Net Zero Teesside

Table of Contents

Tables

25. Summary of Significant Effects

25.1 Introduction

25.1.1 Chapters 8 to 24 of this Preliminary Environmental Information (PEI) Report have considered the potential environmental impacts and effects of the Proposed Development. This chapter provides a summary of those adverse and beneficial environmental effects that at this stage in the project development and based on preliminary assessments to date are considered to be significant (i.e. moderate and major effects).

25.2 Significant Environmental Effects and Proposed Mitigation Measures

25.2.1 Table 25-1 summarises the significant environmental effects of the Proposed Development that have been identified, following implementation of the embedded mitigation or impact avoidance measures included in the design of the Proposed Development (as detailed in Chapters 8 to 24, where relevant). Table 25-1 also summarises any additional mitigation measures that have been identified in the technical assessments contained in the PEI Report.

25.2.2 For each topic, the reasonable worst case scenario is assessed, including the construction programme scenario and design parameters (by applying the Rochdale Envelope, as set out in Chapter 4: Proposed Development and Chapter 5: Construction Programme and Management (PEI Report, Volume I)). Where applicable, the reasonable worst case appropriate for each assessment is described in Chapters 8 to 24). It is important to note that these potentially significant effects are based on current assessment outcomes and that work is ongoing to refine the Proposed Development and further reduce environmental effects through embedded mitigation and design evolution work. The number of significant effects identified in the ES that will accompany the DCO application may therefore be lower than those presented in this chapter.

25.2.3 Effects have been assessed for the construction, operation (including maintenance) and decommissioning scenarios.

25.2.4 As outlined in Chapter 2: Assessment Methodology (PEI Report, Volume I), for the purposes of this EIA an effect is considered to be ‘significant’ if it is assessed to be moderate (adverse or beneficial) or major (adverse or beneficial). Minor and negligible effects are only referenced in this chapter where a ‘significant’ (moderate or major) effect has been reduced to a ‘not significant’ effect following mitigation.

25.2.5 To provide further clarification on the nature of the effects, each has been identified for the purposes of this summary as:

- short term (St) – effects occurring only over a short period of time, e.g. an effect that only lasts for the duration of the construction period, or one that lasts for only part of the operational phase;
- medium term (Mt) – effects occurring for the duration of the Proposed Development's operation, but which cease when operations cease; or
- long term (Lt) – effects occurring beyond the operation of the Proposed Development, for example the permanent loss of semi-improved grassland associated with the Proposed Development;
- temporary (T) – effects that are not permanent because the effect would no longer occur if the impact was removed within the relevant timescale (for example the visual amenity impact of construction structures would be described as St, T as the impact goes when the structures are removed);
- permanent (P) – effects that are permanent and cannot be readily reversed within the relevant timescale (for example an environmental feature that is lost and cannot be replaced until after decommissioning would be Mt, P. In the event that it could not be replaced at all, this would be Lt, P); and
- direct (D) – effects that result from a direct impact, for example, the loss of ecological habitat; or
- indirect (In) – also known as secondary effects are effects that result indirectly, for example, increased traffic could indirectly impact on air quality.

Table 25-1: Summary of Significant Effects

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 8: Air Quality					
Construction	No significant effects are predicted to occur.				
Operation	Release of ammonia and N-amines from the operation of the Proposed Development (based on the initial screening assessment).	Major adverse (significant)	Further work is ongoing to reduce the ammonia emission rate from the absorber stacks, either through amine solvent selection or through the use of additional stack treatment methods such as introducing an acid wash on the treated flue gas leaving the absorber. In addition, further work is ongoing to determine the sensitivity of the Teesmouth and Cleveland Coast receptor including: • Diffusion tube monitoring of the ammonia and NO_2 concentrations at the receptor to confirm the background concentrations; and • Site visits and ground truthing to be carried out by ecologists. N-amine emissions and impacts are being further evaluated using detailed dispersion modelling techniques that include amine chemistry.	Provisionally major adverse (significant) pending design of mitigation to reduce to non-significant. The assessment is currently based on highly conservative assumptions and a more refined assessment will be completed for the final (Environmental Statement) ES when further information is available on the level of emissions and the atmospheric dispersion of those emissions.	To be included in final ES
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 9: Surface Water, Flood Risk and Water Resources					
Construction	Surface water quality effects - suspended fine sediments on watercourses and waterbodies which may be affected by construction activities.	Moderate (significant)	Water quality monitoring programme for potentially affected waterbodies to be set out in brief within the outline Construction Environmental Management Plan (CEMP) and outline Water Management Plan (WMP), including daily observations and periodic and ad-hoc water quality sampling (embedded mitigation). Water quality monitoring pre-construction and during construction will be undertaken. Use of trenchless technology for pipeline installation across watercourses where appropriate and possible. Clarify requirement for use of coffer dam at the abstraction and discharge points for full impact assessment. Provide mitigation options during open-cut works to maintain pond water levels.	Minor (not significant).	T, St and D for Tees Estuary, Tees Bay and Belasis Beck. P, Lt and D for Coatham Dunes
Operation	No significant effects are predicted to occur.				
Decommissioning	Expected to be lower than construction				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 10: Geology and Hydrogeology					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 11: Noise and Vibration					
Construction	Noise effects on habitats during construction on the Power Capture and Compression site (PCC).	Moderate adverse (significant)	Further refinement of assumptions and detailed assessment, and through the CEMP.	Negligible adverse or less	St, T, D
Operation	CO_2 venting effects on residential receptors.	Up to moderate adverse (significant)	Further detailed assessment of mitigation and control measures in the ES.	Minor adverse or less	Lt, T, D
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 12: Terrestrial Ecology and Nature Conservation					
Construction	**Designated sites** - Preliminary precautionary assumption that there is potential for a significant (moderate adverse) residual effect on the integrity of the SSSI and the conservation status of designated habitat and species interest features.	Up to moderate adverse (significant)	Consultation and agreement with Natural England that all relevant temporary construction impacts and effects on the SSSI can be mitigated, and that such mitigation is technically feasible	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	P, Mt, D
Construction	**Semi-improved grassland -** a permanent loss of semi-improved neutral grassland in this area (up to 20 ha). Adjacent areas of grassland may also be damaged during construction e.g. due to compaction and disturbance from construction vehicles and the laydown of materials during construction.	Moderate adverse (significant)	While the details of the mitigation measures to be provided to address localised permanent losses of grassland requires further specification (this will be provided in the ES) the composition of the affected grasslands and their secondary origins indicates that mitigation is feasible in a reasonable timeframe (5 to 10 years) and that there can be confidence in its successful delivery. Wider commitments to provide biodiversity enhancement can also deliver habitat gains suitable to offset any localised permanent losses of grassland.	Neutral (not significant)	P, Mt, D/In

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	**Loss of Bat Habitat -** Pending the completion of bat activity surveys at Coatham Sands and further hydrological assessment it is assumed that there is potential for an adverse residual effect on bats from permanent loss or degradation of foraging habitats.	Moderate adverse (significant)	All buildings requiring construction-related demolition works would be reassessed for their suitability for use by roosting bats. If bat roosts are found through the above work, then a Bat Low Impact Licence or European Protected Species Mitigation Licence (EPSML) would be applied for from Natural England to permit demolition works to proceed. Demolition would only proceed once all necessary licences are in place, and associated mitigation requirements (e.g. provision of replacement roosts) have been met.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	P, Mt, D
Operation	**Nitrogen deposition - Teesmouth and Cleveland Coast SSSI/SAC/Ramsar** Pending further engineering design, modelling and technical assessment it is considered that there is potential for the Teesmouth and Cleveland Coast SSSI/SAC/Ramsar to experience significant adverse air quality effects as a result of nutrient nitrogen deposition.	Major adverse (significant)	Engineering design, modelling and technical assessment is ongoing to identify technological solutions that would reduce operational emissions at source and, by so doing, mitigate the potential for adverse effects on nature conservation designations. Once this process is exhausted, ecological mitigation options will be identified through consultation with relevant stakeholders e.g. options to offset increased nutrient deposition through enhanced habitat management regimes. This will be provided in the ES.	Provisionally major adverse (significant) pending design of mitigation to reduce to non-significant.	P, Lt, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Operation	**Nitrogen deposition - Saltburn Gill SSSI** Pending further engineering design, modelling and technical assessment it is considered that there is potential for the Saltburn Gill SSSI to experience significant adverse air quality effects as a result of nutrient nitrogen deposition.	Moderate adverse (significant)	Engineering design, modelling and technical assessment is ongoing to identify technological solutions that would minimise operational emissions at source and, by so doing, mitigate the potential for adverse effects on nature conservation designations. Once this process is exhausted, ecological mitigation options will be identified through consultation with relevant stakeholders e.g. options to offset increased nutrient deposition through enhanced habitat management regimes. This will be provided in the ES.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	P, Lt, D
	Nitrogen deposition - Coatham Marsh LWS Pending further engineering design, modelling and technical assessment it is considered that there is potential for the Saltburn Gill SSSI to experience significant adverse air quality effects as a result of nutrient nitrogen deposition.	Moderate adverse (significant)	Engineering design, modelling and technical assessment is ongoing to identify technological solutions that would minimise operational emissions at source and by so doing mitigate the potential for adverse effects on nature conservation designations. Once this process is exhausted, ecological mitigation options will be identified through consultation with relevant stakeholders e.g. options to offset increased nutrient deposition through enhanced habitat management regimes. This will be provided in the ES.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	P, Lt, D
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 13: Aquatic Ecology and Nature Conservation					
Construction	To be completed after field surveys but no significant effects are predicted to occur with use of embedded mitigation (e.g. pollution control measures).				
Operation	To be completed after field surveys but no significant effects are predicted to occur with use of embedded mitigation (e.g. pollution control measures).				
Decommissioning	To be completed after field surveys but no significant effects are predicted to occur with use of embedded mitigation (e.g. pollution control measures).				
Chapter 14: Marine Ecology and Nature Conservation					
Construction	**Underwater Sound – Pinnipeds** Effects to pinnipeds, including harbour seals, from underwater sound generated by Unexploded Ordnance (UXO) detonations, if required, during the construction phase.	Significant	If UXO detonations are required these should be undertaken outside the sensitive breeding and moulting season for harbour seals (June to early September). Noise abatement measures such as implementation of acoustic barrier technologies, deflagration and the use of acoustic deterrent devices will also be investigated and incorporated into the Proposed Development where practicable.	Not significant	T, St, D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 15: Ornithology					
Construction	**Noise and Vibration Disturbance – Waterbirds and Waterfowl – PCC Construction** In the absence of mitigation, the piling noise and vibration at the PCC has the potential to cause moderate disturbance to waterbirds utilising the quarries and lagoons and waterfowl utilising parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development	Moderate adverse (significant)	Depending on the specific construction methods being used (e.g. necessity of sheet piling), an environmental (noise and visual) barrier may need to be erected in predetermined locations along boundaries of the working area prior to the start of the main construction works. This is being evaluated further to inform the ES. If appropriate, phasing of construction activities which could cause disturbance could be carried out at a time of year when the likelihood of birds being present is minimised, where reasonably practicable. Any works associated with construction of the proposed infrastructure that have the potential for significant noise or disturbance effects will not be undertaken during extreme weather conditions that coincide with spring tides or other extreme tide conditions, because SPA and other water birds are more likely to roost or seek shelter on land in such conditions.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	**Noise and Vibration Disturbance – Sandwich Tern – PCC Construction** In the absence of mitigation, the piling noise and vibration at the PCC has the potential to cause moderate disturbance to sandwich tern utilising the parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D
Construction	**Noise and Vibration Disturbance – Redshank – PCC Construction** In the absence of mitigation, the piling noise and vibration at the PCC has the potential to cause moderate disturbance to redshank utilising the quarries and lagoons and redshank utilising parts of the Redcar and Coatham Sands South within 500 m of the Proposed Development.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	**Noise and Vibration Disturbance – Waterfowl – PCC Construction** In the absence of mitigation, the piling noise and vibration at the PCC has the potential to cause moderate disturbance to waterfowl present at Coatham Dunes and dune ponds and the intertidal areas along Coatham Sands within 500 m of the Proposed Development.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D
Construction	**Noise and Vibration Disturbance – Waterbirds – CO_2 Export Pipeline** In the absence of mitigation, the construction noise and vibration during construction of the CO_2 Export Pipeline has the potential to cause moderate disturbance to waterbirds utilising the SPA/Ramsar.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	**Noise and Vibration Disturbance – Sandwich Tern – CO_2 Export Pipeline** In the absence of mitigation, the construction noise and vibration during construction of the CO_2 Export Pipeline has the potential to cause moderate disturbance to sandwich tern utilising the SPA/Ramsar.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D
Construction	**Noise and Vibration Disturbance – Redshank – CO_2 Export Pipeline** In the absence of mitigation, the construction noise and vibration during construction of the CO_2 Export Pipeline have the potential to cause moderate disturbance to redshank utilising the SPA/Ramsar.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Construction	**Noise and Vibration Disturbance – Foraging Little Tern and Common Tern – CO_2 Export Pipeline** In the absence of mitigation, the construction noise and vibration during construction of the CO_2 Export Pipeline have the potential to cause moderate disturbance to foraging little tern and common tern utilising the SPA/Ramsar.	Moderate adverse (significant)	Same as above.	Provisionally moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D
Operation	**Noise and Vibration Disturbance – Foraging Little Tern and Common Tern – Nutrient nitrogen deposition** No significant effects are currently predicted to occur due to change in little tern colony location. However should the little tern colony relocate for 2020 or beyond, this might expose them to doses of nutrient nitrogen that are detrimental to their nesting habitat, with the potential for significant adverse impacts in the long term.	Potentially moderate adverse (significant)	Engineering design, modelling and technical assessment is ongoing to identify technological solutions that would minimise operational emissions at source and, by so doing, mitigate the potential for adverse effects on nature conservation designations. Once this process is exhausted, ecological mitigation options will be identified through consultation with relevant stakeholders e.g. options to offset increased nutrient deposition through enhanced habitat management regimes. This will be provided in the ES.	Potentially moderate adverse (significant) pending design of mitigation to reduce to non-significant.	St, T, D

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 16: Traffic and Transportation					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 17: Landscape and Visual Amenity					
Construction	Impact on Redcar Flats Landscape Character Tracts and Coastal Fringe during construction activities.	Moderate adverse (significant)	No potential mitigation has been identified due to the scale of the structures.	Moderate adverse (significant)	St, T, D
Construction	Impact on recreational users at North Gare Sands and South Gare Sands during construction activities.	Moderate adverse (significant)	No potential mitigation has been identified due to the proximity to the Proposed Development and the scale of the structures.	Moderate adverse (significant)	St, T, D
Construction	Impact on recreational users using England Coastal Path and on Redcar seafront during construction activities.	Moderate adverse (significant)	No potential mitigation has been identified due to the proximity to the Proposed Development and the scale of the structures.	Moderate adverse (significant)	St, T, D
Opening	Impact on recreational users using England Coastal Path and on Redcar seafront during opening.	Moderate adverse (significant)	Landscaping and the use of good design, although the massing of the structures cannot be fully screened from view.	Moderate adverse (significant)	Lt, P, D
Opening	Impact on recreational users using England Coastal Path and on Redcar seafront during operation.	Moderate adverse (significant)	Landscaping and the use of good design, although the massing of the structures cannot be fully screened from view.	Moderate adverse (significant)	Lt, P, D
Decommissioning	The impacts on landscape character and visual amenity arising as a result of decommissioning of the Proposed Development are considered (using professional judgement) to be similar to those identified at the construction stage.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 18: Archaeology and Cultural Heritage					
Construction	World War II pillboxes and rifle buts are located entirely within the Water Abstraction Corridor and Water Discharge Corridor. Construction would result in the total loss of heritage value which would constitute a high magnitude of impact.	Major adverse (significant)	Avoidance of the asset is being evaluated so as to not affect it during construction.	Neutral (not significant)	P, Lt, D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 19: Marine Heritage					
Construction	Non-designated wrecks located within Water Discharge Corridor. Construction would result in the total loss of heritage value which would constitute a high magnitude of impact.	Major adverse (significant)	Avoidance of the asset is being evaluated so as to not affect it during construction.	Neutral (not significant)	P, Lt, D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 20: Socio-economics and Tourism					
Construction	**Construction employment -** the estimated net employment generated during the construction phase is 2,440 workers per annum of which 1,220 are likely to be from the Middlesbrough and Stockton Travel to Work Area (TTWA).	Major beneficial effect (significant)	N/A	N/A	T, St, D/In
Operation	**Operation employment** – increased levels of employment.	Moderate beneficial effect (significant)	N/A	N/A	P, Lt, D/In
Decommissioning	No significant effects are predicted to occur.				
Chapter 21: Climate Change					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 22: Major Accidents & Natural Disasters					
Construction	Not applicable				
Operation	No significant effects are predicted to occur.				
Decommissioning	Not applicable				

Development stage	Environmental Impact (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 24: Cumulative and Combined Effects					
Construction	To be included in Final ES				
Operation	To be included in Final ES				
Decommissioning	To be included in Final ES				

Note: Lt = long term, Mt = medium term, St = short term, P = permanent, T = temporary, D = direct and In = indirect.