

Immingham Green Energy Terminal

Environmental Impact Assessment

Preliminary Environmental Information Report

Volume II – Main Report

Chapter 3: Need and Alternatives

Associated British Ports



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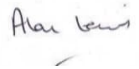
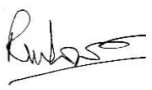
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3 Need and Alternatives

3.1 Introduction

3.1.1 This Chapter of the PEI Report introduces the need and objectives for the Project and the alternatives that have been considered. Firstly, it sets out why there is a need for the Project in the Humber Estuary arising from the Government's clear plans to develop a hydrogen economy in the UK and capture CO₂ for sequestration to drive decarbonisation and the transition to net zero. Secondly the chapter then explains why at this preliminary stage it is considered that the Project is most suitable to meet the identified need. The explanation of need draws from the National Policy Statement for Ports (NPSfP) (Ref 3-1) and other relevant Government and National and Local policy. The chapter is set out as follows:

- a. The need and objectives for the Project are explained.
- b. The alternatives that have been considered during the evolution of the Project and design process as presented in **Chapter 2: The Project**, up to this stage of statutory consultation.

3.1.2 A more detailed need case and further information on main alternatives considered and reasons why the Project site was selected will be set out in the Environmental Statement (ES) and documentation to support the application for development consent.

3.2 Summary of Overarching Project Need

3.2.1 The need for the Project arises in response to the Government's strategy to deliver the UK's legally binding net zero obligations, which requires the delivery of new infrastructure to support meeting those obligations. The Ten Point Plan for a Green Industrial Revolution (November 2020) (The Ten Point Plan), The Net Zero Strategy: Build Back Greener (October 2021), and the British Energy Security Strategy (April 2022) together set out the Government's strategy to decarbonise industry in line with the plan for achieving the UK's legally binding net zero obligations by 2050. The Government has detailed policies for how this would be achieved through the deployment of a combination of different technologies and measures. These include carbon capture, utilisation and storage (CCUS) and fuel switching to low carbon hydrogen. Business models and funding mechanisms have been created to support the use of low carbon hydrogen and deployment of CCUS infrastructure. Ports will play an important role in industrial decarbonisation through the provision of enabling infrastructure, allowing the technologies and measures needed for a transition to net zero to be deployed.

3.2.2 As such, there is a compelling need to develop a range of infrastructure including specific port infrastructure, both landside and within the marine area, to meet the growing and changing nature of demand from the energy sector as the transition to net zero gains momentum. The provision of port infrastructure to increase capacity and resilience in response to an identified need aligns with Government policy guidance set out in the NPSfP, see **Section 3.3** of this Chapter.

- 3.2.3 The Project would directly support the aims of the Government's decarbonisation strategy, through the production and delivery of green hydrogen. The Project will contribute to the decarbonisation of hard to abate transport emissions and will help to improve Britain's energy security and support the Levelling Up agenda.
- 3.2.4 The Port of Immingham plays a key role in the movement of freight in and out of the UK, forming part of one of the UK's largest port complexes together with Grimsby, Hull and Goole. Furthermore, the Port of Immingham is the UK's largest port by tonnage, handling over 46 million tonnes of cargo every year. However, there is currently insufficient suitable capacity and infrastructure designed to meet the emerging future demand from the energy sector at the Port of Immingham.
- 3.2.5 The energy sector requires port infrastructure that can provide deep water berths to accommodate very large vessels to import ammonia and liquefied carbon dioxide and import or export other energy products. The port infrastructure needs to be directly proximate and connected to the landside infrastructure including storage for ammonia and hydrogen, production plants to convert ammonia to hydrogen, carbon dioxide compressors and pipeline links. The Project would provide infrastructure designed to meet that need and contribute towards the Government's aim of achieving 10GW of low carbon hydrogen production capacity by 2030, as defined in the British Energy Security Strategy. Future energy cargoes that would support the transition to net zero would also be accommodated.
- 3.2.6 The provision of additional port capacity in direct proximity to the Humber industrial cluster presents an ideal opportunity for the delivery of clean energy production and industrial decarbonisation through supporting the delivery of CCS (Carbon Capture and Storage). The Viking CCS project, a carbon dioxide transport and storage (T&S) network linked to the former Viking gas fields in the Southern North Sea, is currently being developed. The developer of the Viking CCS project (Harbour Energy) and ABP are collaborating around the potential to develop a facility for the discharge of liquefied CO₂ cargoes from vessels at the Immingham Green Energy Terminal (IGET) facility into the Viking CCS T&S for storage. The proposed pipeline from Immingham to Theddlethorpe can be directly connected to IGET to provide a method of transporting CO₂ captured at other dispersed industrial and power generation locations by ship to Immingham for sequestration. Shipping of CO₂ is crucial to ensuring all areas of the UK can remain competitive by providing access to CO₂ storage for areas not located adjacent to pipelines connecting geological storage. The potential facilities for the connection of IGET to the Viking CCS storage sites will be the subject of a separate future consent should they be progressed.
- 3.3 The Objectives of the Project and Need
- 3.3.1 The high level objectives for the Project have been developed having regard to the Government's strategy to deliver the legally binding net zero obligations and the requirements of national and local planning policy as set out in the National Policy Statements for ports and energy (Ref 3-1), the National Planning Policy Framework (Ref 3-2) and the North East Lincolnshire Local Plan (Ref 3-3). Other

factors include the location of the Port in proximity to the UK's largest industrial cluster in the Humber, the Viking CCS project, the Humber Industrial Cluster Plan¹ and the vision set by the Humber Energy Board² to deliver decarbonisation.

3.3.2 The objectives for the Project are as follows:

- a. To provide essential port infrastructure, capacity and resilience to support the growth and changing strategic needs of the energy sector to support decarbonisation within the Humber Industrial Cluster and the Humber Enterprise Zone.
- b. To provide capacity to support import and export of a range of bulk liquid energy products including (i) ammonia (NH₃) to produce green hydrogen to help decarbonise the United Kingdom's (UK) transport sector and (ii) carbon dioxide (CO₂), to facilitate carbon capture and storage, both of which will assist transition towards net zero.
- c. To deliver and operate new port infrastructure in a safe, efficient and sustainable manner by making effective use of available land, water, transport and utility connections which exist in and around the Port of Immingham.
- d. To minimise adverse impacts on the environment and safeguard the health, safety and amenity of local residents.
- e. To enhance both the local and regional economy through direct investment in and around the Port of Immingham and by partnering with the supply chain, providing opportunities for training, upskilling, apprenticeships and local employment.

3.3.3 The need for the Project, which arises from the Government's plans for decarbonisation and transition to net zero, is explained further in the following paragraphs by reference to the project objectives.

Objective 1 - To provide essential port infrastructure, capacity and resilience to support the changing strategic needs of the energy sector to support decarbonisation within the Humber Industrial Cluster and the Humber Enterprise Zone

3.3.4 To explain the purpose of the first objective, an explanation of the need to provide energy capacity to help deliver decarbonisation, the need for energy security and the need for the Project to be located in the Humber is provided.

¹ The Humber Industrial Cluster Plan will set out a comprehensive plan for the Humber Cluster to achieve net zero by 2040

² The Humber Energy Board was convened by two Local Enterprise Partnerships across the region (the Hull and East Yorkshire Local Enterprise Partnership (LEP) and the Greater Lincolnshire LEP) to act as a single voice on climate change matters.

Reference is made to the Government's strategy to achieve net zero, and national and local planning policy.

The need to provide energy capacity to meet net zero obligations

- 3.3.5 To support the Government's plan to achieve net zero by 2050, sufficient infrastructure capacity is needed to enable the energy sector to deliver measures for decarbonisation. The Port of Immingham is already an established part of the supply chain for the energy sector but needs to respond to the changing needs of the energy market in this location and the requirements of various aspects of the response to Government energy policy including CCS and low-carbon hydrogen production and the Humber Industrial Cluster Plan.
- 3.3.6 The Energy White Paper 'Powering our Net Zero Future' (December 2020) (Ref 3-4) seeks to transform the energy sector recognising that the necessity of tackling climate change offers huge opportunity for both growth and job creation. The White Paper sets out the Government's long term strategic vision to transition to clean energy and meet net zero by 2050, and emphasises that *"simply setting the target is not enough, we need to achieve it"*. The Energy White Paper recognises that achieving the goal of net zero by 2050 requires *"action across the economy"* and a wide set of measures and initiatives to *"reduce emissions from power, buildings, industry, upstream oil and gas, and address the implications for the energy system of electrifying surface transport"*.
- 3.3.7 In relation to hydrogen, the Energy White Paper states *"As a gas that can be used as a fuel without emitting harmful greenhouse gasses, hydrogen will be critical in reducing emissions from heavy industry, as well as in power, heat and transport"*. The Energy White Paper committed the Government to publishing a dedicated Hydrogen Strategy to position the UK as a world leader in the production and use of clean hydrogen. The UK Hydrogen Strategy (August 2021) (Ref 3-5) recognises the scale of the challenge to increase green hydrogen production, stating in Chapter 1 *"With virtually no low carbon hydrogen produced or used currently, particularly to supply energy, this will require rapid and significant scale up from where we are today"*. Paragraph 1.2 of the Hydrogen Strategy emphasises the need for hydrogen infrastructure stating, *"hydrogen can only be considered as a decarbonisation option if it is readily available"*. Paragraph 1.3 builds on this, stating *"as a result of its geography, geology, infrastructure and capabilities, the UK has an important opportunity to demonstrate global leadership in low carbon hydrogen"*. Section 2.2 of the Hydrogen Strategy outlines how hydrogen development can be delivered and scaled up, and states *"Investors, developers and companies across the length and breadth of the UK are ready to build if the policy environment is in place"*, further stating at 2.4.2 that *"developing and scaling hydrogen power during the 2020s can reduce the burden on other technologies such as renewables, CCUS and nuclear"*.
- 3.3.8 In terms of carbon capture and storage, the ambition of the Energy White Paper *"is to capture 10Mt of carbon dioxide a year by 2030"* recognising that the deployment of CCUS is *"fundamental to the decarbonisation of energy intensive industries such as steel, cement, oil refining and chemicals. CCUS can help secure the long-term future of these industries and enable production of clean*

hydrogen at scale.” The Energy White Paper is clear on the challenge of developing the necessary infrastructure, stating that “Developing carbon transport and storage infrastructure will require large upfront capital expenditure, to construct offshore and onshore pipelines and develop storage sites and wells. We will help to put in place this critical network, as the foundation for the scaling up of CCUS across the UK.”

- 3.3.9 The NPSfP recognises the essential role that ports play in the growth of the UK economy. Paragraph 1.2.4 states that this NPS “sets out the Government’s conclusions on the need for new infrastructure, considering the current place of ports in the national economy, the available evidence on future demand and the options for meeting future needs. It explains to planning decision makers the approach they should take to proposals, including the main issues which, in the Government’s view, will need to be addressed to ensure that future development is fully sustainable, as well as the weight to be given to the need for new port infrastructure and to the positive and negative impacts it may bring”.
- 3.3.10 Within paragraph 3.1.4 the NPSfP recognises that “for an island economy, there are limited alternatives available to the use of sea transport for the movement of freight and bulk commodities. Air freight is often used for high-value items and express deliveries, and the Channel Tunnel has a significant role in freight as well as passenger transport. But these alternatives are constrained by the volumes that can be practically carried by air, by the capacity of the rail links through the tunnel and in the case of aviation by cost and environmental disadvantages. As a consequence, shipping will continue to provide the only effective way to move the vast majority of freight in and out of the UK, and the provision of sufficient sea port capacity will remain an essential element in ensuring sustainable growth in the UK economy”.
- 3.3.11 The role that ports play in the energy market is recognised in the NPSfP which states at paragraph 3.1.5 ‘Energy Supplies’ that ‘Ports have a vital role in the import and export of energy supplies’ and that ‘port handling needs for energy can be expected to change as the mix of our energy supplies changes and particularly as renewables play an increasingly important part as an energy source”.
- 3.3.12 The Overarching National Policy Statement for Energy (July 2011) (EN-1) (Ref 3-6) sets out the Government’s policy for the development of nationally significant energy infrastructure which seeks a reduction in carbon emissions, energy security and affordability. In the case of IGET, Air Product’s hydrogen production facilities are associated development but EN-1 provides context for the low carbon energy and CCS sectors and is an important material consideration in support of the need for the Project. Low carbon hydrogen production and use are also specifically included in the Draft Overarching National Policy Statement for Energy (September 2021) (Draft EN-1).
- 3.3.13 Within EN-1, the Government has emphasised the importance of CCS, highlighting at paragraph 3.6.5 that the Government is supporting the cost of four commercial scale demonstration projects at UK power stations and also stating that “the demonstration programme will also require the construction of essential infrastructure (such as pipelines and storage sites) that are sized and located

both for the purpose of the demonstration programme and to take account of future demand beyond the demonstration phase". Also highlighted in EN-1 is the need for more gas infrastructure. Paragraph 3.8.9 states *"new import infrastructure, both in terms of conventional import pipelines, gas reception facilities and LNG import facilities"* are likely to be required.

- 3.3.14 Draft EN-1 outlines the policy context for the development of nationally significant energy infrastructure to support the vision set out in the Energy White Paper. Draft EN-1 considers the large-scale infrastructure that will be required to ensure the UK can provide a secure, reliable and affordable supply of energy while also meeting decarbonisation targets.
- 3.3.15 In terms of energy capacity, Draft EN-1 sets out that the Government sees the need for significant amounts of new, large-scale infrastructure to meet its energy objectives. Paragraph 3.2.4 of Draft EN-1 sets out that *"it is for industry to propose new energy infrastructure within the strategic framework set by government... the government does not consider it appropriate for planning policy to set limits on different technologies but planning policy can be used to support the government's ambitions in energy policy and other policy areas."* It is considered that this Project clearly fulfils these ambitions.
- 3.3.16 The National Planning Policy Framework (NPPF) (July 2021) Ref 3-2) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. It highlights that the purpose of the planning system is to contribute to the achievement of sustainable development, providing a *"presumption in favour of sustainable development"*. The NPPF highlights the challenges of climate change and how the planning system should support the transition to a low carbon future, including paragraph 152 which supports encouraging *"renewable and low carbon energy and associated infrastructure"*. Paragraph 158 states that *"When determining planning applications for renewable and low carbon development, local planning authorities should: a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions; and b) approve the application if its impacts are (or can be made) acceptable"*.
- 3.3.17 The Project will directly support the Government's strategy to achieve net zero by 2050 by providing port infrastructure for the deployment of hydrogen and CCS technologies, both being essential measures to achieve industrial decarbonisation.

The need for energy security

- 3.3.18 The UK becoming energy independent and being in a position to draw upon its own energy supplies is an increasingly urgent issue. The British Energy Security Strategy (Ref 3-7) addresses the UK's vulnerability to international energy prices and highlights the importance of reducing the UK's dependence on imported oil and gas. The Government identifies that the UK is well placed to exploit all forms of low carbon hydrogen production and commits to doubling its hydrogen production ambition to 10GW by 2030. In meeting net zero by 2050, the British

Energy Security Strategy highlights the importance of the North Sea reserve. It is stated that we must *“use the empty caverns for CO₂ storage, bring through hydrogen to use as an alternative to natural gas and use our offshore expertise to support our offshore wind sector”*.

- 3.3.19 The British Energy Security Strategy recognises that to accelerate our supply of low carbon hydrogen, it requires *“designing, by 2025, new business models for hydrogen transport and storage infrastructure, which will be essential to grow the hydrogen economy”*.
- 3.3.20 With regards to energy security, EN-1 highlights how critical it is that the UK continues to have secure and reliable supplies of energy to make the transition to a low carbon economy. Under paragraph 2.2.20, achieving security of supply includes the use and import of *“a diverse mix of technologies and fuels, so that we do not rely on any one technology or fuel. Diversity can be achieved through the use of different technologies and multiple supply routes (for example, primary fuels imported from a wide range of countries”*. Paragraph 2.2.21 states that *“Developing our infrastructure ... will help us maintain and improve our security and access to competitive supplies, particularly for electricity generation and gas importation and storage”*.
- 3.3.21 The NPSfP, at paragraph 3.1.5 recognises that *“Ensuring security of energy supplies through our ports will be an important consideration, and ports will need to be responsive both to changes in different types of energy supplies needed (and to the need for facilities to support the development and maintenance of offshore renewable sites) and to possible changes in the geographical pattern of demand for fuel”*. Further at paragraph 3.3.3, the NPSfP sets out that new port infrastructure should also *“ensure competition and security of supply”*. The Project clearly fulfils these objectives through the first proposed use of the terminal for the importation of green ammonia for green hydrogen production.

The need for capacity to be located in the Humber

- 3.3.22 The Government’s Levelling Up White Paper (February 2022) (Ref 3-8) seeks to end geographical inequality and improve economic dynamism and innovation to drive growth across the whole country. For levelling up and the transition to net zero, the White Paper states *“Industrial centres stand to benefit from employment and export opportunities created by the transition to Net Zero. Many are building on a rich manufacturing and engineering heritage and opportunities for synergies between different green technologies and industries provide a strong foundation for place-based clusters to develop.”*
- 3.3.23 On Figure 1.30 of the Levelling Up White Paper, the Humber estuary is shown as being a location for energy intensive and process industries. Furthermore, the White Paper states *“The Humber is playing a key role in energy. Through its natural geography and emerging cluster, the Humber will help to ensure that offshore wind, industrial decarbonisation, carbon capture, and other technologies will sustain key industries and create high quality jobs at scale for years to come.”* The White Paper reports that a private sector board will be created to provide strategic leadership and drive development and delivery of the Humber economic priorities including the Humber Net Zero Cluster. The White Paper further states

that *“The Humber is the UK’s largest trading estuary and has the capacity to make significant inroads into decarbonisation and the application of new and related technologies.”*

- 3.3.24 In terms of specific measures in the Humber area, the Levelling Up White Paper sets out that a new freeport for Yorkshire and the Humber will be created, *“The Humber Freeport, spanning Hull, Goole, Immingham and Grimsby will provide new opportunities for Yorkshire and the Humber. This location has excellent connectivity to the UK’s manufacturing hinterland and supply chain, and is ideally positioned to service the growing North Sea offshore wind industry. The Freeport will build on existing regional strengths, including renewable energy, clean growth and advanced manufacturing, to deliver thousands of jobs and new investment.”*
- 3.3.25 The Project is seeking to respond to existing and emerging markets and customers by focusing development in and around the Port of Immingham to support the emerging future needs of the energy sector. The need for the Project to be located in the Humber arises from market demand for additional port capacity in that location. Furthermore, the Project is in close proximity to the proposed Viking CCS project and East Coast Cluster, the latter being a collaboration between Zero Carbon Humber, Net Zero Teesside and Northern Endurance Partnership with the aim of removing 50% of the UK’s industrial CO₂ emissions, protecting thousands of jobs and establishing the region as a globally-competitive climate-friendly hub for industry and innovation. The Cluster includes a diverse mix of low carbon projects including industrial carbon capture, low-carbon hydrogen production, negative emissions power, and power with carbon capture. These technologies are essential for the UK to meet its net zero obligations.
- 3.3.26 This market led approach is reflected in the NPSfP which seeks to enable the ports industry to respond to the needs of the market but in a way that delivers sustainable development. At paragraph 3.3.5 the NPSfP states that port development should wherever possible be *“an engine for growth; supporting sustainable transport by offering more efficient transport links with lower external costs” and support “sustainable development by providing additional capacity for the development of renewable energy”.*
- 3.3.27 In terms of the Government’s assessment of the need for new infrastructure, it is recognised at paragraph 3.4.1 of the NPSfP that the need for port infrastructure depends not only on demand for port capacity, but also on the need to retain the flexibility that ensures port capacity is located where it is required and, on the need to ensure effective competition and resilience in port operations. Paragraph 3.4.2 of the NPSfP states that *“over time and notwithstanding temporary economic downturns, increased trade in goods and, to a lesser extent in commodities, can be expected as a direct consequence of the Government’s policies to support sustainable economic growth and to achieve rising prosperity”.* With the movement of 95% of all goods in and out of the UK being by sea, and very limited alternatives being available, the majority of this increase will need to be through ports around the coast of the United Kingdom. At paragraph 3.4.11 of the NPSfP, it states that *“capacity needs to be provided at a wide range of facilities and locations, to provide the flexibility to match the changing demands of*

the market". Paragraph 3.4.12 reinforces this statement, setting out that *"Port development must be responsive to changing commercial demands, and the Government considers that the market is the best mechanism for getting this right, with developers bringing forward applications for port developments where they consider them to be commercially viable."*

- 3.3.28 Paragraph 3.4.13 of the NPSfP recognises that competition is an important factor in driving efficiency and lowering costs and that *"effective competition requires sufficient spare capacity to ensure real choice for port users"* and *"requires ports to operate at efficient levels, which is not the same as operating at full physical capacity"*. This is due to fluctuating levels of demand resulting in the need to ensure that there is flexibility in physical capacity to accommodate such fluctuations. It emphasises that *"The Government believes the port industry and port developers are best placed to assess their ability to obtain new business and the level of any new capacity that will be commercially viable, subject to developers satisfying decision-makers that the likely impacts of any proposed development have been assessed and addressed."*
- 3.3.29 Paragraph 3.4.14 underlines the contribution coastal shipping, as a substitute for inland freight transport, can make towards decongestion and decarbonisation and to the environment. The NPSfP states *"facilitating coastal shipping as a substitute for inland freight transport of various commodities"* *"can mean reduced emissions of pollutants per tonne-mile, with those emissions, and noise, at the same time having much less effect on people close to the transport arteries."* Furthermore, *"Coastal shipping is expected to grow, and developers are expected to provide suitable facilities on a commercial basis"*. The Project includes provision for a second berth to support smaller vessels which will be provided if the demand exists. Vessels utilising the second berth would contribute to decongestion and decarbonisation as required by the NPSfP.
- 3.3.30 In terms of resilience, the NPSfP sets out that, *"Spare capacity also helps to assure the resilience of the national infrastructure. Port capacity is needed at a variety of locations and covering a range of cargo and handling facilities, to enable the sector to meet short-term peaks in demand, the impact of adverse weather conditions, accidents, deliberate disruptive acts and other operational difficulties, without causing economic disruption through impediments to the flow of imports and exports."*
- 3.3.31 The NPSfP sets out the compelling need for substantial additional port capacity over the next 20-30 years and states that excluding the possibility of providing additional capacity would be to accept limits on economic growth and the price, availability and choice of goods imported as well as limit the local and regional benefits that new development might bring. Paragraph 3.4.16 recognises that this outcome would be *"strongly against the public interest"*.
- 3.3.32 Under section 3.5 of the NPSfP, guidance is outlined to the decision maker in assessing the need for additional capacity. Paragraph 3.5.1 states that the decision maker should accept the need for future capacity to *"cater for long-term forecast growth in volumes of imports and exports by sea for all commodities indicated by the demand forecast figures set out in the MDST forecasting report accepted by Government, taking into account capacity already consented ...;*

support the development of offshore sources of renewable energy; offer a sufficiently wide range of facilities at a variety of locations to match existing and expected trade, ship call and inland distribution patterns and to facilitate and encourage coastal shipping; ensure effective competition among ports and provide resilience in the national infrastructure; and take full account of both the potential contribution port developments might make to regional and local economies". The Project will help provide resilience in the port sector through the provision of additional port capacity including a terminal with a deep water jetty and up to two berths, pipelines, ammonia storage and the hydrogen production facility. The ammonia would be produced outside the UK using renewable electricity. The Project will also provide the marine infrastructure required to facilitate the transfer of liquified CO₂, linking to the planned Viking CCS project. This will support growth of the energy sector in the Humber Estuary, directly supporting Government policy on decarbonisation and net zero obligations.

- 3.3.33 Paragraph 3.5.2 recognises the urgent need for infrastructure of the types covered as set out above and because of that need, states that *"the [determining authority] should start with a presumption in favour of granting consent to applications for ports development. That presumption applies unless any more specific and relevant policies set out in this or another NPS clearly indicate that consent should be refused"*.
- 3.3.34 The North East Lincolnshire Local Plan 2013-2032 (2018) sets out the local authority's vision and strategy for development, including why, where and how the Borough will grow. The overall spatial vision for the region is to ensure that by 2032 North East Lincolnshire is *"nationally and internationally recognised as a centre for offshore renewables, focusing on operations and maintenance and contributing significantly to the Humber's 'Energy Estuary' status"*. This includes growing key sectors including ports and logistics and renewable energy.
- 3.3.35 The Local Plan outlines in paragraph 6.6 that the Ports of Immingham and Grimsby together form the largest port complex in the UK by tonnage handled and the fourth largest in Europe. They are of international trading significance, which provides the Borough with strong logistical operations capacity.
- 3.3.36 The Local Plan does not preclude other forms of renewable energy coming forwards, stating at Paragraph 14.104 that *"The presence of the port, combined with the Borough's infrastructure network associated with a long history of industry and energy production provides excellent foundations for a range of onshore renewable energy technologies to continue to be developed."*
- 3.3.37 The Project will provide capacity for liquid bulk users of the jetty in the Humber. It is anticipated that the first user of the jetty, (Air Products) will use approximately 3% of the annual jetty capacity of approximately 400 ship calls per year ('maximum throughput' across both berths if they are constructed is in excess of 16 million tonnes) in association with the import of ammonia for processing. The remaining jetty capacity provides substantial flexibility for any expansion by Air Products or use by other liquid bulk users, including the carbon capture sector. The environmental effects of the Project have been assessed through the establishment of a series of maximum development extents known as a 'Rochdale Envelope' as set out in **Chapter 5: EIA Approach** of this PEI Report.

This takes account of opportunities to increase the use of the jetty by other liquid bulk customers, including the carbon capture sector, up to the annual jetty capacity or 'maximum throughput'.

Objective 2 - To provide capacity to support import and export of a range of bulk liquid energy products including (i) ammonia (NH₃) to produce green hydrogen to help decarbonise the United Kingdom's (UK) transport sector and (ii) carbon dioxide (CO₂), to facilitate carbon capture and storage, both of which will assist transition towards net zero.

- 3.3.38 To explain the purpose of the second objective, an explanation of the need for green hydrogen capacity and other bulk liquids is provided. Reference is made to the Government's strategy to achieve net zero, and national and local planning policy.

The need specifically for green hydrogen capacity and other bulk liquids

- 3.3.39 There is a growing need to develop green hydrogen capacity in the UK and while some of this is being facilitated through UK production, the opportunity exists to import green hydrogen from other countries where surplus renewable energy can be harnessed. The safest and most appropriate way to transport hydrogen is in the form of ammonia. As shipping will continue to provide the most effective way to move ammonia in and out of the UK, sufficient port and landside infrastructure is required for its subsequent storage and processing to convert it to hydrogen. The Project seeks to provide the necessary infrastructure and capacity not only for ammonia cargoes but also for future CO₂ to link to the Viking CCS carbon transport and storage proposals.
- 3.3.40 The Ten Point Plan sets out the Government's aim for the UK to develop 5GW³ of low carbon hydrogen production capacity by 2030 (Ref 3-9). The Ten Point Plan seeks to drive the growth of low carbon hydrogen stating that "*Hydrogen is the lightest, simplest and most abundant chemical element in the universe. It could provide a clean source of fuel and heat for our homes, transport and industry*".
- 3.3.41 The Energy White Paper further supports this aim, setting out that hydrogen is earmarked as a priority area in the Net Zero Innovation Portfolio with the intention to invest in new hydrogen technologies. Within the White Paper it is stated "*by 2050 we expect low-carbon options, such as clean hydrogen and long-duration storage, to satisfy the need for peaking capacity and to ensure security of supply*", which highlights a need for low-carbon, hydrogen infrastructure. Finally, it is also highlighted that "*action now to deploy hydrogen during the 2020's will*

³ The Government revised this target in the British Energy Security Strategy (April 2022) where it is stated "*We will double our UK ambition for hydrogen production to up to 10GW by 2030, with at least half of this from electrolytic hydrogen*".

stimulate domestic supply chains, enabling UK businesses to capture increasing international demand for hydrogen goods and services”.

- 3.3.42 The UK Hydrogen Strategy also supports the Government’s aim, recognising that *“Hydrogen is one of a handful of new, low carbon solutions that would be critical for the UK’s transition to net zero. As part of a deeply decarbonised, deeply renewable energy system, low carbon hydrogen could be a versatile replacement for high-carbon fuels used today - helping to bring down emissions in vital UK industrial sectors and providing flexible energy for power, heat and transport.”* Chapter 2.3.2 also indicates that *“Hydrogen’s ability to store energy for long periods of time and in large quantities is an important part of its strategic value to a fully decarbonised energy system, and we envisage hydrogen storage being a key part of future network infrastructure”.*
- 3.3.43 Paragraphs 3.4.11 to 3.4.16 of Draft EN-1 establish the need for low carbon hydrogen infrastructure, stating *“The government is committed to developing low carbon hydrogen, which will be critical for meeting the UK’s legally binding commitment to achieve net zero by 2050, with the potential to help decarbonise vital UK industry sectors and provide flexible deployment across heat, power and transport.”* Paragraph 3.4.12 sets out that *“Hydrogen can be produced through water electrolysis with low carbon power (‘green’ hydrogen) or through methane reformation with CCS (‘blue’ hydrogen). The government’s view is that a twin track approach of developing both green and blue hydrogen production will be needed to achieve the scale of low carbon hydrogen production required for net zero.”* Paragraph 3.4.15 further states that *“in the future, low carbon hydrogen may become an internationally traded energy vector, piped or shipped from areas of low-cost production to areas of demand. While the development of this market is uncertain, the UK could become both an exporter and Importer of low carbon hydrogen, potentially necessitating current gas infrastructure to be configured or for new infrastructure to be put in place”.* It is also stated at Paragraph 3.4.16 that *“There is an urgent need for all types of low carbon hydrogen infrastructure to allow hydrogen to play its role in the transition to net zero.”*
- 3.3.44 The Draft EN-1 also sets out the need for new nationally significant CCS infrastructure for the transition to a net zero economy. In paragraph 3.5.1, it sets out that the Government’s Climate Change Committee states that new CCS infrastructure is said to be a *“necessity not an option”* and that *“CCS infrastructure will also be needed to capture and store carbon dioxide from hydrogen production from natural gas, industrial processes, the use of bioenergy and from the air”.*
- 3.3.45 The Project aligns with the Government’s aim to scale up production of green hydrogen and also to help facilitate the use of carbon capture through the proposed CO₂ import facility and link to the Viking CCS project. Air Products wish to develop a green hydrogen production facility (the Associated Development) which aligns with the Government’s ambition to deliver 10GW of low carbon hydrogen by 2030. The use of the hydrogen produced by the facility in substitution of other fuels used in road transport could eliminate approximately 580,000 tonnes of greenhouse gas emissions each year, the equivalent of taking

20,000 diesel HGVs off the road. Refer to **Chapter 19: Climate Change** for the impact of the Project on greenhouse gas emissions.

Objective 3 - To deliver and operate new port infrastructure in a safe, efficient and sustainable manner by making effective use of available land, water, transport and utility connections which exist in and around the Port of Immingham.

- 3.3.46 To explain the purpose of the third objective, an explanation of the need to make best use of available resources is set out with reference to the NPSfP and national and local planning policy.

The need to make best use of available land, water, transport and utility connections

- 3.3.47 The NPSfP (Ref 3-1) sets out Government policy for ports and at paragraph 3.3.3 sets out that to help meet the requirements of the Government's policies on sustainable development new port infrastructure should *"contribute to local employment, regeneration and development; ensure competition and security of supply; preserve, protect and where possible improve marine and terrestrial biodiversity; minimise emissions of greenhouse gases from port related development; be well designed, functionally and environmentally; be adapted to the impacts of climate change; minimise use of greenfield land; provide high standards of protection for the natural environment; ensure that access to and condition of heritage assets are maintained and improved where necessary; and enhance access to ports and the jobs, services and social networks they create, including for the most disadvantaged."*
- 3.3.48 National and local planning policy provide a framework to deliver development that is sustainable. The NPPF sets out that the planning system has three overarching objectives, economic, social and environmental, that are mutually supportive and collectively achieve sustainable development. Furthermore, the NPPF has a presumption in favour of sustainable development and contains policies that provide the framework to achieve this. Locally, the spatial development strategy of the North East Lincolnshire Local Plan (Ref 3-3) provides the basis for future planning decisions, and promotes sustainable development to *"improve the quality of life, bring forward quality development to meet identified needs and which delivers economic, social and environmental benefits."*
- 3.3.49 The North East Lincolnshire Local Plan proposals map shows that landside, part of the land identified for the purposes of the Project is located on operational port land. Furthermore, there are two site allocations in the North East Lincolnshire Local Plan located on land identified for the Project: ELR001, a strategic proposed employment allocation for the ports and logistics sector on Kings Road and ELR025a, a site reserved for long term business expansion. The Project is therefore making effective use of available land by utilising land that has been allocated for that purpose. Section 3.5 provides more detail on the water, transport and utility connections that are available to the Project at the Port of Immingham. A more detailed review of national and local policy and how the

Project is policy compliant will be set out in the documentation prepared to support the application for development consent.

Objective 4 - To minimise adverse impacts on the environment and safeguard the health, safety and amenity of local residents.

- 3.3.50 To explain the purpose of the fourth objective, an explanation of the need to minimise impacts is provided with reference to the NPSfP and national and local planning policy.

The need to minimise impacts

- 3.3.51 At Paragraph 4.7.1, the NPSfP requires that projects subject to the Environmental Impact Assessment (EIA) Directive must be accompanied by an Environmental Statement describing *“the aspects of the environment likely to be significantly altered by the project”*. Paragraph 4.7.2 of the NPSfP goes on to state that *“the decision-maker will find it helpful if the applicant also sets out information on the likely significant social and economic effects of the development.”* The NPSfP also recognises at Paragraph 4.16.2 that *“Port developments can have direct impacts on health, including increasing traffic, air pollution, dust, odour, polluting water, hazardous waste and pests.”*
- 3.3.52 National and local planning policy also seek to avoid adverse impacts as a result of development. The NPPF contains sections relating to conserving and enhancing the natural and built environment and the need to mitigate and reduce the potential adverse impacts arising from new development. The North East Lincolnshire Local Plan contains strategic policies to safeguard the built, historic and natural environment and more detailed policies that require the consideration of local amenity in terms of noise, air quality, traffic, vibration, dust and visual impact.
- 3.3.53 The Project will seek to minimise impacts through the process of scheme design and environmental assessment. The likely significant environmental effects of the Project, including noise, air quality, landscape and visual, socio-economics and health, will be assessed and addressed in an Environmental Statement which will be submitted alongside an application for development consent.
- Objective 5 - To enhance both the local and regional economy through direct investment in and around the Port of Immingham and by partnering with the supply chain, providing opportunities for training, upskilling, apprenticeships and local employment.***
- 3.3.54 To explain the purpose of the fifth objective, an explanation of the need to support local and regional economic growth is provided. Reference is made to the Government’s strategy to achieve net zero, and national and local planning policy.

The need to support local and regional economic growth

- 3.3.55 The Government’s Ten Point Plan (Ref 3-9) sets out the ambition for job creation in implementing measures to achieve net zero stating that *“This Ten Point Plan to get there will mobilise £12 billion of government investment, and potentially three times as much from the private sector, to create and support up to 250,000 green*

jobs.” The Ten Point Plan sets out that delivering the growth of low carbon hydrogen could deliver up to 8,000 jobs by 2030 with the potential to unlock 100,000 jobs by 2050 in a high hydrogen net zero scenario. Similarly investing in carbon capture and storage could potentially deliver 50,000 jobs by 2030. The Energy White Paper buildings upon this ambition setting out the aim is to “establish the UK as a world leader in the deployment of CCUS and clean hydrogen, supporting 60,000 jobs by 2030”.

- 3.3.56 The Levelling Up White Paper identifies that the UK’s transition to net zero is a future factor driving the UK’s economic geography. Chapter 1.4.1 recognises that whilst the transition to Net Zero could be disruptive for places that need to undergo the largest transition (given the level of jobs in carbon-intensive industries), it could also be transformative. It states *“the ‘Green Industrial Revolution’ will require significant investment in new infrastructure and production processes using new technologies”*. The White Paper also highlights how many places outside London and the South East have potential to build on their existing strengths such as *“renewable energy, electric vehicle manufacture, Carbon Capture, Utilisation and Storage, and hydrogen”*.
- 3.3.57 Policy on port development is set out in paragraph 3.3.1 of the NPSfP, where it advises that the Government seeks to *“encourage sustainable port development to cater for long term forecast growth in volumes of imports and exports by sea with a competitive and efficient port industry capable of meeting the needs of importers and exporters cost effectively and in a timely manner, thus contributing to long-term economic growth and prosperity; allow judgments about when and where new developments might be proposed to be made on the basis of commercial factors by the port industry or port developers operating within a free market environment; and ensure all proposed developments satisfy the relevant legal, environmental and social constraints and objectives, including those in the relevant European Directives and corresponding national regulations.”*
- 3.3.58 Paragraph 4.3.2 of the NPSfP recognises that at a regional and local level, *“economic benefits from port developments include regeneration and employment opportunities. As commercial developments, ports can also generate agglomeration effects by bringing together businesses, with varying degrees of mutual interaction, and producing economic benefits over and above those reflected in the value of transactions among those businesses.”* Furthermore, at paragraph 4.3.3, the NPSfP also recognises that *“Ports can contribute to the enhancement of people’s skills and of technology, as embodied in equipment used by ports and port-related activities, with wider longer-term benefits to the economy.”*
- 3.3.59 Paragraph 81, within Chapter 6 of the NPPF recognises the need for economic growth and productivity, by stating *“planning policies and decisions should help create the conditions in which businesses can invest, expand and adapt. Significant weight should be placed on the need to support economic growth and productivity, taking into account both local business needs and wider opportunities for development”*. This approach is aimed at allowing specific areas to build on its strengths, counter weaknesses and address challenges of the future. Paragraph 83 outlines that policies and decisions should *“recognise and*

address the specific locational requirements of different sectors. This includes making provision for clusters or networks of knowledge and data-driven, creative or high technology industries; and for storage and distribution operations at a variety of scales and in suitable accessible locations”.

- 3.3.60 The North East Lincolnshire Local Plan aims to encourage growth and ensure the Borough becomes a sustainable location in the future. The Foreword to the Local Plan sets out that North East Lincolnshire is entering a period of economic growth and that between 2013 and 2032 the Council plan to deliver 8,800 new jobs. It is further stated that a significant proportion of these will be focused around five key economic sectors which includes ports and logistics and renewable energy.
- 3.3.61 The Project will support national and local growth ambitions through the creation of approximately 700 jobs during the construction stage (marine and terrestrial) and approximately 160 jobs during the operational stage (marine and terrestrial). Refer to **Chapter 23: Socio-economics** for a preliminary assessment of the impact of the Project on employment (including training and apprenticeship opportunities).

3.4 Alternatives

- 3.4.1 This section has been prepared to address the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended) (‘the EIA Regulations’) (Ref 3-10). These state at Regulation 14(2)(d) that the Environmental Statement (and a PEI Report) should contain “*a description of the reasonable alternatives studied by the application, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment*”. Paragraph 2 of Schedule 4 ‘Information for Inclusion in Environmental Statements’ of the EIA Regulations further states “*A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*”.
- 3.4.2 Paragraph 4.9.1 of the NPSfP highlights that “*in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to the proposed development is in the first instance a matter of law, detailed guidance on which falls outside the scope of this NPS*”. The paragraph also states that “*From a policy perspective this NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option.*” However, paragraph 4.9.2 outlines that “*applicants are obliged to include in their ES factual information about the main alternatives they have studied. This should include an indication of the main reasons for the applicant’s choice, taking into account the environmental, social and economic effects and including, where relevant, technical and commercial feasibility; and in some circumstances there are*

specific legislative requirements, notably under the Habitats Directive, for the applicant and decision-maker to consider alternatives”.

- 3.4.3 Paragraph 4.9.3 of the NPSfP further states that *“given the public interest in provision of new port infrastructure, the decision-maker should, subject to any relevant legal requirements ... which may indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives”*, including *“the consideration of alternatives in order to comply with policy requirements should be carried out in an proportionate manner; whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development; the decision-maker should not reject an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that other suitable sites for port infrastructure of the type proposed may be needed for future proposals; alternatives not among the main alternatives studied by the applicant ... should only be considered to the extent that the decision-maker thinks they are both important and relevant to its decision”*.
- 3.4.4 The consideration of alternatives and design evolution has been undertaken in context of selecting the location of the proposed jetty and site for hydrogen production facilities with the aim of avoiding and/ or reducing adverse environmental effects (following the mitigation hierarchy of avoid, reduce and, if possible, remedy), while maintaining operational efficiency and cost-effectiveness, and considering other relevant matters such as available land and planning policy.
- 3.4.5 It is highlighted in paragraph 4.10.3 of the NPSfP that, given the importance which the Planning Act 2008 (Ref 3-11) places on good design and sustainability, *“the decision maker needs to be satisfied that port infrastructure developments are sustainably designed and, having regard to regulatory and other constraints, are as attractive, durable and adaptable ... as they can be”*. The design of the Project will be informed by relevant standards and guidelines for port infrastructure to ensure they are fit for purpose. Opportunities to incorporate sustainable design features into the Project will be identified and incorporated where practicable.
- 3.4.6 The design of the Project is at a preliminary stage and will continue to evolve up to the point of an application for development consent in response to feedback from statutory consultation and with reference to any ongoing surveys and technical studies. The following paragraphs provide a summary of the preliminary consideration of potential alternatives to meeting the need which has been undertaken to date in respect of the Project.
- 3.5 Preliminary consideration of alternative sites and jetty locations
- 3.5.1 The Port of Immingham has been identified as a suitable option to meet the need which has been identified to deliver the following objective, *“To provide essential port infrastructure, capacity and resilience to support the changing strategic needs of the energy sector to support decarbonisation within the Humber*

Industrial Cluster and the Humber Enterprise Zone” Having regard to the wider context relating to decarbonisation and the transition to net zero and these objectives, it is considered that the solution to meeting this need within the Humber estuary can be met via the provision of suitable port infrastructure close to available land in a location that benefits from good links to the strategic road network. The Port of Immingham represents the most suitable location in the Humber for the following reasons:

- a. It is an established Port in a central UK location and therefore suitably well connected to import or export green energy vectors into and out of the UK;
- b. The Port of Immingham is ideally located to be able to connect to the East Coast carbon capture and storage clusters – Humberside is one of the main industrial decarbonisation regions being developed in the UK and therefore that could connect to the developing CO₂ storage infrastructure. This is a major differentiator for this location over other UK ports when considering the wider use of the Green Energy Terminal;
- c. It is a deep water port with sufficient available adjacent space to construct a new jetty which can accommodate large gas transporter vessels;
- d. It is in an industrial location away from large conurbations;
- e. There is space within the area to accommodate the Associated Development of the green hydrogen production facility in close proximity to the jetty.

3.5.2 Development within the current operational boundaries of the Port of Immingham is constrained by existing infrastructure, including on the marine side by existing jetties and on the landside by both operational buildings and structures and an extensive network of pipelines and other services, both above and below ground. The proposed Immingham Eastern Ro-Ro Terminal Development (IERRT Development) (Planning Inspectorate Ref TR030007) has been accommodated within the port itself by the relatively short jetty requirement (a function of the shallow draft requirement of the related vessels) and adjacent landside requirements which do not require extensive pipework or other services. There is no spare capacity on the existing deep water jetties to facilitate the Green Energy Terminal.

3.5.3 In order to develop a new deep water jetty to support the import and export of liquid bulk products associated with the Net Zero agenda, it was therefore necessary to locate the jetty outside the existing operational port site, but as close to it as possible to benefit from the existing supporting infrastructure and port services, whilst also with sufficient land to support the establishment of a new pipeline corridor and terrestrial storage and production facilities.

3.5.4 This development requires deep-water berths and a deep-sea channel to accommodate vessels with up to a 14m draught (depth below water level). Given these factors, the preferred jetty location lies to the immediate east of the Immingham Oil Terminal Jetty, as the berths need to be close to the eastern extent of the Port since the deep-water channel extends further away from the south bank of the estuary further east of this point. A jetty location further east would significantly increase the length of the jetty required and it would extend further into the estuary. In addition, the chosen location places the jetty outside

the widest intertidal areas, reduces the capital dredge required to provide the larger western berth (Berth 1), eliminates the need for a capital dredge for the smaller eastern berth (Berth 2) and should minimise the requirements for ongoing maintenance dredging.

- 3.5.5 The proposed jetty location, just to the east of the existing boundary of the Port, is therefore considered to be the most suitable, given:
- a. The need to reach the deep-water channel and minimise interfaces with other vessels;
 - b. The need for space on the adjacent land side to support a pipeline corridor, storage and production facilities; and
 - c. The need to make best use of existing infrastructure and services and to facilitate the location of the Associated Development in close proximity to the jetty.
- 3.5.6 As set out in the NPSfP, ports are developed in response to customer demand, which in turn are influenced by wider matters such as Government legislation and policy. In this case, Air Products wish to develop a green hydrogen production facility (the Associated Development) which aligns with the Government's ambition to deliver 10GW of low carbon hydrogen by 2030. In summary, the characteristics of the Port of Immingham are considered suitable for the location of the Associated Development for the following reasons:
- a. The Port is a deep water port that could facilitate the import of green ammonia using the very large gas carrying vessels that would be used.
 - b. The Port is located in an area that is already industrial in nature with a limited residential population in and adjacent to the Site.
 - c. The Port has good access to the existing road network which is suitable for HGVs and is within close proximity to main roads with good connectivity to the wider strategic road network. This will facilitate onward transport and the distribution of green hydrogen to customers in the UK from this central location.
- 3.5.7 A suitable location for the Associated Development within and around the Port was identified taking into account available space, the Port's existing development plans, ground conditions, presence of existing structures and services including existing transport corridors, proximity to residential conurbations, access, and proximity to the jetty. The two plots of land identified as the proposed location of the Associated Development were selected as the most suitable for the following reasons:
- a. Availability of sufficient area of predominantly brownfield land for the Associated Development including land for terrestrial pipelines to join with the pipelines on the jetty trestle;

- b. The west site is allocated for employment use (B1⁴, B2, B8) in the North East Lincolnshire Local Plan. A green hydrogen production facility would be classified as B2 use, comprising development that would be suitable on this site;
- c. Proximity to the jetty to minimise onshore transport distances for ammonia, for safety reasons; and
- d. Local access to existing gas and grid connections.

3.6 Consideration of alternative jetty layouts

3.6.1 Alternative jetty layouts are being developed but these all sit within the parameters defined for the Nationally Significant Infrastructure Project which are being assessed as part of the EIA process. All options involve a jetty in the form of a trestle supported on a series of groups of piles leading to up to two berths capable of accommodating ships of different storage capacities, located in the existing deep water channel.

3.6.2 The jetty deck itself would comprise either steel or concrete decks and as with the final layout, this would be subject to future design.

3.6.3 In order to ensure a robust assessment of the likely significant environmental effects of the Project, the EIA is being undertaken adopting the principles of the 'Rochdale Envelope' approach where appropriate. This involves assessing the maximum (or where relevant, minimum) parameters for the elements where flexibility needs to be retained (dimensions or operational modes for example). As such, this PEI Report represents a reasonable worst-case assessment of the potential impacts of the Proposed Development at its current stage of design.

3.7 Consideration of alternative technologies for hydrogen production

3.7.1 The need for a green hydrogen production facility was identified as an essential part of the Project at an early stage, to align to the Government's ambition to deliver 10GW of low carbon hydrogen by 2030 in order to help decarbonise the UK transport sector.

3.7.2 Large scale global deployment of green ammonia is emerging as the safest and most efficient way to transport bulk quantities of green hydrogen from world locations where sustainable solar and wind energies are significantly more available than in the UK. While transport of green hydrogen could be achieved in other ways, such as direct shipping of hydrogen, the transport risks, costs and scale achievable make alternative transport methods less viable and more hazardous.

⁴ The B1 use class no longer exists and has been replaced by Eg(i)(ii)(iii) as set out in The Town and Country Planning (Use Classes) Order 1987 (as amended).

3.7.3 A production facility to subsequently produce and temporarily store green hydrogen from the ammonia is therefore required and there are limited alternative technologies to facilitate this. The technology proposed is considered to represent that with the lowest environmental impact, the highest efficiency and is the most technically mature technology available.

3.7.4 The final decision has not yet been made on the detailed design of the hydrogen production facility. Therefore, the design of the Project at this stage incorporates a degree of flexibility in the dimensions and configurations of buildings and structures to allow for the final detailed design.

3.8 The Do Nothing alternative

3.8.1 The do nothing alternative would mean that a UK first of a kind Green Energy Terminal including facilities to enable production of green hydrogen from ammonia would not be developed, meaning that a key development to assist the UK in realising net zero obligations would not be brought forward.

3.8.2 For these reasons the Do Nothing scenario is not considered appropriate.

3.9 Summary and Conclusion

3.9.1 The Project would directly support the aims of the Government's decarbonisation strategy and 2050 net zero obligations through the provision of infrastructure to support the energy sector in producing clean energy, specifically hydrogen production and CCS. The Project also helps to improve Britain's energy security and support the Levelling Up agenda.

3.9.2 The preliminary conclusion is that the preferred solution to the need which has been identified is the provision of new port infrastructure and landside facilities at the Port of Immingham. The Port is deemed the most appropriate site for the development of a Green Energy Terminal in the Humber, given its location, access to deep water and proximity to the UK's largest industrial cluster in the Humber. The Project will seek to minimise adverse effects and make effective use of appropriately designated available land.

3.9.3 The form and approach to the Project has been considered, taking into account environmental effects, alongside other factors such as technical and commercial feasibility. The design will continue to evolve following consultation and the final Rochdale Envelope design will be assessed in the ES submitted as part of the DCO Application.

3.10 References

- Ref 3-1 Department for Transport (2012). The National Planning Policy Statement for Ports.
- Ref 3-2 Ministry of Housing, Communities & Local Government (2021) National Planning Policy Framework
- Ref 3-3 North East Lincolnshire Council (2018). North East Lincolnshire Local Plan.
- Ref 3-4 Department for Business, Energy & Industrial Strategy (2020) Energy white paper: Powering our net zero future
- Ref 3-5 Department for Business, Energy & Industrial Strategy (2022) UK hydrogen strategy
- Ref 3-6 Department of Energy & Climate Change (2011). Overarching National Policy Statement for Energy (EN-1)
- Ref 3-7 Department for Business, Energy & Industrial Strategy (2022) British energy security strategy
- Ref 3-8 Department for Levelling Up, Housing and Communities (2022) Levelling Up the United Kingdom
- Ref 3-9 Department for Business, Energy & Industrial Strategy (2020) The ten point plan for a green industrial revolution
- Ref 3-10 The Stationery Office Limited (2017). The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.
- Ref 3-11 The Stationery Office Limited (2008). Planning Act 2008.

3.11 Abbreviations and Glossary of Terms

Table 3.1: Glossary and Abbreviations

Term	Acronym	Meaning
Associated British Ports	ABP	One of the UK's leading and best-connected ports groups, owning and operating 21 ports across England, Wales and Scotland.
Ammonia	NH ₃	Ammonia is a compound of Nitrogen and Hydrogen.
Carbon Capture and Storage	CCS	The process of capturing carbon before it enters the atmosphere.
Carbon Capture, Usage and Storage	CCUS	The process of capturing carbon dioxide CO ₂ emissions from fossil power generation and industrial processes for storage deep underground or re-use.
Carbon Dioxide	CO ₂	A colourless, odourless gas produced by burning carbon and organic compounds and by respiration.
Environmental Impact Assessment	EIA	The statutory process through which the likely significant effects of a development project on the environment are identified and assessed.
Environmental Statement	ES	A statutory document which reports the EIA process, produced in accordance with the EIA Directive as transposed into UK law by the EIA Regulations.
Gigawatt	GW	A unit of power equal to one billion watts.
Health and Safety Executive	HSE	The Health and Safety Executive is a UK government agency responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare.
Heavy Goods Vehicle	HGV	A large truck for transporting goods.
Immingham Eastern Ro-Ro Terminal	IERRT	The proposed ro-ro facility.

Term	Acronym	Meaning
Immingham Green Energy Terminal	IGET	A multi-user liquid bulk jetty, located on the eastern side of the Port of Immingham,
Liquefied Natural Gas	LNG	Liquefied natural gas is natural gas that has been cooled to a liquid state (liquefied), for shipping and storage.
Marine Management Organisation	MMO	The Marine Management Organisation is an executive non-departmental public body in the United Kingdom established under the Marine and Coastal Access Act 2009, with responsibility for English waters.
National Planning Policy Framework	NPPF	A planning framework which sets out the Government's planning policies for England and how these are expected to be applied.
National Policy Statement for Ports	NPSfP	The National Policy Statement for Ports provides the framework for decisions on proposals for new port development.
Preliminary Environmental Information	PEI	The information referred to in Part 1 of Schedule 4 of the EIA Regulations that has been reasonably compiled by the applicant and is reasonably required to assess the environmental effects of a project.
Roll on-roll off	Ro-ro	A design to allow vehicles to drive on and drive off ships.
Transport & Storage	T&S	-
United Kingdom	UK	-