South East Strategic Reservoir Option

Preliminary Environmental Information Report

Chapter 17 - Greenhouse gases

Date: October 2025

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17.1 Introduction

17.1.1 This chapter of the Preliminary Environmental Information (PEI) Report provides the preliminary assessment of likely significant effects on greenhouse gases (GHG) from the construction and operation of the proposed SESRO Project (the Project, as detailed in Chapter 2: Project description).

17.1.2 Within this chapter, aspect-specific sections are included on:

- Legislation, policy and guidance (Section 17.2)
- Consultation, engagement and scoping (Section 17.3)
- Assessment methodology (Section 17.4)
- Study area (Section 17.5)
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- Project parameters, assumptions and limitations (Section 17.7)
- Embedded design mitigation and standard good practice (17.8)
- Preliminary assessment of likely significant effects (Section 17.9)
- Next steps (Section 17.10)

17.1.3 This chapter should be read in conjunction with Chapter 2: Project description and other chapters of key relevance, namely:

- Chapter 7: Terrestrial ecology which considers the temporary and permanent habitat losses and gains associated with the construction of the Project, which has been used to determine the balance of GHG emissions associated with land use change.
- Chapter 11: Materials and waste which considers potential effects from the use of key construction materials for the Project.
- Chapter 12: Traffic and transport looks at the rise in traffic and transport across the transport network associated with the anticipated activity from the construction and operation of the Project, and subsequent GHG emissions.

17.1.4 This chapter is supported by the following appendix:

- Appendix 17.1: Greenhouse gases data and assumptions

17.1.5 This PEI Report does not constitute a draft Environmental Statement (ES). Assessments reported within this PEI Report chapter are considered a reasonable 'worst case' as a precautionary approach has been taken where design, construction or baseline information is being developed. Nevertheless, the preliminary assessment is considered sufficiently robust to enable consultees to understand the likely significant environmental effects of the Project, based on the current design information and understanding of the baseline environment. Gaps in information identified within the PEI Report will be considered and addressed as part of the assessment during the production of the ES, as noted in Section 17.10: Next steps.

17.1.6 Where initial likely significant effects are identified at this stage, these may ultimately be determined as not significant in the ES once data gaps are addressed, and the design and mitigation are further developed. The ES will be submitted with the Development Consent

Order (DCO) application and will provide the final assessment of likely significant effects; this will be informed by the ongoing Environmental Impact Assessment (EIA) process and ongoing consultation and engagement.

17.2 Legislation, policy and guidance

17.2.1 Table 17.1 lists the legislation, policy and guidance relevant to GHG for the Project and specifies where in the PEI Report information is provided in relation to these. A full policy compliance assessment will be presented within the Planning Statement as part of the DCO application.

17.2.2 National Policy Statements (NPS) form the principal policy for developments progressing through the Planning Act 2008 process. The NPS for Water Resources Infrastructure (NPSWRI) is the primary NPS for the Project. In addition, the Secretary of State must also have regard to any other matters which they think are both important and relevant to the decision and this could include regional and local planning policies.

17.2.3 The Project is located mainly within the Vale of White Horse District, with the exception of the far eastern extent on the eastern bank of the River Thames, which falls within the South Oxfordshire District. The Project is wholly within the county of Oxfordshire. The regional and local planning policies most relevant to the assessment within this chapter are included in Table 17.1.

Table 17.1 Relevant legislation, policy and guidance for GHG

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
Legislation		
Climate Change Act 2008 This Act makes it the duty of the Secretary of State to reduce net greenhouse gas emissions to avoid dangerous climate change and make provision about adaptation to climate change. It originally set a legally binding target for the UK to reduce its GHG emissions from 1990 levels by at least 80% by 2050. This was amended in 2019, requiring the government to reduce the UK's net emissions by 100% (net zero) relative to 1990 levels by 2050. This target is supported by a system of legally binding five-year 'Carbon Budgets' that restrict the amount of GHG emissions the UK can legally emit. The 4th carbon	With the national Net Zero targets, it is important for the whole life GHG emissions of the Project to align with a Net Zero trajectory. The assessment considers the likely significant effects of GHG emissions in terms of alignment to this trajectory. The Project construction phase would start from 2027, with the reservoir being operational from 2040, meaning effects on GHG would span across the fifth (2028-2032), sixth (2033-2037) and seventh (2038-2042) Carbon Budgets. As part of the assessment, estimated GHG emissions for the Project are compared against relevant Carbon Budgets.	This requirement is addressed in Section 17.4: Assessment methodology and Section 17.9: Preliminary assessment of likely significant effects.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
budget is made legally binding through the 'Carbon Budgets Order 2011'. The 5th through the 'Carbon budget Order 2016. The 6th through the 'Carbon Budget Order 2021'. In February 2025, the Climate Change Committee (CCC) published its advice on the seventh carbon budget (2038–2042), which outlines the recommended emissions limits for that period (Climate Change Committee, 2025). However, this seventh budget has not yet been ratified by the UK government, meaning it is not yet legally binding. The CCC uses the **Balanced Pathway** as the core scenario when recommending the level of each carbon budget to the UK government. The Balanced Pathway is designed to align with the Net Zero target by 2050, as mandated by the 2019 amendment to the Climate Change Act. It provides a detailed emissions trajectory that meets the requirements of each carbon budget period, including the sixth and proposed seventh budgets.	The CCC's Balanced Pathway projections have been used to contextualise GHG emissions in the assessment alongside the Carbon Budgets. The CCC's Balanced Pathway projections for different transport modes (rail and bus) have also been incorporated into the calculations of transport emissions in the future.	
The Infrastructure Planning (EIA) Regulations 2017 These regulations contain the requirements for the assessment of the effects of certain public and private projects on the environment to ensure that the environmental impacts are thoroughly assessed and considered before development consent is granted.	The PEI Report has been produced to support the statutory consultation process under Planning Act 2008 to comply with Regulation 12 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.	Likely significant effects have been assessed as reported in Section 17.9: Preliminary assessment of likely significant effects.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
National Policy Statement for Water Resources Infrastructure (NPSWRI)		
National Policy Statement for Water Resources Infrastructure (NPSWRI) (Department of Environment, Food & Rural Affairs, 2023) The NPSWRI outlines the need and government policies for significant water resources projects in England, including reservoirs, desalination plants, and water transfer infrastructure. It mandates Environmental Impact Assessments and requires consideration of climate change effects in all project phases. Projects must assess their climate impact and provide evidence of emissions, ensuring alignment with government targets. The water resources management plan should offer context on reducing greenhouse gas emissions.	Given that the Project is a water infrastructure project, it is important to satisfy the requirements of the NPSWRI. The NPSWRI states that climate change and GHG emissions need to be assessed in an EIA. The assessment reported in this chapter considers the likely significant effects of GHG emissions.	These requirements of the NPSWRI are addressed in Section 17.9: Preliminary assessment of likely significant effects. Section 17.10: Next steps outlines some of the opportunities currently being explored by the Project in order to mitigate GHG emissions further. A comprehensive list of mitigation opportunities will be reviewed with design teams and will inform the GHG assessment undertaken as part of the ES.
Paragraph 3.2.3 states: '*The Environmental Impact Assessment process is required to identify, describe and assess effects on the human health and population, biodiversity, land, soil, water, air, climate, the landscape, material assets and cultural heritage, and the interaction between them. The Environmental Impact Assessment Regulations set out the information that should be included in the Environmental Statement.*'	The assessment reported in this chapter considers the likely significant effects on climate through the consideration of likely effects of GHG emissions resulting from the Project.	The assessment methodology is set out in Section 17.4: Assessment methodology and the results of the assessment are set out in Section 17.9: Preliminary assessment of likely significant effects.
Paragraph 3.2.10 states: '*The Environmental Statement should provide details of the measures proposed to prevent, reduce or offset any significant effects, the*	The assessment considers the likely significant effects of GHG emissions after the incorporation of mitigation measures.	This is addressed in Section 17.8: Embedded design mitigation and standard good practice.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
likely efficacy of such measures and how they are secured. It should also include details of any ongoing monitoring or remediation that maybe required.'		
Paragraphs 4.4.1 to 4.4.9 outline how projects must align with national policies and targets such as the Climate Change Act 2008, Paris Agreement and UK Carbon Budgets. It highlights how these policies and targets aim for net zero at a national and global level.	With the national net zero targets, it is important for the whole life GHG emissions of the Project align with a net zero trajectory. The assessment considers the likely significant effects of GHG emissions in terms of alignment to this trajectory.	This is addressed in Section 17.9: Preliminary assessment of likely significant effects.
Paragraphs 4.4.10 to 4.4.12 state that climate impacts of a project need to be considered in relation to the government achieving their emissions targets. This needs to be done through an '*assessment of any likely significant climate effects*'.	With the national net zero targets, it is important for the whole life GHG emissions of the Project align with a net zero trajectory. The assessment considers the likely significant effects of GHG emissions in terms of alignment to this trajectory.	This is addressed in Section 17.9: Preliminary assessment of likely significant effects.
Paragraphs 4.4.13 to 4.4.14 state that *'evidence of appropriate mitigation measures in design, construction and operation should be presented'.* This includes the implementation of renewable energy and maximising the use of on-site materials.	The assessment considers the likely significant effects of GHG after the incorporation of mitigation measures, which inform the significance conclusion.	This is addressed in Section 17.4: Assessment methodology, where the renewable energy generation and material reuse GHG saving calculation methods are shown.
Paragraphs 4.4.15 to 4.4.16 highlight the importance of decision-making to reduce a project's carbon impact and allowing governments to achieve their carbon targets.	With the national Net Zero targets, it is important for the whole life GHG emissions of the Project to align with a Net Zero trajectory. The assessment considers the likely significant effects of GHG emissions in terms of alignment to this trajectory.	Section 17.8: Embedded design mitigation and standard good practice outlines the mitigation measures adopted whilst the overall Project effect on Carbon Budgets is presented in Section 17.9: Preliminary assessment of likely significant effects.
Other national policy		
National Planning Policy Framework (NPPF) sets out the	The scope of the assessment includes the disturbance of	This is addressed in Section 17.4: Assessment

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
UK Government's planning policies for England, emphasising sustainable development, economic growth, and environmental protection (Ministry of Housing, Communities & Local Government, 2024). With respect to GHG, Chapter 11 mentions the importance of making effective use of land including land function such as carbon storage. Chapter 14 goes on to discuss the importance of the planning system supporting the transition to net zero by 2050, contributing to radical reductions in GHG emissions, and renewable and low carbon energy associated with infrastructure.	carbon stores (soils and vegetation) during construction as well as carbon sequestered through land use change during operation of the Project. With the national net zero targets, it is important for the whole life GHG emissions of the Project to align with a net zero trajectory. The assessment considers the likely significant effects of GHG emissions in terms of alignment to this trajectory.	methodology and Section 17.9: Preliminary assessment of likely significant effects.
Regional and local policy		
Oxfordshire Net Zero Route Map & Action Plan (South Oxfordshire District Council, 2022). The objective of the action plan is to achieve net zero carbon emissions in Oxfordshire by 2050, with some local authorities aiming for earlier dates. The Route map also includes a net zero pathway model which focuses on reducing Scope 1 and 2 emissions, with future attention to Scope 3 emissions. Specific actions towards achieving their goals include: • Energy Supply: Quadruple installed photovoltaic (PV) capacity by 2030. • Industrial and Commercial: Shift to low-carbon fuels and self-supplied solar PV electricity.	With the Project being in Oxfordshire, it is important to consider Oxfordshire County Council's net zero goals and how the Project aligns with these goals. The Project also considers renewable energy which has been identified in the Oxfordshire County Council's Route map.	Section 17.4: Assessment methodology and Section 17.9: Preliminary assessment of likely significant effects address the key areas identified by Oxfordshire County Council.
Vale of White Horse District Council Climate Action Plan The purpose of the Climate Action	The vast majority of draft Order limits are within Vale of White Horse District; therefore it is	This is addressed in Section 17.4: Assessment methodology, where the

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
Plan is to outline how the council will meet its target of becoming carbon neutral by 2030, with a 75 per cent reduction in carbon emissions by 2025. It sets out carbon targets for 2025 and 2030. To achieve these targets, the Vale of White Horse District Council has identified specific actions: • Implement a local renewable energy project, such as a solar farm, to address unavoidable council emissions.	important to consider the Project effects on the district council's targets. The council's Climate Action Plan has also identified renewable energy as a key enabler to achieving their goals, with the Project already implementing these in its design.	renewable energy generation GHG saving calculation methods are shown.
South Oxfordshire and Vale of White Horse District Councils, Emerging Joint Local Plan 2041 The Emerging Local Plan contains developing planning policies that help address the climate emergency, restore nature, and meet the needs of residents. Policy CE1: Sustainable design and construction Policy CE3: Reducing embodied carbon Policy CE5: Renewable energy	These emerging policies align with the net zero route map. The Project will be required to seek to minimise the carbon and energy impacts from design and construction, including reducing embodied carbon. The Project also considers renewable energy which has been identified in the emerging plan.	Section 17.4: Assessment methodology and Section 17.9: Preliminary assessment of likely significant effects address the key areas identified by the emerging local plan.
Guidance		
Thames Water Net Zero Route Map (Thames Water, 2021). The roadmap sets a Net Zero operational target by 2030, against which Thames Water has identified some key action areas which will enable them to achieve this. These include: • Growing renewable energy generation • Carbon sequestration. This is consistent with the Net Zero 2030 Routemap developed by Water UK, the trade	Given that the Project would be in construction and operation beyond 2030, it is important for the Project to align with Thames Water Net Zero targets. The route map also mentions renewable energy generation and carbon sequestration as key areas to achieving Net Zero goals; these are two large aspects of the Project which would contribute to GHG emissions reductions. Thames Water have committed to reduce operational net carbon emissions to zero by	This is addressed in Section 17.9: Preliminary assessment of likely significant effects.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
association for the water industry (Water UK, 2020).	2030. Since then, there have been some material changes to the assumptions used by the water sector. These have a direct impact on the net zero challenge and include: • Changes to the Applicant's understanding of levels of Nitrous Oxide. This includes levels associated with the wastewater treatment process • Increased operational emissions due to changes in reporting scope boundaries • Additional carbon impacts associated with increases in treatment standards • Government guidance to consider phasing of non-statutory commitments including Net Zero These developments have been reflected in Thames Water's AMP8 plan submitted to Ofwat. They do not change the intent to achieve Net Zero. Thames Water are reviewing the route map to understand the challenges and opportunities they present. Thames Water will publish an updated overview of net zero goals when complete.	
Ofwat 2024 Price Review outlines how the water sector should improve performance across a variety of areas, including GHG emissions to deliver change by 2050. As part of this improvement, they expect to see progress to properly measure and reduce 'embedded' emissions (Ofwat, 2024). This improvement aims to help the sector contribute to national 2050 Net Zero targets.	Given the Project would construct and operate new infrastructure which would have associated embodied emissions, it is important that GHG emissions reduction methods are implemented where possible and embodied GHG emissions are measured and reported correctly.	Section 17.4: Assessment methodology and Section 17.9: Preliminary assessment of likely significant effects. address the key areas identified by Ofwat.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
Publicly Available Specification (PAS) 2080:2023 (BSI, 2023). PAS 2080:2023 is a specification for carbon management in buildings and infrastructure. It provides a framework for organisations to manage and reduce whole-life carbon emissions across the lifecycle of their projects. The main areas identified in PAS 2080:2023 are: • Whole-Life Carbon Management: Emphasises managing carbon emissions throughout the entire lifecycle of buildings and infrastructure, from planning to end-of-life. • Supply Chain Collaboration: Encourages collaboration across the value chain, involving all stakeholders in GHG emissions reduction efforts. • Integrated Decision-Making: Promotes integrating carbon management into decision-making processes to support sustainability goals. • Decarbonisation Principles: Includes principles for setting targets, monitoring, and reporting on GHG emissions.	The principles of PAS2080 inform the GHG assessment, including reporting whole-life GHG emissions, identifying of mitigation measures, and influencing design through the EIA process via engagement with design teams looking to reduce GHG emissions as far as its practicable.	This is addressed in Section 17.4: Assessment methodology, Section 17.8: Embedded design mitigation and standard good practice and Section 17.10 Next steps. A carbon management plan is in preparation in line with PAS 2080:2023 and expected to be submitted alongside the ES.
BS EN 17472:2022 discusses the sustainability of construction works and sustainability assessment of civil engineering works with a focus on calculation methods for a range of environmental indicators including GHG emissions (BSI, 2022). It establishes the requirements and specific methods for assessing whole life GHG	The GHG assessment methodology aligns with the principles and engineering stages of BS EN 17472:2022.	This is addressed in Section 17.4: Assessment methodology.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
emissions, including establishing standard civil engineering stages: • A1-3 Product stage • A4 Transport stage • A5 Manufacturing stage • B1-8 Use stage (use, maintenance, repair, replacement and refurbishment) • D Benefits beyond the project boundaries. PAS2080:2023 follows the same project stages.		
The **2022 IEMA Greenhouse Gas Guidance for Environmental Impact Assessment** (IEMA, 2022) provides updated methodologies for assessing, mitigating and reporting GHG emissions in statutory and non-statutory EIAs. It emphasises the importance of integrating mitigation measures from the outset of a project and throughout its lifecycle to achieve net zero emissions by 2050, in line with the UK's legally binding targets. The guidance introduces more nuanced levels of significance for GHG emissions, helping practitioners evaluate the relative impact of projects on climate change. Additionally, it highlights the need for early stakeholder engagement and collaboration with project design teams to maximise GHG reductions.	IEMA 2022 guidance on EIA and GHG has informed the assessment, including the identification of mitigation measures and a more nuanced significance assessment.	The IEMA guidance is addressed in Section 17.8: Embedded design mitigation and standard good practice where mitigation measures are presented, and Section 17.9: Preliminary assessment of likely significant effects, where the significance of effects are assessed.
Royal Institute of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment (RICS, 2024) provides a framework for measuring carbon emissions throughout the lifecycle of built environment projects, including embodied, operational, and user	The guidance lays out a methodology of how to measure the Project GHG emissions throughout its lifecycle, which aligns with BS EN 17427:2022, however the RICS guidance provides further assumptions and benchmarks (such as average UK construction	The RICS guidance is addressed in Section 17.4: Assessment methodology.

Legislation, policy or guidance description	Relevance to assessment	Where in the PEI Report is information provided to address this
carbon. It emphasises the importance of integrating carbon assessment into the early stages of project design and throughout the project lifecycle. The guidance outlines standardised methodologies for data collection, calculation, and reporting to ensure consistency and accuracy. It also offers criteria for evaluating the significance of carbon emissions.	transport distances, construction emissions per spend, or infrastructure design life assumptions) to address instances of data gaps.	

17.3 Consultation, engagement and scoping

17.3.1 Feedback from consultation and engagement is used to define the assessment approach and to ensure that appropriate baseline information is used. Feedback is also used to drive the design of the Project to avoid, prevent and reduce any likely environmental effects. In particular, feedback from key stakeholders has informed the Project's proposed mitigation measures. Specific mitigation measures relevant to the GHG assessment are summarised in Section 17.8: Embedded design mitigation and standard good practice of this chapter. Engagement is ongoing and will continue to inform the EIA and design process.

Scoping Opinion

17.3.2 The EIA Scoping Report (Thames Water, 2024a) was issued to the Planning Inspectorate (PINS) on 28 August 2024. PINS provided its EIA Scoping Opinion (The Planning Inspectorate, 2024) on 8 October 2024, which included feedback from consultation bodies that it formally consulted.

17.3.3 Table 17.2 captures the key Scoping Opinion comments received from PINS relevant to the GHG assessment, along with the Applicant's response to these at this stage of the assessment. Key activities to inform the final assessment that will be undertaken between the PEI Report and ES are covered in Section 17.10: Next steps. The full consultee comments on the EIA Scoping Report and responses to these will be provided in the ES.

Table 17.2 Key Scoping feedback for GHG

Stakeholder	Scoping comment	Applicant response
Planning Inspectorate	**3.14.3** For the purposes of clarity, the ES should include an assessment of the loss of solar farm apparatus and identify any associated likely significant effects, if applicable.	Chapter 17: Greenhouse gases considers the likely significant effects of climate change in relation to GHG emissions that relate to the Project. A whole-life approach has been adopted where both construction and operational effects are assessed. The reprovision of the decommissioned existing solar farms is being considered as part of the Project, as well as the

Stakeholder	Scoping comment	Applicant response
		proposed renewables mixture of floating solar, solar on structures and hydropower. With regards to identifying any significant effects, the GHG assessment follows the IEMA Guidance in determining whether the GHG emissions resulting from the Project are likely to result in significant effects.

Non-statutory public consultation

17.3.4 Non-statutory public consultation on the emerging proposals for the Project was undertaken with stakeholders and local communities in Summer 2024. Formal responses to this non-statutory consultation feedback have been provided within the 'Statement of Response' (Thames Water, 2025). Any feedback relevant to the GHG assessment has been taken into account where appropriate.

Ongoing engagement

17.3.5 To date, engagement with stakeholders for GHG has focussed on the methodology that was set out in the EIA Scoping Report. As outlined in paragraph 17.10.14 of Section 17.10 Next steps, we will seek to consult with all relevant local authorities associated with the Project (Vale of White Horse District Council, South Oxfordshire District Council, and Oxfordshire County Council) on the GHG emissions assessment and proposed mitigation measures.

17.4 Assessment methodology

17.4.1 This section outlines the methodology followed to assess the likely significant effects of the Project in relation to GHG including:

- Effects scoped into the assessment
- Study area
- Criteria for determining likely significant effects
- Assessment of cumulative effects

17.4.2 Any further data collection or site surveys, studies, modelling, or additional assessments that are still to be undertaken to inform the ES are set out in Section 17.10: Next steps.

17.4.3 The project-wide approach to the assessment methodology is set out in Chapter 4: Approach to environmental assessment.

17.4.4 The assessment methodology for the GHG Emissions assessment follows the IEMA guidance (IEMA, 2022). This states that GHG quantification within an EIA should follow the principles outlined in key documents such as the GHG Protocol (WBCSD & WRI, 2015), BS EN ISO14064-2, and PAS 2080 (The Green Construction Board, Construction Leadership Council, the BSI, 2023), and in doing so, enable the assessment to align with the principles of relevance, completeness, consistency, clarity and accuracy.

Scope of the assessment

17.4.5 The scope of the assessment has been informed by the EIA Scoping process, including the EIA Scoping Report (Thames Water, 2024a) and Scoping Opinion (The Planning Inspectorate, 2024), combined with subsequent changes to the Project design and an enhanced understanding of the baseline environment.

17.4.6 No matters have been scoped out of the GHG Emissions assessment.

17.4.7 Effects that are scoped in for the GHG Emissions assessment relevant to the construction stage are:

- Extraction, transportation and manufacturing of construction materials and products
- Transport of construction materials and products to and from site
- Construction and installation process

17.4.8 Effects that are scoped in for the GHG Emissions assessment relevant to the operation stage, which will increase GHG emissions are:

- Maintenance and repair
- Replacement
- Refurbishment
- Operational energy use
- Potable water use – to be reported in the ES
- Operational transport
- Transport, treatment and disposal of operational waste – to be reported in the ES
- In-use embodied emissions from T2ST WTW chemicals usage

17.4.9 Effects that are scoped in for the GHG Emissions assessment relevant to the operation stage, which will reduce GHG emissions are:

- Land-use based carbon sequestration – to be reported in the ES
- Renewable energy generation

17.4.10 PAS 2080 (The Green Construction Board, Construction Leadership Council, the BSI, 2023) outlines a modular, lifecycle approach for GHG emissions assessments, providing a framework to consider effects throughout a project's lifecycle. This approach has informed the scope of this assessment. Table 17.3 outlines the scope of this GHG Emissions assessment, structured within the modular framework set out in PAS 2080. This includes both direct and indirect GHG emissions from the Project and includes benefits and loads beyond the system boundary.

Table 17.3 Proposed scope of the GHG Emissions assessment

Project work stage	Lifecycle module	Emission source
Construction	A1-A3 Product stage	Extraction, transportation and manufacture of construction materials and products
		Embodied emissions of the solar farm reprovision
	A4 Transport	Transport of construction materials and products to site

Project work stage	Lifecycle module	Emission source
	A5 Construction and installation process	Fuel use in mobile plant and equipment, potable water consumption
		Transport of construction workers, site staff and visitors to, from and within the construction site
		Transport and disposal of waste
		Land use change. Disturbance of carbon stores (soils and vegetation)
		Decommissioning of existing solar farms
Operation	B1 In-use material emissions and removals	Change in land use and creation of the reservoir (e.g. changes of carbon and stored carbon)
	B2 Maintenance	Activities and embodied carbon in maintenance materials, including preventative and planned maintenance
	B3 Repair	Activities and embodied carbon in materials to repair damage over and above the regular maintenance regime
	B4 Replacement	Activities and embodied carbon in materials to replace components at the end of their life expectancy
	B5 Refurbishment	Activities and embodied carbon in refurbishment materials
	B6 Operational energy use	Regulated and unregulated operational energy use
	B7 Operational water use	Potable water use, including water use by members of the public
	B8 User Activities	Operational transport of staff and visitors
		Transport, treatment and disposal of operational waste. Emissions relating to farming activities onsite.
	B8 Chemicals	Extraction, transportation and manufacture of chemicals used for T2ST WTW
Benefits and loads beyond the system boundary	D2 Exported utilities	Electricity exported to the national grid by renewable energy sources

Study area

17.4.11 The study area for the GHG Emissions assessment defines the physical location of emission sources associated with the Project, some of which are or will be within the draft Order limits (for PEI Report) (e.g. fuel use associated with construction plant equipment) and some of which are outside of the draft Order limits (e.g. extraction, manufacturing and production of construction materials). For the assessment of GHG emissions, the receptor

is the global climate as all emissions, regardless of where they occur, contribute to the concentration of GHGs in the atmosphere and associated global warming. Therefore, there is no defined physical study area with regard to the identification and assessment of impacts to the receptor.

Methodology

17.4.12 The GHG Emissions assessment methodology seeks to quantify the whole-life GHG emissions associated with the Project (absolute Project emissions) and the difference in emissions between the Project and baseline scenario (net Project emissions). The assessment has been based on a reasonable worst-case scenario. Significance has been determined based on professional judgement balancing both quantitative and qualitative assessments of the whole-life GHG impact (construction and operation) of the Project. Significance is ultimately determined based on the Project's alignment with the UK's trajectory to net-zero carbon.

Baseline

Data collection

17.4.13 Baseline data collection has been undertaken to obtain information within the study area. This section provides the approach to collecting baseline data.

17.4.14 Baseline data collection for the GHG Emissions assessment is desk-based. Baseline data can be broken down into three categories:

- Existence data
- Operational data
- User data

17.4.15 The following data sources have been accessed to inform the baseline with respect to GHG Emissions:

1) Existence data
   - Length of roads (kilometre (km))
   - Area (m^2) and type of residential properties
   - Area (m^2) and type of commercial properties/sites
2) Operational data
   - Material replacement requirements of existing solar farms
   - Annual energy export of existing solar farms (kilowatt-hours per year (kWh/year)).
3) User data
   - Transport distance (km) of residents via car per year
   - Transport distances (km) relating to commercial and industrial businesses via car and HGV per year

17.4.16 The data sources outlined above present **activity data** that have been multiplied by a **GHG factor** to establish the magnitude of GHG Emissions, as described in paragraph 17.4.24.

17.4.17 In addition to these data sources, the GHG Emissions assessment also draws on environmental baseline outputs for other aspects, specifically, baseline outputs presented in Chapter 7: Terrestrial ecology and Chapter 12: Traffic and transport.

Site surveys

17.4.18 Baseline data collection for the GHG Emissions assessment is desk-based. No surveys specific to the GHG Emissions assessment have informed the PEI Report.

Future baseline

17.4.19 The assessment has considered the likely evolution of the baseline without the implementation of the Project. This is termed the future baseline, and for the GHG Emissions assessment, is defined by the GHG emissions arising from the study area in the absence of the Project.

17.4.20 The future baseline for the GHG Emissions assessment assumes that the study area would continue to operate in its existing configuration for the duration of the study period (i.e. construction and operation stages), where:

- All baseline land uses and operations (e.g. those associated with cereal farming, existing solar farms, highways and buildings) are included
- No construction of any new assets are assumed

Criteria for the assessment of significance

17.4.21 The methodology for assessing effects is based on the principle that the environmental effects of the Project, in relation to a receptor, should be determined by identifying the receptor's sensitivity, assessing the magnitude of impact the Project would have on the receptor's sensitivity and then using professional judgement in combining these two elements to identify the significance of effect.

Assessment of sensitivity

17.4.22 For the GHG assessment, emissions are not geographically limited and have a global effect rather than directly affecting local receptors. As per the IEMA (2022) guidance, the receptor is the global climate. The receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources.

Magnitude of impact

17.4.23 The approach used to assess the magnitude of impact on the global climate considers the nature and magnitude of impact in GHG emissions as a result of the Project. In line with applicable guidelines from the GHG Protocol (The Green Construction Board, Construction Leadership Council, the BSI, 2023), GHG emissions are reported as tonnes of carbon dioxide equivalent (tonnes of carbon dioxide equivalent (tCO_2e)) and consider the seven Kyoto Protocol gases:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)

- Sulphur hexafluoride (SF_6)
- Nitrogen trifluoride (NF_3)

17.4.24 These GHGs are broadly referred to in this chapter under an encompassing definition of 'GHG emissions'. GHG emissions have been assessed using a calculation-based methodology as per the below equation:

$$\textit{Activity data} \times \textit{GHG factor} = \textit{GHG emissions or removals}.$$

where:

Activity data – a measure of the quantity of an activity, and

GHG factor – a measure of the GHG emissions per unit of activity based on the generalised formula

17.4.25 The activity data used to inform this assessment have been provided by the Applicant. Where data were unavailable from the Applicant and Project team, appropriate industry-recognised assumptions and benchmarks have been used.

17.4.26 Section 17.7: Project parameters, assumptions and limitations contains a summary of the data sources, limitations and assumptions of the GHG Emissions assessment, a detailed description of which is included in Appendix 17.1: Greenhouse gases data and assumptions.

17.4.27 Where GHG factors are expected to change over the duration of the Project i.e. as a result of grid decarbonisation and vehicle fleet transition, appropriate sources have been used to provide an estimate. HM Treasury Green Book data tables (DESNZ, 2023) have been used to model the decarbonisation of the electricity grid, and the TAG data book (DfT, 2023) has been used to model vehicle fleet mix proportion projections. The CCC's Balanced Pathway (Climate Change Committee, 2025) trajectories have been used to model decarbonisation for sources of emissions such as bus transport, rail transport and chemicals.

17.4.28 Within Section 17.9: Preliminary assessment of likely significant effects, GHG emissions are discussed in two important and distinct contexts:

- Absolute GHG emissions: The total GHG emissions that are released as a result of the Project.
- Net GHG emissions: The difference in GHG emissions between the future baseline and with the Project development scenarios.

17.4.29 For the reporting of GHG emissions in this assessment, a 60-year operational life is considered (2040-2100). The 60-year operational life in this case is a standardised period over which the operation of the Project is assessed. In line with the RICS Professional Standard on Whole life carbon assessment for the built environment (RICS, 2024), a standardised assessment period of 60 years is utilised in order to enable comparability in the reporting of similar projects. In reality, the intended design life of the Project is 120 years.

Significance of effect

17.4.30 The IEMA guidance (IEMA, 2022) defines the overall approach to assessing the impacts and significance of effects of GHG emissions from projects. There is no quantifiable threshold above or below which the significance of GHG emissions can be based. The

guidance directs that emissions must be contextualised as part of the assessment process, including, but not exclusively, against national Carbon Budgets.

17.4.31 The guidance restates the principles that:

- GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect.
- That the consequences of a changing climate have the potential to lead to significant environmental effects on all aspects in the EIA Regulations (e.g. human health, biodiversity, water, land use, air quality).

17.4.32 The current IEMA guidance (IEMA, 2022) provides a more nuanced approach to the appraisal of significance of changes in GHG emissions arising from a project than was set out in the previous iteration. The previous iteration of the IEMA guidance concluded that all GHG emissions, regardless of scale or extent of mitigation, were significant. The updated IEMA guidance notes that some projects will lead to increases in emissions but that this alone does not represent a significant effect. Instead, it is the role of the competent professional carrying out the assessment to consider the scale of changes in emissions; the context within which these are expected to occur; the mitigation undertaken to minimise negative impacts; and the overall alignment of the Project with the UK's carbon targets.

17.4.33 In determining significance, mitigation employed by the Project is considered where appropriate. For example, the Project is exploring renewable energy generation from floating solar, solar on structures and hydropower and it is currently estimated that approximately a third of the energy demand for SESRO assets may be met through renewable generation. Likewise, the carbon implications of such indirect impacts form part of the significance narrative where appropriate.

17.4.34 The GHG emissions of the Project for the PEI Report have been contextualised against the following Carbon Budgets and UK emission trajectories, as will also be the case for the assessment to be presented in the ES:

- The Climate Change Committee's (CCC) UK Carbon Budgets
- Balanced Pathway (Climate Change Committee, 2025) (see Table 17.1 in Section 17.2: Legislation, policy and guidance)

17.4.35 It should be noted that the CCC Carbon Budgets are legislated and provide a national scale context for GHG emissions. However, the CCC's Balanced Pathway is non-statutory but provides an indicative pathway to net zero by 2050 at a national level and at industry level.

17.4.36 The approach to the assessment of significance for GHG effects draws on guidance set out in the IEMA guidance and is summarised in Table 17.4 where effects that are moderate or major are deemed to be significant.

Table 17.4 Significance categories

Significance category	Significance	Descriptor
Major adverse	Significant	The Project's GHG emissions are not mitigated or are only compliant with do-minimum standards set through regulation,

Significance category	Significance	Descriptor
		and do not provide further reductions required by existing local and national policy for projects of this type. A project with major negative effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate adverse	Significant	The Project's GHG emissions are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate negative effects falls short of fully contributing to the UK's trajectory towards net zero.
Minor adverse	Not significant	The Project's GHG emissions would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor negative effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible	Not significant	The Project's GHG emissions 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. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial	Significant	The Project's net GHG emissions are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

17.4.37 The assessment of significance is determined based on professional judgement balancing both quantitative and qualitative assessments of the whole-life GHG impact (construction and operation) of the Project. The determination of significance considers whether the Project is in line with existing and emerging best practice and policy requirements for GHG emissions reduction (see Table 17.1 in Section 17.2: Legislation, policy and guidance), in addition to Thames Water's climate change policy and Water Resources Management Plan (Thames Water, 2024c).

17.4.38 A precautionary approach to determining significance has been adopted because the design and construction information that informs the assessment is still being developed. Therefore, a preliminary assessment has been made, based on professional judgement, as to whether GHG emissions from the Project would have a material impact on the ability of the UK Government to meet its GHG emissions reduction targets (and would, therefore, potentially be significant).

17.4.39 For the initial assessment of significance reported within this preliminary assessment, the assessment of effects has assumed that 'embedded design mitigation' and 'standard good practice mitigation' relevant to the Greenhouse gases assessment are in place (these measures are presented in Section 17.8: Embedded design mitigation and standard good

practice). However, it should be noted that not all mitigation measures in Appendix 2.2: Draft commitments register have informed the quantitative assessment of GHG emission, with only some measures able to be quantified at this time. Table 17.8 and Table 17.9 in Section 17.8 note where the mitigation has been included in the quantitative assessment.

17.4.40 The preliminary assessment of likely significant effects assumes that 'additional mitigation' that may reduce any identified likely significant adverse effects is not applied, as the viability, nature, and extent of these are not confirmed at this stage in the EIA process. As a result, consideration of residual effects (those that remain after the implementation of all mitigation, including additional mitigation) has not been completed for this preliminary assessment; this will be undertaken in the ES.

17.4.41 Section 17.10: Next steps outlines some of the opportunities currently being explored by the Project in order to mitigate GHG emissions further. A comprehensive list of mitigation opportunities will be reviewed with design teams and will inform the GHG assessment reported in the ES.

Assessment of cumulative effects

17.4.42 All global GHG sources are relevant to the effect on climate change, therefore effects of GHG emissions from other developments should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other. This is in line with IEMA GHG Guidance (IEMA, 2022). Instead, it is necessary to consider GHGs in the context of the UK's net-zero trajectory, using benchmarks such as the UK Carbon Budgets. These benchmarks are inherently cumulative as they consider emissions from all sources across the economy including future emissions from new developments. The contextualisation of the GHGs against Carbon Budgets, and the significance criteria adopted for the assessment (see Table 17.4) account for the alignment of the Project with a net-zero trajectory, and therefore, considers the potential cumulative effect of GHG emissions on the atmospheric concentration of GHGs. Therefore, no separate cumulative GHG assessment with other developments is required.

17.4.43 No other environmental aspects within this PEI Report have the global atmosphere as a receptor. Therefore, no intra-project cumulative effects assessment is required beyond the assessment within this chapter.

17.5 Study area

17.5.1 The methodology used to define the study area is outlined in Section 17.4: Assessment methodology above. The study area for direct GHG emissions produced on site (for example, operational energy use by the Project) is defined by the draft Order limits (as shown in Figure 1.2 Draft Order limits) for emissions generated on site by the Project. The study area for indirect GHG emissions produced offsite (for example, from the extraction, manufacturing and production of construction materials) extends beyond the boundary of the draft Order limits. For the assessment of GHG emissions the receptor is the global atmosphere.

17.5.2 The study area for direct GHG emissions has changed since the EIA scoping stage as a result of changes to the design and the associated draft Order limits. See Chapter 2: Project description for details of the Project parameters and assumptions for the PEI Report

and Chapter 3: Consideration of alternatives for narrative on the design development undertaken to date.

17.6 Baseline conditions

17.6.1 To assess the significance of effects arising from the Project in relation to GHG emissions, it is necessary to identify and understand the baseline environment within the study area. This provides a reference state against which any potential effects on GHG emissions can be assessed. As set out in Chapter 4: Approach to the environmental assessment, the preliminary assessment of effects considers the likely evolution of the baseline without the implementation of the Project.

17.6.2 This section outlines the estimated future baseline GHG emissions associated with activities taking place within the study area.

Existing and future baseline

17.6.3 As stated in paragraph 17.4.11, the global atmosphere is the receptor for all GHG emissions regardless of their origin. The scope of the existing and future baseline GHG assessment aligns with that for the Project programme (see Table 17.3).

17.6.4 The existing baseline represents the environmental conditions at the time of the preliminary assessment (2025) for the PEI Report. The existing baseline is not relevant to the assessment of GHG emissions across the lifecycle of the Project. Instead, the future baseline is the reference point against which the GHG impact of the Project can be compared and assessed.

17.6.5 The future baseline represents the environmental conditions that would exist in the absence of the Project and aligns with the Project programme, including any committed developments/site allocations that would become future baseline sources of emissions. Future baseline starts in the year 2027 and overlaps with the Project assessment period. The Project assessment period is aligned with a 17-year construction period starting in 2027, and a 60-year operational period starting in 2040 (the year in which water is estimated to be available for use).

17.6.6 Table 17.5 presents future baseline GHG emissions within the draft Order limits from activities such as energy from commercial and residential properties (including farmhouses), energy from farming activities, transport and the operation of existing solar farms. It is assumed that there will be no construction activities within the draft Order limits in the future baseline.

17.6.7 The data that supports the future baseline calculation, alongside the relevant assumptions and limitations, are outlined in Appendix 17.1: Greenhouse gases data and assumptions.

Table 17.5 Future baseline GHG emissions

Emissions module	Emission source	Future baseline (2027-2100) GHG Emissions (tCO_2e)
B1 In-use material emissions and removals	Carbon removal associated with land uses and habitats	To be reported in the ES.
B2-B3 Maintenance and repair	Maintenance activities and embodied carbon in maintenance materials, including preventative and planned maintenance of buildings. Repair activities and embodied carbon in materials to repair damage over and above the regular maintenance regime for buildings.	133
B4 Replacement	Embodied carbon in materials to replace road surfaces at the end of their life expectancy.	6,905
	Embodied carbon in materials to replace existing solar farm components at the end of their life expectancy.	No replacements expected between 2027-2039
B6 Operational energy use	Energy use associated with buildings.	1,220
B8 User activities	Operational transport associated with personal and delivery vehicles for residential, agricultural, retail and industrial purposes.	300,041
	Operational energy associated with cereal production on cropland.	341,716
C1-C4 Decommissioning and disposal	Decommissioning of existing solar farms in 2039.	346
Total	**650,361**	
D2 Exported utilities	Electricity exported to the national grid by existing solar farms	-26,102

Greenhouse gases receptors considered in the preliminary assessment

17.6.8 Table 17.6 shows the Greenhouse gases receptor in the study area that has been considered in the preliminary assessment for the PEI Report (i.e. the global atmosphere). The sensitivity of the receptor is defined in the table with commentary justifying the sensitivity category assigned. The table also identifies the effect ID(s) relevant to the receptor. The effect IDs are unique identifiers of each effect assessed (discussed further in Section 17.9: Preliminary assessment of likely significant effects). The receptor for this aspect is not spatially mapped, as spatial representation is not applicable.

Table 17.6 Receptor assessed in the preliminary assessment

Receptor Name	Sensitivity	Sensitivity Commentary	Effect-ID(s)

Global atmosphere	High	GHG emissions are not geographically limited. They have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The receptor for GHG emissions is the global atmosphere. The receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources.	GHG-2, GHG-3, GHG-4

17.7 Project parameters, assumptions and limitations

17.7.1 Chapter 2: Project description relies on the use of relevant parameters and assumptions to allow flexibility in the final design of the Project, in accordance with the Rochdale envelope approach (Planning Inspectorate, 2018). This preliminary assessment for the Greenhouse gases aspect uses the parameters and assumptions outlined in Chapter 2: Project description as well as additional parameters and assumptions specific to this aspect to ensure that the reasonable worst-case scenario is considered within this assessment.

Project parameters and assumptions specific to this aspect

17.7.2 Table 17.7 identifies the Project parameters, components and activities relevant to this assessment where assumptions specific to the preliminary GHG assessment have been generated.

Table 17.7 Project parameters and assumptions forming the basis of assessment

Project parameter / component / activity	Assumption (basis of assessment)
Construction compounds	Compounds are assumed to be powered through a mains connection and renewable energy sources if expected to be in use for greater than a three-month period. Smaller compounds are assumed to be powered through diesel generators if they are in use for less than three months, or for mobile use.
Plant	Equipment are mineral diesel powered, except for electrical equipment specified by design requirements (i.e. Tunnel Boring Machine, Temporary Rail Head and Conveyor). Fuel consumption rates for all equipment are sourced from available Caterpillar (CAT) fuel consumption handbook. Fuel consumption rates assume Medium Fuel Consumption, with idle time percentage at 30%.
Construction Equipment and Machinery	Construction equipment that represent significant energy users have been included within this assessment while minor ancillaries with less significant power and energy demand have been excluded at this stage. Included equipment are: • Tunnel boring machine • Temporary Rail Head & Conveyor • Excavators • Rollers • Tippers/Dump Trucks

Project parameter / component / activity	Assumption (basis of assessment)
	• Dozers • Mixers • Graders • Forklifts • Cranes • Compounds • Light towers.
Dewatering	Dewatering would be required for most activities involving excavation throughout the site, including: Reservoir embankment construction - where removal of overburden extends below the water table, excavation of new watercourse channels, de-watering will be required for the River Thames Intake / Outfall Structure. This is included within each appropriate construction compound construction emissions.
Rail transport	The train related assumptions are: • There will be 705 trains each way per year, or 58 each way per month on average. • Each train can carry: 742m^3 (riprap rock), 866m^3 (gravel) or 974m^3 (sand & topsoil). • Rail decarbonisation is modelled based on the Climate Change Committee (CCC)'s sector specific decarbonisation pathways.
Road transport	Road transport is assumed to be via HGV, car, motorbike, bus or van. Car and van fuel mix projections have been taken from the Transport Analysis Guidance (TAG) data book (2015). Bus decarbonisation is modelled based on the Climate Change Committee (CCC)'s sector specific decarbonisation pathways.
Material import/export quantities	Initial forecasts have been made of the volumes of key construction materials that are likely to be required during construction, in addition to those exported. It is acknowledged that the reservoir embankment design will continue to evolve and, likewise, the material volumes as a result.
Existing Solar Farms	The future baseline GHG assessment assumes an annual export of 67GWh on average for the existing solar farms. For the Project, the existing solar farms are operational until 2029 when they are decommissioned so construction can start.
Renewable Energy Provision	The Project is exploring renewable energy generation from floating solar, solar on structures and hydropower and it is currently estimated that approximately a third of the energy demand for SESRO assets may be met through renewable generation. The potential for reprovision of the decommissioned existing solar farms is also assumed to form part of the Project for the purposes of assessment.
Workforce movements	Construction workforce is assumed to be 1500 for SESRO during its peak, whilst T2ST will have 200 construction workers during peak construction.

Project parameter / component / activity	Assumption (basis of assessment)
	It is assumed that 100 staff members will travel to and from the SESRO site per day during operation. These workers are assumed to all travel by car. Operational staff movements start in 2040, when the water for use date commences.
Visitor movements	The results of the 'high' estimate from traffic modelling have been used to inform the GHG assessment. This assumes that visitors travel by foot, bicycle, bus, rail or car. Visitor movements start in 2043, when construction finishes.
Operational energy	Operational emissions associated with energy demand from for example the water pumps, buildings and water treatment works (WTW) assumes the decarbonisation of the UK grid.

Assessment assumptions and limitations

17.7.3 This section identifies the aspect-specific assumptions and limitations for the preliminary GHG assessment including those related to the availability of data to inform the assessment and assumptions used in the methodology. The assessment of effects in this chapter is preliminary and will be revisited in the ES, depending on the availability of data at that stage and the design taken forward for submission. Assessments reported within this PEI Report chapter are considered a reasonable 'worst case' as a precautionary approach has been taken where design, construction or baseline information is incomplete. Nevertheless, the preliminary assessment is considered sufficiently robust to enable consultees to understand the likely significant environmental effects of the Project, based on current design information and understanding of the baseline environment. Gaps in information identified within the PEI Report will be considered and addressed as part of the assessment during the production of the ES, as noted in Section 17.10: Next steps. Assumptions and limitations identified in relation to the preliminary GHG assessment include:

Construction

- Construction material, such as volumes of concrete and steel (Module A1-A3), are based on a preliminary bill of quantities, with known gaps and limitations addressed through uplift factors.
- Transport of construction workers to and from site during construction (Module A4) does not include staff and visitors, such as consultants. This number is expected to be negligible in comparison to the overall workforce numbers.
- Transport of construction workers (Module A4) does not include transport within the draft Order limits, only to and from the draft Order limits.
- The assessment of fuel use in mobile plant and equipment (Module A5) currently assumes that all mobile plant and equipment are powered by traditional mineral diesel, except for a few electrically powered machines specified by design (e.g. Tunnel Boring Machine, Temporary Rail Head & Conveyor). However, with commitments like SGP-24, which encourages the use of electric, hydrogen, or Hydrotreated Vegetable Oil (HVO)-powered equipment where appropriate, actual emissions could be significantly lower.

- Dewatering has been accounted for in the construction emissions assessment (under Module A5); however, it is acknowledged that additional dewatering activities would be required across the construction compounds as the construction program develops. The intention is to account for these changes within the ES.
- The assessment does not currently include potable water consumption during construction due to the availability of data at this stage. This will be reported in the ES under Module A5.
- The land within the draft Order limits will have carbon stored within the soil. A proportion of this soil will be disturbed during construction with approximately three million cubic meters of topsoil currently expected to be disposed of offsite. However, GHG emissions associated with the disturbance of carbon stores (under Module A5) has not been reported in the PEI Report because it is currently not fully understood what proportion of the existing carbon stock will be released as a result of the works. A specific study will be undertaken to understand the expected quantity of soil carbon disturbance and release. This will be reported in the ES.
- The disposal/processing of demolition and construction waste (under Module A5) has not been assessed due to data limitations at the PEI Report stage, however it will be reported in the ES. Transport of demolition and construction waste has, however, been included in the assessment (under Module A4 for the PEI Report).
- The embodied carbon of materials and the emissions relating to construction and installation of mooring for the floating solar has not been reported in the PEI Report, but will be reported in the ES.
- The sprayed concrete lining machine emissions have not been assessed due to data limitations at the PEI Report stage, however this will be reported in the ES.

Operation

- Tables 4 to 6 in Appendix 17.1: Greenhouse gases data and assumptions presents lifespans of key project components, with recreational buildings and road elements having design lives which are less than 60 years and will need to be replaced within the study period. This is anticipated to increase operational emissions when included in the ES.
- The emissions related to the refurbishment (Module B5) of project components have not been included in the assessment because there is currently no refurbishment planned. This is, likewise, expected to be the case for the ES.
- The results do not currently include GHG emissions changes from land use, specifically carbon capture and release by plants and soils (Module B1). Analysis of sequestration potential is ongoing and will be reported in the ES to better understand the mitigation potential of proposed habitat creation and enhancement.
- The transportation and disposal of operational waste (Module B8) has not been assessed due to data limitations at the PEI Report stage, however an Operational Waste Management Plan will be submitted as part of the DCO which will include sufficient information to report on operational waste GHG emissions.
- The staff commuting emissions (Module B8) does not account for workers commuting to and from the T2ST WTW in operation. These numbers will be confirmed for the ES but are unlikely to materially change the calculations undertaken for the PEI Report.
- It is possible that there will be some retained cereal cropland within the draft Order limits. This could be a source of operational (Module B8) emissions from cereal

farming. The landscape masterplan is in development at the time of PEI reporting, therefore emissions from retained cereal farming areas will be reported in the ES if appropriate.
- The replacement of all solar panels themselves has been reported, but replacement of the mooring equipment of the floating solar has not been reported in the PEI Report. This will be reported in the ES.

17.7.4 Further, due to the early stage of design development, some of the mitigation in Appendix 2.2: Draft commitments register have not yet been incorporated in the quantitative analysis presented in Section 17.9: Preliminary assessment of likely significant effects. This limitation is discussed further in Section 17.8: Embedded design mitigation and standard good practice (see paragraph 17.8.13).

17.7.5 For a more complete list of data assumptions and limitations behind the GHG assessment see Appendix 17.1: Greenhouse gases data and assumptions.

17.8 Embedded design mitigation and standard good practice

17.8.1 As described within Chapter 4: Approach to the environmental assessment, identified embedded design mitigation and standard good practice measures are assumed to be applied within this preliminary assessment to reduce the potential for environmental effects. Embedded design mitigation identified for the Project at this stage are noted in Chapter 2: Project description. These, and standard good practice measures to be applied, are described in greater detail within Appendix 2.2: Draft commitments register.

17.8.2 Table 17.8 and Table 17.9 summarise the type of embedded design mitigation and standard good practice measures considered by the GHG aspect for both construction and operation respectively, including the unique commitment IDs that relate to Appendix 2.2: Draft commitments register (where further detail on each can be referred to). The tables also states the purpose of each mitigation and the applicable securing mechanisms.

Embedded design measures during construction

17.8.3 A key embedded design measure employed by the Project that minimises carbon is the reduction of imported materials, achieved by assessing existing assets for reuse and optimising design to lower material requirements (ED-04 and ED-24).

17.8.4 In parallel, the Project incorporates rail infrastructure to support the bulk transport of construction materials, reducing reliance on road haulage and associated emissions (ED-05). The use of rail sidings and freight pathways is embedded within the design and reflects a broader commitment to low-carbon logistics.

17.8.5 Efforts to maximise the reuse of excavated materials on site further reinforce this approach. By reducing the need for both import and export of materials, the Project not only lowers emissions but also supports circular economy principles (ED-24). These embedded measures are integral to the Project's construction strategy and are expected to evolve as the design progresses.

Standard good practice measures during construction

17.8.6 Beyond embedded design, the Project will implement a suite of standard good practice measures to further mitigate GHG emissions during construction. These include the use of appropriately sized plant and equipment, the use of low-carbon fuels, where appropriate, and automated machinery. Operators will be trained in fuel-efficient techniques, and energy use will be closely monitored to ensure optimal performance (SGP-28).

17.8.7 Locally sourced materials will be prioritised, and batching plants will incorporate excavated material (where suitable) to produce low-carbon concrete. Where feasible, compounds will be powered by renewable or low-carbon energy sources (SGP-28).

17.8.8 Vehicle and machinery emissions will be minimised through the use of Euro VI-compliant vehicles and alternative fuels such as Hydrotreated Vegetable Oil (HVO), electricity and hydrogen (SGP-24) will be considered and used where appropriate. Efficient machinery and planning to reduce multiple handling will be employed, alongside grid connections and low-emission generators. These actions support commitment SGP-24 and are in line with the Draft CoCP (Appendix 2.1: Draft code of construction practice) expectations for sustainable construction practices.

Embedded design measures during operation

17.8.9 Operational emissions have also been addressed through forward-thinking design. Renewable energy technologies, including energy recovery turbines and floating solar arrays, are planned for integration across the site where possible (ED-35). These technologies are expected to contribute significantly to the Project's energy needs, reducing reliance on grid electricity.

17.8.10 The Project is also exploring the application of circular economy principles and the waste hierarchy during design (ED-55), with measures such as designing for deconstruction flexibility aimed to design out waste.

Standard good practice measures during operation

17.8.11 The Project will also continue to apply good practice measures to reduce GHG emissions. During operation, good practice measures include measures to support the successful establishment of tree and other planting (SGP-12), implementing a Site Waste Management Plan (SPG-33), and maintaining soil health through habitat management (SGP-42). These measures contribute to the Project's broader environmental objectives and reinforce its commitment to long-term sustainability.

17.8.12 Additionally, the Project is exploring the provision of infrastructure to support active travel, electric vehicle charging, and carbon-sequestering planting (SGP-50). Intake pump sizing has been optimised to reduce energy demand, and a net zero-aligned energy and maintenance strategy will guide long-term operations (SGP-50).

Integration of mitigation in the Draft commitments register within the assessment

17.8.13 Not all mitigation measures in Appendix 2.2: Draft commitments register have informed the quantitative assessment. Due to the early stage of design development some of the measures have not yet been incorporated into the quantitative analysis presented in Section 17.9: Preliminary assessment of likely significant effects. As such, the results in

Section 17.9 reflect a conservative overall estimate of emissions, which may reduce as design progresses and further mitigation measures are integrated. For example, the assessment of fuel use in mobile plant and equipment (Module A5) currently assumes that all mobile plant and equipment are powered by traditional mineral diesel, except for a few electrically powered elements specified by design (e.g. Tunnel Boring Machine (TBM) and Temporary Rail Head & Conveyor). However, with commitments like SGP-24, which encourages the use of electric, hydrogen, or HVO-powered equipment where appropriate, actual emissions could be significantly lower.

17.8.14 Further mitigation measures that have not yet been quantified may also materially reduce emissions. These measures demonstrate a proactive approach to decarbonisation, and as design progresses, further measures will inform the quantitative assessment presented in the ES. Table 17.8 and Table 17.9 summarise where mitigation has been included in the quantitative assessment for the PEI Report.

Table 17.8 Construction: Relevant embedded design mitigation and standard good practice measures, their purpose and the securing mechanisms

Embedded design mitigation or standard good practice measure (unique commitment ID)	Purpose of mitigation measure	Indicative securing mechanism	Informs quantitative assessment
Design the Project to reduce the need to import material as far as practicable (ED-04)	Reduce GHG emissions associated with construction materials and products (A1-A3), transport of construction materials (A4) and construction and installation processes (A5)	Under the terms of the DCO	Yes
Use of rail to transport bulk construction materials, if practicable (ED-05)	Reduce GHG emissions associated with construction transport of construction materials (A4)	Under the terms of the DCO	Yes
Seek to increase re-use of excavated materials on site where practicable (ED-24)	Reduce GHG emissions associated with construction materials and products (A1-A3) and transport of construction materials (A4)	Under the terms of the DCO	Yes
Application of circular economy principles and the waste hierarchy during design (ED-55)	Reduce GHG emissions associated with A1-A3 Product Stage A4 Transport A5 Construction and Installation Process	Under the terms of the DCO	Yes
Standard good practice measures for establishment of trees and other planting (SGP-12)	Reduce GHG emissions associated (A5) Land use change: disturbance of carbon stores (soils)	CoCP Under the terms of the DCO	No

Embedded design mitigation or standard good practice measure (unique commitment ID)	Purpose of mitigation measure	Indicative securing mechanism	Informs quantitative assessment
Standard good practice measures for minimising vehicle, plant and machinery emissions (SGP-24)	Reduce GHG emissions associated with construction and installation processes (A5)	CoCP	No
Good practice measures to mitigate GHG emissions during construction (SGP-28)	Reduce GHG emissions associated with construction materials and products (A1-A3), transport of construction materials (A4) and construction and installation processes (A5)	CoCP	No
Implement an outline Site Waste Management Plan (SPG-33)	Reduce GHG emissions associated with construction and installation processes (A5)	CoCP	No

Table 17.9 Operation: Relevant embedded design mitigation and standard good practice measures, their purpose and the securing mechanisms

Embedded design mitigation or standard good practice measure (unique commitment ID)	Purpose of mitigation measure	Indicative securing mechanism	Informs quantitative assessment
Embedded design measures to mitigate GHG during operation (ED-35)	Reduce GHG emissions associated with operational energy use (B6)	Under the terms of the DCO	Yes
Application of circular economy principles and the waste hierarchy during design (ED-55)	Reduce GHG emissions associated with replacement (B4) and operational waste (B8)	Under the terms of the DCO	No - Operational waste to be reported in the ES
Standard good practice measures for establishment of trees and other planting (SGP-12)	Reduce GHG emissions associated with land-uses (B1) and optimise carbon sequestration	CoCP Under the terms of the DCO	No

Embedded design mitigation or standard good practice measure (unique commitment ID)	Purpose of mitigation measure	Indicative securing mechanism	Informs quantitative assessment
Management and maintenance of plants and habitats to ensure soil health and functions are sustained (SGP-42)	Reduce GHG emissions associated with land-uses (B1) and optimise carbon sequestration	Under the terms of the DCO	No
Good practice measures to mitigate GHG during operation (SGP-50)	Reduce GHG emissions associated with land-uses (B1), maintenance and repair (B2-B3), operational energy use (B6) and operational transport of visitors (B8)	Under the terms of the DCO	Yes – in terms of Active travel provision and provision of electric vehicle charging

17.8.15 Section 17.10: Next steps outlines some of the opportunities currently being explored by the Project in order to mitigate GHG emissions further. A comprehensive list of mitigation opportunities will be reviewed with design teams and will inform the GHG assessment undertaken as part of the ES.

17.9 Preliminary assessment of likely significant effects

Introduction

17.9.1 This section summarises the findings of the preliminary assessment of effects for GHG emissions. The assessment of significance has been made assuming that embedded design mitigation measures relevant to GHG are applied (see Table 17.8 and Table 17.9, and Appendix 2.2: Draft commitments register for more details). The assessment assumes no additional mitigation, as specific measures are yet to be confirmed during the EIA process. As a result, consideration of residual effects (those that remain after the implementation of all mitigation, including additional mitigation) has not been completed for the PEI report.

17.9.2 As noted in paragraphs 17.1.5 and 17.1.6 the GHG assessment considered a reasonable 'worst case' in line with the precautionary approach that has been taken. Preliminary assessments may indicate likely significant effects; however, these may later be deemed not significant in the Environmental Statement once data gaps are resolved, and design and mitigation measures are refined. The next steps for the GHG assessment, including further exploration of relevant additional mitigation, are set out in Section 17.10: Next steps.

17.9.3 Table 17.20, Table 17.21 and Table 17.22 set out the preliminary assessment of effects for each receptor for the construction phase. Each table distinguishes effects initially

anticipated to be significant and those not likely to be significant. Each table outlines the following details for each effect:

- Receptor name, the Effect ID (a unique identifier for each effect), and sensitivity category.
- Project components and activities giving rise to the effect.
- Relevant embedded mitigation and standard good practice mitigation (with unique Commitment ID, which relates to Appendix 2.2: Draft commitments register).
- Description and duration of the effect.
- Any additional mitigation and monitoring identified at this stage (with unique Additional Mitigation ID to enable cross reference to the measures noted in Section 17.10: Next steps).

Construction – Estimated GHG emissions

17.9.4 Estimated construction phase GHG emissions are presented in Table 17.10. The embodied carbon of the construction materials (module A1-A3) is estimated to account for the largest proportion (46%) of construction stage emissions, followed by the construction and installation process emissions (module A5) at 45%. For further detail on the underlying data assumptions behind the construction GHG emissions calculations see Appendix 17.1: Greenhouse gases data and assumptions. It is important to note that the current construction footprint is largely unmitigated, with alternative options to reduce material, waste and fuel emissions being currently explored (see Section 17.10: Next steps).

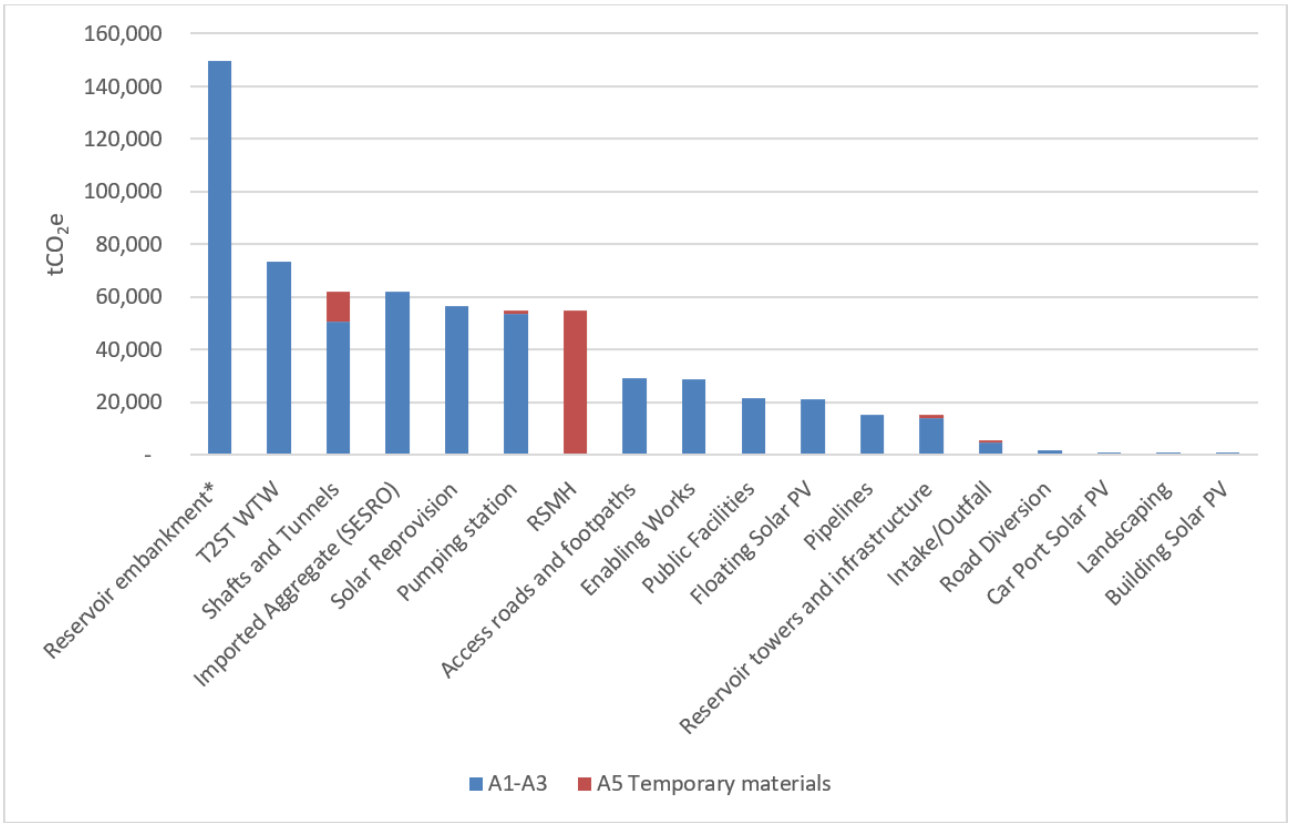
Table 17.10 Construction preliminary GHG emissions

Lifecycle module	Source of emissions	GHG (tCO_2e)
A1-A3 Product stage	Extraction of raw materials, transportation to the manufacturer, and manufacture of construction materials and products: SESRO	453,583
	Extraction of raw materials, transportation to the manufacturer, and manufacture of construction materials and products: Solar farm reprovision	56,643
	Extraction of raw materials, transportation to the manufacturer, and manufacture of construction materials and products: T2ST WTW	73,350
A4 Transport	Transport of construction materials and products to site: SESRO	108,341
	Transport of construction materials and products to site: T2ST WTW	9,169
A5 Construction and installation process	Fuel use in mobile plant and equipment: SESRO	488,053
	Transport of construction workers to and from site: SESRO	613
	Transport and disposal of waste	Transport aggregated within Module A4 for PEI Report.

Lifecycle module	Source of emissions	GHG (tCO_2e)
		Disposal methods under development and to be reported in the ES.
	Land use change: disturbance of carbon stores (soils)	To be reported in the ES
	Embodied emissions of temporary construction materials: SESRO	68,817
	Construction and installation process emissions: T2ST WTW	9,169
	Transport of construction workers to and from site: T2ST WTW	36
Total Module A		1,267,774

17.9.5 Plate 17.1 presents the estimated embodied carbon in the construction materials (module A1-A3 + A5 temporary construction materials) broken down by project component. According to preliminary results the top five most GHG intensive components are the reservoir embankment (149,760 tCO_2e), T2ST WTW (73,350 tCO_2e), shafts and tunnels (62,002 tCO_2e), imported aggregate (61,908 tCO_2e) and the solar farm reprovision (56,643 tCO_2e).

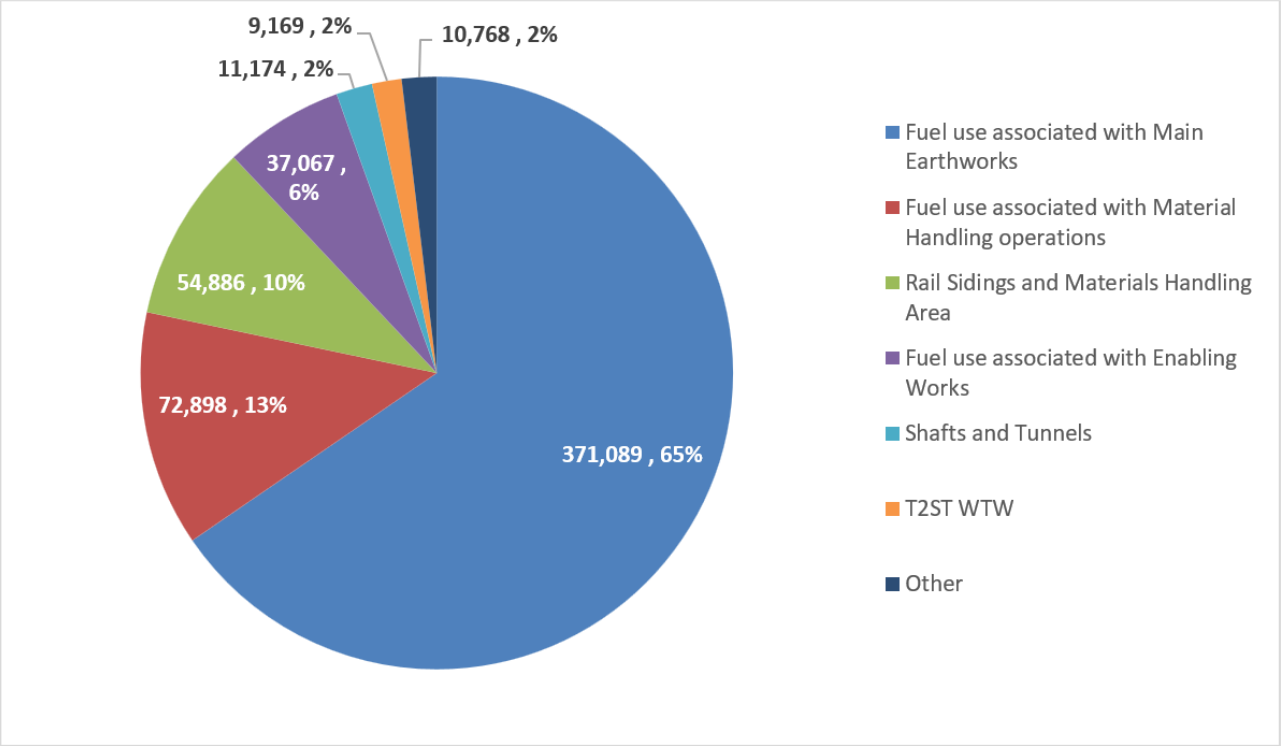
Plate 17.1 A1-A3 + A5.2 Product stage emissions by project component



**including rip rap, drainage pipes, and geotextiles*

17.9.6 Plate 17. provides more detail behind construction process (module A5) emissions, including the embodied emissions of temporary materials used during construction (under module A5). The main earthworks would be both the longest and most intense construction phase due to the large number of heavy-duty construction equipment required for reservoir excavation and embankment construction. As a result, the main earthworks account for 65% (371,089 tCO_2e) of total construction emissions (module A5) and 29% of total construction emissions (module A1-A5).

Plate 17.2 A5 Construction GHG emission (tCO_2e)



Operation - Estimated GHG emissions

17.9.7 Estimated operational GHG emissions for SESRO, over the adopted 60-year assessment period, are presented in Table 17.11 (see paragraph 17.4.29 for further detail on the adopted design life period). Results indicate that the largest share of operational emissions are associated with replacement (module B4), accounting for 52% of total operational emissions. Another large proportion (33%) of operational emissions are from user transport (module B8), largely due to the large number of expected visitors per year, estimated to be in the region of one million. The emissions relating to the use of chemicals (module B8), which are used solely for the T2ST WTW, account for 9% of all operational emissions. For further detail on the underlying data assumptions behind the operational GHG emissions calculations see Appendix 17.1: Greenhouses gases data and assumptions. Opportunities to reduce operational emissions further are outlined in Section 17.10: Next steps.

Table 17.11 Operational preliminary GHG emissions over the adopted 60-year assessment period

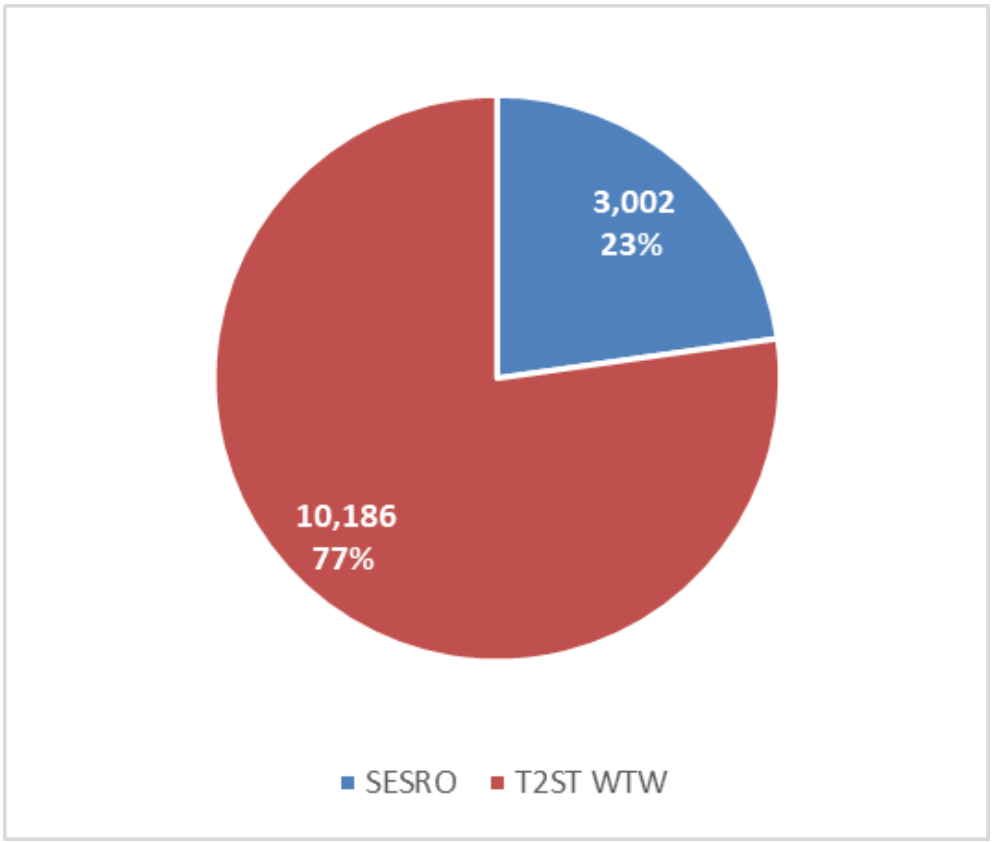
Lifecycle module	Emission source	GHG (tCO_2e)
B1 In-use material emissions and removals	Land-uses (changes in carbon dioxide (CO_2) emissions from capture and release from plants and soils)	To be reported in the ES
B2 Maintenance	Activities and embodied carbon in maintenance materials, including preventative and planned maintenance: SESRO	12,371
B3 Repair	Activities and embodied carbon in materials to repair damage over and above the regular maintenance regime: SESRO	3,093
B4 Replacement	Activities and embodied carbon in materials to replace components at the end of their life expectancy: SESRO	147,063
	Activities and embodied carbon in materials to replace components at the end of their life expectancy: T2ST WTW	109,891
	Activities and embodied carbon in materials to replace components at the end of their life expectancy: Solar farm reprovision	84,441
B5 Refurbishment	Activities and embodied carbon in refurbishment materials	No planned refurbishment
B6 Operational energy use	Regulated and unregulated operational energy use: SESRO (including energy use by members of the public)	3,002
	Regulated and unregulated operational energy use: T2ST WTW	10,186
B7 Operational water use	Potable water use, including water use by members of the public	To be reported in the ES
B8 User activities	Operational transport of SESRO staff and visitors	189,247
	Transport, treatment and disposal of operational waste	To be reported in the ES
B8 Chemical consumption	Extraction of raw materials, transportation to the manufacturer, and manufacture of chemicals used for T2ST WTW	45,997
Total Module B		**605,291**
D2 Exported utilities	Electricity exported to the national grid by the existing solar PV until they are decommissioned in 2029.	-11,552

Lifecycle module	Emission source	GHG (tCO_2e)
	Electricity exported to the national grid by floating solar, solar on structures and hydropower.	-7,245
	Electricity exported to the national grid by the solar farm reprovision (from 2030).	-30,147
Total Module D		-48,944

17.9.8 Renewable energy generation from floating solar, solar on structures and hydropower is estimated, at the time of the assessment, to supply approximately a third of the total operational energy demand for SESRO components. Renewable generation from floating solar, solar on structures and hydropower is not currently assumed to supply T2ST WTW energy demand, however this is being explored as an opportunity. Excess renewable energy generation, that is not predicted to support Project energy demand, is assumed to be exported to the national grid for the purposes of the PEI Report. The exported electricity is accounted for as a carbon saving in Module D2.

17.9.9 Plate 17.3 provides a breakdown of SESRO and T2ST WTW operational energy use (module B6). The WTW accounts for 77% of operational energy use (module B6) GHG emissions.

Plate 17.3 B6 Operational energy use breakdown for SESRO and T2ST WTW (tCO_2e and percentage share)



17.9.10 Table 17.12 provides a more granular breakdown of B6 emissions for SESRO over the adopted 60-year operational life based on the energy demand of key project components. It can be seen that the SESRO Ancillaries and Intake Pumps are the main sources of operational emissions for the Project, accounting for 31% and 26% of the Project's operational emissions respectively.

Table 17.12 Operational energy use (module B6) GHG emissions per Project component over the adopted 60-year design life

Project component	Operational emissions (tCO_2e)
SESRO Ancillaries	940
SESRO River Intake Pumps	773
EV Charging	391
SESRO Dewatering Pumps	312
SWOX to Farmoor Transfer Pumps	163
SESRO Recirculation Pumping	132
Lakes Cluster	82
SESRO Mixing Air Compressors	76
SESRO Pump House and Electrical Building	66
Watersports Centre	30
Visitors Centre	24
Nature Education Centre	9
SESRO River Intake Screens	5

17.9.11 Operational energy use (module B6) GHG emissions per T2ST component over the adopted 60-year design life in provided in Table 17.13 Operational energy use (module B6) GHG emissions per T2ST component over the adopted 60-year design life. It shows that the T2ST WTW accounts for nearly all (99.5%) of the T2ST operational emissions.

Table 17.13 Operational energy use (module B6) GHG emissions per T2ST component over the adopted 60-year design life

Project component	Operational emissions (tCO_2e)
T2ST WTW	10,138
T2ST Transfer Pumps	25
T2ST Plantrooms	23

17.9.12 Table 17.11 currently excludes changes in carbon dioxide (CO_2) emissions from capture and release from land uses (plants and soils). The carbon sequestration of the proposed habitats has the potential to mitigate the GHG emissions of the Project and this will be explored in greater detail and reported in the ES.

Design development from previously published carbon footprint

17.9.13 In August 2025 the SESRO A2: Carbon Report (Thames Water, 2025) was published presenting the Project's pre-planning feasibility GHG emissions. Whole life carbon emissions were reported at 723,150 tCO_2e with construction emissions (A1-A5) at 495,700 tCO_2e. The forecasted construction emissions presented in this PEI Report show that this figure would more than double in comparison to 1,267,774 tCO_2e. The main driver for this has been the evolution of the design in the intervening period between the forecasts being prepared. There has been a change in scope and design to include, for example:

- Changes to the slope of the embankment
- An increase in dam crest level
- A larger pumping station
- The addition of the Wilts & Berks Canal
- An increase in the Project's land area
- Multitude of new structures including new culverts, bridges and access roads
- An increase in the temporary rail siding material handling to import and export material
- Onsite renewables beyond the hydropower and existing solar farm reprovision
- T2ST assets including the WTW
- Visitor transport emissions
- Additional recreational buildings, and
- 15% contingency in design not previously accounted for.

Carbon payback of solar PV

17.9.14 It is currently unclear whether the solar PV proposed for the Project will deliver enough carbon savings over their lifetime to "pay back" the emissions generated during their manufacture, installation and replacement. While PVs are estimated to reduce operational energy emissions, their upfront and in-use embodied carbon may not be fully paid back - especially when installed in and beyond 2040, against what is forecasted to be a near net-zero carbon UK National Grid. It is important to note that this projected decarbonisation of the grid is facilitated due to the increasing installation of renewable energy projects, including solar PV, which are displacing fossil fuel-based energy generation.

17.9.15 However, comparison with the grid intensity published by the Department for Energy Security and Net Zero (DESNZ) is not like-for-like, as the grid carbon factors exclude some embodied emissions in energy infrastructure, while the assessment of the Project's solar are based on whole-lifecycle emissions.

17.9.16 At present, the provision of solar energy by the Project remains in the exploration phase. The extent, timing and duration of PV deployment are still being worked through as part of the evolving design. However, solar energy remains a national priority under UK policy and will contribute to long-term grid decarbonisation goals. Therefore, for the purposes of this assessment, solar PVs have been assumed to remain in place for the duration of the study period. This presents a cautious, worst-case scenario overall for lifecycle emissions associated with solar energy provision.

Summary of likely significant construction effects

17.9.17 This section summarises the construction effects that are initially anticipated to be 'significant' through the preliminary assessment of effects GHG emissions. It pulls out the key potential causes and receptors affected.

Construction - Contextualisation and significance

17.9.18 Table 17.14 presents the estimated absolute and net (the difference between future baseline and Project) GHG emissions from the construction phase of the Project, grouping those emissions into the relevant five-year budget periods in which they occur (including the 7th budget which has yet to be adopted by UK Government). It should be noted that there is no confirmed construction work within the draft Order limits under the future baseline. The respective contribution of both the estimated absolute and net GHG emissions to the UK Carbon Budgets are presented.

Table 17.14 Construction GHG emissions contextualised against the UK Carbon Budgets

Carbon Budget	5-year carbon budget (tCO_2e)	Future baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Net change between future baseline and project emissions (tCO_2e)	Contribution to Carbon Budget: Absolute emissions (%)	Contribution to Carbon Budget: Net emissions (%)
4th CB (2023 – 2027)	1,950,000,000	0	2,898	+2,898	0.0001%	0.0001%
5th CB (2028 – 2032)	1,725,000,000	0	362,984	+362,984	0.02%	0.02%
6th CB (2033 - 2037)	965,000,000	0	586,270	+586,270	0.1%	0.1%
7th CB (2038 - 2042)[1]	535,000,000	0	315,622	+315,622	0.1%	0.1%

17.9.19 The comparison of construction emissions to the Carbon Budgets indicates that that they are small for all periods, never exceeding 0.1% of the total emissions for the budget periods in any individual five-year period. It should be noted that only early works, such as ecological habitat creation in preparation for translocation would be expected to start in 2027, and this is reflected in the assessment of Module A4 and A5 emissions. However, this level of granularity is not yet achieved in the assessment of Module A1-A3 emissions and these emissions are divided equally across each year of construction. Therefore in

[1] The Climate Change Committee (CCC) has provided recommendations on the emissions cap for the seventh budget; however, it is not yet adopted by the UK Government. The 7th budget has been included for context and has not informed the significance conclusions.

reality, the Project's contribution to the fourth Carbon Budget is currently an overestimate – and its contribution to the fifth, sixth and seventh Carbon Budget is, as a result, an underestimate.

17.9.20 The Carbon Budgets accommodate development and activity at a national scale, and are intended to inform national policy, development and action. As a result, almost all individual projects when compared to the budgets appear small and are only a fraction of the allocated budget. The IEMA guidance (2022) also encourages a more sector-specific contextualisation. Construction GHG emissions have also been contextualised against the CCC's Balanced Pathway trajectory for the industry sector. As shown in Table 17.15, the comparison of net construction emissions to the CCC Balanced Pathway indicate these are also small across the 2025 – 2050 period, estimated to be 0.7% of the total.

Table 17.15 Construction GHG emissions contextualised against the CCC Balanced Pathway Industry sector (2025 – 2050)

CCC Balanced Pathway sector	CCC Balanced Pathway sector emissions: 2027 – 2050 (tCO_2e)	Future baseline emissions: 2027 – 2050 (tCO_2e)	Project emissions: 2027 – 2050 (tCO_2e)	Net change between future baseline and project (tCO_2e)	Contribution to CCC Balanced Pathway sector – Absolute emissions (%)	Contribution to CCC Balanced Pathway sector – Net emissions (%)
Industry[2]	178,890,583	-	1,267,774	+1,267,774	0.7%	0.7%

Construction significance

17.9.21 The key challenge in concluding whether a project's GHG emissions are significant or not is determining whether these support or undermine a UK trajectory to net zero i.e. does the project hinder the UK's ability to achieve its legally binding net zero target by 2050. It is, hence, the role of the competent professional carrying out the assessment to consider the scale of changes in emissions, the context within which these are expected to occur, the mitigation undertaken to minimise negative impacts and the overall alignment of the Project with the UK's carbon targets.

17.9.22 Preliminary estimates show that the net increase in GHG emissions between the future baseline scenario and the Project is 1.27 $MtCO_2e$ over the construction period (see Table 17.14). The level of GHG emitting activity within the draft Order limits under the future baseline scenario is small compared to the scale estimated for the construction necessary to deliver a Nationally Significant Infrastructure Project (NSIP). IEMA guidance notes that: '*The crux of significance … is not whether a project emits GHG emissions, nor even the magnitude of emissions alone but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050'*.

17.9.23 Contextualisation against the UK Carbon Budgets shows that the Project's construction GHG emissions never exceed 0.1% of total emissions across any of the five-year budget periods. Further, when compared against the CCC Balanced Pathway emissions trajectory

[2] The following categories from the CCC Balanced Pathway for Industry have been included to best reflect the construction sector: Cement and lime; Glass and other minerals; Iron and steel; Non-ferrous metals; Non-road mobile machinery.

for the industry sector, the Project's emissions are less than 1% of the total. On this basis it could be concluded that that construction emissions are likely to be minor adverse and not be significant. However, such a conclusion would be based on preliminary information, assumptions and an evolving Project design (with a number of limitations outlined in Section 17.7: Project parameters, assumptions and limitations). As a result, construction emissions are expected to change between the PEI Report and the ES.

17.9.24 Ultimately, the GHG emissions presented at the PEIR stage reflect a preliminary design that is still in development. The quantitative assessment does not yet capture the full extent of the mitigation in Appendix 2.2: Draft commitments register, however the Project has employed embedded design measures that have reduced the quantified construction-related emissions (see embedded design measures in Table 17.8). There are standard good practice mitigation measures, such as the uptake of sustainable construction fuels, that are being explored but have not yet been reflected in the quantitative results (see Section 17.8: Embedded design mitigation and standard good practice). In addition, a comprehensive suite of additional mitigation measures are actively under review (see Section 17.10: Next steps). These measures, that have not yet been quantified, represent a strong foundation for future reductions and provide important qualitative context for assessing significance.

17.9.25 Given the early stage of design development, and in line with IEMA guidance (IEMA, 2022) which underscores the importance of integrating mitigation to maximise GHG reductions to align with net zero ambitions, a precautionary approach has been adopted in drawing a significance conclusion at this stage. Accordingly, GHG emissions associated with the construction of the Project are preliminarily considered to have a likely adverse effect considered to be significant. However, this conclusion is provisional and subject to change as the design matures and additional mitigation is quantified. The Project's current commitments already lay a strong foundation for future reductions, and the significance of effects may be reassessed in the ES in light of these developments.

17.9.26 Section 17.10: Next steps outlines the next steps and includes mention of the mitigation measures to be quantified in the ES that are expected to reduce emissions further.

Summary of likely significant Operation effects

Operation - Contextualisation and significance

17.9.27 Similar to construction, absolute and net GHG emissions from operation have been contextualised against the UK Carbon Budgets, with those emissions grouped into the relevant five-year budget periods in which they occur (including the 7th budget which has yet to be adopted by UK Government) (see Table 17.16). Future baseline emissions are also grouped into the relevant five-year budget periods in which they occur. However, it is important to note that this comparison has limitations. This is because the Project would be expected to be fully operational in 2040 (commissioning and filling of the reservoir for use) whilst the latest seventh Carbon Budget covers the 2038-2042 period. This means that only three years (2040-2042) of Project operational emissions overlap with the seventh Carbon Budget for contextualisation. Operational emissions are estimated to contribute 0.003% of the seventh Carbon Budget's GHG emissions. Emissions that are grouped into the fourth, fifth and sixth Carbon Budgets are those associated with the existing and reprovision of solar farms. The net change in GHG emissions between the future baseline and the Project is negative during all years covered by the Carbon Budgets.

Table 17.16 Operation GHG emissions contextualised against the UK Carbon Budgets

Carbon Budget	5-year carbon budget (tCO_2e)	Future baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Net change between future baseline and project emissions (tCO_2e)	Contribution to Carbon Budget: Absolute emissions (%)	Contribution to Carbon Budget: Net emissions (%)
4th CB (2023 – 2027)	1,950,000,000	7,673	-4,467	-12,139	0%	0%
5th CB (2028 – 2032)	1,725,000,000	55,518	-15,136	-70,653	0%	0%
6th CB (2033 - 2037)	965,000,000	48,753	-6,693	-55,446	0%	0%
7th CB (2038 - 2042)[3]	535,000,000	46,070	13,580	-32,490	0.003%	0%

17.9.28 In line with IEMA guidance, it is good practice to consider multiple sources of evidence when contextualising GHG emissions. However, the challenge is that there is not an official UK-wide water sector decarbonisation pathway to 2050 (and beyond) to contextualise the Project's emissions. Water UK, the UK's water and wastewater industry trade association, published a net zero route map for the water sector (Water UK, 2020), however the various pathways do not extend beyond 2030, the target year the water industry pledges to be operationally net zero. Although the wider water sector's net zero timeline does not align with the Project, the proposed deployment of decarbonisation actions align with the mitigation measures in Section 17.8: Embedded design mitigation and standard good practice. These include sequestration, renewable energy generation, the decarbonisation of the grid and reduced water and wastewater process emissions.

17.9.29 The CCC Balanced Pathway is a detailed roadmap of how the UK can reduce its GHG emissions to net zero by 2050. Although the water sector is considered within the scope of the Carbon Budgets and CCC Balanced Pathway, there is no discrete water sector pathway. Instead, water sector operational emissions are embedded within other sectors such as 'industry', 'buildings', 'non-residential buildings' and 'waste'. That said, Table 17.17

[3] The Climate Change Committee (CCC) has provided recommendations on the emissions cap for the seventh budget; however, it is not yet adopted by the UK Government. The 7th budget has been included for context and has not informed the significance conclusions.

contextualises the Project's operational emissions against the CCC Balanced Pathway, which are a small fraction at 0.002%.

Table 17.17 Operation GHG emissions contextualised against the CCC UK-wide Balanced Pathway (2025 – 2050)

CCC Balanced Pathway sector	CCC Balanced Pathway sector emissions: 2027 – 2050 (tCO_2e)	Future baseline emissions: 2027 – 2050 (tCO_2e)	Project emissions: 2027 – 2050 (tCO_2e)	Net change between future baseline and project (tCO_2e)	Contribution to CCC Balanced Pathway sector – Absolute emissions (%)	Contribution to CCC Balanced Pathway sector – Net emissions (%)
UK – all sectors[4]	3,594,609,420	206,062	72,588	-133,474	0.002%	0%

Operation significance

17.9.30 Looking purely at the contextualisation of operational emissions it would be possible to conclude a minor adverse and non-significant effect, with Project emissions always less than 0.003% of comparable budgets. However, any conclusion should be considered with caution due to the data limitations outlined (see Section 17.7: Project parameters, assumptions and limitations) and lack of a water sector specific net zero pathway described in paragraphs 17.9.27 - 17.9.29.

17.9.31 In determining significance other factors have also been considered:

- The estimated scale of operational emissions is small, with preliminary results reporting 9,797 tCO_2e (including B2-B3, B4, B6 and B8, but excluding D2) in 2043, the opening year.
- The Project also benefits from the decarbonisation of the UK grid between 2040 and 2050, helping further reduction operational emissions to 9,204 tCO_2e by 2050.
- Transport emissions from visitors and employees are also expected to reduce between 2040 and 2050, reflecting the UK's policy to decarbonise the transport sector through interventions such as the phasing out of petrol and diesel road vehicles or the electrification of the rail network.
- Renewable energy generation from floating solar, solar on structures and hydropower is estimated, at the time of the assessment, to supply approximately a third of the total operational energy demand for SESRO components.
- Through the proposed landscaping strategy, a potentially high quantity of carbon is expected to be sequestered annually, plateauing in the 2070s when different land uses are expected to have matured.

17.9.32 Taking into consideration the contextualisation of the Project's operational emissions, the factors listed in paragraph 17.9.31, and the data limitations of the assessment noted in

[4] The CCC sectors: agriculture, aviation, shipping, electricity supply, f-gases, fuel supply, industry, land use, non-residential building, residential buildings, surface transport and waste.

Section 17.7: Project parameters, assumptions and limitations, it is concluded that operation emissions are likely to result in an adverse, non-significant effect.

Summary of likely significant overall effects

Appraisal of overall significance

17.9.33 Construction and operation emissions have been contextualised individually against the UK's Carbon Budgets and against sector-specific projections (in the case of construction), concluding a likely significant effect for construction and likely non-significant effect for operation. Table 17.18 contextualises total GHG emissions for both construction and operation against the Carbon Budgets, showing that when considered together, these never exceed 0.1% of the legislated budgets.

Table 17.18 Total GHG emissions (construction and operation) contextualised against the UK Carbon Budgets

Carbon Budget	5-year carbon budget (tCO_2e)	Future baseline emissions (tCO_2e)	Project emissions (tCO_2e)	Net change between future baseline and project emissions (tCO_2e)	Contribution to Carbon Budget: Absolute emissions (%)	Contribution to Carbon Budget: Net emissions (%)
4th CB (2023 – 2027)	1,950,000,000	7,673	-1,569	-9,242	0%	0%
5th CB (2028 – 2032)	1,725,000,000	55,518	347,849	292,331	0.02%	0.02%
6th CB (2033 - 2037)	965,000,000	48,753	579,577	530,824	0.1%	0.1%
7th CB (2038 - 2042)[5]	535,000,000	46,070	329,202	283,131	0.1%	0.1%

17.9.34 As previously noted, the contextualisation against the Carbon Budgets has limitations since the latest budget ends in 2042 whilst the reporting scope Project's operational emissions covers a period of 60 years (2040-2100), well beyond the seventh Carbon Budget. Project total GHG emissions have also been contextualised against the CCC Balanced Pathway in Table 17.19, accounting for an estimated 0.04% of the pathway.

[5] The Climate Change Committee (CCC) has provided recommendations on the emissions cap for the seventh budget; however, it is not yet adopted by the UK Government. The 7th budget has been included for context and has not informed the significance conclusions.

Table 17.19 Total (construction and operation) GHG emissions contextualised against the CCC UK-wide Balanced Pathway (2025 – 2050)

CCC Balanced Pathway sector	CCC Balanced Pathway sector emissions: 2027 – 2050 (tCO_2e)	Future baseline emissions: 2027 – 2050 (tCO_2e)	Project emissions: 2027 – 2050 (tCO_2e)	Net Increase between future baseline and project (tCO_2e)	Contribution to CCC Balanced Pathway sector – Absolute emissions (%)	Contribution to CCC Balanced Pathway sector – Net emissions (%)
UK – all sectors[6]	3,594,609,420	206,062	1,340,362	1,134,300	0.04%	0.03%

17.9.35 The net increase in GHG emissions between future baseline and the Project is large but expected as explained in paragraph 17.9.22, total emissions would likely account for a fraction of the UK Carbon Budgets and CCC Balanced Pathway. However, as stated in the IEMA guidance, the scale of emissions alone does not determine significance. Operational emissions are small and are expected to reduce over time benefiting from national strategies looking to decarbonise the UK grid and transport sector. This is combined with Project specific measures, such as renewable energy generation and carbon sequestration from the proposed landscaping strategy. However, operational emissions need to be considered in tandem with construction emissions which are currently estimated to be sizeable (1.27 $MtCO_2e$).

17.9.36 However, the Project team is actively working to embed the additional mitigation in Appendix 2.2: Draft commitments register into the evolving design (see Section 17.10 Next steps). Additional mitigation, though not yet reflected in the quantitative results, represents a strong foundation for future reductions. The ES will reflect this updated footprint and provide a less conservative view of the Project's GHG emissions. However, in this PEI report, a precautionary approach has been adopted in preliminarily concluding that the Project is likely to have an adverse and significant effect.

[6] The CCC sectors: agriculture, aviation, shipping, electricity supply, f-gases, fuel supply, industry, land use, non-residential building, residential buildings, surface transport and waste.

Table 17.20 Initial likely significant effects during construction (with embedded and standard good practice mitigation applied, but prior to additional mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Global atmosphere [GHG-2] (High)	Most / all project components	A1-A3 Product Stage A4 Transport A5 Construction and Installation Process	(ED-04) Design the Project to reduce the need to import material as far as practicable. (ED-05) Use of rail to transport bulk construction materials, if practicable. (ED-24) Seek to increase re-use of excavated materials on site where practicable. (SGP-12) Standard good practice measures for establishment of trees and other planting. (ED-55) Application of circular economy principles and the waste hierarchy during design. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions. (SGP-28) Standard good practice measures to mitigate GHG emissions during construction. (SPG-33) Implement an outline Site Waste Management Plan.	Significant Adverse	Climate Change: GHG emissions from the Project and in combination with other projects will contribute to climate change, the largest interrelated cumulative environmental effect. Many embedded and standard good practice mitigation measures are being explored by the Project, however only few are implemented in the PEI Report assessment. (Permanent)	The Project is actively exploring a range of additional measures to reduce construction-related GHG emissions, focusing on smarter design, material efficiency, and sustainable logistics — all underpinned by a commitment to low-carbon procurement and nature-based solutions.

Table 17.21 Summary of likely non-significant effects during operation (with embedded design and standard good practice mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Global atmosphere [GHG-3] (High)	Most / all project components	B1 In-use Material Emissions and Removals B2-B5 Maintenance, Repair, Replacement, and Refurbishment B6 Operational Energy Use B7 Operational Water Use B8 User Activities	(SGP-50) Standard good practice measures to mitigate GHG during operation. (ED-35) Embedded design measures to mitigate GHG during operation. (SGP-12) Standard good practice measures for establishment of trees and other planting. (ED-55) Application of circular economy principles and the waste hierarchy during design. (SGP-42) Management and maintenance of plants and habitats to ensure soil health and functions are sustained.	Not Significant Adverse	Climate change: GHG emissions from the Project and in combination with other projects will contribute to climate change, the largest interrelated cumulative environmental effect. Many embedded and standard good practice mitigation measures are being explored by the Project, however only few are implemented in the PEI Report assessment. (Permanent)	Additional mitigation centres on designing energy-efficient infrastructure, sourcing low-carbon power, and promoting sustainable travel, with the aim of embedding net zero principles throughout the Project's lifecycle.

Table 17.22 Summary of likely significant effects during construction and operation (with embedded design and standard good practice mitigation)

Receptor name [Effect ID] (Sensitivity of receptor)	Project component(s)	Project activity(ies)	Embedded design / standard good practice mitigation applied	Initial significance / Direction of effect	Description of effect (including duration)	Additional mitigation identified (including monitoring)
Global atmosphere [GHG-4] (High)	Most / all project components	A1-A3 Product Stage A4 Transport A5 Construction and Installation Process B1 In-use Material Emissions and Removals B2-B5 Maintenance, Repair, Replacement, and Refurbishment B6 Operational Energy Use B7 Operational Water Use B8 User Activities	(ED-04) Design the Project to reduce the need to import material as far as practicable. (ED-05) Use of rail to transport bulk construction materials, if practicable. (ED-24) Seek to increase re-use of excavated materials on site where practicable. (SGP-12) Standard good practice measures for establishment of trees and other planting. (ED-55) Application of circular economy principles and the waste hierarchy during design. (SGP-24) Standard good practice measures for minimising vehicle, plant and machinery emissions. (SGP-28) Standard good practice measures to mitigate GHG emissions during construction. (SGP-33) Implement an outline Site Waste Management Plan. (SGP-50) Standard good practice measures to mitigate GHG during operation. (ED-35) Embedded design measures to mitigate GHG during operation. (SGP-42) Management and maintenance of plants and habitats to ensure soil health and functions are sustained.	Significant Adverse	Climate change: GHG emissions from the Project and in combination with other projects will contribute to climate change, the largest interrelated cumulative environmental effect. Many embedded and standard good practice mitigation measures are being explored by the Project, however only few are implemented in the PEI Report assessment. (Permanent)	Refer to Table 17.20 and Table 17.21.

17.10 Next steps

17.10.1 As part of next steps, the Project is proactively developing the design, refining the construction approach and continuing to define the environmental baseline, in conjunction with ongoing consultation and engagement. These activities will inform the EIA process and provide a robust evidence base for the ES. The aim is that where initial likely significant effects are identified at this stage, these may ultimately be determined as not significant in the ES once data gaps are addressed, and the design and mitigation proposals are further developed. Effects that remain after the implementation of all mitigation are referred to as 'residual effects'. These effects are not reported in the PEI Report as additional mitigation is not assumed to be implemented at this stage of the assessment. The assessment of the significance of residual effects after all mitigation is applied is a key outcome of the EIA process and will be reported within the ES submitted with the DCO application.

17.10.2 The next steps anticipated to be undertaken in relation to the GHG assessment prior to completion of the ES and submission of the DCO application are explained below.

Further exploration of additional mitigation

17.10.3 A key aspect of the next steps for the GHG assessment is to further explore additional mitigation that may reduce the adverse effects that the preliminary assessment has initially identified as likely to be significant. Additional mitigation that has been identified for the GHG assessment is noted against relevant likely significant effects in Table 17.20, Table 17.21 and Table 17.22 of Section 17.9: Preliminary assessment of likely significant effects. All additional mitigation that has been identified in relation to the GHG assessment to date is listed below in Table 17.23 along with a description of what each measure entails. Each measure has a unique Additional Mitigation ID to enable cross reference between Table 17.20, Table 17.21 and Table 17.22 and Table 17.23. As noted previously above, the preliminary assessment presented in the PEI Report assumes that additional mitigation is not yet applied, as the precise nature and extent of any additional mitigation measures is not confirmed at this stage in the EIA process.

17.10.4 During construction, a number of strategic interventions (AM-15) are under review and development. These include:

- Optimising earthworks to reduce soil movement and associated emissions
- Reusing haulage roads to reduce new construction and material use
- Refining tunnel and shaft designs to reduce embodied carbon
- Specifying low-carbon materials, including concrete and steel
- Adopting nature-based design decisions, such as vegetation selection and lagoon design to reduce organic matter decomposition

17.10.5 Further opportunities to reduce construction-related emissions include the consideration of rock armour alternatives (AM-71), such as open stone asphalt and concrete slabs, which could reduce reliance on traditional, high-carbon materials like granite. A Sustainable Procurement Plan (AM-07) is being developed to promote the use of locally sourced, circular, and low-carbon materials. This includes the prioritisation of low-carbon concrete and recycled steel.

17.10.6 Efficient use of surplus topsoil (AM-74) is also being explored to avoid landfill, while a framework for the offsite reuse of excavated material (AM-72) is being established to ensure sustainable and clear management of resources.

17.10.7 In addition, the Project is considering ways to encourage sustainable construction workforce travel (AM-10) to reduce commuting-related emissions.

17.10.8 During operation, additional mitigation measures (AM-31) are being considered to reduce GHG emissions across the Project's lifecycle. These include:

- Procuring low-carbon power to reduce reliance on grid electricity.
- Optimising energy demand through smart design and operational planning.
- Designing net zero visitor facilities, including the education and nature centres.

17.10.9 Operational plans will also be developed to ensure efficient maintenance and inspection regimes, while Thames Water's Net Zero Route Map (2021) will guide fleet and supply chain decarbonisation.

17.10.10 Further opportunities to reduce emissions from operational transport are being explored. Measures to encourage public transport and active travel (AM-29) include setting targets to reduce car trips, providing shuttle services, and enhancing local bus networks.

17.10.11 The additional mitigation measures outlined in Table 17.23 being explored by the Project have the potential to further reduce GHG emissions and affect the significance conclusions in the ES.

Table 17.23 Additional mitigation identified to date in relation to the GHG assessment

Additional mitigation ID	Additional mitigation name	Description of additional mitigation measure
AM-07	Implement a Sustainable Procurement Plan	A Sustainable Procurement Plan would be developed to encourage the specification, procurement and use of sustainable, responsible and locally sourced non-hazardous and circular construction materials and products, where practicable. This would include consideration of opportunities to reuse recovered/recycled materials from offsite and other sources where appropriate. It may also consider the feasibility and potential use of low carbon concrete, steel and sewage sludge ash to make low carbon aggregate, where practicable.
AM-10	Encourage the use of sustainable modes of transport for workforce travel	The use of sustainable modes of transport for workforce travel would help reduce the number of car trips resulting from construction and so, associated GHG emissions. Such measures would be contained in a Construction Workforce Travel Strategy and could include, for example, cycle parking provision, the promotion of public transport usage, the use of shuttle bus to transport the workforce, and car-sharing to reduce single-occupancy car trips etc.
AM-15	Additional opportunities to mitigate GHG during construction	Potential further opportunities to mitigate GHG emissions during construction are being considered. Potential measures include, for example:

Additional mitigation ID	Additional mitigation name	Description of additional mitigation measure
		- Geotechnical opportunities such as optimising the cut and fill balance (earthworks) in the reservoir and wider project site with the view to reduce soil movements and construction activities. - Construction and utilities opportunities, such as maintaining the current location of energy cables and pylons where practicable, reusing haulage roads for the main design or maximising rail deliveries. • Optimising the design of major structures • Consideration of material specification, such as the use of low carbon concrete, low carbon and recycled steel, alternative materials for grout mix and reservoir face protection. • Land and nature-based design solutions. • Further consideration of the use of low carbon fuels for construction plant, machinery and vehicles.
AM-29	Encourage public transport / active travel use	Measures to encourage visitors and operational/maintenance staff to use public transport or active travel could reduce private car trips during operation. This may include methods such as: • provision of a website to guide visitors to SESRO which encourages access to the site by public transport, cycling or walking • parking restrictions • offering shuttle bus services from nearby stations.
AM-31	Additional opportunities to mitigate GHG during operation	Potential further opportunities to mitigate GHG emissions during operation are being considered. This includes, for example, consideration of the following: • Energy generation including the procurement of low carbon power, decarbonised electricity and energy recovery where practicable. • Energy demand including opportunities to optimise energy demand through smart design. • Water quality monitoring to optimise the use of the air diffuser network and sweetening flow pump. • The design of buildings in line with net zero carbon objectives. • Development of operational plans to operate the Project and undertake the required inspections and maintenance efficiently to reduce GHG emissions. • Implementing wider organisational measures from the Thames Water net zero route map (Thames Water, 2021) relevant to the operation of the Project (e.g. use of electric vehicles for the operational fleet and supply chain).

Additional mitigation ID	Additional mitigation name	Description of additional mitigation measure
AM-71	Consider rock armour alternatives	The use of alternative materials to rock armour will be considered. This may include, for example, open stone asphalt and concrete slabs to avoid relying solely on using rock armour for wave protection.
AM-72	Establish a framework for the reuse of excavated material offsite	A framework will be established for the reuse of excavated material offsite. This will include a structured selection process to identify and assess potential receiver sites for surplus excavated material, ensuring a standardised, transparent, and sustainable approach that reduces environmental and community impact.

Other next steps

17.10.12 Other steps that are continuing or are planned to be undertaken to support the GHG assessment prior to completion of the ES and submission of the DCO application are noted below with an explanation of how these will inform the EIA process:

- A Carbon Management Plan (CMP) will be prepared for submission as part of the DCO application. The CMP will cover the Project design principles, governance and leadership, integrating carbon in project delivery, baseline and targets, procurement and offsetting. The CMP is expected to set out how to manage and reduce GHG emissions over the Project's lifetime and support the significance conclusion to be reported in the ES.
- The science behind how to most accurately account for emissions from the water body of the reservoir, including during the drawdown and filling, is uncertain. This will be considered as understanding within this area develops across the wider water industry to ensure consistency of reporting.

17.10.13 As explained in Section 17.8: Embedded design mitigation and standard good practice, paragraph 17.8.13, due to the preliminary nature of the assessment, there are mitigation measures in Appendix 2.2: Draft commitments register that have yet to be quantified in the analysis presented in Section 17.9 Preliminary assessment of likely significant effects. The Project team are actively working to embed mitigation from Appendix 2.2: Draft commitments register into the evolving design and constructability strategy. In the ES, the GHG chapter will report a number of further measures anticipated to reduce emissions. For example, the uptake of sustainable fuels during construction, where appropriate (SGP-24), and carbon-sequestering tree and vegetation planting (ED-34 and SGP-12).

17.10.14 Furthermore, as part of the ongoing environmental assessment process, the Project team will seek to consult with all relevant local authorities associated with the Project on the GHG emissions assessment and the proposed mitigation measures. This engagement will help ensure that local priorities and perspectives are reflected in the development of a robust and locally appropriate approach to managing GHG impacts.

17.10.15 The relevant principal local authorities to be consulted are:

- Vale of White Horse District Council

- South Oxfordshire District Council
- Oxfordshire County Council

References

It should be noted that the Institute of Environmental Management and Assessment (IEMA) has recently rebranded as the Institute of Sustainability and Environmental Professionals (ISEP). Guidance that was historically published by IEMA is still referenced under that institute name.

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