

Viking CCS pipeline Preliminary Environmental Information Report Volume II

Main PEIR

Applicant: Chrysoar Production (U.K.) Limited, a Harbour Energy Company PINS Reference: EN070008 November 2022





Chapter 21 Summary of Likely Significant Effects

Table of Contents

21	Sum	mary and Next Steps	
		Summary	
		Next Steps	
Tabl	es		

Table 21-1: Summary of the Preliminary Environmental Information	2
--	---

21 Summary and Next Steps

21.1 Summary

- 21.1.1 Chapters 6 to 20 of this Preliminary Environmental Information Report (PEIR) have considered the potential environmental effects of the Viking CCS Pipeline (hereafter 'the Project'). This chapter provides a summary of those potential residual environmental effects that are currently considered to be significant, based on the preliminary assessments which have been undertaken.
- 21.1.2 The assessment of the potential residual effects has been predicted after due consideration of those embedded and additional mitigation that have been developed and committed to at this stage, as identified in each technical chapter.
- 21.1.3 **Table 21-1** summarises these potentially significant residual environmental effects, split by each technical topic, and covering each of the three key phases of the Project's development (Construction, Operation and Decommissioning). The table also provides a written description of the impact, outlines the identified receptors and provides a confidence level for the prediction.
- 21.1.4 The preliminary assessment of significant effects will be reviewed and further detailed assessment work will be undertaken for the Environmental Impact Assessment (EIA) and reported in the Environmental Statement (ES).
- 21.1.5 Reporting a potentially significant effect at this preliminary assessment stage does not mean that the effect is certain to be significant. Such effects may change at the ES stage, as further baseline information is gathered, and as additional mitigation measures are developed and committed to, which may reduce the significance of residual effects. These will be reported in the ES.
- 21.1.6 Where a confidence rating is reported as low or moderate, these would also be improved to a high confidence in the full assessment as environmental survey work progresses and more detailed design information becomes available.

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction		
Chapter 6: Ecolog	y and Biodiversity					
Construction	Semi-natural broadleaved woodland Broadleaved plantation woodland	Direct loss of woodland habitat within the Draft Order Limits. Damage to retained trees due to encroachment of machinery, compaction of soil or a pollution event.	As a result of the loss of this habitat, the impact is likely to be Significant .	There is a Low confidence in the prediction of effect significance as options for pipeline installation crossing woodland habitat are being reviewed, and woodland may be avoidable. Standard best practice methods would be followed to prevent damage to retained woodland habitats. Further survey work will be undertaken in 2022 and 2023 after which a comprehensive review of potentially significant effects will be provided within the EIA.		
Operation		o making a positive contribution to biodivers otential to lead to a significant beneficial e		al details will be included		
Decommissioning	No significant effects are pre	No significant effects are predicted.				
Chapter 7: Lands	cape and Visual					

Table 21-1: Summary of the Preliminary Environmental Information

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
Construction	Landscape Character Regional Character Areas (RCAs). The Historic Character of The County of Lincolnshire (RCA 3: The Northern Marshes; RCA 4: The Wolds; and RCA 8: The Grazing Marches). East Midlands Region Landscape Character Assessment (RCA 1a: Coastal Saltmarsh; RCA 1b: Coastal Dunes; RCA 1c: Shallow Coastal Waters; RCA 2a: Settled Fens and Marshes; RCA 2c: Fen and Marsh Margin Farmlands; and RCA 7a: Chalk Wolds).	Introduction of construction activity including vehicle movements, signage and fencing, excavations, earth movements, removal of vegetation including hedgerows and trees, and the removal of land for agricultural use. Potential effects on tranquility resulting from construction operations as set out above. Change to landscape pattern following the removal of field boundary hedgerows. Loss of landscape elements resulting from the potential removal of trees and vegetation.	As a result of the scale of the RCAs compared with the scale of Project the impact on the RCAs may be Significant as a result of the short term effects associated with the construction phase and the long term effects resulting from vegetation removal.	There is a Moderate confidence in the prediction of the level of significance of effects as a result of the baseline work undertaken, sensitive siting of the pipeline construction route and uncertainty over construction methods to be utilised.
Construction	Landscape Character Local Character Areas (LCAs); North Lincolnshire Landscape Character Assessment and Guidelines (The Humber Estuary, Lincolnshire Coast and Marshes).	Introduction of construction activity including vehicle movements, signage and fencing, excavations, earth movements, removal of vegetation including hedgerows and trees, and the removal of land for agricultural use. Potential effects on tranquility resulting from construction operations as set out above.	As a result of the scale of the LCAs compared with the scale of Project the impact on the LCAs may be Significant as a result of the short term effects associated with the construction phase and the long term	There is Moderate confidence in the prediction of level of significance of effects as a result of the baseline work undertaken, sensitive siting of the pipeline construction route and uncertainty over

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
	 West Lindsey District Council Landscape Character Assessment (Wolds' Estates). North East Lincolnshire Landscape Character Assessment. (Humber Estuary, Lincolnshire Coast and Marshes). East Lindsey District Council Landscape Character Assessment. (LCA G1: Binbrook to Telford Wolds Farmland. LCA I1: Holton le Clay to Great Steeping Middle Marsh. LCA J1: Tetney Lock to Skegness Coastal Outmarsh; and LCA K1: Donna Nook to Gibraltar Point Naturalistic Coast.) 	Change to landscape pattern following the removal of field boundary hedgerows. Loss of landscape elements resulting from the potential removal of trees and vegetation. Change to the character, extent, and nature of available views due to potential localised reduction of enclosure from the loss of vegetation.	effects resulting from vegetation removal.	construction methods to be utilised.
Construction	<i>Landscape Designations</i> AONB: Lincolnshire Wolds	Introduction of construction activity including vehicle movements, signage and fencing, excavations, earth movements, removal of vegetation	Loss of landscape elements such as hedgerows, trees and vegetation which contribute to the	There is Moderate confidence in the prediction of level of significance of effects as a result of the

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
		 including hedgerows and trees, and the removal of land for agricultural use. Potential effects on tranquility as result construction activities as set out above. Change to landscape pattern following the removal of field boundary hedgerows. Loss of landscape elements resulting from the potential removal of trees and vegetation 	natural beauty of the designation. Introduction of plant machinery at odds with the scenic qualities of the area. The sensitivity and landscape value of the AONB designation and the loss of the features described above, means that the impact is expected to be Significant.	baseline work undertaken, sensitive siting of the pipeline construction route and uncertainty over construction methods to be utilised.
Construction	<i>Visual Receptors</i> Residents within 2 km of the Block Valve Stations, Immingham Facility and Theddlethorpe Facility.	Change in character of views as a result of the introduction of construction activities including excavation of landform, removal of landscape features including hedgerow and construction of the Block Valve Stations, Immingham Facility and Theddlethorpe Facility.	Impacts associated with the construction of the AGIs will be limited as a result of intervening screening vegetation and the relatively long distance to residential receptors. Impacts associated with the Theddlethorpe Facility including 25m high vent stack may	There is moderate confidence in the level of significance of effect as a result that no detailed field work has been undertaken to date to look at groups of potential receptors, their existing view and predicted view of construction operations.

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
			result in significant effects as a result of limited intervening vegetation and the rural characteristics at Theddlethorpe. Therefore, effects on a number of receptors are expected to be Significant.	
Construction	<i>Visual Receptors</i> Residents within 1 km of the pipeline route.	Change in character of views as a result of the removal of landscape features including hedgerow, introduction of construction activities including excavation of landform, earth stockpiles, vehicle movements and site compounds.	The nature of impacts and significance of effects will vary for each individual receptor based on existing views and proximity to the pipeline construction route. Therefore, effects on a number of receptors are expected to be Significant.	There is Moderate confidence in the level of significance of effect as a result that no detailed field work has been undertaken to date to look at groups of potential receptors, their existing view and predicted view of construction operations.
Construction	<i>Visual Receptors</i> Recreational users (Public Rights of Way (PRoW)) and recognised viewpoints	Change in character of views as a result of the removal of landscape features including hedgerow, introduction of construction activities including excavation of landform, earth stockpiles, vehicle movements, site compounds,	The nature of impacts and significance of effects will vary for each individual receptor based on existing views.	There is Moderate confidence in the level of significance of effect as a result that no detailed field work has been undertaken to date

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
	Users of local roads Places of business Users of trunk roads	construction of the Block Valve Stations, Immingham Facility and Theddlethorpe Facility.	There is the potential for moderate impacts to PRoW users in proximity to the construction of the Block Valve Station near Ashby cum Fenby and users of local roads and PRoW in proximity of the construction of the pipeline route. Therefore, effects on a number of receptors are expected to be Significant .	to look at groups of potential receptors, their existing view and predicted view of construction operations.
Operation	Residents within 2 km of the Theddlethorpe Facility	Change in character of views as a result of vegetation removal during the construction stage and the introduction of permanent structures.	Impacts associated with the Theddlethorpe Facility including 25m high vent stack may result in significant effects as a result of limited intervening vegetation and the rural characteristics at Theddlethorpe. Therefore, effects on a number of	There is moderate confidence in the level of significance of effect as a result that no detailed field work has been undertaken to date to look at groups of potential receptors, their existing view and predicted view of operational structures.

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
			receptors are expected to be Significant.	
Decommissioning	Effects are expected to be sir	nilar, and certainly no worse than those ide	ntified for construction.	
Chapter 8: Histori	c Environment			
Construction	Section 1 - buried landscapes associated with a former inland shoreline (MLS22428)	Late Iron Age ditches, west of Rosper Road Direct physical permanent impact upon the buried remains of an Iron Age occupation site found to the west of Rosper Road. Possibly part of a known Iron Age and Romano-British settlement that has been investigated at the Immingham CHP Plant (MLS19771; MLS22743).	Significant	Moderate - previous archaeological surveys have demonstrated the presence already of the resource in the area.
Construction	Section 1 - Prehistoric (Iron Age) and Roman settlement (MLS19771)	Iron Age and Romano-British settlement, west of Rosper Road Direct physical permanent impact upon the buried remains of an Iron Age and Roman settlement site that has been investigated at the Immingham CHP site and which is likely to extend to the south. Possibly associated with a square enclosure (MLS21321) and Iron Age occupation (MLS22428).	Significant	Moderate - previous archaeological surveys have demonstrated the presence already of the resource in the area.
Construction	Section 2 - Roman settlement (MNL2689)	Roman enclosures southeast of Greenlands Farm, Stallingborough	Significant	Moderate - previous archaeological surveys have demonstrated the

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
		Direct physical permanent impact on the buried remains of Roman site comprising a complex of enclosures southeast of Greenlands Farm that has been identified by archaeological geophysical survey and dated by surface artefact collection. The site is identified in North East Lincolnshire Planning Office Draft Local List of Historic Assets of Special Interest.		presence already of the resource in the area.
Construction	Section 3 - Roman field system (MLI41207)	Romano-British field system and possible vineyard, North Thoresby Direct physical permanent impact on the buried remains of a Romano-British site discovered during archaeological investigations (field system and associated possible vineyard) south of Grainsby Grange.	Significant	Moderate - previous archaeological surveys have demonstrated the presence already of the resource in the area.
Construction	Section 5 - Possible Late Saxon / medieval occupation site, west of Mablethorpe Road (A1031), Theddlethorpe All Saints and associated remains (MLI80941, MLI80940, MLI80942)	Possible Late Saxon / medieval occupation site, west of Mablethorpe Road (A1031), Theddlethorpe All Saints and associated remains Direct physical permanent impact upon the buried remains of a possible late Saxon / medieval settlement, west of Mablethorpe Road at Theddlethorpe All Saints. The site is suggested on the basis of a medieval pottery scatter found	Significant	Low - It is not currently known whether buried archaeological remains exist as archaeological evaluations have not yet been undertaken. The results of geophysical survey and other surveys (such as trial trenching) will ground

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
		during a watching brief. Another findspot of medieval material and an undated ditch are possibly associated with this site.		truth, clarify and resolve this in due course.
Construction	Section 5 - Field system and settlement near Walk Farm, Great Carlton (MLI42821)	Field system and settlement near Walk Farm, Great Carlton Direct physical permanent impact arising from the construction of an access route on the earthwork and buried remains of a medieval field system and settlement.	Significant	Low - It is not currently known whether buried archaeological remains exist as archaeological evaluations have not yet been undertaken. The results of geophysical survey and other surveys (such as trial trenching) will ground truth, clarify and resolve this in due course.
Construction	Section 5 - Toft earthworks and cropmarks, Theddlethorpe All Saints (MLI88214)	Toft earthworks and cropmarks, Theddlethorpe All Saints Direct physical permanent impact on the earthwork and buried remains of a medieval occupation site, north of Neves Farm at Theddlethorpe All Saints. The site lies c.250m west of a more extensive area of historic settlement at Theddlethorpe All Saints (MLI88255) which is immediately north of the Draft Order Limits.	Significant	Low - It is not currently known whether buried archaeological remains exist as archaeological evaluations have not yet been undertaken. The results of geophysical survey and other surveys (such as trial trenching) will ground truth, clarify and resolve this in due course.

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
Operation		ound infrastructure required, including the E ting of heritage assets. No Significant effe		inlikely to introduce
Decommissioning	No significant effects are pr	edicted to occur.		
Chapter 9: Geolog	gy and Hydrogeology			
Construction	No significant effects are pr	edicted to occur.		
Operation				
Decommissioning				
Chapter 10: Agric	ulture and Soils			
Construction	No significant effects are pre	edicted to occur.		
Operation	-			
Decommissioning	-			
Chapter 11: Water	r Environment			
Construction	Laceby Beck / River Freshney (to N Sea) (High).	Temporary morphological impacts to waterbodies: crossings for the pipeline corridor	Potentially Significant as indicated to be open cut. However this crossing is at the upper reach of the WFD designation and open cut is the most suitable methodology due to ground conditions. Best practice mitigation measures detailed	Low. There is a general understanding of the Project activities being undertaken and the associated impacts based on other Projects. However importance of waterbody will be confirmed though a site visit which may reduce the impact significance, additionally alternative

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
			within the Draft CEMP (Appendix 3- 1) are likely to reduce morphological impacts, however open cut may result in short term impacts whilst reinstatement takes effect. Additional mitigation may be recommended at the ES stage.	methodologies may be considered.
Construction	South Dike and Grayfleet Drain (High)	Temporary morphological impacts to waterbodies: crossings for the pipeline corridor	Potentially Significant as indicated to be open cut, however this is a worst case assumption. This crossing is in a location with artificial plan form and low morphological value. May result in short to medium term impacts whilst reinstatement takes effect. Additional mitigation may be	Moderate. There is a general understanding of the Project activities being undertaken and the associated impacts based on other Projects. However importance of waterbody will be confirmed though a site visit. which may reduce the impact significance, additionally alternative methodologies may be considered.

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction	
			recommended at ES stage.		
Operation	No significant effects are p	edicted to occur.			
Decommissioning					
Chapter 12: Traff	ic and Transport				
Construction	24hr AADT Assessment – Construction Vehicles and Workers Properties off Thoroughfare (ATC Site 10) - Section 3	The receptors located along this section of the proposed routing include several local properties adjacent to the road however there is no direct routing through any villages	Significant –The proposed routing does contain a number of HGV movements in the region of ~9% of all traffic, which may lead to some significant short term effects.	Moderate – The link is currently used by HGV traffic. However, the relatively low overall AADT indicates that a relatively small increase in construction traffic could have a disproportionate percentage increase.	
Operation	No significant effects are predicted to occur.				
Decommissioning					
Chapter 13: Nois	e and Vibration				
Construction	R3 - Immingham Rd Properties, Habrough R11 - Moorhouse, Brigsley Rd, Ashby cum Fenby R26 - Yew Tree Cottage, Ings Lane, Fotherby	Noise during the construction phase of the pipeline could lead to potential impacts at these receptors. These receptors are within 30m of the Draft Order Limits and are likely to	Significant – however, the further the distance from the construction activity, the lower the level of potential impact. The significance of the	Moderate – the construction programme and the assessment of construction impacts is still progressing. The identification of plant to be used during the	

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction	
	R32 - Louth Rd Properties, North Cockerington R42 - Mablethorpe Rd Properties, Theddlethorpe R44 - Pelham Rd Properties, Holton le Clay	experience an exceedance of the SOAEL threshold during construction.	effect will depend on the location, duration of works, and equipment being used. Further assessment work will be undertaken and presented in the ES.	construction phase and the final alignment of the pipeline within the Draft Order Limits is still progressing.	
Chapter 14: Air Q	Chapter 14: Air Quality				
Construction	No significant effects are predicted to occur.				
Operation	The operation and decommissioning phases have been scoped out of the preliminary air quality assessment.				
Decommissioning	However, it is worth noting that the Air Quality team will review the venting strategy in more detail when further information is available, and if required, will conduct a further assessment.				
Chapter 15: Clima	ite Change				
Construction	No significant effects are predicted to occur.				
Operation	Atmosphere	Transportation (and storage) of significant volumes of CO ₂ during the lifetime of the Project which would otherwise be emitted to the atmosphere	Significant (Beneficial) – reducing CO2 emissions and contributing to the UK's Net Zero targets	High – Initial annual CO ₂ transportation targets have been provided. These will be further refined as the Project progresses	

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
Decommissioning	No significant effects are pr	redicted to occur.		
Chapter 16: Socio	o-economics			
Construction	Amenity Value	 Identified potential likely significant effects on residential properties, business premises, community facilities, visitor attractions and open space during construction include: temporary loss of open space; temporary land take during installation of underground pipeline, shutdown valves and the use of a temporary construction compounds; potential for noise and vibration, air quality and visual effects arising from construction activities associated with the construction of the Project to impact on the amenity of residential properties, business premises, community facilities, visitor attractions and open space; 	A full assessment of amenity impacts, arising from noise and vibration; air quality; and landscape and visual impacts has not been undertaken on which to base a conclusion. However, the effect of the Project on private assets due to amenity impacts during construction has the potential to be Significant .	Low – Based on the preliminary assessments presented in <i>Chapter 7:</i> <i>Landscape and Visual</i> <i>Amenity, Chapter 13:</i> <i>Noise and Vibration</i> and <i>Chapter 14: Air Quality.</i>

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
		• potential temporary disruption of access to residences during and after construction; and potential temporary disruption of access to visitor attractions or open space leading to impact on residents' physical activity and health.		
Operation	No significant effects are pr	edicted to occur.		
Decommissioning	Effects are expected to be sir	nilar to those of construction.		
Chapter 17: Health	n and Wellbeing			
Construction	Construction workforce.	Access to work and training - increased temporary employment and training in the Study Area leading to improved mental and physical health outcomes. Increased expenditure for local businesses	Positive - temporary effects which may be Significant	High – The number of workers required to construct the Project is approximately 127 workers on average over the construction period. Indirect and induced jobs will also be created. There will be a positive local impact associated with the employment generated.
Construction	Local residents and, workers and visitors in communities close to the construction sites and exposed to amenity effects (e.g. noise, construction	Air quality, noise and Neighbourhood amenity - potential amenity effects (e.g. noise, dust, construction traffic, air quality and visual intrusion) which could impact on the mental and physical health of people living or working in	Negative – temporary effects which may be Significant	Moderate – The assessments presented in <i>Chapter 7:</i> <i>Landscape and Visual,</i> <i>Chapter 13: Noise and</i> <i>Vibration</i> and <i>Chapter</i>

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
	traffic, air quality and visual intrusion).	local communities as well as visitors, including impacts on community cohesion due to severance and/or impacts to the local communities' quality of life.		14: Air Quality are preliminary and subject to change. A negative impact is possible based on the typical nature of these environmental impacts. However, the use of industry-standard guidance and best practice mitigation where applicable, this is likely to be able to be minimised during construction.
Construction	Users of affected recreational routes and amenity areas including open spaces and nature, Public Rights of Way (PRoW), local community services and social infrastructure.	Accessibility and active travel and Social cohesion and Neighbourhoods - potential severance impacts (temporary diversions in a worst case scenario) on walkers, cyclists and horse-riders in accessing recreational routes and amenity areas including open spaces and nature, public rights of way, local community services and social infrastructure.	Negative – temporary effects which may be Significant	Moderate - The assessment presented in <i>Chapter 16: Socio-</i> <i>economics</i> on which this assessment is primarily based is preliminary. Some temporary closures and diversions are likely which may result in severance of access.
Operation	No Significant effects are predicted to occur.			
Decommissioning	The predicted effects would be the same or less than those reported for the construction phase.			
Chapter 18: Materials and Waste				

Phase	Receptor	Description of Environmental Impact	Likely significance of residual effect	Confidence in Prediction
Construction	No Significant effects are predicted to occur.			
Operation	The operation and decommissioning phases have been scoped out of the material and waste assessment as No			
Decommissioning	Significant effects are anticipated.			
Chapter 19: Cumu	lative Effects			
Construction	The cumulative effects assessment of inter-project effects remains at the Stage 1 phase. The Long List of other developments has been provided in Chapter 19 for feedback during this Statutory Consultation. A full assessment of cumulative and combined effects will be included within the ES.			
Operation				
Decommissioning				
Chapter 20: Major Accidents and Disasters				
Construction	The preliminary assessment has identified the potential major accidents and disaster which could be applicable to the Project and the consequences of these events happening. These incidents have an extremely low probability of occurrence, and the engineering design of the Project will incorporate appropriate standards, regulations, proven design methods and control measures necessary to reduce the risks of such accidents to an acceptable level, i.e. ALARP, which is the standard expected by the Regulatory Authorities (HSE and Environment Agency). With the implementation of these measures, risks are considered to have been mitigated to a 'tolerable' level and No Significant Effects are anticipated to occur.			
Operation				
Decommissioning				

21.2 Next Steps

- 21.2.1 Environmental and engineering surveys and assessment will continue through 2022, working towards a proposed submission of the ES with the DCO application in Summer 2023.
- 21.2.2 Feedback provided during the statutory consultation will be used to help to inform the further assessment work, where it is of relevance.