Immingham Green Energy Terminal

9.3 Applicant's Responses to the Examining Authority's First Written Questions

(Responses to "Q1.15. Decommissioning")

Infrastructure Planning (Examination Procedure) Rules 2010

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Chapter **Pages**

1 Introduction

Overview

1.1 This document has been prepared to accompany an application made to the Secretary of State for Transport (the "Application") under section 37 of the Planning Act 2008 ("PA 2008") for a development consent order ("DCO") to authorise the construction and operation of the proposed Immingham Green Energy Terminal ("the Project").

1.2 The Application is submitted by Associated British Ports ("the Applicant"). The Applicant was established in 1981 following the privatisation of the British Transport Docks Board. **The Funding Statement [APP-010]** provides further information.

1.3 The Project as proposed by the Applicant falls within the definition of a Nationally Significant Infrastructure Project ("NSIP") as set out in Sections 14(1)(j), 24(2) and 24(3)(c) of the PA 2008.

The Project

1.4 The Applicant is seeking to construct, operate and maintain the Immingham Green Energy Terminal, comprising a new multi-user liquid bulk green energy terminal located on the eastern side of the Port of Immingham (the "Port").

1.5 The Project includes the construction and operation of a green hydrogen production facility, which would be delivered and operated by Air Products (BR) Limited ("Air Products"). Air Products will be the first customer of the new terminal, whereby green ammonia will be imported via the jetty and converted on-site into green hydrogen, making a positive contribution to the UK's net zero agenda by helping to decarbonise the United Kingdom's (UK) industrial activities and in particular the heavy transport sector.

1.6 A detailed description of the Project is included in **Chapter 2: The Project** of the Environmental Statement ("ES") **[APP-044]**.

Purpose and Structure of this Document

1.7 This document contains the Applicant's responses to those of the Examining Authority's Written Questions 1 **[PD-008]** grouped under the theme "Q1.15. Decommissioning". It represents one of a collection of eighteen such documents, each of which addresses a different theme.

1.8 Responses are ordered ascendingly by reference number, replicating the structure of the Examining Authority's Written Questions 1.

1.9 Responses are provided in a table. The text of the question appears on the lefthand side, with the Applicant's answer to its right.

1.10 Further materials pertinent to the Applicant's response are included at the end of the document as appendices where necessary.

2 Applicant's Responses to the Examining Authority's First Round of Written Questions

Q1.15. Decommissioning	
Q1.15.1 Decommissioning	
Q1.15.1.1	
Question	**Response**
Decommissioning Further to discussions at ISH2 [EV4-007] [EV4-008] and ISH3 [EV5-008] [EV5-009], a detailed note is required to clarify the apparent inconsistencies between what the Applicant has said at the Hearings and what is in the ES regarding operating life and decommissioning provisions, and design life and maintenance provisions. The note must cover the following, in addition to anything else considered important and relevant by the Applicant: • operating life related Worst Case Scenario in all assessment areas; • assumptions relating to temporal scope in all assessment areas is consistent with assumptions relating to Operating life; • if the statutory consultees are clear on Worst Case Scenario, temporal scope and the corresponding conclusions on adverse effects; and • if the conclusion and related mitigation measures are responding to that Worst Case Scenario.	As agreed with the ExA at Issue Specific Hearing 2, an Operational Life Technical Note is appended at **Appendix 1**. This note prepared by the Applicant reviews the approach used for these elements of temporal scope to demonstrate that the worst case for assessment has been used by individual technical assessments in the **Environmental Statement**. The note will be shared with North East Lincolnshire Council, the Environment Agency and Natural England, and the Applicant will follow up with these stakeholders and collate any responses received. The responses and an updated version of the note to address the third bullet point in the question (as appropriate) will be submitted at Deadline 3.

The note should include evidence from the entire ES that the assumptions relating to operating life is clear and consistent.	
Q1.15.1.2	
Question	**Response**
Design life of containment features The ES [APP-060, Paragraph 18.8.13] states "At the end of its 25 year design life all aboveground equipment associated solely with the hydrogen production facility (Work No. 3, Work No. 5 and Work No. 7) would be decommissioned and removed from the Site". However at ISH3 [EV5-008] [EV5-009], the Applicant stated this may not be the case. a) Confirm the design life of all containment features, associated with reducing the risk of potential impact on local water courses. b) What further steps would need to be taken, to maintain the integrity of these containment features, should hydrogen production continue beyond 25 years.	a) The containment features associated with reducing the risk of potential impact on watercourses include a retention pond, an oily water separator, kerbed areas with sumps and underground piping, manholes and isolation valves. These are generally civil infrastructure items with a specified nominal design life of 25 years. As indicated in the response to Q1.15.1.5, there is no 'maximum point in time' by which the hydrogen production facility needs to be or will be decommissioned and the drainage containment features would be maintained, replaced and/or refurbished as necessary to accord with the actual operational life as explained further under b) below. b) Whilst these are civil items, they are regarded as equipment and, as with all equipment items, have a defined maintenance and inspection programme. This will cover routine activities such as cleaning to ensure no silt build up but will also include periodic inspections to ensure there are no signs of degradation. For example, the retention ponds will be drained periodically, cleaned and inspected. If necessary, repairs would be made to ensure ongoing integrity. Valves and other supporting equipment will be repaired and replaced, if needed, and regular surveys will be conducted on critical

	underground pipework. As with all equipment items, the maintenance and inspections are an ongoing activity throughout the operational life of the facility. There is no specific inspection required at 25 years to validate operation beyond that point.
Q1.15.1.3	
Question	**Response**
Maintenance of Marine Infrastructure The ES [APP-044, Paragraph 2.7.1] states "The main elements of the Terminal would not be decommissioned". a) Provide further explanation and justification for this. b) Would this position change if the commercial market for import of liquid bulk chemicals were to decline, such that the port was no longer in use?	a) Port infrastructure traditionally evolves through time to adapt to changes in the macroeconomic environment and the needs of trade. As an example, Immingham dock was originally constructed in the early 20th century for the export of coal. The port has evolved through a number of phases to its present state around this same base infrastructure now utilised for very different types of trade. It is normal for ports to retain, maintain and adapt infrastructure. Further consideration of design life and operational life is provided in the Operational Life Technical Note at **Appendix 1**. b) The Applicant cannot foresee any circumstances where liquid bulks would not be handled by merchant vessels in the foreseeable future. It would take a fundamental shift in the way the world economy functions to render liquid bulk import and export terminals obsolete. In the event that the use of the jetty as a commercial opportunity evolves, the Applicant would explore repurposing strategies that align with future

	economic and environmental sustainability goals, leveraging the port's inherent adaptability, as evidenced by its historical evolution. This approach would ensure the jetty remains a valuable asset, responsive to changing market demands and societal needs, thereby continuing the Applicant's legacy of adaptation and resilience. Any repurposing work would require further consent and, as such, would be environmentally assessed at that stage.
Q1.15.1.4	
Question	**Response**
Further Details on Decommissioning Process a) Confirm if additional temporary land is required as part of the decommissioning process as described in the ES [APP-222, Paragraph 1.4.1.b.vii] and if the process would involve the movement of abnormal loads? b) Provide a plan of the proposed elements that are to be decommissioned and those elements that are to remain in situ, to confirm the extent of infrastructure to remain on the site in perpetuity. Include reference to the Work Nos. to understand the magnitude of decommissioning works across the site. c) The ES [APP-044, Section 2.7] does not specify the timescales for the decommissioning process; confirm how long the decommissioning phase will last?	a) The decommissioning works for the hydrogen production facility can be completed within the operational boundary of the facility and no additional land would be required. There may be a small number of abnormal loads, such as for movement of the hydrogen storage tanks. However, some equipment is expected to be deconstructed rather than removed as whole components and therefore it is expected that there will be substantially fewer abnormal loads during the decommissioning of the facility than during construction. b) Full decommissioning would include the removal of all the above ground process plant and facilities in Work Nos. 3, 4, 5, 6 and 7. The only elements that will remain in place within those Work Nos. will be underground structures such as foundations, piles, pipelines and underground services as described in the response to Q1.7.4.1. The jetty topside infrastructure for the ammonia in Work No. 1 and the pipe rack for the ammonia along the jetty access road in Work No. 2 would also be

	removed, but the marine infrastructure as considered in response to Q1.15.1.3 and jetty access road and associated infrastructure in Work No. 2 would be retained. The illustrative plans [APP-013] illustrate the likely extent of buildings and structures across Work Nos 3, 5 and 7 which will be removed during decommissioning. Foundations below those buildings and structures will remain (together with pipelines and below ground services as explained in the response to Q.1.7.4.1). c) Decommissioning of individual work areas or the whole facility as required would typically take place over a 6 to 12 month period. Individual Work Nos. may be decommissioned separately (so the decommissioning phase may take place over several years). See also the Operational Life Technical Note which is appended to address Q15.1.1.1 at **Appendix 1**.
Q1.15.1.5	
Question	**Response**
When Hydrogen Production Facility Will be Decommissioned The ES [APP-044, Paragraph 2.7.2] refers to the hydrogen production facility having a 25-year design life, although this could be longer depending on plant integrity and market conditions, however it is not stated that at what point it would need to be decommissioned.	a) In principle, there is no 'maximum point in time' by which the hydrogen production facility needs to be or will be decommissioned. So long as there are the necessary replacement parts available and favourable economic conditions to continue operation, it is anticipated that the facility will continue to be operated. The Applicant is not seeking consent for the Associated Development on a time limited basis. With a programme of ongoing predictive and preventive maintenance, the facility could operate for 50 years or more.

a) Provide further details to confirm the maximum point in time the hydrogen production facility will be decommissioned. b) Explain what you mean when you say: "When appropriate, this infrastructure would be decommissioned"? See related questions in the Development Consent Order section.	Some of the major items of equipment and plant have a nominal design life of around 25 years, at which point these items may need refurbishing or replacing (and are considered at the end of their technical and economic life). See Operational Life Technical Note which is appended in response to s Q15.1.1.1 at **Appendix 1**. b) The sentence "*When appropriate, this infrastructure would be decommissioned*" in **Paragraph 2.7.2** of **Environmental Statement Chapter 2: The Project [APP-044]** simply reflects the above. Work Nos. 3, 4, 5, 6 and 7 will each be decommissioned when they have come to the end of their technical life or their economic life.

3 Appendices to the Applicant's Responses to the Examining Authority's First Round of Written Questions

Appendix 1 – Operating Life Technical Note

Immingham Green Energy Terminal

Operational Life Technical Note

Planning Act 2008

Regulation 5(2)(a)

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

March 2024

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

Immingham Green Energy Terminal

Development Consent Order 2023

Operational Life Technical Note

Regulation Reference	APFP Regulation 5(2)(a)
Planning Inspectorate Case Reference	TR030008
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Author	Associated British Ports Air Products BR

Version	Date	Status of Version
Revision 1	10 March 2024	Deadline 1

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1 Introduction

1.1 Background

1.1.1 This technical note has been prepared at the request of the ExA following Issue Specific Hearing ("ISH") 2 and ISH3, to address WQ1.15.1.1:

'Further to discussions at ISH2 [EV4-007] [EV4-008] and ISH3 [EV5-008] [EV5-009], a detailed note is required to clarify the apparent inconsistencies between what the Applicant has said at the Hearings and what is in the ES regarding operating life and decommissioning provisions, and design life and maintenance provisions. The note must cover the following, in addition to anything else considered important and relevant by the Applicant:

- *operating life related Worst Case Scenario in all assessment areas;*
- *assumptions relating to temporal scope in all assessment areas is consistent with assumptions relating to Operating life;*
- *if the statutory consultees are clear on Worst Case Scenario, temporal scope and the corresponding conclusions on adverse effects; and*
- *if the conclusion and related mitigation measures are responding to that Worst Case Scenario.'*

1.1.2 This note responds to each of the matters set out in the bullet points above on the Operational Life and has sought to address those points as comprehensively as possible, reviewing the approach to each matter where relevant in each of the technical assessment areas in the Environmental Statement (ES). The Applicant notes the ExA's question identifies these matters relating to Operational Life as points that the note must cover and it has focussed its efforts accordingly. The Applicant also notes that the list of bullet points does not include direct reference to decommissioning per se or to decommissioning effects. It has been assumed that following discussion at the Issue Specific Hearing the focus of the question on operational life rather than decommissioning effects per se is deliberate. A full review of decommissioning and the related effects has therefore not been undertaken for each technical assessment within this note. However, a definition of decommissioning is provided at Paragraph 2.1.1 and further clarity on decommissioning is provided in response to WQ1.6.2.4 - "Decommissioning Effects", WQ1.15.1.4 - "Further Details on Decommissioning Process" and WQ1.15.1.5 - "When Hydrogen Production Facility Will be Decommissioned." If having read those responses and this note there are any further questions specifically in relation to decommissioning effects the Applicant would be happy to assist further as required.

1.1.3 This note addresses the three bullets directed at the Applicant in WQ1.15.1.1 (set out above) in three sections as follows:

- Section 2 provides an explanation of the terms "operational life" and "design life" used in the application and clarifies the assumptions for the various elements of the Project in the environmental impact assessment which has been undertaken.

- Section 2 also reviews any definitions and references to operational life (and design life) in relation to the Project, as they appear in the ES chapters and other relevant application documents.

- Section 3 reviews, in tabular form, each of the technical topics within the ES to address the following three elements of the requested scope:
  - operating life related worst case scenario in all assessment areas;
  - whether the assumptions relating to temporal scope in all assessment areas are consistent with assumptions relating to operating life; and
  - if the conclusions and related mitigation measures respond to that worst case scenario.

- Section 4 provides a conclusion on the above matters, drawing on the reviews and technical inputs in Sections 3 and 4.

1.1.4 In relation to the third bullet point above, whilst directed at the statutory consultees, as set out in the relevant technical chapters, there has been active engagement with the statutory consultees and in most cases, draft methodologies, assessment criteria and assessment conclusions have been shared with the relevant consultees. The Statements of Common Ground with relevant bodies will clarify the extent to which the consultees agree with the methodologies applied and the conclusions reached within technical assessments, noting that one would expect any substantive concerns in relation to temporal scope of any assessment to be raised at an early stage of the examination. In this regard the Applicant notes the intervention made by the Environment Agency at Issue Specific Hearing 3, in support of the temporal scope of the Flood Risk Assessment [APP-209].

1.1.5 'Operating life' and 'operational life' are used interchangeably in this note. The latter is the term typically used in the ES (alongside 'operational phase'). There is no distinction between the meaning of these terms as used in the ES.

1.1.6 A number of additional responses to the First Written Questions also address questions related to temporal scope. Those which are directly relevant to the operating or design life (and decommissioning) are as follows:

- WQ1.6.2.4 - "Decommissioning Effects";
- WQ1.5.2.7 - "Temporal Scope of the Assessment";
- WQ1.8.3.3 - "Temporal Scope of the Assessment";
- WQ1.8.1.6 – "Temporal Scope of Assessment";
- WQ1.15.1.4 - "Further Details on Decommissioning Process"; and
- WQ1.15.1.5 - "When Hydrogen Production Facility Will be Decommissioned".

2 References to Operational Life (and Design Life)

2.1 Background

2.1.1 By way of clarity:

- What is referred to as the “design life” (or nominal design life) of a structure will depend on the context. Design life means the period of time for which a component of the facility is expected to function as intended, with anticipated maintenance but without major repairs or replacement. In relation to the Hydrogen Production Facility (“HPF”) for the purposes of the ES, what is referred to as the 25 year “design life” was the minimum period for which the parts of the facility are designed to operate, therefore a realistic minimum period that the overall facility could be expected to be operational.

- The “operational life” or “operating life” of a structure is the period of time during which it operates for its given purpose. For the HPF, with appropriate maintenance, including repair and replacement of components, that is likely to be considerably longer than 25 years – it could be 50 years or more. It is however considered likely that the HPF will cease to be operational at some point in time.

- The approach jetty and jetty head (excluding the topside infrastructure used in connection with the HPF) access ramp and jetty access road, with maintenance, are anticipated to form a permanent part of the Port estate and therefore no minimum operational life is specified in the DCO Application documents.

- However, the nominal design life of the jetty is considered to be approximately 50 years i.e. the point in time at which the need for more significant repair and replacement of parts is considered likely to arise.

- The HPF (and associated jetty topside equipment) will be decommissioned at the end of its operational life. No decommissioning is required for the jetty and jetty access road as explained above. "Decommissioning” (as defined in Schedule 2 of the draft DCO [APP-006]) means decommissioning of the relevant part of the Project when it is no longer required for operational use or upon the permanent cessation of operational use (such that it is expected that the relevant part will not be returned to operational use in the future). For assessment purposes for the ES, the 25 year period in relation to decommissioning simply means that it is the earliest point that decommissioning would be contemplated. It does not mean that decommissioning is assumed or expected to be likely to happen at 25 years and it is just that decommissioning is not realistically anticipated to happen before that point. It is anticipated to be later than 25 years as explained above

by reference to the operating life of the HPF but this period has been assumed to provide a reasonable worst case assessment.

- Such decommissioning would take place in accordance with a decommissioning environmental management plan to be approved pursuant to Requirement 18 (Schedule 2) of the draft DCO when the entirety of Work Nos. 2 (except the jetty access road), 3, 4, 5, 6 or 7 is to be decommissioned and which would be in general accordance with the Outline Decommissioning Environmental Management Plan [APP-222].

- Until such time as decommissioning takes place, the HPF would be maintained in accordance with Article 41 of the DCO.. "Maintain" is defined in the draft DCO as including to inspect, repair, adjust, alter, remove or reconstruct (Article 2). The jetty and jetty access road would continue to be maintained under Article 41 as necessary. The power to maintain is subject to the limitation in Article 41(2) which provides that the power to maintain does not authorise the carrying out of any works which are likely to give rise to any materially new or materially different effects that have not been assessed in the ES.

2.1.2 Chapter 2: The Project [APP-044] of the ES states the following at paragraphs 2.7.1 – 2.7.2, in relation to the operational life of the Project [underlining added for emphasis]:

- *'The main elements of the Terminal would not be decommissioned. The jetty, jetty head, loading platforms, access ramps and the jetty access road would, once constructed, become part of the fabric of the Port estate and would, in simple terms, continue to be maintained so that they could be used for port-related activities to meet a long-term need.*

- *The hydrogen production facility would have a design life of up to approximately 25 years, although the operational life could be longer, depending on its integrity and market conditions at that time. When appropriate, this infrastructure would be decommissioned. It is anticipated that plant and equipment on the jetty topside associated with hydrogen production would be decommissioned in parallel with the decommissioning of the related landside elements.'*

2.1.3 Similar or identical phrasing is also used in the Non-Technical Summary [APP-042], Chapter 5: EIA Process [APP-047] (and the Outline Decommissioning Environmental Management Plan [APP-222]) and these ES front end chapters provide the context for the technical chapters that follow. With few exceptions (see Section 3), the technical chapters do not restate any assumptions about the length of the operational life, unless this is particularly relevant to the topic in question, notably climate change [APP-061] and flood risk [as part of APP-060 and in full at APP-209].

2.1.4 Q1.15.1.1 requests that the Applicant '*clarifies the apparent inconsistencies between what the Applicant has said at the Hearings and what is in the ES*

regarding operating life and decommissioning provisions.' This is considered below in respect of both the jetty and the HPF.

2.2 Jetty

2.2.1 Although Chapter 2: The Project [APP-044] was silent on the design life of the jetty, as explained in response to Q1.8.3.3, in the context of flood risk and coastal change, the '*basis of design, and as is common in the maritime engineering, the design life of the jetty structure is 50 years. Beyond this, the jetty would likely require significant maintenance / overhaul to maintain its ability to operate*.'

2.2.2 As indicated above, the nominal design life of the jetty and jetty access road is therefore considered to be 50 years, the jetty and jetty access road are however considered to be permanent features and therefore not subject to any minimum operational period and will be maintained as necessary to enable them to be retained as part of the fabric of the Port estate.

2.3 Hydrogen Production Facility

2.3.1 As explained in response to Q1.15.1.5:

'*In principle, there is no 'maximum point in time' by which the hydrogen production facility needs to be or will be decommissioned. So long as there are the necessary replacement parts available and favourable economic conditions to continue operation, it is anticipated that the facility will continue to be operated. The Applicant is not seeking consent for the Associated Development on a time limited basis. With a programme of ongoing predictive and preventive maintenance, the facility could operate for 50 years or more.*

Some of the major items of equipment and plant have a nominal design life of around 25 years, at which point these items may need refurbishing or replacing (and are considered at the end of their technical and economic life).'

2.3.2 As indicated above, the HPF therefore has a nominal design life of 25 years but a longer operational life (which may be 50 years or more but which cannot be specified at this point in time) and will be maintained until decommissioned.

2.3.3 Importantly in this note and particularly in Table 3 included in Section 3, 'Year 1' for the operational HPF is shorthand for the fully built out HPF (so all six phases operational), rather than meaning Year 1 of (any) operation, which could be taken to mean the start of operation of the Phase 1 of the HPF. This is important in the consideration of worst case scenarios which tend to relate to the fully built, operational HPF.

3 Review of Technical Assessments

3.1.1 The following table reviews each of the ES technical chapters to determine:

- the operating life related Worst Case Scenario in all assessment areas;
- whether assumptions relating to temporal scope in all assessment areas are consistent with assumptions relating to operating life; and
- if the conclusion and related mitigation measures respond to that Worst Case Scenario.

3.1.2 The Cumulative Effects Assessment [APP-067] is excluded from the review. The only two relevant likely significant effects which arise in the operational phase relate to socio-economics (the beneficial effect of additional jobs) and landscape and visual impacts (the adverse effects from viewpoints 2 and 3). These effects are covered in reviews of the individual technical chapters and the cumulative effects would mirror the effects associated with the Project alone.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
Chapter 6: Air Quality [APP-048]	All potential effects on impact pathways identified for air quality during operation have been assessed as not significant. The assessment is based on the assumption that the worst case operational impacts (emissions) would be the same for each year that the HPF operates at full capacity (all six phases) and be maintained, with minor annual variations, until the end of the operational life.	Once the HPF is fully built out (all six phases), the annual operational emissions would be similar during year 1, year 25 or any subsequent year of the operational life. The worst case would not vary. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for air quality) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The operational controls in the Environmental Permit would be designed for the operational peak, i.e. the worst case, which is set out in the columns to the left and which would be based on the operation of the facility at full capacity and which would be similar during year 1, year 25 or any subsequent year of the operational life, beyond the nominal design life.
Chapter 7: Noise and Vibration [APP-049]	All potential effects on impact pathways identified for noise and vibration during operation, primarily residential noise sensitive receptors on the eastern edge of Immingham have been assessed as not significant. The operational noise assessment is based on a worst case scenario for the HPF which is fully built out (all six phases), thus including all parts of Work No. 7 which are closest to the residential noise sensitive receptors on the eastern edge of Immingham. The noise effects are assumed to be the same for each year that the HPF operates at full capacity [the noise impacts from the jetty itself to human receptors are minimal] and would be maintained, with minor annual variations until the end of the operational life.	The operational noise levels would be similar during Year 1, year 25 or any subsequent year of the full operational life. The worst case would not vary. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for noise and vibration) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The operational controls in the Environmental Permit and in the Operational Noise Management Plan (to be approved under Requirement 17 (Schedule 2) of the draft DCO) would be designed for the operational peak, i.e. the worst case, which is set out in the columns to the left and which would be similar during year 1, year 25 or any subsequent year of the operational life.
Chapter 8 Nature Conservation (Terrestrial Ecology) [APP-050]	All potential effects on impact pathways identified for terrestrial ecology during operation have been assessed as not significant. However, woodland loss from the Long Strip arises at the start of construction and is considered to be a moderate adverse (significant) effect and that loss would remain during the operational life of the HPF, albeit offset by the woodland compensation plan (see right). However, as stated at Paragraph 8.11.3, 'compensation for the loss of mature woodland would not be achieved over the operational life of the terrestrial elements of the Project [here meaning the HPF] and the residual effect would remain significant over the	This 25 year period used in the chapter to determine the significance of the woodland loss is appropriately regarded as a worst case. The value of compensatory woodland [and other plantings delivered in the OLEMP [APP-225] would increase after 30, 40 or 50 years. A 50 year period (the nominal design life of the jetty) would have been an appropriate, reasonable and realistic case to use in considering the period over which the compensatory woodland habitats	The conclusion (in respect of residual effects for terrestrial ecology) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. However, as explained to the left, the mitigation deployed for habitat loss is primarily the draft Woodland Compensation Plan which responds to the full quantum of habitat loss, i.e. the worst case scenario, which does not vary between

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
	long term'. The determination of a moderate adverse effect for the woodland loss is a worst case, as the woodland loss is associated with the landtake for Work No 1 and Work No. 2, and so more appropriately related to the much longer operational life of the jetty. The woodland compensation planting will become fully functional within the operational life of the jetty although as noted above, not within the operational life of the HPF.	become established and therefore the assessment was conservative. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	the first year of construction [when the woodland habitats are cleared] and over the operational life of either the HPF or the jetty. However the compensatory habitats will become gradually more valuable over time as the planting become established and can be expected to be fully functional woodland within the operational life of the jetty. The OLEMP and the habitat measures within it are embedded within the Project design to maximise, so far as is possible, the landscape and habitat value of the fully built HPF (all six phases) which represents the worst case scenario. The measures will not vary with the operational life, albeit as with the habitat created pursuant ot the final Woodland Compensation Plan, the habitats would become more valuable as they become established over time.
Chapter 9: Nature Conservation (Marine Ecology) [APP-051]	All potential impacts on nature conservation and marine ecology receptors during operation have been assessed as insignificant to minor adverse and, therefore, not significant. This assessment has been based on the assumption that the approach jetty, jetty head, jetty access ramp and the jetty access road will not be decommissioned. It has therefore also been assumed that maintenance dredging could be undertaken at any point in the future (should this be required). The results of this assessment are therefore not sensitive to any particular time scale for Operating Life	The assumptions and results of the assessment are consistent with the proposed operational life of jetty. The operational life of the HPF does not affect marine ecology as the pathways for impacts between the HPF and the relevant marine receptors are limited and no significant effects have been identified arising from these pathways.	The conclusion (in respect of residual effects for marine ecology) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The assessment conclusions are not dependent on any particular time scale and as such reflect a worst case scenario. No specific mitigation measures have been identified as being likely to be required. This is the same regardless of the duration of the operational life of the Project.
Chapter 10: Ornithology [APP-052]	All potential impacts on ornithology receptors [including both marine and terrestrial species] during operation have been assessed as not significant. For marine species, the assessment has been based on the assumption that the approach jetty, jetty head, jetty access ramp and the jetty access road will not be decommissioned. It has, however, been assumed that maintenance of Work No.1 could be undertaken at any time (recognising that this activity would be expected to be limited and only required occasionally). The results of this assessment are therefore not dependent on any particular time scale.	In relation to the operational use of the jetty, related ecological impacts, such as disturbance, are assumed to occur once operation commences. The respective assessments have therefore not been based on a specific assessment year. The same applies to the terrestrial bird species and the effects are not expected to despite the differing operational lives of the different Project elements.	The conclusion (in respect of residual effects for ornithology) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The assessment conclusions and proposed mitigation measures are not dependent on any particular time scale and as such reflect a worst case scenario. This is the same regardless of the duration of the operational life of the Project.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
	For terrestrial species, the differing operational lives of the different project elements do not impact the assessment of the Project effects on these species, as the assessment is determined primarily by the relatively low value of adjacent and retained habitats, which generally support only commoner species. The results of the assessment are therefore not dependent on any particular time scale for any element of the Project.		
Chapter 11: Traffic and Transport **[APP-053]**	All potential impacts on traffic and transport receptors during operation have been assessed as not significant. The worst case operational impacts (operational traffic levels) would be the same for each year that the fully built out HPF (all six phases) operates at full capacity and would be maintained, with minor annual variations until the end of the operational life [the operational traffic levels for the jetty are minimal].	The operational traffic levels would be similar during year 1, year 25 or any subsequent year of the full operational life of the HPF. The worst case would not exceed the peak at year 25. The assumptions and results of the assessment are consistent with the assumptions made on the operating lives of the relevant parts of the Project. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for traffic and transport) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The measures in the Operational Travel Plan [TR030008/EXAM/9.33] are designed for the operational peak, i.e. the worst case, which would be similar during year 1, year 25 or any subsequent year of the operational life of the fully built HPF (all six phases). The proposed mitigation measures are therefore not dependent on any particular time scale and as such reflect a worst case scenario. This is the same regardless of the duration of the operational life of the Project.
Chapter 12: Marine Transport and Navigation **[APP-054]**	With the implementation of appropriate mitigation measures, all the risks during the operational phase were assessed to be Tolerable and ALARP (As Low as Reasonably Practicable), or insignificant in EIA terms. The assessment of the operational phase has been based on the assumption that the approach jetty, jetty head, jetty access ramp and the jetty access road will not be decommissioned.	Fifty years was defined as the lifetime of the jetty for the purposes of the future baseline, based on the nominal design life, and potential changes in marine traffic levels. The risk assessment considered the frequency and consequences of the different navigational hazards. The frequency of a hazard was assessed based on the probability of that hazard occurring within indicative (nominal) timescales. Consequences were assessed in terms of most likely and worst-credible outcomes of the hazard.	The conclusion (in respect of residual effects for marine traffic and navigation) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The assessment conclusions and proposed mitigation measures are not dependent on any particular time scale and as such reflect a worst-case scenario. This is the same regardless of the duration of the operational life of the Project.
Chapter 13: Landscape and Visual Impact	All potential operational effects were considered to be not significant with the exception of the impact on recreational users at viewpoints 2 and 3 on the sea wall, on the proposed	Paragraphs 13.4.12-13.4.13 [APP-055] demonstrate that the assessment has been based on the relevant operational lives set out in Chapter 2: The Project [APP-044]. The assumptions and results of the assessment are therefore consistent with the	The conclusion (in respect of residual effects for landscape and visual) is that two moderate adverse (significant) effects are expected to

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
[APP-055]	England Coast Path Route), and both effects are assessed as moderate adverse (significant) and considered to be long term. The assessment has been based on the relevant operational lives for both the jetty and the HPF set out in Chapter 2: The Project [APP-044].	assumptions made on the operating lives of the relevant parts of the Project. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life as the nature and scale of the operational project would not vary and the effects remain the same with a longer operational life.	occur, based on the worst case scenario set out in the columns to the left. The OLEMP and the habitat measures within it are embedded within the Project design to maximise, so far as is possible, the habitat value as well as providing a filtering / integration landscape function for the fully built HPF (all six phases), which represents the worst case scenario and is set out in columns to the left. The measures will not vary with the operational life, albeit as with the draft Woodland Compensation Plan (see above), the habitats would become more valuable as they become established over time.
Chapter 14: Historic Environment (Terrestrial) **[APP-056]**	All potential impacts on terrestrial historic environment receptors during operation have been assessed as not significant. The impacts and the relevant mitigation measures associated with terrestrial historic environment receptors arise in the construction phase and will be mitigated to "not significant" at that stage. The assessment conclusions are not dependent on any particular time scale for the operational phase and as such reflect a worst-case scenario.	If any operational effects on the terrestrial historic environment were to arise, these would be expected to be a worst case when all six phases of the HPF have been built, and this would be the same during year 1, year 25 or any subsequent year of the eventual operational life of the HPF. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the 25 year nominal design life.	The conclusion (in respect of residual effects for terrestrial historic environment) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. No mitigation measures are directly applicable to the operational phase (see left) or are required to ensure that the effects are not significant. This is the same regardless of the duration of the operational life of the Project.
Chapter 15: Historical Environment (Marine) **[APP-057]**	The assessment considered the potential for direct and indirect impacts on known and potential heritage receptors from maintenance dredging and operational activities. With the implementation of appropriate mitigation measures the significance of any direct or indirect effects on marine archaeology were concluded to be insignificant. The assessment has been based on the assumption that the approach jetty, jetty head, jetty access ramp and the jetty access road will not be decommissioned. It has therefore also been assumed that maintenance dredging could be undertaken at any point in the future (should this be required). The results of this assessment are therefore not dependent on any particular time scale.	If any operational effects on the marine historic environment, were to arise, these would be expected to be a worst case when the jetty is first operational and would be the same during year 1, year 50 or any subsequent year of the operational life of the jetty. The assessment conclusions would therefore not vary if, as expected, the operational life of the jetty were to be greater than the 50 year nominal design life.	The conclusion (in respect of residual effects for marine historic environment) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. No mitigation measures are directly applicable to the operational phase (see left) or are required to ensure that the effects are not significant. This is the same regardless of the duration of the operational life of the Project.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
Chapter16: Physical Processes [APP-058]	All potential effects on impact pathways identified for physical processes during operation have been assessed as not significant. Overall, the predicted changes as a result of the Project are minor/negligible and are not considered significant in the context of the projected impacts of climate change (i.e. the future changes to water levels, associated flows, storminess and the resultant combined impacts to sediment transport etc. anticipated to arise as a result of climate change, are much greater than the small magnitude and limited extent of the predicted impacts arising from the Project). In the future, higher sea levels (associated with climate change) are considered to reduce the associated relative impacts on physical processes – i.e. the same dredge in deeper water will mean a smaller relative change to overall water depths (notwithstanding the case that deeper water depths might negate the need for a dredge entirely). With higher sea levels, waves can approach closer to the coast, but the assessment described in the ES [APP-058, paragraphs 16.8.57 to 16.8.68 and in Figures 16.15 to 16.17] indicates the Project will result in slightly lower wave heights at the coast, providing a slight potential benefit in terms of coastal erosion or overtopping.	A design life of 50 years has been assumed in order to define a future baseline and to provide context to the magnitude and extent of predicted impacts. Whilst the assessment has covered the predicted impacts under present-day and future periods, it is considered that changes to physical processes (as a result of the Project) over a longer timeframe will be no greater than those described in the ES [APP-058].	The conclusion (in respect of residual effects for physical processes) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. No specific mitigation measures have been identified as being likely to be required. This is the same regardless of the duration of the operational life of the Project.
Chapter 17: Marine Water and Sediment Quality [APP-059]	The assessment considered three impact pathways in detail during operation as a result of maintenance dredging and disposal activities. These addressed the potential for impacts as a result of the potential changes to dissolved oxygen concentrations, changes to chemical water quality as a result of potential sediment-bound contaminants, and redistribution of sediment-bound contaminants. All of the potential impacts on marine water and sediment quality receptors during operation were assessed as not significant. The assessment has been based on the assumption that the approach jetty, jetty head, jetty access ramp and the jetty access road will not be decommissioned. It has therefore also been assumed that maintenance dredging could be undertaken at any point in the future (should this be required). The results of this assessment are therefore not dependent on any particular time scale.	If any operational effects on marine water and sediment quality were to arise, these would be a worst case when the jetty is fully operational and these effects would then remain the same during year 1, year 50 or any subsequent year of the operational life of the jetty. The assessment conclusions would therefore not vary if, as expected, the operational life of the jetty were to be greater than the 50 year nominal design life.	The conclusion (in respect of residual effects for marine water and sediment quality) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. No specific mitigation measures have been identified as being likely to be required. This is the same regardless of the duration of the operational life of the Project.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage **[APP-060]**	All potential impacts on the relevant receptors, such as surface water courses, have been assessed as not significant during operation. The potential impacts are primarily related to the HPF and its operational life is of greatest relevance to these receptors. The operational effects would be a worst case when all six phases of the HPF are operational. Measures included to ensure that the effects are not significant include: (i) containment areas and bunded operations and spill kits to be used on Site to mitigate impacts upon surface water courses, (ii) provision of a drainage strategy to manage surface water run-off up to and including the 1% AEP plus 40% climate change allowance and (iii) the implementation of a Flood Response Plan. These measures would be in place for all phases of the HPF. Although the nominal design life of the HPF is stated as 25 years (APP-044], the Flood Risk Assessment FRA **[APP-209**] uses a minimum lifetime of development of 75 years, taken from the year 2025.	HPFThe operational effects on the water environment would be a worst case when all six phases of the HPF are operational, and this would be the same during year 1, year 25 or any subsequent year of the eventual operational life of the HPF. In the case of the FRA, the conclusions are valid for a minimum lifetime of development of 75 years, taken from the year 2025, so would be equally valid for any operational life lasting to 2100. The temporal scope of FRA [for any development] is limited by the temporal scope of available local flood models and climate change predictions and extending the assessment beyond 2100 would not be appropriate. It is noted that the temporal scope of the FRA [APP-209] was supported verbally at Issue Specific Hearing 3 by the Environment Agency.	The conclusion (in respect of residual effects for water use, water quality, coastal protection, and drainage) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The mitigation measures for these topic areas respond to the worst case scenario set out to the left. Specifically in relation to flood risk, no significant residual effects are expected for the worst case set out in columns to the left. Mitigation in relation to flood risk responds to the worst case set out to the left and is based on the 0.1% AEP breach of defences flood event water level for the year 2115, as provided by the Environment Agency [APP-209, Annex A], and in line with the requirements of the North East Lincolnshire SFRA. HPF
Chapter 19: **Climate Change** **[APP-061]**	All potential impacts on the relevant receptors have been assessed as not significant during operation, other than the impact resulting from operational greenhouse gas emissions which is assessed as significant beneficial (as a result of the low carbon hydrogen produced by the HPF, which would be used in substitution for high carbon fossil fuels). The assessments consider the operational lives as defined in [APP-044] but Year 2100 has been used for each of the assessments to span a wide range of plausible future emissions scenarios. The Greenhouse Gas (GHG) assessment considers the scenario where the HPF has an operational life of 25 years. Given the effects are beneficial this is an operational worst case (see right). The GHG assessment also considers the jetty to reach full capacity within this period and so this represents the worst case for annual emissions, irrespective of the operational life of the jetty.	For the GHG assessment the benefits of the hydrogen facility would increase if operational life cycle continued beyond 25 years and so an operational life of (only) 25 years is regarded as a worst case in this context. A more detailed answer on this is provided in response to **Q1.3.2.8.** For the CCR and the ICCI assessments, the operational life has been assessed to 2069 due to the longer lifespan for the jetty whilst consideration of a 100 year+ scenario is provided in response to **Q1.8.3.3.**	The conclusion in respect of residual effects for the GHG assessment is that the residual effects are significant beneficial and no mitigation measures are required The conclusion in respect of residual effects in respect of CCR, is that the effects are not significant. The mitigation measures respond to the worst case described in the columns to the left and relate primarily to design such that structures and buildings would either be designed for projected climatic conditions, e.g. increased average temperatures using appropriate design guidance where available, or that adaptive capacity will be built into the designs. The assessment assumes that the relevant measures will be delivered through detailed design of the Project elements, which will account for the changing climate and respond to the worst case scenario envisaged within the relevant design life.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
	The Climate Change Resilience (CCR) assessment and the In-combination climate change impact (ICCI) assessment consider scenarios that reflect a high level of GHG emissions at the 10%, 50%, and 90% probability levels of the climate variables up to 2069 to assess the impact of climate change on the Project.		
Chapter 20: Materials and Waste [APP-062]	All potential impacts have been assessed as not significant during operation. Operational waste volumes are expected to be low and would not vary substantially once all six phases of the HPF have been fully built out [waste volumes from the jetty operation would be negligible].	Annual operational waste volumes would not vary substantially once all six phases of the HPF have been fully built out would be similar during year 1, year 25 or any subsequent year of the operational life. The worst case would not vary. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for materials and waste) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. The waste management arrangements for the operational development would, in due course and as the phases are built out, address the waste volumes associated with the six phases of the HPF and so respond to the worst case scenario..
Chapter 21: Ground Conditions and Land Quality [APP-063]	All potential impacts on the relevant receptors have been assessed as not significant during operation.	The effects on ground conditions would not vary once all six phases of the HPF have been fully built out. This represents the operational worst case. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for ground conditions) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in the columns to the left. No mitigation measures are directly applicable to the operational phase beyond the requirements of the Environmental Permit and Hazardous Substance Consent to ensure that the effects are not significant. These operational controls respond to the worst case described to the left.
Chapter 22: Major Accidents and Disasters [APP-064]	All risk events identified during the operational phase of the Project have been reduced to ALARP.	The risks would not vary once all six phases of the HPF have been fully built out. This represents the operational worst case. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of risk events for major accidents and disasters) is all risk events identified during the operational phase of the Project have been reduced to ALARP and this is based on the operational worst case which is set out in the columns to the left. No mitigation measures are directly applicable to the operational phase beyond the relevant statutory safety requirements.

Technical Chapter	'operating life related Worst Case Scenario'	'assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to Operating life	'if the conclusion and related mitigation measures [for the topic] are responding to that Worst Case Scenario.'
Chapter 23: Socio-economics [APP-065]	All potential impacts on the relevant receptors have been assessed as not significant during operation other than effect on North East Lincolnshire's economy which is regarded as moderate beneficial (significant) in respect of employment generation.	The beneficial socio-economic effects would be greatest once the jetty and all six phases of the HPF have been fully built out and would not be expected to vary substantially, on an annual basis, once the facility is fully operational. The assessment of beneficial effects during operation was based on the Project definition of operational life defined in [APP-044] and so is a worst case because if the operational life is greater than this, the significant beneficial effects of employment would continue.	The conclusion in respect of residual effects for socio-economics is that they are significant beneficial and no mitigation measures are required.
Chapter 24: Human Health & Well-being [APP-066]	All potential impacts on the relevant receptors have been assessed as not significant during operation.	The operational effects would not vary once all six phases of the HPF have been fully built out. This represents the operational worst case. The assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life.	The conclusion (in respect of residual effects for human health and well-being) is that no significant residual effects are expected to occur and this is based on the operational worst case which is set out in columns to the left. No mitigation measures are required in the operational phase to reduce the significance of effects.

4 Conclusions

4.1.1 The following conclusions can be drawn from the review of individual chapters in Section 3 above:

- For all bar one technical topic, there are no significant adverse operational effects, primarily because of measures embedded within the design or operational controls which will limit impacts. If the eventual operational life of a project element is substantially longer than the nominal design life (50 years for the jetty and 25 years for the HPF), no materially new or materially different significant effects would then be expected.
- For landscape and visual impacts, the one technical topic where significant adverse effects are expected in the operational phase (visual impacts at Viewpoints 2 and 3), the assessment conclusions would not vary if the operational life of the HPF were to be greater than the nominal 25 year design life. This is because the nature and scale of the operational project would not vary with a longer operational life.
- The operational lives for the jetty and the HPF assumed for each technical chapter are a worst case, as they represent the fully operational jetty and the fully built out HPF and no additional significant adverse effects are predicted as a result of (i) the nominal design life of the jetty being shorter than its proposed operational life or (ii) the operational life of the HPF being longer than the 25 year nominal design life.
- The assumptions relating to temporal scope [for the topic] are consistent with assumptions relating to operating life. This is demonstrated on a case by case basis. In the cases of flood risk and climate change, the assessments use timeframes which are the standard temporal assessment periods for those topics. For the HPF, the temporal scope of these two assessments is substantially longer than the nominal design life. In the case of the jetty, the temporal scope of these assessments is extended beyond the nominal design life of 50 years and is extended as far as they can be into the future (as determined and limited by the availability of local flood risk models and climate change predictions) to address, so far as is possible, that the jetty will be retained permanently.
- The conclusions (in respect of significant effects) and related mitigation measures respond to the worst case scenarios for each topic. In many cases, no additional mitigation measures are required for the operational phase beyond those which are embedded within the Project to ensure that the residual effects are not significant. Operational controls, such as the Environmental Permit and the Operational Noise Management Plan would respond to the worst case scenario (i.e. the fully built operational development) and would continue to be in effect for so long as the Project is operational (they are not time limited).