ARUP

ConocoPhillips

Ethane2Power

Habitat Regulations Assessment - Stage 1 and Stage 2

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Contents

Tables

Figures

Drawings

Appendices

Executive Summary

Ove Arup and Partners Ltd. (Arup) was commissioned by Conoco Phillips to undertake a Stage 1 and Stage 2 Habitat Regulations Assessment (HRA) in relation to the construction of a Power Island utilising existing ethane products at the Site produced to generate electricity through its combustion in gas engines.

The key findings of the Stage 1 and Stage 2 assessment are as follows:

- Two internationally designated sites are within 10km of the Proposed Development;
- No works will be taking place within the designated sites;
- The Stage 1 assessment concluded that there was the potential for likely significant effects on the qualifying features of both designated sites due to direct emissions to air (during construction), direct emission to water (during construction) and from noise (during construction and operation). As such, these risks were taken forward for consideration within the Stage 2 assessment;
- The Stage 2 assessment presents mitigation measures to avoid adverse effects on the designated sites during the construction period. These include dust management and pollution prevention measures that are outlined in this document and detailed within the outline CEMP and the air quality assessment. With the implementation of the measures proposed, it is considered there will be no potential for adverse effect on site integrity during construction, for either site.
- The Stage 2 assessment presents further analysis and scenarios regarding operational noise emitted by the Proposed Development. No areas of the designated sites will be subject to an increase in noise above the 3dB threshold, but a small area of grassland/scrub adjacent to the site will be subject to an increase above the threshold. However this will only be at night and will impact a small area of the habitat that is unlikely to support the designated species listed in the citations of the designated sites. Therefore, it is considered that there will be no potential for adverse effect on site integrity during construction, for either site.

1. Introduction

1.1 Background

Ove Arup and Partners Ltd. (Arup) was commissioned by Conoco Phillips to undertake a Stage 1 & Stage 2 Habitat Regulations Assessment (HRA) in relation to the construction of a Power Island utilising existing ethane products at the Site produced to generate electricity through its combustion in gas engines.

1.2 Purpose of this Document

This document has been prepared by Arup on behalf of ConocoPhillips to inform Stockton Borough Council (the 'competent authority') about the implications of the proposed works on internationally important sites, as required under Regulation 63 of The Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (amendment) (EU Exit) Regulations 2019[1] (hereafter referred to as the 'Habitats Regulations'). It is informed by contemporary Defra (Department for Environment, Food and Rural Affairs and Natural England, 2021)[2] and Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government (MHCLG) guidance (Ministry of Housing, Communities & Local Government, 2019).[3] In addition, it follows guidance contained within the Habitats Regulations Assessment Handbook.[4]

[1] In general, the EU Exit Regulations (see Reg. 4) retain the requirements and interpretation of, and relevance of guidance that applied to the 2017 Regulations, but with adjustments necessary to reflect the UK's exit from the European Union.

[2] Department for Environment, Food and Rural Affairs and Natural England (2021) Habitats regulations assessments: protecting a European site. Available at: https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site

[3] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities and Local Government (2019) Appropriate Assessment. Guidance on the use of Habitats Regulations Assessment. Available at: https://www.gov.uk/guidance/appropriate-assessment

[4] Tyldesley, D. and Chapman, C. (2013) *The Habitats Regulations Assessment Handbook*, April 2021 edition UK: DTA Publications Ltd.

2. The Habitats Regulations Assessment Process

2.1 Overview

An overview of the HRA process for projects within or with the potential to affect internationally important sites is provided in Figure 2:1.

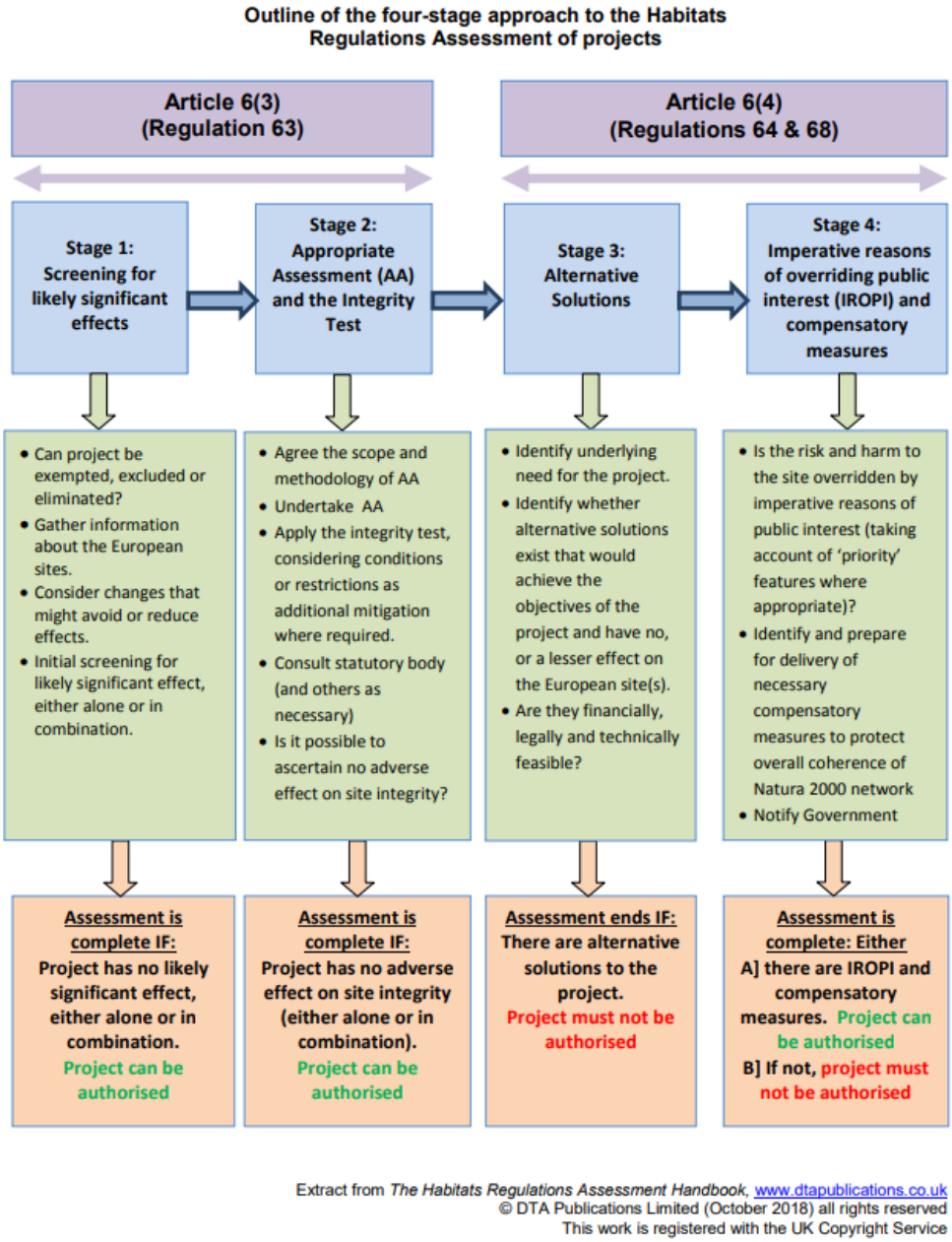

Figure 2:1: Outline of the four-stage approach to the HRA of projects.

2.2 Requirement of the Habitats Regulations

The Habitats Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna provides legal protection for habitats and species of international importance. The Directive is transposed into UK law by the Habitats Regulations.

Regulation 63 of the Habitats Regulations requires a competent authority to make an 'appropriate assessment' of the implications of a plan or project for that site in view of its conservation objectives, before deciding to undertake or give consent for a plan or project which: (a) is likely to have a significant effect on a

European important site (either alone or in combination with other plans or project); and, (b) is not directly connected with or necessary to the management of that site.

The HRA process employs the precautionary principle and Regulation 63 ensures that where a project is "*likely to have a significant effect,*" it can only be consented if the competent authority can ascertain (following an appropriate assessment) that it "*will not adversely affect the integrity of the European site.*" European Sites include Special Areas of Conservation (SACs), candidate SACs, Offshore Marine SACs and Special Protection Areas (SPAs). However, it is government policy in England and Wales to also include Wetlands of International Importance (Ramsar sites), potential SPAs and possible Ramsar sites as European Sites.

All plans and projects should identify any such possible effects early in the plan/project making process and then either alter the plan/project to avoid them or introduce mitigation measures to the point where no adverse effects occur. The competent authority is to agree to the plan or project only after having ascertained that it would not adversely affect the integrity of the site concerned and, if appropriate, having obtained the opinion of the general public.

An in-combination assessment is required where an impact is identified which would have an insignificant effect on its own (a residual effect) but where likely significant effects arise cumulatively with other plans or projects.

The assessment of a plan or project under the Habitats Regulations can be split into several sections as shown in Figure 2:1. There are effectively four stages to the assessment, comprising:

- **Stage 1 – Screening**: This is the assessment of the likelihood of a plan or project having a significant effect on a European important site or its features. This is the trigger for the need for an Appropriate Assessment as set out in Regulation 61(1).
- **Stage 2 - Appropriate Assessment**: This is the detailed consideration of the potential effects of the plan or project in relation to the conservation objectives for the European important site to determine if there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives). The integrity of a European site is described in the Government Circular (06/2005) on biodiversity and geological conservation as:

  "*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified*."

  Providing it can be demonstrated that with appropriate mitigation measures the plan or project would not give rise to an adverse effect on the integrity of a European important site, the plan or project can proceed.
- **Stage 3 - Consideration of Alternatives**: Where it cannot be demonstrated that the project could give rise to an adverse effect on the integrity of a European important site, or there is uncertainty, the assessment would need to consider if there were any other alternatives to the plan or project that would not give rise to adverse effects on the integrity of the European important site.
- **Stage 4 – Reasons of Overriding Public Interest:** If there are no alternatives, Stage 4 would then consider if there are any imperative reasons of overriding public interest, and whether there were any compensatory measures that might be required.

3. Proposed Development

3.1 Background

The Oil Terminal, located at Seal Sands and operated by ConocoPhillips is a crude oil reception, storage and trans-shipment facility. The Oil Terminal is designed to receive crude oil from UK and Norwegian fields via an offshore pipeline and to produce, store and export stabilised crude oil and refrigerated natural gas liquids (NGLs).

NGL feed is fractionated at the Terminal into individual components (methane, ethane, propane and mixed butanes) in a series of fractionating towers. The methane and a portion of the ethane is consumed as plant fuel; the remaining ethane, propane, and butanes are refrigerated and are currently stored onsite ready for bulk sale to world markets.

Due to a combination of declining crude oil throughput, plant turndown limitations and a narrow market for ethane as a product, ConocoPhillips has identified the Proposed Development as an alternative outlet for the methane/ethane mix, namely, to generate energy in gas engines.

The Proposed Development will be capable of consuming all the excess methane/ethane, not required to fuel the existing process, to generate electrical power both for site usage (reducing the need to import electricity) and export to the National Grid.

The Proposed Development provides the Oil Terminal with a scalable, flexible outlet for the excess gas stream and allows retirement of existing liquid ethane assets at the Teesside Oil Terminal thereby simplifying the NGL process.

The Proposed Development is a key enabler for the future electrification and subsequent decarbonisation of the Oil Terminal operation, in line with the UK Government targets and ConocoPhillips' corporate net zero ambition.

3.2 Description of the Proposed Development

The total generation capacity of the Power Island would not exceed 49.9 MWe. The Power Island would comprise up to a maximum 16 No. gas engine units that would generate electrical power for use at the Oil Terminal, with excess power being exported to the National Grid.

The actual number of engines installed will be dependent on projected volumes of available fuel gas and is expected to be lower than the maximum 16 included in the assessment, being more likely to be 14. It should also be noted that a number of the installed engines (up to four) will be provided to provide redundancy to ensure that the availability of the Proposed Development meets target levels. It is therefore considered likely that the maximum number of engines that are actually operated at the same time would be 10.

In addition, the available fuel gas volumes will decline over time, and therefore the number of engines needing to operate would reduce correspondingly, such that the number of engines operational remains appropriate for the available fuel gas volume. The maximum number of engines (14) are therefore only likely to be operational for the first 4-5 years of operation of the Proposed Development, with operational engines reducing rapidly after this time. For the purposes of this assessment a reasonable realistic worst-case scenario of 14 engines has been assessed.

The Proposed Development will be in continuous operation 24 hours per day, seven days per week.

The Proposed Development will be linked to the Oil Terminal existing fuel gas and utility supplies. There are existing electrical connections between Substations within the Oil Terminal and the Proposed Development. Small areas of land within the Oil Terminal will be utilised to accommodate a new fuel gas conditioning and control equipment and interconnecting pipework. Fibre optic data cable connections will be established between the Proposed Development and the main Control Room for the Oil Terminal.

The illustrative proposed site layout for the Power Island is shown in Figure 3:1 and Figure 3:2.

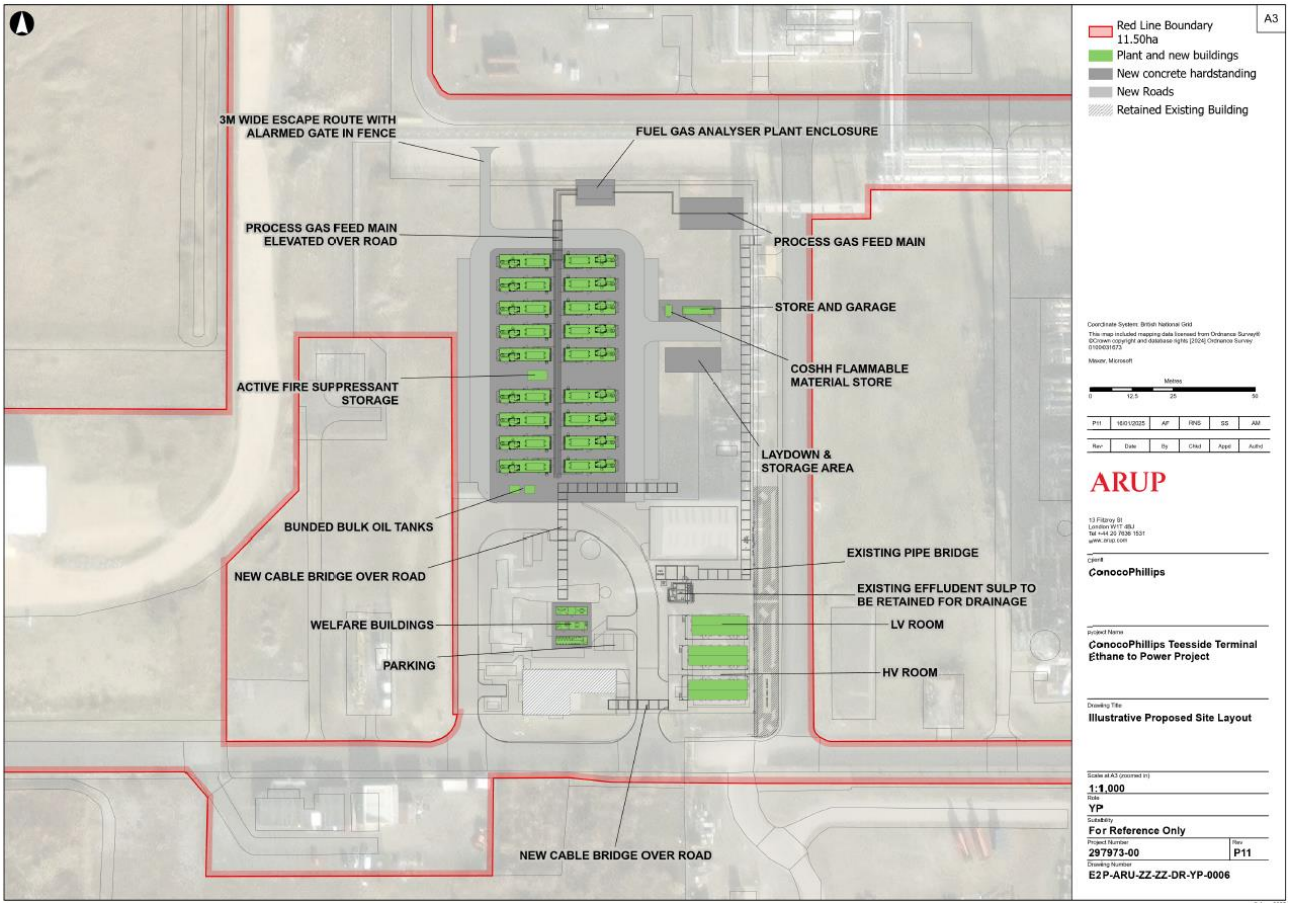

Figure 3:1: Illustrative Proposed Site Layout

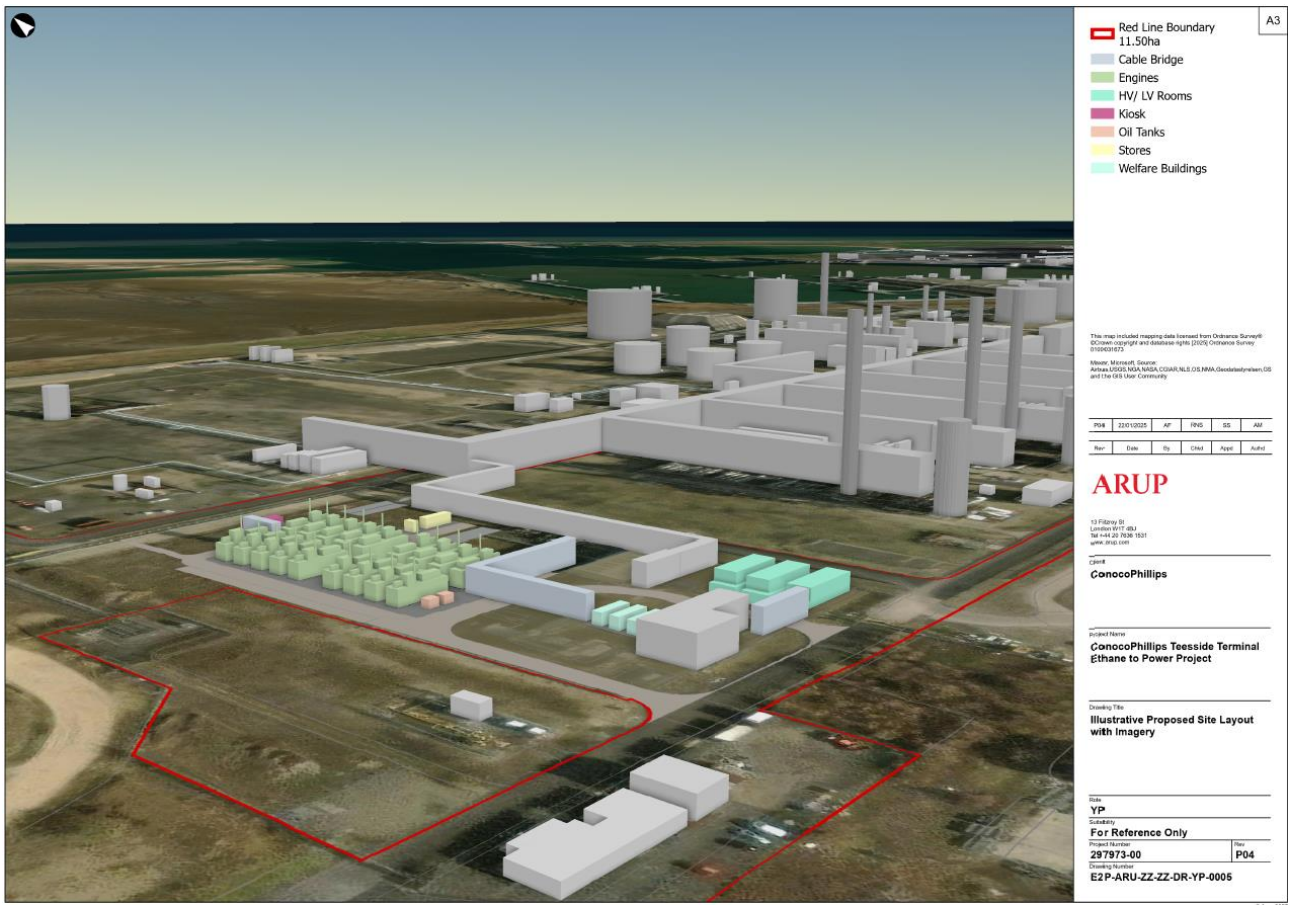

Figure 3:2: Illustrative Proposed Site Layout with Imagery

The Proposed Development is anticipated to comprise the following elements:

3.3 Power Plant

- Up to a maximum of 16 No. gas engine units, each measuring approximately 15m (L) x 3.5m (W) x 3.2m (H);
- Up to 16 stacks (one per engine unit) up to a maximum height of 10.4m (H);
- Up to 3 No. electrical rooms each measuring approximately 16m (L) x 4m (W) x 3.5m (H);
- Existing Substation building located at the southern end of the Proposed Development;
- Existing electrical transformers, each measuring approximately 1.5m (L) x 1m (W) x 1.5m (H);
- The gensets installed on the Power Island will be connected to separate external bulk tanks, for storage of fresh lubrication oil and recovered, waste lubrication oil (each approximately $5m^3$). Each tank will contain up to a maximum of 10,000 litres of oil, housed within an integrally bunded steel tank;
- Each genset will have an individual, small dry tank containing a normal inventory of fresh lubrication oil contained within the genset enclosure; and
- A fuel gas metering control kiosk.

Further project refinement has now reduced the maximum number of installed engines to 16. The project's aim is to minimise the potential for having to flare the fuel gas if it can't be used in the gas engines, and therefore there will be a number of engines installed for redundancy, to ensure that availability of the engines is >95%. Therefore, the realistic number of engines actually operating at the same time is likely to be a maximum of 12, and therefore significantly lower than the worst-case scenario presented for the planning application.

3.4 Ancillary Infrastructure

- The preliminary design of the Power Island has been based on the installation of 8 No. lighting columns with a maximum height of approximately 7.5m. This is to be confirmed by the Vendor who will conduct a lighting assessment;
- Approximately 2 No. new fire hydrants, connected to the existing fire water system at the Oil Terminal;
- Existing pipe bridge above ground to accommodate gas supply and utility pipework to the Power Island;
- New connections from the existing pipe bridge to the gas engines via a new pipe bridge and new manifold;
- Use of the existing electrical connection (below ground) between the Proposed Development site and the main substation serving the Oil Terminal site;
- Installation of a new fibre optic data cables between the Proposed Development to an interface within the Oil Terminal Control Room, to provide appropriate telemetry management and monitoring. This telemetry link will provide ConocoPhillips with continuous visibility of the status of operations at the Proposed Development, including key process information. A dedicated emergency shutdown (ESD) signal cable will also be installed, to enable personnel to activate an ESD from the Control Room in the event of a confirmed fire or other incident, to limit the consequences to both Proposed Development and Oil Terminal. Data cables will be routed on existing overhead pipe racks and/or underground ducts;
- Refurbishment of existing surface water drain and pump system on the Site, as needed to accommodate the Proposed Development;
- An extension of the existing internal access road to accommodate vehicles required for the operation and maintenance of the Proposed Development;
- Installation of three new single story modular buildings for office space and welfare facilities;

- Retention of the existing palisade security fence to the west, south and east boundaries of the Site, and addition of new palisade fencing to the northern and north-western boundaries of the Proposed Development; and
- Use of the existing Oil Terminal access road along the southern boundary of the Site for construction and operational phases.

3.5 Transport and Access

- Use of the existing PD Teesport Ltd access road network from its junction with the public highway network at the roundabout junction of the A1185 and A178 (Seaton Carew Road), to the Proposed Development Site for construction and operational phases; and
- A vehicle parking area for up to 4 No. vehicles.

3.6 Drainage

- Fire water will continue to be supplied from the Oil Terminal to fire hydrants located at the Proposed Development;
- All surface water run-off from the Proposed Development during construction and operation will be routed through the Power Island collection facilities to the existing Terminal drainage, effluent storage and treatment facilities.
- The lubrication oil bulk storage tanks will be supplied with 110% capacity integral bunds, providing full secondary containment in the event of a failure of primary containment. Separate clean and waste tanks will be installed;
- Foul water drainage will be via the existing welfare facilities located in the existing building to the south of the Proposed Development when the Site is operational. No new foul drainage is required, local collection of this material will be via septic tank; and
- During construction, temporary facilities will be provided to remove sand/sediment/soil from surfaces water runoff prior to discharge to the Terminal drainage system. Silt collected during construction will be disposed offside via licensed waste contractors. Solid removal facilities are not required within the drainage system during operation.

3.7 Construction

Construction is anticipated to take place over a period of approximately 24-36 months, commencing in Autumn 2025 subject to planning approval. Construction requirements are likely to include:

- Temporary construction and maintenance compound area;
- Repurposing of existing facility and temporary cabins during the construction phase to provide welfare facilities for increased numbers of personnel. Temporary cabins will be removed prior to operation;
- Enabling works including site compound set up and site clearance;
- Piling works (assumed to be non-percussive piles);
- Formation of hard standing;
- Delivery and installation of gas engines;
- Landscaping and external works; and
- Demobilisation of site compound.

The lighting will be similar as the existing Oil Terminal. Nighttime lighting required for access and security.

All routes are accessible by heavy good vehicles (HGVs), low loaders and routine industrial traffic and delivery times are expected to be outwith peak hours. However, the site is not accessible by public transport

and cannot be easily accessed by walking or cycling due to the remote location. It is anticipated that the majority of construction workers can travel to site via a minibus and car sharing. Normal planned construction working hours are expected to be Monday to Friday, 10 hours per day.

3.7.1 Construction Piling

A site investigation was completed in December 2024 at the location of the Proposed Development to establish the ground conditions which will inform the civil engineering design of the facility. The output of this study included a recommendation that a piled foundation solution should be developed, with Continuous Flight Auger (CFA) techniques to be used. Approximately 150 piles in total would be installed on the Power Island, with eight piles per engine to support the load. It has been advised by project civil engineering specialists that by employing one piling rig, all 150 piles could be installed within a three-week period. This technique is recognised for the low levels of noise and vibration generated during installation of the piles, such that this piling technique poses no special risk to environmental receptors.

A detailed construction schedule has not yet been developed, however taking into consideration the short duration of the piling activities and the specific piling methods selected, the risk of disturbing protected species and during sensitive periods is considered to be no greater than any other aspect of the construction methodology.

3.8 Noise

The noise emissions from the Proposed Development have been modelled based on information provided by ConocoPhillips, the full methodology and results can be viewed within the noise report[5] and are summarised within this assessment.

[5] Arup (2025) ConocoPhillips, Ethane2Power, Noise Survey & Assessment

4. Methodology

4.1 Desk Study and Evidence Gathering

The ecological data reviewed to inform the HRA comprised:

- Information on the internationally important designated sites available through Natural England Open Data.[6]
- Designated site data sheets available from the Joint Nature Conservation Committee (JNCC)[7], Natural England citation sheets[8], and Ramsar Sites Information Service.[9]
- Updated information regarding designated sites available from Natural England's Designated Sites View.[10]
- Preliminary Ecological Appraisal[11]
- Data sourced from the British Trust for Ornithology – Wetland Bird Surveys (WeBS).

No bird surveys were undertaken as part of this assessment, however based on professional judgement and use of the precautionary principle (as detailed in Section 4.2.4) this is not a fundamental limitation of this assessment and the assessment is robust and valid.

4.2 Habitats Regulations Assessment Methodology

In order to understand the potential implications for internationally important sites from the Proposed Development, it is necessary to identify those sites that are located close to the project or where there is a pathway for effect on internationally important sites.

All internationally designated sites within a 10km radius of the Proposed Development were identified. Potential pathways for effect were identified and available ecological data was used to support the assessment to determine the likelihood for a significant effect.

4.2.1 Understanding Qualifying Interests and Conservation Objectives

For sites identified, the qualifying features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any effects that might arise from the project.

4.2.2 Identification of the Potential Effects of the Project

Any potential pathways for effect on European Sites resulting from the project were identified prior to consideration of best practice procedures (for example, Guidelines for Pollution Prevention and Construction Industry Research and Information Association (CIRIA) guidance) or the integration of any mitigation measures.

4.2.3 Identification of Plans or Projects Considered for In-Combination Effects

An 'in-combination' assessment is required where the project may have an effect on a European Site, but on its own the effects would not be significant. The potential effects of the project should be considered in-

[6] Natural England Open Data. https://naturalengland-defra.opendata.arcgis.com/

[7] Natura 2000 Standard Data Form – Teesmouth and Cleveland Coast. Available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9006061.pdf

[8] Teesmouth & Cleveland Coast SPA. Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9006061&SiteName=tees&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

[9] RIS. Teesmouth & Cleveland Coast. Available at: https://rsis.ramsar.org/ris/741

[10] NE. *Designated Sites View* Available: https://designatedsites.naturalengland.org.uk/

[11] Arup (2025). ConocoPhillips Ethane2Power – Preliminary Ecological Appraisal.

combination with other plans or projects that similarly may have an effect, where the combined effects may become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the European Sites identified were obtained from the local planning authority website[9] to inform the in-combination assessment of the project.

4.2.4 Consideration of the Significance of Potential Effects

The significance of potential effects was assessed in the absence of any avoidance and/or mitigation measures. The assessment has been made with awareness of the conservation objectives for the features of the European Sites, although as stated in the relevant guidance the assessment of the project against the conservation objectives is not required until the Appropriate Assessment stage of the HRA process. In the assessment of the significance of effects, professional judgement was applied using the following criteria (as sufficient information about the elements and interests is often unavailable):

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects is likely to occur (e.g. construction and/or operation);
- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

Where there was not enough information about the risk of qualifying interest being present, or of the risk of effects, the assessment used the precautionary principle to inform the judgement. The precautionary principle has been applied to ensure that any assessment errs on the side of caution, without being overly cautious. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

5. European Sites Potentially Affected by the Proposal

Two European Sites were identified within 10km of the project, Teesmouth and Cleveland Coast SPA and Teesmouth and Cleveland Coast Ramsar. The location of these sites is illustrated in Drawing 1.

5.1 Teesmouth and Cleveland Coast SPA

Teesmouth and Cleveland Coast SPA comprises 1,200ha of coastal habitats, centred on the Tees Estuary. Habitats on site include sandflats, mudflats, rocky foreshore, saltmarsh, sand dunes, wet grassland, and freshwater lagoons. The site is designated for avian features and is located within 200m of the site boundary.

The overall conservation objective for the SPA is to "*ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;*

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The population of each of the qualifying features, and,*
- *The distribution of the qualifying features within the site."*

Table 5.1: Description of interest features of Teesmouth and Cleveland Coast SPA, and their conservation objectives.

Interest features	Description of Features and their Conservation Objectives	Pressures and threats to conservation status[12]
The site regularly supports more than 1% of the Great Britain populations of five species listed in Annex I of the EC Birds Directive: • Avocet *Recurvirostra avosetta*; • sandwich tern *Sterna sandvicensis*; • common tern *Sterna hirundo*; • little tern *Stermula albifrons*; and • ruff *Philomachus pugnax*.	Key sub-features: • Sand and shingle areas – sparsely vegetated shingle/sand areas fronting sand dune systems provide an important nesting area for little terms. Colonies are located at Hart Warren Dunes, South Gare and Coatham Sands, and Seaton Dunes. • Intertidal sandflat and mudflat – these habitats provide roosting and loafing sites for the sandwich tern population during the post-breeding period (July and August) before autumn migration, and for little tern in summer (May to August). North Gare Sands, Seal Sands, Bran Sands and Coatham Sands are key sites. • Shallow coastal waters – shallow coastal waters comprise the main feeding areas for little and sandwich terns. Both species feed almost exclusively on fish (particularly sprats and sand eels). Conservation objectives: Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of	• Physical modification poses a threat to the habitat used by red knot, common redshank, and the general waterbird assemblage. As a result, measures are being put in place to create/restore intertidal habitat rich in soft sediments. • Public access/disturbance poses a threat to red knot, common redshank, sandwich tern, little tern, and the general waterbird assemblage, particularly their ability to roost safely. As a result of this, measures are being put into place to create/restore safe roosts and manage recreational use of these areas. • Direct land take from development poses a threat to red knot, common redshank, sandwich tern, little tern, and the wider waterbird assemblage. To reduce this threat, the council, Tees Valley Local Enterprise Partnership (LEP), and landowners will ensure the coverage of protected sites is adequate and will develop strategic mitigation. • Water pollution poses a threat to red knot, common redshank, and the

[12] Natural England. (2014). Site Improvement Plan: Teesmouth & Cleveland Coast (SIP236). Available at: https://publications.naturalengland.org.uk/publication/5803888850501632

Interest features	Description of Features and their Conservation Objectives	Pressures and threats to conservation status[12]
	the regularly occurring Annex I bird species, under the Birds Directive, in particular: • Sand and shingle. • Intertidal sandflat and mudflat. • Shallow coastal waters.	wider waterbird assemblage. To reduce this threat, algal mats will be monitored, and any remaining significant nutrient inputs identified. • Commercial and recreational marine and estuarine fisheries pose a threat to red knot, common redshank, sandwich tern, and the wider waterbird assemblage. The impacts of bait collection on non-breeding waterbirds will be investigated and managed, to reduce the threat this poses. • Undergrazing poses a threat to common redshank and the wider waterbird assemblage. To reduce this threat, areas of brownfield and wet grassland will be managed. • Inappropriate water levels pose a threat to common redshank and the wider waterbird assemblage. To reduce this risk, a sustainable high quality freshwater supply is to be secured. • Predation poses a threat to the little tern population. To reduce this risk, wardening of the little tern colony will continue. • Coastal squeeze poses a threat to red knot, common redshank, sandwich tern, little tern, and the wider waterbird assemblage. To reduce this threat, intertidal habitat rich in soft sediments are to be created/restored. • A change to the site conditions poses a threat to little tern. To reduce this threat, suitable habitat for breeding little tern will be created/restored. • Air pollution, specifically, the impact of atmospheric nitrogen deposition, may pose a threat to little tern. The impacts of this on little tern will be investigated following further guidance.
The Site regularly supports more than 1% of the biogeographic population of two regularly occurring migratory species not listed in Annex I of the EC Birds Directive; • Red knot; and • common redshank.	Key sub-features: • Rocky shores – provide food resources for wintering knot population, and are used by a small proportion of the autumn redshank population. Those at a higher tidal level are used (largely by knots) as high water roosting sites, especially at Seaton Snook. • Intertidal sandflat and mudflat – support high densities of invertebrates, an important food for knot and redshank. More sheltered areas with a relatively high silt content support a richer biomass than more exposed areas. Seal Sands, North Tees Mudflat, and Greatham Creek are of prime importance for redshank, while knot favour Seal Sands and Hartlepool North Sands. Knot also roost at higher tidal levels at North Gare Sands, Bran Sands and Hartlepool North Sands. • Saltmarsh – concentrated on the margins of Greatham Creek and within Seal Sand Peninsula enclosures, provide roosting opportunities for redshank. • Grazing marsh – a small proportion of the redshank population use grazing marsh habitats outside of the EMS. Conservation objectives: Subject to natural change, maintain in favourable condition the habitats for the internationally important populations of regularly occurring migratory bird species, under the Birds Directive, in particular: • Rocky shores. • Intertidal sandflat and mudflat. • Saltmarsh.	
The Site qualifies under Article 4 of the Birds Directive (2009/147/EC) as it used regularly by over 20,000 waterfowl (waterfowl as defined by the Ramsar Convention) or 20,000 seabirds in any season.	Key sub-features: • Rocky shores – present around Hartlepool Headland/North Sands South Gare, Coatham and Redcar Rocks and Seaton Snook. Provide a substrate for a different range of prey species. These areas are important bird feeding habitats. Small mussels are eaten by knot, and these and other invertebrates are taken by a small	

Interest features	Description of Features and their Conservation Objectives	Pressures and threats to conservation status[12]
	proportion of the wintering redshank population. • Rocky shores at higher tidal levels are also used (largely by knot) as high water roosting sites, especially at Seaton Snook. • Intertidal sandflat and mudflat – these habitats on site support high densities of invertebrates, which are important winter food for knot, redshank, shelduck, and sanderling. Generally more sheltered areas with relatively high silt content support a richer biomass than more exposed areas. • Saltmarsh – this habitat on site provides significant feeding and roosting opportunities for many species of waterbirds, including redshank, shelduck and teal. Important sites are Greatham Creek and Seal Sands Peninsula enclosure. • Grazing marsh – A high proportion of the assemblage uses grazing marsh habitats outside of the EMS. Conservation objectives: Subject to natural change, maintain in favourable condition the habitats for the internationally important assemblage of waterbirds, under the Birds Directive, in particular: • Rocky shores • Intertidal sandflat and mudflat • Saltmarsh	

5.2 Teesmouth and Cleveland Coast Ramsar Site

The Ramsar Site is an estuarine complex of intertidal sand and mudflats, rocky shore, saltmarsh, freshwater marsh and sand dunes. The site supports a wide range of invertebrates, including *Pherbellia grisescens*, *Thereva valida, Longitarsus nigerrimus*, *Dryops nitidulus*, *Macroplea mutica*, *Philonthus dimidiatipennis* and *Trichohydnobius suturalis* (red data book species). The site is designated for its importance as a spring and/or autumn staging area for migratory waterbirds and is located within 200m of the site boundary.

Table 5.2: Description of interest features of Teesmouth and Cleveland Coast Ramsar, and their conservation objectives.

Interest features	Description of Features and their Conservation Objectives	Pressures and threats to conservation status
The Site qualifies under Ramsar criterion 5 – assemblages of international importance. Species with peak counts in winter: 9528 waterfowl (5 year peak mean 1998/99-2002/2003)	The site is noted for internationally important populations of red knot. Conservation objectives are not provided for Ramsar Sites. However, the Ramsar has a similar geographical area and qualifying bird species as the SPA.	Vulnerabilities for individual features are not provided, however, the Ramsar has a similar geographical areas and qualifying bird species as the SPA (detailed above). Eutrophication is identified as the main factor adversely affecting the site's ecological character. Land uses at the site include habitat/nature conservation and grazing.
The Site qualifies under criterion 6-species/populations occurring at levels of international importance. Qualifying species/populations (as identified at designation):	The Ramsar population of common redshank (5 year peak mean 1998/9-2002/3) was 883 individuals, representing an average of 0.7% of the GB population.	

Interest features	Description of Features and their Conservation Objectives	Pressures and threats to conservation status
Species with peak counts in spring/autumn: • Common redshank Species with peak counts in winter: • Red knot (*Calidris canutus islandica*), West & Southern Africa (wintering)	The Ramsar population of red knot *Calidris canutus islandica* (5 year peak mean 1998/9-2002/3) was 2579 individuals, representing an average of 0.9% of the GB population. Conservation objectives are not provided for Ramsar Sites. However, the Ramsar has a similar geographical area and qualifying bird species as the SPA.	

6. Consideration of Any Likely Significant Effects on European Sites

6.1 Introduction

This assessment considers whether the proposed works are directly connected with or necessary to, the management of the European designated sites listed in Section 5. It also checks whether the proposed works have the potential for a Likely Significant Effect (LSE). A European designated site will only be at risk from LSE where the Source-Pathway-Receptor (S-P-R) link exists between the site and the European designated site.

Due to the similarities and overlapping nature of the designated site, the assessments of them have been combined.

6.1 LSE from direct emission to air

Construction and operation activities can result in an increase in chemicals, dust and other harmful substances into the air. A reduction in air quality can lead to a loss of deterioration of habitat within the European designated site - for example, dust arising from construction can be deposited on vegetation and effect photosynthesis and respiration.

6.1.1 Construction

There will be no demolition as part of the Proposed Development. Medium and small dust emissions associated with earthworks, construction and trackout will be emitted during the construction phase[13].

6.1.2 Operation

The pollutants modelled within the Air Quality assessment include Nitrogen (N), Sulphur Dioxide (SO2), Nitrous Oxides (NOx) and Acidity. No ecological receptors (Appendix B-2, Drawing 2 and Drawing 3) were assessed as being above the Critical Level for the NOx, SO2 and Acidity assessments[13].

Nitrogen deposition was assessed as occurring a 2.6% and 2.9% increase at two ecological receptors (Critical Level is any increase above 1%). However, it was noted during the assessment that the background Nitrogen deposition has fluctuated since 2003 and that the Proposed Development would not cause the receptors to increase above the maximum Nitrogen deposition that occurred in 2018. Furthermore, the assessment was based on 18 engines running continuously[14] and that a reduction to 10 running engines continuously (considered to be the most likely scenario) would reduce the predicted Nitrogen deposition to 1.6% at both receptors.

Further project refinement has now reduced the maximum number of installed engines to 16. The project's aim is to minimise the potential for having to flare the fuel gas if it can't be used in the gas engines, and therefore there will be a number of engines installed for redundancy, to ensure that availability of the engines is >95%. Therefore, the realistic number of engines actually operating at the same time is likely to be a maximum of 12, and therefore significantly lower than the worst-case scenario presented for the planning application. The basis of the Environmental Permit application that is currently being developed is a maximum of 16 engines, with a realistic operational case of a maximum of 12 engines. This is still considered to be conservative, supported by the fuel gas volumes data provided in Table 6.1.

[13] Arup (2025) ConcoPhillips, Ethane2Power, Air Quality Assessment.

[14] 18 engines were assessed under the original application. As mentioned in Section 3, the development will now consist of 16 engines as a maximum.

Table 6.1: Fuel Gas Flows.

Year	Maximum Predicted Flows		Average Predicted Flows	
	Available Fuel Input (MWth)	No. of Operational Engines	Available Fuel Input (MWth)	No. of Operational Engines
2027	48.7	10.1	40.6	8.5
2028	51.0	10.6	42.5	8.8
2029	52.7	11.0	43.9	9.1
2030	47.0	9.8	39.2	8.2
2031	34.7	7.2	28.9	6.0
2032	45.8	9.5	38.1	7.9
2033	39.9	8.3	33.2	6.9
2034	30.3	6.3	25.2	5.3
2035	26.9	5.6	22.4	4.7
2036	22.3	4.6	18.6	3.9
2037	9.9	2.1	8.3	1.7
2038	9.8	2.0	8.2	1.7
2039	5.9	1.2	4.9	1.0
2040	9.7	2.0	8.1	1.7
2041	5.8	1.2	4.9	1.0
2042	5.8	1.2	4.8	1.0
2043	5.8	1.2	4.9	1.0
2044	5.8	1.2	4.9	1.0
2045	2.0	0.4	1.7	0.3
2046	0.0	0.0	0.0	0.0
2047	0.0	0.0	0.0	0.0

As shown in Table 6.1, the available gas levels for the engines will peak in 2029 and will decrease year on year after this. As such, the emissions calculated will also decrease from the levels detailed above and in the Air Quality Assessment. Critical loads for Nitrogen deposition are generally modelled over a 20-30 year period[15], therefore it is likely that the levels emitted by the Proposed Development will fall below the critical load within a few years of operation.

Therefore, it is considered unlikely that Nitrogen deposition associated with the Proposed Development will have a significant impact on the designated sites.

[15] CIEEM (2023) Advice on Ecological Assessment of Air Quality Impacts, Version 2. Chartered Institute of Ecology and Environmental Management. Winchester, UK

Therefore, there will be no likely significant effects on the conservation objectives on both of European designated sites as a result of direct emissions to air during the operational phase only.

6.2 LSE from direct emissions to water

6.2.1 Construction

During the construction phase, water pollution could occur through spillage of polluting materials. All surface water and foul water runoff will be discharged via the existing drainage infrastructure which is treated for entrained oils before being pumped to Bran Sand treatment works on the south bank of the River Tees.

6.2.2 Operation

During the operation of the Proposed Development, all surface water runoff will be discharged via the existing drainage infrastructure which is treated for entrained oils before being pumped to Bran Sand treatment works on the south bank of the River Tees.

Therefore, there will be no likely significant effect on the conservation objectives of both of the European designated sites as a result LSE from direct emission from direct emissions to water during construction and operation.

6.3 LSE from lighting

6.3.1 Construction

No works will be undertaken outside of standard working times (0700-1800). Mobile floodlights will only be used in early morning/late afternoons when daylight is not sufficient for safe working and will only light the working area. No areas of the site will be lit overnight.

6.3.2 Operation

A detailed lighting design has not yet been commissioned for the Proposed Development; however the following principles have been laid out:

- *All external lighting shall be designed to minimise any upward environmental impacts and where practicable be aligned with best practice dark skies. PIR sensors, or remote switching shall ensure that lighting is only activated when personnel are required on plant.*
- *General road lighting shall be limited to 50 lux average and be installed on the permitter of the roads.*
- *The gas engines are enclosed in modules, the majority of task lighting shall be internal only.*
- *External areas shall be limited to 50 lux average for walkways and where task lighting is required.*
- *The E2P plant is automated with minimal manual intervention required. The lighting schemes shall be designed to be in operation only during routine checks, or alternatively when equipment requires investigation.*
- *No vehicle movements are expected during the night hence the road lighting would only be illuminated intermittently.*

Lux levels of individual lighting units will be selected in accordance with levels detailed in Table 6.2.

Table 6.2: Lux Design Levels.

Area	Lux
Control room – general lighting	400
Control room – back of panel	100

Area	Lux
Control room – horizontal line of vertical surface	400
Offices and administrative indoor areas	500
Indoor workshops	50
Outdoor pump area	100
Indoor pumps and compressor house	50
Operating platforms, access ways and highway	50
Store (small parts)	200
Warehouse and general storage	100
Inactive storage areas	50
Drafting offices	750

As all external areas will only be lit when movement (i.e. inspection or repairs) is detected by PIR sensors and the lighting will be designed in alignment with good practice principles, it is anticipated, there will be no impacts on the designated sites as a result of operational lighting within the Proposed Development.

Therefore, there will be no likely significant effect on the conservation objectives of both of the European designated sites as a result of lighting.

6.4 LSE from loss of habitat used by Annex II species

There will be no land take from any European designated site as part of the Proposed Development both during construction and operation. Furthermore, the habitats on site are unsuitable to host Annex II species and no Annex II species were observed within the Proposed Development boundary during the PEA site visits[11]. Therefore, there is no source for this impact to occur.

Therefore, there will be no likely significant effect on the conservation objectives of both of the European designated sites as result of habitat loss.

6.5 LSE from noise

Seven bird species are listed within the citations of the designated sites: ruff, pied avocet, common tern, little tern, sandwich tern, redshank and red knot. Of these species, only two are present in significant numbers (i.e. more than 1% of the total population of the designated site) within the Seal Sands area of the designated sites based on the WeBS data search: sandwich tern and redshank. Common tern and little tern were recorded within the WeBS data, but their numbers were not significant. However, it is noted by the BTO that tern counts are optional during the WeBS assessment so the absence of tern counts may not reflect the actual numbers of birds present. Therefore, it is assumed as a precaution that common tern and little tern are present in significant numbers. Ruff, pied avocet and red knot were not recorded in the WeBS data and are assumed to not be present within the Seal Sands area of the designated sites.

Overall, this assessment will consider the impacts of noise on redshank, common tern, little tern and sandwich tern.

6.5.1 Construction

Natural England standing advice for the Tees Estuary is that any noise increase (one off or continuous) of **3dB over the baseline** is considered significant. During construction, it is not anticipated that general construction activities (e.g. vehicles movements, generators, concrete mixers) will cause an increase above 3dB above baseline[22].

Approximately 150 piles in total would be installed on the Power Island, with eight piles per engine to support the load using CFA techniques. It has been advised by project civil engineering specialists that by employing one piling rig, all 150 piles could be installed within a three-week period. This technique is recognised for the low levels of noise and vibration generated during installation of the piles, such that this piling technique poses no special risk to environmental receptors.

Furthermore, a piling trial was undertaken in 2014 at the ConocoPhillips site, to assess the impacts of percussive piling (a louder method than CFA) on bird disturbance within the Seal Sands lagoon[16]. This trial was located within 200m of the designated site boundary and took place over 15 sessions in March 2014 (totalling 96 hours) with a suitably qualified ecologist positioned on the sea wall overlooking the Seal Sands lagoon to monitor the birds. During these sessions, the noise level was exceeded 874 times, and no birds were recorded to have been disturbed by the percussive piling[16].

A detailed construction schedule has not yet been planned for the Proposed Development; however an indicative list of plant and uptime has been prepared. This is detailed in Table 6.3.

Table 6.3: Indicative Construction Noise.

Equipment	No. of plant	Source	Sound Power Level, Lw dB	Typical on-time (%)
Crawler Mounted Rig	1	BS5228 Table C3-21	107	60
Wheeled loader	1	BS5228 Table C9-27	105	30
Articualted dump truck (tipping fill)	1	BS5228 Table C2-32	102	30
Dozer	1	BS5228 Table C2-13	106	20
Vibratory plate (petrol)	1	BS5228 Table C2-41	108	10
Concrete mixer truck	1	BS5228 Table C4-20	108	20
Concrete pump	1	BS5228 Table C3-25	106	20
Lorry on access road	N/A	BS5228 Table C11-7	107 (passing by noise level, worst-case assumption)	N/A

Noise maps illustrating the typical and highest levels of construction noise can be seen in Drawing 5 and Drawing 6. Under typical activities, none of the ecological receptors will be subject to noise 3dB or higher above baseline. However, under the highest levels of activity, receptors E1, E3, E6 and E7 will all be subject to noise 3dB above baseline.

Receptor E1 is located to the north of the Proposed Development and is within the wider ConocoPhillips landholdings. This area was not accessed during the PEA however it was viewed from the boundary of the habitat, and it was noted that this area was dominated by bramble and rose scrub over grassland (appearing to be similar in species composition to the modified grassland recorded within the PEA survey area). None of the three tern species considered within this assessment will utilise this habitat for nesting/passage roosts as they prefer sand or shingle beaches[17][18][19] and are noted within the citation to nest/roost elsewhere within the

[16] INCA (2014) De-construction noise and bird monitoring, ConcoPhillips

[17] BTO (2025) Common Tern. Available at: https://www.bto.org/understanding-birds/birdfacts/common-tern

[18] The Wildlife Trusts (2025) Sandwich Tern. Available at: https://www.wildlifetrusts.org/wildlife-explorer/birds/seabirds/sandwich-tern

[19] BTO (2025) Little Tern. Available at: https://www.bto.org/understanding-birds/birdfacts/little-tern

designated site[20]. While redshank utilise grassland areas, they prefer wetland areas[21] and are noted within the SPA citation that they are likely to utilise saltmarsh within the designated sites[20]. Due to the high scrub cover, it is considered that they are unlikely to be using these areas of habitat adjacent to the site.

Overall, is not anticipated that any species considered in this assessment will be utilising this area. Therefore, it is considered unlikely that there will be any significant effect on the designated sites from noise during construction at Receptor E1.

However, there will be noise in exceedance of 3Db above baseline at Receptors E3, E6 and E7, all of which are situated within the designated site and may support designated species/a waterbird assemblage. Therefore, the species considered within this assessment will be impacted by noise emitted by the Proposed Development.

6.5.2 Operation

Natural England standing advice for the Tees Estuary is that any noise increase (one off or continuous) of 3dB over the baseline is considered significant. The initial noise assessment was carried out on the assumptions that 18 engines[14] will be in operations for 24 hours a day, 7 days a week. The noise impacts from operation were assessed over two timeframes – day (0700-2300) and night (2300-0700)[22]. 32 receptor points were selected for the noise assessment; these provide an understanding of the noise impacts at various locations across the designated sites and the supporting habitats (Drawing 4). The results for the assessment are detailed in Table 6.4.

Table 6.4: Noise Assessment results for 18 engines.

Receptor	Baseline		Operational Noise Level	Noise limit criteria (3dB above baseline)		Exceedance (above 3dB)	
	LA90, modal, day	LA90, modal, night		Day	Night	Day	Night
E1	39	31	45	42	34	3	11
E2	39	31	32	42	34	-10	-2
E3	39	31	38	42	34	-4	4
E4	39	31	34	42	34	-8	0
E5	39	31	38	42	34	-5	4
E6	39	31	41	42	34	-1	7
E7	39	31	39	42	34	-3	5
E8	39	31	37	42	34	-5	3
E9	39	31	37	42	34	-5	3
E10	39	31	35	42	34	-7	1
E11	39	31	36	42	34	-6	2
E12	39	31	38	42	34	-4	4

[20] Natural England (2020) Teesmouth and Cleveland Coast SPA Citation. Available at: https://publications.naturalengland.org.uk/publication/6619918699069440

[21] BTO (2025) Redshank. Available at: https://www.bto.org/understanding-birds/birdfacts/redshank

[22] Arup (2025) ConocoPhillips, Ethane2Power, Noise Survey & Assessment

Receptor	Baseline		Operational Noise Level	Noise limit criteria (3dB above baseline)		Exceedance (above 3dB)	
	LA90, modal, day	LA90, modal, night		Day	Night	Day	Night
E13	39	31	36	42	34	-6	2
E14	39	31	34	42	34	-8	0
E15	39	31	32	42	34	-10	-2
E16	39	31	27	42	34	-15	-7
E17	39	31	21	42	34	-21	-13
E18	39	31	25	42	34	-17	-9
E19	39	31	22	42	34	-20	-12
E20	39	31	20	42	34	-22	-14
E21	39	31	31	42	34	-12	-4
E22	39	31	28	42	34	-14	-6
E23	39	31	35	42	34	-7	1
E24	39	31	31	42	34	-11	-3
E25	39	31	21	42	34	-21	-13
E26	39	31	23	42	34	-19	-11
E27	39	31	25	42	34	-17	-9
E28	39	31	26	42	34	-16	-8
E29	39	31	26	42	34	-16	-8
E30	39	31	18	42	34	-24	-16
E31	39	31	18	42	34	-24	-16
E32	39	31	24	42	34	-18	-10

During the day timeframe, one ecological receptor (Drawing 4, Receptor E1) was predicted to have an increase of over 3dB above baseline. As discussed in Section 6.5.1, this receptor is unlikely to support features of the designated sites and overall, is not anticipated that any species considered in this assessment will be utilising this area. Therefore, it is considered unlikely that there will be any significant effect on the designated sites from noise during daytime operations.

During the night timeframe, 13 receptors are predicted to have an increase of over 3dB above baseline (Table 6.4) - 12 of these are located within the designated sites (Drawing 4). Therefore, the species considered within this assessment will be impacted by noise emitted by the Proposed Development.

Therefore, there will the potential for significant effects on the conservation objectives of both of European designated sites as a result of noise during both operational and construction phases.

6.6 Summary of Stage 1

Table 6.5 summarises Stage 1 of the HRA process and lists which LSE have been taken forward for Appropriate Assessment.

Table 6.5: Summary of Stage 1 of the HRA process.

LSE	Stage 1	Stage 2
Direct emission from air – Construction	Screened in	Screened out
Direct emission from air – Operation	Screened in	Screened in
Direct emission to water - Construction	Screened in	Screened out
Direct emission to water – Operation	Screened in	Screened out
Loss of habitat used by Annex II species	Screened in	Screened out
Noise – Construction	Screened in	Screened in
Noise – Operation	Screened in	Screened in

7. Appropriate Assessment

This section considers mitigation required to prevent adverse effects on site integrity of the Teesmouth and Cleveland SPA and Teesmouth and Cleveland Ramsar, in relation to the potential effects outlined above in Section 6.

7.1 Proposed Mitigation

7.1.1 Mitigation for direct emission to air during construction

Methods to eliminate air emissions are outlined in the air quality assessment[13] and in the Construction Environmental Management Plan (CEMP)[23]. These measures include (but are not limited to):

- Use of water sprayers to suppress dust;
- Cover skips/spoil heaps;
- Ensure vehicles/plant switch off engines when unneeded – no idling vehicles
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- Ensure vehicles entering and leaving Sites are covered to prevent escape of materials during transport.

A Dust Management Plan will also be prepared by the Contractor.

With the implementation of the measures detailed within the air quality assessment[13], the CEMP[23] and the Dust Management Plan, **there is no potential for adverse affects on the designated sites**.

7.1.2 Mitigation for noise during construction

As detailed in the CEMP[23], vehicles/plant will be switched off when not in use to reduce idling noise. Furthermore, the contractor will phase daily operations within the Proposed Development to avoid noisy vehicles/plant being used simultaneously. Following discussions with Natural England in June 2025, it was recommended that an Ecological Clerk of Works (ECoW) is implemented during periods when high noise levels are expected. The ECoW will be situated on the sea wall to the north of the Proposed Development and will monitor the Seal Sands lagoon for signs of bird disturbance. If they see any signs of disturbance, all work will be paused to prevent further disturbance. Work will then resume in a phased approach to reduce the noise levels impacts on the birds.

With the implementation of the measure in the CEMP[23] and the measures detailed above, **there is no potential for adverse affects on the designated sites**.

7.1.3 Mitigation for noise during operation

Following the results of the initial noise assessment as detailed in Section 6.5, additional scenarios were modelled as it has been considered unlikely that all 16 engines will be running continuously and the initial assessment did not have detailed information pertaining to the characteristics of the engines so had to use a 'worst-case scenario'[24]. The additional scenarios used the following criteria:

- Scenario 1 - 14 engines constructed; the 4 most southern engines turned off.
- Scenario 2 – 14 engines constructed; the 4 most northern engines turned off.

The scenarios also included updated information relating to the noise emitted by the stacks and cooling fans at each engine and are considered to be a more realistic assessment of the Proposed Development's

[23] Arup (2025). ConocoPhillips, Ethane2Power, Construction Environmental Management Plan.

[24] At the time of assessment, this was 18 engines running consecutively

operation. Scenarios 1 has predicted that a lower number of receptors will be impacted by noise from the Proposed Development – five receptors will see an increase above the 3dB threshold. However, Scenario 2 has predicted that no receptors will see an increase above the 3dB threshold during the day period and only one receptor will be above 3dB threshold during the night period (Table 7.1). Noise maps detailing these scenarios can be found in Drawing 7 and Drawing 8.

Table 7.1: Noise Assessment results for 14 engines, with the 4 most northern turned off.

Receptor	Baseline		Operational Noise Level	Noise limit criteria (3dB above baseline)		Exceedance (above 3dB)	
	LA90, modal, day	LA90, modal, night		Day	Night	Day	Night
E1	39	31	37	42	34	-5	3
E2	39	31	24	42	34	-18	-10
E3	39	31	29	42	34	-13	-5
E4	39	31	25	42	34	-17	-9
E5	39	31	29	42	34	-13	-5
E6	39	31	33	42	34	-9	-1
E7	39	31	32	42	34	-10	-2
E8	39	31	29	42	34	-13	-5
E9	39	31	29	42	34	-13	-5
E10	39	31	27	42	34	-15	-7
E11	39	31	28	42	34	-14	-6
E12	39	31	30	42	34	-12	-4
E13	39	31	29	42	34	-13	-5
E14	39	31	26	42	34	-16	-8
E15	39	31	24	42	34	-18	-10
E16	39	31	19	42	34	-23	-15
E17	39	31	12	42	34	-30	-22
E18	39	31	17	42	34	-25	-17
E19	39	31	13	42	34	-29	-21
E20	39	31	11	42	34	-31	-23
E21	39	31	22	42	34	-20	-12
E22	39	31	19	42	34	-23	-15
E23	39	31	27	42	34	-15	-7
E24	39	31	23	42	34	-19	-11
E25	39	31	11	42	34	-31	-23

Receptor	Baseline		Operational Noise Level	Noise limit criteria (3dB above baseline)		Exceedance (above 3dB)	
	LA90, modal, day	LA90, modal, night		Day	Night	Day	Night
E26	39	31	14	42	34	-28	-20
E27	39	31	16	42	34	-26	-18
E28	39	31	18	42	34	-24	-16
E29	39	31	18	42	34	-24	-16
E30	39	31	9	42	34	-33	-25
E31	39	31	9	42	34	-33	-25
E32	39	31	15	42	34	-27	-19

The impacted receptor is E1 which is located within the wider ConocoPhillips site and for the reasons detailed in Section 6.5.1 is considered to be unlikely to support the species/waterbird assemblage considered within this assessment.

Overall, with the reduction in engines and the reduction in noise emitted by the stacks and cooling fans, the noise emitted by the Proposed Development will only impact a small area of habitat located adjacent to the site, which is not within the designated sites and is unlikely to support or be utilised by the species considered within this assessment.

Therefore the Proposed Development is considered to have no potential for adverse affects on the designated sites.

7.2 In-Combination Effects

For in-combination effects, planning applications within 2km of the Proposed Development that are proposed or currently in construction of a scale or nature worthy of consideration for in-combination effects were identified (Table 7.2). Upon consideration of the scale, nature and location (including distance to the international designated sites and lack of pollution pathways) of valid planning applications it is considered that the projects would not have any likely significant in-combination effect to the designated sites.

Table 7.2: Relevant planning proposal for in-combination impacts.

Development	Summary of impacts		Potential for significant cumulative effects
	Construction	Operation	
23/1019/EIS Development of Greenergy Renewable Fuels and Circular Products Facility comprising a Sustainable Aviation Fuel Plant and Tyre Plant and associated infrastructure. A temporary construction laydown area, proposed services corridor, pipe bridge, ancillary buildings and car parking Land West Of Epax Pharma U K Limited North South Access Road Seal Sands TS2 1UB	Best practice methods for noise and air emission will be followed during the construction of 23/1019/EIS. Site offices and other temporary structures are also being used to block noise emissions to the designated sites. The construction noise assessment for 23/1019/EIS concluded that no further specific mitigation is necessary to reduce the noise impacts on the designated sites.	The maximum annual average NOx concentration within the Teesmouth and Cleaveland Coast SPA and Ramsar for 23/1019/EIS was 1.4µg/m3 or 4.7% of the Critical Level. Together with the contribution from the E2P Power Island of 2.1µg/m3 at this location (predicted for the realistic worst-case operating case of 12 engines), the PEC would be 21.4µg/m3 or 71% of the Critical Level. Given that the Critical Level is not considered to be relevant to this location, the cumulative impacts are considered not to be significant. The maximum daily average NOx concentration for 23/1019/EIS within the Teesmouth and Cleaveland Coast SPA and Ramsar was 15.6µg/m3 or 7.8% of the daily Critical Level. This concentration was predicted to occur at ER2, which does not have a corresponding receptor for the E2P Power Island Assessment. At ER3 (the next highest receptor) the PC was 7.3µg/m3 or 3.6%, and together with the 20.1µg/m3 contribution from the E2P Power Island at the corresponding E3 location (predicted for the realistic worst-case operating case of 12 engines), the PEC would be 52.9µg/m3 or 71% of the Critical Level. Given that the Critical Level is not considered to be relevant to this location, the cumulative impacts are considered not to be significant. The predicted SO2 impacts for 23/1019/EIS at all receptors are less than 1% of the Critical Level, and therefore in-combination with the impacts of the E2P Power Island, the highest PEC would still represent only 26% of the Critical Level and therefore would not be significant. Figures A10.1.18 and A10.1.19 of the 23/1019/EIS Air Quality Assessment show that the Nitrogen Deposition impacts are <1% of the relevant Critical Loads at the saltmarsh and sand dune habitat location respectively. Receptor ER4 corresponds to E2P Power Island Receptor E11 (i.e. saltmarsh) and the impacts are reportedly 1% of the Critical Load, whereas Receptor ER10 corresponds to E2P Power Island Receptor E13 (i.e. dunes), and the impacts are reportedly 0.9% of the Critical Load. It should be noted that the Critical Load used in the 23/1019/EIS assessment were 10kg N/ha/yr for receptor ER4 and 8kg N/ha/yr for receptor ER10, whereas for the E2P Power Island assessment, the use of higher Critical Loads has been justified for each of these habitat locations. With this in mind, the impacts predicted in the 23/1019/EIS assessment would be lower (i.e. 0.5% at E11 and 0.7% at E13). The Acid Deposition for the 23/1019/EIS assessment was reportedly <1% at all receptors assessed.	No likely significant in-combination effects
24/1208/FUL Installation and operation of a Carbon Dioxide storage terminal.	Noise disturbance will be limited due to a number of natural barrier in place between 24/1208/FUL and the designated sites. Furthermore, 24/1208/FUL is located on the	The operational noise of the storage terminal is not expected to exceed the current baseline. There will be an additional number of train movements to service the terminal, however the shadow HRA for 24/1208/FUL noted that	No likely significant in-combination effects

Navigator Terminals Seal Sands Seal Sands Road Seal Sands Middlesbrough TS2 1UA	other side of Seal Sands, approximately 1.5km east of the Proposed Development with area between the two developments occupied by the main ConocoPhillips oil refinery which will act as a barrier to noise between the two developments.	birds are habituated to train movements due to the industrial nature of the area. During normal operations, no gases will be emitted from 24/1208/FUL. CO2 will only be emitted during emergency situations and periodic shutdowns (every few years)	
24/0709/FUL Application for a proposed Carbon Capture, Storage and Utilisation (CCSU) plant Greenergy Biofuels Teesside Limited Seal Sands Road Seal Sands Middlesbrough TS2 1UB	No construction information has been provided for 24/0709/FUL, however due to the small size of the development there are unlikely to be any in-combination effects.	The maximum annual average NOx concentration from 24/0709/FUL within the Teesmouth and Cleaveland Coast SPA and Ramsar was 0.2µg/m3 or 0.4% of the Critical Level, however it is not possible to determine where this occurs for receptor comparison. That said, together with the contribution from the E2P Power Island at any location within the receptor, this level of impact would have a minimal effect on the overall PEC and given that the Critical Level is not considered to be relevant to this location, the cumulative impacts are considered not to be significant. The maximum daily average NOx concentration within the Teesmouth and Cleaveland Coast SPA and Ramsar was 2.6µg/m3 or 3.5% of the daily Critical Level. Again, it is not clear where this impact occurs, however together with the contribution from the E2P Power Island at all locations, the PEC remains within the Critical Level. Given that the Critical Level is not considered to be relevant to this location, the cumulative impacts are considered not to be significant. The increase in Nitrogen Deposition impacts of 24/0709/FUL are <1% of the relevant Critical Loads at the saltmarsh and sand dune habitat respectively. It should be noted that the lower Critical Loads used in the Greenergy assessment were 10kg N/ha/yr for receptor saltmarsh and 5kg N/ha/yr for dune habitats, whereas the E2P Power Island assessment justifies the use of higher lower Critical Loads for each habitat type. The impacts predicted in 24/0709/FUL assessment would therefore be lower. No assessment of Acid Deposition was carried out in 24/0709/FUL, however it is likely that the increase as a result of the change in the emission parameters would be significantly less than 1%.	No likely significant in-combination effects
H/2019/0055 Installation of 4no. gas fired steam boilers and associated modular electrical/control building, pipework (including pipebridge), exhaust stack (height approx. 40m AGL) and associated works.	Boilers are likely to have been installed by the time the Proposed Development starts construction, therefore there will be no overlap of timescales.	The new gas boilers emit less noise and less gas emissions than the previous boilers.	No likely significant in-combination effects

Venator Materials UK Ltd Tees Road Hartlepool TS25 2DD			

8. Conclusions

Based on the information currently available, it is considered that there will be no adverse effects on the integrity of the internationally important sites of Teesmouth and Cleveland SPA and Teesmouth and Cleveland Ramsar as a result of the Proposed Development.

It is therefore considered that no further stage of the HRA process will be required.

Disclaimer

This report is produced solely for the benefit of ConocoPhillips and no liability is accepted for any reliance placed on it by any other party. This report is prepared for the proposed uses stated in the report and should not be used in a different context.

Appendix A

Drawings

Drawing 1 - Location of Designated Sites.
Drawing 2 - Location of Air Quality Receptor points used for the Air Quality Assessment, Sheet 1.
Drawing 3 - Location of Air Quality Receptor points used for the Air Quality Assessment, Sheet 2.
Drawing 4 - Location of Noise Receptor points used for the Noise Assessment.
Drawing 5 - Highest Predicted Construction Noise Levels above Baseline.
Drawing 6 - Typical Predicted Construction Noise Levels above Baseline.
Drawing 7 - Predicated operational daytime noise above baseline conditions.
Drawing 8 - Predicated operational nighttime noise above baseline conditions.

A3

Red Line Boundary
Ramsar
Special Protection Area

06/03/2025 20:44

Coordinate System: British National Grid

Metres
0 200 400 800

Rev	Date	By	Chkd	Appd
P03	07-02-25	MS	FM	AM

ARUP

13 Fitzroy Street
London W1T 4BQ
Tel +44 20 7636 1531 Fax +44 20 7580 3924
www.arup.com

Client
ConocoPhillips

Project Title
Ethane2Power

Drawing Title
Drawing 1 - Location of Designated Sites.

Scale at A3
1:15,000
Role

Suitability
ISSUE

Arup Job No	Rev
297973-12	**P01**

Name
D1

A3

Red Line Boundary

Air Quality Receptors

06/03/2025 20:48

Coordinate System: British National Grid

Metres

0 390 780 1,560

Rev	Date	By	Chkd	Appd
P03	07-02-25	MS	FM	AM

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Client

ConocoPhillips

Project Title

Ethane2Power

Drawing Title

Drawing 2 - Location of Air Quality Receptor points used for the Air Quality Assessment, Sheet 1

Scale at A3

1:30,000

Role

Suitability

ISSUE

Arup Job No

297973-12

Rev

P01

Name

D2

A3

Red Line Boundary

Air Quality Receptors

06/03/2025 20:55

Coordinate System: British National Grid

Metres

0 1,500 3,000 6,000

Rev	Date	By	Chkd	Appd
P03	07-02-25	MS	FM	AM

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Client

ConocoPhillips

Project Title

Ethane2Power

Drawing Title

Drawing 3 - Location of Air Quality Receptor points used for the Air Quality Assessment, Sheet 2

Scale at A3

1:125,000

Role

Suitability

ISSUE

Arup Job No

297973-12

Rev

P01

Name

D3

A3

Red Line Boundary

Noise Receptors

07/03/2025 09:36

Coordinate System: British National Grid

Metres

0 260 520 1,040

Rev	Date	By	Chkd	Appd
P03	07-02-25	MS	FM	AM

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Client

ConocoPhillips

Project Title

Ethane2Power

Drawing Title

Drawing 4 - Location of Noise Receptor points used for the Noise Assessment.

Scale at A3

1:20,000

Role

Suitability

ISSUE

Arup Job No

297973-12

Rev

P01

Name

D4

A3

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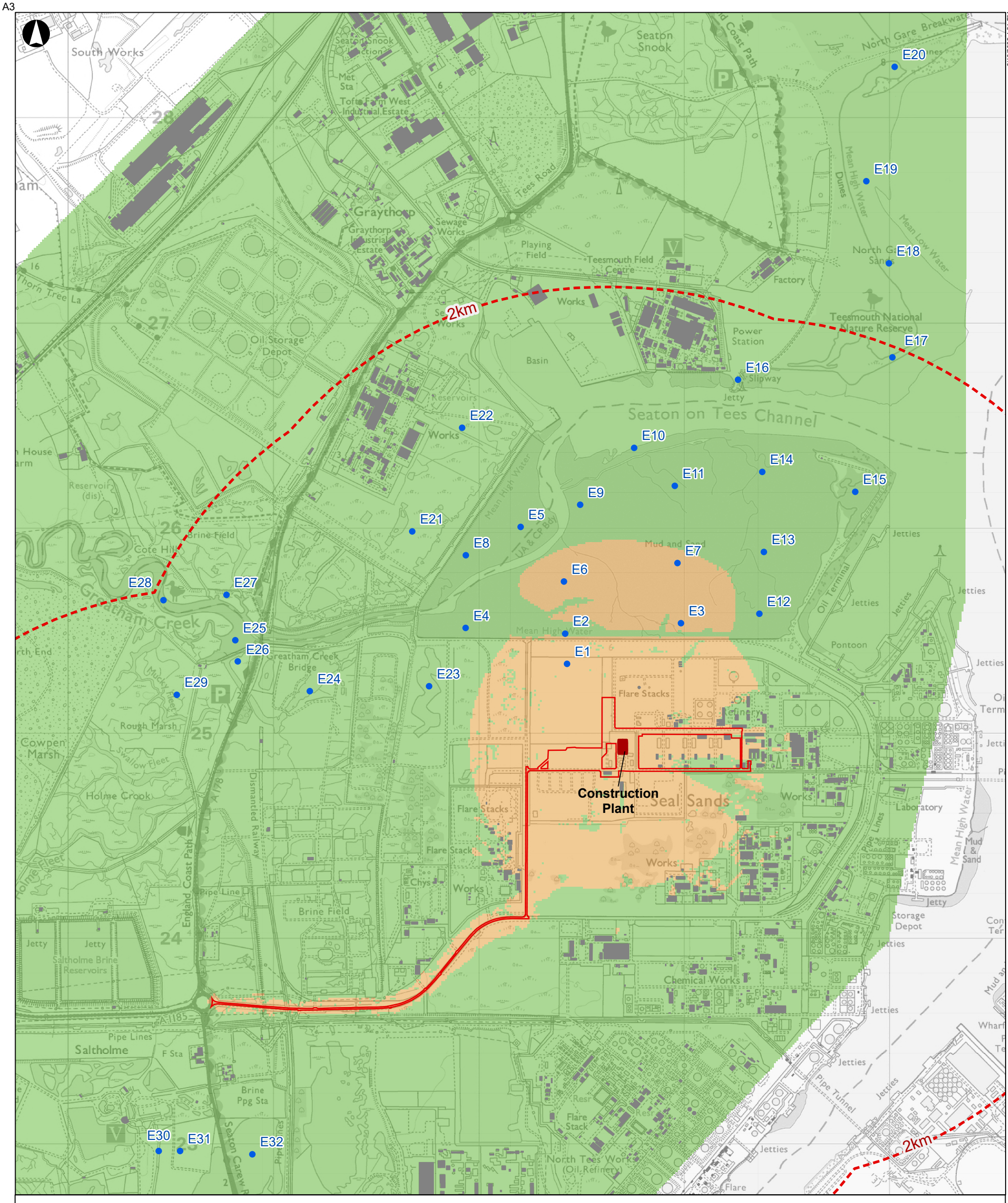

Red Line Boundary

2km Buffer from RLB

Receptors

Construction Plant

Buildings

Predicted noise levels ($L_{Aeq, T}$ dB)

Below baseline conditions

Over baseline conditions

Metres

0 270 540 1,080

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
P02	16/06/25	BW	RNS	YY

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Client:
ConocoPhillips

Project Title
ConocoPhillips Teesside Terminal Ethane to Power Project

Drawing Title
Predicted highest construction daytime noise levels above baseline conditions

Scale at A3
1:18,000

Role
YE

Suitability
For Reference Only

Arup Job No
279781-00

Rev
P02

Drawing Number
E2P-ARU-ZZ-ZZ-DR-YE-0001

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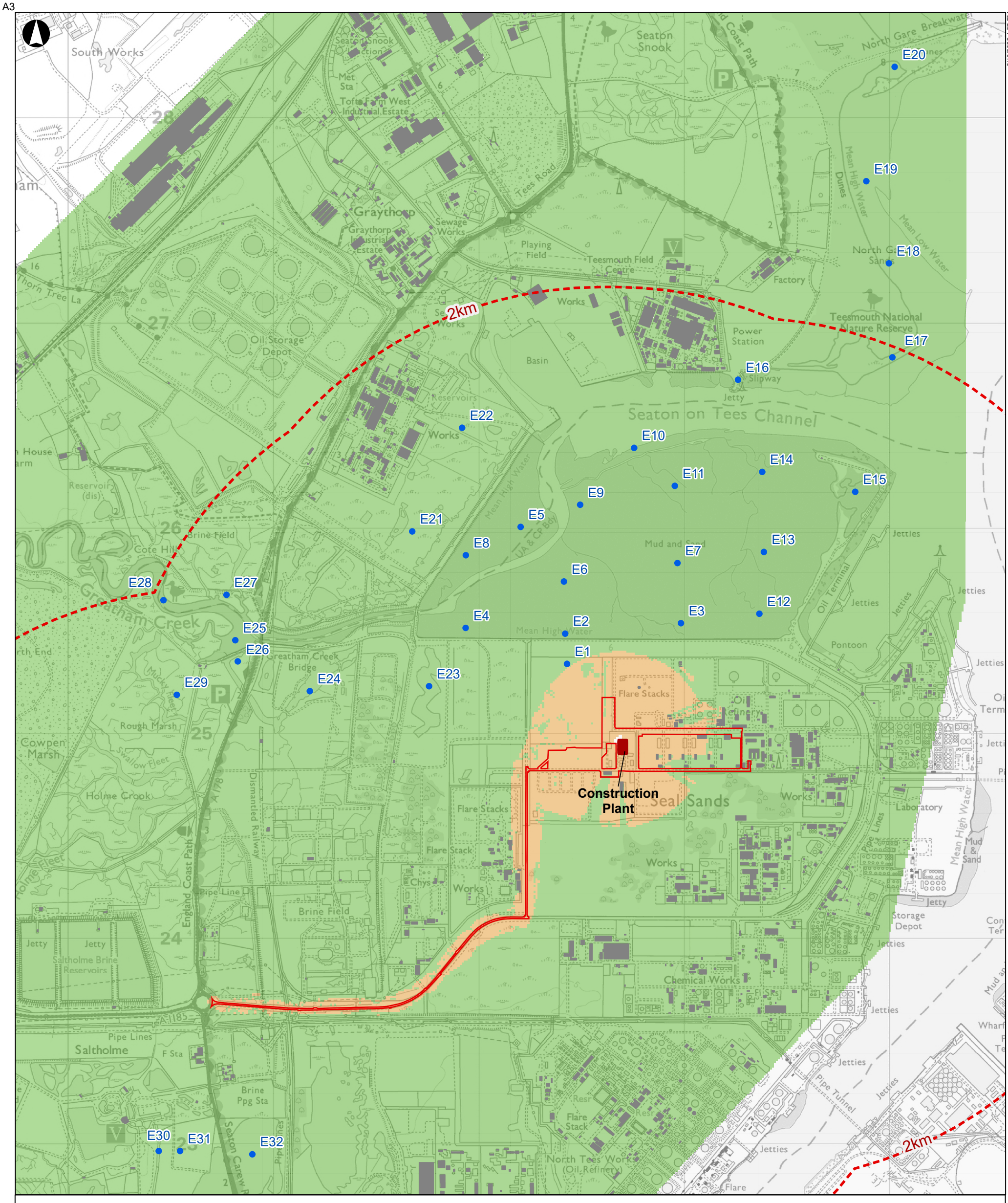

Red Line Boundary

2km Buffer from RLB

Receptors

Construction Plant

Buildings

Predicted noise levels ($L_{Aeq, T}$ dB)

Below baseline conditions

Over baseline conditions

Metres

0 270 540 1,080

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
P02	16/06/25	BW	RNS	YY

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Client:
ConocoPhillips

Project Title
ConocoPhillips Teesside Terminal Ethane to Power Project

Drawing Title
Predicted typical construction daytime noise levels above baseline conditions

Scale at A3
1:18,000

Role
YE

Suitability
For Reference Only

Arup Job No
279781-00

Rev
P02

Drawing Number
E2P-ARU-ZZ-ZZ-DR-YE-0001

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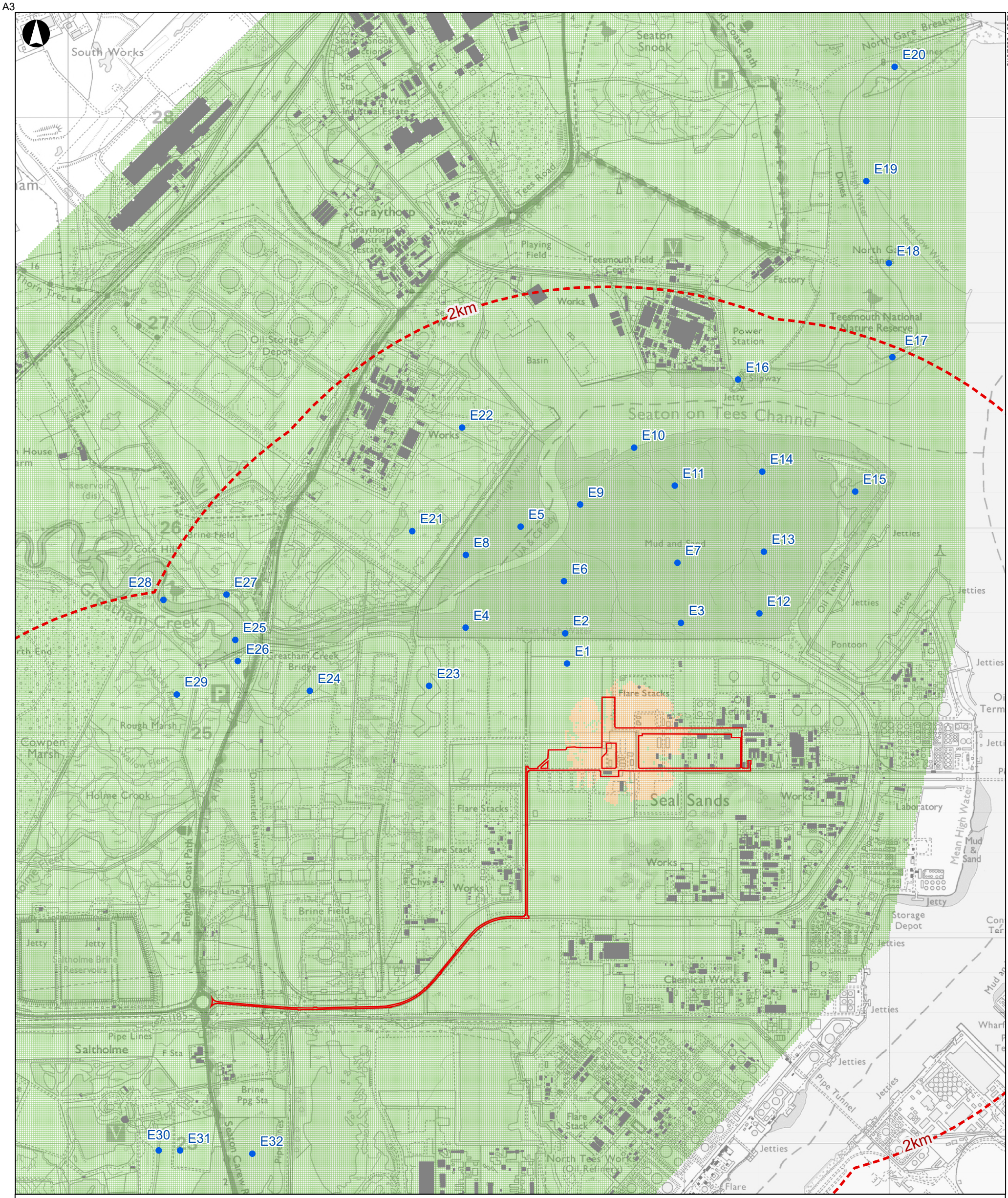

Red Line Boundary

2km Buffer from RLB

Receptors

Buildings

Predicted noise levels ($L_{Aeq, T}$ dB)

Below baseline conditions

Over baseline conditions

Metres

0 270 540 1,080

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
P02	16/06/25	BW	RNS	YY

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Client:
ConocoPhillips

Project Title
ConocoPhillips Teesside Terminal Ethane to Power Project

Drawing Title
Predicted operational daytime noise levels above baseline conditions

Scale at A3
1:18,000

Role
YE

Suitability
For Reference Only

Arup Job No
279781-00

Rev
P02

Drawing Number
E2P-ARU-ZZ-ZZ-DR-YE-0001

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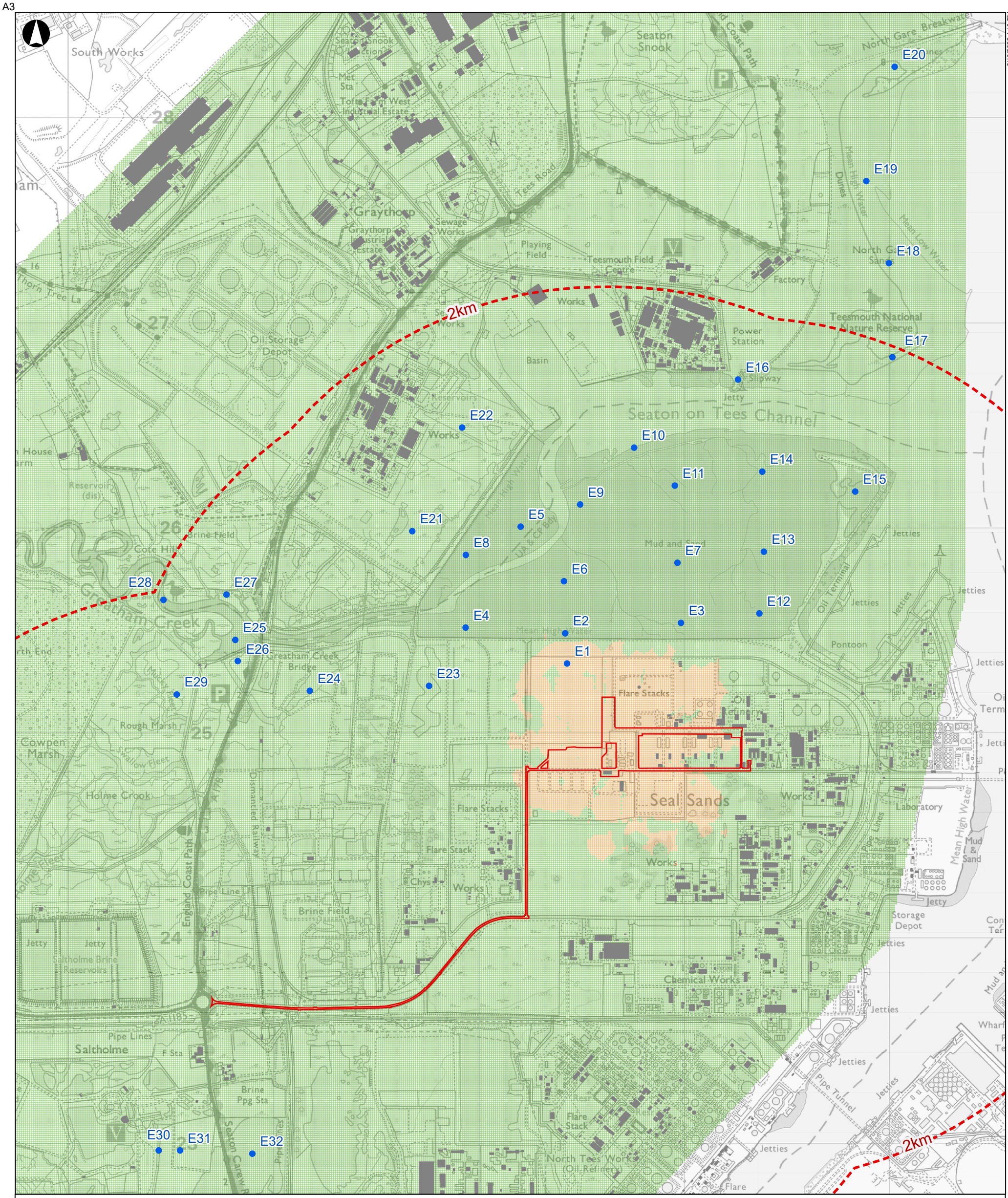

- Red Line Boundary
- 2km Buffer from RLB
- Receptors
- Buildings

Predicted noise levels ($L_{Aeq,\ T}$ dB)

- Below baseline conditions
- Over baseline conditions

Metres

0 270 540 1,080

Coordinate System: British National Grid

Rev	Date	By	Chkd	Appd
P02	16/06/25	BW	RNS	YY

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Client:
ConocoPhillips

Project Title
ConocoPhillips Teesside Terminal Ethane to Power Project

Drawing Title
Predicted operational night-time noise levels above baseline conditions

Scale at A3
1:18,000

Role
YE

Suitability
For Reference Only

Arup Job No
279781-00

Rev
P02

Drawing Number
E2P-ARU-ZZ-ZZ-DR-YE-0001

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Appendix B

Air Quality Receptors

B.1 Air Quality Receptors

Receptor ID	Receptor	Designation	X	Y
E1	Teesmouth and Cleveland Coast	SPA, Ramsar, SSSI and NNR	451868	525445
E2			452076	525445
E3			452297	525445
E4			452536	525459
E5			452796	525454
E6			453071	525459
E7			453380	525441
E8			453681	525357
E9			453880	525163
E10			454423	524862
E11			453561	525600
E12			451842	525379
E13			453561	526785
E14	Northumbria Coast	SPA and Ramsar	448266	537476
E15	Durham Coast	SAC and SSSI	448266	537476
E16	North York Moors	SPA, SAC, SSSI	461229	513618
E17	Lovell Hill Pools	SSSI	459555	519057
E18	Hart Bog	SSSI	445285	535391
E19	Langbaurgh Ridge	SSSI	455467	512389
E20	Roseberry Topping	SSSI	457835	512796
E21	Saltburn Gill	SSSI	466990	521253
E22	Whitton Bridge Pasture	SSSI	438679	522285
E23	Briarcroft Pasture	SSSI	439513	519361
E24	Pike Whin Bog	SSSI	441514	533400
E25	Cliff Ridge	SSSI	457266	511728

Receptor ID	Receptor	Designation	X	Y
E26	Hulam Fen	SSSI	443898	537392
E27	Charity Land	SSSI	437520	534526
E28	Fishburn Grassland	SSSI	436462	532832
E29	Coastal and floodplain grazing marsh	Prioirty Habitats	451890	526152
E30	Mudflat & Coastal saltmarsh	Prioirty Habitats	450906	525494
E31	Coastal and floodplain grazing marsh	Prioirty Habitats	450596	525178
E32	Sand dune	Prioirty Habitats	453055	528648
E33	Mudflat	Prioirty Habitats	452409	521998
E34	Mudflat & Coastal saltmarsh	Prioirty Habitats	450073	525858
E35	Saline lagoon & Coastal saltmarsh	Prioirty Habitats	451190	525282

Appendix C

Noise Receptors

C.1 Noise Receptors

Receptor ID	NGR	X	Y	Lat	Long
E1	NZ 52428 25340	452428	525340	54.62049	-1.18959
E2	NZ 52419 25487	452419	525487	54.62182	-1.1897
E3	NZ 52983 25538	452983	525538	54.62221	-1.18096
E4	NZ 51934 25515	451934	525515	54.62212	-1.19721
E5	NZ 52202 26007	452202	526007	54.62651	-1.19297
E6	NZ 52413 25741	452413	525741	54.6241	-1.18975
E7	NZ 52966 25831	452966	525831	54.62485	-1.18117
E8	NZ 51935 25869	451935	525869	54.6253	-1.19713
E9	NZ 52492 26115	452492	526115	54.62745	-1.18846
E10	NZ 52755 26392	452755	526392	54.62991	-1.18433
E11	NZ 52953 26207	452953	526207	54.62823	-1.1813
E12	NZ 53365 25584	453365	525584	54.62259	-1.17503
E13	NZ 53387 25885	453387	525885	54.62529	-1.17464
E14	NZ 53379 26275	453379	526275	54.6288	-1.17469
E15	NZ 53832 26178	453832	526178	54.62788	-1.16769
E16	NZ 53261 26724	453261	526724	54.63284	-1.17644
E17	NZ 54013 26833	454013	526833	54.63374	-1.16477
E18	NZ 53996 27291	453996	527291	54.63786	-1.16495
E19	NZ 53886 27691	453886	527691	54.64147	-1.16658
E20	NZ 54024 28248	454024	528248	54.64646	-1.16434
E21	NZ 51674 25985	451674	525985	54.62637	-1.20115
E22	NZ 51917 26490	451917	526490	54.63088	-1.1973
E23	NZ 51756 25231	451756	525231	54.61958	-1.20001
E24	NZ 51175 25207	451175	525207	54.61943	-1.20901
E25	NZ 50812 25455	450812	525455	54.62169	-1.21459
E26	NZ 50824 25352	450824	525352	54.62076	-1.21442
E27	NZ 50769 25676	450769	525676	54.62368	-1.21522
E28	NZ 50462 25650	450462	525650	54.62348	-1.21998
E29	NZ 50527 25189	450527	525189	54.61933	-1.21905

Receptor ID	NGR	X	Y	Lat	Long
E30	NZ 50439 23382	450439	523382	54.6031	-1.22072
E31	NZ 50543 22967	450543	522967	54.59936	-1.21918
E32	NZ 50895 22951	450895	522951	54.59918	-1.21374