based workers (construction workers expected to stay in temporary accommodation) could impact on other forms of healthcare including mental health and community health services, pharmacies and dental healthcare infrastructure. However, given the temporary nature of the non-home-based construction workforce, the impact on these other healthcare services is not expected to be material.

17.5.52 Overall, the magnitude of impact on health through changes in access to health and social care services is anticipated to be negligible. Given the medium sensitivity, this results in a negligible (not significant) impact at the NIA level.

Operational effects

Diet and nutrition

17.5.53 Wales does not have its own separate, independent and explicit 'food system', but is instead part of the UK internal and international food system. A large part of diet and nutrition is mostly dictated by trade, and hence it is not likely that any potential loss of agricultural land at this scale would have a likely significant effect in this instance. Similarly, the PEIR Boundary may benefit from a break from cultivation and improved soil health, once the land is returned to agricultural production at the end of the Decommissioning Phase (Ref 17-78).

17.5.54 Throughout the Operational Phase, agricultural uses could still be supported. At this stage it is not known the level or type of agricultural output that would be supported, however most of the land within the PEIR Boundary is used for sheep grazing, supporting a multifunctional land use and therefore any potential impact on diet and nutrition is likely to be low.

17.5.55 Bringing this altogether, the magnitude of impact of the effect of the Project on changes in diet and nutrition is deemed negligible during the Operational Phase.

Given the medium sensitivity, this results in a negligible (not significant) effect on health.

Open space, leisure, and play

17.5.56 There is strong evidence of the link between open spaces and leisure facilities and health outcomes. The presence of these facilities has been directly associated with levels of physical activity. In addition, there is a growing body of literature relating access to open space, play space and nature with positive mental health and wellbeing. For example, when surrounded by green space and nature, blood pressure and stress levels decrease, and exposure to nature have been found to enhance mood and improve self-esteem (Ref 17-79).

17.5.57 Appendix 6-4: Amenity and Recreation Assessment evaluated the impact on local open spaces and PRoW (including public footpaths, bridleway, cycleways and byways). The assessment concluded that due to the lack of visibility and the distance (approximately 300m to the south of Maen Hir A) between the PEIR Boundary and local open spaces (recreation and playing fields, golf courses, allotments and cemeteries), no effects on their recreational amenity are anticipated. In terms of PRoWs, there are none present within Maen Hir South B and many of the PRoW routes in Maen Hir North are not well used and are not passable. Of the 13 identified PRoW there would be a large scale of change to their amenity, noting Mitigation would assist in tempering potential impacts.

17.5.58 Furthermore, as stated in PEIR Chapter 6: Landscape and Visual, the Project would retain all existing PRoWs running through the parcels. Embedded design measures would ensure that the proposed PV Arrays sit at least 15-metres from existing PRoWs, limiting the visual impact for visitors and residents.

17.5.59 However, there is potential for the Project to improve access to PRoW and to green and natural spaces by enhancing pathways and creating new Permissive Paths that are connected to communities. At this preliminary stage it is not known the potential improvement of pathways that would be supported and the possible beneficial impact. This will be confirmed in the ES. Any improved pathways would encourage more active travel through the PEIR Boundary and have a positive impact on health.

17.5.60 Overall, whilst there are expected to be significant adverse effects on the amenity of PRoW, there is potential for the Project to improve access to PRoW and create new Permissive Paths. Based on this, the magnitude of impact on health through changes in PRoW is anticipated to be low. Given the medium sensitivity, this results in a minor adverse (not significant) effect at the NIA level.

Community identity, culture, resilience and influence

17.5.61 As mentioned in section 17.5, there is strong evidence linking community identity, culture, resilience and influence and the cohesiveness of communities to health outcomes, specifically mental wellbeing. This follows the same structure as the construction and decommissioning effect, but naturally does not consider the temporary presence of a large construction workforce.

Changes to landscape character and visual impacts and cultural assets

17.5.62 As in the Construction Phase for this effect, the health impact of changes in visual amenity, rather than landscape character, is the focus of this assessment.

17.5.63 As detailed in Appendix 6-6: Summary of Landscape and Visual Effects Schedule, during the Operational Phase of the Project, visual Receptors experience varying levels of impact, with significant (major, major-moderate and in some cases moderate) adverse effects identified for certain groups. Visual Receptor Groups 2 (Maen Hir North and Surrounds), 10 (Maen Hir Central and Surrounds), and 13 (Maen Hir South A and Surrounds) are expected to experience major adverse effects before Mitigation, and moderate adverse effects post-Mitigation. Visual Receptor Groups 6 (Mynydd Mechell uplands and Carreglefn) and 7 (Rhosgoch, Four Crosses and Rhos-wen) are expected to experience moderate adverse effects before Mitigation, and moderate or slight adverse effects that aren't significant post-Mitigation. Visual Receptor Group 11 (Llyn Alaw, Penwerthyr and Gwredog Uchaf) is expected to experience moderate adverse effects that are significant both before and after Mitigation. Visual Receptor Group 15 (Mynydd Bodafon Upper Slopes) is expected to experience major-moderate adverse effects before Mitigation, and moderate adverse effects post-Mitigation. Visual Receptor Groups 4 and 5 (includes Parys Mountain) are not expected to experience any significant effects during operation.

17.5.64 As noted in Chapter 6: Landscape and Visual, there are varying levels of adverse residual effects on visual amenity with many expected to reduce over time as the screening measures such as planted hedgerows become established, therefore reducing the visual amenity impact and associated health impact. Although, many visual Receptors would not be significantly impacted during operation, there are five Receptor groups which are likely to have a permanent significant visual effects (see Chapter 6: Landscape and Visual for full details).

Effects on the Welsh language

17.5.65 The Operational Phase of the Project is expected to support lower levels of employment than the Construction and Decommissioning Phases. The Preliminary Employment, Skills and Supply Chain Plan outlines measures in which the Applicant will support the Welsh language, specifically in The Operational Phase which will be beneficial for supporting culture.

17.5.66 It is estimated that the operation and management of the Project will support between 10 and 12 jobs per annum over the 60-year period. It is likely that these operational workers will be locally based and as such will enhance community identity among residents, albeit only to a small extent.

Preliminary conclusion

17.5.67 While the Project is expected to result in both positive and negative changes to the community, the influence on health outcomes related to community identity, culture, resilience, and influence is, at this preliminary stage, most conservatively described as negative. The operational impacts are predominantly adverse due to changes in landscape character, visual impacts, and potential disruptions to the visibility of cultural assets, however are expected to reduce over time.

17.5.68 The exposure and scale of the impact are moderate, with the operational effects being long-term and continuous. Although the severity is not predominantly related to mortality or severe morbidity, the changes in the landscape and visual amenity may have an impact on quality of life for some of the Receptor population. This is particularly relevant in areas with higher sensitivity and where moderate to major adverse effects are anticipated. However, it should be noted that long-term effects on visual amenity are expected to decrease over time.

17.5.69 The jobs created during the Operational Phase will have some (albeit likely limited) impact on community dynamics, and while efforts to support the Welsh language are beneficial, they are unlikely to offset the negative impacts entirely. The negative visual impacts on cultural assets and the landscape may affect residents' sense of place and community cohesion. Based on this, the changes brought about by the Project will result in a low negative impact on mental health and well-being.

17.5.70 Chapter 16: Socio-economics notes that the Applicant is proposing that a proportion of the site is community owned. Engagement with IoACC is ongoing to ensure the scheme aligns with community priorities and delivers positive benefits. More detail will be provided in the ES and captured in this effect if funding is used for health-related projects.

17.5.71 As such, the health effects related to community identity, culture, resilience, and influence are at this preliminary stage assumed to be negative. At this stage, the likely significant effect is provisionally deemed to have a low magnitude of impact, combining with a high sensitivity, resulting in a moderate adverse (significant) effect on health at the LA level. This effect will be reviewed following further consultation with the local community and ongoing design work for the ES application.

Education and training

17.5.72 Chapter 16: Socio-economics states that the Project will support operational employment opportunities, consistent of operation and maintenance crews (including technical professions such as electrical engineers and performance managers), landscaping, and occasional repair teams. The types of skills required to be supported are detailed in the chapter. Additionally, the jobs supported would also support long-term skills development for local residents, which would help address skills shortages in the green and low carbon sector.

17.5.73 With the link in literature between education and training attainment and health outcomes in existing literature. The opportunities of education and training by the Project would have a low magnitude of impact on health. Given the medium sensitivity this would result in minor beneficial (not significant) effect.

Employment and income

17.5.74 Chapter 16: Socio-economics states that the Operational Phase of the Project would support between 10 to 12 jobs per annum. The periodic replacement of infrastructure would also likely require temporary jobs during the Operational Phase, although they have not been estimated quantitatively at this stage. All of these jobs are currently assumed to be additional, on the assumption that there is not expected to be a loss of agricultural jobs onsite during the Operational Phase, with sheep grazing continuing throughout the operational period.

17.5.75 Considering the significant link in existing literature between the provision of new employment opportunities on physical and mental health, the generation of employment opportunities by the Project would have a negligible magnitude of impact on health. Given the medium sensitivity this would result in negligible (not significant) effect.

Climate change and adaptation

17.5.76 Climate change is a significant threat to public health and has the potential to influence a range of health determinants and alter the physical environment. (Ref 17-80) Changes in climate, including high air temperatures, raised levels of ozone and other pollutants can contribute to cardiovascular or respiratory disease or deaths whilst increased risks of flooding can cause displacement and increased mental burdens. Furthermore, the climate crisis can pose stress and worry upon individuals with 74% of Wales residents who are very or fairly concerned about climate change.

17.5.77 Both the Welsh Government and IoACC have acknowledged the significant threat imposed by climate change and its impact on health through the declaration of a climate emergency (in 2019 and 2020 respectively) (Ref 17-81).

17.5.78 Chapter 14: Climate Change identifies that operational emissions from the Project are associated with maintenance and worker travel. However, the benefits of generating renewable energy from the Project far outweigh the associated emissions. The Project's Operational Phase indirectly causes a reduction in atmospheric GHG concentration compared to the without-project baseline and supports a trajectory towards Net Zero. The GHG impact of the Operational Phase

is therefore considered to be beneficial and significant when compared to the future baseline.

17.5.79 The generation of additional renewable energy would have a measurable impact at the national level on the use of non-renewable energy sources once complete. This would contribute to reducing the amount of greenhouse gas emissions, and the subsequent impact of climate change. Overall, this is anticipated to have a negligible magnitude of impact on health. Given the high sensitivity, this results in in a minor beneficial (not significant) effect at the national level.

Noise and vibration

17.5.80 Chapter 10: Noise states that the project could generate operational noise from electrical and mechanical equipment such as Transformers, BESS, and Inverters, with the potential for noticeable sound characteristics. The impact on Receptors varies with distance. For Receptors located between 25m and 200m from operational noise sources during the day, there is likely to be a permanent, long-term, adverse effect which is considered to be minor for Receptors more than 200m from the source and major for Receptors as close as 100m during the daytime. For the evening, there is likely to be a permanent, long-term, adverse effect which is considered to be negligible for Receptors more than 150m from the source and major for Receptors closer than 50m from the source.

17.5.81 The anticipated health impact from the Project's operational noise is minimal due to the absence of nearby residents, limiting exposure. The noise, though permanent, is unlikely to cause severe health outcomes. Therefore, the magnitude of impact on health through changes in noise and vibration is anticipated to be low. Given the medium sensitivity, this results in a minor adverse (not significant) effect on health at the NIA level.

Wider societal infrastructure and resources

17.5.82 Existing literature highlights the importance of affordable and accessible infrastructure, which indirectly supports people's livelihoods. Changes in access to affordable infrastructure, such as transport or electricity, can have knock-on consequences for low-income groups, causing them to lose access to activities, goods or services.

17.5.83 Energy insecurity is a public health concern particularly for vulnerable populations (low-income, young people, and older people). It has been associated with hazardous exposures, heat stress, cold stress, asthma, chronic disease, poor mental health, parental fear and stigma, family disruption and residential instability (Ref 17-82).

17.5.84 The electricity produced by the Project once operational could enable many aspects of everyday life that either protect or promote good health. UK energy security is important for maintaining continuous and affordable electricity which supports many aspects of public health. This includes power to safely cook and refrigerate food, regulate the temperature and lighting of homes and schools, operate health and social care services, maintain economic productivity and employment, and operate technologies that improve quality of life and social support. The Project would have the capacity to generate more than 350MW of renewable energy, contributing to energy security at the national level.

17.5.85 At the national level, the contribution of the Project once operational to wider society infrastructure and resources is expected to have a low magnitude of impact. Given the medium sensitivity, this results in a minor beneficial (not significant) effect at the national level.

Bio-physical environment (radiation)

17.5.86 Existing literature provides mixed evidence of the impact of exposure to EMFs on health outcomes. Literature distinguishes between the impact of ionising radiation, such as that emitted by undergoing X-ray scanners, and non-ionising radiation, such as that emitted by mobile phones and by the generation of electricity (Ref 17-83). According to the WHO, there is no evidence that the latter is harmful to human health provided it falls within guidance levels such as those set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) (Ref 17-84). In the UK, current guidance from the Health and Safety Executive focuses on compliance with guideline levels from ICNIRP (Ref 17-85).

17.5.87 The operation of the Project would result in the creation of new sources of EMF. Guidance from the Department of Energy and Climate Change identifies that sources of EMF up to and including 132kV do not have any potential to exceed

the ICNIRP exposure guidelines, and as a result have limited potential to affect health (Ref 17-86).

17.5.88 The Grid Connection Cable and Project Substation, which form a part of the Project, are likely to exceed 132kV and have the potential to cause electromagnetic fields with potential for adverse effects on human health. However, as noted in Chapter 4: Reasonable Alternatives and Design Evolution the Grid Connection Cable will be buried underground at a suitable depth and the Project Substation will be set back from sensitive Receptors and designed in accordance with relevant guidance as set out in the Embedded Mitigation Section. In addition, in terms of EMF radiation, advice from National Grid is that Magnetic field levels at the boundary of a substation are typically at a level of 1 or 2 µT (microtesla), but this decreases very quickly as you move away from the substation. At approximately 1-2 metres from the substation, for example, the magnetic field is usually lower than the field found in homes. Therefore, electromagnetic fields will not have any adverse effects on residential Receptors.

17.5.89 The impact of the Project on health through changes to the bio-physical environment is expected to have a negligible magnitude of impact. Given the low sensitivity, this results in a negligible (not significant) effect at the national level.

17.6 Additional Mitigation

17.6.1 Currently, there are no additional Mitigation measures proposed at this stage which are relevant to the effect on human health, however, this will be developed for the ES.

17.7 Residual effects

17.7.1 In the absence of any additional Mitigation, the residual effects are the same as the potential effects set out above. The preliminary health effects are summarised in the table below. Where the assessment year is not stated, the sensitivity, magnitude of impact and effect significance are the same in all assessment years.

Table 17-16 Summary of health effects

Effect	Receptor	Spatial scale	Sensitivity	Impact	Effect
Construction effects					
Diet and nutrition	Residents, workers	Anglesey	Medium	Negligible	Negligible (not significant)
Housing	Residents, workers	Anglesey	Medium	Low	Minor adverse (not significant)
Transport modes, access and connections	Residents, workers	NIA	High	Negligible	Minor adverse (not significant)
Community identity, culture, resilience and influence	Residents	Anglesey	High	Negligible	Minor adverse (not significant)
Education and training	Residents, workers	Anglesey	Medium	Medium	Moderate beneficial (significant)
Employment and income	Residents, workers	Anglesey	Medium	Medium	Moderate beneficial (significant)
Water quality or availability	Residents	NIA	Low	Negligible	Negligible (not significant)
Noise and vibration	Residents	NIA	Medium	Negligible	Negligible (not significant)
Health and social care services	Residents	NIA	Medium	Negligible	Negligible (not significant)
Operational effects					
Diet and nutrition	Residents, workers	Anglesey	Medium	Negligible	Negligible (not significant)

Effect	Receptor	Spatial scale	Sensitivity	Impact	Effect
Open space, leisure and play	Residents	NIA	Medium	Low	Minor adverse (not significant)
Community identity, culture, resilience and influence	Residents	Anglesey	High	Low	Moderate adverse (significant)
Education and training	Residents, workers	Anglesey	Medium	Low	Minor beneficial (not significant)
Employment and income	Residents	Anglesey	Medium	Negligible	Negligible (not significant)
Climate change and adaptation	Residents	National	High	Negligible	Minor beneficial (not significant)
Noise and vibration	Residents	NIA	Medium	Low	Minor adverse (not significant)
Wider societal infrastructure and resources	Residents	National	Medium	Low	Minor beneficial (not significant)
Bio-physical environment (radiation)	Residents, workers	NIA	Low	Negligible	Negligible (not significant)

17.8 Effect interactions

17.8.1 Effect interactions are also assessed to understand the overall impact of the Project on health. The aim is to present a comprehensive understanding of the Project's effect interactions on the same Receptors. Effect interactions can occur where multiple effects interact, occurring in the same location and affecting the same population group. It can also occur where the intensity of effects is amplified

where multiple effects combine at the same time or if effects occur in series over long timescales.

17.8.2 This health chapter has been informed by other technical assessments, which combines assessments of agriculture and soils, transport, socio-economics, landscape and visual, water, noise and vibration and climate change with health, considering their respective impact on health based on the relevant determinant of health.

17.8.3 The following will be assessed further in the ES by an analysis of the timing, duration, and frequency of different health impacts. An interaction matrix will then be used to illustrate how these effects interact both spatially and temporally, and the use of scenarios will be considered to understand their combined influence on health outcomes.

17.9 References

17-1 WHO, 2024. Constitution

17-2 Barton, H. and Grant, M. (2006) A health map for the local human habitat. The Journal for the Royal Society for the Promotion of Health, 126 (6). pp. 252-253

17-3 IEMA, 2017. Institute of Environmental Management and Assessment (IEMA) guide to: Effective scoping of Human Health in Environmental Impact Assessment

17-4 WHIASU, 2012. Health Impact Assessment, a practical guide

17-5 Isle of Anglesey, 2009. Health Impact Assessment Tool

17-6 Gov.Wales, 2023. Domestic GB tourism statistics (overnight trips in Wales: January to March 2023)

17-7 IEMA, 2017. Health in Environmental Impact Assessment. A primer for a Proportionate Approach

17-8 Public Health England, 2020. Advice on the content of Environmental Statements accompanying an application under the Nationally Significant Infrastructure Planning Regime

17-9 WHIASU, 2012. Health Impact Assessment, a practical guide

17-10 NHS HUDU, 2017. Healthy Urban Planning Checklist (third edition)

17-11 IEMA, 2022. Determining Significance For Human Health In Environmental Impact Assessment

17-12 IEMA, 2022. Determining Significance For Human Health In Environmental Impact Assessment

17-13 ONS, 2024. Life expectancy for local areas in England, Northern Ireland and Wales: between 2001 to 2003 and 2020 to 2022

17-14 Stats Wales, 2024. Adult general health and illness by age and gender, 2022-23

17-15 Stats Wales, 2024. Adult general health and illness by age and gender, 2022-23

17-16 Stats Wales, 2024. Adult lifestyles by local authority and health board, 2022-23

17-17 ONS, 2023. How life has changed on the Isle of Anglesey: Census 2021

17-18 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-19 Stats Wales, 2024. Adult lifestyles by local authority and health board, 2020-21 onwards

17-20 Public Health Wales, 2023. Child Measurement Programme 2021-2022

17-21 End Child Poverty, 2023. Child poverty in your area

17-22 Betsi Cadwaladr University Health Board, 2023. Anglesey Locality Needs Assessment 2022-23

17-23 Stats Wales, 2019. Welsh Index of Multiple Deprivation

17-24 Isle of Anglesey County Council, 2022. Anglesey County Council Local Population Needs Assessment

17-25 Isle of Anglesey County Council, 2022. Anglesey County Council Local Population Needs Assessment

17-26 Isle of Anglesey County Council, 2022. Anglesey County Council Local Population Needs Assessment

17-27 Stats Wales, 2024. Life expectancy (archive)

17-28 Stats Wales, 2024. National Survey for Wales

17-29 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-30 Welsh Parliament, 2024. The rise in obesity: some food for thought

17-31 ONS, 2023. Deprivation and the impact on smoking prevalence, England and Wales: 2017 to 2021

17-32 IoACC, 2021. Welsh Language Promotion Strategy 2021-2026

17-33 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-34 Stats Wales, 2024. Adult lifestyles by local authority and health board, 2020-21 onwards

17-35 Betsi Cadwaladr University Health Board, 2023. Anglesey Locality Needs Assessment 2022-23

17-36 PHW, 2023. Economy, Trade and Rural Affairs Committee – Food (Wales) Bill Public Health Wales' Written Response

17-37 ONS, 2024. Housing affordability in England and Wales: 2023

17-38 ONS, 2021. National Census

17-39 Betsi Cadwaladr University Health Board, 2023. Anglesey Locality Needs Assessment 2022-23

17-40 Mind, 2021. Housing and mental health

17-41 ONS, 2021. National Census

17-42 ONS, 2021. National Census

17-43 Department for Transport, 2023. Road accident and safety statistics

17-44 ONS, 2023. National Survey for Wales

17-45 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-46 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-47 Isle of Anglesey County Council, 2024. North Anglesey Socio-economic Impact Report.

17-48 Welsh Government, 2021. Technical Advice Note 15 Development, flooding and coastal erosion

17-49 Chartered Institute of Environmental Health, 2019. CIEH Noise Survey 2019/20 Report on findings – Wales

17-50 NHS Wales, 2023. General practice workforce

17-51 NHS Wales, 2023. General practice workforce

17-52 NHS Wales, 2023. NHS hospital waiting times

17 - 53 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-54 IoACC, 2016. Anglesey and Gwynedd Joint Local Development Plan Topic Paper 14: Open Space Assessment.

17-55 Welsh Government, 2023. Wellbeing of Wales 2023.

17-56 Gwynedd and Anglesey Public Service Board, 2022. Anglesey Well-Being Assessment

17-57 IEMA, 2022. Determinant Significance for Human Health in Environmental Impact Assessment.

17-58 IEA, 2019. Multiple benefits of energy efficiency.

17-59 Welsh Government. 2022. Guidance for developers, local communities & decision-makers – local and shared ownership of energy projects in Wales.

17-60 Public Health Wales, 2023. Not Enough for Essentials, as the Cost of Living Crisis Bites

17-61 SP Energy Networks, 2015. Major Electrical Infrastructure Projects – Approach to Routeing and Environmental Impact Assessment.

17-62 WHO, 2016. Radiation: Electromagnetic fields

17-63 Mental health foundation, 2022. Diet and mental health

17-64 Solar Power Portal, 2024. Mythbusting: solar PV's impact on agricultural land.

17-65 World Health Organisation (WHO), 2017. Housing and health

17-66 Bentley, R., et al, 2011. Association Between Housing Affordability and Mental Health: A Longitudinal Analysis of a Nationally Representative Household Survey in Australia

17-67 Yat-Nork-Chung, R., et al., 2020. Housing affordability effects on physical and mental health: household survey in a population with the world's greatest housing affordability stress

17-68 NatCen, 2019. Transport, health and wellbeing: an evidence review for the Department for Transport.

17-69 Angel, C. 2014. Beyond the 'roughneck' stereotype: revealing the actual face of mobile workers in the Alberta Oil Sands and North Dakota's Bakken Oil Region and why it matters to health

17-70 Stafford et al., 2007. Association between fear of crime and mental health and physical functioning

17-71 IoACC, 2021. Welsh Language Promotion Strategy 2021-2026

17-72 Department for Business, Innovation and Skills, 2012. The Contribution of Basic Skills to Health Related Outcomes During Adulthood: Evidence from BCS70.

17-73 Michael Marmot, Peter Goldblatt, Jessica Allen , et al. 2018. Fair Society, Healthy Lives (The Marmot Review)

17-74 Public Health Wales, 2021. Promising Intervention: promising interventions to improve health and health equity

17-75 Thomson RM, Kopasker D, Leyland A, Pearce A, Katikireddi SV. To what extent does income explain the effect of unemployment on mental health? Mediation analysis in the UK Household Longitudinal Study. Psychol Med. 2023 Oct;53(13):6271-6279.

17-76 World Health Organization, 2017. Noise

17-77 Health and Safety Executive, 2023. Self-Reported Work-Related Ill Health

17-78 Solar Power Portal, 2024. Mythbusting: solar PV's impact on agricultural land.

17-79 UK Health Security Agency, 2016. Green space, mental wellbeing and sustainable communities

17-80 World Health Organization, 2023. Climate Change

17-81 Isle of Anglesey County Council, 2020. Towards Net Zero Plan: March 2022 to March 2025

17-82 Hernandez, D., 2016. Understanding 'energy insecurity' and why it matters to health. Social Science & Medicine, 167, 1–10

17-83 National Institute of Environmental Health Sciences, 2023. Electric and Magnetic Fields

17-84 World Health Organization, 2016. Radiation: Electromagnetic Fields

17-85 Ofcom, 2023. Electromagnetic Fields (EMF)

17-86 Department of Energy and Climate Change, 2012. Power Lines: Demonstrating Compliance with EMF Public Exposure Guidelines.