

Chapter 19:

Intra-Project Effects

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19. Intra-Project Effects

19.1 Introduction

- 19.1.1 The Draft ES 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.
- 19.1.2 This chapter presents the assessment of the likely significant effects of the Project with respect to intra-project cumulative effects, based on the information obtained to date. Following consultation, the assessment will be updated for the Final ES that will accompany the DCO application for the Project.
- 19.1.3 This chapter should be read in conjunction with the project description provided in **Chapter 2: The Project** and the relevant parts of the following chapters:
- **Chapter 3: Approach to Preparing the Draft ES;**
 - **Chapter 5: Biodiversity;**
 - **Chapter 6: Historic Environment;**
 - **Chapter 7: Water Environment;**
 - **Chapter 8: Landscape and Visual;**
 - **Chapter 9: Air Quality;**
 - **Chapter 10: Noise and Vibration;**
 - **Chapter 11: Traffic and Transport;**
 - **Chapter 12: Ground Conditions;**
 - **Chapter 13: Agriculture and Soil Resources;**
 - **Chapter 14: Land Use;**
 - **Chapter 15: People and Communities;**
 - **Chapter 16: Major Accidents and Disasters;**
 - **Chapter 17: Climate Change: Greenhouse Gas Emissions; and**
 - **Chapter 18: Climate Change: Climate Change Resilience.**
- 19.1.4 The intra-project effects assessment considers likely significant effects from multiple impacts and activities from the construction, operation and decommissioning of the Project on the same receptor, or group of receptors.
- 19.1.5 The potential intra-project effects include Project lifetime effects and receptor-led effects, as follows:

- Project lifetime effects are where phases of the Project interact to create a potentially more significant effect on a receptor than in one phase alone. The phases for the Project are construction, operation/maintenance and decommissioning. Project lifetime effects are scoped out of the assessment for the Project (refer to **Section 19.6**).
- Receptor-led effects are where effects from different environmental topics combine spatially or temporally on a receptor. These effects may be short-term, temporary, transient or longer-term. Receptor-led effects are considered in this chapter.

19.1.6 This chapter¹ describes:

- the legislation, planning policy and other documentation that has informed the assessment (**Section 19.4**);
- details of consultation and engagement undertaken in relation to intra-project effects (**Section 19.5**);
- the scope of the assessment for intra-project effects (**Section 19.6**);
- the methodology applied for the assessment (**Section 19.7**);
- the assessment of intra-project effects (**Section 19.8**); and
- a summary of the significance conclusions (**Section 19.10**).

19.2 Project Overview

- 19.2.1 The Project includes the construction, operation and eventual decommissioning of approximately 100km of new pipeline to distribute hydrogen to industry in the North West. A number of Hydrogen Above Ground Installations (HAGIs), including Block Valve Installations (BVIs) are required to control the flow and pressure of hydrogen at key points along the proposed pipeline.
- 19.2.2 The Project connects the Hydrogen Production Plant (HPP) at the Stanlow site, as the source of hydrogen, for onward distribution to the network. The pipeline transports hydrogen to the Central Hub at the centre of the network, which then serves as the connection and onward distribution point to the North, East and South corridors, which would extend to St. Helens, Partington and Northwich respectively. Branching off from each main corridor would be pipeline spurs connecting hydrogen customers to the main pipeline. Infrastructure has also been included which supports the potential blending of hydrogen with methane in the existing gas network. The Project would also link to underground hydrogen storage facilities in Cheshire used to balance supply and demand through the network.
- 19.2.3 The presently anticipated maximum extent of land in which the Project may take place, which is assessed in this Draft ES, is defined by the 'Draft Order Limits', land within which is hereafter referred to as 'land within the Draft Order Limits'.

¹ Note the inter-project effects methodology is defined in Chapter 3 and is assessed in technical topic chapters (5-18).

- 19.2.4 A proportionate degree of flexibility has been incorporated into the project design so that unforeseen issues that may be encountered following consent can be sufficiently mitigated. For example, previously unidentified poor ground conditions may require a pipeline section to be re-routed slightly for geotechnical reasons. Therefore, to allow for this, new infrastructure would be constructed within specified Limits of Deviation (LoD) which identify a maximum distance or measurement of variation within which the works must be constructed; further detail is provided on LoD in **Chapter 2: The Project**.

19.3 Limitations and Assumptions

- 19.3.1 At this Draft ES stage, the assessment of intra-project effects is limited to the extent of relevant technical topic assessments (**Chapters 5-18**) available, where surveys and assessment may still be ongoing. Therefore, this intra-project assessment will be updated in the Final ES, once technical topic assessments have been completed. At the Final ES stage, opportunities to identify additional mitigation measures specific to intra-project effects will be explored, as necessary.
- 19.3.2 As a consequence of the above, this draft intra-project effects assessment only considers intra-project effects occurring in the construction phase of the Project. The operational and decommissioning phases will be considered in the Final ES where relevant, once technical topic assessments have been completed.

19.4 Relevant Legislation, Policy and Other Information and Guidance

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

Legislation

- 19.4.2 **Table 19.1** lists the key legislation relevant to the assessment of intra-project effects.

Table 19.1 Legislation relevant to intra-project effects

Legislation description	Relevance to assessment
Infrastructure Planning (Environmental Impact Assessment) Regulations 2017	
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017² (“the EIA Regulations 2017”) transpose the provisions of the EIA Directive (2014/52/EU, amending 2011/92/EU).³	The EIA Regulations 2017 require that the effects of a project, where these are likely to have a significant effect on the environment, are taken into account in the decision-making process for that project. Regulation 5(2)(e) of EIA Regulations requires that the EIA must consider the interaction of different environmental effects of the Project on various topics. This chapter details the consideration of these interacting effects arising from the Project.

Planning Policy

- 19.4.3 The primary national planning policy documents relevant to the consideration of the Project are the Overarching National Policy Statement for Energy (EN-1) and the National Policy Statement for Natural Gas Supply Infrastructure and Gas and Oil pipelines (EN-4).
- 19.4.4 Other national and local policies may also provide additional guidance on this environmental topic and could be considered material to the consideration of this Project. **Table 19.2** lists the national and local planning policy relevant to the assessment of intra-project effects. Only the local planning authorities (LPA) with relevant planning policy for intra-project assessments have been included.

² UK Government (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. (Online) Available at: <https://www.legislation.gov.uk/ukxi/2017/572/contents/made> (Accessed June 2024).

³ European Commission (2014). Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. (Online) Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0052&from=EN> (Accessed September 2024).

Table 19.2 Planning policy relevant to intra-project effects

Description	Relevance to assessment
National Planning Policy	
Overarching National Policy Statement (NPS) for Energy (EN-1)⁴	
NPS EN-1 includes guidance on what matters are to be considered in the assessment of renewable energy projects.	Paragraph 4.3.19 states that consideration should be given to: <i>‘...the accumulation of, and interrelationship between, effects might affect the environment, economy, or community as a whole, even though they may be acceptable when considered on an individual basis with mitigation measures in place.’</i>
Local Planning Policy	
Cheshire East Local Plan, Local Plan Strategy 2010 - 2030 Adopted 27 July 2017⁵	Policy SE 8: Renewable and Low Carbon Energy describes that the development of renewable and low carbon energy schemes will be positively supported: <i>Weight will be given to the wider environmental, economic and social benefits arising from renewable and low carbon energy schemes, whilst considering the anticipated adverse impacts, individually and cumulatively ...</i>” for the potential impacts within the EIA requirements. Policy SE 12: Pollution, Land Contamination and Land Instability states <i>“The council will seek to ensure all development is located and designed so as not to result in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm”</i>.

⁴ Overarching National Policy for Energy Infrastructure (EN-1) November 2023. DESNZ. Available from: <https://assets.publishing.service.gov.uk/media/65bbfbdc709fe1000f637052/overarching-nps-for-energy-en1.pdf> (accessed June 2024).

⁵ Cheshire East Council. (2017). Cheshire East Local Plan, Local Plan Strategy 2010 – 2030 Adopted 27 July 2017. (Online). Available at: [local-plan-strategy-web-version-1 \(cheshireeast.gov.uk\)](https://www.cheshireeast.gov.uk/local-plan-strategy-web-version-1) (Accessed September 2024).

Description	Relevance to assessment
Halton Delivery and Allocations Local Plan, 2022 ⁶	Policy GR5: Renewable and Low Carbon Energy states all the different aspects/impacts that need to be considered and assessments included for a newly proposed renewable (or low carbon) energy development, with Halton Council taking <i>“into account the individual and cumulative impacts”</i> .

Technical Guidance

19.4.5 A summary of other technical guidance relevant to the assessment of intra-project effects is provided in **Table 19.3**.

Table 19.3 Technical guidance relevant to intra-project effects

Technical guidance document	Context
Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU) ⁷	Guides developers and consultants to produce good quality EIA reports. Section 1.4.3 highlights the need to consider interactions between the different environmental topics in a single project. It recommends using interactive matrices that consider the interactions of impacts assessed individually.
Guideline for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions ⁸	Sets out various tools that can be used for intra-project effects, guidance on the approach and assessment. Section 3 of the guidance outlines the tools that can be used for intra-project effects, which are: expert opinion, matrices,

⁶ Halton Borough Council. (2022). Halton Delivery and Allocations Local Plan. (Online). Available at: [DALP Adopted.pdf \(halton.gov.uk\)](https://www.halton.gov.uk/media/10000/DALP_Adopted.pdf) (Accessed September 2024).

⁷ European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). (Online) Available at: https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf (Accessed September 2024).

⁸ European Commission (1999). Guideline for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. (Online) Available at: [Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions \(archive-it.org\)](https://archive-it.org/) (Accessed September 2024).

Technical guidance document	Context
	consultation and questionnaires, network and systems analysis and spatial analysis. These tools can be used in different combinations at different stages of the project. Section 7.7 of the guidance states the intra-project effects assessment can be within the individual topic chapters or as its own standalone chapter (as in this Draft ES). Section 7.3.1 of the guidance states where the assessment cannot be quantitative, a qualitative assessment can be carried out.
Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment⁹	Advises that the assessment of interrelationships between aspects for the proposed NSIP (such as between ecology and hydrology) are normally assessed as part of the specialist aspect chapters, as combined effects. Also, that the Environmental Statement should set out a table demonstrating where multiple impacts from the proposed NSIP would combine to affect sensitive receptors. Where they are identified, these in-combination effects should be assessed in the Environmental Statement.

19.5 Consultation and Engagement

Overview

- 19.5.1 The assessment has been informed by consultation responses, plus statutory and technical engagement. An overview of the approach to consultation is provided in **Chapter 3: Approach to preparing the Draft ES**.

⁹ UK Government (2024). Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment. (Online). Available at: [Nationally Significant Infrastructure Projects: Advice on Cumulative Effects Assessment - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/publications/nationally-significant-infrastructure-projects-advice-on-cumulative-effects-assessment) (Accessed October 2024).

Scoping opinion

19.5.2 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 intra-project effects and confirmation of how these have been addressed within the assessment is presented in **Table 19.4**.

Table 19.4 Summary of EIA Scoping Opinion responses for intra-project effects

Consultee	Consideration	How addressed in this Draft ES
St Helen's Borough Council	Chapter 4 outlines the EIA process and includes details of the Cumulative Effects Assessment. This appears to be comprehensive and includes both inter and intra-project effects. However, it is noted that there does not seem to be a separate chapter on this. It would be easier to review if this was included as a separate chapter and not only included in each individual chapter.	The assessment of intra-project cumulative effects has been presented in a stand-alone chapter in this Draft ES. The inter-project CEA is contained within the respective topic chapters.
Marine Management Organisation	The MMO wishes to highlight that in sub-section 4.5.1., it states " <i>a Cumulative Effects Assessment (CEA) will be carried out for the Project, which will examine the result from the combined impacts of the Project with other developments on the same single receptor or resource as required under Paragraph 5(e) of Schedule 4 of the EIA Regulations and the interaction of environmental aspect effects occurring as a result of the Project in accordance with Regulation 5(2). Two types of effects will be considered</i> ": these being inter-project effects and intra-project effects. This assessment will be undertaken in the environmental statement and not in the scoping report stage and thus it is not possible to assess its adequacy at present.	Noted, we would welcome feedback from the MMO on the draft assessment presented in this draft ES and the final assessment that will be presented in the final ES. Although we have now agreed with the MMO that an exemption for a Marine Licence will be sought, as a trenchless crossing(s) of the River Mersey will be undertaken.

Statutory consultation

- 19.5.3 Stage 2 Statutory Consultation took place between 12 September and 10 November 2022 in accordance with the Planning Act 2008. Prescribed and non-prescribed consultees and members of the public were consulted. Various methods of consultation and engagement were used in accordance with the Statement of Community Consultation (SoCC) including letters, website, public exhibitions, publicity/advertising in newspapers and webinar briefings.
- 19.5.4 The Applicant previously prepared a Preliminary Environmental Information Report (PEIR) which was publicised at this consultation stage. The Applicant sought feedback on the environmental information presented in that report. Feedback received during statutory consultation was considered by the Applicant and incorporated, where relevant into the design of the Project and its assessment and is presented in this Draft ES.
- 19.5.5 A summary of the relevant responses received in response to statutory consultation, together with any subsequent discussions held in relation to intra-project effects and confirmation of how these have been considered within the assessment to date is presented in **Table 19.5**.
- 19.5.6 Technical engagement with consultees in relation to intra-project effects is ongoing.

Table 19.5 Summary of Section 42 Consultation responses for intra-project effects

Consultee	Consideration	How addressed in this Draft ES
Cheshire West and Chester Council Biodiversity Officer	Concern that cumulative impacts on Frodsham Marshes LWS, is not considered and this should be carried out	Ecological receptors have been scoped out of this assessment of intra-project effects, as they are considered within Chapter 5: Biodiversity (see paragraph 19.6.8). Intra-project effects on Frodsham, Helsby and Ince Marshes LWS are considered in Chapter 5: Biodiversity .

19.6 Scope of the Assessment

Overview

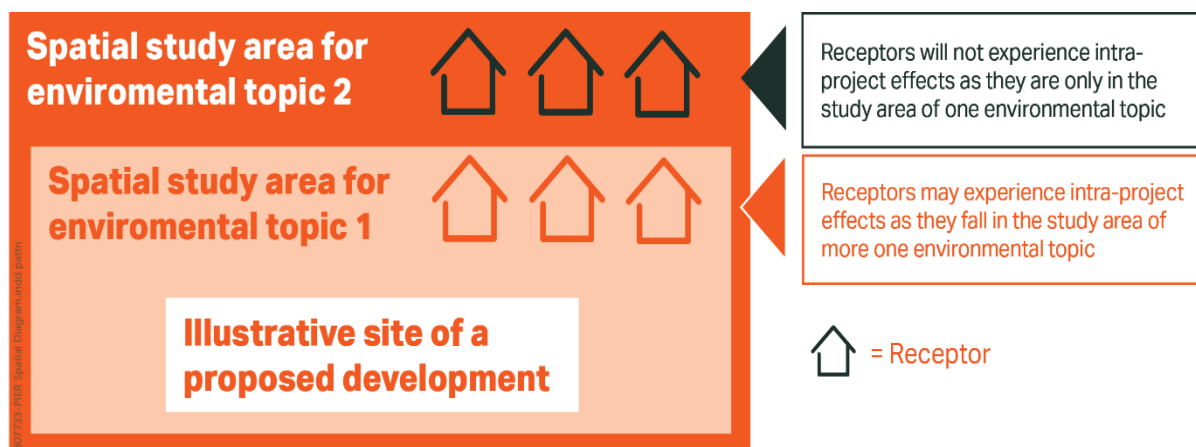
- 19.6.1 This section sets out the proposed scope of the assessment for intra-project effects. This scope has been developed as the project design has evolved and responds to feedback received to date as set out in **Section 19.5**.

Spatial Scope and Study Area

- 19.6.2 The spatial scope of the intra-project effects assessment is based on the Study Areas from each of the environmental topic chapters (**Chapter 5** to **Chapter 18**).

- 19.6.3 The spatial study area is dependent on each receptor. To have a potential intra-project effect a receptor or receptor group must be within the Study Area of more than one environmental topic. An illustrative example of this is described in **Graphic 19.1**; only the orange receptors have the potential to experience intra-project effects as they are in the Study Area for environmental topic 1 and environmental topic 2.

Graphic 19.1 Illustrative example of the spatial scope and study area for an example receptor



- 19.6.4 The Study Area for each of the individual technical topics (**Chapter 5** to **Chapter 18**) relevant to this chapter have been informed via a combination of desk studies, professional judgement, field/survey data, best practice guidance and engagement with stakeholders, with the approach to determining each Study Area set out within each of the technical topic chapters.

Temporal scope

- 19.6.5 The temporal scope of this draft assessment of intra-project effects is limited to the construction phase, however the Final ES will be updated to include assessment of operation and decommissioning phases of the Project, which therefore covers the construction, operation and decommissioning periods (see **Chapter 2: The Project**).

Activities or impacts scoped out of assessment

Project lifetime effects

- 19.6.6 As described in **Section 19.1** there are two types of assessment for intra-project effects. The first is receptor-led effects, which is scoped in the intra-project effects assessment. The second is project lifetime effects, which have been scoped out of the intra-project effects assessment for the Project.

- 19.6.7 For project lifetime effects to occur, multiple phases of the Project must overlap. The phases for the Project are construction, operation and decommissioning. The construction, operation and decommissioning phases are temporally distinct from each other; the operation phase is currently planned to commence after construction and decommissioning of the Project will only start at the end of its operational life i.e. after the operation phase is complete (approximately 40 years). Therefore, there is no potential for project lifetime effects to occur and they have been scoped out of the intra-project effects assessment.

Environmental topics

- 19.6.8 All intra-project effects in relation to ecological receptors are assessed within **Chapter 5: Biodiversity**; this includes impacts to water quality (in relation to turbidity and spillage of pollutants) and hydrological/hydromorphological processes on watercourses (as assessed in **Chapter 7: Water Environment**), including those subject to statutory designation. Ecological receptors are therefore scoped out of the intra-project effects assessment of in this chapter.
- 19.6.9 All intra-project effects in relation to heritage assets are already assessed within **Chapter 6: Historic Environment** as this chapter considers all types of effects on heritage receptors. As a result, such effects are scoped out of the assessment of intra-project effects in this chapter.
- 19.6.10 Air quality effects have been scoped out of this intra-project effects assessment, as they are assessed in **Chapter 7: Air Quality** to be negligible (not significant). This is achieved via the implementation of suitable good practice measures, as defined by the Institute of Air Quality Management (IAQM). Therefore, there is no pathway for air quality effects to contribute to a significant intra-project effect.
- 19.6.11 There are aspects of the assessment in **Chapter 10: Noise and Vibration** which will not be complete until the Final ES, these include the assessment of vibration effects and operational noise and these aspects are therefore not considered in this intra-project effects assessment.
- 19.6.12 **Chapter 12: Ground Conditions** concludes that potential effects to property receptors from construction activities located on potential sources of contamination are negligible and therefore there is no pathway for these effects to contribute to a significant intra-project effect.
- 19.6.13 **Chapter 14: Land Use** considers intra-project effects on recreational and non-residential receptors and therefore these categories are scoped out of this intra-project effects assessment to avoid duplicating assessment. This assessment is limited to intra-project effects on residential receptors.
- 19.6.14 **Chapter 15: People and Communities** considers intra-project effects arising from other technical topics on common receptors inherently in the assessment and is therefore scoped out of this intra-project effects assessment.
- 19.6.15 Major Accidents and Disasters (discussed in detail in **Chapter 16: Major Accidents and Disasters**) is scoped out from the assessment as a different assessment approach is used from the other technical chapters assessments within the Draft ES. The vulnerability of the Project to major accidents and disasters is assessed rather than effects on sensitive receptors. As a result, major

accidents and disasters is scoped out from detailed consideration in the assessment of intra-project effects.

- 19.6.16 Greenhouse gases (discussed in detail in **Chapter 17: Climate Change – Greenhouse Gas Emissions**) have been scoped out of the intra-project effects assessment. The only receptor for the greenhouse gas assessment is the global climate and it is not possible for this receptor to experience intra-project effects from any other environmental topics.

In-combination Climate Change Impact Assessment

- 19.6.17 The In-combination Climate Change Impact (ICCI) assessment reflects the receptors identified in the environmental topic chapters and utilises the topic-specific assessment methodologies to assess likelihood and magnitude of the impact, with the combined consideration of future climate change trends and impacts. The assessment uses expert judgement on whether climate change would have a combined effect with the effects already identified by the technical topics. Where a combined effect is identified, additional embedded mitigation measures are proposed.

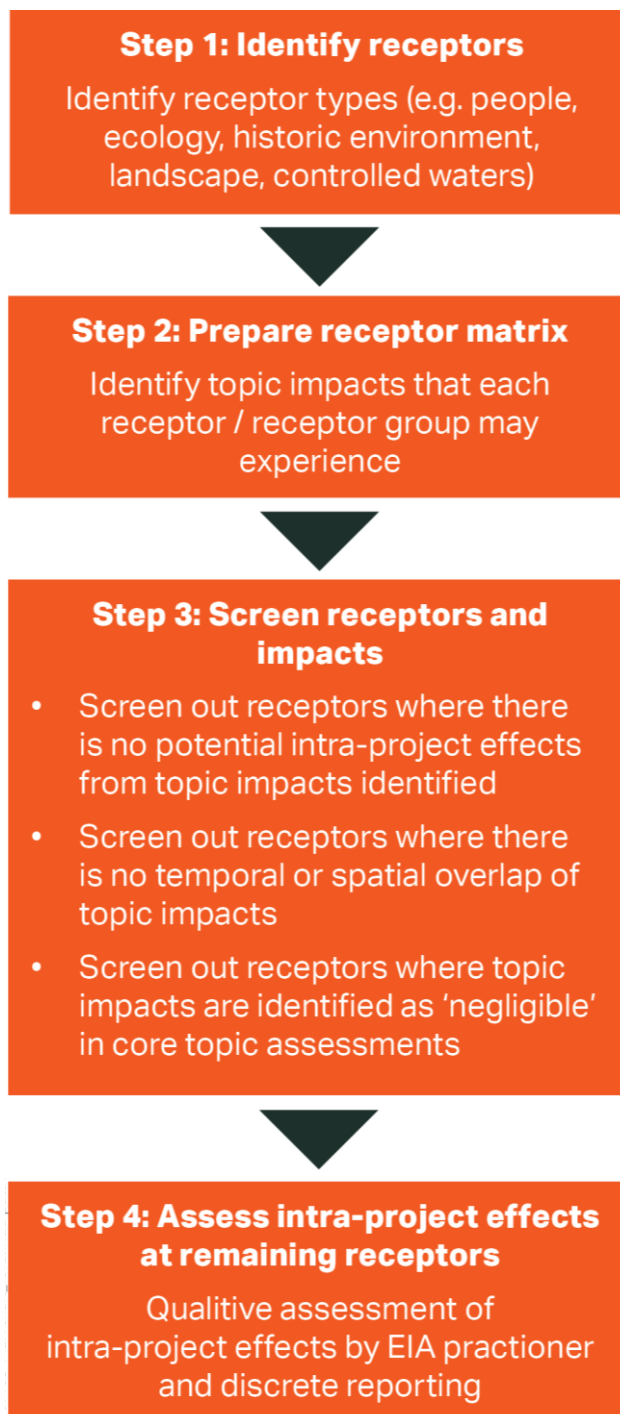
- 19.6.18 The ICCI assessment is provided in **Section 19.9**.

19.7 Methodology

- 19.7.1 There is no established methodology for quantitatively assessing complex cross-topic, intra-project effects and assigning a level of significance to them, as methodologies and criteria vary across environmental topics. Therefore, assessment of intra-project effects between topics is qualitative, relying on professional judgement as to how individual effects would interact.
- 19.7.2 As project lifetime effects have been scoped out of further assessment (see **Section 19.6**), only receptor-led effects are considered.

Receptor-led effects

- 19.7.3 Receptor-led effects are where effects from different environmental topics combine spatially and temporally on a receptor. These effects may be short-term, temporary, transient or longer-term.
- 19.7.4 The methodology is summarised in **Graphic 19.2** and is outlined in detail in the remainder of this section.

Graphic 19.2 **Summary of intra-project effects methodology**

19.7.5 Common receptors for environmental topics have been identified and consideration given to whether the topics effects on any common receptors are likely to combine. This has identified:

- the common receptor(s) from the individual topics assessments;
- the impact source pathways that can affect the common receptor(s);
- the potential effects on the identified common receptor(s); and

- the intra-project effects across the construction, operation and decommissioning phases, where appropriate.

19.8 Assessment of Intra-project Effects

Identification of common receptors

- 19.8.1 **Section 19.6** identifies technical topics and associated receptor types, which are scoped out of this intra-project effects assessment, as they are considered in the relevant technical topic chapter (**Chapter 5-18**).
- 19.8.2 **Table 19.6** lists the remaining common receptor identified for assessment of intra-project effects and the corresponding environmental topics.

Table 19.6 Common Receptors – Construction phase¹⁰

Type of receptor	Environmental Topics
Human/Settlement (residents and residential properties)	- Water Environment - Noise and Vibration - Traffic and Transport - Landscape and Visual

Identified Effects on Common Receptors

- 19.8.3 The purpose of EIA is to identify and assess any likely significant effects that are material to the decision-making process. In order to maintain proportionality, and in line with the EIA Regulations, this assessment therefore concentrates on where significant intra-project cumulative effects are likely to arise between topics considered in this Draft ES.
- 19.8.4 Only receptors that would experience effects that have the potential to combine with a different type of effect have been included and net 'negligible' or 'neutral' effects have been excluded from the matrix. Instances of common receptors between topics have been identified as potential intra-project cumulative effects. If there are no common receptors identified then there is no potential for such effects.
- 19.8.5 Where an environmental topic assessment only distinguishes between significant and not significant effects, rather than providing a scale of significance, professional judgement has been used to determine which non-significant residual effects have the potential to result in intra-project effects.
- 19.8.6 **Table 19.7** provides a summary of effects identified in the technical chapters (unless scoped out) on the common receptors identified in **Table 19.6**.

¹⁰ See **Section 19.4** - Limitations and assumptions

Table 19.7 Residual Effects on Common Receptors – Construction phase

Receptor / Corridor	Landscape and Visual	Water Environment	Noise and Vibration	Traffic and Transport
Settlements (residents and residential properties)				
West Corridor	Not significant to Major/ Moderate (Significant) (depending on the receptor location) Visual effects	-	Moderate (Significant) Daytime (65db) and nighttime (45db) within the relevant Zone of Influence (Zol) of trenchless crossing and construction compounds	Minor (not significant) Severance
South Corridor	Not significant to Major/ Moderate (Significant) (depending on the receptor location) Visual effects	Moderate to Major (Significant) Storage of materials in areas categorised as Flood Risk 2	Moderate (Significant) Daytime (65db) and nighttime (45db) within the relevant Zol of trenchless crossing and construction compounds	-
East Corridor	Not significant to Major/ Moderate (Significant) (depending on the receptor location) Visual effects	-	Moderate (Significant) Daytime (65db) and nighttime (45db) within the relevant Zol of trenchless crossing and construction compounds.	Minor (not significant) Severance and Non- motorised User Amenity, Non-motorised User Delay and Fear and Intimidation

Receptor / Corridor	Landscape and Visual	Water Environment	Noise and Vibration	Traffic and Transport
North Corridor	Not significant to Major/ Moderate (Significant) (depending on the receptor location) Visual effects	-	Moderate (Significant) Daytime (65dB) and nighttime (45dB) within the relevant Zol of trenchless crossing and construction compounds	Minor (not significant) Severance
Warrington Spur	-	Moderate to Major (Significant) Storage of materials in areas categorised as Flood Risk 3	Moderate (Significant) Daytime (65dB) and Nighttime (45dB) within the relevant Zol of trenchless crossing and construction compounds	-

Assessment

- 19.8.7 The intra-project effects that may occur as the result of interactions of multiple non-negligible effects between the common receptors with effects exceeding negligible identified in **Table 19.7** are identified in **Table 19.8**.
- 19.8.8 At the Final ES stage, once all relevant technical topic assessments have been completed, opportunities to identify additional mitigation measures specific to intra-project effects will be explored, as necessary.

Table 19.8 Intra-project effects assessment

Common receptors	Individual topic effects	Intra-project effect
Residential Receptors (residents and residential properties)	Landscape and Visual: not significant to Major/ Moderate (Significant)	Residential receptors on the West Corridor are anticipated to experience multiple adverse environmental effects, including landscape/ visual, noise and traffic/transport. The identified adverse effects are localised to specific locations along the corridor, and with respect to noise and traffic/ transport are considered to be temporary in nature, as they are limited to the construction phase of the Project.
West Corridor	Noise: Moderate (Significant) Traffic and Transport (Not Significant)	On the West Corridor, noise effects may be experienced during the construction phase, within the vicinity of trenchless crossing compounds (significant within the 45dB nighttime buffer and 65dB daytime buffer, where works occur for 1 month or more). These include residential receptors situated in the south and east extents of Elton. Residential receptors along the south-east extent of Elton may also experience visual effects, with views of trenchless crossing compounds. Similarly, residential receptors along the north-eastern extent of Frodsham and the southern extent of Halton may experience significant noise effects due to proximity to trenchless crossing compounds, at crossings of the River Weaver. These receptors may also experience visual and traffic/transport effects. Where noise effects experienced by residential receptors within the 45dB buffer are limited to nighttime hours, there is no pathway for intra-project effects to occur with visual effects due to the implementation of appropriate measures secured via the Outline Lighting Strategy. Traffic/transport effects are not anticipated during

Common receptors	Individual topic effects	Intra-project effect
		nighttime hours. Therefore, intra-project effects are considered to be Negligible (not significant). Due to their proximity to the West Corridor and thus trenchless crossing compounds (crossing RDX001-00-00-03 and RDX001-00-00-04), there are four residential receptors along Parkland Drive, Elton situated within the daytime 65dB buffer of the microtunneling trenchless crossing compounds. These specific receptors are anticipated to experience significant noise effects and significant visual effects, which in combination, result in a significant intra-project effect, albeit only during the construction phase. If the HDD option is selected at these crossing locations, the trenchless crossing compound would be located further away from these residential receptors and they would therefore not be within the 65dB daytime noise buffer. They would also be screened from views of the HDD trenchless crossing compounds. Therefore, intra-project effects in this scenario are considered to be not significant.
Residential Receptors (residents and residential properties)	Landscape and Visual: not significant to Major/ Moderate (Significant)	Trenchless crossing compounds would be sited in agricultural fields either side of the M56 motorway. The construction activity would result in up to a locally high magnitude of change and a Major/Moderate and Significant effect encompassing the pipeline corridor, construction compounds and adjacent landscape. There is one residential property south of the M56 which is situated within the 45dB nighttime noise buffer and therefore if the HDD option is selected, significant noise effects are anticipated. Intra-project effects at this location are therefore assessed as significant .
North Corridor	Noise: Moderate (Significant) Traffic and Transport: Moderate (Significant)	

Common receptors

Individual topic effects

Intra-project effect

There would be localised views of construction activity along the North Corridor, including trenchless construction compounds available from properties along Holly Hedge Lane, Runcorn Road and the south-west edge of Higher Walton, including from dwellings on Thomason's Bridge Lane. Where these available views overlap at residential properties also within the 65dB daytime noise buffer, there is a pathway for **significant** intra-project effects, such as those along Holly Hedge Lane.

Optionality in design is retained for the Draft ES with respect to the location of the Higher Walton HAGI and trenchless crossing method. Should the HDD trenchless crossing be selected, properties along Mill Lane within the 45dB nighttime noise buffer are anticipated to experience noise effects, however as this will only be at nighttime, there is no pathway for intra-project effects to occur with visual effects due to the implementation of appropriate measures secured via the Outline Lighting Strategy.

If the HDD trenchless crossing option is selected to cross the River Mersey and Sankey Canal, residential receptors in the south extent of Penketh are situated within the 45dB nighttime noise buffer and are therefore anticipated to experience significant noise effects. Views are also available in this area, along Tannery Lane, however as the noise effects will only be significant at nighttime, there is no pathway for intra-project effects to occur with visual effects due to the implementation of appropriate measures secured via the Outline Lighting Strategy.

Common receptors	Individual topic effects	Intra-project effect
		Optionality is retained to cross Fiddler's Ferry Golf Club (NP6 and NP7). NP6 is routed across the northern extent of Fiddler's Ferry Golf Club, adjacent to Tannery Lane, where there would be relatively open views to the south of the construction works associated with the pipeline and temporary trenchless crossing compound, to cross Widnes Road (RDX-04-00-00-013). There are approximately three residential receptors on the Widnes Road/Tannery Lane Junction in the 65dB daytime noise buffer, which may experience a significant intra-project effect, in combination with the visual impacts described above. Residents to the south of the Clock Face HAGI, along Jubits Lane are anticipated to experience significant noise effects during the construction phase, due to their proximity to the HAGI construction compound. These receptors and those to the north of the M62, along School Lane and Bell Lane are also within the 45dB nighttime buffer. There is a pathway for significant intra-project effects during the daytime for receptors along Jubits Lane, in combination with available views of the Clock Face HAGI.
Residential Receptors (residents and residential properties)	Landscape and Visual: not significant to Major/ Moderate (Significant)	The East Corridor is typically characterised by its rural setting, with areas open fields and more disparate areas of residential settlements, separated by hedgerows and tree lines. Areas with the potential for intra-project effects to occur are therefore limited.
East Corridor	Noise: Moderate (Significant)	Trenchless crossing compounds associated with RDX-03-00-00-023, RDX-03-00-00-024 and CLX-03-00-00-001, crossing the A56 and the Bridgewater Canal are in the vicinity of properties along Agden Lane

Common receptors	Individual topic effects	Intra-project effect
	Traffic and Transport; Minor (Not Significant)	south of Bridgewater Canal and Spring Lane, to the north of the Bridgewater Canal. Chapter 8: Landscape and Visual identifies visual effects in this area as Major/Moderate and Significant. There is only pathway for intra-project effects where available views of the trenchless crossing compounds overlap with 65dB noise buffer however, which is limited to one property on Spring Lane. The intra-project effect at this residential receptor is therefore significant, elsewhere it is not significant. Residential receptors within the vicinity of the Warburton HAGI, such as properties on Dunham Road and Carrgreen Lane, are anticipated to experience a significant intra-project effect during the construction phase. These properties would experience views of Warburton HAGI under construction and/or construction compound, as well as a materials storage area, in combination with noise effects up to 300m from the construction compound. Residential receptor in the eastern extent of Partington (Broadway) are anticipated to experience intra-project effects, due to their proximity to the Partington HAGI. Although these receptors are screened of views, they may still experience noise effects during the construction phase, in combination with Minor (Not Significant) Severance effects on the A6114 (highway link RE10), assessed in Chapter 11: Traffic and Transport. Intra-project effects are therefore assessed as significant.

Common receptors	Individual topic effects	Intra-project effect
Residential Receptors (residents and residential properties) South Corridor	Flood Risk: Moderate to Major (Significant) Landscape and Visual: not significant to Major/ Moderate (Significant) Noise: Moderate (Significant)	On the South Corridor noise effects may be experienced during the construction phase within the vicinity of trenchless crossing compounds associated with CLX-02-00-00-001, TRX-02-00-00-002 and RVX-02-00-00-001 crossing the Trent and Mersey Canal, a private track and River Weaver respectively (within the 45dB nighttime buffer and 65dB daytime buffer, where works occur for one month or more). These include residential receptors located in Dones Green, Bartington and Acton Bridge. Residential receptors along the east extent of Bartington and west extent of Acton Bridge may also experience visual effects, with views of trenchless crossing compounds. Optionality is retained in design for the Draft ES at CLX-02-00-00-001 (Trent and Mersey Canal). Option SP5 considers both HDD and microtunneling options and therefore associated trenchless crossing compounds. Residential receptors located in Bartington and the south extent of Dones Green fall within the 45dB nighttime buffer of the HDD construction compounds and are therefore anticipated to experience significant effects during the construction phase. There are two properties within the 65dB daytime buffer of the microtunneling trenchless crossing compound that are anticipated to experience significant noise effects. Views of SP5 from Bartington are assessed to be Moderate and Significant, to No Effect depending on the location of the specific receptor relative to the trenchless crossing compounds and the presence of intervening screening. Where visual effects are realised in these settlements, during periods of trenchless crossing activity, a significant intra-project effect is anticipated.

Common receptors

Individual topic effects

Intra-project effect

The HDD trenchless crossing compounds associated with the River Weaver (RVX-02-00-00-001) crossing are anticipated to result in significant noise effects to residential receptors within the 45dB nighttime buffer, which includes properties in Bartington, the north-west extent of Acton Bridge and along Acton Lane. Receptors in these locations are also anticipated to experience significant visual effects associated with views of the trenchless crossing compounds and are in the vicinity of the material storage area at Acton Bridge. The material storage area at Acton Bridge coincides with Flood Zone 2, associated with the River Weaver and is in an area where flooding has been recorded in the past. It is assessed as Moderate (Potentially Significant) to Major (Significant) in **Chapter 7: Water Environment**.

In the event of flooding at the Acton Bridge material storage area, during the HDD trenchless crossing of the River Weaver, a **significant** intra-project effect is anticipated for residential receptors along Acton Lane. However, where flooding does not occur, no intra-project effect is anticipated, as there are no residential receptors within the 65dB daytime buffer and there is no pathway for intra-project effects for residential receptors in Bartington, Acton Bridge and along Acton Lane, during nighttime operation, due to the implementation of the Outline Lighting Strategy.

Residential receptors adjacent to the Hartford BVI are situated within 300m of the BVI construction area. These receptors would also experience potential views towards the South Corridor and trenchless compound to the north of the A556, although views would be typically heavily restricted by mature tree cover along property curtilages and

Common receptors	Individual topic effects	Intra-project effect
		are assessed as Moderate and Significant to No Effect in Chapter 8: Landscape and Visual . Where visual effects are available, to residential receptors within 300m of the BVI construction area, a significant intra-project effect is anticipated.
Residential Receptors (residents and residential properties)	Flood Risk: Moderate to Major (Significant)	Residential receptors along Eastford Road are anticipated to experience a significant intra-project effect, as they are situated within the 45dB nighttime noise buffer and within the vicinity of the Morley Common material storage area. The material storage area at Morley Common coincides with Flood Zone 3, associated with the River Mersey and is in an area where flooding has been recorded in the past. It is assessed as Moderate (Potentially Significant) to Major (Significant) in Chapter 7: Water Environment .
Warrington Spur	Noise: Moderate (Significant)	

19.9 Assessment of In-Combination Climate Impacts

19.9.1 The In-combination Climate Change Impact (ICCI) assessment is presented in **Table 19.9**.

Table 19.9 In-combination climate change impacts assessment

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
Chapter 6: Historic Environment					
Buried remains of geoarchaeological interest, such as peat	Physical disturbance during the construction phase	A programme of archaeological recording as described in the OWSI (Appendix 6G)	Trend for drier summers and wetter winters to adversely affect the survival of buried deposits where the groundwater regime is a factor in archaeological preservation.	Deterioration of survival of buried deposits beyond the footprint of the Project	No - the existing mitigation measures would remain necessary and appropriate.
Chapter 8: Landscape and Visual					
Landscape elements, landscape character and visual amenity	Impact on new planting proposed at the HAGI and BVI sites and reinstatement planting within the Pipeline	Any new habitats created will be designed to ensure resilience to climate change.	Decrease in summer precipitation and/or increased frequency and intensity of	Drought conditions across the operational lifetime of the Project causing failure of	No. Changes are unpredictable and likely to occur over

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
	Corridors/compounds to reduce the potential effects upon landscape elements, landscape character and visual amenity.	This commitment is formalised in embedded environmental measure and is secured in the Outline Landscape and Ecology Management Plan.	heatwave events resulting in drought conditions.	the proposed planting at the HAGI and BVI sites impacting on visual amenity and landscape character	a long period of time allowing tree and shrub species time to adapt.
Landscape elements, landscape character and visual amenity	Impact on new planting proposed at the HAGI and BVI sites and reinstatement planting within the pipeline corridors/compounds to reduce the potential effects upon landscape elements, landscape character and visual amenity.	Any new habitats created will be designed to ensure resilience to climate change. This commitment is formalised in embedded environmental measure and is secured in the Outline Landscape and Ecology Management Plan.	Increase in frequency and intensity of storm events, which include high winds	Increase in storm conditions during the operational lifetime of the Project can cause failure of the proposed planting at the HAGI and BVI sites impacting on visual amenity and landscape character. Wind may result in loss of trees which could disrupt views	No. Changes are unpredictable and likely to occur over a long period of time allowing tree and shrub species time to adapt.

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
				towards the HAGI and BVI sites.	
Landscape elements, landscape character and visual amenity	Impact on new planting proposed at the HAGI sites and reinstatement planting within the pipeline corridors/ compounds to reduce the potential effects upon landscape elements, landscape character and visual amenity.	Any new habitats created will be designed to ensure resilience to climate change. This commitment is formalised in embedded environmental measure and is secured in the Outline Landscape and Ecology Management Plan.	Increase in warmer winters and winter precipitation	A longer growing season could result in greater screening/filtering effects of planting due to faster growth and extended period of leaf cover. Could lead to an increase in pests and diseases, leading to loss of vegetation and defoliation making species more susceptible to external stress.	No. Changes are unpredictable and likely to occur over a long period of time allowing tree and shrub species time to adapt.

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
Chapter 12: Ground Conditions					
Controlled Waters	Leaching of existing contamination to Controlled Waters receptors	Measures include ground investigation prior to construction to allow design of infrastructure and remediation, where required, to ensure land is suitable for use in line with Environment Agency guidance (LCRM).	Increase in winter precipitation resulting in flooding. Increase in frequency and intensity of rainfall events	Increased precipitation or flooding could lead to shallow ground level changes or increased infiltration, increasing leaching of contamination or the mobility of contamination resulting in pollution of controlled waters.	No. The existing measures to manage land contamination risks include remediation, where required, to ensure land is suitable for use in line with LCRM. The controlled waters risk assessment process in LCRM includes allowance for climate change. Accordingly, ensuring land is suitable for use already includes allowance to do so with embedded mitigation of the identified climate change trends.

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
Chapter 13: Agriculture and soil resources					
Agricultural land – ALC Grades 1 – 5 (including Subgrades 3a and 3b*) Soil resources, including peat	Heating of subsurface soil/peat due to gas temperature in pipeline from Hydrogen Production Plant at Stanlow Refinery through Frodsham, Ince and Helsby Marshes (West Corridor) during operation	The hydrogen pipeline will be completely buried other than where it comes above ground at HAGIs and BVI sites. This means that the original topsoil and some or all the subsoil can be replaced on top of the pipeline and the topsoil returned to its original state. Design work undertaken prior to the Draft ES has confirmed that the normal operating temperature of the hydrogen pipeline will be between 1°C and 35°C. The risk	Increased frequency and intensity of heatwave events. Decrease in summer precipitation. Potential for increased frequency of wildfires.	The potential for soil/peat heating effects due to the temperature of gas in the operational pipeline in combination with soil heating/ drying out caused by climate change has been considered. Due to the depth of burial of the pipeline/ the reinstatement of pre-existing topsoil and some or all the subsoil above the pipeline, and the maximum gas temperature in the pipe being 35°C, there should be no	No additional mitigation measures are required.

Receptor	Effect	Existing mitigation / embedded measures	Climate change trend	Potential ICCI	Are additional measures required?
		of peat self-ignition has therefore been reduced to an acceptable level through design.		significant in-combination impacts associated with heating/ drying out of the near surface soils (with possible lowering of the groundwater level) due to climate change and heating of soils/ peat in the subsurface due to operation of the pipeline.	

19.10 Significance Conclusions

- 19.10.1 The assessment of intra-project effects has considered whether any of the individual environmental topic effects resulting from the Project could combine to create effects that are significant, on common receptors between technical topics. The assessment focused on those receptors where significant effects have been predicted in respect of at least two or more topics and/or where the technical assessments have shown that potential individual effects exceed 'negligible'.
- 19.10.2 It is concluded at this stage that there are specific residential receptors that are anticipated to experience significant intra-project effects during the construction phase of the Project. Additional mitigation measures will be explored where necessary at the Final ES stage when all relevant technical topic assessment have been completed.

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