Lighthouse Green Fuels Development Consent Order

Preliminary Environmental Information Report

Non-Technical Summary

Planning Inspectorate Reference: EN0110025

28th November 2025

Contents

Tables

1. Non-Technical Summary

1.1 Introduction

1.1.1 This document is the Non-Technical Summary (NTS) of the Preliminary Environmental Information Report (PEIR) prepared to support a proposed Development Consent Order (DCO) application by LGF Projects Limited for the Lighthouse Green Fuels project on land within Stockton-on-Tees Borough Council and Redcar and Cleveland Borough Council. A DCO is required as the project has received a direction from the Secretary of State to seek development consent under the Planning Act 2008 (the 2008 Act). If granted, the DCO will authorise construction, operation, maintenance, and decommissioning of the proposed Lighthouse Green Fuels project (hereafter called the 'Proposed Development').

1.1.2 The Proposed Development will be the UK's first commercial-scale second-generation sustainable aviation fuel (SAF) facility, producing more than 180 million litres of SAF and 30 million litres of renewable naphtha annually from the processing of over one and a half million tonnes of biomass, making it one of Europe's largest SAF plants. The current DCO application replaces a previous proposed DCO application by a company connected to the Applicant for another site in Teesside (PINS Reference EN010150), which was at the pre-application stage and has been discontinued, as the Proposed Development requires a larger site with direct access to the River Tees for feedstock delivery.

1.1.3 Key components of the Proposed Development include feedstock reception and storage, pre-treatment of the biomass feedstock, SAF production, and product storage and export pipelines. An on-site biomass fired Combined Heat and Power (CHP) plant (itself meeting the threshold of a Nationally Significant Infrastructure Project ('NSIP')) is also proposed to be built to provide electricity and steam to the SAF production process. Connections extend from the main Site for industrial gases, water and wastewater, a proposed electrical connection and product export lines to existing ship and rail delivery infrastructure in the vicinity.

1.1.4 This NTS summarises the findings of the PEIR prepared under the EIA Regulations 2017 to inform the Statutory Consultation for the proposed DCO application.

1.2 The Applicant

1.2.1 The Applicant is LGF Projects Limited wholly owned by the Alfanar Group (Alfanar). Alfanar is a global project development, manufacturing, and engineering group headquartered in Saudi Arabia. Alfanar has developed significant in-house feedstock-to-SAF expertise. This experience will be utilised to construct and operate the Proposed Development.

1.3 Assessment Methodology

Environmental Impact Assessment Methodology

1.3.1 The Environmental Impact Assessment (EIA) process is intended to enable consenting decisions to be made with knowledge of the likely significant effects of a future development. The EIA, as has been progressed to date, is presented in the PEIR (Volumes 1 – 3) and summarised in this NTS.

1.3.2 EIA is undertaken to help anticipate changes (or 'impacts') that may occur to the environment as a result of the Proposed Development and assess key stages in the construction and operation (including maintenance and use) and where possible and relevant, decommissioning stages.

1.3.3 The EIA process identifies potentially sensitive 'receptors' that may be affected by these changes (e.g. people living near the development, local flora and fauna) and assesses the extent to which these receptors are likely to experience a 'significant effect'.

1.3.4 Where possible, standard methods and industry guidance are used to ensure consistency. Where significant adverse effects are identified, mitigation measures are proposed to reduce or avoid them. These measures are secured through planning conditions (called requirements) or other legal measures.

Table 1-1 Classification of Effects

Magnitude of Impact	Sensitivity/Importance of Receptor			
	High	Medium	Low	Very Low
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

1.3.5 In general, the classification of an effect is based on the magnitude (scale) of the impact and sensitivity or value/ importance of the receptor, using the matrix shown in Table 1-1. Moderate and major effects are

considered to be 'significant' for the purposes of the EIA Regulations in accordance with standard EIA practice.

EIA Scoping

1.3.6 EIA Scoping is a process that is designed to identify relevant topics that should be included in the EIA and reported in an Environmental Statement (ES). An EIA Scoping Report and request for an EIA Scoping Opinion, under Regulation 10 of the EIA Regulations, was submitted to the Planning Inspectorate (PINS) and relevant consultees on 1 October 2025 to allow them to comment on the extent of and approach to the environmental assessments to be undertaken.

1.3.7 A Scoping Opinion was received from PINS on 11 November 2025 and is presented within Appendix 1B (PEIR Volume 3). The scope of the PEIR is based on the Scoping Opinion received, as well being informed by the Scoping Opinion provided for the previous iteration of the Proposed Development which progressed through EIA Scoping and statutory consultation before the application was discontinued. As the main purpose of the Proposed Development is the same as it was for the previous iteration of the project, much of the work done to agree the scope and approach to environmental assessment remained appropriate. The EIA therefore includes assessments of the following environmental topics:

- Chapter 8: Air Quality;
- Chapter 9: Noise and Vibration;
- Chapter 10: Terrestrial Ecology;
- Chapter 11: Freshwater and Marine Ecology;
- Chapter 12: Water Environment and Flood Risk;
- Chapter 13: Landscape and Visual Impact Assessment (LVIA);
- Chapter 14: Greenhouse Gases;
- Chapter 15: Climate Change and Resilience;
- Chapter 16: Materials and Waste;
- Chapter 17: Socioeconomics;
- Chapter 18: Traffic and Transportation;
- Chapter 19: Major Accidents and Disasters;
- Chapter 20: Marine Navigation;
- Chapter 21: Geology and Soils;
- Chapter 22: Cumulative and Combined Effects; and
- Chapter 23: Summary of Likely Significant Residual Effects.

1.3.8 Following the publication of the Scoping Opinion, the environmental information for a DCO is reported in

two stages:

- A PEIR is prepared to inform statutory (formal) consultation with the public and other stakeholders about the Proposed Development, based on the preliminary environmental information available at the time of consultation; and
- An ES is then prepared to accompany the DCO application. The ES summarises the EIA of the Proposed Development, taking account of any design evolution that has taken place, as well as feedback received during consultation.

1.3.9 This PEIR has been prepared to meet the requirements of Regulation 12(2) of the EIA Regulations. In order to enable consultees to understand the likely environmental effects of the Proposed Development, the PEIR presents the preliminary findings of the environmental assessment undertaken up to that point in time. This allows consultees the opportunity to provide informed comments on the likely significant effects of the Proposed Development (including associated development) upon the environment, prior to the finalisation of the ES.

Consultation

1.3.10 Consultation is important in the preparation of DCO applications and in the EIA process. The 2008 Act requires applicants for development consent to carry out pre-application consultation on their proposals. This includes consultation on the PEIR.

1.3.11 Consultation with key stakeholders has been ongoing throughout the EIA process and comments raised have been addressed in the PEIR where applicable. Engagement with key stakeholders will be ongoing during the preparation of the ES and DCO application.

Preliminary Environmental Information Report

1.3.12 The format of the PEIR is outlined in Table 1-2.

Table 1-2 PEIR Contents

PEIR Volume	Content
Volume 1 – Main Chapters	Chapters 1 - 2 present an introduction to the project and EIA assessment methodology. Chapters 3 - 6 present a description of the Site and surrounding areas; components of the Proposed Development, their construction and decommissioning, shift, design evolution and alternatives. Chapter 7 presents a summary of relevant legislation and planning policy. Chapters 8 – 21 present the findings of the environmental assessments, likely significant effects identified, and mitigation, monitoring and enhancement measures proposed. Chapter 22 provides an initial assessment of the potential for cumulative and combined effects to occur as a result of the Proposed Development with other proposed developments. Chapter 23 provides a summary of the likely significant residual environmental effects identified.
Volume 2 - Appendices	Presents additional information to support the environmental assessments in Volume I.
Volume 3 – Figures	Presents figures that accompany Volumes I and II.
Volume 4 – Non-Technical Summary	A stand-alone summary of the PEIR Volumes listed above in non-technical language (this document).

1.4 Description of the Existing Environment

The Site and Surroundings

1.4.1 The Proposed Development site (called the 'Site') is situated in Teesside. The site on which the SAF plant is proposed to be built (the 'Main Site') is predominantly brownfield land on Seal Sands, north of the river Tees. The wider Site also includes land extending on both the north and south banks of the River Tees, with connection utility corridors crossing through existing infrastructure under the river. Historically, the main Site was operated as a chemical plant most recently owned and operated by INEOS Nitriles. This plant has been decommissioned and cleared, leaving mainly concrete hardstanding with some vegetated areas and two jetties along the river frontage. The western end of the main Site includes a former landfill vegetated with grass and scrub, while the northern section is largely undeveloped greenfield land. The surrounding area is dominated by industrial uses, including gas processing facilities, bulk chemical storage terminals, chemical plants, and energy-from-waste facilities.

Existing Environment

Local Environment and Ecology

1.4.2 The main Site is approximately 4km south-west of Teesmouth. It is adjacent to (and the proposed quay is within) nationally and internationally designated conservation sites, including the Teesmouth and Cleveland Coast Special Protection Area (SPA), Ramsar Site (a wetland of international importance designated under the Ramsar Convention on Wetlands), and Site of Special Scientific Interest (SSSI).

1.4.3 These designations encompass intertidal sand and mudflats, saltmarsh, saline lagoons, sand dunes, and coastal waters that support significant bird populations. The Tees Estuary and nearby Bran Sands Lagoon form part of this ecological network. To the south-west of the Main Site is the Royal Society for the Protection of Birds (RSPB) Saltholme Nature Reserve.

Nearby Communities and Infrastructure

1.4.4 The Site lies within the administrative boundaries of Stockton-on-Tees Borough Council (where the Main Site is located) and Redcar and Cleveland Borough Council. It is approximately 5km east of Billingham and 4km north-east of Middlesbrough. The nearest communities include Port Clarence (2.8km south-west) and Cowpen Bewley (3.5km north-west), which also contains listed buildings and a conservation area.

1.4.5 Surrounding infrastructure includes industrial facilities such as Navigator Terminals, SABIC, Exolum, N+P Subcoal, Whitetower, KD Pharma, Lianhetech, BOC and others, as well as consented projects like the Northern Endurance Partnership CO_2 Gathering Network and the proposed H2Teesside hydrogen pipeline. To the south, across the river, lies Teesport - one of the UK's largest ports - and the Teesworks development area, which is earmarked for low-carbon energy projects.

Water and Flood Risk

1.4.6 The River Tees forms the eastern boundary of the Main Site and is a tidal estuary from the Tees Barrage to Teesmouth. The coastline at Tees Bay lies about 4km north-east, and includes Coatham Dunes and associated habitats. Bran Sands Lagoon and Dabholm Gut are key water bodies near the proposed pipeline corridors. These areas are integral to the SPA and Ramsar designations, supporting wetland and intertidal habitats.

1.4.7 The Site is predominantly within Flood Zone 1, denoting the lowest level of flood risk. Some of the connection corridors extend into areas of potentially higher flood risk (Food Zones 2 and 3).

Geology and Soil

1.4.8 The Site was used as a chemical plant from the 1970s onward and includes extensive concrete hardstanding. The western section comprises a closed landfill that is now vegetated with grass and scrub, while the northern section is undeveloped greenfield land. The underlying geology is Mercia Mudstone bedrock overlain by superficial deposits. The industrial area of Seals Sands is built on land reclaimed from the River Tees. The geology and soil conditions reflect a mix of industrial legacy and land reclamation.

Landscape

1.4.9 The landscape is dominated by heavy industry, with Seal Sands and Teesport forming a highly modified setting. Despite this, nearby ecological sites and water bodies create some visual and functional separation from residential areas. Heritage assets include the Grade II listed Haverton Hill and Port Clarence War Memorial (2.8km south-west) and several listed properties in Cowpen Bewley (3.5km north-west). The nearest conservation area is also in Cowpen Bewley. Recreational routes such as the King Charles III England Coast Path and Teesdale Way pass close to the Proposed Development, and visitor attractions include the RSPB Saltholme Nature Reserve and Teesmouth National Nature Reserve.

1.5 The Proposed Development

Components of the Proposed Development

1.5.1 The Proposed Development includes the construction, operation, maintenance and eventual decommissioning of a commercial-scale facility that will produce more than 180 million litres of advanced SAF and approximately 30 million litres of renewable naphtha each year.

1.5.2 The Proposed Development will include a new quay on the River Tees to allow delivery of modular plant and construction materials by ship and biomass feedstock during operation, reducing road transport and associated emissions. Feedstock will be stored in silos and pre-treated on site before being processed into SAF through a gasification process. The process will also produce renewable naphtha

for use as a chemical feedstock.

1.5.3 To support operations, the site will include a biomass-fired CHP plant capable of generating up to 200 megawatts (MW) of electricity and steam, ensuring a low-carbon energy supply for the SAF process. Additional connections will provide natural gas for start-up, water for processing, and oxygen and nitrogen from existing pipelines. Alternatively, a new Air Separation Unit may be built on Site for production of oxygen and nitrogen. Finished products will be transferred via pipelines to local marine and rail loading facilities for export of SAF or exported by road, as would any off-specification material.

1.5.4 The plant is designed for continuous operation, 24 hours a day, seven days a week, and will create a significant number of permanent jobs alongside temporary roles during construction and maintenance. Construction is expected to begin in early 2028, subject to consent and investment decisions, with commercial operations starting by 2031. The facility is expected to have an at least 30 year operational life – potentially longer subject to commercial decisions at that time. On closure, the plant will be decommissioned in accordance with environmental and safety regulations, with an emphasis on recycling and reuse of materials.

Design Parameters

1.5.5 As the detailed design of the Proposed Development is not yet completed, maximum design parameters have been used to enable a robust EIA to be undertaken. A conservative approach has been adopted whereby the parameters that give rise to the worst-case potential environmental impacts and effects are assessed. This is known as the 'Rochdale Envelope' approach and is further explained in PINS Advice Note Nine: Using the Rochdale Envelope.

1.5.6 The final design will be within the Rochdale Envelope parameters assessed within the PEIR and presented in the ES and the Draft DCO.

1.5.7 Figure 1-1 Lighthouse Green Fuels - Visualisation (south-east)shows an indicative layout of the Main Site.

Proposed Development Construction

1.5.8 Construction of the Proposed Development is proposed to commence in 2028, subject to consent, and is expected to take between three and four years including commissioning. Each topic assessment in the PEIR assesses a reasonable

worst-case construction scenario. Contractors will deliver the works under the Applicant's oversight to ensure compliance with legal requirements.

1.5.9 Core construction working hours will be between 07:00 and 19:00 Monday to Friday (except bank holidays), Saturday 07:00 to 16:00 and Sunday 08:00 to 17:00. However, it is likely that some construction activities may need to be undertaken outside of these core working hours. Where on-site works are to be conducted outside the core hours, they would comply with any restrictions agreed with the local planning authority, in particular regarding control of noise and traffic.

1.5.10 Twenty-four hour working for certain activities has therefore been assessed in the PEIR which sets out specific mitigation and control measures required to prevent disturbance from any activities outside of core working hours. A detailed Construction Environmental Management Plan (CEMP) will be prepared and legally secured through the DCO, with an Outline CEMP forming part of the DCO submission.

1.5.11 Preliminary works may include jetty demolition, site preparation, removal of unsuitable or contaminated materials, and ground investigations. Main works will involve earthworks, temporary spoil storage, imported fill and best-practice soil management. Laydown areas, welfare facilities, and compounds will be established on-site and at strategic locations in pipeline corridors.

1.5.12 Quay construction will follow removal of the existing jetties. Three quay design options are under consideration with some requiring percussive piling and structural works. Quay construction and operation will also require capital dredging to be undertaken for vessels to use the approach channel in the Tees and to create a berthing pocket at the quay for offloading.

1.5.13 Main civil and process works on the Main Site will include formation of a development platform and installation of foundations. The SAF production facility will be constructed using pre-fabricated modules brought to the Site by sea and offloaded at the quay together with conventional construction techniques. Construction will use cranes up to 155m high. Where feasible, continuous flight auger piling will be utilised to develop the foundations for the main plant buildings and structures.

1.5.14 Construction traffic accessing the Site via Seal Sands Road- Peak movements are estimated at 120 heavy goods vehicle (HGV) trips daily and up to around 1,200 car trips for a workforce of around

2,000, while abnormal loads will mainly arrive by ship (approximately 300 consignments in around 200 deliveries over 18 months).

1.5.15 Materials and waste will be managed under a Site Waste Management Plan, with segregation and licensed disposal. Best-practice measures and environmental commitments will be implemented throughout construction to minimise impacts.

Proposed Development Operation

1.5.16 The Proposed Development will include feedstock reception and storage, feedstock pre-treatment, SAF production, product storage, export facilities, and supporting utilities.

1.5.17 Sustainably sourced biomass feedstock and waste wood for the CHP will predominantly be delivered by ship to the proposed new quay. Pre-treatment will prepare biomass for gasification. The gasification process will produce a gas for conversion into liquid hydrocarbons by a process which will yield SAF and naphtha. Power and steam will come primarily from an on-site biomass CHP plant (up to 200 MWe), fuelled using biomass and waste wood. The CHP plant will include flue gas treatment and cooling systems.

1.5.18 External connections include natural gas for start-up, water and wastewater links to Northumbrian Water infrastructure, and potential oxygen and nitrogen pipelines. A future CO_2 export connection is anticipated but is outside the scope of this consent application. Drainage will segregate clean and contaminated water to prevent pollution. Wastewater will be piped to Northumbrian Water Ltd's Bran Sands facility for treatment.

Proposed Development Decommissioning

1.5.19 The Proposed Development will have an at least 30 year operational life and subsequent decommissioning period but is expected to operate for longer, subject to market conditions. At the end of its lifespan the Proposed Development would be decommissioned.

1.5.20 A Decommissioning Plan (including Decommissioning Environmental Management Plan (DEMP)) will be produced at the time of cessation of operations and agreed with the Environment Agency (EA) as part of the Environmental Permit and site surrender process.

1.6 Consideration of Alternatives

Introduction

1.6.1 The EIA Regulations state that a PEIR should include a description of reasonable and relevant alternatives studied by an applicant and the main reasons for selecting the chosen development, taking into account the environmental effects. Chapter 6: Alternatives and Design Evolution (PEIR, Volume 1) provides this information in respect of the Proposed Development.

1.6.2 The detailed design of the Proposed Development has not yet been completed and will continue to evolve beyond the point of submission of the DCO Application.

Alternatives Considered

1.6.3 In summary, alternatives have been considered during the evolution of the Proposed Development including:

- Alternative Sites;
- Alternative feedstocks; and
- Alternative technologies.

1.6.4 The environmental effects of these alternatives have been compared to inform the Proposed Development layout and design.

1.6.5 The chosen Seal Sands Site location offers a large, predominantly brownfield industrial site with direct access to the River Tees, enabling construction of a quay for importing modular plant and biomass feedstock. It also provides proximity to road, rail, and marine transport for product export, as well as opportunities to connect to utilities including natural gas, electricity, water and wastewater treatment. The Site's size allows for an on-site CHP plant to supply low-carbon electricity and steam, reducing the carbon intensity of SAF production. Additionally, the Site is close to the Northern Endurance Partnership's CO_2 transport and storage network, providing future potential for carbon capture integration.

1.6.6 The design as presented in this PEIR has evolved through environmental appraisal, stakeholder consultation, and application of the Rochdale Envelope approach to allow flexibility while ensuring robust environmental assessment. Key decisions have balanced technical feasibility, commercial viability, and environmental considerations. The design will continue to evolve during the preparation of the DCO application and the ES will set out the reasonable alternatives considered.

1.7 Summary of Environmental Effects

1.7.1 This section provides a summary of the likely environmental effects predicted to occur as a result of the construction, operation, maintenance and decommissioning of the Proposed Development. These likely significant environmental effects are described further in PEIR Volume 1 and its accompanying technical appendices (PEIR Volume 2). The full position will be set out in the ES included within the DCO application after all assessments have been fully completed for the final design

1.7.2 A summary of likely significant residual effects (effects that are likely to occur even after the implementation of mitigation measures) is outlined in Chapter 23: Summary of Likely Significant Residual Effects (PEIR Volume 1).

Air Quality

1.7.3 Chapter 8: Air Quality (PEIR Volume I) provides a preliminary assessment of the Proposed Development on air quality during construction, operation, and decommissioning, focusing on human health and ecological receptors.

Likely Impacts and Effects

1.7.4 During construction, activities such as earthworks and material handling could generate dust. Without controls, this could affect nearby receptors, but with standard best practice measures in place, such as dust suppression and wheel washing, these effects are expected to be negligible, particularly given the distances to the nearest residential receptors. Additional traffic during construction will increase emissions of nitrogen dioxide and fine particles, but modelling shows these changes will be very small and well below health-based standards. Emissions from construction machinery will also be minor and controlled through good practice measures.

1.7.5 When the plant is operating, emissions will come from the emission stacks. These emissions have been modelled and compared against national air quality standards. For all pollutants, predicted concentrations at residential and ecological sites are well within safe limits and considered negligible. Deposition of nitrogen and acidic substances on sensitive habitats is also predicted to be well below critical levels and critical loads. Operational plant emissions will be monitored to demonstrate that emission limit values set within an environmental permit will be met; compliance with the permit will be

regulated by the EA.

1.7.6 Air quality effects during decommissioning are expected to be less than those during construction and are considered not significant.

1.7.7 With embedded mitigation measures and compliance with strict environmental standards, the Proposed Development is not expected to cause significant effects of air quality for people or the environment.

Noise and Vibration

1.7.8 Chapter 9: Noise and Vibration (PEIR Volume 1) provides a preliminary assessment of potential noise and vibration impacts from the Proposed Development on sensitive human receptors. The study adopts worst-case assumptions based on current design information and applies recognised standards such as BS 5228 for construction noise and vibration and BS 4142 for operational noise.

Likely Impacts and Effects

1.7.9 Noise impacts may arise from site preparation, earthworks, piling for on-site structures and quay construction, module installation, and pipeline works. Vibration could occur from piling and ground compaction. Construction traffic may cause temporary noise increases, particularly near the A1185 in Billingham.

1.7.10 Underwater noise from dredging and piling will be assessed in more detail in the ES when the quay design is finalised. With embedded mitigation and best practicable means, significant effects from construction noise and vibration are considered unlikely.

1.7.11 Operational noise sources include feedstock handling, SAF production plant operations, CHP plant operation, exhaust stacks, and ancillary equipment. Noise modelling predicts that rating levels at all assessed receptors will remain below thresholds for adverse impact, indicating low impact under BS 4142 criteria. Rail operations – if undertaken - are expected to introduce a small number of additional freight movements at night, resulting in minor noise changes at receptors but with no significant effects. Vibration increases from rail are predicted to be negligible. Underwater and marine traffic noise during operation is scoped out of further assessment due to minimal change compared to existing river traffic.

1.7.12 Impacts during decommissioning are expected to be less than those of construction and at a reduced scale, since no piling or hardstanding clearance are

anticipated as being required. The quay are anticipated to remain in place, further limiting potential effects. No significant adverse effects are anticipated.

1.7.13 Overall, the preliminary assessment concludes that significant noise and vibration effects are unlikely during construction, operation, or decommissioning, provided embedded mitigation measures are implemented. Construction traffic noise near Billingham will be examined in detail at the ES stage. Operational noise impacts are predicted to be low, and rail-related effects are minor. Residual effects after mitigation are expected to be negligible.

Terrestrial Ecology

1.7.14 Chapter 10: Terrestrial Ecology (PEIR Volume 1) provides a preliminary assessment of likely significant effects of the Proposed Development on terrestrial ecology during construction and operation. It sets out the methodology and scope for the terrestrial ecology assessment, based on currently available information. Where necessary, the chapter identifies where further assessment will be required in the ES.

Likely Impacts and Effects

1.7.15 The Chapter reports the preliminary assessment of likely significant effects of the Proposed Development on terrestrial ecology during construction. It sets out the methodology and scope for the terrestrial ecology assessment, based on currently available information. Where necessary, further assessment will be required in the ES.

1.7.16 On a precautionary basis, the main impacts during construction include temporary loss and disturbance of habitat within the Teesmouth and Cleveland Coast SPA and Ramsar Eston Pumping Station LWS; habitat loss including impacts on amphibians, breeding birds, otter, and wintering birds due to fragmentation, noise and vibration and artificial lighting.

1.7.17 Construction and Operational effects will be examined in detail at the ES stage.

1.7.18 Mitigation during construction may include timing vegetation removal works outside the bird breeding bird season, or use of a pre-clearance inspection to identify nesting birds and definition of exclusion zones. If required, applications for protected species licensing will be made. Where licensing is not required, precautionary working methods may be employed for works with the potential to impact on

protected and notable species. These will be included in the CEMP. Mitigation may require compensation and enhancement measures within the Proposed Development. Options outside the site boundary will be explored in the local area.

1.7.19 A full assessment of the operational phase of the Proposed Development and mitigation measure to minimise impacts will be made within the ES.

Freshwater and Marine Ecology

1.7.20 Chapter 11: Freshwater and Marine Ecology (PEIR Volume 1) provides a preliminary assessment of the potential impacts of the Proposed Development on freshwater and marine ecology. The Proposed Development includes demolition of two jetties, construction of a new quay, capital and maintenance dredging, and increased vessel movements during construction and operation. The quay lies within the Teesmouth and Cleveland Coast SPA, Ramsar site, and SSSI, making it a highly sensitive location.

Likely Impacts and Effects

1.7.21 During construction, the main impacts include temporary loss and disturbance of intertidal and subtidal habitats due to jetty demolition, quay construction, and dredging. These activities will increase turbidity and may release any contaminants if present within sediments. If unmitigated, underwater noise from piling, geophysical surveys, and potential unexploded ordnance (UXO) clearance poses risks to marine mammals and fish, while artificial lighting at night may alter behaviour. Vessel movements increase collision risk and wave wash effects, though these are considered minor given existing high traffic levels. There is also a risk of introducing invasive and non-native species (INNS) through ballast water and hull fouling.

1.7.22 During operation, potential impacts include maintenance dredging, ongoing vessel traffic, and accidental spills of fuel or chemicals, which could affect water quality and sensitive species. Underwater noise and artificial light remain potential stressors, and the risk of INNS persists. Freshwater receptors are unlikely to be significantly affected, apart from potential changes in surface water management during construction.

1.7.23 Most impacts are assessed as minor or negligible after mitigation, though moderate significance is attributed to subtidal habitat loss and potential chemical contamination during construction, and major significance to accidental spills affecting

marine mammals if unmitigated. Measures to mitigate effects on freshwater and marine ecology will be identified in the ES. A Marine Licence will be sought which will include measures agreed with marine stakeholders to protect the marine environment and minimise the risk of harm. Mitigation measures include implementing robust water and sediment management measures and also to undertake sediment quality testing prior to submission of the DCO application in order to understand the levels of existing contamination already present. Residual effects after mitigation are predicted to be minor or not significant. Climate change may exacerbate pressures through coastal squeeze, species regime shifts, and increased viability of INNS, but these are independent of the Proposed Development and will be considered in future resilience planning.

Water Environment and Flood Risk

1.7.24 Chapter 12: Water Environment and Flood Risk (PEIR Volume 1) provides a preliminary assessment of the potential impacts on water quality, hydrology and hydrogeology, and flood resilience. The assessment considers designated sites, Water Framework Directive (WFD) compliance, and future climate change scenarios. A Level 2 Flood Risk Assessment has informed the preliminary assessment.

Likely Impacts and Effects

1.7.25 During construction, the most significant risks arise from activities such as jetty demolition, quay construction and dredging. These could lead to temporarily increased turbidity in the Tees Estuary, potential mobilisation of existing contaminated sediments into the estuarine waters patterns. There is also a risk of accidental pollutant spills and sediment-laden runoff affecting surface water and groundwater quality. The Main Site is in Flood Zone 1 as land at low risk of flooding. The quay will be located in land at risk of flooding but is water compatible development. Parts of Seal Sands Road and pipeline construction corridors in South Tees are in Flood Zones 2 and 3. While most effects are expected to be slight and temporary with embedded mitigation, adverse effects are predicted for water quality in the River Tees without additional mitigation. Measures to control and minimise the potential effects of flooding on construction workers and the environment will be included in the DCO application.

1.7.26 Operational impacts associated with the Proposed Development will slightly increase the area of impermeable surfaces leading to slightly increased higher runoff rates, and potentially increased flood risk. Routine maintenance dredging and vessel movements could disturb sediments, affecting water quality. Discharge of treated effluent is proposed to be to Bran Sands Wastewater Treatment Plant with treated effluent discharged to Tees Bay using the proposed Bran Sands long sea outfall. Overall, most operational effects are assessed as slight adverse, but moderate to large adverse effects associated with flood risk and sediment disturbance could occur without mitigation.

1.7.27 With embedded mitigation such as a CEMP, pollution prevention protocols, a dredging management plan and a drainage strategy, most construction-phase effects are reduced to negligible or slight adverse and are not significant. During operation, residual effects are generally minor, but moderate adverse effects could persist for flood risk and sediment mobilisation. No significant effects are anticipated for groundwater quality or designated sites once mitigation is applied. The ES will refine these assessments, confirm drainage design, and detail additional measures such as flood resilience and water quality monitoring. Overall, the Proposed Development will comply with regulatory requirements and maintain environmental protection, with mitigation and monitoring strategies identified at the application stage and secured through the DCO.

Landscape and Visual Impact Assessment

1.7.28 Chapter 13: Landscape and Visual Impact Assessment (PEIR Volume 1) provides a preliminary assessment of potential changes to landscape character and visual amenity during construction and operation. It considers the scale and nature of the Proposed Development, which includes tall structures such as a flare stack up to 140m high, the CHP plant stack, process columns, large buildings, and associated infrastructure.

Likely Impacts and Effects

1.7.29 During construction, impacts will include site clearance, earthworks, installation of temporary compounds, and erection of large structures, cranes, and lighting. These activities will introduce additional prominent industrial elements into an already industrial landscape and views. Operational impacts will involve the presence of tall stacks,

process columns, and large-scale buildings, altering the visual composition of the estuary and adjacent areas. Despite the scale of development, the existing industrial context limits the magnitude of change for most receptors. Landscape character effects are predicted to be minor and not significant across all receptors. Visual effects are similarly limited, with most receptors experiencing minor adverse changes. However, significant moderate adverse effects are identified for recreational receptors at Seal Sands car park and Saltholme RSPB reserve, where views towards the Proposed Development will be more pronounced due to proximity and open sightlines.

1.7.30 The assessment concludes that the Proposed Development will not result in significant landscape effects due to the dominance of existing industrial features and the limited susceptibility of the landscape to further change. Visual effects are generally minor and not significant, except for two recreational receptor locations where moderate adverse effects are anticipated during both construction and operation. Embedded mitigation measures, such as directional lighting, will help reduce visual prominence. Planting is not considered effective or possible for screening tall structures. No additional mitigation is proposed, and residual effects remain as assessed. Overall, the Proposed Development is judged to have a limited influence on the wider landscape and visual environment, with significant effects confined to a small number of viewpoints close to the site.

Greenhouse Gases

1.7.31 Chapter 14: Greenhouse Gases (GHG) (PEIR Volume 1) provides a preliminary assessment of GHG emissions associated with the Proposed Development. The assessment evaluates emissions across the entire lifecycle, using a precautionary worst-case approach. The primary purpose of the Proposed Development is to produce sustainable aviation fuel (SAF), which will displace conventional jet fuel and contribute to national and aviation decarbonisation targets.

Likely Impacts and Effects

1.7.32 The Proposed Development is expected to emit approximately 3.6 million tonnes of carbon dioxide equivalent ($MtCO_2e$) over its lifecycle. Construction accounts for around 12% of these emissions (0.45 $MtCO_2e$), primarily from material production and transport. Operation is the dominant contributor, responsible for 88% of emissions (3.17 $MtCO_2e$),

largely due to biomass cultivation, pellet production, and SAF processing. Decommissioning emissions are minimal, less than 1% of the total.

1.7.33 When compared to the UK's Carbon Budgets, the Proposed Development's emissions represent a very small fraction, less than 0.1% of any five-year budget and up to 2% of indicative budgets beyond 2048. Sector-specific contextualisation shows similarly low contributions relative to aviation and fuel supply pathways. Importantly, the project will produce approximately 180 million litres of SAF annually, reducing lifecycle emissions by about 80% compared to traditional jet fuel. Over 30 years, this equates to an estimated 12.8 $MtCO_2e$ of avoided emissions, delivering a carbon payback ratio of roughly 3.5:1. Construction emissions alone are expected to be offset within just over one year of operation.

1.7.34 The assessment concludes that direct emissions have been minimised and that the Proposed Development will have a net beneficial climate impact due to its role in displacing fossil-derived aviation fuel. It aligns with the UK's Net Zero Strategy, and is a key enabler project to help the UK meet its Jet Zero ambitions, and deliver the SAF Mandate, contributing around 5% of the mandated domestically produced SAF requirement by 2040. Embedded mitigation measures such as using a predominantly brownfield site and on-site biomass CHP for low-carbon energy to further reduce emissions.

1.7.35 No additional mitigation is proposed at this stage, and residual effects remain minor adverse and not significant. Overall, the project is considered consistent with national decarbonisation objectives and represents a key enabler of low-carbon aviation.

Climate Change Resilience

1.7.36 Chapter 15: Climate Change Resilience (CCR) (PEIR Volume 1) provides a preliminary assessment of potential climate hazards and their implications for the Proposed Development over its anticipated 25-year design life, at least 30 year operational life and subsequent decommissioning period.

Likely Impacts and Effects

1.7.37 Climate projections indicate significant changes in temperature, precipitation, and sea level over the lifetime of the Proposed Development. By the 2080s, summer temperatures could rise by nearly 4°C, winter temperatures by 3°C, and heatwaves could increase from less than one per year to over

four annually. Summer rainfall is projected to decrease by up to 23%, while winter rainfall could rise by 21%, increasing flood risk. Sea levels near the site may rise by up to 0.7m by the end of the century. These changes introduce hazards such as extreme heat, heavy precipitation and flooding, storms and high winds, drought, and sea level rise.

1.7.38 During operation, warmer temperatures could increase cooling demands and pose health risks to workers, while heavy rainfall and flooding may damage assets, disrupt operations, and mobilise pollutants. Storms and high winds could lead to physical damage, power outages, and supply chain disruption. Drought conditions may reduce water availability for process and cooling needs, potentially causing temporary shutdowns. Sea level rise could exacerbate flood risks and corrosion of marine infrastructure. Similar hazards apply during decommissioning, with additional health and safety concerns for workers exposed to extreme weather.

1.7.39 With embedded mitigation measures in place, the assessment concludes that no significant residual effects are expected. Design measures include compliance with relevant codes and standards, floor levels informed by the Flood Risk Assessment, robust drainage systems, lightning and surge protection, and emergency response planning. Critical equipment will be housed in weather-protected structures, and contingency plans will address supply chain disruptions. The CHP plant will provide on-site power to reduce reliance on external grids, and critical systems will be designed for safe operation during electrical failures. Monitoring protocols will track extreme weather events, drainage performance, and structural integrity, with maintenance schedules adjusted as necessary.

1.7.40 Overall, the Proposed Development is considered resilient to projected climate changes. While some hazards, such as storms and flooding, initially present moderate risks, these are reduced to minor or negligible levels through embedded design and operational measures. No additional mitigation beyond what is already planned is deemed necessary, and ongoing monitoring will ensure adaptive management throughout the facility's life cycle.

Materials and Waste

1.7.41 Chapter 16: Materials and Waste (PEIR Volume 1) provides a preliminary assessment of primarily the construction phase, as operational and decommissioning phases are anticipated to have

negligible impacts on material consumption and waste generation. Operational activities will involve only minor use of consumables and natural gas for start-up, while decommissioning will not require significant new material resources. Consequently, both phases are scoped out of detailed assessment. The chapter also identifies measures to avoid and mitigate impacts through design and sustainable resource management.

Likely Impacts and Effects

1.7.42 During construction, the Proposed Development will consume significant quantities of materials such as aggregates, asphalt, cement, steel, and specialist industrial products. While these demands will be notable, they are unlikely to cause significant depletion of regional or national stocks given current availability. Waste will arise from site clearance, demolition of jetties, excavation, and general construction activities, including concrete, metals, soils, and packaging. Some waste may be hazardous due to potential contamination from historic land use. The operation phase will generate only small quantities of waste, such as ash and slag, which will be managed in accordance with the waste hierarchy. Feedstock for the plant will consist of sustainably sourced biomass. Decommissioning impacts cannot be reliably predicted at this stage and will be addressed in a future plan.

1.7.43 The assessment concludes that the construction phase will have slight adverse effects on material resources and landfill capacity, but these are not considered significant due to the availability of resources and infrastructure. No mineral sterilisation is expected despite the presence of safeguarding areas for gypsum and salt in the area. Waste diversion rates are anticipated to remain high, consistent with national recovery trends, further reducing potential impacts on landfill capacity. Operational and decommissioning phases are expected to have negligible effects. Mitigation measures, including a Site Waste Management Plan, Materials Management Plan, and sustainable design principles such as modular construction and designing out waste, will further minimise impacts. Residual effects after mitigation are assessed as not significant.

Socioeconomics

1.7.44 Chapter 17: Socioeconomics (PEIR Volume 1) presents the findings of the preliminary assessment of the likely significant effects arising from the construction and operation of the Proposed

Development on Socioeconomics.

Likely Impacts and Effects

1.7.45 The construction of the Proposed Development is anticipated to generate direct, indirect and induced opportunities for employment and Gross Value Added (GVA), which are likely to give rise to a significant beneficial effect. Temporary construction activities are considered likely to generate significant, positive impacts in the context of local and regional markets, benefiting residents and businesses in the local and regional study areas. Overall, the Proposed Development could support a significant number of jobs, as well as significant GVA both directly and indirectly through construction-related spending. The operational phase is not anticipated to give rise to any significant adverse effects.

Traffic and Transportation

1.7.46 Chapter 18: Traffic and Transportation (PEIR Volume 1) provides a preliminary assessment of the likely significant effects of the Proposed Development on traffic and transport during construction, operation and decommissioning. The assessment considers both motorised and non-motorised users (NMUs), i.e. pedestrians, cyclists and equestrians, within a defined study area and evaluates potential impacts such as severance, pedestrian delay, NMU amenity, fear and intimidation, road safety, and driver delay.

Likely Impacts and Effects

1.7.47 Traffic generation is expected to be highest during the construction phase, with up to 1,200 car and light goods vehicle (LGV) trips per day and 180 HGV trips, in addition to the abnormal indivisible loads (AILs) for large components delivered by ship or, if ship cannot be used, by road. Operational traffic will be lower, with up to approximately 450 car/LGV trips and up to 90 HGV trips daily. Decommissioning impacts are anticipated to be similar to or less than those during construction.

1.7.48 Preliminary analysis indicates that most links within the study area will experience negligible changes in traffic flow, generally below the 30% threshold for significant severance or amenity effects. The site access road is the only link predicted to exceed this threshold, but its low environmental sensitivity means the effect is classified as slight and not significant. Changes in HGV flows are also negligible across all links proposed to be used by

site construction traffic. Consequently, impacts on amenity and the anxiety and discouragement experienced by NMU are assessed as neutral or slight adverse. No step changes in hazard scores were identified, and public transport services are expected to remain unaffected. Road safety analysis shows no inherent issues within the study area, although a full review of collision data and junction performance will be undertaken for the ES. Driver delay and cumulative impacts will also be assessed.

1.7.49 With embedded mitigation measures such as a Construction Traffic Management Plan (CTMP) and Construction Worker Travel Plan (CWTP), residual effects during construction are expected to be neutral or slight adverse and therefore not significant. These measures will manage vehicle routeing, timing, and parking, and promote sustainable travel options for workers. No additional mitigation is currently proposed, but further refinement will occur as design details progress. Overall, the Proposed Development is unlikely to result in significant traffic or transport effects, provided that planned management strategies are implemented. The ES will confirm final trip generation, junction capacity modelling, and any cumulative impacts, ensuring compliance with relevant policy and guidance. at the next stage.

Major Accidents and Disasters

1.7.50 Chapter 19: Major Accidents and Disasters (PEIR Volume 1) provides a preliminary assessment of Major Accidents and Disasters (MA&Ds). Major accidents are incidents such as fires and explosions that could result in serious harm to people. They also have the potential to cause widespread damage to property and the environment. Disasters can be naturally occurring events, such as earthquakes, landslides and flooding.

Likely Impacts and Effects

1.7.51 The impact of MA&Ds can be very significant, but the likelihood of occurrence is low. In the ES a number of hypothetical MA&Ds scenarios during construction and operation will be identified and assessed. The industrial location and size of the site inherently reduces risks of MA&D, while the engineering design, construction and operation of the Proposed Development will incorporate appropriate standards and mitigation measures necessary to reduce the risks of MA&Ds to an acceptable level, i.e. as low as is reasonably practicable. As well as an Environmental Permit, the operational plant will be regulated by the HSE as a Control of Major Accident Hazards (COMAH) site.

Consequently, based on the design of the Proposed Development and the proposed operational control measures to be applied, no significant effects are anticipated to be identified.

Marine Navigation

1.7.52 Chapter 20: Marine Navigation (PEIR Volume 1) provides a preliminary assessment of the likely significant effects of the Proposed Development on marine navigation during the construction and operational phases of the proposed project.

1.7.53 The Proposed Development has the potential to impact marine navigation during the following phases:

- Phase 1: Construction of the quay (and demolition of existing jetties) and dredging of the berth pocket and approach channel;
- Phase 2: Marine operations during the construction of the Lighthouse Green Fuels plant; and
- Phase 3: Marine operations during the operational phase of the project.

1.7.54 Potential likely significant effects during the three outlined marine operation phases include the following navigation hazards: collisions, contact incidents, grounding of vessels, and breakout incidents. These will be assessed in a Navigation Risk Assessment, the approach to which is set out in the chapter. The results of the Navigation Risk Assessment will be included in the ES in line with the legislation, policy and guidance and any mitigation identified.

Geology and Soils

1.7.55 Chapter 21: Geology and Soils (PEIR Volume 1) provides a preliminary assessment of potential effects on geology and soils arising from the construction and operation of the Proposed Development. The assessment evaluates risks associated with land contamination, ground gas, and controlled waters.

Likely Impacts and Effects

1.7.56 During construction, disturbance of made ground and historical contamination could expose workers and neighbours to pollutants through direct contact, inhalation, or ingestion. There is also potential for ground gas migration and for contaminants to leach into groundwater or surface water, particularly if preferential pathways are created through piling. Jetty works and dredging could mobilise contaminated sediments in the River Tees.

However, with embedded mitigation such as ground investigation and remediation strategies prior to construction, and pollution prevention measures during construction and operation – the latter being implemented through compliance with the environmental permit - these impacts are assessed as negligible to minor adverse and not significant.

1.7.57 In the operational phase, risks primarily relate to accidental spills or leaks of chemicals. These could affect soils, groundwater, or surface water, but compliance with the required environmental permit, use of bunded storage tanks, and rapid spill response protocols will minimise risks. Consequently, operational impacts are predicted to be negligible to minor adverse and not significant. No significant geological resource loss is anticipated, and the site design will prevent creation of new contamination pathways.

1.7.58 The assessment concludes that, with embedded and good practice measures in place, no likely significant adverse effects on geology, soils, or controlled waters will occur during construction or operation. Residual effects remain negligible or minor adverse, primarily in relation to the Principal aquifer, but these are not considered significant. Further ground investigation and sediment sampling will refine risk assessments and inform remediation strategies prior to construction. Overall, the Proposed Development is expected to be suitable for use from a contaminated land perspective and will comply with regulatory requirements for environmental protection.

Cumulative and Combined Effects

1.7.59 The purpose of Chapter 22: Cumulative and Combined Effects (PEIR Volume 1) is to provide a preliminary assessment of the potential for cumulative effects to occur as a result of the Proposed Development being built and operated at the same time as other committed developments.

1.7.60 A number of other proposed developments that are also likely to be constructed and operated in future, and that have the potential to generate cumulative environmental effects together with the Proposed Development have been identified. Following a thorough review of other developments proposed within 10km of the Site (the largest study area considered by the EIA) a longlist of development were identified for consideration in the ES.

1.8 Summary and Conclusions

1.8.1 The PEIR outlines the potential impacts of the

Proposed Development during construction, operation and decommissioning phases. It identifies both positive and negative effects, using a precautionary approach to assess worst-case scenarios where final design details are still to be confirmed. Construction and Operational effects for terrestrial, freshwater and marine ecology will be assessed and reported in the ES.

1.8.2 The significant effects identified within the PEIR include:

- Potential significant adverse visual effects from nearby recreational viewpoints during construction and operation of the Proposed Development;
- the Proposed Development will have a potential net beneficial climate impact due to its role in displacing fossil-derived aviation fuel; and
- there will potentially be significant beneficial socio-economic effects (through the creation of employment) during construction of the Proposed Development.

1.8.3 A range of mitigation measures have been identified to reduce and control environmental effects during construction, operation and decommissioning of the Proposed Development. Further assessment will be undertaken and reported in the ES to take account of additional design work and consultation feedback, including development of mitigation for certain aspects.

Figures

Figure 1-1 Lighthouse Green Fuels - Visualisation (south-east)

Lighthouse GREEN FUELS

www.lighthousegreenfuels.co.uk