Note / Memo

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Water & Maritime

To:	Lindsey Stuart (East Lindsey District Council)
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Subject: **Viking CCS Pipeline Environmental Impact Assessment Report Review**

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1 Introduction

Royal HaskoningDHV has been commissioned by East Lindsey District Council (ELDC) to review selected elements of the Environmental Statement (ES) on their behalf pertaining to the Development Consent Order (DCO) application for the Viking CCS Pipeline project by Chrysaor Production (UK) Limited.

The purpose of the assessment is to support ELDS's statutory remit in relation to DCO applications by reviewing selected technical ES chapters and supporting documents to:

- confirm the adequacy (or otherwise) of the documents in relation to
  - baseline characterisation (including receptor identification and spatial extent of the study area);
  - the impact assessment methods employed (including compliance with best practice guidance);
  - the potential impacts assessed; and
  - the approach to identifying likely significant effects.
- the presentation of information is clear and in line with expectations for a DCO submission and the project;
- determine whether the technical assessments are considered to be adequate to support the DCO application and if there are key risks in approach or final determination of likely significant effects.

This Technical Note sets out the results of the initial review of the documentation, as identified in Appendix A.

The review of the ES chapters, and associated appendices, has been conducted as a desk based exercise and did not include site assessment or consultation with third parties. The key points from the reviews of each technical topic are presented below.

1.1 Chapter 6 Ecology and Biology

A review of Chapter 6 Ecology and Biology has identified the following key points:

- Updates to the National Policy Statement (NPS) for Energy (EN-1) and NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) were published in November 2023. The

policy section of the chapter should be updated to give consideration of the revised NPS and make reference to Biodiversity Net Gain (BNG).

- The baseline habitat surveys were undertaken using Joint Nature Conservation Committee (JNCC) Phase 1 handbook. This method has been superseded by UKHab as the preferred method of habitat characterisation. For the purposes of the BNG Assessment the Phase 1 habitat codes were converted to UKHab, this is satisfactory. However, there are issues with the accuracy of this interpretation with regard to BNG. The Initial BNG Assessment (Appendix 6.7.1) has incorrectly accounted for the area of open mosaic habitat at the Immingham facility, which is located outside the jurisdiction of East Lindsey District Council, as urban bare ground. This substantially undervalues this habitat. The metric should be updated to show this habitat as open mosaic on previously developed land to correctly account for true the baseline value.
- Reptile surveys were undertaken in 2021, these are now considered to be out of date and should be updated. A justification as to why reptile surveys were scoped out for the southern end of the pipeline needs to be provided. Bat and riparian mammal surveys are ongoing, as such the adequacy of results of the survey will be required once the surveys are completed.
- In order to quantify the baseline value of all habitats present within the order limits a biodiversity metric should be used. It is recommended that the Defra Statutory Metric should be used or extending the use of Metric 4.0 to include the route of the pipeline.
- It is currently unclear as to which areas of habitat will be affected during the construction and operational phases of the project. This needs to be quantified and assessed for the whole of the pipeline route. It is also currently unclear if there will be any temporary or permanent losses of the coastal habitats east of the Theddlethorpe Facility which is located within the East Lindsey District Council area.
- BNG should be discussed in greater detail within the chapter, reference should also be made to the Initial Biodiversity Net Gain Assessment (Document reference: 6.7.1). The BNG assessment of the Immingham facility (located outside the jurisdiction of East Lindsey District Council) is incorrect and substantially undervalues the habitats present. The chapter notes that this area comprises open mosaic habitats on previously developed land. This is demonstrated by the floral composition of the area. However, the Initial BNG Assessment identifies this habitat as ‘urban bare ground’, a low value habitat. The metric and BNG assessment / strategy requires updating to correctly account for this habitat type and its biodiversity value. Mitigation proposals will likely require revising once this error has been addressed. The revised strategy will need to ensure trading rules for this habitat are satisfied in order to achieve the 10% BNG commitment. A bespoke approach may be required.
- Measures should be committed to at the Front End Engineering Design (FEED) stage to deliver 10% BNG for habitat which cannot be restored to their original habitat type and condition within 2 years (most habitat excluding cropland, subject to soil reinstatement within 1 – 2 years) along the pipeline route.
- Where onsite mitigation cannot be delivered to compensate for the effects of habitat losses and disturbance, off-site opportunities should be explored. This should account for the spatial and temporary effects of the Project upon habitats and their biodiversity. Where impacts to non-agricultural habitats are anticipated along the pipeline route, full habitat restoration cannot be delivered within two years, and therefore, losses cannot be classified as ‘temporary’. These impacts should be subject to BNG requirements. Compulsory purchase rights are unlikely to be required to deliver a 10% BNG for these habitats, given the national and possibly local availability of biodiversity units from private off-site providers, such as the Environment Bank.
- Further information should be requested regarding:
    - what justification is there for not avoiding potential for impacts upon lamprey, chalk streams and associated designations located within the jurisdiction of East Lindsey

District Council through the use of HDD or other trenchless techniques at all connected watercourses?;
- what will the time lag be between completion of works and replacement planting being installed? Provision of dead-hedging currently indicates an undetermined period; and
- detail regarding the aftercare period. Aftercare should be long term (e.g. 30 years) and ensure that there are suitable measures in place to legally and financially secure it for the duration.

The ES contains Chapter 6 on Ecology and Biodiversity and a Shadow Habitat Regulations Assessment to inform Appropriate Assessment has also been prepared. The Chapter requires updating to address a number of comments, in particular, the assessment and mitigation measures relating to effects upon habitats from the Project. The Shadow Habitat Regulations Assessment provides the required information, however there are comments which may require addressing with regard to the mitigation measures recommended for lamprey, chalk streams and associated designations.

1.2 Chapter 7 Landscape and Visual

A review of Chapter 7 Landscape and Visual has identified the following key points:

- The methodology is based upon the relevant legislation and policy, noting that there have been updates the National Planning Policy framework (NPPF) following the publication of the chapter. The assessment also adopts current best practice guidance (primarily Guidelines for Landscape and Visual Impact Assessment (LVIA), Third Edition), further guided by supporting documents that are also considered relevant.
- The methodology adopted as part of the impact assessment is considered to be clearly set out. The criteria used as part of the assessment is transparent in nature. The parameters are defined for 'value' and 'susceptibility' and subsequent identification of receptor sensitivity.
- The study area for the landscape and visual assessment is considered appropriate and in proportion to the scale and nature of the proposed development. The study area is sufficiently extensive, partly determined by zone of theoretical visibility (ZTV) mapping (best practice). The baseline environment and subsequent assessment includes representative viewpoints across a full range of receptor types and sensitivities, geographically well-spaced along the development corridor.
- The impact assessment appropriately identifies the magnitude of changes arising from the development, the degree / nature of effects, and the approach to judging the significance of those effects. The assessment identifies that there will be no significant residual effects on landscape receptors as a result of the construction and operation of the proposed development. With regards to potential visual effects, there is the potential for a significant residual effect at one location within the boundary of East Lindsey District Council during construction, this is reduced to not significant during the operational stage. All other visual effects within the boundary of East Lindsey District Council are considered not to be significant. The assessment provides sufficient objective detail and assessment of effects at construction, operation, decommissioning stages.
- The chapter outlines the embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents.
- Presentation of the assessment and findings:
  - The LVIA appears to be appropriately objectivate and applies professional judgement as required.
  - Landscape and visual effects, including cumulative effects are described.

- Supporting tables, graphics and visualisations are effective in supporting the report text.
- Photomontage visualisations are prepared in accordance with relevant guidance and are helpful in conveying effects identified.
- Clear and concise summation of the effects of the development is provided.

No technical errors have been identified that would lead to significant challenge of ES Chapter 7: Landscape and Visual. Given that the LVIA / process incorporates a degree of 'subjective' professional judgement, there is inherently potential challenge of the assessed magnitude and significance of effect. That said the LVIA chapter is transparent, coherent and adopts a robust methodology. The ES LVIA chapter therefore is considered adequate for the Examination Authority to assess the landscape and visual issues within East Lindsay District.

1.3 Chapter 9 Geology and Hydrogeology

A review of Chapter 9 Geology and Hydrogeology has identified the following key points:

- The methodology is based upon current legislation, policy and guidance. Although the NPPF, NPS for Energy (EN-1) and NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) have been updated since the ES was issued. However, the changes to the policy documents are not deemed to substantially affect the assessment contained within Chapter 9.
- Updates have also been made to the Land Contamination Risk Management (LCRM) since the author of the chapter accessed the web page. As with the updated policy documents, the changes to the LCRM are not deemed to substantially affect the assessment contained within the chapter.
- The baseline environment has been informed by a range of appropriate data sources, both publicly available and purchased datasets. These include a Groundsure report, Google maps and aerial imagery, MAGiC maps, BGS data, Zetica UXO maps, Coal Authority and UK Radon websites. The baseline is also based on two walkover surveys. Information in relation to groundwater abstraction data has been obtained from the Environment Agency, North East Lincolnshire Council, East Linsey District Council and West Lindsey District Council. The baseline assessment is supported by the information contained within Appendices 9-1 and 9-2. This approach is considered to be appropriate.
- The impact assessment methodology is based upon relevant and current best practice. The methodology is considered to be appropriate with well-defined terminology and criteria provided for the magnitude of impact and sensitivity of receptors.
- The route of the proposed pipeline has been spilt into sections within the chapter. The description of the baseline environment for each section is discussed in turn so as to assist the reader with identifying which features are associated with each section of the pipeline. The baseline environment section is laid out in a clear and methodical manner.
- The impact assessment considered the potential impacts on human health, geology and hydrogeology receptors during the construction phase. Identified receptors that may be impacted during the operational phase include geology, hydrogeology and development infrastructure. The potential impacts to the identified receptors are clearly and robustly assessed during the construction and operational phase.
- Decommissioning impacts are considered to be similar in nature to those of construction. The potential for the decommissioned pipeline to act as a preferential pathway has not been identified or discussed. A cross reference to Chapter 3 Description of the Proposed Development, specifically section 3.15 should be added as this provides details of the potential decommissioning activities including details of capping of the pipeline.

- The chapter outlines the embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents. With these measures in place, the residual effect on receptors is considered to be not significant for those receptors present within the East Lindsey District Council area.
- The chapter is supported by Appendix 9-1 Geology Summary Tables, Appendix 9-2 The Coal Authority – Coal Mining Report, Appendix 9-3 Hydrogeological Risk Assessment and Appendix 9-4 Conceptual Site Model.
- The assessment contained within Appendix 9-3 references the Environment Agency publications 'The Environment Agency's Approach to Groundwater Protection' and 'Drinking Water Safeguard Zones (Groundwater)'. This is considered to be an appropriate approach. The hydrogeological risk assessment appears to include the sections you would expect from this type of assessment. The assessment is well laid out and goes through each of the sections of pipeline that interact with SPZs in turn. The approach used for describing each section of the pipeline is consistent with the relevant mitigation measures described. The preliminary assessment is considered appropriate.

Overall Chapter 9 Geology and Hydrogeology has adopted a coherent and robust approach to the assessment of the potential impacts associated with the construction and operation of the Viking CCS pipeline. However, additional detail is needed with regards to the decommissioning of the pipeline to demonstrate that it would not create a preferential pathway for the migration of contaminants. A detailed hydrogeological risk assessment will also be required prior to the commencement of construction works.

1.4 Chapter 10 Agriculture and Soils

A review of Chapter 10 Agriculture and Soils has identified the following key points:

- The methodology is based upon current legislation, policy and guidance. Although the NPPF, NPS for Energy (EN-1) and NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) have been updated since the ES was issued, the changes to the policy documents are not deemed to substantially affect the assessment contained within Chapter 10.
- The baseline environment has been informed by a range of appropriate data sources, both publicly available and purchased datasets. A conservative approach has been adopted with regards to subdividing Grade 3 agricultural land into Grades 3a (considered Best and Most Versatile (BMV)) and 3b (non-BMV) based on the likelihood of BMV land being present. This approach was supported by the review of aerial imagery. In their Scoping Opinion, Natural England commented that it may be necessary for an Agricultural Land Classification survey to be undertaken to confirm potential impacts on BMV agricultural land. A commitment has been made for targeted detailed post-consent surveys to be undertaken with the results of the survey incorporated into a Soil Management Plan. This approach is considered appropriate .
- Operational impacts relating to a loss of agricultural land and loss of soil functions / volumes and soil related features were scoped out of the assessment following agreement with the Planning Inspectorate during the Scoping stage of the project.
- The impact assessment methodology is based upon relevant and current best practice. The methodology is considered to be comprehensive with well-defined terminology and criteria provided for the magnitude of impact and sensitivity of receptors.
- The route of the proposed pipeline has been split into sections within the chapter. The description of the baseline environment for each section is laid out in a clear and methodical manner. Although not assessed within the chapter, the areas where there would be a permanent loss of agricultural land are identified and discussed ahead of the impact assessment section.

- The impact assessment considered the potential impacts on agricultural land and soil resources. The potential impacts to the identified receptors are clearly and robustly assessed during the construction phase. It is noted that potential impacts associated with the decommissioning of the pipeline would be similar in nature to those during construction, as such a separate assessment has not been included within the chapter.
- The chapter outlines the embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents. With these measures in place, the residual effect on receptors is considered to be not significant. The exception to this is an area of Grade 2 BMV land (0.2ha) associated with the Theddlethorpe facility which will be located within the East Lindsey District Council area that would be permanently lost as a result of the pipeline, this represent a moderate adverse residual effect that cannot be further mitigated against. This is considered to be a fair interpretation of this anticipated result.
- Both Appendix 10-1 Outline Soil Management Plan and Appendix 10-2 Public Rights of Way Management Plan complement Chapter 10. The appendices are clear and considered to include an appropriate level of detail for this stage of the DCO application.

No technical errors have been identified that would lead to the challenge of ES Chapter 10 Agriculture and Soils. The chapter, and its associated appendices, are transparent, coherent and adopts a robust methodology. The chapter is therefore considered adequate for the Examination Authority to assess the agriculture and soil impacts associated with the construction, operation and decommissioning of the Viking CCS pipeline.

1.5 Chapter 11 Water Environment

A review of Chapter 10 Water Environment has identified the following key points:

- Updates to the NPS for Energy (EN-1) and NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) were published in November 2023. Table 11-1 should be updated to ensure that all references to EN-1 and EN-4 reflect the latest guidance, with changes made as appropriate in the subsequent assessment. References to the Water Framework Directive (WFD) within the chapter should be updated with reference to the Water Environment Regulations 2017.
- The baseline assessment has been informed by analysis of standard freely available flood risk datasets including MAGiC and the Environment Agency's Catchment Data Explorer. The baseline is also based on two walkover surveys that are reported in Appendix 11-2. The Environment Agency's Ecology & Fish Data Explorer and Water Quality Archive (Open WIMS) should also be reviewed to identify whether there is any relevant information. Some of this information appears to have been used in Appendix 11-1, however it is not mentioned in Chapter 11.
- Further details are required within the flood risk column of the 'Importance (and Sensitivity) Criteria' table to explain the flood risk definitions used e.g. 'more vulnerable', 'less vulnerable'. It is currently not clear as to whether these are based on the definitions included within Annex 3 of NPPF (Department for Levelling Up, Housing and Communities, 2021) for example: 'Highly Vulnerable Land Use' and 'Land with more than 100 residential properties' (after Standards for Highways, 2020).
- With regards to Table 11-10 'WFD Study Waterbody Status within study area of the DCO Site Boundary (Cycle 3)', updates are required in order to show the latest 2022 status updates for Cycle 3 as the table currently contains data from 2019.

- Surface water receptors are listed within Paragraph 11.5.16, however it would be clearer if the key list of water receptors were grouped by water body catchment and stated whether they are main river, ordinary watercourse and whether they are an Internal Drainage Board (IDB) drain.
- The potential impacts associated with the construction and operation of the pipeline are adequately assessed and are clearly explained. The section starting paragraph 11.7.31 only discusses the impacts for the adoption of trenchless techniques (e.g. Horizontal Directional Drilling (HDD), Auger bore and micro-tunnelling) only discusses surface water. Deeper drilling down to 20 m as described in the text will probably encounter groundwater. This is of particular importance at the HDD crossings of the chalk streams described in the assessment. Details of potential impacts on groundwater receptors needs adding, or a summary provided within Chapter 11 with a cross reference to Chapter 9: Geology and Hydrogeology.
- The chapter outlines embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents. With these measures in place, the residual effect on receptors is considered to be not significant.
- The chapter is supported by Appendix 11-1 Water Environment Supporting Baseline Info, Appendix 11-2 Site Visit Technical Note – Water, Appendix 11-3 Drainage Strategy, Appendix 11-4 WFD Assessment, Appendix 11-5 Flood Risk Assessment, Appendix 11-6 Outline Surface Water Management Plan.
- With regards to Appendix 11-4, it is difficult to separate construction impacts from operational impacts as they seem to have been covered together. Better signposting is needed in the assessment for the different phases, for example the justification columns of Table 2 and Table 3 only seem to cover construction impacts. Similarly it is not clear that Section 5 addresses operational impacts.
- With regards to Appendix 11-5:
  - Climate change allowances set out in Section 4.2 appear to be correct. However, there is limited information in this section on the tidal allowance that has been used and how it has been calculated for the year 2115. It is understood that this is based on the 2010 modelling study referenced within the FRA. It is noted that, whilst the use of the epoch up to 2115 may be reasonable, there have been a number of updates to guidance on sea level rise since the 2010 modelling and therefore this approach may no longer be a conservative assessment.
  - Within the remainder of the FRA when discussing coastal / tidal flooding it is difficult to follow which climate change allowances have been considered for the coastal / tidal flood risk to the above ground infrastructure as multiple variations are presented. However, the FRA conclusions indicate there could be 3.25m of flood water at the Immingham Facility (located outside the jurisdiction of East Lindsey District Council) and 2.06m at the Theddlethorpe Facility (located within the jurisdiction of East Lindsey District Council). The FRA indicates that mitigation measures are needed to ensure their resilience to flooding but it does not contain detailed information as to how this significant risk will be mitigated. This does not appear to accord with the conclusion that the FRA has demonstrated, in accordance with the requirements of the Exception Test, that the infrastructure will be safe for the duration of its lifetime.
  - The FRA follows the guidance set out in the PPG on Sequential and Exception Tests and summarises the Sequential Test and Exception Test. However, the FRA does not provide clarification as to why the Project requires location within Flood Zone 2 or Flood Zone 3 or why it is necessary to apply the Exception Test. This is of relevance as above ground infrastructure (e.g. the Theddlethorpe Facility) is noted as being within Flood Zone 3. The FRA indicates that this justification is provided in ES Volume II Chapter 2 (Application Document 6.2.2) but does not

directly provide any information within the FRA on the consideration of the Sequential Test, merely summarising in Paragraph 3.3.10 that it is considered that the Sequential Test is passed.

- The conclusions appear to be based on technical evidence using modelling information provided by the Environment Agency. There remains some uncertainty over the future risk and the modelling information / conclusions utilised.
- No major issues have been identified at this stage, however, the following points should be considered in more detail and post-application questions/commentary could be provided to the DCO examination:
  - As there is a significant risk of coastal / tidal flooding to the project, the need to consider emergency planning matters is of key importance. Whilst the FRA mentioned the need for a Flood Warning and Evacuation Plans, there is no detail on what this would entail, including time to onset and depth of flooding related to evacuation.
  - Linked to the above there is no consideration of the differences in flood risk during the construction phase vs the operational phase. As such, there appears to be no cross reference to the Code of Construction Practice (CoCP) in the FRA – as a document / mechanism for setting out the measures to be included during the construction phase.
  - The FRA assesses the impact of flooding during the construction and operational phases of the development. However, there is no discussion on the decommissioning phase and reinstatement of land / drainage following completion of the project to ensure there is no long-term impact on flood risk.

The assessment includes consideration of impacts to surface water quality, water resources, hydromorphology, flood risk and drainage during construction, operation and decommissioning. Impacts and effects are clearly explained and assessed. Embedded and additional mitigation is comprehensive, and it is clear how the mitigation will be secured. In the assessment, clearer links are needed to relevant impacts from Chapter 9, which assesses groundwater features. Overall, residual effects for the proposed development on the Water Environment are minor adverse to negligible and therefore not considered to be significant. It is considered the ES contains adequate information for the Examination Authority to assess the impact of the proposal on water environment issues.

A Water Environment Regulations (WFD) assessment is considered in Appendix 11.4, and an FRA assessment in Appendix 11.5. Appendix 11.4 requires further detail to make clear that operational impacts have been properly assessed. At the moment this is not clear.

1.6 Chapter 13 Noise and Vibration

A review of Chapter 13 Noise and Vibration has identified the following key points:

- The assessment has been undertaken in line with the relevant policy, legislation and guidance.
- The baseline survey consisted of a combination of long-term unattended measurements, to inform assessments of operational noise, and short-term attended daytime measurements to inform assessments of noise from construction works. The long-term measurements are considered sufficient, however, it is considered that one hour of baseline measurements is not sufficient to confidently capture baseline sound levels. The project has committed to undertaking additional pre-construction noise monitoring within the Construction Environmental Management Plan (CEMP). These surveys should be sufficient to capture an adequate baseline.
- in relation to construction noise:

- The assessment does not provide sufficient justification for the adopted Lowest Observed Adverse Effect Level (LOAEL) (65 dB(A)) and SOAEL (75 dB(A)) values for the construction noise impact assessment. Alternative and lower (i.e. more onerous) criteria are included in the DMRB (daytime SOAEL of 65 dB(A)), BS 5228-1 (e.g. ABC method – threshold for potentially significant effect at dwellings is 65 dB(A) where baseline sound levels are low) and the Department of Environment advisory leaflet AL72 'Noise control on building sites' (quoted in BS5228-1 – 70 dB(A) in rural, suburban and urban areas), justification for not adopting these values should be provided.
- The vast majority of the area proposed for the construction works is rural and baseline sound levels are therefore low. At the receptors represented by NM10, measured daytime baseline sound levels are very low (40 dB(A)). A LOAEL of 65 dB(A) at these locations implies that a construction noise level resulting in a change in daytime noise level of up to 15 dB would not constitute an "observed adverse effect". Similarly, at these receptors, a SOAEL of 75 dB(A) implies a construction noise level resulting in a change in daytime noise level of up to 25 dB would not constitute a significant observed adverse effect. In accordance with other guidance, such large noise level changes could be considered to meet the description for a significant observed adverse effect identified in the Planning Practice Guidance on Noise, depending on other factors such as the duration of the periods of high noise levels, which are not identified in the assessment.
- The assessment methodology also does not state whether the identified LOAEL and SOAEL values are in the free-field or include a facade reflection. Where calculating construction noise levels to assess impacts on indoor receptors (such as residential dwellings), BS 5228-1 requires that a facade correction is included. Appendix 13.2 does not state whether a facade correction has been included in the calculations. The calculations have been reviewed and this appears to show that the distances from the works described in Table 12, App 13.2, are to the free-field level, which is considered to be incorrect. If this is indeed an error, the results of the construction noise assessment will require revision.
- Appendix 13.2 describes the construction noise level calculations and states that the ground was assumed to be acoustically "soft" i.e. absorptive. This is likely to be true for the majority of the study area, but there may be locations where the ground is acoustically hard and noise levels will be higher than calculated. Best practice would be to use the actual ground absorption characteristics at the location, or a reasonable worst-case. It is considered that the construction noise level calculations should be revised accordingly.
- Paragraph 13.4.27 states "In terms of sound insulation or temporary rehousing due to construction noise, BS 5228-1 states that a property would be eligible if exposed to significant levels of noise "for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months". Consequently, these durations will be considered should a significant effect be identified." The construction noise assessment identifies significant effects, due to high construction noise levels at receptors; however, it does not provide an indication of the likely duration of these noise impacts, other than by making cross-reference to the indicative programme in ES Volume II Chapter 3: Description of the Proposed Development, which identifies the total duration of activities but these are not directly linked to the likely duration of high noise levels, which will depend on the activity location. It is considered that further information on the likely duration of the predicted effects is necessary to make an appropriate judgement of their potential significance.
- The assessment methodology does not provide predicted construction noise levels at receptors, rather, it identifies the distance at which the adopted LOAEL and SOAEL is predicted to occur. Whilst this is an acceptable approach in the scenario that there are no receptors identified to experience significant effects, the absence of predictions means that the required attenuation by mitigation is not known. This is considered a significant flaw in the assessment methodology, as

discussed in the review of the mitigation proposals, it cannot be known whether these are sufficient to mitigate residual effects to not significant.

- The assessment of construction compound noise focusses solely on the compound setup, as noise emissions will be the highest during this phase. Where heavy plant are required (e.g. earth moving equipment, chainsaws, rollers etc) to setup the compound, it is accepted that setup noise emissions will be higher than during compound usage. It is also accepted that the Northern and Central compounds (located outside the jurisdiction of East Lindsey District Council) are sufficiently far from receptors that daytime impacts will not be significant. Paragraph 13.7.54 identifies the Southern compound (located within the jurisdiction of East Lindsey District Council) as 45m from R3, and concludes that "As the site is already located on hardstanding ground, there would be minimal use of heavy vehicles... noise emissions would be from vehicle movements and minor site set-up activities, which are not expected to generate high levels of noise. As such, no significant effects are anticipated." It is accepted that compound setup noise will be minimal; however, this does not assess potential noise effects from the use of the construction compound. Depending on the activities which will be undertaken when the compound is used, the timings of those activities and the overall length of time it will be used for, noise effects at nearby receptors could be significant. The assessment should be revised to include noise from the use of the Southern construction compound, or else provide further evidence as to why an assessment is not required. Clarification is also required on whether the compounds will be used at night. If this is the case, it is considered that night-time noise from the Northern Compound should also be assessed as the associated effects could be significant.
- Paragraph 13.4.7 of the assessment (which is in the construction assessment section) presents an assessment of maintenance venting impacts; this is understood to refer to maintenance of the operational pipeline and this section should therefore be moved to the operational assessment section. This paragraph states that "The venting of CO2 will be undertaken at a rate whereby the noise at the nearest Noise Sensitive Receptor will be no greater than 10 db above daytime background levels, which are 38 dB at Theddlethorpe. These levels will be back calculated to the perimeter of the facility and monitored as such. It is therefore confirmed that venting noise would be Not Significant." The operational noise assessment methodology should be updated to describe the method used for assessment of effects during maintenance. It should be clarified what noise level parameters the "noise at the nearest Noise Sensitive Receptor" is referring to. Further details should also be provided on the monitoring and calculation procedures that will be used to demonstrate compliance with the proposed limit and a demonstration that the proposed limit can be met, including any mitigation that may be required.
- The outcome of the construction noise impact assessment is considered inadequate in that it identifies potentially significant effects at receptors (exceedances of the SOAEL) due to pipeline construction and pipeline crossing noise impacts along the majority of the route. As the assessment does not identify predicted construction noise levels at receptors, the required attenuation from mitigation measures is not known and, contrary to the claim made in the chapter, it is not apparent that the proposed mitigation measures are sufficient to avoid significant residual effects.
- Paragraph 13.7.84 explains that, on those road links where traffic flows are outside the validated range of the Calculation of Road Traffic Noise (CRTN), impacts have been assessed qualitatively. Para 13.7.85 states "The maximum number of average hourly vehicle movements along a low traffic flow road is six movements per hour... Consequently, construction traffic noise effects on low flow roads are considered to be, at worst, Minor Adverse and not significant." An example of a link with low baseline traffic flows is "Thoroughfare", the total traffic introduced by construction (Table 2 in Appendix 15.3) is 148 per day (an increase of more than 50% on the baseline), with 57 HGVs (number per day almost tripling from the baseline). Over the 12-hour construction period,

this equates to an additional 12 vehicles per hour, of which five are HGVs, this contradicts the value of 6 stated in the chapter. This discrepancy should be rectified or justified. It is considered that the qualitative assessment presented does not provide sufficient evidence that these effects will be not significant and further quantitative evidence is required to assess these effects.

- In relation to operational noise
  - Paragraph 13.4.36 identifies the LOAEL for the operational noise assessment as 35 dB Laeq,T during the daytime, and 13.4.37 identifies a LOAEL of 30 dB Laeq,T and SOAEL of 40 dB Lar,Tr at night. The quoted LOAELs contradict the values in Table 13-15, which uses the rating level (Lar,Tr) parameter. This inconsistency should be rectified, and any amendments required must be made to the operational noise assessment.
- In relation to non-residential receptors:
  - Paragraph 13.4.39 states “The only identified non-residential receptors that are sensitive to noise is a hotel and a caravan site that contains mobile homes.” Table 13-16 identifies sensitive receptors included in the assessment, this includes the following non-residential receptors located within the jurisdiction of East Lindsey District Council which are omitted from 13.4.39: night-fishing (R29a) and a caravan site (R46). It is therefore apparent that the statement in paragraph 13.4.39 is incorrect. The methodology for the assessment of impacts on non-residential receptors requires revision to demonstrate how impacts on these additional receptors have been assessed. The document referenced in Paras 13.4.40 and 13.4.41, to identify noise level criteria for mobile homes, includes calculations of the acoustic performance of a caravan, which is significantly worse than a mobile home.
- Mitigation measures I6, I22 and I25 provide for screening around the construction compounds, HDD and hydrostatic pump test site; however, none of the proposed mitigation measures include screening from other construction activities. In the discussion on residual effects, paragraph 13.9.3 states “Wherever practicable, during construction acoustic fencing will be used to minimise the effect of noise on residents of sensitive receptors. However, there may still be periods of high noise generating activities that cannot be screened effectively.” This is considered to contradict the mitigation described in Section 13.8 which only includes screening to the HDD hydrostatic testing. Clarification should be provided on whether screening is proposed for the other works.
- The assessment of construction noise identifies exceedances of the LOAEL and potentially significant effects at receptors (exceedances of the SOAEL) due to pipeline construction and pipeline crossing noise impacts along the majority of the route. As the assessment does not identify predicted construction noise levels at receptors, and the effect of mitigation measures has not been predicted, it is not apparent that the proposed mitigation measures will avoid significant residual effects.
- Paragraph 13.9.7 states “The additional mitigation measures listed in Section 13.9 above are considered to represent all reasonable measures to reduce noise as far as reasonably practicable. Consequently, giving appropriate implementation of mitigation measures, there are anticipated to be no significant residual effects due to construction activities.” It is not agreed that all reasonable measures have been implemented. For example, currently, it is understood that screening is only proposed around the construction compounds, HDD and hydrostatic pump test site, alternative construction programmes could be adopted which reduce the items of plant required, and a scheme of noise insulation/temporary rehousing could be offered in case required. In addition, whilst implementation of all reasonable measures (i.e. Best Practicable Means) demonstrates compliance with the requirements of the Control of Pollution Act 1974, it is not agreed that demonstrating compliance with this piece of legislation shows that residual effects are not significant. To analyse the significance of residual effects, the applicant must use the assessment methodology set out in the ES Chapter.

There are a number of inadequacies within the Noise and Vibration chapter, these include the following:

- Inadequate justification of construction noise assessment criteria, disregarding low baseline sound levels in rural areas.
- Construction noise assessment criteria require clarification.
- Construction noise predictions have not considered potential worst-case and appear to disregard facade reflections.
- In determining whether construction noise effects are potentially significant, it would be helpful to provide information on the duration of potential impacts.
- The construction noise assessment identifies potentially significant effects but the required attenuation is not known; hence, it cannot be known whether the proposed mitigation measures are sufficient to mitigate the effects to a non-significant level.
- The noise level parameter used in the operational noise assessment methodology section is inconsistent. Any changes to this parameter may require the assessment to be revised.
- The assessment method for impacts on non-residential receptors requires revision to include criteria for omitted receptor types.
- Potential noise effects from the use of the Southern construction compound require assessment, along with whether the compounds will be used at night. Night-time noise from the Northern Compound (if present) should also be assessed.
- The assessment of maintenance venting impacts should be moved to the operational assessment section.
- The operational noise assessment methodology should be updated to describe the method and noise level parameters used for assessment of effects during maintenance.
- Further details are needed on the monitoring and calculation procedures, along with any required mitigation, to ensure that residual effects from maintenance venting noise will be not significant.
- The discrepancy between Appendix 15.3 and the Chapter in terms of the additional construction traffic to be introduced requires rectification.
- Further quantitative evidence is required to assess the effects of construction road traffic noise on roads with low traffic flows.
- It is not clear which of the construction works will be included in a section 61 consent application.
- The distance to the night-time SOAEL from HDD works is inconsistent between the assessment and mitigation sections.
- The discussion of screening in the residual effects contradicts that proposed in the mitigation section.
- It is not agreed that all reasonable measures have been implemented to control construction noise impacts.
- The construction noise impact assessment methodology set out in the ES Chapter has not been used to analyse the significance of residual effects.

1.7 “”Chapter 14 Air Quality

A review of Chapter 14 Air Quality has identified the following key points:

- The chapter outlines the relevant legislation, planning policy, and technical guidance that are relevant to the air quality assessment. A summary of relevant legislation, such as the Environment Act 1995, and relevant regulations, such as The Air Quality Standards Regulations 2010, have been provided in Table 14-1.
- In addition, Table 14-2 provides the Air Quality Standards (AQS) and Air Quality Objectives (AQO) that are relevant to the assessment. The relevant Air Quality Objectives are outlined in planning policy, such as the National Policy Statement for Energy (EN-1), which requires that proposals should be supported by evidence that demonstrates that "Adverse impact upon air quality from odour, fumes, smoke, dust and other sources" has been considered in relation to both the construction and life of the development. Overall, it is evident that the policy and guidance related to the air quality assessment have been adequately addressed as part of the Viking CCS pipeline EIA, and the relevant legislation, planning policy, and technical guidance have been appropriately cited.
- Section 14.2.5: The Defra Local Air Quality Management (LAQM) Technical Guidance LAQM.TG16 is referenced in the assessment. However, it's worth noting that LAQM.TG22 was available a year prior to the assessment. The assessment references the IAQM Guidance on the Assessment of Dust from Demolition and Construction: 2016. However, in August 2023, an updated version of the guidance, IAQM 2023 V1.1, was released with an additional update released in January 2024. While this choice of guidance does not impact the assessment outcome, it is advisable to consider the latest available guidance documents for robust and up-to-date practice.
- The methodologies outlined cover key emissions sources like construction dust, plant / Non-Road Mobile Machinery (NRMM), and construction traffic using accepted guidance from IAQM and other agencies. For dust, a systematic risk-based approach evaluates emission magnitudes, receptor sensitivities, and mitigation requirements. Plant / NRMM emissions are qualitatively assessed with a focus on mitigation. Traffic screening criteria determine if detailed modelling is needed based on predicted changes in flows and road configurations. Overall, the range of methodologies aligns with industry best practices, providing a comprehensive framework to evaluate and mitigate air quality impacts associated with this major linear infrastructure project.
- The baseline environment has been informed by local authority data, including that included within the East Lindsey District Council Combined Annual Status Report (2016 – 2022) and national datasets. The methods adopted to determine the baseline environment is considered to be appropriate.
- The assessment appropriately follows guidance for evaluating emissions from construction site plant / NRMM, traffic, and dust. Plant / NRMM emissions were qualitatively assessed as unlikely to cause significant impacts given the temporary and transient activities using standard mitigation measures. Traffic emissions were screened out based on negligible increases following guidance criteria. A semi-quantitative dust risk assessment was conducted in line with IAQM guidance to specify appropriate mitigation requirements at different site locations.
- Overall, the different construction emissions were evaluated using accepted qualitative and screening approaches reasonable for this stage given the linear nature of the project across varied environments. More refined quantification can be done later once construction details are finalised, but the current assessment conclusions appear technically sound based on the information provided.
- The mitigation measures proposed for construction dust, traffic emissions, and plant / NRMM emissions appear technically adequate. The dust mitigation follows IAQM guidance with standard measures like suppression, enclosures, monitoring, and a Dust Management Plan. For traffic and plant / NRMM, sensible measures are proposed including using newer/cleaner equipment, avoiding idling, using grid power where possible, and proper maintenance.

- Overall, the suite of mitigation aligns with established best practices and guidance for mitigating emissions from the various construction sources for a linear project of this nature. Implementation through a Construction Environmental Management Plan should effectively control potential air quality impacts.
- The chapter is supported by Appendix 14-1 Construction Dust Methodology. There is no indication that the report contains any technical errors that could potentially lead to it being challenged. The methodology used in the assessment of the potential dust impacts of the proposed development follows the guidance provided by the Institute of Air Quality Management (IAQM), and professional judgement was used where detailed information was not available. Based on the information provided on the methodology used in the assessment of potential dust impacts arising from the proposed development, the appendix appears to have followed established best practices and guidance with regard to dust assessments, identified appropriate mitigation measures, and there is no indication that there are any technical issues with the report that could be open to challenge.

The ES contains Chapter 14 that discusses air quality. An updated version was submitted in October 2023. It considers particulates from transport emissions and advises that dust and non-mobile machinery emissions will be controlled a management plan submitted with the application (Document references 6.4.3.1). As such it is considered the ES contains adequate information for the Examining Authority to assess the impact of the proposal on air quality. This document is implemented through Requirements 5 in the DCO. We are content that Requirement 5 is discharged by Lincolnshire County Council.

1.8 Chapter 15 Climate Change

A review of Chapter 15 Climate Change has identified the following points:

- The legislation, policy and guidance section of the chapter appropriately highlights the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC) as a key International Agreement. However, the Kyoto Protocol which is an international agreement linked with the UNFCCC, commits its Parties to the agreement by setting internationally binding emission reduction targets is not mentioned. It is recommended that the Kyoto Protocol be included as part of the International policy and legislation.
- The legislation, policy and guidance section also lists relevant legislation for the Green House Gas (GHG) assessment and Climate Change Risk (CCR) assessment including the UK Nationally Determined Contribution, Climate Change Act 2008 and the Infrastructure Planning (Environmental Impact Assessment Regulations 2017).However, for the policy context of the Climate Change Act 2008 detailed in Table 15-1, the requirement for the UK Government to produce a Climate Change Risk Assessment every five years should be presented. To support compliance with this requirement, the UK Government produced the Climate Change Risk Assessment (2022) report. It is recommended that this report be highlighted in Table 15-1 to support the national policy and legislative context.
- In addition, the Third National Adaptation Programme (NAP3) sets out the actions that the government will take to adapt to the impacts of climate change in the UK. The NAP3 forms part of the five-year cycle of requirements detailed in the Climate Change Act 2008. This should also be highlighted in Table 15-1 as part of the national policy and legislative context.
- Updates to the NPS for Energy (EN-1) and NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) were published in November 2023. Table 15-2 should be updated to ensure that all references to EN-1 and EN-4 reflect the latest guidance, with changes made as appropriate in the subsequent assessment.

- The CCR baseline presented in the chapter is adequate as it is based on historical climate data obtained from the Met Office for the closest meteorological station to the Viking CCS pipeline. The historical data obtained presents a suitable climate variables to support the assessment of the resilience of the Viking CCS pipeline to future climate change impacts.
- The GHG baseline is based on current land use within the DCO Site Boundary, which includes emission stocks and sinks from soil and vegetation, and the operation of vehicles and equipment in support of agricultural activities. Activities within the DCO Site Boundary is considered to have minor levels of GHG emissions and therefore a baseline of zero was applied Although no estimation of existing emissions from carbon stock is undertaken, the assumption of minor levels of GHG emissions is considered to be acceptable.
- The future baseline presented in the chapter is adequate as it presents the latest available future climatic data obtained through the UK Climate Projections Database 2018. The projected data include a suitable range of climate variables for temperature and precipitation for the worst-case scenario, Representative Concentration Pathway (RCP), RCP8.5. The projected data presented covered the initial operational life of the Proposed Development at 10%, 50% and 90% probability in line with relevant IEMA guidance.
- The assessment methodology is in line with the IEMA guidance and is therefore deemed to be acceptable. The methodology for the assessment presents criteria for likelihood magnitudes, levels of consequence and the significance of effect in Tables 15-8, 15-9 and 15-12 respectively. The parameters that are scoped into the assessment are presented in Table 15-7, however, there is no information on climate parameters have been scoped out, nor how these parameters were selected.
- In relation to the GHG assessment, only a very high-level overview of the emissions calculation methodology was provided in Section 15.4. Therefore, although the high-level methodology and assumptions used in the calculations are adequate, there is insufficient information on how the emissions were calculated to assess the robustness and accuracy of the assessment outputs in Section 15.7. It is recommended that a detailed description of the emissions sources, and the calculation methodologies for each source be included in the chapter or as an appendix to ensure clarity on how the assessment outputs presented in Section 15.7 are obtained.
- There are no CCR embedded mitigation provided, as the assessment is based on a worst-case approach which assumes no mitigation measures are embedded into the design. This approach is suitable for the purposes of the assessment. Additional mitigation measures are presented in Section 15.8. These measures are primarily related to flooding, and there is no justification for the residual effects predicted in Table 15-36 and Table 15-37.
- The design and embedded mitigation measures associated with GHG are presented in Section 15.6 are considered to be adequate. However, a number of the mitigation measures do not result in a quantifiable reduction in emissions, and there are no measures related to the main emission sources identified in the assessment which are construction materials.
- In relation to the CCR impact assessment, there is little data or evidence to support the determination of likelihood and consequences of impacts in Table 15-30, therefore the outcomes of the assessment are unsupported. Furthermore, there is no evidence to determine how the potential impacts on the Viking CCS pipeline in Table 15-30 and 15-31 have been identified. Therefore, the outcomes of the assessment (significance) cannot be wholly supported without further information.

The significance of GHG emissions released from the project is presented in Section 15.9, Residual Effects. With consideration of the project's contribution to GHG emissions to the UK carbon budget. The assessment concluded that the construction, operation and decommissioning of the project would have a negligible contribution to the UK carbon budget and therefore have a minor adverse effect on climate

which is deemed as not significant. In addition, it was concluded that the pipeline as part of the wider Viking CCS Project would cause a reduction in atmospheric GHG concentrations and was therefore assessed as having a beneficial effect on the climate. This is an accepted outcome, although is not supported by evidence, and therefore the conclusions would be stronger if details of avoided emissions could be provided.

1.9 Chapter 16 Socio-Economics

A review of Chapter 16 Socio-Economics has identified the following key points:

- All relevant National Planning Statements are referenced. Review and readability could have been improved by including in Table 16.1 a column referring to the relevant section of the chapter where each issue is addressed. It is noted the new NPS have now been approved, so reference to the previous 2011 statements is no longer required. It should be noted that the effects of a transient workforce have not been explicitly considered in the assessment, despite being requested in all NSPs. Paragraph 16.2.5 refers to EN-3 for renewable energy projects, rather than EN-4 which is for gas supply infrastructure. The correct document is referred to in the table, so this is more likely to be a copy and paste error, rather than an error in the assessment.
- Green Book Guidance is not mentioned at any point. However, the use of multipliers and consideration of additionality is consistent with Green Book practice. Reference to IPROW – Environmental Impact Assessment: Appraising Access has not been referenced and is generally considered best practice. However, this is not statutory and methodology used is generally consistent.
- The criteria used to assess the magnitude of effects and sensitivity of receptors (Section 16.4) is highly subjective. For example, employment impacts are considered quantitatively in the assessment (Para 16.7.14) and considered to be of “low’ magnitude due to its comparative scale. However, there is no indication as to what threshold would be required for an impact to have a “medium” effect. Due to the subjective nature of the assessment criteria, the author has not referred back to these criteria when making the assessment.
- Paragraph 15.12.4 of the 2011 National Policy Statement EN-1 and paragraph 15.13.4 of the 2023 Draft National Policy Statement both request that the “impact of the influx of workers during the different construction, operation and decommissioning phases of the energy infrastructure” are considered. This will include the development of an accommodation strategy if necessary (2023 Draft EN-1, Para 5.13.7). There is no mention of this either in the reference to the guidance or the assessment. It may be that the effect has been scoped out, because the 138 workers that will need to be accommodated in the area (Table 16-16) is considered negligible. If it was scoped out, this should be explicit, to give the Inspector the opportunity to respond.
- The entire economic impact assessment is based on one estimated employment impact value which is introduced in Para 16.7.5 but the details behind this estimate are not provided. It is not clear if this estimate has been provided by the Developer or if it has come from the Assessor. It is also not clear if the estimated value includes any development, manufacturing or other activities, beyond the construction sector.
- The 60-minute travel study area is used to define the “Economic Impact Study Area” and forms the basis of the baseline assessment. It would be beneficial if the LSOA’s used to define this area was included as an appendix or similar.
- There is no justification given for why private assets will only have an amenity effect if it experiences two or more significant effects at the same time (Para 16.4.28). This does not relate to the description of the magnitude of impacts (Table 16-11), which could in theory be related to a single significant effect. The two or more rule enables all private assets to be scoped out of the assessments and

therefore it would be good to see a justification for this approach. A receptor which experiences a single significant effect may question this approach.

- The requirement for two or more significant effects before amenity effects are considered appears to be professional judgement and could be challenged. If justification is provided for this, this would reduce the likelihood of it being challenged.
- The four local authorities that are used to determine the GVA of the construction sector (North Lincolnshire, North East Lincolnshire, West Lindsey and East Lindsey) account for around a quarter of the population of the Economic Impact Study Area. According to the industrial structure (Table 16-16) the construction sector is less concentrated in these four local authorities than the wider Economic Impact Study Area. It is therefore expected that the majority of the local companies involved in this work would come from outside these four local authorities. It would have made more sense to use a wider view of the construction sector when estimating the GVA per head in the construction sector. This is unlikely to have impacted the findings of the assessment.
- The 60-minute travel study area is used to define the "Economic Impact Study Area" and forms the basis of the baseline assessment. It would be beneficial if the LSOA's used to define this area was included as an appendix or similar.
- There is no justification given for why private assets will only have an amenity effect if it experiences two or more significant effects at the same time (Para 16.4.28). This does not relate to the description of the magnitude of impacts (Table 16-11), which could in theory be related to a single significant effect. The two or more rule enables all private assets to be scoped out of the assessments and therefore it would be good to see a justification for this approach. A receptor which experiences a single significant effect may question this approach.
- The cumulative effects do not consider how the effects from the Viking project would interact with those of the listed cumulative projects. It notes that the cumulative employment supported would include at least 2,616 jobs from the construction of residential projects and 1,727 jobs from other projects. This is also considered to be not significant, however due a lack of clarity on what the magnitude of the effect would need to be before it was considered "medium", it can only be assumed this is a subjective assessment.
- The assessment does the minimum amount required to be considered acceptable. The economic methodology relies on single, unexplained assumptions to which it applies basic methodologies. However, it is unlikely that any further details provided would change the overall assessment of significance due to the large size of the Economic Impact Study Area. The assessment of Public Rights of Way and Community Severance is acceptable. The assessment of amenity effects on private assets is based on professional judgement which should be justified further. Further information should be requested regarding:
  - Justification for two or more significant effects required for the assessment of amenity effects;
  - Justification for scoping out of impact of transient workforce on services such as accommodation; and
  - List of LSOA's used to define Local Economic Study Area

Chapter 16 of the ES considers Socio-economics that was submitted in October 2023. The council should continue to work with the Developer to consider the socio-economic impact of the proposal and is requesting areas of clarification but consider the information adequate for the Examination Authority to begin assessing the impact of the proposal on these issues.

1.10 Chapter 17 Health and Wellbeing

A review of Chapter 17 Health and Wellbeing has identified the following key points:

- The methodology is based upon the relevant legislation, policy and guidance, noting that there have been updates the NPPF following the publication of the chapter. The assessment adopts the IEMA guidance on assessing human health within EIA (IEME, 2022) supported by a range of other supporting and information documents that are considered relevant. Table 17-2 correctly identifies the relevant policy from the ELDC Core Strategy Local Plan (2018).
- The incorporation of wellbeing to the assessment is welcomed and in line with the World Health Organisation's description on health. The health determinants assessed are clear and assessments based on professional judgement, best practice and draw on other, appropriate technical chapters within the ES.
- It is noted that the assessment uses different impact magnitude and sensitivity criteria from the Preliminary Environmental Impact Report (PEIR) due to the publication of the IEMA guidance following PEIR production. This is acceptable and appropriate and the definitions on impact significance are acceptable. The impact assessment methodology is clearly set out and transparent.
- The health profile study area includes ELDC as a whole with reference to study areas for specific topics as expected (e.g. air quality). A reasonable description of the baseline receptors and key attributes within 'sections' of the whole study area is provided and encompasses the relevant parts of ELDC area. No maps are provided and it is difficult to visualise the baseline in comparison with the proposed DCO boundary without a good working knowledge of the district and without reference to multiple-other chapters. However, referencing to other chapters is good and appropriate.
- It is noted that the Applicant has scoped out the assessment impacts from venting, "as the venting system will only comprise CO2 emissions which will not affect human health". Further information to confirm this outcome is required as the Best Available Technique (BAT) document for Post-combustion carbon dioxide capture: emerging techniques – GOV.UK (www.gov.uk) states that to deliver CO2 "levels of water, oxygen and other impurities as required for transport and storage such as that for the system operator National Grid". Clarification should be sought on the venting composition and commentary made regarding human health.
- The assessment on the impacts to health care services notes the areas of deprivation within ELDC and states in para 17.7.8 that, "demand would be facilitated by the existing facilities. This is because of the large number of GPs noted in the study area". The impact magnitude is therefore stated as "very low" and the overall impact being "minor adverse". ELDC should satisfy themselves that this statement is in line with their knowledge of GP services in the area and the demand placed on them by the resident population.
- The minimal impacts on PRoWs (which should not require diversions or closures) is welcomed, although some minor changes are required on a temporary basis (e.g. changes from one side to of the road to another).
- Other impact assessments seem to appropriately define the magnitude of changes arising from the development, the degree / nature of effects, and the approach to judging the significance of those effects. The assessment provides sufficient objective detail and assessment based on cross-referencing to other technical chapters.
- It is noted that potential impacts associated with the decommissioning of the pipeline would be similar in nature to those during construction, as such a separate assessment has not been included within the chapter. However, commitment is made to update the Construction Environment Management Plan (CEMP) for the decommissioning phase.

- The chapter outlines the embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents.
- No residual effects are forecast in relation to health and wellbeing, but the two issues of 'venting impacts on health' (scoped out) and 'increased demand to healthcare services' during construction should be questioned by ELDC to confirm acceptability of these assessments and ensure mitigation is appropriate.

ES Health and Wellbeing chapter considered good, and reflective of guidance. The exception is the potential impacts from venting and access to healthcare as previously mentioned and we recommend that further assurances and evidence is provided by the applicant on these matters.

1.11 Chapter 18 Materials and Waste

A review of Chapter 18 Materials and Waste has identified the following key points:

- Updates to the NPS for Energy (EN-1) were published in November 2023. Table 18-1 should be updated to ensure that all references to EN-1 reflect the latest guidance, with changes made as appropriate in the subsequent assessment. Updates to NPS for Natural Gas Supply Infrastructure and Gas and Oil Pipelines (EN-4) were also published in November and a review of the updated policy should be conducted to identify any applicable references to materials and waste. With regards to additional policies and main guidance applicable to the chapter are adequately covered.
- The baseline assessment contained within Section 18.5 identifies elements such as Mineral Safeguarding Areas, safeguarded waste facilities, waste management infrastructure and waste inputs by facility within the East Midlands and Yorkshire and Humber regions. Paragraph 18.5.38 of the future baseline section discusses landfill capacity, states that there is no publicly available information on potential changes to landfill capacity by the time of the construction of the proposed development. However, it is typically forecast to deplete based on the typical trend of current inputs, therefore it is deemed possible to consider the year that construction wastes would be generated.
- The assessment methodologies adopted within the chapter are based on the IEMA Guide to Materials and Waste in Environmental Impact Assessments, this is deemed to be an appropriate approach. However, paragraph 18.4.14 of the methodology described within the chapter indicates that "It is assumed that all waste would be disposed of to landfill" which contradicts that of paragraph 3.12.286 of Chapter 3 Description of the Proposed Development which states that "at least 90% (by weight) recovery of non-hazardous construction and demolition waste"
- Within the impact assessment section of the chapter it is not clear how the sensitivity of some receptors has been determined, for example it is unclear how sensitivity bandings have been applied to materials as this is not included within the assessment methodology section of the chapter. With regards to determining the magnitude of impact from construction wastes, there is very little information provided on the estimated volumes of waste as a result of construction activities. There have been no attempt to align the estimates to waste type or split the waste types into inert, non-hazardous or hazardous. There is also no detail in relation to how specific materials, for example scrap metal, will be recycled and diverted from landfill of consideration of waste accumulation along the route of the pipeline. In addition, the location of waste generation has not been apportioned to waste disposal regions (i.e. Yok and Humber / East Midlands).
- The chapter outlines the embedded and additional mitigation measures applicable to the receptors identified within the chapter. These are clearly labelled to allow for cross referencing to associated documents, however, there is no clear commitment to recycle specific material waste streams. With

these measures in place, the residual effect on receptors is considered to not be significant. The outcome of the assessment is considered to be appropriate, although it is worth noting that there has been no attempt to set out specific types of hazardous wastes (noting however that these will be small quantities) with paragraph 18.7.19.

- The chapter is supported by Appendix 18-1 Outline Site Waste Management Plan (SWMP). The SWMP sets out the information that is expected within this type of document. However the SWMP does not provide any lists of expected wastes and an order of magnitude estimate of the likely arisings in line with the construction programme (i.e. what wastes will be generated when). There is an opportunity for the Applicant to embed mitigation commitments within the SWMP that are currently absent.

Overall, the chapter is considered adequate. Although there are points to be addressed as discussed above the overall impact assessment would remain not significant. A more detailed SWMP is required which should be tailored to show how mitigation commitments will be implemented by the Contractor prior to the start of construction works.

2 Conclusions

A review of the ES for the Viking CCS Pipeline project has identified a number of inadequacies that require addressing. These are summarised below in Table 2.1.

Table 2.1 Summary of points requiring further clarification

Chapter	Points requiring clarification and/or further information
Chapter 6 Ecology and Biodiversity	■ Justification is there for not avoiding potential for impacts upon lamprey, chalk streams and associated designations through the use of HDD or other trenchless techniques at all connected watercourses? ■ What will the time lag be between completion of works and replacement planting being installed? Provision of dead-hedging currently indicates an undetermined period. ■ Detail regarding the aftercare period. Aftercare should be long term (e.g. 30 years) and ensure that there are suitable measures in place to legally and financially secure it for the duration.
Chapter 9 Geology and Hydrogeology	■ Details regarding potential decommissioning techniques to be added to the chapter in order to demonstrate that there is not the potential for a preferential pathway to be created.
Chapter 11 Water Environment	■ Flood Warning and Evacuation Plans - details on what this would entail, including time to onset and depth of flooding related to evacuation. ■ No consideration of the differences in flood risk during the construction phase vs the operational phase. As such, there appears to be no cross reference to the Code of Construction Practice (CoCP) in the FRA – as a document / mechanism for setting out the measures to be included during the construction phase. ■ The FRA assesses the impact of flooding during the construction and operational phases of the development. However, there is no discussion on

Chapter	Points requiring clarification and/or further information
	the decommissioning phase and reinstatement of land / drainage following completion of the project to ensure there is no long-term impact on flood risk.
Chapter 13 Noise and Vibration	■ Inadequate justification of construction noise assessment criteria, disregarding low baseline sound levels in rural areas. ■ Construction noise assessment criteria require clarification. ■ Construction noise predictions have not considered potential worst-case and appear to disregard facade reflections. ■ In determining whether construction noise effects are potentially significant, it would be helpful to provide information on the duration of potential impacts. ■ The construction noise assessment identifies potentially significant effects but the required attenuation is not known; hence, it cannot be known whether the proposed mitigation measures are sufficient to mitigate the effects to a non-significant level. ■ The noise level parameter used in the operational noise assessment methodology section is inconsistent. Any changes to this parameter may require the assessment to be revised. ■ The assessment method for impacts on non-residential receptors requires revision to include criteria for omitted receptor types. ■ Potential noise effects from the use of the Southern construction compound require assessment, along with whether the compounds will be used at night. Night-time noise from the Northern Compound (if present) should also be assessed. ■ The assessment of maintenance venting impacts should be moved to the operational assessment section. ■ The operational noise assessment methodology should be updated to describe the method and noise level parameters used for assessment of effects during maintenance. ■ Further details are needed on the monitoring and calculation procedures, along with any required mitigation, to ensure that residual effects from maintenance venting noise will be not significant. ■ The discrepancy between Appendix 15.3 and the Chapter in terms of the additional construction traffic to be introduced requires rectification. ■ Further quantitative evidence is required to assess the effects of construction road traffic noise on roads with low traffic flows. ■ It is not clear which of the construction works will be included in a section 61 consent application. ■ The distance to the night-time SOAEL from HDD works is inconsistent between the assessment and mitigation sections.

Chapter	Points requiring clarification and/or further information
	■ The discussion of screening in the residual effects contradicts that proposed in the mitigation section. ■ It is not agreed that all reasonable measures have been implemented to control construction noise impacts. ■ The construction noise impact assessment methodology set out in the ES Chapter has not been used to analyse the significance of residual effects.
Chapter 15 Climate Change	■ Insufficient information on how the emissions were calculated to assess the robustness and accuracy of the assessment outputs. ■ No information on why climate parameters have been scoped out, nor how these parameters were selected. ■ CCR impact assessment, there is little data or evidence to support the determination of likelihood and consequences of impacts in Table 15-30, therefore the outcomes of the assessment are unsupported. Furthermore, there is no evidence to determine how the potential impacts on the Viking CCS pipeline in Table 15-30 and 15-31 have been identified.
Chapter 16 Socio-Economics	■ Justification for two or more significant effects required for the assessment of amenity effects; ■ Justification for scoping out of impact of transient workforce on services such as accommodation; and ■ List of LSOA's used to define Local Economic Study Area
Chapter 17 Health and Wellbeing	■ Clarification should be sought on the venting composition and commentary made regarding human health. ■ ELDC should satisfy themselves that the statement regarding the large number of GP services in the area is correct and the demand placed on them by the resident population is sufficiently low to allow for additional workforce impacts to be non-significant.
Chapter 18 Materials and Waste	■ Clarification on how material sensitivity has been defined. ■ Additional details on the estimated volumes of waste as a result of construction activities as well as the split of waste types into inert, non-hazardous or hazardous, how specific materials will be recycled and diverted from landfill.

Appendix A – Reviewed Documents

Chapters and appendices reviewed as part of drafting of this technical note include the following:

- Chapter 6 Ecology and Biology (Document Reference: EN070008/APP/6.2.6
  - Appendix 6-1 Phase 1 Habitat Survey Report (Document Reference: EN070008/APP/6.4.6.1)
  - Appendix 6-2 Bat Survey Report (Document Reference: EN070008/APP/6.4.6.2)
  - Appendix 6-3 Otter and Water Vole Survey Report (Document Reference: EN070008/APP/6.4.6.3)
  - Appendix 6-5 Hedgerow Survey Report (Document Reference: EN070008/APP/6.4.6.5)
  - Appendix 6-6 Aquatic Ecology Report (Document Reference: EN070008/APP/6.4.6.6)
  - Appendix 6-7 Ornithology Baseline Report (Document Reference: EN070008/APP/6.4.6.7)
  - Appendix 6-9 Great Crested Newt District Level Licence (Document Reference: EN070008/APP/6.4.6.9)
  - Appendix 6-10 Arboriculture Report (Document Reference: EN070008/APP/6.4.6.10)
  - Report to Inform the Habitats Regulations Assessment – Revision A (Document Reference: EN070008/APP/6.5)
  - Initial Biodiversity Net Gain Assessment (Document Reference: EN070008/APP/6.7.1)
  - Draft Biodiversity Net Gain Strategy (Document Reference: EN070008/APP/6.7.2)
  - Plans of Statutory / Non-Statutory Sites or Features of Nature Conservation (Document Reference: EN070008/APP/6.9.1)
  - Habitats of Protected Species, Important Habitats or other diversity features (Document Reference: EN070008/APP/6.9.2)
- Chapter 7 Landscape and Visual (Document Reference: EN070008/APP/6.2.7)
  - Appendix 7-1 Representative Viewpoints (Document Reference: EN070008/APP/6.4.7.1)
  - Appendix 7-2 Visualisations (Document Reference: EN070008/APP/6.4.7.2)
  - Outline Ecological Management Plan (Document Reference: EN070008/APP/6.8)
- Chapter 9 Geology and Hydrogeology (Document Reference: EN070008/APP/6.2.9)
  - Appendix 9-1 Geology Summary Tables (Document Reference: EN070008/APP/6.4.9.1)
  - Appendix 9-2 The Coal Mining Authority – Coal Mining Report (Document Reference: EN070008/APP/6.4.9.2)
  - Appendix 9-3 Hydrogeological Risk Assessment (Document Reference: EN070008/APP/6.4.9.3)
  - Appendix 9-4 Conceptual Site Model (Document Reference: EN070008/APP/6.4.9.4)
- Chapter 10 Agriculture and Soils (Document Reference: EN070008/APP/6.2.10)
  - Appendix 10-1 Outline Soil Management Plan (Document Reference: EN070008/APP/6.4.10.1)
  - Public Rights of Way Management Plan (Document Reference: EN070008/APP/6.11)
- Chapter 11 Water Environment (Document Reference: EN070008/APP/6.2.11)
  - Appendix 11-1 Water Environment Supporting Baseline Info (Document Reference: EN070008/APP/6.4.11.1)
  - Appendix 11-2 Site Visit Technical Note – Water (Document Reference: EN070008/APP/6.4.11.2)

- Appendix 11-3 Drainage Strategy – Revision A (Document Reference: EN070008/APP/6.4.11.3)
- Appendix 11-4 WFD Assessment (Document Reference: EN070008/APP/6.4.11.4)
- Appendix 11-5 Flood Risk Assessment (Document Reference: EN070008/APP/6.4.11.5)
- Appendix 11-6 Outline Surface Water Management Plan (Document Reference: EN070008/APP/6.4.11.6)
- Waterbodies in a River Basin Management Plan (Document Reference: EN070008/APP/6.9.3)

- Chapter 13 Noise and Vibration (Document Reference: EN070008/APP/6.2.13)
  - Appendix 13-1 Noise Baseline Data (Document Reference: EN070008/APP/6.4.13.1)
  - Appendix 13-2 Construction Noise Calculations (Document Reference: EN070008/APP/6.4.13.2)
  - Appendix 13-3 Construction Traffic Noise Calculations (Document Reference: EN070008/APP/6.4.13.3)
  - Appendix 13-4 HRA Noise Assessment (Document Reference: EN070008/APP/6.4.13.4)
- Chapter 14 Air Quality (Document Reference: EN070008/APP/6.2.14)
  - Appendix 14-1 Construction Dust Methodology (Document Reference: EN070008/APP/6.4.14.1)
- Chapter 15 Climate Change (Document Reference: EN070008/APP/6.2.15)
- Chapter 16 Socio-Economics (Document Reference: EN070008/APP/6.2.16)
- Chapter 17 Health and Wellbeing (Document Reference: EN070008/APP/6.2.17)
- Chapter 18 Materials and Waste (Document Reference: EN070008/APP/6.2.18)
  - Appendix 18-1 Outline Site Waste Management Plan (Document Reference: EN070008/APP/6.4.18.1)