

17. Climate Change - Greenhouse Gas Emissions

17.1 Introduction

- 17.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary assessment of the likely significant effects of the Project with respect to climate change, specifically in relation to greenhouse gas (GHG) emissions arising as a result of the Project. The preliminary assessment is based on information obtained to date. It should be read in conjunction with the Project description provided in **Chapter 2: The Project** and with respect to relevant parts of: **Chapter 11: Traffic and Transport** where there is a relationship between the assessment of effects of traffic generation and GHG emissions; and **Chapter 13: Agriculture and Soil Resources** which considers the presence of peat within the Preliminary Order Limits.
- 17.1.2 The *2017 Environment Impact Assessment (EIA) Regulations*¹ require consideration of the impact of the Project on climate (for example the nature and magnitude of GHG emissions) and the vulnerability of the Project to climate change (Climate Change Resilience (CCR)). The CCR assessment is reported in **Chapter 18: Climate Change – Climate Change Resilience**.
- 17.1.3 This chapter describes:
- the legislation, policy and technical guidance that has informed the assessment (**Section 17.2**);
 - consultation that has been undertaken to date and how comments from consultees relating to GHG emissions have been addressed (**Section 17.3**);
 - the Study Area used in the assessment (**Section 17.4**);
 - the methods used for baseline data gathering (**Section 17.5**);
 - overall baseline, including the current and future baseline (**Section 17.6**);
 - embedded environmental measures relevant to GHG emissions (**Section 17.7**);
 - the scope of the assessment for GHG emissions (**Section 17.8**);
 - the methodology applied for the assessment (**Section 17.9**);
 - the preliminary assessment of GHG emission effects (**Section 17.10**);
 - preliminary assessment of cumulative (inter-project) effects (**Section 17.11**);
 - a summary of the preliminary significance conclusions (**Section 17.12**); and

¹ UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. (online). Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made> (Accessed 18 July 2022).

- an outline of further work to be undertaken for the Environmental Statement (ES) (**Section 17.13**).

Limitations and assumptions

- 17.1.4 The information provided in this PEIR is preliminary, the final assessment of likely significant effects will be reported in the ES. The PEIR has been produced to fulfil the Applicant's consultation duties and enable consultees to develop an informed view of the likely significant effects of the Project.
- 17.1.5 Assumptions have been made to characterise the likely activities associated with the Project and therefore enable GHG emissions to be determined. These assumptions ensure a proportionate assessment has been carried out. The assumptions made in the assessment are stated within **Section 17.9**.

17.2 Relevant Legislation, Planning Policy and Technical Guidance

- 17.2.1 This section identifies the legislation, planning policy and technical guidance that has informed the assessment of effects with respect to GHG emissions. Further information on policies relevant to the Project is provided in **Chapter 4: Legislation and Policy Overview**.

Legislation

17.2.2 A summary of the relevant legislation is given in **Table 17.1**.

Table 17.1 Legislation relevant to the GHG emissions assessment

Legislation	Legislative context
Climate Change Act 2008² (including The Climate Change Act 2008 (2050 Target Amendment) Order 2019³)	This Act, as amended in 2019, commits the UK to reducing its net GHG emissions by at least 100% below 1990 levels by 2050 (the 'UK carbon target', often referred to as 'net zero') and requires the Government to establish 5-year carbon budgets. The Act also established an independent expert body, the Climate Change Committee (CCC), to advise the Government on the level of those emissions targets and report on progress made to reduce emissions.
The Carbon Budgets Order 2009⁴	This legislation implements the carbon budgets set out in the Climate Change Act 2008 ² . The budgets require the UK to continually reduce emissions in line with the carbon reduction commitments established under that Act. The carbon budgets are: • first carbon budget, 2008 to 2012: 3,018 mega tonnes carbon dioxide equivalent (MtCO₂e) representing a 25% reduction below 1990 levels; • second carbon budget, 2013 to 2017: 2,782MtCO₂e representing a 31% reduction below 1990 levels;

² UK Government (2008). Climate Change Act 2008. (online). Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> (Accessed 18 July 2022).

³ UK Government (2019). The Climate Change Act 2008 (2050 Target Amendment) Order 2019. (online). Available at: <https://www.legislation.gov.uk/uksi/2019/1056/contents/made> (Accessed 18 July 2022).

⁴ UK Government (2009). The Carbon Budgets Order 2009. (online). Available at: <https://www.legislation.gov.uk/uksi/2009/1259/contents/made> (Accessed 18 July 2022).

Legislation	Legislative context
	- third carbon budget, 2018 to 2022: 2,544MtCO₂e representing a 37% reduction below 1990 levels by 2020; - fourth carbon budget, 2023 to 2027: 1,950MtCO₂e representing a 51% reduction below 1990 levels by 2025;⁵ - fifth carbon budget, 2028 to 2032: 1,725MtCO₂e representing a 57% reduction below 1990 levels by 2030;⁶ and - sixth carbon budget, 2033 to 2037: 965MtCO₂e representing a 78% reduction below 1990 levels by 2035.⁷
Energy Act 2016	The Energy Act 2016 is a UK Act of Parliament relating to UK enterprise law and energy in the UK. It covers three main areas, establishes the Oil and Gas Authority (OGA), sets out the formal powers of the OGA and sets out the closure of the Renewables Obligation for onshore wind in England, Wales and Scotland.
Environment Act 2021	An Act to make provision about targets, plans and policies for improving the natural environment, including waste management and resource efficiency (Part 3). The Act aims to help the Government achieve the net zero carbon emissions target. It establishes a new public body, the Office for Environmental Protection (OEP) which will act as an independent,

⁵ UK Government (2011). The Carbon Budget Order 2011. (online). Available at: <https://www.legislation.gov.uk/ukxi/2011/1603/contents/made> (Accessed 18 July 2022).

⁶ UK Government (2016). The Carbon Budget Order 2016. (online). Available at: <https://www.legislation.gov.uk/ukxi/2016/785/contents/made> (Accessed 18 July 2022).

⁷ UK Government (2021). The Carbon Budget Order 2021. (online). Available at: <https://www.legislation.gov.uk/ukxi/2021/750/contents/made> (Accessed 18 July 2022).

⁸ UK Government (2016). Energy Act 2016. (online). Available at: <https://www.legislation.gov.uk/ukpga/2016/20/contents> (Accessed 18 July 2022).

⁹ UK Government (2021). Environment Act 2021. (online). Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents> (Accessed 18 July 2022).

Legislation	Legislative context
	domestic watchdog. All climate change legislation (including carbon budgets) is within the enforcement remit of the body, ensuring that there is no governance gap in relation to climate change legislation. The OEP's scope is wide-ranging, including monitoring progress against environmental improvement plans and new environmental targets, as well as having the ability to enforce non-compliance with environmental law when public authorities fall short.

Planning policy

17.2.3 A summary of the relevant international, national and local planning policy is given in **Table 17.2**.

Table 17.2 Planning policy relevant to the GHG emissions assessment

Policy	Policy context
International policy	
The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement¹⁰	The UNFCCC is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as: <i>"This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change"</i> . The

¹⁰ UNFCCC (2015). Paris Agreement. (online). Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed 18 July 2022).

Policy	Policy context
	agreement sets targets for countries' GHG emissions, but these are not legally binding or enforceable.
UNFCCC Kyoto Protocol¹¹	The Kyoto Protocol was adopted in December 1997. It commits industrialised countries and economies to transitioning towards limiting and reducing GHG emissions in accordance with agreed individual targets. These have been strengthened in more recent international agreements culminating in the Paris Agreement, as described above. The Kyoto Protocol covers six categories of GHG: carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O), F-gases (comprised of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs)), sulphur hexafluoride (SF ₆), and nitrogen trifluoride (NF ₃). In this GHG assessment, these GHGs are collectively considered "GHG emissions" and reported as carbon dioxide equivalent (CO ₂ e) GHG emissions.
UNFCCC Glasgow Climate Pact¹²	The recent Conference of the Parties (COP 26) held in Glasgow in November 2021, resulted in almost 200 countries agreeing on: the acceleration of action on climate change this decade to reduce emissions (mitigation); helping those already impacted by climate change (adaption); enabling countries to deliver on their climate goals (finance); and working together to deliver even greater action (collaboration). This agreement is in the form of the Glasgow Climate Pact which reaffirms the long-term goal of limiting global warming to 1.5°C above pre-industrial levels and resolves to pursue efforts to achieve this, recognising that limiting global warming to 1.5°C <i>"requires rapid, deep and sustained reductions in global greenhouse gas emissions, including reducing global CO₂ emissions by 45% by 2030 relative to the 2010 level and to net zero around mid-century, as well as deep reductions in other greenhouse gases"</i> .
National planning policy	

¹¹ UNFCCC (1998). Kyoto Protocol. (online). Available at: <https://unfccc.int/resource/docs/convkp/kpeng.pdf> (Accessed 18 July 2022).

¹² UNFCCC (2021). Glasgow Climate Pact. (online). Available at: https://unfccc.int/sites/default/files/resource/cop26_auv_2f_cover_decision.pdf (Accessed 18 July 2022).

Policy	Policy context
Overarching National Policy Statement for Energy (EN-1)¹³	NPS EN-1 is a key relevant consideration in the determination of the Development Consent Order (DCO) application. NPS EN-1 sets out general assessment principles for applications relating to energy infrastructure. This includes that the Secretary of State should take into account the potential benefits of a project including meeting needs for energy infrastructure and job creation and long term or wider benefits. The Energy NPS aims to <i>“speed up the transition to a low carbon economy and thus help to realise the UK climate change commitments sooner than continuation under the current planning system”</i> [1.7.2]. Note the <i>“current planning system”</i> as described in the Energy NPS has since been updated with more ambitious carbon reduction targets. NPS EN-1 notes that the ES should consider the impacts of climate change when planning the location, design, build and operation of new energy infrastructure [4.8.5].
Draft Overarching National Policy Statement for Energy (Draft EN-1)¹⁴	The 2021 Draft EN-1 includes the same principles relating to the GHG assessment as EN-1, accounting for updates to carbon reduction targets.

¹³ Department of Energy and Climate Change (2011). Overarching National Policy Statement for Energy (EN-1). (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf (Accessed 18 July 2022).

¹⁴ Department for Business, Energy and Industrial Strategy (2021). Draft Overarching National Policy Statement for Energy (EN-1). (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015233/en-1-draft-for-consultation.pdf#:~:text=1.3.1 This Overarching National Policy Statement for Energy, Government’s policy for delivery of major energy infrastructure. (Accessed 18 July 2022).

Policy	Policy context
	Draft EN-1 acknowledges that to achieve net zero by 2050 <i>"We will need to dramatically increase the volume of energy supplied from low carbon sources and reduce the amount provided by fossil fuels"</i> [2.3.4]. Draft EN-1 also notes that the ES should include a whole life carbon assessment [5.3.4].
National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4)¹⁵	NPS EN-4 provides additional technology specific guidance to complement NPS EN-1. It states that <i>"The efficient import, storage and transmission of natural gas and oil products is crucial to meeting our energy needs during the transition to a low carbon economy"</i> [1.1.1]. It does not cover hydrogen pipelines but it is noted that EN-4 could be useful in identifying impacts to be considered in applications for pipelines for other gases [1.8.2].
Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (Draft EN-4)¹⁶	The 2021 Draft NPS EN-4 includes the same principles relating to the GHG assessment as NPS EN-4. NPS EN-4 states that <i>"The need for low carbon hydrogen infrastructure is established in Section 3.4 of EN-1. The guidance that follows in this NPS has been drafted in respect of, and has effect only in relation to, natural gas infrastructure. It does not have effect for hydrogen infrastructure but may contain information that is important and relevant to the Secretary of State's decision on applications for hydrogen infrastructure"</i> [1.6.4].

¹⁵ Department of Energy and Climate Change (2011). National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47857/1941-nps-gas-supply-oil-en4.pdf (Accessed 18 July 2022).

¹⁶ Department for Business, Energy and Industrial Strategy (2021). Draft National Policy Statement for Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4). (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1015237/en-4-draft-for-consultation.pdf (Accessed 18 July 2022).

Policy	Policy context
National Planning Policy Framework (NPPF)¹⁷	The NPPF, paragraph 152 states: “<i>The planning system should support the transition to a low carbon future in a changing climate... shape places in ways that contribute to radical reductions in greenhouse gas emissions... and support renewable and low carbon energy and associated infrastructure</i>”. It also requires in paragraph 154 (b) that new development should be planned for in ways that “<i>can help to reduce greenhouse gas emissions, such as through its location, orientation and design</i>”. Furthermore, it is stated in paragraph 157, that local planning authorities should expect new development to: “<i>comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.</i>”
The UK’s Nationally Determined Contribution (NDC) under the Paris Agreement¹⁸	In December 2020, the UK submitted its first NDC under the Paris Agreement¹⁰ to the UNFCCC, committing to “<i>at least a 68%</i>” reduction in economy-wide GHG emissions below 1990 levels (1995 levels for F-gases) by 2030, aligned with the UK’s 2050 net zero GHG emissions target.

¹⁷ Ministry of Housing, Communities and Local Government (2021). National Planning Policy Framework. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf (Accessed 18 July 2022).

¹⁸ Department for Business, Energy & Industrial Strategy (2020). The UK’s Nationally Determined Contribution under the Paris Agreement. (online). Available at: <https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc> (Accessed 18 July 2022).

Policy	Policy context
Clean Growth Strategy¹⁹	This report provides the strategy for the UK's future clean growth to allow carbon budgets to be met and support economic growth. It sets out policies and targets for 2050 for reducing GHG emissions across a number of sectors. It acknowledges the role of low carbon fuels (such as hydrogen) in decarbonisation.
The Ten Point Plan for a Green Industrial Revolution²⁰	This plan sets out the UK Government's approach to "build back better" following the impacts of the COVID-19 pandemic. It includes details of how the Government intend to accelerate the path to net zero. Point 2 focuses on 'driving the growth of low carbon hydrogen' and the UK Government's plans to develop low carbon hydrogen production capacity.
Net Zero Strategy: Build Back Greener²¹	This strategy sets out sectoral policies and proposals for decarbonising all sectors of the UK economy to meet the coming carbon budgets, the NDC and the net zero target by 2050. It aims to enable the delivery of the objectives set out in the Ten Point Plan ²⁰ . Section 3ii. covers fuel supply and hydrogen, including commitments to reduce emissions from conventional fossil fuels and scale up low carbon alternatives such as hydrogen. The Net Zero Strategy has recently been judicially reviewed and the UK Government are now required to issue an

¹⁹ Department for Business, Energy and Industrial Strategy (2017) Clean Growth Strategy. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf (Accessed 18 July 2022).

²⁰ HM Government (2020). The Ten Point Plan for a Green Industrial Revolution. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf (Accessed 18 July 2022).

²¹ Department for Business, Energy & Industrial Strategy (2021). Net Zero Strategy: Build Back Greener. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1033990/net-zero-strategy-beis.pdf (Accessed 18 July 2022).

Policy	Policy context
	updated strategy detailing a quantified account of how policies will achieve the UK's climate targets. ²²
The Energy White Paper: 'Powering our Net Zero Future' ²³	The White Paper sets out the strategic vision for how we will transform our energy system to build a cleaner, greener future for our country, people and planet. It states that " <i>decarbonising the energy system over the next 30 years means replacing - as far as it is possible to do so - fossil fuels with clean energy technologies such as renewables, nuclear and hydrogen</i> ".
UK Hydrogen Strategy ²⁴	The Strategy sets out the role of hydrogen in meeting the UK's legally binding commitment to achieve net zero by 2050. It establishes the case for low carbon hydrogen and the role of hydrogen in meeting net zero, recognising that it will play " <i>an important complementary and enabling role alongside clean electricity in decarbonising our energy system</i> ", stating " <i>low carbon hydrogen will be essential for achieving net zero, and ahead of that, meeting our world-leading CB6 target to reduce emissions 78 per cent on 1990 levels by 2035</i> ".
Local planning policy	

²² Royal Courts of Justice (2022). Friends of the Earth -v- BEIS, Case No: CO/126/2022, CO/163/2022, CO/199/2022, 18 July 2022. (online). Available at: <https://www.judiciary.uk/judgments/friends-of-the-earth-v-beis/> (Accessed 02 August 2022).

²³ Department for Business, Energy & Industrial Strategy (2020). Energy white paper: Powering our net zero future. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf (Accessed 18 July 2022).

²⁴ Department for Business, Energy & Industrial Strategy (2021). UK Hydrogen Strategy. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1011283/UK-Hydrogen-Strategy_web.pdf (Accessed 18 July 2022).

Policy	Policy context
Cheshire East Local Plan Strategy 2010 - 2030²⁵	Strategic Priority 3: Seeks to reduce the Borough's impact on climate change by encouraging sustainable patterns of development, including through promoting renewable energy and using energy efficiently. Policy SD 1 Sustainable Development in Cheshire East: Sets out requirements for development. Of relevance is the policy requirement to provide appropriate infrastructure to meet the needs of the local community including energy; and use appropriate technologies to reduce carbon emissions and create a low carbon economy. SE8 Renewable and Low Carbon Energy: Notes that the development of renewable and low carbon energy schemes will be positively supported and considered in the context of sustainable development and mitigation of any adverse impact on the environment.
Cheshire West and Chester Local Plan (Part One) Strategic Policies²⁶	Strat 1 Sustainable Development: Seeks to enable development that improves and meets the objectives of the Borough in line with the presumption in favour of sustainable development unless material considerations indicate otherwise. Development should make the best use of opportunities for renewable energy use and generation, protect and enhance the natural and historic environment, and ensure prudent use of natural finite resources. Strat 11 Infrastructure: Aims to secure the delivery of infrastructure improvements and meet the sustainability objectives of the Borough. Supports the provision of appropriate new infrastructure, including schemes intended to mitigate and adapt to climate change and any cross-boundary schemes necessary to deliver the priorities of the Local Plan where this will have no adverse effect upon recognised environmental assets.

²⁵ Cheshire East Council (2017). Cheshire East Local Plan Strategy 2010-2030. (online). Available at: <https://www.cheshireeast.gov.uk/pdf/planning/local-plan/local-plan-strategy-web-version-1.pdf> (Accessed 18 July 2022).

²⁶ Cheshire West and Chester Council (2015). Cheshire West and Chester Local Plan (Part One) Strategic Policies. (online). Available at: <http://consult.cheshirewestandchester.gov.uk/file/3310073> (Accessed 18 July 2022).

Policy	Policy context
	ENV6 High Quality Design and Sustainable Construction: Development must be sympathetic to the environment; incorporate energy efficiency measures and provide for renewable energy generation either on site or through carbon offsetting measures; and mitigate and adapt to the predicted effects of climate change. ENV 7 Alternative Energy Supplies: Support is given to renewable and low carbon energy proposals where there are no unacceptable environmental impacts.
Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies²⁷	DM4 Sustainable Construction: All development proposals will be expected to achieve the highest levels of energy and water efficiency that is practical and viable, and to maximise opportunities to incorporate sustainable design features where feasible. The Council will encourage the use of sustainable construction techniques that promote the reuse and recycling of building materials, maximise opportunities for the recycling and composting of waste on all new development proposals and reduce CO₂ emissions. DM53 Energy generation, storage and district heat networks: Proposals will be supported that: make maximum use of renewable energy sources as set out in Local Plan (Part One) policy ENV 7; and provide for electricity storage which assists with balancing the grid and support the use of intermittent renewable energy sources (such as wind and solar).
Halton's Local Plan Core Strategy²⁸	Strategic Objective 9: Aims to minimise Halton's contribution to climate change through reducing carbon emissions. CS(R)19 Sustainable Development and Climate Change: Requires development to be sustainable and be designed to have regard to the predicted effects of climate change

²⁷ Cheshire West and Chester Council (2019). Cheshire West and Chester Local Plan (Part Two) Land Allocations and Detailed Policies. (online). Available at: <https://consult.cheshirewestandchester.gov.uk/file/5448701> (Accessed 18 July 2022).

²⁸ Halton Borough Council (2013). Halton's Local Plan Core Strategy April 2013. (online). Available at: <https://moderngov.halton.gov.uk/documents/s29520/CORE%20STRATEGY%20Final%20Draft.pdf> (Accessed 18 July 2022).

Policy	Policy context
	including reducing CO₂ emissions and adapting to climatic conditions. Support is given to proposals for decentralised renewable and low carbon energy schemes provided that they do not result in unacceptable harm to the local environment which cannot be mitigated. GR5 Renewable and Low Carbon Energy: Requires development proposals for renewable energy developments to take into account and minimise the potential effects of development on the environment. The incorporation of renewable and low carbon energy into developments will be encouraged. Proposals for renewable and low carbon energy within Energy Priority Zones will be supported.
St Helens Local Plan Core Strategy²⁹	Strategic Objective 2.2: Aims to mitigate the effects of, and minimise the impact of, development on climate change. St Helens recognises reducing the impact of climate change as a key issue in the Core Strategy. CP1 Ensuring Quality Development: Aims to ensure quality development in St. Helens and sets out in detail the minimum standards development is expected to meet, in relation to the protection of the environment. It specifically requires developments to incorporate renewable and low-carbon energy generation.
Trafford District Council Local Plan: Core Strategy³⁰	L5, L5.12 Climate Change: Requires new development to mitigate and reduce its impact on climate change factors, such as pollution and flooding, and maximise its sustainability through improved environmental performance of buildings, lower carbon emissions and renewable or decentralised energy generation. L5.12 recognises the role that commercial and community

²⁹ St Helens Council (2012). St Helens Core Strategy 2012. (online). Available at: https://www.sthelens.gov.uk/media/2031/LOC001-St-Helens-Local-Plan-Core-Strategy-2012/pdf/LOC001_St_Helens_Local_Plan_Core_Strategy_2012.pdf?m=637794835913030000 (Accessed 18 July 2022).

³⁰ Trafford District Council (2012). Trafford Local Plan: Core Strategy. (online). Available at: <https://www.trafford.gov.uk/planning/strategic-planning/docs/core-strategy-adopted-final.pdf> (Accessed 18 July 2022).

Policy	Policy context
	low carbon, renewable and decentralised energy generation and distribution facilities can play in reducing CO ₂ emissions and providing viable energy supply.
Warrington Borough Council Local Plan Core Strategy³¹	CS1 Delivering Sustainable Development: Welcomes sustainable development proposals without delay, having regard to the need to address the causes of, and be resilient to the effects of climate change. QE1 Decentralised Energy Networks and Low Carbon Development: Encourages proposals that seek to maximise opportunities for the use of decentralised renewable and low carbon energy. Development proposals in all locations should seek to minimise CO₂ emissions and the impacts of climate change by reducing the need for energy consumption; using energy as efficiently as possible; and using renewable and low carbon energy where possible. QE2 Grid Connected Renewable Energy: Supports proposals for grid-connected renewable or low carbon energy infrastructure and schemes, provided that they do not result in unacceptable harm to the local environment.

17.2.4 In addition to the local planning policy documents described above, **Table 17.3** includes the commitments that the host local authorities have made to decarbonisation in line with the UK's 2050 net zero GHG emissions target. All six councils have declared a climate emergency and committed to setting priorities to mitigate climate change.

³¹ Warrington Borough Council (2014). Local Plan Core Strategy. (online). Available at: https://www.warrington.gov.uk/sites/default/files/2020-09/Local_Plan_Core_Strategy_Feb_2015.pdf (Accessed 18 July 2022).

Table 17.3 Decarbonisation targets of the host authorities

Authority	Declared climate emergency	Decarbonisation target ³²
Cheshire East Council³³	Yes – May 2019	Carbon neutral borough by 2045.
Cheshire West and Chester Council³⁴	Yes – May 2019	Carbon neutral borough by 2045.
Halton Borough Council³⁵	Yes – October 2019	No borough wide climate pledges.
St. Helens Council³⁶	Yes – July 2019	Net zero borough by 2040.
Trafford District Council³⁷	Yes – November 2018	Carbon neutral borough by 2038.

³² Carbon neutral, as defined by PAS 2060, refers to a policy of not increasing carbon emissions and of achieving carbon reduction through offsets, while net zero carbon, as defined by the Science Based Targets Initiative (SBTi), means making changes to reduce GHG emissions in line with the latest climate science and a 1.5°C trajectory – and offsetting as a last resort (2022 The Carbon Trust).

³³ Cheshire East Council (2022). Carbon Neutral Council. (online). Available at: <https://www.cheshireeast.gov.uk/environment/carbon-neutral-council/carbon-neutral-council.aspx> (Accessed 01 August 2022).

³⁴ Cheshire West and Chester Council (2022). The Climate Emergency. (online). Available at: <https://www.cheshirewestandchester.gov.uk/your-council/councillors-and-committees/the-climate-emergency> (Accessed 01 August 2022).

³⁵ Halton Borough Council (2022). Climate Change Action Plan. (online). Available at: <https://councillors.halton.gov.uk/documents/s68214/Climate%20Change%20Action%20Plan%20Strategy%20Template%20-%20Layout%20JT%2028.2.22.pdf> (Accessed 01 August 2022).

³⁶ St. Helens Council (2022). St Helens Climate Change. (online). Available at: <https://netzero.sthelens.gov.uk/#:~:text=St%20Helens%20Borough%20Council%20declared,borough%20net%20zero%20by%202040.> (Accessed 01 August 2022).

³⁷ Trafford District Council (2022). Climate Change – Trafford's Climate Emergency. (online). Available at: <https://www.trafford.gov.uk/planning/strategic-planning/Climate-Change.aspx> (Accessed 01 August 2022).

Authority	Declared climate emergency	Decarbonisation target ³²
Warrington Borough Council ³⁸	Yes – June 2019	Carbon neutral by 2030. ³⁹

Technical guidance

17.2.5 A summary of the technical guidance for the GHG emissions assessment is given in **Table 17.4**.

Table 17.4 Technical guidance relevant to the GHG emissions assessment

Technical guidance document	Context
Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition⁴⁰	The Institute of Environmental Management and Assessment (IEMA) provides guidance on GHG emissions assessment, mitigation and reporting within an EIA context and this is the primary source of guidance for assessing GHG emissions. The 2022 guidance further builds upon the 2017 guidance, with key changes including an emphasis on mitigation at the project outset and throughout its lifetime, and more nuanced levels of GHG emissions significance. It provides detail on the application of the five IEMA Principles on Climate Change Mitigation and EIA⁴¹: 1. <i>“The GHG emissions from all projects will contribute to climate change, the largest inter-related cumulative environmental effect.</i>

³⁸ Warrington Borough Council (2022). Our climate emergency plans and targets. (online). Available at: <https://www.warrington.gov.uk/our-climate-emergency-plans-and-targets> (Accessed 01 August 2022).

³⁹ Clarification is required on the scope of this target i.e. whether it is borough wide or only encompasses council operations.

⁴⁰ IEMA (2022). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – 2nd Edition. (online). Available at: <https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions> (Accessed 18 July 2022).

⁴¹ IEMA (2010). IEMA Principles Series: Climate Change Mitigation & EIA.

Technical guidance document	Context
	2. <i>The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality).</i> 3. <i>The UK has legally binding GHG reduction targets – EIA must therefore give due consideration to how a project will contribute to the achievement of these targets.</i> 4. <i>GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant.</i> 5. <i>The EIA process should, at an early stage, influence the location and design of projects to optimise GHG performance and limit likely contribution to GHG emissions.”</i>
Publicly Available Standard (PAS) 2080: 2016 – Carbon management in infrastructure ⁴²	PAS 2080:2016 provides an approach to reducing GHG emissions from infrastructure projects including working with stakeholders throughout the project lifecycle.
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol) ⁴³	Provides standards and guidance for preparing a GHG emissions inventory. It covers the accounting and reporting of the six GHGs covered by the Kyoto Protocol ¹¹ .

⁴² BSI (2016). PAS 2080: 2016 – Carbon management in infrastructure.

⁴³ World Resources Institute and World Business Council for Sustainable Development (2015). The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition).

Technical guidance document	Context
BS EN ISO 14064-1⁴⁴ and 14064-2⁴⁵	ISO 14064 sets out guidance for quantification and reporting of GHG emissions and removals. The methodology for quantification of GHGs follows this guidance and the stated guidance on reporting will be taken into account as part of this assessment.
Methodology to calculate embodied carbon 1st edition⁴⁶	The Royal Institution of Chartered Surveyors (RICS) guidance note represents best practice on how to estimate carbon emissions associated with product and construction process stages. The aim of the guidance is to provide a framework of practical guidance on how to calculate embodied carbon emissions associated with projects.
Net Zero – The UK’s contribution to stopping global warming⁴⁷	This report prepared by the CCC to the UK Government reassesses the UK’s long-term emission target. In the UK, the report recommends a net zero date of 2050 achieved through known technologies, improvements in people’s lives and policy updates. As a result of this report, emission targets in the UK were updated in the <i>Climate Change Act 2008</i> ³ .
2022 Progress Report to Parliament⁴⁸	This CCC annual report sets out the UK’s progress for 2022 against emissions reduction targets to 2050. One of the CCC’s key recommendations is funding and support for extra hydrogen production capacity. The UK Government is yet to respond to the CCC’s recommendations.

⁴⁴ BSI (2019). BS EN ISO 14064-1: 2019 Greenhouse gases. Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals.

⁴⁵ BSI (2019). BS EN ISO 14064-1: 2019 Greenhouse gases. Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements.

⁴⁶ RICS. (2012). Methodology to calculate embodied carbon 1st edition.

⁴⁷ CCC (2019). Net Zero – The UK’s contribution to stopping global warming. (online). Available at: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf> (Accessed 01 August 2022).

⁴⁸ CCC (2022). 2022 Progress Report to Parliament. (online). Available at: <https://www.theccc.org.uk/publication/2022-progress-report-to-parliament/> (Accessed 01 August 2022).

Technical guidance document	Context
Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6): Climate Change 2021 - The Physical Science Basis⁴⁹	In August 2021 the contribution of Working Group I to AR6 was published by the IPCC. The publication reinforces the evidence presented in the previous IPCC report (AR5) and, through the utilisation of updated climate model simulations and analyses, states that <i>“it is unequivocal that human influence has warmed the atmosphere, ocean and land”</i> . It is highlighted that <i>“global warming of 1.5°C and 2°C will be exceeded during the 21st century unless deep reductions in CO₂ and other greenhouse gas emissions occur in the coming decades”</i> . The publication states that <i>“limiting human-induced global warming to a specific level requires limiting cumulative CO₂ emissions, reaching at least net zero CO₂ emissions, along with strong reductions in other greenhouse gas emissions”</i> and it is this assertion which will underpin the international response to global warming.
IPCC AR6: Climate Change 2022 – Mitigation of Climate Change⁵⁰	The IPCC finalised the third part of AR6, the Working Group III contribution, in April 2022. It provides an updated global assessment of climate change mitigation progress and pledges, and examines the sources of global emissions. It explains developments in emission reduction and mitigation efforts, assessing the impact of national climate pledges in relation to long-term emissions goals.
CCC Sixth Carbon Budget Report Sector Summaries – Fuel Supply⁵¹	This document contains a summary of content for the fuel supply sector from the CCC’s Sixth Carbon Budget Advice. The key messages include the important role that low carbon

⁴⁹ IPCC (2021). The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu and B. Zhou (eds.)). Cambridge University Press.

⁵⁰ IPCC (2022). Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (P.R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)). Cambridge University Press.

⁵¹ CCC (2020). *The Sixth Carbon Budget - Fuel supply*. (online). Available at: <https://www.theccc.org.uk/publication/sixth-carbon-budget/> (Accessed 01 August 2022).

Technical guidance document**Context**

hydrogen plays in displacing emissions from fossil fuels. The CCC's recommended carbon budget sector allocations for fuel supply are:

- remaining third carbon budget, 2022 only, 35MtCO₂e;
- fourth carbon budget, 2023 to 2027, 148MtCO₂e;
- fifth carbon budget, 2028 to 2032, 85MtCO₂e; and
- sixth carbon budget, 2033 to 2037, 42MtCO₂e.

17.3 Consultation and Engagement

Overview

- 17.3.1 The assessment has been informed by consultation responses. An overview of the approach to consultation is provided in **Section 3.4 of Chapter 3: Approach to Preparing the PEIR**.

Scoping Opinion

- 17.3.2 A Scoping Opinion was adopted by the Secretary of State, administered by the Planning Inspectorate, on 08 March 2022. A summary of the relevant responses received in the Scoping Opinion in relation to the GHG emissions assessment, and confirmation of how these have been addressed within the assessment to date is presented in **Table 17.5**.
- 17.3.3 The information provided in the PEIR is preliminary and not all of the Scoping Opinion comments have been addressed at this stage, however all comments will be addressed within the ES.

Table 17.5 Summary of EIA Scoping Opinion responses for the GHG emissions assessment

Consultee	Consideration	How addressed in this PEIR
Planning Inspectorate (PINS)	GHG emissions from operation and maintenance (project life cycle stages B1 to B5 and B7 to B9) GHG emissions during operation and maintenance are proposed to be scoped out for project life cycle stages B1 to B9 inclusive. Considering the nature and characteristics of the Proposed Development, the Inspectorate is content that GHG emissions are not likely to result in significant effects for project life cycle stages B1 to B5 and B7 to B9. GHG emissions from operation and maintenance (project life cycle stages B1 to B5 and B7 to B9) can be scoped out of the ES assessment.	Noted, no action required.
PINS	GHG emissions from operational energy use (project life cycle stage B6) The Inspectorate does not consider sufficient evidence has been provided to scope out GHG emissions from operational energy use (project life cycle stage B6). The ES must assess impacts from operational energy use (such as pumping and compression) where significant effects are likely.	An assessment of operational energy use GHG emissions has been provided in this chapter of the PEIR (Section 17.10) based on assumptions around energy usage.
PINS	Guidance The Scoping Report refers to the 2017 IEMA guidance on Assessing Greenhouse Gas	The assessment methodology has been updated in the PEIR to reflect the newly released IEMA 2 nd Edition GHG guidance ⁴⁰ .

Consultee	Consideration	How addressed in this PEIR
	Emissions and Evaluating their Significance. The ES assessment methodology should refer to the 2nd Edition of this guidance, published since submission of the Scoping Report - IEMA (February 2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance (online).	
PINS	GHG emissions arising from disturbance of landfill sites The Inspectorate notes from paragraph 12.4.10/ Figure 12.5 of the Scoping Report that numerous historic and authorised landfill sites are present within the study area for the Ground Conditions aspect. In the event that the pipeline route cannot avoid all these sites, the potential to increase, or give rise to, GHG emissions from these sites during construction should be included in the assessment.	The presence of existing landfills has been noted and these have been considered in the optioneering process of the Project. There are four landfills within the Preliminary Order Limits. The pipeline route and Hydrogen Above Ground Installations (HAGI) locations are still undergoing further refinement, and these landfill sites will be avoided where feasible. As a worst-case, it is estimated that there would be approximately 2km of direct open-excavation through landfill. In accordance with IEMA guidance⁴⁰ for GHG assessments, activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions. On that basis, given the likely scale of emissions in the context of the whole Project construction, consideration of the potential release of landfill gas from these landfills is not considered further in the GHG assessment.
Natural England	The ES should also identify how the development impacts the natural environment's ability to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environment's contribution to achieving net zero by 2050. Natural England's Carbon	As discussed in Chapter 13: Agriculture and Soil Resources, carbon storage potential in soils within the Preliminary Order Limits varies from low to high (potential peat). The Preliminary Order Limits avoids larger expanses of peatland present regionally, but there is potential for peat to be present in several areas. Desk-based review has identified the likelihood of deep peaty soils being present in seven areas within the Preliminary Order Limits. At PEIR stage, the

Consultee	Consideration	How addressed in this PEIR
	Storage and Sequestration by Habitat report (2021) and the British Ecological Society's nature-based solutions report (2021) provide further information.	initial ground investigations have not yet been completed and there is uncertainty over the ground conditions, including the presence and extent of peat (the depth to peat, its thickness and its lateral extent within the study area). At present, the Preliminary Order Limits display the maximum extent of land in which the Project will take place and will undergo further refinement through the EIA process, and this is expected to include narrowing of the Preliminary Order Limits, which will reduce the effects on land. The potential for the release of GHG emissions from disturbed peat will therefore be clarified in the ES. For potential areas where peat cannot be avoided by the temporary works or permanent development elements of the Project, specific management measures will be adopted to protect peat during construction. These will be provided in a Peat Management Plan (PMP) to accompany the DCO submission, an outline of which is included in Appendix 13A .
St Helens Borough Council and Wirral Council	It is acknowledged that the Hynet project is considered to be a significant project for the Liverpool City Region for the long term decarbonisation of the LCR. However, it is important the wider project is taken into account when considering the overall climate change impacts of the project. At this point in time, not all hydrogen production is equal with only a fraction of hydrogen being classed as green. This should be considered as part of the climate change assessment and is likely to change over time. The methodology for the Climate Change Assessment seems reasonable.	The wider HyNet North West programme is expected to provide an overall benefit to the climate in relation to GHG emissions, however this benefit is not quantitatively included in the scope of the GHG assessment for the Project. The wider benefits of the HyNet North West programme are described in Chapter 1: Introduction, Section 1.2 . The GHG assessment will examine the extent to which the Project materially affects the ability of the UK Government to meet its carbon target and budgets by 2050.

Consultee	Consideration	How addressed in this PEIR
Cheshire West and Chester Council	The Councils Climate Change team are broadly supportive of the project and consider the measures proposed in the EIA to be largely comprehensive, however from Table 0.8 A5 Construction; the proposal that land use will not be affected by GHG's through the pipelines route does not seem to take into account the suggested size of the HAGI's or the pipeline route potentially disrupting other land use change for decarbonisation. It is recommended that this is considered in the wider context. Table 0.8 B6 Operation the project should comment on not being viewed in isolation particularly where the GHG operation may not be significant in themselves but will act as an enabler to associated projects described in Chapter 2 which have much greater potential to release GHG's.	As discussed in Chapter 13: Agriculture and Soil Resources, carbon storage potential in soils within the Preliminary Order Limits varies from low to high (potential peat). The Preliminary Order Limits avoids larger expanses of peatland present regionally, but there is potential for peat to be present in several areas. Desk-based review has identified the likelihood of deep peaty soils being present in seven areas within the Preliminary Order Limits. At PEIR stage, the initial ground investigations have not yet been completed and there is uncertainty over the ground conditions, including the presence and extent of peat (the depth to peat, its thickness and its lateral extent within the study area). At present, the Preliminary Order Limits display the maximum extent of land in which the Project will take place and will undergo further refinement through the EIA process, and this is expected to include narrowing of the Preliminary Order Limits which will reduce the effects on land. The potential for the release of GHG emissions from disturbed peat will therefore be clarified in the ES. For potential areas where peat cannot be avoided by the temporary works or permanent development elements of the Project, specific management measures will be adopted to protect peat during construction. These will be provided in a PMP to accompany the DCO submission, an outline of which is included in Appendix 13A. The GHG assessment will examine the extent to which the Project materially affects the ability of the UK Government to meet its carbon target and budgets by 2050.

17.4 Study Area

Spatial scope

- 17.4.1 The spatial scope for the GHG emissions assessment will be informed by the spatial extent of the Project, including all activities within the Preliminary Order Limits during its construction, operation and decommissioning, as well as the GHG emissions associated with transport movements generated by the Project. Further details of activities considered are provided in **Table 17.7**.

Temporal scope

- 17.4.2 The temporal scope of the GHG emissions assessment is consistent with the period over which the Project would be constructed, in operation and decommissioned (see **Chapter 2: The Project**).

17.5 Data Gathering Methodology

Desk study

- 17.5.1 The UK carbon budgets and the CCC's recommended sector allocations have been used to establish the assessment baseline. No other data sources have been gathered to inform the baseline for the GHG emissions assessment. Data sources used for the GHG assessment are discussed in **Section 17.9**.

17.6 Overall Baseline

Current baseline

- 17.6.1 The third carbon budget (2018 to 2022) of 2,544MtCO₂e and the CCC's recommended carbon budget sector allocations (see **Table 17.4**) can be considered as the current baseline for the GHG emissions assessment. The change in GHG emissions associated with the Project are evaluated against national, regional and local targets for decarbonisation (the future baseline). Therefore, an assessment of the change in GHG emissions arising from current site use to those arising from the Project is not required.

Future baseline

- 17.6.2 GHG emissions are expected and required to reduce in the future. The UK Government has set a net zero target which requires the UK to reduce GHG emissions by 100% below 1990 levels by 2050.³ Policy has been implemented at national, regional and local scales in order to achieve targets for decarbonisation (see **Table 17.2**). The future baseline considers relevant policy and a number of the UK carbon budgets (including sectoral allocations) over the lifetime of the Project: the fourth carbon budget (2023 to 2027) of 1,950MtCO₂e, the fifth carbon

budget (2028 to 2032) of 1,725MtCO₂e and the sixth carbon budget (2033 to 2037) of 965MtCO₂e.

- 17.6.3 Emissions from a 'without Project' case in the future baseline will not be quantified in this assessment as they are considered to be nil.

17.7 Embedded Environmental Measures

- 17.7.1 As part of the Project design process, a number of embedded environmental measures are proposed to reduce the potential for impacts on GHG emissions. **Table 17.6** outlines how these embedded measures will influence the GHG emissions assessment.

Table 17.6 Summary of embedded environmental measures

Embedded measures	Compliance mechanism
A Code of Construction Practice (CoCP) will be produced prior to commencement of construction which will detail measures to be implemented to reduce GHG emissions during the construction phase. Goals to reduce embodied carbon in construction materials and encourage circular economy principles will be detailed in the CoCP.	CoCP secured via DCO requirement
Measures to reduce GHG emissions from construction plant and equipment will be detailed in the CoCP. The use of efficient and well-maintained plant and equipment will reduce GHG emissions from fuel and energy consumption.	CoCP secured via DCO requirement
The CoCP will include measures to minimise emissions from construction traffic. This will include measures such as consolidating deliveries where possible and policies such as 'no idling'. Sustainable modes of travel for the construction workforce will be encouraged.	CoCP secured via DCO requirement
For potential areas where peat cannot be avoided by the temporary works or permanent development elements of the Project, an outline PMP will be produced, including the measures to be employed to protect peat during handling, storage and reinstatement, to promote its reuse within the Preliminary Order Limits where possible, or offsite if a suitable receptor site can be identified, and avoid it becoming waste.	CoCP and PMP, secured via DCO requirement

17.8 Scope of the Assessment

Potential receptors

- 17.8.1 GHG emissions have a global effect rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global climate is therefore the only receptor for the GHG assessment. The receptor has a high

sensitivity, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources⁴⁰.

Likely significant effects

17.8.2 The likely significant GHG emissions effects that have been taken forward for assessment are summarised in **Table 17.7**. This is based on phases as defined within PAS 2080: Carbon Management in Infrastructure⁴² (see **Graphic 17.1**).

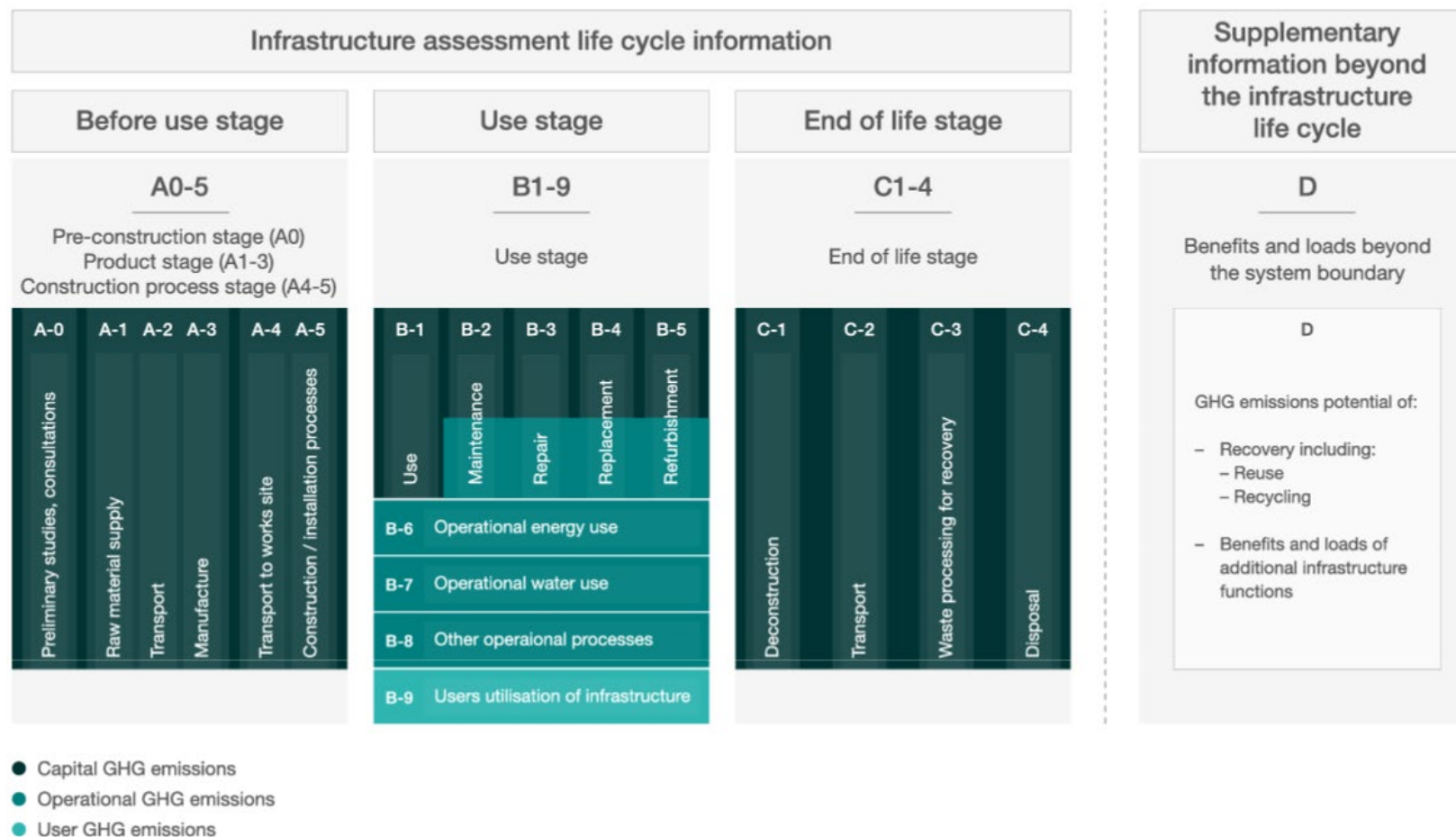
Graphic 17.1 Infrastructure life cycle stages⁴²

Table 17.7 Stages of the Project considered as likely significant effects

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects	Scoped in / out
Pre-Construction	<i>A0 – Pre-construction stage</i>	<i>Represents preliminary studies and works, for example strategy and brief development, design efforts, EIA and cost planning. Most, if not all, of these functions will be largely office-based contributions from across the value chain. In accordance with IEMA guidance⁴⁰ for GHG assessments, activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions. GHG emissions related to pre-construction stage are not likely to be significant and have been scoped out of the assessment.</i>	<i>Scoped out</i>
Construction	A1-A2-A3 – Raw materials supply, transport and manufacture	GHG emissions associated with the materials used to construct the pipelines and any associated Project facilities. These comprise embodied GHG emissions associated with the raw material assets required to construct the Project. The materials used in temporary infrastructure during construction are not included in the assessment.	Scoped in
	A4 – Construction transport	Transport of construction materials, resources and equipment from point of purchase to the works site. Commuting of workforce during construction.	Scoped in
	A5 - Construction process stage	Emissions associated with construction and installation processes (including fuel and electricity consumption) of the temporary works, ground works, landscaping and permanent works. Emissions associated with site water demand. Waste management activities (transport, processing, final disposal) associated with waste arising from the Project.	Scoped in
	A5 - Construction process stage	GHG emissions associated with land use change. As detailed in Table 17.5 , the potential for the release of GHG emissions from disturbed peat will be clarified in the ES.	Scoped in - ES

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects	Scoped in / out
		Consideration of the potential release of landfill gas from landfill is unlikely to be significant and therefore not considered in the GHG assessment (see Table 17.5).	
	<i>B1 – Boundary of use stage: installed products and materials</i>	<i>Called ‘use’, this represents the carbon emitted directly from the fabric of products and materials once they have been installed as part of infrastructure and it is in normal use. It is not anticipated that any of the materials used in the construction of the Project will be capable of emitting carbon directly.</i>	<i>Scoped out</i>
Operation	<i>B2-B5 – Maintenance, repair, replacement and refurbishment</i>	<i>Represents the works activities and new materials for the maintenance, repair, replacement and refurbishment of the infrastructure during the use stage / operation of infrastructure. As per the maintenance schedule detailed in Chapter 2: The Project, Section 2.6, maintenance activities mostly include less than 10 personnel. It is not anticipated that any intrusive pipeline maintenance would be required unless defects are identified. It is therefore anticipated that GHG emissions will be insignificant.</i>	<i>Scoped out</i>
	<i>B6 – Operational energy use</i>	<i>Emissions resulting from the energy used by the Project to enable it to deliver its service during operation. This includes the energy requirements of the HAGIs and Block Valves.</i>	<i>Scoped in</i>
	<i>B7 – Operational water use</i>	<i>Emissions resulting from the consumption of water required by the Project to operate and deliver its service. It is not anticipated that the operation of the Project would include any consumption of water.</i>	<i>Scoped out</i>
	<i>B8 – Other operational processes</i>	<i>Represents other process GHG emissions arising from the Project to enable it to operate and deliver its service including management of</i>	<i>Scoped out</i>

Project phase	Main stages of Project life cycle	Sources of GHG emissions and effects	Scoped in / out
		<i>operational waste. No GHG emissions associated with this aspect are considered likely to arise.</i>	
	<i>B9 – User’s utilisation of infrastructure</i>	<i>Represents the activities associated with user’s utilisation of the Project during the use stage. This is defined by the principle of control and influence whereby the GHG emissions are B9 (user’s utilisation) when they arise from an activity that the user has control over. No GHG emissions associated with this aspect are considered likely to arise.</i>	<i>Scoped out</i>
Decommissioning	C1-C4 – End of life stage: deconstruction, transport, waste processing for recovery and disposal	Represents the on-site activities of deconstructing, dismantling and demolishing the infrastructure. All GHG emissions due to transport to disposal and / or until the end-of-waste state of waste materials arising. Activities associated with treatment and processing for recovery, reuse and recycling of waste materials arising from infrastructure. GHG emissions resulting from final disposal of demolition materials.	Scoped in
General	D – Benefits and loads beyond the infrastructure life cycle	<i>Includes avoided carbon emissions associated with the Project including potential for re-use, recovery and recycling of materials and / or energy and associated GHG emissions beyond the system boundary. The wider HyNet North West project is expected to provide an overall benefit to the climate in relation to GHG emissions, however this benefit is not quantitatively included in the scope of the GHG assessment for the Project. The wider benefits of the HyNet North West project are described in Chapter 1: Introduction, Section 1.2.</i>	<i>Scoped out</i>

17.9 Methodology for PEIR Assessment

Introduction

- 17.9.1 The generic project-wide approach to the assessment methodology is set out in **Chapter 3: Approach to preparing the PEIR**. However, whilst this has informed the approach that has been used in this preliminary GHG emissions assessment, it is necessary to set out how this methodology has been applied, and adapted as appropriate, to address the specific needs of this assessment.

Assessment of effects and determining significance

- 17.9.2 The approach to the GHG assessment is to quantify and contextualise the GHG emissions of the Project. The 'with Project' case will consider the life cycle stages of the Project as set out within **Table 17.7**. The only assessment case to consider for the GHG assessment of the Project is the 'with Project' case, as future GHG emissions will be nil in the context of the 'without Project' case.

Quantification of GHG emissions

- 17.9.3 The approach to quantifying the GHG emissions associated with the Project will consider the whole infrastructure life cycle of the Project. The infrastructure life cycle phases as described within the PAS 2080: Carbon Management in Infrastructure⁴² and in **Table 17.7** will be used. These phases will allow for the identification of the GHG emission sources associated with the Project. The assessment will present a reasonable worst-case. This methodology is in line with the latest IEMA guidance⁴⁰.

- 17.9.4 GHG emissions associated with the emission sources described in **Table 17.7** will generally be calculated using the following equation:

$$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emissions value}$$

- 17.9.5 Assumptions have been made to characterise the likely activities associated with the Project and therefore enable GHG emissions to be determined. These assumptions ensure a proportionate assessment has been carried out. All assumptions are detailed below.

Construction

- 17.9.6 For construction emissions, the cumulative emissions of processes up to the start of the use (operational) phase have been considered.
- 17.9.7 A significant proportion of the emissions associated with the Project are likely to be the embodied carbon of the materials used. This represents the sum of GHG emissions covering extraction of raw and primary materials and their manufacture and refinement into products and construction materials, as well as the transport and supply logistics to the factory gate. The RICS methodology to calculate embodied carbon⁴⁶ along with the embodied carbon figures reported by the

Inventory of Carbon and Energy (ICE) Database⁵² have been used. The exact bill of materials required is unknown at this stage, so assumptions have been made for the specific type and quantity of materials required. An estimated list of material resources has been based upon available information from project engineers on the materials required for construction of the HAGIs and Block Valves, and details of the pipework.

- 17.9.8 Surface access emissions associated with construction activities have been estimated, based on trip length and using the Department for Environment, Food and Rural Affairs (Defra) Emissions Factor Toolkit (EFT)⁵³. The Defra EFT accounts for introduction of newer vehicles into the fleet in accordance with the NAEI Vehicle Fleet Composition Projection for 2021. Details on the number of heavy goods vehicles (HGVs) and light vehicles throughout the construction of the Project have been estimated through the traffic and transport workstream (**Chapter 11: Traffic and Transport**).
- 17.9.9 In the absence of specific data for the Project, the one-way transport distance for construction materials (HGVs and light goods vehicles (LGVs)) is estimated to be 100km. This is based on the Department for Transport (DfT) dataset on domestic road freight transport by commodity and length of haul⁵⁴ (calculated as the average distance travelled to move “Glass, cement and other non-metallic mineral products” and “Metal products”). The average one-way commuting distance for construction staff is estimated to be 15km, estimated based on the DfT dataset on the average number of trips, miles and time spent travelling by trip purpose in England⁵⁵.
- 17.9.10 The precise details of the nature and quantity of plant and machinery for each sub-phase are unknown at this stage. Therefore, a combination of the value of the Project and a construction industry benchmark for process emissions, published by RICS, have been used to calculate the construction process emissions. These include emissions related to energy consumption, plant use and waste. The RICS Key Performance Indicator (KPI) suggests, that in the absence of specific data, a suitable estimate for emissions related to building construction site emissions is 1,400kg CO₂e/£100k⁵⁶. The cost figure is based on the date of the publication,

⁵² Circular Ecology (2019). Embodied Carbon – The ICE Database.

⁵³ Defra (2021). Emissions Factors Toolkit v11. (online). Available at: <https://laqm.defra.gov.uk/air-quality/air-quality-assessment/emissions-factors-toolkit/> (Accessed 18 July 2022).

⁵⁴ DfT (2021). TSGB0430 (RFS0105): Goods lifted and moved by commodity and length of haul. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/815863/rfs0105.ods (Accessed 18 July 2022).

⁵⁵ DfT (2021). NTS0403: Average number of trips, miles and time spent travelling by trip purpose: England. (online). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1016917/nts0403.ods (Accessed 18 July 2022).

⁵⁶ RICS (2017). Professional standards and guidance, UK: Whole life carbon assessment for the built environment. (online). Available at: <https://www.rics.org/globalassets/rics->

March 2015, and has been adjusted to current value in accordance with the Consumer Price Index (CPI).

Operation

- 17.9.11 GHG emissions associated with the operational energy usage of the HAGIs and Block Valves have been estimated using information supplied by the project engineers. The information is preliminary at this stage and will be updated as the design further develops. The energy usage is based on the estimated load in its current form, the preliminary load which allows for loads to be classed as continuous, intermittent and standby, while assuming a continuous running at this load for 24 hours a day.
- 17.9.12 The grid average, consumption-based, industrial emissions factors reported as part of the Treasury's Green Book⁵⁷ have been used in the assessment. These emissions factors consider the carbon intensity of UK grid electricity which reflect the projected rate of decarbonisation over time. Transmission and distribution losses are included in the factors used. The assessment has accounted for the modelled Green Book factors showing a two year time lag behind actual published emission factors released by the Department for Business, Energy and Industrial Strategy (BEIS).

Decommissioning

- 17.9.13 As described in **Chapter 2: The Project, Section 2.7**, decommissioning of the Project would likely involve removing the hydrogen and leaving the pipeline in situ, avoiding removal and associated potential environmental effects. This would typically involve rail, road and watercourse crossings being filled with grout and the removal of all HAGIs and Block Valves. The sequence of decommissioning of these elements would be the reverse of the construction sequence (as described in **Section 2.5**) and would likely involve the application of similar construction plant and methods.
- 17.9.14 In the absence of further detailed information for decommissioning, an estimate of the GHG emissions has been based upon the proportion of GHG emissions associated with the construction of the HAGIs and Block Valves (as these are the only fixed infrastructure elements to be removed during decommissioning), and an additional allowance for the removal of hydrogen and infilling of crossings during the decommissioning.

Assessment of significance

- 17.9.15 Current IEMA guidance⁴⁰ states that: "*The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG*

website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf (Accessed 18 July 2022).

⁵⁷ BEIS (2021). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal. (online). Available at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> (Accessed 18 July 2022).

emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050”.

- 17.9.16 The significance of GHG emissions associated with the Project will be evaluated based on the extent to which the Project materially affects the ability to achieve national, regional and local targets for decarbonisation. The primary basis of contextualisation will be the UK carbon budgets (see **Table 17.1**), including the relevant CCC sectoral allocations (see **Table 17.4**) and the UK carbon target of ‘net zero’ by 2050. Regional and local policy for reducing GHG emissions will also be considered, but are not the basis of assessment. Consideration will also be given as to whether GHG emissions are appropriately mitigated and compliant with relevant policy.
- 17.9.17 The significance of the GHG emissions from the Project is determined based on the criteria in **Table 17.8** developed from the IEMA guidance⁴⁰. Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant.

Table 17.8 Significance criteria

Significance	Significance criteria
Major adverse	The Project does not make a meaningful contribution to the UK Government meeting its carbon budgets / targets. Adverse GHG impacts are not mitigated / do-minimum and are not compliant with requirements of national, regional and local policy.
Moderate adverse	The Project falls short of fully contributing to the UK Government meeting its carbon budgets / targets. Adverse GHG impacts are partially mitigated and partially meet the requirements of national, regional and local policy.
Minor adverse	The Project is fully in line with the trajectory of the UK Government meeting its carbon budgets / targets. Adverse GHG impacts are mitigated with good practice design standards and meet the requirements of national, regional and local policy.
Negligible	The Project has minimal residual GHG emissions and is ‘ahead of the curve’ for the trajectory of the UK Government meeting its carbon budgets / targets. GHG impacts are mitigated through measures that go beyond good practice design standards and the requirements of national, regional and local policy.
Beneficial	The Project has net GHG emissions below zero, causing a direct or indirect reduction in atmospheric GHG emissions which has a positive impact on the UK Government meeting its carbon budgets / targets.

17.10 Preliminary Assessment of GHG Emission Effects

Construction phase

Raw materials supply, transport and manufacture

- 17.10.1 The RICS methodology to calculate embodied carbon⁴⁶ along with the ICE Database⁵² has been used (see paragraph 17.9.7 for the methodology and assumptions). The GHG emissions associated with the embodied carbon of material resources needed for the construction of the Project are estimated to be 106.58ktCO₂e.

Construction transport

- 17.10.2 In accordance with the methodology and assumptions in paragraphs 17.9.8 and 17.9.9, the total GHG emissions arising from surface access for HGVs and LGVs to transport this material, and the surface access emissions from workers' transport during the construction of the Project, are estimated to be 31.44ktCO₂e.

Construction process stage

- 17.10.3 Construction process GHG emissions have been estimated using RICS' construction KPI for process emissions per value of the Project⁵⁶ (see paragraph 17.9.10 for the methodology and assumptions), giving an estimated total GHG emissions of 8.53ktCO₂e.

Summary

- 17.10.4 The total GHG emissions associated with the construction phase of the Project are estimated to be around 146.55ktCO₂e of which 73% is embodied carbon associated with the use of materials.

Operational phase

- 17.10.5 Based on the design information available at this stage, total annual energy consumption for all HAGI and Block Valve sites combined is estimated to be 6,963,061kWh. In accordance with the methodology and assumptions in paragraphs 17.9.11 and 17.9.12, the total lifetime GHG emissions associated with the operational energy use of the Project are estimated to be around 5.49ktCO₂e.

Decommissioning phase

- 17.10.6 In accordance with the decommissioning phase methodology and assumptions in paragraphs 17.9.13 and 17.9.14, the total GHG emissions for the decommissioning phase of the Project are estimated to be around 22.87ktCO₂e.

Summary

- 17.10.7 A summary of the preliminary phased lifecycle GHG emissions assessment is presented in **Table 17.9**.

Table 17.9 Lifecycle emissions over the duration of the Project

Phase of Project	Main stages of Project life cycle	Estimated lifetime GHG emissions (ktCO ₂ e)
Construction	A1-A2-A3 – Product stage: raw material supply, transport and manufacture	106.58
	A4 – Construction transport	31.44
	A5 – Construction process stage	8.53
Operation	B6 – Operational energy use	5.49
Decommissioning	C1-C4 – End of life stage: deconstruction, transport, waste processing for recovery and disposal	22.87
Total		174.91

Contextualisation against relevant UK carbon budgets

- 17.10.8 The significance of GHG emissions associated with the Project is evaluated based on the extent to which the Project materially affects the ability to achieve national, regional and local targets for decarbonisation. The primary basis of contextualisation is the UK carbon budgets, including the relevant CCC sectoral allocations and the UK carbon target of ‘net zero’ in 2050. Regional and local policy for reducing GHG emissions is also considered, but this is not the basis of assessment. Consideration is also given as to whether GHG emissions are appropriately mitigated and compliant with relevant policy.
- 17.10.9 The preliminary GHG emissions assessment has considered GHG emissions from the Project in three separate phases: construction, operation and decommissioning. The construction of the Project runs from late 2024/2025 to 2027. GHG emissions from the construction phase will therefore fall within the fourth carbon budget. GHG emissions from the operation phase of the Project (considered to be 40 years) will fall into the fifth and sixth carbon budgets, and subsequent future budgets once set through from 2038 and beyond. GHG emissions from the decommissioning of the Project will fall entirely within future budgets once set.
- 17.10.10 **Table 17.10** presents the net ktCO₂e associated with the construction, operation and decommissioning phases of the Project during each of the legislated carbon budget periods.

Table 17.10 Lifecycle emissions contextualised against the UK carbon budgets⁵⁸

Phase of Project	Estimated lifetime GHG emissions (ktCO ₂ e)	Net GHG emissions per relevant carbon budget (ktCO ₂ e) and 2050 net zero target (ktCO ₂ e/yr)			
		4 th (2023 to 2027)	5 th (2028 to 2032)	6 th (2033 to 2037)	2050 net zero target (2050 only)
Total UK carbon budget		1,950,000	1,725,000	965,000	
CCC sector allocation		147,710	85,172	42,233	
Construction		146.55	-	-	-
Operation		-	2.41	1.09	0.05
Decommissioning		-	-	-	-
Total		146.55	2.41	1.09	0.05
Total % of UK carbon budget		0.0075%	0.0001%	0.0001%	-
Total % of CCC sector allocation		0.099%	0.003%	0.003%	-

17.10.11 This assessment has established that the Project's lifetime net GHG emissions will equate to 0.0075% of the UK's fourth carbon budget, 0.0001% of the UK's fifth carbon budget and 0.0001% of the UK's sixth carbon budget. In 2050, when the UK net carbon budget is zero, the Project will have an impact equivalent to 0.05ktCO₂e/yr. In this context, it is concluded that the Project will not have a material effect on the UK Government meeting its carbon budgets / targets.

17.10.12 **Table 17.6** details the embedded measures to minimise GHG emissions associated with the Project. These are considered to be in line with good practice design standards and the requirements of national, regional and local policy.

17.10.13 It is also important to consider the role of the Project in the wider HyNet North West programme, which is expected to provide an overall benefit to the climate in relation to GHG emissions. The wider benefits of the HyNet North West programme are described in **Chapter 1: Introduction, Section 1.2**. HyNet North West will produce, store and distribute hydrogen – a low carbon energy source – as well as capture and store carbon from industry in the North West of England and North Wales. This concept has the potential to reduce GHG emissions by millions of tonnes every year by 2030 – the equivalent of taking millions of cars off the road.

⁵⁸ GHG emissions have been calculated on an annual basis throughout the Project lifecycle and allocated to the carbon budget periods as per paragraph 17.10.9.

- 17.10.14 UK Government policy establishes clear objectives for decarbonising energy supply and achieving net zero by 2050. Policy acknowledges the vital role of low-carbon hydrogen as an energy source to replace conventional fossil fuels (see **Table 17.2**). At a local level, the host local authorities have their own decarbonisation targets (see **Table 17.3**) and are implementing policy aligned to achieving these decarbonisation targets (see **Table 17.2**). It is considered that the Project aligns with national and local decarbonisation policy.

17.11 Assessment of Cumulative (Inter-Project) Effects

- 17.11.1 The approach to cumulative effects assessment (CEA) for GHGs differs from that for many EIA topics. All global cumulative GHG sources are relevant to the effect on climate change, and this is taken into account in defining the receptor as being of 'high' sensitivity'. Effects of GHG emissions from specific cumulative projects are not 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. Additionally, the contextualisation of GHG emissions, by its nature, incorporates the cumulative contributions of other GHG sources which make up that context. Therefore, it has not been necessary to carry out a separate CEA of GHG emissions. This approach is in accordance with IEMA guidance⁴⁰.

17.12 Preliminary Significance Conclusions

- 17.12.1 In accordance with the assessment methodology and criteria for defining significance in **Table 17.8**, the Project is assessed as having a minor adverse effect and is therefore assessed as being not significant. The Project is fully in line with the trajectory of the UK Government meeting its carbon budgets / targets. Adverse GHG impacts are mitigated with good practice design standards and meet the requirements of national, regional and local policy.

17.13 Further Work to be Undertaken

- 17.13.1 The information provided in this PEIR is preliminary, the final assessment of likely significant effects will be reported in the ES. This section describes the further work to be undertaken to support the GHG assessment presented in the ES.

Assessment

- 17.13.2 Assumptions have been made to characterise the likely activities associated with the Project and therefore enable GHG emissions to be determined. As the design develops throughout the EIA process, any further information available will be considered and updates will be made to the GHG assessment in the ES.
- 17.13.3 As detailed in **Table 17.5**, the potential for the release of GHG emissions from disturbed peat will be clarified in the ES following refinement of the Preliminary Order Limits and further confirmation of the extent of peat (the depth to peat, its thickness and its lateral extent within the study area) during ground investigations.

Environmental measures

- 17.13.4 Throughout the EIA process, the embedded measures relating to the GHG emissions assessment (see **Table 17.6**) will be reviewed to ensure all relevant and implementable measures are captured in the assessment.

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