16. Climate Change

Photograph of existing causeway, taken south-east of the causeway, facing north-west

The climate change ES chapter reports on the likely climate change effects associated with the demolition and construction stage and operational stage of the proposed development.

Existing Conditions

To establish the existing climate change conditions, a desk study was completed. Relevant data was reviewed, such as from the Met Office UK Climate Averages, the United Kingdom Climate Projections and UK Carbon Budgets.

Average monthly climate data for the period 1991-2020 was obtained from Camborne climate station, the closest station to the site, to establish the following understanding of climate at the site:

- Annual maximum (13.65°C) and minimum (8.61°C) temperatures are higher than UK averages (12.79°C and 5.53 °C respectively);
- Higher rainfall annual total (1075.84 mm) than the average for England (869.60 mm); and
- Less air frost days experienced (7.38 days) than the UK average (53.36 days).

In the UK, general climate trends for the period up to 2080 are projected to lead to milder, wetter winters and warmer, drier summers, in addition to increased frequency and intensity of extreme weather, such as windstorms, heatwaves, droughts and rainfall.

The climate assessment comprised two separate assessments:

- In-Combination Climate Impacts Assessment – considered how extreme weather and projected climate change could have an additive effect on impacts identified by other technical disciplines as a result of the proposed development during the demolition and construction stage and operational stage; and
- GHG Emissions Assessment – considered the potential for significant effects to arise from the proposed development in terms of GHG emissions during the demolition and construction stage and operational stage.

Demolition and Construction

The In-Combination Climate Impacts Assessment for the proposed development has identified no significant effects as a result of climate change during the demolition and construction stage given embedded design mitigation measures.

The GHG Emissions Assessment has calculated that the net contribution of the proposed development's demolition and construction stage is expected to contribute 0.006 % to the UK's fourth carbon budget (2023-2027). This is considered to be a not significant minor adverse effect.

Operation

The In-Combination Climate Impacts Assessment for the proposed development has identified no significant effects as a result of climate change during the operational stage given embedded design mitigation measures.

The GHG Emissions Assessment has calculated that the net contribution of the proposed development's operational stage is expected to contribute to:

- 0.0001 % of the UK's carbon budgets for 2023-2027;
- 0.0003 % of the UK's carbon budget for 2028-2032; and
- 0.001 % of the UK's carbon budget for 2033-2037.

This is considered to be a not significant minor adverse effect.

Taking into account both the demolition and construction stage and the operational stage contribution to the UK carbon budgets, the proposed development is assessed as being compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction (a not significant minor adverse effect).

The proposed development is required to provide the supporting infrastructure for offshore wind in the area which is beneficial to the UK meeting its net zero by 2050 target.

16 Climate Change

16.1 Introduction

16.1.1 This chapter reports on the likely climate change effects associated with the demolition and construction stage and operational stage of the proposed development.

16.1.2 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - Paris Agreement (2015)[1];
  - Kyoto Protocol (1998)[2];
- National Legislation and Policy:
  - UK's Nationally Determined Contribution (NDC)[3], to the United Nations Framework Convention on Climate Change (UNFCCC) (2022)[4];
  - Climate Change Act (2050 Target Amendment) Order (2019)[5], including UK Carbon Budgets[6];
  - National Planning Policy Framework (NPPF) (2024)[7]; and
  - UK Climate Change Risk Assessment: Government Report (2022)[8].
- Regional Policy:
  - Devon, Cornwall, and Isles of Scilly (DCIoS) Climate Adaption Strategy (2019)[9] sets out a response to declarations of climate emergency made across the three areas. It outlines a dual approach to climate change mitigation and adaption, focusing on adaptation.
- Local Policy:
  - Cornwall Climate Change Plan (2019)[10] developed by Cornwall Council outlines the vision and plan for Cornwall becoming carbon neutral by 2030.
  - Cornwall Council Climate Emergency Development Plan Document (DPD)[11] was adopted on 21 February 2023. It adds to the Cornwall Local Plan's Strategic Policies (2010 – 2030) to address the impacts of climate change. Relevant policies include:
  - Policy C1 – Climate Change Principles
  - Policy G1 – Green Infrastructure Design and Maintenance
- National Guidance and Industry Standards:
  - Planning Practice Guidance (PPG)[12];
  - Institute of Environmental Management and Assessment (IEMA) Guide to Assessing Greenhouse Gas (GHG) Emissions and Evaluating their Significance (2022)[13];
  - IEMA Guide to Climate Change Resilience and Adaptation (2020)[14];
  - Royal Institute of Chartered Surveyors (RICS) Whole Life Carbon Assessment (WLCA) Guidance[15]; and
  - Publicly Available Standard (PAS) 2080 Carbon Management in Infrastructure (2023)[16].

Consultation

16.1.3 Table 16.1 summarises the key EIA Scoping Opinion responses with respect to the climate change assessment.

Table 16.1: Summary of Consultation

Consultee /Date of Consultation	Summary of Comments	Summary of Action Taken and Where in this Chapter Comments are Addressed
Environment Agency Scoping Opinion received 14 September 2023	Flood Risk Assessment will need to consider climate change impacts in line with current guidance.	Addressed in the Flood Risk Assessment which is submitted as part of the planning application.

16.2 Assessment Scope

16.2.1 For assessing climate change within this chapter, a combination of professional judgement, consideration of IEMA guidance on Assessing GHG Emissions and Evaluating Their Significance[17] and IEMA guidance on Climate Change Resilience and Adaptation[18] and technical experience has been used throughout the assessment.

16.2.2 Account has been taken of all applicable guidance and policy in Section 16.1. The technical scope of the climate change assessment has considered the following:

- **In-Combination Climate Impacts (ICCI) Assessment** – considers how extreme weather and projected climate change could have an additive effect on impacts identified within other technical assessments as a result of the proposed development during the demolition, construction and operational stage; and
- **GHG Emissions Assessment** – considers the potential for significant effects to arise from the proposed development in terms of GHG emissions during the demolition, construction and operational stage.

16.2.3 A Climate Change Resilience assessment has been scoped out of the climate change chapter on the grounds that it will be considered within the other relevant ES chapters or standalone documents. These include, but are not limited to the CEMP, FRA and Air Quality Assessment

16.2.4 The quantitative GHG emissions assessment has considered how the construction and the operational stages of the proposed development would impact on climate change as a result of its global warming potential. The GHG emissions assessment has included the following in line with IEMA guidance[17]:

- A review of current and future GHG emissions trends;
- A proportionate estimation of GHG emissions associated to the construction stage in line with PAS 2080:2023 requirements[16]. PAS 2080 provides a framework setting out how to manage whole life carbon when delivering infrastructure and buildings assets and programmes of work. It considers carbon emissions associated with raw material extraction, processing and manufacturing of building materials used in construction (embodied carbon), the transportation of materials to and from site and, construction activities; and
- A proportionate estimation of GHG emissions associated with the operational stage of the proposed development in line with PAS2080:2023 requirements. PAS 2080, considers GHG emissions

[1] United Nations Framework Convention on Climate Change (UNFCCC). 2015. Paris Agreement. 21st Conference of the Parties. Paris. United Nations.
[2] UNFCCC, 1998. Kyoto Protocol. 11th Conference of the Parties. Montreal. United Nations.
[3] UNFCCC, 2020. Nationally Determined Contribution User Guide. Available at: https://unfccc.int/sites/default/files/NDC/2022-06/UK%20Nationally%20Determined%20Contribution.pdf. Accessed 06/06/2024.
[4] Department for Business, Energy and Industrial Strategy. 2022. The UK's Nationally Determined Contribution communication to the UNFCCC. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1109429/uk-nationally-determined-contribution.pdf. Accessed 06/06/2024.
[5] Secretary of State. 2019. Climate Change Act 2008 (2050 Target Amendment) Order 2019.
[6] House of Commons Library. 2019. UK Carbon Budgets. House of Commons Library.
[7] Department for Levelling Up, Housing and Communities. 2024. The National Planning Policy Framework.
[8] UK Government, 2022. UK Climate Change Risk Assessment 2022 (Policy Paper). Presented to Parliament pursuant to Section 56 of the Climate Change Act 2008. Available at: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022. Accessed 06/06/2024.
[9] Climate Resilient DCIoS. 2019. Adaption Strategy. Available at: https://www.climateresilient-dcios.org.uk/view-adaptation-strategy/. Accessed 06/06/2024.
[10] Cornwall Council. 2019. Our Action Plan. Available at: https://www.cornwall.gov.uk/environment/climate-emergency/our-action-plan/. Accessed 06/06/2024.
[11] Cornwall Council. 2023. Climate Emergency Development Plan Document (DPD). Available at: https://www.cornwall.gov.uk/planning-and-building-control/planning-policy/adopted-plans/climate-emergency-development-plan-document/. Accessed 06/06/2024.
[12] Department for Levelling Up, Housing and Communities, 2019. Planning Practice Guidance. Available at: https://www.gov.uk/government/collections/planning-practice-guidance. Accessed 06/06/2024.
[15] RICS. 2023. RICS Professional Standards and Guidance: Whole Life Carbon Assessment for the Built Environment (2nd edition). Available at: https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment.html. Accessed 06/06/2024.
[16] British Standards Institution. 2023. PAS2080 Carbon Management in Buildings and Infrastructure.
[17] IEMA. 2022. Environmental Impact Assessment: Guide to Assessing GHG Emissions and Evaluating Their Significance 2nd Edition.
[18] IEMA. 2020. Environmental Impact Assessment: Climate Change Resilience and Adaptation.

associated with regulated and unregulated energy demand, water use and transport use by the users of the proposed development.

16.2.5 The following two scenarios have been included within the GHG assessment, which is in line with the IEMA Guidance on assessing GHG emissions:

- 'Do minimum' scenario, i.e. the existing development remains in operation; and
- 'Do something' scenario, i.e. existing development remains in operation and the proposed development is built.

16.2.6 The GHG assessment will then undertake the following assessment using the two scenarios:

- A proportionate estimation of the net GHG emissions that would be the difference between the "do minimum" and "do something" scenarios;
- A comparison of the proposed development's net GHG emissions against the UK carbon budgets and the Tyndall Centre set carbon budget for CC; and
- A summary of design and mitigation measures for the proposed development.

Spatial Scope

16.2.7 Due to the nature of each assessment (ICCI and GHG emissions), it has been necessary to define a separate study area for each of the two assessments described in Paragraph 16.2.2.

In-Combination Climate Impacts

16.2.8 The study area for the ICCI assessment has matched that of the relevant technical assessments (e.g. air quality, noise and vibration, transport etc.). This is to take account of the fact the ICCI assessment considers the additive effect of climate change within the other technical assessments cumulatively.

Greenhouse Gas Emissions

16.2.9 The study area for the demolition and construction stage's GHG assessment includes the red line boundary area, as well as the transport network utilised for transport of materials (300 km based upon RICS) guidance[15], transportation of construction waste and workforce commuting.

16.2.10 The study area for the operational stage GHG emissions is consistent with the site and the area selected for the proposed development's traffic model. This area is described in ES Chapter 12: Transport and Accessibility.

Temporal Scope and Assessment Scenarios

16.2.11 The assessment has considered impacts arising during the demolition and construction stage which would be expected to be temporary and short-term (up to five years) in nature. It also has considered impacts arising during the operational stage which would be expected to be permanent and long-term in nature (i.e. more than 10 years).

In-Combination Climate Impacts

16.2.12 The temporal scope for the ICCI assessment matches that of the relevant technical assessments. This is to take account of the fact the ICCI assessment considers the additive effect of climate change on the other technical assessments. The assessment has been undertaken against the future baseline based on the future climate change projections.

Greenhouse Gas Emissions

16.2.13 The GHG assessment has considered impacts arising during the demolition and construction stage. The operational stage is expected to start in 2027 in terms of vehicle emissions related to the proposed development. For the purposes of this assessment, a 50-year design life has been assumed for the operational development which is considered to be long-term in duration. The assessment has been undertaken against the existing baseline.

16.3 Baseline Characterisation Method

Desk Study

In-Combination Climate Impacts

16.3.1 In order to establish baseline climate change conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Met Office UK Climate Averages – Camborne Climate Station[19]; and
- United Kingdom Climate Projections (UKCP18)[20].

Greenhouse Gas Emissions

16.3.2 For the GHG assessment, data was obtained from the following sources:

- Local Planning Authority (CC) and national carbon dioxide emissions statistics[21]; and
- UK Carbon Budgets (2019)[22].

Field Study

16.3.3 Not applicable to this assessment.

16.4 Assessment Method

Methodology

16.4.1 The assessment has been based on the information presented in the ES Chapter 3: Alternatives, Chapter 4: Proposed Development and Chapter 5: Demolition and Construction Description.

Demolition and Construction Stage

In-Combination Climate Impacts

16.4.2 Climate change may have an additive effect in respect of the individual environmental effects reported within other technical assessments undertaken as part of the EIA. These effects may individually be insignificant, but when combined or added, could result in significant effects requiring additional design and/or mitigation measures.

16.4.3 All technical assessment chapters included as part of this ES have been considered. The ICCI assessment has been completed as a high-level overview providing the following:

- Review of current climate trends and projected changes in climate variables in the study area using Met Office and UKCP18[20] data;
- Review of potential effects associated with the proposed development which could be exacerbated by the impacts of climate change;
- Review of embedded design and mitigation measures, as well as additional mitigation that have been identified;
- Qualitative assessment, based on professional judgement, of the implications of extreme weather and potential future climate change on additional mitigation measures identified within the other technical assessments during the demolition and construction stage;
- Further mitigation that may be required to address the effects of climate change; and
- Identification of any residual effects taking account of climate change.

16.4.4 The ICCI assessment has provided a qualitative judgement on whether climate change is likely to alter the significance of any of the effects identified in the impact assessment. To ensure the assessment is proportionate, individual negligible effects have not been considered in this assessment.

[19] Met Office. 2024. Historic Climate Station Data. Available from: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gbujwtyv1. Accessed 06/06/2024.
[20] The UKCP18 projections are available from the Met Office website. Available at: https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/data/index. Accessed 06/06/2024.
[21] UK Government. 2023. UK local authority and regional carbon dioxide emissions national statistics: 2005-2021. Available at: https://www.gov.uk/government/collections/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics. Accessed 06/06/2024.
[22] UK Government. 2019. Carbon Budgets. Available at: https://commonslibrary.parliament.uk/. Accessed 06/06/2024.

Greenhouse Gas Emissions

16.4.5 The GHG assessment considers the GHG emissions associated with the demolition and construction stage of the proposed development based on material quantities. GHG emissions are measured in carbon dioxide equivalent (CO_2e). This is a measure used to compare the emissions from various GHG emissions based upon their global warming potential.

16.4.6 Input data provided by the Client and Design Team, or reasonable assumptions made using professional judgement, have been used in calculations along with GHG emissions factors to estimate the GHG emissions associated with the demolition and construction stage. The scope of the demolition and construction stage assessment has been shown in Table 16.2. Further information on the limitations and assumptions of the assessment is provided in the 'Assumptions and Limitations' Section of this ES Chapter.

Table 16.2: Demolition and Construction Greenhouse Gas Assessment Scope

WLCA module	Description	Included	Emissions Factors
A1-A3: Product stage	GHG emissions which are emitted during the extraction and manufacture of materials used in the construction works.	Yes	Inventory of Carbon and Energy Database (ICE)[23]
A4: Transport to Site	GHG emissions associated with vehicles transporting resources to and from the Site.	Yes	UK Government Conversion Factors 2024[24]
A5: Construction – Installation process	Demolition of existing buildings.	Yes	RICS guidance
	GHG emissions from the direct on-site construction works.	Yes	OneClickLCA[25]
	Waste management and demolition of infrastructure.	Yes	OneClickLCA UK Government Conversion Factors 2024

16.4.7 The GHG assessment provides professional judgement on whether GHG emissions associated with the proposed development are likely to be significant in the context of the UK carbon budgets. As CC does not have its own carbon budgets at this time, the CC carbon budget has been calculated by the Tyndall Centre by allocating a proportion of the UK carbon budget. As the CC local carbon budget only considers operational energy consumption, only the operational energy demand has been compared to the CC carbon budget.

Operational Stage

In-Combination Climate Impacts

16.4.8 The approach for the operational stage assessment is the same as that for the demolition and construction stage and therefore covered above under the 'Demolition and Construction Stage' sub-heading.

Greenhouse Gas Emissions

16.4.9 The GHG assessment considers the GHG emissions associated with the operational stage of the proposed development based on land use change, replacement of materials, typical annual energy and water consumption and operational transport emissions.

16.4.10 Input data provided by the Client and Design Team, or reasonable assumptions made using professional judgement, has been used in calculations along with GHG emissions factors to estimate the GHG emissions associated with the operational stage. The scope of the operational stage assessment has been shown in Table 16.3. Further information on the limitations and assumptions of the assessment is provided in the 'Assumptions and Limitations' section of this ES chapter.

Table 16.3: Operational Development and End of Life Greenhouse Gas Assessment Scope

WLCA module	Description	Included	Emissions Factors
B1: Use of proposed development (land use change)	GHG emissions associated with the change of land use as a result of the proposed development	Yes	National Highways' Environment and Wellbeing Fund tool[26]
B2-B5: Maintenance, repair, replacement and refurbishment of materials	GHG emissions associated with the maintenance, repair and replacement of materials.	Yes (No for refurbishment)	RICS guidance
B6: Energy consumption	GHG emissions from energy consumption of the proposed development	Yes	UK Government Conversion factors 2024
B7: Water consumption	GHG emissions associated with water consumption	Yes	UK Government Conversion factors 2024
B8: User utilisation	GHG emissions associated with vehicles travelling to and from the proposed development	Yes	UK Emissions Factors Toolkit (EFT) V12[27]
C1-C4: End of life stage	The electricity, fuel and water used in the deconstruction process, i.e., deconstruction, transport; waste processing for recovery; disposal	Yes	RICS guidance

16.4.11 The GHG assessment provides a professional judgement on whether GHG emissions associated with the proposed development are likely to be significant in the context of the UK carbon budgets. As CC does not have its own carbon budgets at this time, the CC carbon budget has been calculated by the Tyndall Centre by allocating a proportion of the UK carbon budget. As the CC local carbon budget only considers operational energy consumption, only the operational energy demand has been compared to the CC carbon budget.

Carbon Budgets

16.4.12 The UK Government has set five-yearly carbon budgets which currently run until 2037. The UK national GHG emission fourth, fifth and sixth carbon budgets covers all of the demolition and construction stage of the proposed development which is expected to be between 2025 and 2029, with the majority being completed and operational in 2027. As shown in Table 16.4, 2027 is within the fourth carbon budget and the operation of the proposed development runs into the fifth and sixth carbon budgets.

Table 16.4: UK and Tyndall Centre CC Fourth, Fifth and Sixth Carbon Budgets

Carbon Budget	**UK Carbon Budget Level ($MtCO_2e$)**	**CC Carbon Budget Level ($MtCO_2e$)**
Fourth (2023-2027)	1,950	5.9
Fifth (2028-2032)	1,725	2.9
Sixth (2033-2037)	965	1.4

[23] Circular Ecology, 2019. Inventory of Carbon and Energy Database (ICE) version 3, Available at: https://circularecology.com/embodied-carbon-footprint-database.html; Accessed: 05/12/2024
[24] UK Government, 2024. Greenhouse gas reporting: conversion factors 2024, Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2024; Accessed: 30/10/2024
[25] OneClickLCA, 2024. Available at: https://oneclicklca.com/; Accessed: 05/12/2024
[26] National Highways, 2020. Designated Funds: Environment and wellbeing. Available at: https://nationalhighways.co.uk/our-work/designated-funds/. *Tool available as Excel spreadsheet*. Accessed: 02/09/2024.
[27] Department for Environment Food and Rural Affairs, 2023. Emissions factors Toolkit. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/; Accessed: 05/12/2024

Cumulative Stage

In-Combination Climate Impacts

16.4.13 The climate change chapter has considered potential in-combination cumulative climate impacts affecting environmental receptors identified by other ES topic chapters. It includes consideration of existing potential impacts on environmental receptors that could be intensified by climate change, as well as environmental impacts that could potentially emerge in the future.

16.4.14 The ICCI's resulting from the demolition and construction and operation stages would be limited to the spatial scope presented within the relevant technical assessments included in the ES. Furthermore, very limited cumulative development climate information is available in the public domain. Therefore, cumulative effects have been considered for the full scope of technical assessments (intra cumulative) as opposed to in-combination with other cumulative developments (inter cumulative).

Greenhouse Gas Emissions

16.4.15 The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area of, for example, 1-2 km would be included.

16.4.16 Therefore, effects of GHG emissions from specific cumulative developments have not been individually assessed. However, GHG emissions, have been contextualised within the UK and CC carbon budgets.

16.5 Assessment Criteria

16.5.1 The general criteria used to assess if an effect is significant or not, is set out in the following subsections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

In-Combination Climate Impacts

16.5.2 The ICCI assessment focuses on the potential for climate change to exacerbate the effects on receptors identified within the other technical assessments. For this reason, the sensitivity of the receptors is considered the same as that specified by the individual environmental assessments in the ES.

Greenhouse Gas Emissions

16.5.3 GHG emissions associated with the proposed development would be released to the global atmosphere. Therefore, the global atmosphere is considered to be the receptor and is considered to be of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

Impact Magnitude Criteria

In-Combination Climate Impacts

16.5.4 In line with the IEMA Guidance, the ICCI assessment has been completed based on the likely environmental effects as identified and defined by the individual environmental assessments in the ES. Additional mitigation has been identified to address the potential for climate change to exacerbate these environmental effects.

Greenhouse Gas Emissions

16.5.5 In line with IEMA Guidance[13], it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050. Contextualisation of the carbon footprint of a scheme determines whether or not it supports or undermines the trajectory towards net zero.

16.5.6 Therefore, the total GHG emissions associated with the proposed development have been compared to the carbon budget for the UK. Additional mitigation has been identified to reduce GHG emissions where necessary.

Scale of Effect Criteria

In-Combination Climate Impacts

16.5.7 As stated within IEMA Guidance, there is no legislative definition of 'significance'. The ICCI assessment describes each potential climate impact and uses professional judgement to determine whether there is potential for climate change to increase the significance of reported topic specific residual effects.

Greenhouse Gas Emissions

16.5.8 In line with IEMA Guidance, the scale of effects for the GHG assessment has been described as either major, moderate or minor, as presented in Table 16.5.

Table 16.5: Greenhouse Gas Scale of Effect Criteria

Scale	Description
Major	The proposed development's GHG emissions impacts are not mitigated or are only compliant with do-minimum standards set through regulation and do not provide further reductions required by existing CC's and UK's policy for projects of this type. The proposed development is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate	The proposed development's GHG emissions impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with CC's and UK's policy goals for projects of this type. The proposed development falls short of fully contributing to the UK's trajectory towards net zero.
Minor	The proposed development's GHG emissions impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. The proposed development is fully in line with measures necessary to achieve the UK's trajectory towards net zero.

16.5.9 Based on professional judgement, moderate and major effects are considered significant in EIA terms.

16.5.10 In determining the significance of reported effects, consideration has been given to the type of effect i.e. direct, indirect or secondary, the geographical extent of the effect and the duration of the effect i.e. temporary which is considered to be either short-term (up to 5 years) or medium-term (5-10 years) or long-term (10 years or more).

Nature of Effect Criteria

In-Combination Climate Impacts

16.5.11 The nature of the effect has been described as either adverse, neutral or beneficial as follows:

- Beneficial – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither beneficial nor adverse to a receptor or is equally beneficial and adverse; or
- Adverse – A detrimental effect to a receptor.

Greenhouse Gas Emissions

16.5.12 The nature of the effect has been described as adverse, negligible or beneficial in line with the IEMA Guidance on assessing GHG emissions, as presented in Table 16.6.

Table 16.6: Greenhouse Gas Nature of Effect Criteria	
Nature	Description
Adverse	The proposed development's GHG emissions impacts effects would not be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050.
Neutral	The proposed development's GHG emissions effects would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. The proposed development provides GHG emissions performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	The proposed development's net GHG emissions effects are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-proposed development baseline. The proposed development substantially exceeds net zero requirements with a positive climate effect.

Assumptions and Limitations

In-Combination Climate Impacts

16.5.13 The ICCI assessment has relied on the data and professional judgement of other technical chapters within the ES.

Greenhouse Gas Emissions

16.5.14 The GHG emissions assessment presented in this chapter considers GHG emissions associated with the demolition and construction and operational stages. A carbon workshop was held with the project team on 14 December 2023 which has informed some of the embedded mitigation measures associated with the proposed development.

16.5.15 The existing development GHG emissions are estimated based on electricity, fuel use, ship fuel supply and water use data provided by the Applicant. The UK Government Conversion Factors 2024 have been used for the emissions factors.

16.5.16 The typical GHG emissions associated with the demolition of the existing structures have been based on the 3,122 m^2 gross internal area (GIA) of the existing buildings as provided by the project team and the RICS Guidance KPI, 35 kgCO2e/m2 GIA.

16.5.17 To estimate A1-A3 GHG emissions, materials quantities required for the construction of the proposed development have been provided by the design team[28]. As a worst case, it has been assumed for the GHG assessment that 10,610 m^3 (50%) of the concrete from demolition of Northern Arm would be reused on-site as fill material, with 20% of the remaining quantity being recycled off-site and 30% to landfill. It is assumed 65,000 m^3 of dredged material would be reused on-site as fill material, this is also a worst case scenario.

16.5.18 Regarding A4 GHG emissions, in the absence of specific material transport distances, the following assumptions from the RICS guidance have been used:

- Materials sourced **locally** (**50 km** transport distance by road assumed): concrete, cement, soil, aggregates, asphalt & mortar.
- Materials sourced **nationally** (**120 km** transport distance by road assumed): brick, steel products, concrete blocks & precast paving products.

16.5.19 The following assumptions and limitations have been noted for the A5 GHG emissions calculations.

- Wastage rates from the RICS guidance were applied to the proposed quantities of materials. The wastage rates used have been taken from the RICS Guidance.
- The proportion of each waste material that would be recycled, incinerated or landfilled has been based on default end of life routes within the RICS guidance.
- Carbon emission factors for landfill, incineration and recycling have been based on the UK Government Conversion factors 2024.
- A 50 km transport distance from the construction site to the landfill / incineration / recycling facilities has been assumed to estimate the carbon emissions associated to the transport of waste during the construction and end of life phases. This is in line with the RICS guidance.
- A5 carbon emissions associated with energy and fuel use used for construction plant and equipment have been estimated using the OneClick LCA Tool, based on proposed development's costs included within the Cost Plan and in line with RICS Guidance.
- A5 emissions associated to the workers' commute have not been accounted for within the carbon baseline in line with RICS guidance, which states that impacts associated with these activities are not attributable to the project but to the individual employees.

16.5.20 Land use change (B1) GHG emissions have been estimated using the habitat areas of the existing site (baseline) and the proposed development which were provided by the Biodiversity Net Gain Assessment.

16.5.21 In the absence of information on the maintenance schedule, GHG emissions associated with maintenance (B2) were estimated in line with RICS guidance recommendations, at 1% of the emissions associated with A1-A5.

16.5.22 Due to the absence of information on the repair schedule when developing the baseline, carbon emissions associated with repair (B3) have been estimated based on RICS guidance recommendations, at 25% assumption of the emissions associated with B2.

16.5.23 Replacement emissions have been based on the service life of materials (in line with RICS Guidance) and the expected number of times the material groups would be replaced within the 50-year design life of the proposed development. Where replacement of a material group would be required, the associated carbon emissions have been based on the A1-A3 and A4 carbon emissions of that material. The service life of material groups used to estimate the B4 carbon emissions have been presented in the 'Assumptions and Limitations' section of this chapter.

16.5.24 Refurbishment emissions (B5) have not been included in this assessment as it was anticipated that refurbishment would not occur within the proposed development.

16.5.25 As advised by the project team, it is assumed that the operational energy (B6 GHG emissions) of the proposed development is the same as the existing development (existing baseline) on the site.

16.5.26 The method used to estimate tonnes of carbon dioxide equivalent (tCO_2e) from the operational stage traffic flows (B8) followed the Emissions Factors Toolkit (EFT) V12 published by Defra[29]. The EFT allows users to estimate road vehicle pollutant emission rates for nitrogen oxides (NO_x), particulate matter $(PM)_{10}$, $PM_{2.5}$ and carbon dioxide (CO_2) for a specified year, road type, vehicle speed and vehicle fleet composition for all years up to 2030 for air quality assessments. EFT v12.0, allows users to estimate emissions for years between 2030-2050 in support of climate assessments and appraisals only. The EFT v12.0 utilises CO_2 emission factors published by the Department for Transport (DfT). The traffic data were entered into the EFT, along with speed data and link length. The EFT also utilises basic vehicle split composition information and projections for England provided by DfT/National Highways for roads up to 2050.

16.6 Baseline Conditions

Existing Baseline

In-Combination Climate Impacts

16.6.1 This section contains information about average monthly climate data for Camborne climate station (approximately 19 miles northwest of the site) for the period 1991-2020[19], which is summarised in Table

[28] Ramboll, 2023. Falmouth Docks Development Construction and Demolition Methodology Technical Note

[29] Department for Environment Food and Rural Affairs, 2023. Emissions factors Toolkit. Available at: https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/; Accessed: 17/10/2024

16.7. Camborne climate station is the closest station to the site and therefore provides the closest representation of the climate at the site.

Table 16.7: Average Monthly Climate Data for Camborne Climate Station

Month	Maximum temp. (°C)	Minimum temp. (°C)	Days of air frost (days)	Sunshine (hours)	Rainfall (mm)	Days of rainfall ≥ 1mm (days)	Monthly mean wind speed at 10 m (knots)
January	9.18	4.85	2.20	61.13	120.62	16.63	12.15
February	9.15	4.60	2.09	84.54	94.62	13.57	11.95
March	10.23	5.42	1.10	125.32	71.79	12.13	11.46
April	12.09	6.56	0.03	187.46	72.78	11.57	10.46
May	14.54	8.82	0.00	216.22	61.15	9.77	9.95
June	16.93	11.25	0.00	214.59	62.85	9.53	9.17
July	18.71	13.16	0.00	198.89	69.04	9.80	8.76
August	18.97	13.36	0.00	187.22	78.46	11.40	8.70
September	17.45	12.01	0.00	159.65	77.51	11.40	9.46
October	14.59	9.95	0.03	111.57	111.16	15.00	10.79
November	11.77	7.41	0.20	70.15	129.77	17.53	11.44
December	9.91	5.61	1.73	55.38	126.09	17.00	12.10
Annual	13.65 (average)	8.61 (average)	7.38 (total)	1672.12 (total)	1075.84 (total)	155.33 (total)	10.53 (average)

16.6.2 Climate data available for Camborne shows annual maximum and minimum temperatures both being higher than the UK average of 12.79 °C and 5.53 °C respectively and less days of air frost experienced annually (an average of 7.38 annual air frost days in comparison to the UK annual average of 53.36 days). The average annual rainfall for Camborne is 1075.84 mm, compared to an average for England of 869.60 mm.

Table 16.8: UKCP18 climate change projections for extreme weather events for the local area (12 km grid square)

Climate Parameters		Baseline (1991 – 2020)
Temperature	Number of frost days (daily minimum temperature equal or lower than $0^{o}C$)	0.68
	Heatwaves (3 days with maximum temperature higher than $27^{0}C$ and minimum temperature hihgher than $15^{0}C$)	0.00
	Average summer highest daily maximum temperature (^{o}C)	20.31
	Number of hot days (daily maximum temperature (^{o}C)	0.01
Precipitation	Dry spells (10 days or more with no precipitation)	1.64
	Annual number of days per year when precipitation is greater than 25mm per day (Met Office definition of heavy rain)	3.16

Greenhouse Gas Emissions

16.6.3 The operational GHG emissions of the existing development have been referred to as the 'do minimum' scenario and have been presented within this ES Chapter. The existing development GHG emissions are approximately 3,499 tCO_2e per year as a result of the electricity, fuel use, ship fuel supply and water use of the existing development and a -0.24 tCO_2e per year carbon sequestration due to the vegetation currently existing on the site.

16.6.4 National carbon dioxide emissions statistics are published by the UK Government and contain historic emissions data covering 2005-2021 for all Local Authorities and Councils[21]. This showed that CC emitted 2,376 ktCO2e in 2021, with transport making up 1,014 ktCO2e of this total.

Future Baseline

In-Combination Climate Impacts

16.6.5 The future projected climate conditions and extreme weather events for the proposed development for the 2020s and 2060s are outlined in this section. These time periods cover the assumed construction period (commencing in 2025 for a period of 42 months) and the assumed 50-year operational life (2027 to 2077).

16.6.6 To establish the future climate baseline for the boundary of the proposed development, the following methods were implemented:

- The projected changes in average climate conditions were obtained from the UKCP18 probabilistic projections of climate change.
- The projected changes in extreme weather events were obtained using UKCP18 regional projections.

16.6.7 Future climate projections are published by the Met Office through the UK Climate Projections website. These climate projections can be used to determine the likely future climate conditions in the locality of the proposed development through its operational life.

16.6.8 The general climate trends for the UK are described below, summarised from UKCP18 projections. Generally, trends become more pronounced over time with more extreme trends arising by 2080:

- Milder, wetter winters (increase in mean winter rainfall; increase in mean temperatures; decreased frequency of cold weather events);
- Warmer, drier summers (increased frequency of dry spells; increase in mean temperatures; decrease in mean summer rainfall);
- Increase in frequency of extreme weather (increase in high temperatures and heatwaves; increase in droughts; increased frequency of heavy rainfall events); and
- Increased frequency of windstorm events in the latter half of the 21st Century increased average wind speeds and increases in extreme winds.

16.6.9 Climate change projections for a range of meteorological parameters are presented for different probability levels within the RCP8.5 high emission scenario for the short-term and long-term future time periods.

16.6.10 Climate projections take into account uncertainty due to natural variability and an incomplete understanding of the climate system and its imperfect representation in models. The projections do this by giving the probabilities of a range of possible outcomes, as estimated by scientific methodology. Good practice in the UK uses UKCP18 projections[20] and published literature such as UK Climate Change Risk Assessment 2022. UCKP18 includes projections of a range of climate variables for different time slices until the end of the century.

16.6.11 The probabilistic projections in the UKCP18 provide local low, central and high changes across the UK, corresponding to various probability levels (e.g. 10 %, 50 % and 90 %). There are also a number of Representative Concentrations Pathways (RCPs) available for UKCP18 with each pathway resulting in a different range of global mean temperature increases over the 21st century. IEMA Guidance recommends the use of RCP 8.5 at the 50 % percentile, for the 2080 timeline to ensure a suitably conservative approach and has been applied for this assessment

Table 16.9: UKCP18 climate change projections for extreme weather events for the local area (12 km grid square) for the 2020s and 2060s (under the RCP 8.5 high emissions scenario)

Climate Parameters		2020s (2010 – 2039)			2060s (2050-2079)		
		Min	Mean	Max	Min	Mean	Max
Temperature	Number of frost days (daily minimum temperature equal or lower than 0°C)	0.0	0.13	0.57	0.0	0.02	0.17
	Heatwaves (3 days with maximum temperature higher than 27°C and minimum temperature higher than 15°C)	0.0	0.0	0.0	0.13	0.44	1.13
	Average summer highest daily maximum temperature (°C)	21.34	21.99	23.39	24.13	25.06	26.53
	Number of hot days (daily maximum temperature (°C)	0.0	0.04	0.17	1.1	3.82	9.2
Precipitation	Dry spells (10 days or more with no precipitation)	1.57	2.04	2.97	2.2	2.89	3.67
	Annual number of days per year when precipitation is greater than 25mm per day (Met Office definition of heavy rain)	2.2	3.5	4.4	3.57	4.71	5.87

16.6.12 The mean number of hot days, when the maximum temperature is above 25°C, is anticipated to increase from 0.01 in the baseline period to 3.82 days per year in the 2060s for the high emissions scenario. The average number of days in a given year, when the mean daily temperature is below 0°C, is anticipated to decrease from 0.68 to 0.02 in the 2060s under the high emissions scenario.

16.6.13 In the case of extreme precipitation, the number of days with heavy rain (precipitation greater than 25mm/day) in a given year is expected to increase from 3.16 in the baseline period to 4.71 in the 2060s. The average annual number of dry spells (periods of at least ten consecutive days with no precipitation) is projected to increase from 1.64 for the baseline period to 2.89 for the 2060s under the high emissions scenario. This climate trend is aligned with The State of the UK Climate 2020 Report which shows that there has been a general decline in the number of dry spells in the UK.

16.6.14 Temperatures within the boundary of the proposed development are projected to increase in winter and summer. The largest increase in temperature is projected to be in the mean daily maximum temperature in summer, which is expected to increase by between 3.82°C and 6.22°C in the 2080s, relative to the baseline in the high emissions scenario.

16.6.15 Precipitation within the boundary of the proposed development is projected to decrease in the summer and increase in the winter. The largest decrease in precipitation is projected to be in the summer, which is expected to decrease between 5.9% and 72.3% in the 2080s, relative to the baseline in the high emissions scenario.

16.6.16 In general, climatic changes in the region of the proposed development are projected to result in increasingly wetter and warmer winters and drier and warmer summers.

16.6.17 Future climate projections are published by the Met Office through the UK Climate Projections website[20]. Climate projections can be used to determine the likely future climate conditions in the locality of the proposed development through its operational life.

Greenhouse Gas Emissions

16.6.1 In the absence of the proposed development, the GHG emissions from the site are not anticipated to change significantly. However, an upgrade to the high voltage electrical network at the docks is due to be complete by March 2025 and this will enable the provision of shore power units which will reduce vessel emissions, and consequently GHG emissions.

16.6.2 Local and national GHG emissions have been reducing over recent years, primarily due to increasing generation of electricity from sources that produce less GHG emissions. This trend is expected to continue especially given the recent UK commitment to reduce domestic emissions to net zero by 2050. It is expected that emissions/carbon intensity would continue to decline in the region due to a combination of the following factors:

- National Government carbon budget;
- Local carbon reduction targets;
- Low carbon building design; and
- Decarbonisation of industry, energy supply and transportation.

Sensitive Receptors

In-Combination Climate Impacts

16.6.3 The ICCI assessment is based on the receptors identified within the other technical assessments included within this EIA.

Greenhouse Gas Emissions

16.6.4 GHG emissions associated with the proposed development would be released to the global atmosphere. Therefore, this is the receptor and is of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

16.7 Assessment of Effects

Demolition and Construction Effects

In-Combination Climate Impacts

16.7.1 A summary of potential ICCI and effects during the demolition and construction stage is provided in Table 16.10. The assessment is based on professional judgment informed by a review of individual technical assessments within the ES.

Table 16.10: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Chapter 6: Coastal Processes and Sediment Regime					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 6: Coastal Processes and Sediment Regime.					
Chapter 7: Underwater Noise					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 7: Underwater Noise.					
Chapter 8: Marine Water and Sediment Quality					
Contamination of coastal waters adjacent to the site due to release of sediment, silt and construction related pollutants (e.g., fuel, oil, lubricant, soil).	The Outline CEMP includes a number of mitigation measures to manage contamination of coastal waters.	Increased frequency of extreme weather events: Intense rainfall events.	Increased frequency of heavy rainfall events could increase mobilisation of contaminants and surface water run-off from site, potentially spreading contamination to controlled or coastal waters.	Not significant due to mitigation measures specified in the Outline CEMP.	Additional mitigation measures not required.
Chapter 9: Marine Ecology					
Impacts from contaminants and uncontrolled surface water runoff on coastal habitats and species during construction.	The Outline CEMP includes a number of mitigation measures to manage contamination of coastal waters, including control of water run-off.	Increased frequency of extreme weather events: Intense rainfall events.	Increased frequency of heavy rainfall events could exacerbate this effect by increasing uncontrolled surface water runoff and spreading contamination to nearby habitats.	Not significant due to mitigation measures specified in the Outline CEMP.	Additional mitigation measures not required.
Impacts from dust deposition on coastal habitats and species during construction.	The Outline CEMP includes a number of mitigation measures to manage dust. In addition, the air quality chapter provides detail on these measures.	Increased frequency and intensity of extreme weather events: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation. This may increase dust production and deposition which has the potential to affect coastal habitats and species.	Not significant due to the mitigation measures committed to in the CEMP.	Additional mitigation measures not required.
Chapter 10: Commercial Fisheries and Shellfisheries					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 10: Commercial Fisheries and Shellfisheries.					
Chapter 11: Marine Archaeology					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 11: Marine Archaeology.					
Chapter 12: Heritage					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 12: Heritage.					
Chapter 13: Transport and Accessibility					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 13: Transport and Accessibility.					
Chapter 14: Noise and Vibration					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 14: Noise and Vibration.					

Table 16.10: Demolition and Construction Stage In-Combination Climate Impacts and Effects

Effect of Proposed Development on Receptors	Embedded Design and Mitigation Measures	Climate Change Trend	Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation	Is there a Significant In-Combination Climate Impact?	Additional Mitigation Required?
Chapter 15: Air Quality					
Exposure of sensitive receptors to dust from construction activities.	Dust mitigation measures would be aligned with the Institute of Air Quality Management guidance. The Outline CEMP includes, but is not limited to, the following mitigation and management measures: • Preparation of a Dust Management Plan (DMP), to be approved by CC, which would include measures such as implementation of dust suppression techniques, such as damping down, use of temporary screens, covering of stockpiles, soft strip of buildings prior to demolition. • Use solid screens around dusty activities and around stockpiles. • Plan site layout to locate dust generating activities as far as possible from receptors.	Increased frequency and intensity of extreme weather events: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation. This may increase dust production and reduce deposition which has the potential to affect human health.	Not significant due to the mitigation measures committed to in the Dust Management Plan (e.g. increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather; remove dusty materials from site as soon as possible; minimise emissions from stockpiles by covering, seeding, fencing, or damping down etc).	Additional mitigation measures not required.
Exposure of sensitive receptors to dust from construction activities	As outlined in the Outline CEMP, the DMP would specify best practice for the control of dust by mitigation techniques including some that rely on water, such as ensuring adequate water supply for effective dust and particulate matter suppression.	Increased frequency and intensity of extreme weather events: Drought conditions.	Drought conditions may reduce the availability of water for dust suppression mitigation measures, which would reduce the effectiveness of embedded mitigation measures.	Not significant due to mitigation measures which do not rely on water as committed to the DMP (e.g., covering stockpiles and minimising stockpile size).	No additional measures required. Temporary storage of water could be considered during the construction phase to be used for dust suppression in drought conditions.
Chapter 17: Material Resource and Waste					
Contamination of coastal waters adjacent to the site due to release of contaminated waste (e.g., hazardous liquids and solids).	The Outline Site Waste Management Plan (SWMP) includes, but is not limited to, the following mitigation and management measures: • Management of waste, including mitigation measures such as segregation and storing of contaminated and/or hazardous waste (e.g. in suitable receptacles in designated areas). • Implementation of a 'just-in-time' material delivery system to avoid materials being stockpiled. • A Detailed SWMP would be developed prior to the commencement of construction.	Increased frequency of extreme weather events: Intense rainfall events.	Increased frequency of heavy rainfall events could increase mobilisation of contaminated and/or hazardous waste from construction on site, potentially spreading contamination to controlled or coastal waters.	Not significant due to mitigation measures as committed to in the Outline SWMP.	Additional mitigation measures not required.

Table 16.10: Demolition and Construction Stage In-Combination Climate Impacts and Effects					
Effect of Proposed Development on Receptors	**Embedded Design and Mitigation Measures**	**Climate Change Trend**	**Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation**	**Is there a Significant In-Combination Climate Impact?**	**Additional Mitigation Required?**
Chapter 18: Seascape, Landscape and Visual Impacts					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 18: Seascape, Landscape and Visual Impacts.					
Chapter 19: Socioeconomics					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 19: Socioeconomics.					

16.7.2 The ICCI assessment for the proposed development has identified no significant effects as a result of climate change during the demolition and construction stage given embedded design mitigation measures.

Greenhouse Gas Emissions

16.7.3 Information on demolition and construction embedded mitigation measures is presented in ES Chapter 5: Demolition and Construction. A collaborative workshop was held with the client and design team in December 2023 to discuss how carbon could be reduced in the design and construction of the proposed development. Embedded mitigation relevant to the GHG assessment includes, but is not limited to, the following:

- The design has considered minimising the volume and extent of dredging wherever possible;.
- The design has reused the existing Queens Wharf (extension only) and the use of existing land to minimise the requirement for additional land for the proposed development;
- Demolition waste (concrete) from the Northern Arm would be crushed and reused on-site as fill. It has been assumed for the GHG assessment that 10,610 m^3 of material would be reused on-site as fill material;
- Dredged materials would be reused on-site where possible. It has been assumed for the GHG assessment that 65,000 m^3 of rock would be reused on-site. This is a worst case assumption and there is potential for further material to be reused;
- Precast and prefabricated materials have been included in the design and will continue where possible to reduce energy, water and waste;
- Design has considered the consolidation of deliveries that will be delivered by sea vessel;
- An Outline Site Waste Management Plan (OSWMP) has been produced for the site as part of which includes anticipated waste streams, options to reduce or recycle, consideration of end of life of materials and minimising transport.
- The Contractor will develop the OSWMP into a Detailed SWMP to implement mitigation measures during demolition and construction including establishing a waste policy and targets for the proposed development.

16.7.4 A high-level breakdown of the demolition and construction stage GHG emissions are presented in Table 16.11. The GHG emissions have been broken down into life cycle stages as specified in PAS2080.

Table 16.11: Demolition and Construction Greenhouse Gas Assessment Summary	
Stage of Lifecycle	**Estimated GHG Emissions (tCO_2e)**
Product stage; including raw material supply, transport and manufacture (A1-A3)	34,499
Transport to/from works Site (A4)	1,330
Construction/installation processes (inc. demolition of existing buildings and infrastructure, construction works and waste management) (A5)	87,441
Total	123,269

16.7.5 When comparing the 'do something' scenario against the 'do minimum scenario', i.e. the operational emissions of the existing on-site development, the net contribution of the proposed development's demolition and construction stage is expected to contribute:

- 0.006 % to the UK's fourth carbon budget (2023-2027).

16.7.6 Due to the low percentage of the GHG emissions in comparison to the UK and the embedded mitigation measures, the proposed development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction. Therefore, the scale of effect of the proposed development on the likelihood of avoiding severe climate change, partially aligning with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050, is considered to be **Minor Adverse (not significant)**.

16.7.7 It should also be taken into account that the proposed development is required to provide the supporting infrastructure for offshore wind in the area which is beneficial to the UK meeting its net zero by 2050 target.

Operational Effects

In-Combination Climate Impacts

16.7.8 A summary of potential ICCI and effects during the operational stage is provided in Table 14.14. The assessment is based on professional judgment informed by a review of individual technical assessments within the ES.

Table 16.12: Operational Development Stage In-Combination Climate Impacts and Effects					
Effect of Proposed Development on Receptors	**Embedded Design and Mitigation Measures**	**Climate Change Trend**	**Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation**	**Is there a Significant In-Combination Climate Impact?**	**Additional Mitigation Required?**
Chapter 6: Coastal Processes and Sediment Regimes					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 6: Coastal Processes and Sediment Regimes.					
Chapter 7: Underwater Noise					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 7: Underwater Noise.					
Chapter 8: Marine Water and Sediment Quality					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 8: Marine Water and Sediment Quality.					
Chapter 9: Marine Ecology					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 9: Marine Ecology.					
Chapter 10: Commercial Fisheries and Shellfisheries					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 10: Commercial Fisheries and Shellfisheries.					
Chapter 11: Marine Archaeology					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 11: Marine Archaeology.					
Chapter 12: Heritage					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 12: Heritage.					
Chapter 13: Transport					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 13: Transport.					
Chapter 14: Noise and Vibration					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 14: Noise and Vibration.					
Chapter 15: Air Quality					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 15: Air Quality.					
Chapter 17: Material Resource and Waste					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has beenbased on professional judgement and review of Chapter 17: Material Resource and Waste.					
Chapter 18: Seascape, Landscape and Visual Impacts					
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been, based on professional judgement and review of Chapter 18: Seascape, Landscape and Visual Impacts.					
Chapter 19: Socioeconomics					

Table 16.12: Operational Development Stage In-Combination Climate Impacts and Effects					
Effect of Proposed Development on Receptors	**Embedded Design and Mitigation Measures**	**Climate Change Trend**	**Potential In-Combination Climate Impact on Individual Technical Effects or Embedded Mitigation**	**Is there a Significant In-Combination Climate Impact?**	**Additional Mitigation Required?**
Potential interactions of climate change with the identified effects are considered to be **Negligible** as there is no likelihood for climate change to increase the significance of reported residual effects. This has been based on professional judgement and review of Chapter 19: Socioeconomics.					

16.7.9 The ICCI assessment for the proposed development has not identified any significant effects for the operational stage once existing design mitigation measures are taken into account. All effects are therefore considered to be **not significant**.

Greenhouse Gas Emissions

16.7.10 Information on the operational development embedded mitigation measures has been presented in ES Chapter 4: Proposed Development Description.

16.7.11 The operational GHG emissions have been reported in tonnes of CO_2e for an estimated design life (50 years) of the operational stage.

16.7.12 A collaborative workshop was held with the client and design team in December 2023 to discuss how carbon could be reduced in the operational stage. Embedded mitigation relevant to the operational stage GHG assessment includes, but is not limited to, the following:

- Minimal lighting approach and would utilise the existing lighting columns;
- The design considers what material is required on-site and how these can be future proofed or allow for recycling or reuse at end of design life;
- Regular inspections and repairs (where required) would minimise frequency of replacement;
- The wharfs are designed to allow different future uses allowing a degree of flexibility beyond its operational lifespan;
- All aggregates and rock armour from site would be reused at the end of life stage;
- Sheet piles above the seabed would be extracted and recycled at the end of life stage; and
- The concrete deck would be easily accessible for demolition, crushing and recycling at the end of life stage.

16.7.13 A high-level breakdown of GHG emissions associated with the operational stage of the proposed development is presented in Table 16.13.

Table 16.13: Operational Greenhouse Gas Assessment Summary	
Stage of Lifecycle	**Estimated GHG Emissions (tCO_2e)**
Use (land use change) (B1)	-27
Maintenance, repair and replacement of materials (B2 – B4)	49,034
Energy use (B6)	173,865
Water use (B7)	0.14
User's utilisation (traffic) (B8)	7,261
End of life (C1 – C4)	6,018
Total	236,151

16.7.14 The IEMA Guidance requires comparison of the emissions from the 'do something' scenario, i.e. the proposed development is built, with the 'do minimum' scenario, i.e. the existing development remains in operation.

16.7.15 When comparing the 'do something' scenario against the 'do minimum scenario', i.e. the operational emissions of the existing development, the net contribution of the operational stage of the proposed development is expected to contribute to:

- 0.0001 % of the UK's carbon budgets for 2023-2027;
- 0.0003 % of the UK's carbon budget for 2028-2032; and
- 0.001 % of the UK's carbon budget for 2033-2037.

16.7.16 As the CC local carbon budget only considers operational energy consumption (B6) and the operational energy consumption of the proposed development is expected to be the same as the existing development, the net GHG emissions and contribution to the CC carbon budget is 0.

16.7.17 Beyond 2029 it would be expected that the operational GHG emissions of the proposed development would decrease. This is due to the amount of coal in the UK electricity mix that has substantially decreased in recent years and low and zero carbon technologies (including photovoltaic (PV), wind and nuclear energy) that have been increasingly used to generate a larger portion of the UK's electricity. This is expected to result in a reduction of carbon emissions generated from grid supplied electricity. As the grid decarbonises, the lower amounts of emissions created through using on-site electricity would result in a lower carbon impact.

16.7.18 In addition, an upgrade to the high voltage electrical network at the docks is due to be complete by March 2025 and this will enable the provision of shore power units, which will reduce vessel emissions and consequently reduce GHG emissions.

16.7.19 As the proposed development would not be operational, at the earliest, until 2027 and the minor scale of the GHG emissions in comparison to the national carbon budgets, it has been assessed that the operational stage GHG emissions are considered to have a **Minor Adverse (not significant)** effect.

16.7.20 The GHG emissions associated with the demolition and construction stage, operational stage and the end of life of the proposed development are shown in Table 16.14.

Table 16.14: Total Estimated Proposed Development Greenhouse Gas Emissions	
Item	**Estimated GHG emissions (tCO_2e)**
Total demolition and construction stage	123,269
Total operational stage (50 years)	236,151
Total GHG emissions from proposed development	359,420

16.7.21 The total GHG emissions from the demolition and construction and operational stages and end of life of the proposed development, based on a 50-year design life, is 359,420 tCO_2e.

16.7.22 The total net GHG emissions, i.e. the total proposed development GHG emissions minus the GHG emissions from the existing activities on the site (over a 50-year life), are shown in Table 16.15.

Table 16.15: Total Net Greenhouse Gas Emissions	
Item	**Estimated GHG emissions (tCO_2e)**
Total GHG emissions from proposed development	359,420
Total for existing activities on-site	174,921

Table 16.15: Total Net Greenhouse Gas Emissions	
Item	**Estimated GHG emissions (tCO_2e)**
Total net emissions (proposed development minus the existing development)	184,499

Contextualisation of Proposed Development GHG Emissions Against Carbon Budgets

16.7.23 Table 16.16 shows a contextualisation of the results of the net GHG emissions assessment for all stages of the proposed development against the UK carbon budgets.

Table 16.16: Contextualisation of Proposed Development Estimated Net Greenhouse Gas Emissions Against UK Carbon Budgets			
Item	**2023-2027 (4th Carbon Budget)**	**2028-2032 (5th Carbon Budget)**	**2033-2037 (6th Carbon Budget)**
Estimated net GHG emissions (tCO_2e)	124,440	5,792	5,792
UK Carbon Budget (tCO_2e)	1,950,000,000	1,725,000,000	965,000,000
Percentage of UK Carbon Budget	0.006 %	0.0003 %	0.01 %

16.7.24 When comparing the "do something" scenario against the "do minimum" scenario, i.e. the operational emissions of the existing development, the net contribution of the proposed development during demolition, construction and operation is expected to contribute to:

- 0.006 % of the UK's carbon budgets for 2023-2027;
- 0.0003 % of the UK's carbon budget for 2028-2032; and
- 0.001 % of the UK's carbon budget for 2033-2037.

16.7.25 Due to the low percentage of the demolition, construction and operational GHG emissions in comparison to the national carbon budgets and embedded mitigation measures, the proposed development is assessed as compatible with the budgeted, science-based 1.5 °C trajectory in terms of rate of emissions reduction. Therefore, the scale of effect of the amended proposed development on the likelihood of avoiding severe climate change, aligning with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050, is considered to be **Minor Adverse (not significant)**.

16.8 Additional Mitigation

Demolition and Construction Stage

In-Combination Climate Impacts

16.8.1 No significant in-combination climate effects are predicted and consequently no additional mitigation is required.

Greenhouse Gas Emissions

16.8.2 No significant GHG emissions effects are predicted and consequently no additional mitigation is required.

Operational Stage

In-Combination Climate Impacts

16.8.3 No significant in-combination climate effects are predicted and consequently no additional mitigation is required.

Greenhouse Gas Emissions

16.8.4 No significant GHG emissions effects are predicted and consequently no additional mitigation is required.

16.9 Enhancement Measures

Demolition and Construction Stage

In-Combination Climate Impacts

16.9.1 No enhancement measures are proposed or required in respect of climate change.

Greenhouse Gas Emissions

16.9.2 The following enhancement measures will be considered to reduce carbon during the demolition and construction:

- A GI would be undertaken to inform detailed design, and this may result in pile size reduction;
- The design should use Ground Granulated Blast Slag (GGBS) lean concrete for in-situ concrete and should consider using eco-crete (Cornish concrete product), which has been used on-site on other projects i.e. structural beams;
- Sourcing of Environmental Product Declarations (EPDs) should be considered as the design develops;
- The design should utilise high recycled content steel;
- Opportunity to use local suppliers should be considered. Several local quarries within a two-three mile radius would supply Cornwall granite, riprap stone for rock armour and fine sand material;
- Biofuels for machinery should be used during construction where possible; and
- Specialist works such as dredging may require a more national/international workforce. A local workforce should be sourced where possible during construction.

Operational Stage

In-Combination Climate Impacts

16.9.3 No enhancement measures are proposed or required in respect of climate change.

Greenhouse Gas Emissions

16.9.4 No enhancement measures are proposed or required in respect of climate change.

16.10 Demolition and Construction Residual Effects

In-Combination Climate Impacts

16.10.1 As no additional mitigation would be required, the residual demolition and construction effects remain not significant as reported in the assessment of effects section.

Greenhouse Gas Emissions

16.10.2 As no additional mitigation would be required, the residual demolition and construction effects remain **Minor Adverse (not significant)** as reported in the assessment of effects section.

16.11 Operational Residual Effects

In-Combination Climate Impacts

16.11.1 As no additional mitigation would be required, the residual operational effects remain not significant as reported in the assessment of effects section.

Greenhouse Gas Emissions

16.11.2 As no additional mitigation would be required, the residual operational effects remain **Minor Adverse (not significant)** as reported in the assessment of effects section.

16.12 Summary of Significant Effects

16.12.1 Table 16.17 provides a tabulated summary of the outcomes of the climate change assessment of the proposed development. It reports on the likely effects with respect to climate change associated with the demolition and construction and operational stages of the proposed development.

Table 16.17: Summary of Climate Change Effects

Receptor	Description of Effect	Pre-Mitigation Effect: Scale/ Nature/ Significance*	Additional Mitigation	Post-Mitigation Effect: Scale/ Nature/ Significance*	Details of Residual Effect			
					Direct/ Indirect	Permanent/ Temporary	Reversible/ Irreversible	**Short-term/ Medium-term/ Long-term**
Demolition and Construction								
Environmental receptors (as per technical chapters)	ICCI impacts	Not Significant	Not required	Not Significant	Direct	Permanent	Irreversible	Long-term
Global atmosphere	GHG emissions	Minor/ Adverse/ Not Significant	Not required	Minor/ Adverse/ Not Significant	Direct	Permanent	Irreversible	Long-term
Operational Development								
Environmental receptors (as per technical chapters)	ICCI impacts	Not Significant	Not required	Not Significant	Direct	Permanent	Irreversible	Long-term
Global atmosphere	GHG emissions	Minor/ Adverse/ Not Significant	Not required	Minor/ Adverse/ Not Significant	Direct	Permanent	Irreversible	Long-term
Notes (refer to ES Chapter 2: EIA Process and Methodology for definitions): * Negligible/Minor/Moderate/Major, Adverse/Beneficial, Significant/Not Significant								

16.13 Cumulative Effects

Intra-Project Effects

16.13.1 The ICCI's resulting from the demolition and construction and operational stages would be limited in their spatial extent to the relevant technical assessments in the ES for the proposed development. Therefore, ICCI cumulative effects have not been considered with other Inter-Project Effects

Inter-Project Effects

16.13.2 The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, the approach to cumulative effects assessment for GHGs differs from that for many EIA topics where only projects within a geographically bounded study area of, for example, 1-2 km would be included.

16.13.3 Therefore, effects of GHG emissions have been contextualised within the UK and CC carbon budgets.