



Immingham Green Energy Terminal

TR030008

Volume 6

6.4 Environmental Statement Appendices

Appendix 25.C: Assessment of Cumulative Effects

Planning Act 2008

Regulation 5(2)(a)

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

September 2023

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

6.4 Environmental Statement Appendices Appendix 25.C: Cumulative Effects Assessment

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1. Cumulative Effects Assessment (Stage 4)

1.1 Introduction

- 1.1.1 This technical appendix presents the results from the Stage 4 Cumulative Effects Assessment (“CEA”) undertaken for the developments that were scoped in for further assessment. This appendix should be read in conjunction with **Chapter 25: Cumulative and In-combination Effects [TR030008/APP/6.2]**.
- 1.1.2 The Shortlist of Cumulative Developments (**Appendix 25.B [TR030008/APP/6.4]**) identified the developments to be progressed to Stage 4 of the CEA. These developments are shown in **Table 1** which presents the 29 shortlisted developments for which a full CEA has been undertaken. For each development, it has been identified: whether there is a temporal overlap between the development and the Project; whether there is enough information to progress a full assessment; and which environmental topics are considered relevant to the development in question. The developments listed in **Table 1** retain their original ID number throughout this document.

Table 1: Shortlisted Developments Assessed at Stage 4 of the Cumulative Effects Assessment

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
1	DM/1145/19/FUL (includes variation of conditions application DM/0603/22/FUL) Construction and operation of an energy park comprising photovoltaic (PV) solar panels together with battery storage	518m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact, Ground Conditions and Land Quality Historic Environment (Terrestrial) Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Air Quality Noise and Vibration
3	DM/0105/18/FUL (includes variation of conditions application DM/0545/20/NMA) Hybrid application seeking outline consent with access, landscaping and scale to be considered for the development of a 62ha Business Park comprising up to 120,176m ²	938m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Air Quality Cultural Heritage Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Landscape and Visual Impact Socio-Economics
5	DM/0968/19/FUL Variation of conditions 1 (Approved Plans) and 2 (Scheme of Landscaping) as granted in permission DC/101/98/IMM for a materially altered land form to the site with increased height to the eastern dome, a greater drop through the valley to the electricity pylon and an increase to the western dome against the approved, but not implemented, 2004 scheme.	Immediately south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Landscape and Visual Impact Traffic and Transport Materials and Waste Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Air Quality Noise and Vibration

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
9	DM/0865/19/FUL Erection of 20MW gas fuelled embedded energy generation compound – Site 4	507m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Air Quality Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Noise and Vibration
10	DM/0864/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 3	507m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Air Quality Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Noise and Vibration
13	DM/0628/18/FUL (includes variation of conditions DM/0274/20/FUL) Partially demolish existing building and erect 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery	507m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Noise and Vibration Landscape and Visual Impact Nature Conservation (Terrestrial Ecology) Nature Conservation (Marine Ecology) Ornithology Ground Conditions and Land Quality Air Quality Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Major Accidents and Disasters Socio-Economics Historic Environment (Terrestrial)
16	DM/0862/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 1	418m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Air Quality Noise and Vibration Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
17	DM/0863/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 2	418m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Terrestrial Ecology) Nature Conservation (Marine Ecology) Ornithology Air Quality Noise and Vibration Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage
18	DM/0026/18/FUL Erect an Energy Recovery Facility with an electricity export capacity of up to 49.5MW and associated infrastructure including a stack to 90m high	92m south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Noise and Vibration Air Quality Ground Conditions and Land Quality Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Socio-Economics Historic Environment (Terrestrial)
21	EN010107 South Humber Bank Energy Centre	2.2km south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact Nature Conservation (Marine Ecology) Ornithology
22	TR030007 Immingham Eastern Ro-Ro Terminal (IERRT)	910m north of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Air Quality Noise and Vibration Nature Conservation (Marine Ecology) Ornithology Marine Transport and Navigation Historic Environment (Marine) Physical Processes Marine Water and Sediment Quality Socio-Economics

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
25	TR030001, TR030005 and TR030006 Able Marine Energy Park including Material Changes 1 and 2	4.10km north of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Socio-Economics Nature Conservation (Marine) Air Quality Marine Transport and Navigation Marine Water and Sediment Quality Physical Processes
27	EN010038 North Killingholme Power Project	6.4km north west of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Air Quality Nature Conservation (Marine Ecology)
28	EN070006 Humber Low Carbon Pipelines	6.4km north west of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Air Quality Nature Conservation (Marine)
29	EN070008 Viking CCS Pipeline	2km south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Landscape and Visual Impact Historic Environment (Terrestrial) Air Quality Socio-Economics Major Accidents and Disasters
35	DM/0329/18/FUL Erection of industrial building and adjoined two storey office/control room to create power plant (18MW Energy From Waste)	4.91km south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Socio-Economics Air Quality Nature Conservation (Marine Ecology)
37	DM/1070/18/FUL Construction of an energy from waste facility of up to 49.9MWe gross capacity including emissions stack(s) and associated infrastructure	3km south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact Nature Conservation (Marine Ecology) Air Quality Socio-Economics

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
40	DM/0378/15/OUT (includes reserved matters DM/0198/20/REM and DM/1080/18/REM) Outline planning application with means of access to be considered for the construction of up to 250 residential dwellings	3.49km south of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Marine Ecology)
41	DM/0728/18/OUT Outline planning application for the development of up to 525 residential dwellings together with an extra care facility	1.71km west of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact Historic Environment (Terrestrial) Nature Conservation (Terrestrial Ecology) Ornithology Nature Conservation (Marine Ecology) Air Quality
42	DM/1175/17/FUL Residential development for 145 dwellings	2.17km west of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Marine Ecology)
87	DM/0422/17/FUL Construction of a carbon regeneration plant, hydrothermal plant and associated works.	900m north of the Site Boundary	Yes – Construction period has the potential to overlap with the Project	Yes	Nature Conservation (Marine Ecology) Flood Risk
95	PA/2018/918 Planning permission to construct a new gas-fired power station with a gross electrical output of up to 49.9 megawatts. A further non-material amendment application has been made (PA/2021/1039)	3.29km from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	Yes	Air Quality Nature Conservation (Marine Ecology)
96	DM/0111/21/FUL Installation of wash down facility to include new drainage, underground tanks, above ground tanks with 1m high bunded wall enclosure, installation of 2.4m high track and trace ANPR (automatic number plate recognition) system and siting of modular building for staff welfare at Immingham Lorry Park Pelham Road	223m from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	Yes	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Nature Conservation (Marine Ecology)

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
102	<p>DM/1071/22/FUL</p> <p>Rock revetment repair and reinforcement along a 4.5km section of the Humber Estuary, works to repair, reinstate and enable access to the gravity outfalls at Middle Drain, Oldfleet Drain and Mawmbridge Drain, associated landscape improvements, installation of temporary construction compounds and associated infrastructure</p>	1.6km from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	Yes	<p>Landscape and Visual Impact</p> <p>Nature Conservation (Terrestrial Ecology)</p> <p>Ornithology</p> <p>Nature Conservation (Marine Ecology)</p> <p>Socio-Economics</p> <p>Historic Environment (Terrestrial)</p> <p>Historic Environment (Marine)</p> <p>Major Accidents and Disasters</p> <p>Air Quality</p>
113 and 114	<p>DM/0304/23/SCO and PA/SCO/2023/1</p> <p>EIA Scoping request for Immingham onshore wind including up to three wind turbines</p>	913m from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	No	N/A
94	<p>MLA/2020/00520</p> <p>Humber International Terminal berth 2: adaptation for car carriers Marine Management Organisation application: MLA/2020/00520</p>	913m from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	Yes	<p>Nature Conservation (Marine Ecology)</p> <p>Ornithology</p> <p>Marine Transport and Navigation</p> <p>Physical Processes</p> <p>Marine Water and Sediment Quality</p> <p>Socio Economics</p> <p>Ornithology</p> <p>Water Use, Water Quality, Coastal Protection, Flood Risk & Drainage</p>

ID	Name/Description of Proposed Development	Distance from the Site boundary	Overlap in temporal scope?	Environmental Information Available to Progress Assessment?	Relevant Environmental Topics
115	MLA/2014/00431/4 Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel	0.1km – 6.5km from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	No	Air Quality Noise and Vibration Nature Conservation (Marine Ecology) Ornithology Marine Transport and Navigation Historic Environment (Marine) Physical Processes Marine Water and Sediment Quality Socio Economics Water Use, Water Quality, Coastal Protection, Flood Risk & Drainage Ground Conditions and Land Quality Historic Environment (Marine) Historic Environment (Terrestrial)
116	DM/0664/19/FUL Velocys Waste to Fuel Plant, off Moody Lane - Development of a sustainable transport fuels facility, including various stacks up to 80m high, creation of new accesses, installation of pipelines, rail link, associated infrastructure and ancillary works	2.2km from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	Yes	Landscape and Visual Impact Historic Environment (Terrestrial) Historic Environment (Marine) Ornithology Nature Conservation (Marine Ecology) Air Quality Major Accidents and Disasters Socio-economics
117	PA/SCO/2022/7 Station Road South Killingholme, works on land to the east of Rosper Road, Killingholme	3 km from the Site Boundary	Yes - Construction period has the potential to overlap with the Project	No	Air Quality Nature Conservation (Marine Ecology) Socio-economics Major Accidents and Disasters

- 1.1.3 **Table 1:** provides the starting point for Stage 4 of the CEA. Each of the developments presented within this table (hereafter referred to as “Proposed Developments”) has been assessed against each environmental topic considered to have the potential to interact with the Project.
- 1.1.4 For the purposes of the CEA, only those receptors that would experience a residual effect (minor and above) associated with the Project are considered. For receptors where the Project’s residual effects are assessed to be of neutral/negligible significance, it is considered that such receptors would not experience cumulative effects.
- 1.1.5 All of the developments identified in **Table 1:** are considered to have the potential to generate significant cumulative effects when considered alongside the Project, by virtue of their nature, proximity to the Site Boundary and/or their temporal scope. The geographical locations of the shortlisted developments in relation to the Project are shown on **Figure 25.A [TR030008/APP/6.3]**.
- 1.1.6 **Table 2** below lists each of the short-listed developments from Stage 3 of the CEA and identifies whether these have been scoped-in or scoped-out of the assessment of cumulative effects for each technical topic. Where a development has been scoped-in, further assessment is provided in the following sections of this document. Where a development has been scoped-out, it has been identified as having no potential for cumulative effects with the Project for that particular topic and has therefore been discounted and is not discussed further.

Table 2: Short-listed developments and whether they have been Scoped-in or Scoped-out from topic-specific assessment of cumulative effects

ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
1	DM/1145/19/FUL (includes variation of conditions application DM/0603/22/FUL) Construction and operation of an energy park comprising photovoltaic (PV) solar panels together with battery storage	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects
3	DM/0105/18/FUL (includes variation of conditions application DM/0545/20/NMA) Development of a 62ha Business Park comprising up to 120,176 m2	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
5	DM/0968/19/FUL Variation of conditions 1 (Approved Plans) and 2 (Scheme of Landscaping) as granted in permission DC/101/98/IMM	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate e Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
9	DM/0865/19/FUL Erection of 20MW gas fuelled embedded energy generation compound – Site 4	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects
10	DM/0864/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 3	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
13	DM/0628/18/FUL (includes variation of conditions DM/0274/20/FUL) Partially demolish existing building and erect 20MWE waste to energy power generation facility, 65m stack and associated plant, machinery	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
16	DM/0862/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 1	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
17	DM/0863/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 2	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects
18	DM/0026/18/FUL Erect an Energy Recovery Facility with an electricity export capacity of up to 49.5MW and associated infrastructure including a stack to 90m high	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
21	EN010107 South Humber Bank Energy Centre	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
22	TR030007 Immingham Eastern Ro-Ro Terminal (IERRT) – approach to IERRT CEA is discussed in paragraphs 1.2.1 to 1.2.11.	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped In: Potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped In: Potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
25	TR030001, TR030005 and TR030006 Able Marine Energy Park including Material Changes 1 and 2	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped In: Potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped In: Potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
27	EN010038 North Killingholme Power Project	Scoped in: potential for cumulative effects	Scoped out	Scoped out.	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
28	EN070006 Humber Low Carbon Pipelines	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects
29	EN070008 Viking CCS Pipeline	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate e Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
35	DM/0329/18/FUL Erection of industrial building and adjoined two storey office/control room to create power plant (18MW Energy From Waste)	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
37	DM/1070/18/FUL Construction of an energy from waste facility of up to 49.9MWe gross capacity including emissions stack(s) and associated infrastructure	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
40	DM/0378/15/OUT (includes reserved matters DM/0198/20/REM and DM/1080/18/REM) Outline planning application considered for the construction of up to 250 residential dwellings	Scoped out – no potential cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
41	DM/0728/18/OUT Outline planning application for the development of up to 525 residential dwellings together with an extra care facility	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate e Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
42	DM/1175/17/FUL Residential development for 145 dwellings	Scoped out – no potential cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
87	DM/0422/17/FUL Construction of a carbon regeneration plant, hydrothermal plant and associated works.	Scoped out – no potential cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in (Flood Risk)	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
94	MLA/2020/00520 Humber International Terminal berth 2: adaptation for car carriers Marine Management Organisation application: MLA/2020/00520	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out.	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
95	PA/2018/918 Planning permission to construct a new gas-fired power station with a gross electrical output of up to 49.9 megawatts. A further non-material amendment application has been made (PA/2021/1039)	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects

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ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate e Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
96	DM/0111/21/FUL Installation of wash down facility to include new drainage, underground tanks, above ground tanks with 1 m high bunded wall enclosure and siting of modular building for staff welfare at Immingham Lorry Park Pelham Road	Scoped out – no potential cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects
102	DM/1071/22/FUL Rock revetment repair and reinforcement along a 4.5km section of the Humber Estuary. Installation of temporary construction compounds and associated infrastructure	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
113 and 114	DM/0304/23/SCO and PA/SCO/2023/1 EIA Scoping request for Immingham onshore wind including up to three wind turbines	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out.	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects
115	MLA/2014/00431/4 Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects

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Environmental Statement Appendix 25.C Cumulative and In-Combination Effects

ID	Application reference and description	Air Quality	Noise and Vibration	Nature Conservation (Terrestrial Ecology)	Nature Conservation (Marine Ecology)	Ornithology	Traffic and Transport	Marine Transport and Navigation	Landscape and Visual Impact	Historic Environment (Terrestrial)	Historic Environment (Marine)	Physical Processes	Marine Water and Sediment Quality	Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage	Climate e Change	Materials and Waste	Ground Conditions and Land Quality	Major Accidents and Disasters	Socio-economics	Human Health and Well-being
116	DM/0664/19/FUL Velocys Waste to Fuel Plant, off Moody Lane - Development of a sustainable transport fuels facility, including various stacks up to 80m high, creation of new accesses, installation of pipelines, rail link, associated infrastructure and ancillary works	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects
117	PA/SCO/2022/7 Station Road South Killingholme, works on land to the east of Rosper Road, Killingholme	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects	Scoped out	Scoped in: potential for cumulative effects	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped out	Scoped in: potential for cumulative effects	Scoped in: potential for cumulative effects

1.2 Immingham Eastern Ro-Ro Terminal (“IERRT”) (ID22)

- 1.2.1 The IERRT development has been highlighted as having the potential to result in significant cumulative effects, due to the nature and close proximity of the development to the Project.
- 1.2.2 The IERRT development comprises a new roll-on/roll-off terminal in the Port of Immingham and the Grid Reference used for site identification of that project is approximately 920m to the west of the westernmost extent of the Project marine Site Boundary (ID 22 on **Figure 25.1 [TR030008/APP/6.3]**). The site boundary of IERRT extends eastward to include areas which are in close proximity to the Project Site Boundary.
- 1.2.3 The IERRT development progressed through a statutory consultation between 19 January 2022 and 23 February 2022 and then through a supplementary consultation between 28 October 2022 and 27 November 2022. A Development Consent Order (“DCO”) application for the IERRT development was submitted on 5 January 2023 and was subsequently withdrawn on 1 February 2023. The application was re-submitted on 10 February 2023. The IERRT development and the Project both involve new jetties, are in close spatial proximity and there is the potential for their construction programmes to overlap. This means that there is the potential for these developments to interact, leading to potential significant cumulative effects arising.
- 1.2.4 This potential for the Project and the IERRT development to interact cumulatively will vary depending on the periods of construction and operation for each project and the extent to which these periods overlap. The following cumulative scenarios are possible:
- IERRT is under construction at the same time as the Project, at least in part.
 - IERRT is operational by the time the Project construction commences.
 - IERRT and the Project are operational at the same time (this is the expected long-term operational scenario).
- 1.2.5 Consideration has been given to these scenarios for each of the technical areas within the scope of the Environmental Impact Assessment (“EIA”) of the Project and reported in this Environmental Statement **[TR030008/APP/6.2]** to consider the potential for cumulative effects. Cumulative effects are most likely to arise where a theoretical pathway exists, which would enable the impacts from the two projects to interact, or, where the impacts act on the same receptor.
- 1.2.6 With changing project programmes, there is a degree of uncertainty surrounding the extent to which both IERRT and the Project’s construction and operational phase could overlap, therefore the IERRT CEA for each topic has assumed a worst-case assessment. In most instances, the assessments assume that both construction phases will overlap and that both operational phases will overlap. Where this is not the case, this has been stated within the discipline CEA assessment in the sections below.

- 1.2.7 For each discipline, as well as consideration of the shortlisted developments (**Table 1**) for the potential for cumulative effects to occur along with the Project, where the IERRT development (also referred to as ID22 within the cumulative effects assessment tables below) has been scoped in for a discipline, a more detailed assessment has been provided than other proposed developments due to the proximity of IERRT to the Project. This has been undertaken to better understand the interactions between the Project and IERRT (due to their geographical and temporal relationships). This more detailed assessment is presented within each relevant topic sub-section below.
- 1.2.8 The IERRT development was scoped out of the CEA for Materials and Waste, Climate Change and Traffic and Transport. This is because a detailed CEA was not undertaken for these topics as it is considered that the potential for cumulative effects is inherently assessed within the relevant topic chapter.
- 1.2.9 The IERRT development is located mostly within the existing port curtilage, because of this, it is assessed that it is unlikely to introduce new or different significant effects than those presented within **Chapter 13: Landscape and Visual Impact** of the ES [TR030008/APP/6.2] and has therefore been scoped out of the CEA for Landscape and Visual. The IERRT development has been scoped out of the CEA for Historic Environment (Terrestrial) as any impacts on terrestrial archaeology are predicted to be spatially limited for both the Project and IERRT. There are no sensitive settings for built heritage. For those reasons, the Project is not expected to interact cumulatively with IERRT and potentially significant cumulative effects on terrestrial historic environment receptors are not anticipated.
- 1.2.10 The IERRT Project has been scoped out for Nature Conservation (Terrestrial Ecology) due to there being no potential for cumulative effects as the Project would not have an effect on ecological receptors outside of the Site Boundary. It has also been scoped out for Ground Conditions and Land Quality due to any impacts on ground conditions being predicted to be spatially limited for both the Project and IERRT. Mitigation measures would be in place for both the Project and IERRT to ensure no significant project specific effects arise.
- 1.2.11 The IERRT development has been scoped out for Major Accidents and Disasters as the potential for major accidents for both IERRT and the Project would be managed to as low as reasonably practicable (“ALARP”) through the deployment of appropriate safety management systems and engineering design. For all other topics, IERRT has been scoped into the CEA and assessed in the relevant topic sub-sections below.
- 1.3 **Air Quality Cumulative Effects**
- 1.3.1 During the construction phase, cumulative effects have the potential to occur between the Project and other Proposed Developments within the shortlist (**Table 1**).

- 1.3.2 Amenity and human health sensitive receptors (residential properties in the case of the Project) may experience a cumulative effect from construction phase particulate emissions. This may occur where they are located within 350m of the Project construction site boundary, and within 350m from a Proposed Development that is also a source of particulate emissions. Nature conservation receptors may also experience a cumulative effect from construction phase particulate emissions. This may occur where they are located with 50 m of the Project's construction boundary and with 50m of a Proposed Development that is also a source of particulate emissions.
- 1.3.3 Human health sensitive receptors and nature conservation sensitive receptors may experience a cumulative effect from construction phase site plant and road traffic emissions. Point source emissions from the energy plant and industrial processes associated with Proposed Developments can also contribute to a cumulative effect during the construction phase, where committed development emissions impact on shared locations.
- 1.3.4 During the operational phase, human health sensitive receptors and nature conservation sensitive receptors may experience a cumulative effect from operational traffic and point source emissions, where committed development emissions impact on shared locations.
- 1.3.5 **Table 3** summarises how the developments included in the shortlist (**Table 1**) that have been scoped-in with regard to potential cumulative air quality effects during construction and operation have been considered. A total of 25 developments were scoped-in to the assessment of construction and operational cumulative air quality effects.

Cumulative Effects during construction

- 1.3.6 Should the Proposed Development be under construction or operational during the Project's construction phase, emissions from that development could have a cumulative impact at receptors affected by the Project's construction emissions. Impacts associated with the cumulative developments relate to those from construction site emissions, construction and operational road traffic emissions, and operational energy plant and/or process emissions.

Cumulative Effects during operation

- 1.3.7 Should the Proposed Development be operational during the Project's operational phase, emissions from that development could have a cumulative impact at receptors affected by the Project's operational emissions. Again, impacts associated with the cumulative developments relate to those from operational emissions, operational road traffic emissions, and operational energy plant and/or process emissions.

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

- 1.3.8 Due to the proximity of the neighbouring IERRT project and similar zone of influence, emissions from the IERRT project have been modelled in this cumulative assessment alongside emissions from the Project.

- 1.3.9 Cumulative air quality impacts are considered in two ways:
- a. At human health sensitive receptors, the contribution from cumulative sources is accounted for in both the future baseline and construction phase and operational phase scenarios. So, the impact reported is solely that from the Project itself, but the total concentrations reported, from which any risk of an exceedance is determined, includes the contribution of cumulative sources.
 - b. At nature conservation receptors, where there is a nature conservation sensitive receptor within 200m of a road that is affected by Project traffic, the contribution from cumulative sources is added to the with development phase scenarios only (construction and operation). The future baseline scenarios assume that the Project and the cumulative developments are not present, whereas the future operational scenario assumes that the Project and the cumulative developments are present. The impact and future operational concentrations and deposition rates reported therefore include the combined contribution of the Project and cumulative sources together.
- 1.3.10 For the Project, there are no roads within 200m of a sensitive nature conservation habitat that are affected by the construction or operation of the Project.
- 1.3.11 The construction and operational phases of the Project and the IERRT project will use the A1173 and Queens Road for Heavy Goods Vehicle (“HGV”) access to and from the A180 at Stallingborough. There is the potential for the two projects to act cumulatively in respect of air quality given this common access route for HGVs.
- 1.3.12 Despite not being within 200m of a road affected by Project traffic, the construction and operational phases of the Project and the IERRT project will both generate emissions to air via non-road sources that could impact on the same sensitive locations within the Humber Estuary Special Area of Conservation (“SAC”)/Special Protection Area (“SPA”)/RAMSAR.
- 1.3.13 During the construction phase, both the Project and the IERRT project will implement the highest standard of dust and emissions control measures as recommended by the Institute of Air Quality Management and as set out within the respective Construction Environmental Management Plans (“CEMP”). Such measures have a proven track-record of controlling emissions from well managed construction sites to the extent that any effect is not significant. The control measures set out in the respective CEMPs are secured through the DCO process and will be implemented as standard on both construction sites.
- 1.3.14 The construction phase assessment of road traffic emissions impacts, reported in **Section 6.8** and **Table 6-16** of **Chapter 6: Air Quality** of the ES **[TR030008/APP/6.2]** is inherently cumulative in terms of road traffic emissions and includes the contribution of traffic emissions from the IERRT project and other cumulative developments. During the construction phase, combustion emissions associated with the Project traffic flows contribute approximately 0.8% of the air quality objective for annual mean NO₂, and 0.5% of the air quality objectives for both PM₁₀ and PM_{2.5}, at the receptor locations worst affected by the Project. With the contribution from the IERRT project and the background emissions contribution, which account for around 7% of the air quality objective

for annual mean NO₂ and 2% of the air quality objectives for both annual mean PM₁₀ and PM_{2.5}, total annual mean NO₂, PM₁₀ and PM_{2.5} concentrations account for less than 50% of the relevant air quality objectives. At the receptor location within the AQMA at Grimsby, the Project construction traffic emissions account for 0.3% of the air quality objective for NO₂, 0.1% for PM₁₀, and 0.2% for PM_{2.5}. With the addition of the IERRT project and the background contribution emissions, total NO₂ concentrations account for approximately 69% of the air quality objective for annual mean NO₂, 37% of the objective for annual mean PM₁₀ and 46% of the objective for annual mean PM_{2.5}. The cumulative impacts during the construction phase do not cause or worsen an exceedance of an air quality objective, and do not put an air quality objective at risk of an exceedance. As such, the cumulative effect during the construction phase is not considered to be significant.

- 1.3.15 During the operational phase, if the vessels calling at the facility were all to comply with MARPOL Regulation 13 Tier III standards, the Project would contribute less than 1% of the air quality objectives for all pollutants considered and at all human health sensitive receptors considered. With the contribution of emissions from the IERRT project and the background contribution, total annual mean NO₂ concentrations would account for less than 50% of the air quality objective, PM₁₀ concentrations less than 40% of the objective and PM_{2.5} concentrations less than 42%.
- 1.3.16 If the vessels calling at the facility were all to comply with MARPOL Regulation 13 Tier II standards, the Project would contribute up to 1.3% of the air quality objective for annual mean NO₂ and less than 1% of the air quality objectives for annual mean PM₁₀ and PM_{2.5} at the worst affected human health sensitive receptor. With the contribution of emissions from the IERRT project and the background contribution, total annual mean NO₂ concentrations would still account for less than 50% of the air quality objective, PM₁₀ concentrations less than 40% of the objective and PM_{2.5} concentrations less than 42%.
- 1.3.17 As discussed in the air quality chapter it is impossible to estimate the proportion of Tier II and Tier III vessels that may use the facility in 2028 or 2036. Therefore, the actual impact at the receptors is likely to be somewhere between the two sets of values predicted for Tier III and Tier III vessels (as reported in **Chapter 6 of the ES**). The proportion of Tier II vessels using the facility will reduce year on year and Tier III vessels will increase year on year, as older vessels or vessel engines are replaced or retrofitted with new technology.
- 1.3.18 In light of the above, the cumulative effect of the Project alongside the IERRT project is not considered to be significant for human health impacts.
- 1.3.19 During the operational phase, assuming that the vessels calling at the facility will comply with MARPOL Regulation 13 Tier III standards, the Project contributes 1.7% of the Critical Level for annual mean NO_x, 1% of the Critical Load for nitrogen deposition, and less than 1% of the Critical Levels for annual mean SO₂ and NH₃, at the worst affect nature conservation receptor within the SAC (O_E2). With the contribution of emissions from the IERRT project the combined impact within the SAC contributes 2.7% of the Critical Level for annual mean NO_x, (receptor O_E1) 1% of the Critical Load for nitrogen deposition (receptors O_E1 and O_E2) and less than 1% of the Critical Levels for annual mean SO₂ and NH₃

(all receptors). With the background contribution, total annual mean NO_x concentrations account for less than 54% of the Critical Level at the location of worst impacts in the SAC (receptors O_E1 and O_E2), and noting that higher total NO_x concentrations are predicted where the combined impact of the Project and IERRT project account for less than 1% of the Critical Level. Total nitrogen deposition rates within the SAC account for over 100% of the Critical Load at all receptors, predominantly due to the background contribution, which accounts for up to 146% of the lower Critical Load threshold at receptors E_O1 and E_O2. Total SO₂ concentrations account for 11% of the Critical Level and Total NH₃ concentrations less than 50% of the Critical Level (again noting that higher total SO₂ and NH₃ concentrations are predicted where the combined impact of the Project and IERRT project account for a lesser proportion of those Critical Levels).

- 1.3.20 During the operational phase, assuming that the vessels calling at the facility will comply with MARPOL Regulation 13 Tier II standards, the Project contributes 5% of the Critical Level for annual mean NO_x, 2% of the Critical Load for nitrogen deposition, and less than 1% of the Critical Levels for annual mean SO₂ and NH₃, at the worst affect nature conservation receptor within the SAC (O_E2). With the contribution of emissions from the IERRT project the combined impact contributes 6% of the Critical Level for annual mean NO_x, 2% of the Critical Load for nitrogen deposition and less than 1% of the Critical Levels for annual mean SO₂ and NH₃, at receptor O_E2. With the background contribution, total annual mean NO_x concentrations account for less than 57% of the Critical level at the location of worst impacts. It is also noted that higher total NO_x concentrations are predicted at other locations where the combined impact of the Project and IERRT project account for 1% or less of the Critical Level. Total nitrogen deposition rates account for over 100% of the Critical Load at all receptors, predominantly due to the background contribution at receptors E_O1 and E_O2. Total SO₂ concentrations account for 11% of the Critical Level and Total NH₃ concentrations around 50% of the Critical Level (again noting that higher total SO₂ and NH₃ concentrations are predicted where the combined impact of the Project and IERRT project account for a lesser proportion of the Critical Levels).
- 1.3.21 In summary, combined emissions from the Project and the IERRT project will cause a cumulative impact on annual mean NO_x concentrations of more than 1% of the Critical Level at a limited area of Saltmarsh habitat on the northern shore of the Humber Estuary. At these and other locations considered in the assessment, the combined impact does not cause an exceedance of the Critical Level for NO_x, nor put the Critical Level at risk of an exceedance. At locations where total NO_x concentrations are more elevated, combined impacts are 1% or less of the Critical Level.
- 1.3.22 The combined emissions of the Project and IERRT project will cause a cumulative impact on nitrogen deposition of more than 1% of the Critical Level at the same limited area of Saltmarsh habitat on the northern shore of the Humber Estuary, when assuming vessel emissions will comply with MARPOL Regulation 13 Tier II standards. At these and other locations, the deposition rate is over 100% of the Critical Load, although that is predominantly due to the background, which accounts for at least 99% of the total deposition rates reported. With MARPOL Regulation 13 Tier III standards, the combined effect of the Project and

IERRT project will cause a cumulative effect on nitrogen deposition of 1% or less of the Critical Load. In reality, there will be a mix of Tier II and Tier III standard compliant vessels using the facility, with the proportion of Tier III compliant vessels increasing year by year.

- 1.3.23 The significance of the cumulative effect on nature conservation receptors is described in the Nature Conservation (Marine Ecology) assessment of cumulative effects section of this appendix.

Table 3 Air Quality Cumulative Effects Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
1 - DM/1145/19/FUL	<p>Construction:</p> <p>Potential for construction traffic emissions of ID1 to affect receptors adjacent to roads also affected by the Project.</p> <p>Traffic data used to inform the assessment is reported in Section 6.8 of Chapter 6: Air Quality [TR030008/APP/6.2] is inherently cumulative as it includes flows associated with committed and reasonably foreseeable development.</p> <p>No air quality sensitive receptors within 200m of the Project's construction traffic route along the A1173. where cumulative traffic impacts are most likely to occur. Limited traffic impacts from the Project on the A180 and further afield.</p> <p>Operation:</p> <p>No operational emissions are considered likely to cumulatively impact with the Project.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>
3 - DM/0105/18/FUL	<p>Construction:</p> <p>Potential for construction traffic emissions of ID3 to affect receptors adjacent to roads also affected by the Project.</p> <p>Traffic data used to inform the assessment is reported in Section 6.8 of Chapter 6: Air Quality [TR030008/APP/6.2] is inherently cumulative and includes flows associated with committed and reasonably foreseeable development.</p> <p>No air quality sensitive receptors within 200 m of the Project construction traffic route along the A1173. where cumulative traffic impacts are most likely to occur. Limited traffic impacts from the Project will arise on the A180 and further afield.</p> <p>Operation:</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>No air quality sensitive receptors within 200m of the Project operational traffic route along the A1173. where cumulative traffic impacts are most likely to occur. Limited traffic impacts on the A180 from the Project and further afield.</p>		
<p>5 - DM/0968/19/FUL</p>	<p>Construction:</p> <p>Potential for cumulative amenity impact at Queens Road receptors, should offsite construction dust impacts from the Project coincide with dust emissions from ID5.</p> <p>The Project will be committed to the highest level of dust mitigation (as recommended by the IAQM) that will be secured by DCO via the CEMP. With the implementation of the dust mitigation measures listed in the CEMP, the construction of the Project should not contribute to offsite impacts.</p> <p>The Planning Statement published with the planning application for ID5 (FCC Environment, 2019) lists the dust control measures to be implemented at that site. As ID5 has been granted permission, it can be assumed that the Minerals Planning Authority are happy that the dust mitigation measures can control offsite impacts from that site also.</p> <p>As such, the risk of cumulative dust impacts during the construction phase are low.</p> <p>There is also the potential for traffic emissions of ID5 to affect receptors adjacent to roads also affected by the construction of the Project (FCC Environment, 2019). According to the Transport Statement that was published with the planning application for ID5, it will contribute 38 two-way HGV movements per day via the cumulative development site's egress point on Queens Road.</p> <p>Construction phase traffic data used to inform the assessment reported in Section 6.8 of Chapter 6: Air Quality [TR030008/APP/6.2] is inherently cumulative and includes flows associated with committed and reasonably foreseeable development.</p> <p>Operation:</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Potential for traffic emissions of ID5 to affect receptors adjacent to roads also affected by the operation of the Project.</p> <p>According to the Transport Statement that was published with the planning application for ID5, it will contribute 38 two-way HGV movements per day via ID5's site egress point on Queens Road.</p> <p>Operational phase traffic data used to inform the assessment reported in Section 6.8 of Chapter 6: Air Quality [TR030008/APP/6.2] is inherently cumulative and includes flows associated with committed and reasonably foreseeable development. Cumulative traffic impacts will not occur within 200 m of any European designated nature conservation habitat.</p>		
<p>9 - DM/0865/19/FUL</p>	<p>Construction:</p> <p>The air quality assessment that informed the planning application for ID9 (Air Quality Consultants ("AQC"), 2019) considered the impact of this particular generator site in isolation, and the impact of this site along with three sister generator sites in-combination. The assessment of all four generator sites in operation identified that the bulk of the impact from these cumulative developments occurred at locations where there is no relevant air quality exposure. Impacts of less than 0.6 µg/m³ of NO₂ (i.e. rounded to 1% or less of the air quality objective) were predicted at receptors on Queens Road and receptors on the eastern fringe of Immingham town.</p> <p>Given the limited impact of ID9 at the human health sensitive receptors shared with the Project, and the limited impact of the Project's construction phase emissions at those locations (as predicted at receptors C_R1 to C_R3), the potential for cumulative effect is limited.</p> <p>It is noted that the air quality assessment prepared by AQC screened out the impact of the four generator site emissions on the nature conservation receptors, due to lack of sensitivity.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>A second air quality assessment was submitted to inform the planning application for the site in 2020 (Air Pollution Services, 2020). It quantified the impact of the four energy generation sites at several locations within the Humber Estuary SAC. The vast majority of which were mudflat habitat, which have not been considered sensitive to air quality impacts in the Project ES¹. At the saltmarsh habitat considered in that assessment, the impact (or Process Contribution) accounted for 0.15% of the current lower Critical Load threshold for nitrogen deposition. Annual mean NO_x impacts at this location were not reported. Construction phase emissions associated with the Project will be negligible at this same location.</p> <p>Operation:</p> <p>Impacts of less than 0.6 µg/m³ of NO₂ (i.e. rounded to 1% or less of the air quality objective) identified in ID9's air quality assessment were predicted at receptors on the eastern fringe of Immingham town. Given the limited impact of ID9 at the human health sensitive receptors shared with the Project (receptors O_R1 to O_R5), and the limited impact of the Project's operational phase emissions at those locations, the potential for cumulative effect on human health sensitive receptors is limited.</p> <p>The second air quality assessment reported impacts that accounted for 0.15% of the current lower Critical Load nitrogen deposition. Operational phase emissions of the Project and IERRT emissions impact at this same location (receptor O-E5), account for up to 0.4% of the same lower Critical Load threshold assuming MARPOL Regulation 13 Tier II emission standards and 0.3% assuming Tier III standards.</p>		
10 - DM/0864/19/FUL	<p>Construction:</p> <p>As per assessment reported for ID9.</p> <p>Operation:</p> <p>As per assessment reported for ID9.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		6: Air Quality [TR030008/APP/6.2]	
13 - DM/0628/18/FUL	<p>Construction:</p> <p>The air quality assessment that informed the planning application for ID13 did not quantify impacts at receptors on Queens Road. However, they did include contour plots of annual mean NO₂ impacts across the area, which showed that receptors on Queens Road will experience an impact of less than 0.4 µg/m³ (less than 1% of the air quality objective). The Project impacts on Queens Road in the construction phase account for 0.3 µg/m³ (0.8% of the air quality objective). A cumulative impact of up to 1.1% of the air quality objective would not cause a significant effect, where total concentrations are so far below the air quality objective.</p> <p>Cumulative development impacts are also predicted at a location within the Humber Estuary SAC and at two Sites of Special Scientific Interest (“#2SSSI”) locations. The location of the cumulative impact reported for the SAC is for an area of mudflat habitat. As discussed in Chapter 6 of the ES [TR030008/APP/6.2], the Project assessment does not consider mudflat in the Humber Estuary to be sensitive to air quality impacts¹. At the saltmarsh habitat considered in ID13’s air quality assessment (the North Killingholme Haven its SSSI) the impact (or process contribution) accounts for 0.1% of the lower Critical Load threshold. Construction phase emissions associated with the Project are anticipated to have a negligible impact at this location.</p> <p>Operation:</p> <p>The air quality assessment that informed the planning application for development ID13 (Envest, 2018) included impacts at similar receptor locations to some operational receptors considered in Chapter 6: Air Quality [TR030008/APP/6.2] (O_R1, O_R5, O_R8 and O_R9). The maximum impact of the cumulative development to annual mean NO₂ at these locations was less than 0.2 µg/m³ (or 0.5% of the air quality objective). Operational Project impacts on the representative</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>receptors are 0.4 µg/m³ (1% of the air quality objective). A cumulative impact of up to 1.5% of the air quality objective would not cause a significant effect, where total concentrations are so far below the air quality objective.</p> <p>With regards to nature conservation, the saltmarsh habitat that was considered in the cumulative development air quality assessment (the North Killingholme Haven SSSI) will experience an impact (or process contribution) that accounts for 0.1% of the lower Critical Load threshold. At the same location, the operational Project and IERRT impact is 0.2% of the Critical Load (assuming all vessels visiting the Project are MARPOL Regulation 13 Tier II compliant).</p> <p>Again, ID13's air quality assessment (Envest, 2018) does not report impacts at the nature conservation sites worst affected by the operation of the Project, the annual mean NO₂ contour plot it does include can be used to make a reasoned estimate. The contour plot suggests that at the locations of maximum nature conservation impact in the Project's assessment, the cumulative development has an annual mean NO₂ impact of around 0.1 µg/m³, which would convert to a nitrogen deposition impact of around 0.014 kg/ha/yr (or 0.1% of the Critical Load). Thus, the cumulative impact of ID13 to Project impacts is minimal.</p>		
16 - DM/0862/19/FUL	<p>Construction: As per assessment reported for ID9.</p> <p>Operation: As per assessment reported for ID9.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse
17 - DM/0863/19/FUL	<p>Construction: As per assessment reported for ID9.</p>	No additional mitigation required beyond the embedded and standard	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Operation: As per assessment reported for ID9.</p>	<p>measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	
<p>18 - DM/0026/18/FUL</p>	<p>Construction: Cumulative dust emissions would be limited to those associated with trackout from ID18's construction traffic, due to the distance between the construction site boundary and the nearest dust sensitive receptors, and only then if ID18's construction route uses Queen's Road to the south of its site egress. Given that the Project is committed to the highest level of dust mitigation typical of well managed construction sites in the UK, and ID18 has planning permission and the securement of dust mitigation through that process, it is considered that cumulative dust emissions will be sufficiently controlled and any cumulative impact minimal.</p> <p>The air quality assessment chapter of ID18's Environmental Statement ("ES") (North Beck Energy, 2018) states that HGV traffic associated with that development will use the section of Queens Road to the north of its site access, up to Laporte Road, and then Kiln Lane and the A1173, to get to and from the A180. Cumulative impacts from ID18's road traffic emissions with the Project are limited, due to this routing of the other development's traffic, thus avoiding shared receptors. The traffic data used to inform the assessment of the Project is inherently cumulative and includes additional flows associated with other major developments in the vicinity of the Project.</p> <p>The assessment of ID18's Energy recovery point source emissions is described in the emissions modelling report that was appended to the North Beck Energy ES (Fichtner, 2018). This identified maximum annual mean NO₂ impacts at human health sensitive receptors of less than 1% of the air quality objective. Cumulative impacts at shared human health sensitive receptors are therefore considered to be low,</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>considering total concentrations with the Project and ID18 will remain well below the air quality objective.</p> <p>ID18's emissions modelling assessment also reported an annual mean NO_x impact of 2% of the Critical Level and a nitrogen deposition impact of 0.2 kg/ha/yr (or 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold) at the worst affected saltmarsh habitat. The Project construction phase impacts are expected to have a limited impact at this location of shared sensitivity, due to its distance away from the construction site boundary.</p> <p>Operation:</p> <p>During the operation of the Project, cumulative impacts with ID18's road traffic emissions and the Project are limited, due to the routing of ID18 traffic, which avoids shared receptors and the limited traffic movements associated with the operation of the Project. The traffic data used to inform the assessment of the Project is inherently cumulative and includes additional flows associated with other major developments in the vicinity of the Project.</p> <p>With the contribution from ID18's energy recovery plant, the maximum annual mean NO₂ impact at human health sensitive receptors is less than 1% of the air quality objective and occurs at a location where the Project and IERRT impact account for 1% of the air quality objective as well (Receptor O_R1). Cumulative impacts at shared human health sensitive receptors are therefore considered to be low, considering total concentrations at this location remain well below the air quality objective.</p> <p>ID18's emissions modelling assessment reported an annual mean NO_x impact of 2% of the Critical Level and a nitrogen deposition impact of 0.2 kg/ha/yr (or 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold) at the worst affected saltmarsh habitat. Worst-case Project and IERRT emissions (assuming all vessels associated with the Project are MARPOL Regulation 13 Tier II compliant) account for 6% of the Critical Level for annual mean NO_x and 2% of the lower Critical Load Threshold (1% of the upper Critical Load threshold) at a comparable saltmarsh</p>		

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	location (receptors O_E1 and O_E2). Assuming vessels associated with the Project are MARPOL Regulation 13 Tier III compliant, the Project and IERRT emissions account for 3% of the Critical Level for NO _x , 1% of the lower Critical Load threshold for nitrogen deposition (0.5% of the upper Critical Load threshold).		
21 - EN010107	<p>Construction:</p> <p>The air quality dispersion modelling assessment that supported ID21's ES (EP Waste Management Ltd, 2020) describes that annual mean NO₂ impacts at the shared Project human health sensitive receptors accounted for 1% or less of the air quality objective. The impact of the Project's construction phase emissions at this location is negligible, due to the limited impact of both developments and the good standard of existing air quality.</p> <p>At the shared nature conservation sensitive saltmarsh receptors, ID21's impact to annual mean NO_x accounts for around 2.5% of the Critical Level and the nitrogen deposition rate around 4% of the current lower Critical Load threshold. However, the impact of the Project's construction phase emissions at this location is considered to be negligible, due to the distance between the ID21's impacted saltmarsh habitat and the Project's construction phase emissions sources.</p> <p>Operation:</p> <p>ID21's annual mean NO₂ impacts of 1% or less of the air quality objective at the shared receptors will not contribute to a significant cumulative effect, given the limited impact of the Project and good standard of air quality.</p> <p>ID21's impact to annual mean NO_x of around 2.5% of the Critical Level and the nitrogen deposition rate of around 4% of the Critical Load occurs at the same location as the Project saltmarsh receptor O_E5. Here, the Project and IERRT impacts account for 1% of the Critical Level for NO_x and 0.4% of the Critical Load for nitrogen deposition, assuming IGET vessels comply with MARPOL Regulation 13 Tier II emission standards, and 0.5% of the Critical Level for NO_x and 0.3% of the Critical</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Load for nitrogen deposition, assuming vessels associated with the Project comply with Tier III emission standards. However, as the cumulative process contribution of these projects will not result in an exceedance of the 20 – 30 kg/ N/ ha/ yr Critical Load for N deposition at any of the saltmarsh receptors, no significant cumulative effects are predicted.</p>		
22 - TR030007	<p>See paragraph 1.3.8 for cumulative effects assessment of the Project and the IERRT development.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>
<p>25 - TR030001, TR030005 and TR030006</p> <p>Able Marine Energy Park including Material Changes 1 and 2</p>	<p>Construction:</p> <p>The air quality dispersion modelling assessment that supported ID25's ES describes that annual mean NO₂ impacts from its non-road sources account for 0.04% of the air quality objective at the worst affected location. ID25's worst-case road traffic emissions impacts account for 1.5% of the air quality objective value, although this occurs at a different location to that worst affected by non-road sources. It's not clear from ID25's ES where this impact occurs, but it is considered that the impact of the Project construction phase emissions at this location is likely to be negligible, given the distance between the two sites.</p> <p>At the worst-impacted nature conservation site within the SAC from ID25 emissions, annual mean NO_x impacts account for 0.3% of the Critical Level and nitrogen deposition rates account for 0.014 kg/ha/yr (or 0.1% of the lower Critical Load threshold for saltmarsh habitat). It is considered that the impact of the Project construction phase emissions at this same location is likely to be negligible, given the distance between the development work areas.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Operation:</p> <p>The air quality dispersion modelling assessment that supported ID25's ES describes that annual mean NO₂ impacts from its non-road sources account for 0.04% of the air quality objective at the worst affected location. ID25's worst-case road traffic emissions impacts account for 1.5% of the air quality objective value, although this occurs at a different location to that worst affected by non-road sources. Given the negligible Project and IERRT NO₂ impacts reported in Chapter 6: Air Quality [TR030008/APP/6.2] of the ES at all locations modelled, it is considered that the potential for cumulative effects at human health sensitive receptors is limited.</p> <p>At the worst-impacted nature conservation site within the SAC from ID25's emissions, annual mean NO_x impacts account for 0.3% of the Critical Level and nitrogen deposition rates account for 0.014 kg/ha/yr (or 0.1% of the lower Critical Load threshold for saltmarsh habitat). It is not clear where this impact occurs within the SAC. If it is assumed that this impact occurs at the closest section of saltmarsh to ID25's site, the shared receptor would be receptor O_E6, which is predicted to experience a Project and IERRT impact of 1% of the Critical Level for annual mean NO_x and 0.4% of the nitrogen deposition Critical Load for saltmarsh (assuming IGET vessels comply with Tier II emission standards). The combined impact with the cumulative development is 1% or less of the relevant air quality standards.</p>		
27 - EN010038	<p>Construction:</p> <p>The air quality dispersion modelling assessment that supported ID27's ES (WSP, 2020) describes worst-case annual mean NO₂ impacts that account for 3.1% of the air quality objective at the worst affected location. Review of the contour plot provided in that report suggests worst-case human health impacts occur at isolated properties close to the cumulative source. Such locations are over 6 km away from the Project and they will likely experience negligible impacts from the Project construction phase sources. Cumulative source impacts at locations worst affected by the Project's</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>construction phase emissions account for less than 0.1% of the air quality standard, based on the same contour plot.</p> <p>At the worst-impacted saltmarsh habitat site within the SAC, from the worst-case ID27 emissions, annual mean NO_x impacts account for 4% of the Critical Level and nitrogen deposition rates account for 1.8% of the current lower Critical Load threshold for saltmarsh habitat and 0.9% of the upper threshold. At the saltmarsh habitat within the North Killingholme Haven Pits SSSI, the worst-case ID27 impacts account for 1.8% of the Critical Level for NO_x and 0.2% of the lower Critical Load threshold for nitrogen deposition. It is considered that the impact of the Project construction phase emissions at these same locations is likely to be negligible, given the distance between the development work areas.</p> <p>Operation:</p> <p>ID27's worst-case annual mean NO₂ impacts account for 3.1% of the air quality objective at the worst affected location. These impacts occur at isolated properties close to ID27, at locations over 6km away from the Project. They will experience negligible impacts from operational Project emission sources. The location of maximum cumulative impact is likely to occur in the town of Immingham, where the combined impact of both the cumulative development and the Project will account for less than 1% of the air quality objective.</p> <p>The worst-case cumulative development emissions have annual mean NO_x impacts of around 4% of the Critical Level and nitrogen deposition rates of around 1.8% of the current lower Critical Load threshold for saltmarsh habitat (0.9% of the upper threshold). At the saltmarsh habitat within the North Killingholme Haven Pits SSSI, the worst-case cumulative development impacts account for 1.8% of the Critical Level for NO_x and 0.2% of the lower Critical Load threshold for nitrogen deposition (0.1% of the upper threshold). The Project and IERRT emissions predicted closest to ID27's worst-case impacts are represented by receptor O_E12, where impacts assuming all vessels associated with the Project are MARPOL Regulation 13 Tier II compliant account for 0.4% of the Critical Level for NO_x and 0.2% of the lower Critical Load</p>		

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	range for nitrogen deposition. At the SSSI, the Project and IERRT impacts account for 0.3% of the Critical Level for NO _x and 0.1% of the lower Critical Load threshold for nitrogen deposition, assuming Tier II emission standards.		
28 - EN070006	<p>Construction:</p> <p>Impacts associated with ID28 relate to those from its construction phase traffic movements. Given the location of ID28's site boundary and the likely route of its construction traffic, cumulative impacts are only likely to occur to the west and northwest of Immingham, where the Project impacts during the construction phase will be negligible.</p> <p>Operation:</p> <p>Impacts associated with ID28 relate to those from its construction phase traffic movements. Given the location of ID28's site boundary and the likely route of its construction traffic, cumulative impacts are only likely to occur to the west and northwest of Immingham, where the Project impacts during the operational phase will be negligible.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse
29 - EN070008	<p>Construction:</p> <p>Impacts associated with ID29 relate of its construction phase traffic emissions. The assessment of the Project construction phase traffic impacts is inherently cumulative and includes flows associated with major committed developments in the area.</p> <p>The Project does not contribute road traffic emissions to any road link with a nationally or internationally designated site within 200m.</p> <p>Operation:</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Neutral/ Negligible adverse

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Impacts associated with ID29 relate of its construction phase traffic emissions. The assessment of the Project operational phase traffic impacts is inherently cumulative and includes flows associated with major committed developments in the area.</p> <p>The Project does not contribute road traffic emissions to any road link with a nationally or internationally designated site within 200m.</p>		
<p>35 - DM/0329/18/FUL</p>	<p>Construction:</p> <p>Impacts associated with ID25 relate to those from its energy from waste plant stack and HDV emissions from the delivery of waste to the site.</p> <p>The air quality assessment that supported the ES for ID35 (Great Coates Energy Ltd, 2018) reports a maximum offsite annual mean NO₂ impact of 2% of the air quality objective. Cumulative development Impacts near to the Project at Immingham (similar to IGET receptor C_R1), account for 0.01% of the air quality objective. The Project construction impacts at this location account for less than 1% of the annual mean NO₂ air quality objective, with total concentrations being well below the air quality objective.</p> <p>At the saltmarsh habitat to the north of ID35 site, cumulative development impacts account for 4% of the Critical Level for NO_x and 3.6% of the lower Critical Load threshold for nitrogen deposition (1.8% of the upper Critical Load threshold).</p> <p>Given the distance between ID35 and the Project, the fact that the Project construction emissions will impact close to source and the fact that the Project's key receptors are not located downwind of ID35, the risk of cumulative impacts with this are considered low.</p> <p>Operation:</p> <p>The air quality assessment that supported the ES for ID35 (Great Coates Energy Ltd, 2018) reports and maximum offsite annual mean NO₂ impact of 2% of the air quality objective. ID35 Impacts near to the Project at Immingham (similar to the Project</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>receptor O_R1) account for 0.01% of the air quality objective. The Project and IERRT operational impacts at this location account for 1.4% of the annual mean NO₂ air quality objective (assuming the Project vessels comply with MARPOL Regulation 13 Tier II emission standards), with total concentrations being well below the air quality objective.</p> <p>At the saltmarsh habitat to the north of the cumulative development site (similar to the Project receptor O_E5), cumulative development impacts account for 4% of the Critical Level for NO_x and 3.6% of the lower Critical Load threshold for nitrogen deposition (1.8% of the upper Critical Load threshold). The Project and IERRT impacts at the same location account for 1.1% of the Critical Level for NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming the Project vessels all comply with Tier II emission standards. Based on the Project vessels complying with Tier III standards, The Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p>		
37 - DM/1070/18/FUL	<p>Construction:</p> <p>Impacts associated with ID37 relate to those from its energy centre plant stack emissions.</p> <p>The air quality assessment that supported the ES for ID37 (EP SHB Limited, 2018) reports a worst-case receptor annual mean NO₂ impact of 2% of the air quality objective. ID37 impacts near to the Project at Immingham account for 0.6% of the objective. At these locations, the Project construction phase impacts are anticipated to be negligible, due to the distance between the Project emission sources and these cumulative receptors.</p> <p>At the saltmarsh habitat to the north of ID37site, ID37 impacts account for 2.5% of the Critical Level for NO_x and 4% of the lower Critical Load threshold for nitrogen</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]	Negligible (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>deposition (2% of the upper Critical Load threshold). Given the distance between the larger ID37 impacts and the Project, the fact that the project construction emissions will impact close to source and the fact that the Project's key receptors are not located downwind of ID37, the risk of cumulative impacts with this project being anything more than negligible are considered low.</p> <p>Operation:</p> <p>Impacts associated with ID37 relate to those from its energy centre plant stack emissions.</p> <p>The air quality assessment that supported the ES for ID37 reports a worst-case receptor annual mean NO₂ impact of 2% of the air quality objective. ID37 Impacts near to the Project at Immingham account for 0.6% of the objective. The Project and IERRT operational impacts that represent these locations account for 1.4% (O_R1) and 0.8% (O_R7) of the annual mean NO₂ air quality objectives respectively (assuming the Project vessels comply with MARPOL Regulation 13 Tier II emission standards), with total concentrations being well below the air quality objective.</p> <p>At the saltmarsh habitat to the north of ID37 site, ID37 impacts account for 2.5% of the Critical Level for NO_x and 4% of the lower Critical Load threshold for nitrogen deposition (2% of the upper Critical Load threshold). The Project and IERRT impacts at the same location account for 1.1% of the Critical Level for NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming the Project vessels all comply with Tier II emission standards. Based on the Project vessels complying with Tier III standards, The Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p>		

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
41 - DM/0728/18/OUT	<p>Construction:</p> <p>Impacts associated with ID41 are described in the air quality assessment that supported the development's planning application (BWB Consulting, 2017) and concern construction phase and operational phase road traffic emissions.</p> <p>The construction phase air quality assessment for the Project was inherently cumulative, as it included traffic flows associated with all major committed and reasonably foreseeable developments in the area. At shared receptors. ID41 estimated annual mean NO₂ impacts of up to 1% of the air quality objective on Kings Road. For the Project predicts impacts of <0.1% of the objective at a representative location (C_R4). Given that total annual mean NO₂ concentrations are so far below the air quality objective value the locations of cumulative impacts, the effect of these impacts is negligible.</p> <p>ID41's air quality assessment does not consider air quality impacts at any nature conservation site, presumably because traffic emissions impacts associated with that development do not pass within 200 m of a nationally or internationally designated habitat.</p> <p>Operation:</p> <p>Impacts associated with ID41 are described in the air quality assessment that supported the development's planning application (BWB Consulting, 2017) and concern construction phase and operational phase road traffic emissions.</p> <p>The operational phase air quality assessment for the Project was inherently cumulative, as it included traffic flows associated with all major committed and reasonably foreseeable developments in the area. At shared receptors. ID41 estimated annual mean NO₂ impacts of up to 1% of the air quality objective on Kings Road. The operation of the Project and IERRT have impacts of 1.4% of the objective at a representative location (O_R1). Given that total annual mean NO₂ concentrations</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>are so far below the air quality objective value the locations of cumulative impacts, the effect of these impacts is negligible.</p> <p>ID41's air quality assessment does not consider air quality impacts at any nature conservation site, presumably because traffic emissions impacts associated with that development do not pass within 200m of a nationally or internationally designated habitat.</p>		
94 – MLA/2020/00520	<p>Construction:</p> <p>During the construction of ID94, impacts from emissions to air will be limited at human health sensitive locations impacted upon by the construction of the Project. This is because of the limited scale of the ID94 and the distance between it and any shared receptors.</p> <p>There is the potential for ID94 emissions to impact on the nearest area of saltmarsh habitat, close to the west of that development, although it is envisaged that sources of ID94 construction phase emissions will be limited in number and of a limited duration.</p> <p>The operation of ID94 will move the location of some existing emission sources closer to the nearest saltmarsh habitat. There is the potential that ID94 will worsen air quality at that specific location. However, construction phase emissions associated with the Project are anticipated to be negligible at this location, which is over 3km away from the site.</p> <p>Operation:</p> <p>The construction and operation of ID94 during the operation of the Project will have no more than a negligible effect on human health sensitive receptors effected by the Project.</p> <p>The construction and operation of the cumulative development during the operation of the Project will likely cause some cumulative effect at the nearby saltmarsh habitat, which is represented in the Project assessment as receptor (O_E6). At this location,</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>the Project and IERRT emissions account for 1% of the Critical Level for annual mean NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming The Project vessels all comply with Tier II emission standards. Based on IGET vessels complying with Tier III standards, the Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p>		
<p>95 – PA/2018/918</p>	<p>Construction:</p> <p>Impacts from ID95 are set out in the air quality assessment that supported its ES (VPI Immingham B Ltd, 2019), and concern emissions from the operation of an OCGT plant.</p> <p>During ID95’s construction phase, it has impacts on annual mean NO₂ of up to 0.25% of the air quality objective. These all occur at location distant from the Project impacts and the cumulative effect during the construction of the cumulative development is negligible. During ID95’s operation, it has annual mean NO₂ impacts of up to 0.3% of the air quality objective. Again, these occur at locations distant from the Project impacts and the cumulative effect during the operation of ID95 is negligible.</p> <p>During ID95’s construction phase, it has impacts on annual mean NO_x of less than 0.1% of the Critical Level at an area that represents the nearest and worst-affected section of saltmarsh habitat (represented in the Project air quality assessment as receptor O_E6). During ID95’s operation, the same saltmarsh habitat experiences an impact of 0.5% of the Critical Level for NO_x and <0.1% of the Critical Load for nitrogen deposition.</p> <p>Given the distance between the saltmarsh habitat most affected by ID95 impacts and the Project, the limited impact of ID95 and the fact that the Project construction emissions will impact close to source, the risk of cumulative impacts with this project being anything more than negligible are considered low.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Operation:</p> <p>During ID95's construction phase, it has impacts on annual mean NO₂ of up to 0.25% of the air quality objective. These all occur at location distant from the Project impacts and the cumulative effect, should the construction of ID95 coincide with the operation of the Project, is negligible. During ID95's operation, it has annual mean NO₂ impacts of up to 0.3% of the air quality objective. Again, these occur at locations distant from the Project impacts and the cumulative effect should the operation of the cumulative development coincide with the operation of the Project, is negligible.</p> <p>During ID95's construction phase, it has impacts on annual mean NO_x of less than 0.1% of the Critical Level at an area that represents the nearest and worst-affected section of saltmarsh habitat (represented in the Project's air quality assessment as receptor O_E6). At this location, operational Project and IERRT emissions have an impact that is 1% of the Critical Level for NO_x (assuming IGET vessels are MARPOL Regulation 13 Tier II compliant). Assuming vessels are Tier III compliant, the Project and IERRT have emissions have an impact that is 0.5% of the Critical Level.</p> <p>During Id95's operation, the same saltmarsh habitat experiences an impact of 0.5% of the Critical Level for NO_x and <0.1% of the Critical Load for nitrogen deposition. At this location, operational Project and IERRT emissions have an impact that is 1% of the Critical Level for NO_x and 0.4% of the Critical Load for nitrogen deposition (assuming the Project vessels are MARPOL Regulation 13 Tier II compliant). Assuming vessels are Tier III compliant, the Project and IERRT have emissions have an impact that is 0.5% of the Critical Leve and 0.3% of the Critical Load.</p>		
102 – DM/1071/22/FUL	<p>Construction:</p> <p>Details on ID102 have been taken from the ES that supported its planning application (Environment Agency, 2022). During the construction of ID102, emissions to air will be limited to a small number of site plant in operation at any one time and deliveries of construction materials via HGV. HGV trips on roads local to ID102 site peak at 106</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter	Negligible (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>per day for a two-month period of the works but average out at 47 trips per day over the peak year of the cumulative development's construction.</p> <p>HGV emissions associated with ID102 will contribute to cumulative impacts at the Project receptors located on Queens Road (C_R1 to C_R4). However, such a low number of annual daily average trips will mean that the cumulative contribution is limited. Given that the Project construction phase impacts at this location is also limited and total annual mean NO₂ concentrations are well below the air quality objective, the cumulative effect is negligible.</p> <p>With regards to cumulative effects at the nature conservation receptors, ID102 emissions from site plant will occur near some saltmarsh habitat considered as sensitive to air quality impacts, albeit for a limited period of time. However, given the distance from this area of saltmarsh to the Project site, contribution from the Project emissions sources during its construction phase is anticipated to be minimal.</p> <p>Operation:</p> <p>The limited number of site plant and construction phase vehicle movements and their routing (avoiding Kings Road) would mean that the construction of ID102 alongside the operation of the Project would have a negligible cumulative effect on human health sensitive receptors.</p> <p>At the nature conservation sensitive saltmarsh habitat potentially impact on by ID102 and the Project and IERRT Project, ID102 will have some impact from site plant emissions, although such emissions will only be present for a limited period. Operational Project and IERRT impacts at this location (receptor O_E5) account for 1.1% of the annual mean Critical Load for NO_x and 0.4% of the lower Critical Load threshold of nitrogen deposition (0.2% of the upper Critical Load threshold), assuming MARPOL Regulation 13 Tier II emission limits. With Tier III emission limits, the Project and IERRT impacts account for 0.5% and 0.3% of the Critical Level and Lower Critical Load threshold respectively (0.15% of the upper Critical Load threshold).</p>	<p>6: Air Quality [TR030008/APP/6.2]</p>	

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
113 – DM/0304/23/SC O	<p>Construction:</p> <p>During the construction and operation of ID113, emissions to air are anticipated to be very limited. There is the potential for some limited site emissions during construction and the potential for some offsite emissions associated with deliveries by HGV. However, given the scale of ID113’s proposal, these are not anticipated to be capable of contributing anything other than a negligible cumulative effect during the Project’s construction phase.</p> <p>Operation:</p> <p>Again, given the scale of ID113’s proposal, impacts associated with it are not anticipated to be capable of contributing anything other than a negligible cumulative effect during the Project’s operational phase.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>
114 – PA/SCO/2023/1	<p>Construction:</p> <p>During the construction and operation of ID114, emissions to air are anticipated to be very limited. There is the potential for some limited site emissions during construction and the potential for some offsite emissions associated with deliveries by HGV. However, given the scale of ID114’s proposal, these are not anticipated to be capable of contributing anything other than a negligible cumulative effect during the Project’s construction phase.</p> <p>Operation:</p> <p>Again, given the scale of the ID114’s proposal, impacts associated with it are not anticipated to be capable of contributing anything other than a negligible cumulative effect during the Project’s operational phase.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>
115 –	<p>Construction:</p>	<p>No additional mitigation required beyond the embedded and standard</p>	<p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>ID115 is the continuation of dredging the Sunk Channel in the Humber Estuary. This activity is already undertaken in the baseline and associated cumulative emissions accounted for in the baseline dataset used to inform the air quality assessment for the Project. Where ID115 impacts occur close to air quality sensitive receptors, the number of emissions sources will be limited as will the period in which emissions occur, to the extent that a significant cumulative effect is unlikely.</p> <p>Operation:</p> <p>ID115 is the continuation of dredging the Sunk Channel in the Humber Estuary. This activity is already undertaken in the baseline and associated cumulative emissions accounted for in the baseline dataset used to inform the air quality assessment for the Project. Where ID115 impacts occur close to air quality sensitive receptors, the number of emissions sources will be limited as will the period in which emissions occur, to the extent that a significant cumulative effect is unlikely.</p>	<p>measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	
<p>116 – DM/0664/19/FUL</p>	<p>Construction:</p> <p>The construction of ID116 has limited potential to generate emissions that could contribute significant effects at shared receptors with the Project’s construction, due to the distance between ID116’s site and the nearest air quality sensitive receptors.</p> <p>The operation of ID116 has been assessed in the air quality assessment that accompanied the planning application (Air Quality Consultants, 2020). At human health sensitive receptors in Immingham, an annual mean NO₂ impact that account for less than 0.1% of the air quality objective. Cumulative effects at such locations are therefore limited.</p> <p>ID116’s air quality assessment only provides a location of maximum impact within the Humber Estuary SAC, and not an impact specific to any habitat. It reports an annual mean NO_x impact of 1% of the Critical Level and nitrogen deposition rate that is 0.56% of the current lower Critical Load threshold for that habitat type (or 0.28% of the upper Critical Load threshold). Due to the distance between the shared saltmarsh</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>habitat closest to both the ID116 site and the Project, cumulative effects will be limited.</p> <p>Operation:</p> <p>The construction of ID116 has limited potential to generate emissions that could contribute significant effects at shared receptors with the Project's operation, due to the distance between the ID116 site and the nearest air quality sensitive receptors.</p> <p>The operation of ID116 has been assessed in the air quality assessment that accompanied the planning application (Air Quality Consultants, 2020). At human health sensitive receptors in Immingham, an annual mean NO₂ impact that account for less than 0.1% of the air quality objective. Cumulative effects at such locations are therefore limited.</p> <p>ID116's air quality assessment only provides a location of maximum impact within the Humber Estuary SAC, and not an impact specific to any habitat. It reports an annual mean NO_x impact of 1% of the Critical Level and a nitrogen deposition rate that is 0.6% of the current lower Critical Load threshold for that habitat type (or 0.3% of the upper Critical Load threshold). The closest area of saltmarsh to ID116 is represented in the Project air quality assessment as receptor O_E5, where impacts account for 1.1% of the annual mean Critical Load for NO_x and 0.4% of the lower Critical Load threshold of nitrogen deposition (0.2% of the upper Critical Load threshold), assuming MARPOL Regulation 13 Tier II emission limits. With Tier III emission limits, the Project and IERRT impacts account for 0.5% and 0.3% of the Critical Level and Lower Critical Load threshold respectively (0.15% of the upper Critical Load threshold).</p>		
117 - PA/SCO/2022/7	<p>Construction:</p> <p>ID117 has the potential to generate construction dust emissions, site plant emissions and construction traffic emissions that could have a cumulative impact on shared receptors located close to the ID117 site. During the construction phase of the</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter	Negligible (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Project, cumulative effects will be limited, due to the distance between the Project emission sources and the shared receptors.</p> <p>Operation:</p> <p>During the operation of the Project, ID117 has the potential to impact on the saltmarsh habitat represented by receptor O_E6. At this location, operational Project and IERRT emissions have an impact that is 1% of the Critical Level for NO_x and 0.4% of the Critical Load for nitrogen deposition (assuming the Project vessels are MARPOL Regulation 13 Tier II compliant). Assuming vessels are Tier III compliant, the Project and IERRT have emissions have an impact that is 0.5% of the Critical Level and 0.3% of the Critical Load.</p> <p>ID117 works being proposed are located 550m away from the saltmarsh habitat at their nearest point. Construction site emissions are released from sources close to ground level and ID117 impacts are most likely to effect locations with 200m of the ID117 site boundary.</p>	<p>6: Air Quality [TR030008/APP/6.2]</p>	

Conclusion

- 1.3.24 With regards to human health sensitive receptors, the scoped-in shortlisted developments do increase the overall total annual mean NO₂ concentrations likely to be experienced by receptors affected by the Project, but not to the extent that they put the air quality objective at risk of an exceedance. Annual mean concentrations of NO₂ (and other pollutants relevant to harm to human health) will remain well below the air quality objective with the Project, IERRT and all other cumulative developments listed under construction or in operation. As such the cumulative impact is deemed to be **Negligible Adverse**.
- 1.3.25 With regards to nature conservation receptors, the residual cumulative effect of the cumulative impacts described above is reported in the Nature Conservation (Marine Ecology) assessment of cumulative effects section. To inform that discussion on cumulative effects, the review of cumulative impacts reported in **Table 3** demonstrates that there are three key locations where cumulative impacts will occur. These are summarised as follows.
- 1.3.26 Saltmarsh habitat represented by the Project's receptors O_E1 and O_E2, located on the northern shore of the Humber Estuary and downwind of the Project, IERRT (ID22), North Beck Energy Centre (ID18) and energy generation plant sites (ID9, ID10, ID16 and ID17) emissions sources. Should all IGET vessels comply with MARPOL NO_x Tier II emission limits, the combined annual mean NO_x impact accounts for around 3% of the Critical Level, at a location where total concentrations remain well below that Critical Level. Combined nitrogen deposition impacts account for around 3% of the lower Critical Load threshold and 1% of the upper Critical Load threshold, at a location where the background contribution accounts for more than 99% of the total deposition rate. Should all Project vessels comply with MARPOL NO_x Tier III emission limits, the combined annual mean NO_x impact accounts for around 3% of the Critical Level, and combined nitrogen deposition impacts account for around 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold.
- 1.3.27 Saltmarsh habitat represented by the Project receptor O_E5, located north of Great Coates Energy Centre (ID38) and east of South Humber Bank Energy Centre (ID37) and the sustainable transport fuels facility (ID116) emission sources. Should all IGET vessels comply with MARPOL NO_x Tier II emission limits, the combined annual mean NO_x impact accounts for around 9% of the Critical Level, at a location where total concentrations remain well below that Critical Level. Combined nitrogen deposition impacts account for around 9% of the lower Critical Load threshold and 4% of the upper Critical Load threshold, at a location where the background contribution accounts for more than 99% of the total deposition rate. Should all Project vessels comply with MARPOL NO_x Tier III emission limits, the combined annual mean NO_x impact accounts for around 8% of the Critical Level, and combined nitrogen deposition impacts account for around 8% of the lower Critical Load threshold and 4% of the upper Critical Load threshold.

- 1.3.28 Saltmarsh habitat represented by the Project receptor O_E6, located closest to the Able Marine Energy Park (ID25), the Humber International Terminal berth 2 adaptation (ID94), VPI OCGT Plant (ID95) and the Able Humber Ports Enabling Works (ID:11). Should all IGET vessels comply with MARPOL NO_x Tier II emission limits, the combined annual mean NO_x impact accounts for around 6% of the Critical Level, at a location where total concentrations remain well below that Critical Level. Combined nitrogen deposition impacts account for around 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold, at a location where the background contribution accounts for more than 99% of the total deposition rate. Should all IGET vessels comply with MARPOL NO_x Tier III emission limits, the combined annual mean NO_x impact accounts for around 5% of the Critical Level, and combined nitrogen deposition impacts account for around 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold.
- 1.3.29 In conclusion, cumulative air quality effects would be of the same level of significance as the effects from the Project alone both during construction and operation, therefore there will be no residual cumulative effects as a result of the Project and Proposed Developments presented in Table 3. The significance of the cumulative effect on nature conservation receptors is described in the Nature Conservation (Marine Ecology) assessment of cumulative effects section of this appendix.

1.4 Noise and Vibration Cumulative Effects

- 1.4.1 **Table 4** summarises how each of the scoped-in developments included in the short list (**Table 1**) has been considered with regards to potential cumulative noise and vibration effects during construction and operation. A total of 11 developments were scoped-in to the assessment of construction and operational cumulative noise and vibration effects.
- 1.4.2 The locations of noise sensitive receptors (“NSRs”) referred to in **Table 4** are shown on **Figure 7.1** of the ES [TR030008/APP/6.3]. NSRs 1 and 2 are not included in the cumulative operational assessment as these properties are proposed to be acquired prior to the operation of the Project and the residential uses to have ceased.

Cumulative Effects during construction

- 1.4.3 Construction noise was determined for the shortlisted developments with and without the Project at each of the NSRs. The cumulative assessment was based on the worst-case assumption that the construction phase producing the highest construction noise levels for each development would occur simultaneously, though in practice this is unlikely to occur for prolonged periods, if at all. Cumulative construction road traffic noise effects have already been included within the road traffic noise assessment reported in **Chapter 7: Noise and Vibration** of this ES [TR030008/APP/6.2].

Cumulative Effects during operation

- 1.4.4 The assessment of cumulative effects of operational noise from the Project, together with the predicted noise levels presented in the noise assessment submitted with development applications for the other scoped in, shortlisted developments is identified in **Table 4**.
- 1.4.5 The assessment presented is a worst-case scenario based on all of the scoped in, shortlisted developments operating during the night-time period when ambient sound levels are lower and there are likely to be greater impacts on residential NSRs. Additionally, the highest of the operational noise levels predicted have been chosen for each development. This assessment assumes that all of the shortlisted developments are completed and operational. Furthermore, as not all of the other developments included are consented yet so are not certain to go ahead, the outcome of the assessment presents a potentially exaggerated worst case, as it assumes that all shortlisted schemes are operational.
- 1.4.6 Cumulative operational road traffic noise effects have already been included in the road traffic noise assessment reported in **Chapter 7: Noise and Vibration** of this ES [TR030008/APP/6.2].

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

- 1.4.7 The construction and operational phases of IERRT and the Project will use Kings Road and Queens Road for HGV access. There is the potential for the two projects to act cumulatively in respect of noise and vibration given this common access route for HGVs as well as other noise impacts arising on the Project's West Site as a result of construction works.
- 1.4.8 Should IERRT be consented, background sound levels may be influenced by an increase in road traffic on Queens Road and the A1173, and to a lesser extent by distant activities related to loading and unloading of sea vessels and use of new parking/waiting areas within the existing port area.
- 1.4.9 It is considered unlikely that significant cumulative effects from the Project and IERRT would occur on the northern facades of the properties facing Queens Road if either the construction phases or the Project construction phase and IERRT operational phases coincided. This is because the Project traffic passing the Queens Road properties is expected to result in minor or negligible adverse (not significant) effects, and both construction and operation noise effects from the IERRT site are expected to be minor adverse or less (not significant). It is understood that, for the purpose of the noise and vibration assessment for the IERRT project, the offer of noise insulation is considered to be accepted by all affected residential Noise Sensitive Receptors along Queens Road. It is also considered that the cumulative effects of noise from traffic using Queens Road, if operation of IERRT coincided with construction of the Project, remains at minor adverse or less (not significant), given the proposed installation of an appropriate package of noise insulation to the northern facades of the properties associated with the IERRT proposals. There would be no cumulative effects once the Project is operational as the residential use for the properties on Queens Road would need to cease for the hydrogen production facility to become operational, given

the requirements of the Control of Major Accident Hazards (“COMAH”) regulations.

- 1.4.10 However, there is the potential for cumulative effects of noise from IERRT operational traffic on Queens Road impacting the northern façade of these properties (albeit reduced due to the package of sound insulation to be provided in association with the IERRT proposals) whilst construction of the Project on the West Site (Work Area No. 7) could impact the southern (rear) facades of the same properties. Therefore, there is the potential for cumulative effects during construction of this Project. However, with the additional construction mitigation proposed for this Project, the residual construction effects are predicted to be minor adverse (not significant). Therefore, minor adverse effects are predicted for both north facades of Queens Road properties (from IERRT operational road traffic noise) and on the southern façade from construction phase of this Project.
- 1.4.11 The Applicant is currently in discussions with the landowners/occupiers of the relevant residential properties with a view to negotiating their acquisition. Where it is not possible to acquire those properties through negotiation, acquisition powers for these properties are sought through the (DCO). In the event of acquisition of the properties and cessation of residential occupation for the Project ahead of the construction commencing, an adverse effect on those properties (as assessed in this chapter) would not arise.

Table 4: Noise and Vibration Cumulative Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
1 - DM/1145/19/FUL	<p>Construction:</p> <p>The significance of cumulative construction noise effects at NSRs is likely to be the same as that from the Project alone, due to the distance to the NSRs and compliance with BS 5228 for construction noise.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project as ID1 is not expected to result in any noticeable noise emissions during the operational phase.</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction:</p> <p>NSR 1 and 2 Minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>
5 - DM/0968/19/FUL	<p>Construction:</p> <p>The significance of cumulative construction (restoration) noise effects at NSRs is likely to be the same as that from the Project due to the distance to the NSRs and compliance with BS 5228 for construction noise.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID 5 is not expected to result in any significant noise effects during the operational phase.</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
<p>9 - DM/0865/19/FUL</p>	<p>Construction: There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID9 and the Project, and provided each scheme complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation: The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID9 predicted operational noise levels are at least 10 dB less than the Project at NSR 4.</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction: NSR 1 and 2 potentially up to minor adverse (not significant) NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation: NSR 3 and NSR 4 Minor Adverse (not significant)</p>
<p>10 - DM/0864/19/FUL</p>	<p>Construction: There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID10 and the Project, and provided ID10 and the Project comply with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation: The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID 10 predicted</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction: NSR 1 and 2 potentially up to minor adverse (not significant) NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation: NSR 3 and NSR 4 Minor Adverse (not significant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	operational noise levels are at least 10 dB less than the Project at NSR 4.		
13 - DM/0628/18/FUL	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of Id13 and the Project, and provided each scheme complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID13 predicted operational noise levels are at least 9 dB less than the Project at NSR 4.</p>	No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>
16 - DM/0862/19/FUL	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID16 and the Project, and provided each scheme complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors as result of both developments.</p>	No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation:</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project alone, as ID 16 predicted operational noise levels are at least 10 dB less than the Project at NSR 4.</p>		NSR 3 and NSR 4 Minor Adverse (not significant)
17 - DM/0863/19/FUL	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID17 and the Project, and provided each scheme complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID16 predicted operational noise levels are at least 10 dB less than the Project at NSR 4.</p>	No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>
18 - DM/0026/18/FUL	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID18 and the Project, and provided both ID18 and the Project complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that</p>	No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project, as ID 18 predicted operational noise levels are at least 10 dB less than the Project at NSR 4.</p>		<p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>
22 - TR030007	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works for NSRs 1 and 2. However provided both ID22 and the Project complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Project.</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction:</p> <p>NSR 1 and 2 Minor Adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>
113 and 114 DM/0304/23/SCO and PA/SCO/2023/1	<p>Construction:</p> <p>There is the potential for some cumulative noise effects if there are simultaneous construction works. However, given the generally localised nature of noise effects associated with the construction of ID113 and 114 and the Project, and provided both ID113 and 114 and the Project complies with any assigned noise and vibration limits and follows the general guidance contained within BS 5228-1 with respect to noise mitigation, it is</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction:</p> <p>NSR 1 and 2 potentially up to minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible minor adverse (not significant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>considered unlikely that significant cumulative construction noise effects will occur at nearby receptors.</p> <p>Operation:</p> <p>The significance of cumulative operational noise effects at NSRs remain the same as for the Proposed Development, as ID 113 and 114 predicted initial operational noise contours are at least 10 dB less than the Proposed Development at NSR 3 and 4.</p>		<p>Operation:</p> <p>NSR 3 and 4 Minor Adverse (not significant)</p>
<p>115 MLA/2014/00431/4</p>	<p>There is the potential for cumulative effects on NSRs if the dredging activities associated with ID 115 occur at the same time as construction and maintenance dredging as part of Project.</p> <p>The noise associated with ID 115 is likely to be similar to the dredging operations for the Project and will be limited due the intermittent operation over the course of a year. It is also considered likely that the availability of dredging plant (servicing the ports and approaches across the wider Humber, including Goole, Hull and Grimsby) will mean the potential for dredging to be taking place at adjacent locations and at the same time is limited.</p> <p>It is considered unlikely that a significant cumulative effect will occur due to the 'not significant' effect of the Project on NSRs and the limited noise associated with ID 115.</p>	<p>No additional mitigation proposed other than the mitigation committed to in Chapter 7: Noise and Vibration [TR030008/APP/6.2]</p>	<p>Construction:</p> <p>NSR 1 and 2 minor adverse (not significant)</p> <p>NSR 3 and 4 – Negligible/ Minor adverse (not significant)</p> <p>Operation:</p> <p>NSR 3 and NSR 4 Minor Adverse (not significant)</p>

Conclusion

1.4.12 In conclusion, cumulative noise and vibration effects would be of the same level of significance as the effects from the Project alone both during construction and operation, therefore there will be no residual cumulative effects as a result of the Project and Proposed Developments presented in **Table 4**.

1.5 Nature Conservation (Terrestrial Ecology) Cumulative Effects

1.5.1 The ecological impact assessment did not identify any impacts on terrestrial ecology receptors that could occur beyond the Project Site Boundary. There is therefore no potential for construction or operation of the Project to give rise to any cumulative effects on terrestrial ecology receptors with any of the other developments identified within the short list (**Table 1**).

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

1.5.2 Any impacts to terrestrial habitats or species are predicted to be spatially limited for both the Project and IERRT. The Project will not interact cumulatively with IERRT in respect of these issues and potentially significant cumulative effects are not anticipated.

1.6 Nature Conservation (Marine Ecology) Cumulative Effects

1.6.1 There is potential for cumulative effects on marine ecology receptors due to habitat loss, habitat change (including as a result of air quality), water quality and underwater noise.

1.6.2 **Table 5** summarises how each of the scoped-in developments included in the short list (**Table 1**) has been considered with regard to potential cumulative marine ecology effects during construction and operation. Twenty-six developments were scoped-in to the assessment of construction cumulative marine ecology effects.

Cumulative Effects during construction

1.6.3 There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology during construction:

- a. Loss of marine habitats (intertidal and subtidal).
- b. Change to marine habitats due to seabed disturbance.
- c. Water quality changes.
- d. Potential air quality effects on intertidal habitats.
- e. Underwater noise.

Cumulative Effects during operation

1.6.4 There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology during construction:

- a. Change to marine habitats due to maintenance dredging.

- b. Water quality changes due to maintenance dredging.
- c. Change to marine habitats due to air quality effects.
- d. Underwater noise.

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

Construction

- 1.6.5 There is the potential for cumulative effects to arise as a result of IERRT and the Project during construction with respect to the following pathways in relation to marine ecology:
- a. Intertidal habitat loss.
 - b. Subtidal habitat loss.
 - c. Change to marine habitats due to capital dredging.
 - d. Water quality changes due to capital dredging.
- 1.6.6 A worst case assessment has been assumed in that both IERRT and the Project's construction phases will overlap and that both operational phases will overlap.
- 1.6.7 It is anticipated that the IERRT project will result in the loss of 0.022 ha of intertidal habitat due to the following direct and indirect effects:
- a. Direct loss of 0.012 ha of intertidal habitat (0.006 ha due to marine piling and 0.006 which will become subtidal habitat as a result of the deepening).
 - b. Capital dredging and marine infrastructure will cause a potential indirect loss of intertidal (0.01 ha) due to erosion caused by changes in currents.
- 1.6.8 The Project will result in direct loss of 0.00158 ha (due to the marine piling) and a potential indirect loss of 0.03 ha (due to erosion as a result of the presence of the jetty causing changes in currents).
- 1.6.9 On this basis, the anticipated total loss of intertidal as a result of both projects is anticipated to be 0.054 ha.
- 1.6.10 The combined intertidal habitat loss represents approximately 0.000147 % the Humber Estuary SAC and approximately 0.000575 % of the 'mudflats and sandflats not covered by seawater at low tide' feature of the Humber Estuary SAC.
- 1.6.11 The predicted potential indirect intertidal losses for both projects (and direct loss due to capital dredging for IERRT), consist of very narrow strips on the lower shore around the sublittoral fringe. These losses are considered to be of a similar scale to that which can occur due to natural background changes in mudflat extent in the local region (e.g. due to seasonal patterns in accretion and erosion or following storm events). The direct losses of habitat due to marine piling for both projects will also be highly localised. These *de minimis* changes in mudflat extent are of a magnitude that will not change the overall structure or functioning of the nearby mudflats within the Port of Immingham area or more widely in the Humber Estuary.

Subtidal habitat loss

- 1.6.12 Marine piling will result in a direct loss of 0.027 ha and 0.051 ha of seabed habitat for IERRT and the Project respectively. This combined habitat loss represents approximately 0.000213 % of the Humber Estuary SAC.
- 1.6.13 The combined loss in subtidal habitat as a result of the piles is considered negligible in the context of the extent of the overall amount of similar marine habitats found locally in the Humber Estuary. All the species recorded were considered commonly occurring and not protected. Furthermore, faunal assemblage recorded during project specific benthic surveys for both projects are also considered characteristic of subtidal habitats found more widely in this section of the Humber Estuary. Localised losses of this magnitude are also not considered to adversely affect the overall functioning of subtidal habitats within this section of the Humber Estuary.

Change to marine habitats due to capital dredging

- 1.6.14 Capital dredging for the IERRT project will remove approximately 190,000m³ of material over a maximum area of approximately 70,000m² (with the capital dredge for the Project removing 4,000m³ of material over a maximum area of approximately 10,000m²). For both projects following dredging, it is considered likely that the dredge pocket would provide similar substrate for infaunal colonisation to that under pre-dredge conditions which would then be expected to be recolonised by a similar assemblage to baseline conditions.
- 1.6.15 In addition, sedimentation as a result of capital dredging for both projects is predicted to be highly localised and similar to background variability. Species recorded in both dredge footprint areas are considered tolerant to the predicted millimetric changes in deposition and therefore smothering effects as considered unlikely. In addition, the species recorded in the benthic invertebrate surveys are fast growing and/or have rapid reproductive rates which allow populations to fully re-establish in typically less than one to two years and for some species within a few months.

Water quality changes due to capital dredging

- 1.6.16 The resuspension of sediment as a result of seabed disturbance during piling and capital dredging will cause highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) which are considered unlikely to produce adverse effects in any species for both projects. On this basis and given that water quality effects on marine ecology receptors as part of both projects were assessed as insignificant to minor, cumulative effects are anticipated to be insignificant to minor adverse.

Underwater noise

- 1.6.17 Underwater noise generated during marine piling required as part of the IERRT project along with the Project have the potential to result in cumulative effects on fish (including diadromous migratory species) and marine mammal receptors in the Humber Estuary. Piling noise has the potential to cause injury effects in fish

and marine mammals within close proximity to the piling activity and behavioural responses over a wider area of the Humber Estuary for both projects. The same mitigation measures are proposed for both projects to help minimise potential adverse effects (i.e. soft start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is **minor adverse**.

Operation

Change to marine habitats due to maintenance dredging

- 1.6.18 For the IERRT project, regular maintenance dredging (i.e. occurring every 3-4 months) is anticipated to be restricted to a relatively small proportion of the total maintenance dredge area (i.e. focused around the finger pier piles and adjacent areas of the berth pockets and pontoons). The remainder of the area will only be required to be dredged much more periodically (frequency in these areas will be dictated by operational requirements but is anticipated to be approximately every 1-2 years or more). For IGET, maintenance dredging is expected to be to be very limited (if required at all). As a result, any dredging that is required will only be undertaken very periodically (frequency will be dictated by operational requirements but is anticipated there could be several years or more between maintenance dredge campaigns).
- 1.6.19 In both areas, a generally impoverished benthic community was recorded in the dredge footprint which is likely to reflect the existing high levels of physical disturbance in the area due to strong near bed tidal currents and sediment transport with infaunal populations anticipated to fully re-establish in between several months and 1-2 years. On this basis, given the expected frequency of dredging, a comparable macrofaunal community to pre dredge conditions would be expected occur over much of both the maintenance dredging footprints.

Changes in air quality affecting designated habitats

- 1.6.20 The cumulative impact of the Project alongside the IERRT project accounts for more than 1% of the Critical Level for NO_x at receptors O_E1 and OE_2, and around 1% of the Critical Level for NO_x at receptor O_E3. However, these impacts occur at locations where total NO_x concentration with the Project and IERRT project in operation account for no more than 53% of the Critical Level (i.e. the critical level would not be exceeded). The cumulative impact accounts for around 1% of the Critical Load for nitrogen deposition at receptors O_E1 and OE_2 and less than 1% at all others. The Critical Load for nitrogen deposition is already exceeded by the background contribution alone and the in-combination contribution accounts for just 0.9% of the total nitrogen deposition predicted at these locations. Critical Levels for SO₂ and NH₃ are similarly not exceeded under any of the modelled scenarios. Since the '1% of the critical load' threshold will not be exceeded, it can be concluded that under a MARPOL Tier III scenario the 'in combination' effect for all pollutants would be imperceptible and no adverse effect on integrity would arise.

- 1.6.21 The cumulative impact of the Project, with vessels complying with the MARPOL Tier II emissions standard, alongside the IERRT project, accounts for more than 1% of the Critical Level for NO_x at receptors O_E1 to OE_4, and around 1% of the Critical Level for NO_x at receptors O_E5 to O_E7. However, impacts of more than 1% occur at locations where total NO_x concentration with the Project and IERRT project in operation account for no more than 57% of the Critical Level (i.e. the critical level would not be exceeded). The in-combination impact accounts for around 2% of the Critical Load for nitrogen deposition at receptors O_E1 and OE_2, and less than 1% of the critical load at all others. The Critical Load for nitrogen deposition is already exceeded by the background contribution alone and the in-combination contribution accounts for 1.4% of the total nitrogen deposition rate predicted at these locations. Critical Levels for SO₂ and NH₃ are similarly not exceeded under any of the modelled scenarios. Therefore, the impact of the Project together with the IERRT project, on nitrogen deposition under a MARPOL Tier II emissions scenario is greater than 1% of the critical load (being approximately 2% of the critical load) at two receptor locations, and therefore needs further discussion.
- 1.6.22 At the worst affected nature conservation receptor (O_E12, which relates to saltmarsh habitat on the northern shore of the Estuary) (**Figure 6.3 in [TR030008/APP/6.2]**), the change in annual mean NH₃ and SO₂ can be screened as insignificant in line with Environment Agency guidance as the changes do not exceed 1% of the Critical Levels for NH₃ and SO₂. However, the annual mean NO_x concentration and annual N deposition rate cannot be screened as insignificant as it exceeds the 1% screening threshold.
- 1.6.23 For saltmarsh, APIS provides a Critical Load range of 10 - 20 kg/ha/yr and nitrogen inputs have been experimentally demonstrated to have an effect on overall species composition of saltmarsh. However, the Critical Loads on APIS are relatively generic for each habitat type and cover a wide range of deposition rates. They do not (and are not intended to) take other influences (to which the habitat on a given site may be exposed) into consideration.
- 1.6.24 Moreover, it is important to note from APIS that the experimental studies which underlie conclusions regarding the sensitivity of saltmarsh have ‘... neither used very realistic N doses nor input methods i.e. they have relied on a single large application more representative of agricultural discharge’, which is far in excess of anything that would be deposited from atmosphere. Therefore, APIS indicates that determining which part of the critical load range to use for saltmarsh requires expert judgment.
- 1.6.25 Generally, nitrogen inputs from the air are not as important to plants as nitrogen from other sources. Effects of nitrogen deposition from atmosphere are likely to be dominated by much greater impacts from marine or agricultural sources. This is reflected on APIS itself, which states regarding saltmarsh that ‘*Overall, N deposition [from atmosphere] is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs*’. Another mitigating factor is that the nature of intertidal saltmarsh in the Humber estuary means that there is daily flushing from tidal

incursion. This is likely to further reduce the role of nitrogen from atmosphere in controlling botanical composition.

- 1.6.26 The change in threshold values for critical loads in APIS has been informed by recent studies in Ireland and the Netherlands, and a collaboration under the Working Group on Effects (“WGE”) of the UNECE Convention on Long-Range Transboundary Air Pollution reported by the German Environment Agency (Ref 1-1). That research has shown that position of the saltmarsh in the tidal profile is relevant to which part of the critical load range is more appropriate. This is because the less the frequency or duration of inundation by seawater, the more important atmosphere becomes as a source of nitrogen. The APIS Site Relevant Critical Load for the Humber Estuary SAC states that the lowest part of the new critical load range for upper saltmarsh (10 kg N/ha/yr) is most appropriate to the ‘more densely vegetated upper marsh (e.g. EUNIS class MA223, MA224)’ with the highest part of the range being more appropriate for more frequently inundated marsh. Classes MA223 and MA224 are ‘*regularly but not daily flooded by seawater*’ with a figure cited of 100-200 days/year¹.
- 1.6.27 There is therefore good reason to conclude that the upper part (20 kg N/ha/yr) of the critical load range is appropriate for the affected areas of saltmarsh. Therefore, the additional predicted contribution from nitrogen emissions from the Project does not result in any exceedance of the Critical Load range for saltmarsh, as the modelled annual mean deposition rate at receptor O_E12 will be 16.0 kg N/ha/yr, which is well below the 20 kg N/ha/yr upper critical load.
- 1.6.28 Moreover, guidance within the Highways Agency’s Design Manual for Roads and Bridges (“DMRB”) guidance in respect of Air Quality (Ref 1-2), identifies a threshold of 0.4 kg N/ ha/ yr as resulting in ‘no significant effect’ on all habitats based on Natural England Research Report NECR 210 (Ref 1-3), which collated dose response research and found that the lowest additional nitrogen deposition to reduce species richness in any habitat by one species was 0.4 kg/ N/ ha/ yr. The modelled cumulative Process Contribution from the Project under the worst-case MARPOL Tier II Emissions Standards scenario is 0.2 kg/ N/ ha/ yr and therefore is well under this threshold for effecting a measurable change in vegetated habitat species diversity. Although the emissions to air arising from the Project are mainly from marine vessels, as the pollutants are the same as those assessed for road vehicle engine emissions in the DMRB, it is considered appropriate to apply this threshold in the assessment for the Project.

¹ EUNIS -Factsheet for Atlantic upper-mid saltmarshes and saline and brackish reed, rush and sedge beds.

- 1.6.29 In addition, Natural England's Supplementary Advice on Conservation Objectives for the Humber Estuary SAC states that the conservation objective for the 'Atlantic salt meadows *Glauco-Puccinellietalia maritimae*' and 'Salicornia and other annuals colonising mud and sand' habitat features relevant to the assessment of air quality effects is to "*Maintain concentrations and deposition of air pollutants to below the site-relevant Critical Load or Level values given for this feature on the Air Pollution Information System*" (Chapter 9: Marine Ecology Ref 9-201). As set out above, the Process Contribution from the Project, which results in a mean deposition rate of 16 kg N/ ha/ yr on the nearest saltmarsh habitat does, not result in any exceedances of the Critical Load published on the APIS. Indeed, air quality modelling for this Project forecasts a slight improvement in nitrogen deposition between the base year and 2036 even when allowing for the Project and the IERRT. Therefore, the Project will not compromise the air quality 'maintain' target for the Humber Estuary SAC.

Table 5: Marine Ecology Cumulative Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
9 - DM/0865/19/FUL	<p>Construction:</p> <p>The air quality assessment that informed the planning application for ID9 (AQC, 2019) considered the impact of this particular generator site in isolation, and the impact of this site along with three sister generator sites in-combination. The assessment of all four generator sites in operation identified that the bulk of the impact from these cumulative developments occurred at locations where there is no relevant air quality exposure. Impacts of less than 0.6 µg/m³ of NO₂ (i.e. rounded to 1% or less of the air quality objective) were predicted at receptors on Queens Road and receptors on the eastern fringe of Immingham town.</p> <p>It is noted that the air quality assessment prepared by AQC screened out the impact of the four generator site emissions on the nature conservation receptors, due to lack of sensitivity.</p> <p>A second air quality assessment was submitted to inform the planning application for the site in 2020 (Air Pollution Services, 2020). It quantified the impact of the four energy generation sites at several locations within the Humber Estuary SAC. The vast majority of which were mudflat habitat, which have not been considered sensitive to air quality impacts in the Project ES¹. At the saltmarsh habitat considered in that assessment, the impact (or Process Contribution) accounted for 0.15% of the current lower Critical Load threshold for nitrogen deposition. Annual mean NO_x impacts at this location were not reported. Construction phase emissions associated with the Project will be negligible at this same location.</p> <p>Operation:</p> <p>The second air quality assessment reported impacts that accounted for 0.15% of the current lower Critical Load nitrogen deposition. Operational phase emissions of the Project and IERRT emissions impact at this same location (receptor O-E5), account for up to 0.4% of the same lower Critical Load threshold assuming MARPOL Regulation 13 Tier II emission standards and 0.3% assuming Tier III standards.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Neutral/Negligible adverse</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
10 - DM/0864/19/FUL	<p>Construction: As per assessment reported for ID9.</p> <p>Operation: As per assessment reported for ID9.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>
13 - DM/0628/18/FUL	<p>Construction: Cumulative development impacts are predicted at a location within the Humber Estuary SAC and at two SSSI locations. The location of the cumulative impact reported for the SAC is for an area of mudflat habitat. As discussed in Chapter 6: Air Quality of the ES [TR030008/APP/6.2], the Project assessment does not consider mudflat in the Humber Estuary to be sensitive to air quality impacts¹. At the saltmarsh habitat considered in ID13's air quality assessment (the North Killingholme Haven Pits SSSI) the impact (or process contribution) accounts for 0.1% of the lower Critical Load threshold. Construction phase emissions associated with the Project are anticipated to have a negligible impact at this location.</p> <p>Operation: The saltmarsh habitat that was considered in ID13's air quality assessment (the North Killingholme Haven its SSSI) will experience an impact (or process contribution) that accounts for 0.1% of the lower Critical Load threshold. At the same location, the operational Project and IERRT impact is as high as 0.2% of the Critical Load (assuming all vessels visiting the Project are MARPOL Regulation 13 Tier II compliant). Again, ID13's air quality assessment (Envest, 2018) does not report impacts at the nature conservation sites worst affected by the operation of the Project, the annual mean NO₂ contour plot it does include can be used to make a reasoned estimate. The contour</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>plot suggests that at the locations of maximum nature conservation impact in the Project's assessment, the cumulative development has an annual mean NO₂ impact of around 0.1 µg/m³, which would convert to a nitrogen deposition impact of around 0.014 kg/ha/yr (or 0.1% of the Critical Load). Thus, the cumulative impact of ID13 to Project impacts is minimal.</p>		
16 - DM/0862/19/FUL	<p>Construction: As per assessment reported for ID9.</p> <p>Operation: As per assessment reported for ID9.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservaton (Marine Ecology) [TR030008/APP/6.2]	Neutral/ Negligible adverse
17 - DM/0863/19/FUL	<p>Construction: As per assessment reported for ID9.</p> <p>Operation: As per assessment reported for ID9.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]	Neutral/ Negligible adverse
18 - DM/0026/18/FUL	<p>Construction: The cumulative development's emissions modelling assessment reported an annual mean NO_x impact of 2% of the Critical Level and a nitrogen deposition impact of 0.2 kg/ha/yr (or 2% of the lower Critical Load threshold and 1% of the upper Critical Load</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of	Neutral/ Negligible adverse

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>threshold) at the worst affected saltmarsh habitat. IGET construction phase impacts are expected to have a limited impact at this location of shared sensitivity, due to its distance away from the construction site boundary.</p> <p>Operation:</p> <p>The cumulative development's emissions modelling assessment reported an annual mean NO_x impact of 2% of the Critical Level and a nitrogen deposition impact of 0.2 kg/ha/yr (or 2% of the lower Critical Load threshold and 1% of the upper Critical Load threshold) at the worst affected saltmarsh habitat. Worst-case Project and IERRT emissions (assuming all IGET vessels are MARPOL Regulation 13 Tier II compliant) account for 6% of the Critical Level for annual mean NO_x and 2% of the lower Critical Load Threshold (1% of the upper Critical Load threshold) at a comparable saltmarsh location (receptors O_E1 and O_E2). Assuming IGET vessels are MARPOL Regulation 13 Tier III compliant, the Project and IERRT emissions account for 3% of the Critical Level for NO_x, 1% of the lower Critical Load threshold for nitrogen deposition (0.5% of the upper Critical Load threshold).</p>	<p>Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	
21 - EN010107	<p>Construction:</p> <p>At the shared nature conservation sensitive saltmarsh receptors, the cumulative development impact to annual mean NO_x accounts for around 2.5% of the Critical Level and the nitrogen deposition rate around 4% of the current lower Critical Load threshold. However, the impact of the Project's construction phase emissions at this location is considered to be negligible, due to the distance between the cumulative development's impacted saltmarsh habitat and the Project's construction phase emissions sources.</p> <p>Operation:</p> <p>The cumulative development impact to annual mean NO_x of around 2.5% of the Critical Level and the nitrogen deposition rate of around 4% of the Critical Load occurs at the same location as the IGET saltmarsh receptor O_E5. Here, IGET and IERRT impacts account for 1% of the Critical Level for NO_x and 0.4% of the Critical Load for nitrogen deposition, assuming IGET vessels comply with MARPOL Regulation 13 Tier II emission standards, and 0.5% of the Critical Level for NO_x and 0.3% of the Critical Load for</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	Neutral/ Negligible adverse

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	nitrogen deposition, assuming IGET vessels comply with Tier III emission standards. However, as the cumulative process contribution of these projects will not result in an exceedance of the 20 – 30 kg/ N/ ha/ yr Critical Load for N deposition at any of the saltmarsh receptors, no significant cumulative effects are predicted.		
22 - TR030007	The Air Quality assessment has included detailed modelling of the Project in combination with IERRT, due to the proximity of the two projects. It is concluded that no significant changes in air quality arising from the two projects will not result in adverse cumulative effects.	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]	Neutral/ Negligible adverse
25 - TR030001, TR030005 and TR030006	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following key pathways in relation to marine ecology during construction: Intertidal habitat loss; Change to marine habitats; Water quality; Air quality; and Underwater noise;</p> <p>Intertidal habitat loss: ID25 project will result in a direct loss of intertidal habitat (mudflat and saltmarsh) as a result of the reclamation of the proposed quay (33 ha). Compensation for this loss will be provided at the Cherry Cobb Sands compensation site. Losses of intertidal habitat as a result of the Project will be de minimis in extent (0.0416 ha) and were assessed as insignificant. Therefore, with the provision of the compensatory habitat required for AMEP project, potential loss of intertidal habitat is considered to be minor.</p> <p>Changes to marine habitats: Both the AMEP and the Project have the potential to result in changes to marine habitats as a result of capital dredging due to physical disturbance during sediment removal, sediment deposition and indirectly as a result of changes to hydrodynamic and sedimentary processes. These potential effects were</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2] .	Construction: Minor adverse (not significant)

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>assessed as not significant for both projects. The subtidal habitats around the Port of Immingham are typically impoverished and of low ecological value reflecting the existing high levels of physical disturbance in the area due to strong near bed tidal currents and sediment transport. Deposition of sediment as a result of dredging for both projects was predicted to be localised and similar to background variability away from the dredge pockets with species occurring in the local area considered tolerant to some sediment deposition. The magnitude of change on marine habitats and species from the highly localised and small scale predicted effects due to hydrodynamic and sedimentary processes is considered to be negligible for both projects.</p> <p>Water quality: The effects of increased suspended sediment concentrations and water quality impacts associated with the remobilisation of sediment bound contaminants as part of both AMEP and the Project during dredging was assessed as not significant for both projects. Increased SSCs due to the capital dredge and disposal activity was considered to be in the range that can frequently occur naturally with benthic species and fish in the Humber Estuary considered adapted to living in an area with variable and typically very high suspended sediment loads. The level of contamination in the proposed dredge area for both projects was considered to be low with material expected to be rapidly dispersed by strong tidal currents in the area. Potential cumulative effects are considered to be insignificant to minor.</p> <p>Air quality:</p> <p>At the worst-impacted nature conservation site within the SAC from the cumulative development emissions, annual mean NO_x impacts account for 0.3% of the Critical Level and nitrogen deposition rates account for 0.014 kg/ha/yr (or 0.1% of the lower Critical Load threshold for saltmarsh habitat). It is considered that the impact of IGET construction phase emissions at this same location is likely to be negligible, given the distance between the development work areas.</p> <p>Operation:</p> <p>At the worst-impacted nature conservation site within the SAC from the cumulative development emissions, annual mean NO_x impacts account for 0.3% of the Critical Level and nitrogen deposition rates account for 0.014 kg/ha/yr (or 0.1% of the lower Critical</p>		

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Load threshold for saltmarsh habitat). It is not clear where this impact occurs within the SAC. If it is assumed that this impact occurs at the closest section of saltmarsh to the cumulative development site, the shared receptor would be receptor O_E6, which is predicted to experience an IGET Project and IERRT impact of 1% of the Critical Level for annual mean NO_x and 0.4% of the nitrogen deposition Critical Load for saltmarsh (assuming IGET vessels comply with Tier II emission standards). The combined impact with the cumulative development is 1% or less of the relevant air quality standards. The cumulative development is the continuation of dredging the Sunk Channel in the Humber Estuary. This activity is already undertaken in the baseline and associated cumulative emissions accounted for in the baseline dataset used to inform the air quality assessment for the IGET Project. Where cumulative development impacts occur close to air quality sensitive receptors, the number of emissions sources will be limited as will the period in which emissions occur, to the extent that a significant cumulative effect is unlikely.</p> <p>Underwater noise: Underwater noise generated during marine piling and dredging required as part of the Project along with AMEP have the potential to result in cumulative effects on fish (including diadromous migratory species) and marine mammal receptors in the Humber Estuary. Dredging for both projects is only expected to cause behavioural reactions in a relatively localised area in the vicinity of the dredger for both fish and marine mammals. However, marine piling noise has the potential to cause injury effects in fish and marine mammals within close proximity to the marine piling activity and strong behavioral responses over a wider area of the Humber Estuary for both projects. Both projects will require similar mitigation to help minimise potential adverse effects (such as soft start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is minor adverse.</p>		
27 - EN010038	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology during construction:</p>	No additional mitigation required beyond the embedded and standard measures set	Construction: Minor adverse

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
North Killingholme Power Project	<ul style="list-style-type: none"> Indirect effects to marine habitats from changes to air quality); and Underwater noise. <p>Change to marine habitats (air quality):</p> <p><i>Construction</i></p> <p>At the worst-impacted saltmarsh habitat site within the SAC, from the worst-case cumulative development emissions, annual mean NO_x impacts account for 4% of the Critical Level and nitrogen deposition rates account for 1.8% of the current lower Critical Load threshold for saltmarsh habitat and 0.9% of the upper threshold. At the saltmarsh habitat within the North Killingholme Haven Pits SSSI, the worst-case cumulative development impacts account for 1.8% of the Critical Level for NO_x and 0.2% of the lower Critical Load threshold for nitrogen deposition. It is considered that the impact of IGET construction phase emissions at these same locations is likely to be negligible, given the distance between the development work areas.</p> <p>Operation:</p> <p>The worst-case cumulative development emissions have annual mean NO_x impacts of around 4% of the Critical Level and nitrogen deposition rates of around 1.8% of the current lower Critical Load threshold for saltmarsh habitat (0.9% of the upper threshold). At the saltmarsh habitat within the North Killingholme Haven Pits SSSI, the worst-case cumulative development impacts account for 1.8% of the Critical Level for NO_x and 0.2% of the lower Critical Load threshold for nitrogen deposition (0.1% of the upper threshold). IGET Project and IERRT emissions predicted closest to the cumulative development's worst-case impacts are represented by receptor O_E12, where impacts assuming all IGET vessels are MARPOL Regulation 13 Tier II compliant account for 0.4% of the Critical Level for NO_x and 0.2% of the lower Critical Load range for nitrogen deposition. At the SSSI, IGET and IERRT impacts account for 0.3% of the Critical Level for NO_x and 0.1% of the lower Critical Load threshold for nitrogen deposition, assuming Tier II emission standards.</p> <p>Underwater noise: Underwater noise generated during marine piling required as part of the Project along with construction of the intake and marine piling for the North</p>	<p>out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Killingholme Power Project have the potential to result in cumulative effects on fish (including diadromous migratory species) and marine mammal receptors in the Humber Estuary. Marine piling noise has the potential to cause injury effects in fish and marine mammals within close proximity to the marine piling activity and strong behavioural responses over a wider area of the Humber estuary for both projects. Both projects will require similar mitigation to help minimise potential adverse effects (such as soft start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). With the application of mitigation, the residual cumulative effect is minor adverse.</p> <p>Operation:</p> <p>There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology during operation:</p> <ul style="list-style-type: none"> • Change to marine habitats (both direct physical change and indirect effects from changes to air quality) <p>Change to marine habitats (air quality): The North Killingholme Power Project will operate in accordance with BAT and regulated by the Environment Agency which will include measures to minimise the impacts of emissions. The assessment of the North Killingholme Power Project concluded no significant effects on habitats from emissions operation. It is reasonable to assume that given consent has been granted for this project that there is a proportionate level of mitigation. A minor adverse residual cumulative effect is concluded.</p>		
28 - EN070006	<p>Construction:</p> <p>Based on information provided in the EIA scoping report for the Humber Low Carbon Project, trenchless methods (e.g., bored tunnel) could be used to minimise potential effects on marine ecology receptors where the pipelines cross the Humber Estuary. However, construction method has not been confirmed at the landfall (trenchless, e.g., Horizontal Directional Drilling (“HDD”), or via cofferdam) and, therefore, marine ecology receptors could not be scoped out.</p>	No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine	Minor adverse

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>As the precise construction methods and construction programme for the Humber Low Carbon Pipeline have not yet been finalised, it is not possible to provide an accurate assessment of the cumulative effects relating to marine ecology receptors. However, it is assumed that if required this project will be subject to controls by statutory bodies to avoid the potential for any adverse cumulative effects on marine habitats and species. On this basis, cumulative effects are considered to be at worst minor.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>	<p>Ecology) [TR030008/APP/6.2]</p>	
<p>35 - DM/0329/18/FUL Erection of industrial building and adjoined two storey office/control room to create power plant (18MW Energy From Waste)</p>	<p>Construction At the saltmarsh habitat to the north of the cumulative development site, cumulative development impacts account for 4% of the Critical Level for NO_x and 3.6% of the lower Critical Load threshold for nitrogen deposition (1.8% of the upper Critical Load threshold).</p> <p>Given the distance between the cumulative development and the IGET Project, the fact that IGET project construction emissions will impact close to source and the fact that the IGET Project's key receptors are not located downwind of the cumulative development, the risk of cumulative impacts with this development are considered low.</p> <p>Operation At the saltmarsh habitat to the north of the cumulative development site (similar to IGET receptor O_E5), cumulative development impacts account for 4% of the Critical Level for NO_x and 3.6% of the lower Critical Load threshold for nitrogen deposition (1.8% of the upper Critical Load threshold). IGET Project and IERRT impacts at the same location account for 1.1% of the Critical Level for NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming IGET vessels all comply with Tier II emission standards. Based on IGET vessels complying with Tier III standards, IGET Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Neutral/ Negligible adverse</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
<p>37 - DM/1070/18/FUL</p> <p>Construction of an energy from waste facility of up to 49.9MWe gross capacity including emissions stack(s) and associated infrastructure</p>	<p>Construction:</p> <p>Impacts associated with the cumulative development relate to those from its energy centre plant stack emissions.</p> <p>At the saltmarsh habitat to the north of the cumulative development site, cumulative development impacts account for 2.5% of the Critical Level for NO_x and 4% of the lower Critical Load threshold for nitrogen deposition (2% of the upper Critical Load threshold). Given the distance between the larger cumulative development impacts and the IGET Project, the fact that IGET project construction emissions will impact close to source and the fact that the IGET Project's key receptors are not located downwind of the cumulative development, the risk of cumulative impacts with this project being anything more than negligible are considered low.</p> <p>Operation:</p> <p>Impacts associated with the cumulative development relate to those from its energy centre plant stack emissions.</p> <p>At the saltmarsh habitat to the north of the cumulative development site, cumulative development impacts account for 2.5% of the Critical Level for NO_x and 4% of the lower Critical Load threshold for nitrogen deposition (2% of the upper Critical Load threshold). IGET Project and IERRT impacts at the same location account for 1.1% of the Critical Level for NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming IGET vessels all comply with Tier II emission standards. Based on IGET vessels complying with Tier III standards, IGET Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Negligible (not significant)</p>
<p>95 - PA/2018/918</p> <p>Planning permission to construct a new</p>	<p>Construction:</p> <p>Impacts from the cumulative development are set out in the air quality assessment that supported its ES (VPI Immingham B Ltd, 2019), and concern emissions from the operation of an OCGT plant.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of</p>	<p>Negligible</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
<p>gas-fired power station with a gross electrical output of up to 49.9 megawatts. A further non-material amendment application has been made (PA/2021/1039)</p>	<p>During the cumulative development's construction phase, it has impacts on annual mean NO_x of less than 0.1% of the Critical Level at an area that represents the nearest and worst-affected section of saltmarsh habitat (represented in the IGET air quality assessment as receptor O_E6). During the cumulative development's operation, the same saltmarsh habitat experiences an impact of 0.5% of the Critical Level for NO_x and <0.1% of the Critical Load for nitrogen deposition.</p> <p>Operation:</p> <p>During the cumulative development's operation, the same saltmarsh habitat experiences an impact of 0.5% of the Critical Level for NO_x and <0.1% of the Critical Load for nitrogen deposition. At this location, operational IGET Project and IERRT emissions have an impact that is 1% of the Critical Level for NO_x and 0.4% of the Critical Load for nitrogen deposition (assuming IGET vessels are MARPOL Regulation 13 Tier II compliant). Assuming vessels are Tier III compliant, IGET Project and IERRT have emissions have an impact that is 0.5% of the Critical Level and 0.3% of the Critical Load.</p> <p>Given the distance between the saltmarsh habitat most affected by the cumulative development impacts and the IGET Project, the limited impact of the cumulative development and the fact that IGET project construction emissions will impact close to source, the risk of cumulative impacts with this project being anything more than negligible are considered low.</p>	<p>Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	
<p>102 - DM/1071/22/FUL</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology during construction:</p> <ul style="list-style-type: none"> • Loss of intertidal habitat; • Water quality; • Air quality; and • Underwater noise. 	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Minor adverse</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Loss of intertidal habitat: The coastal defence project will result in a permanent loss of 0.25 ha of intertidal habitat in 11 discrete narrow strips averaging 227m², of which the largest is no more than 10m wide and 30m long. These discrete areas of mudflat loss along the revetment are distanced roughly 100m apart. The HRA undertaken for the project concluded that <i>'within the Pyewipe area, there is approximately 300 ha of this Annex 1 habitat, being over 700 m at its widest extent to the south. Therefore, the loss of 0.25 ha equates to a loss of 0.08% of the total mudflats within Pyewipe. The loss of these small and discrete parcels of mudflat along the base of the existing revetment is not considered to adversely affect the function of the mudflats as a self-sustaining habitat within the Pyewipe area. This impact is considered to be ecologically inconsequential to the Humber Estuary SAC and so not adversely affecting the integrity of the site. As the impact is considered to be ecologically inconsequential, it is not considered to frustrate the conservation objective of restore the total extent. No adverse effect on the site integrity of the Humber Estuary SAC is anticipated as a result of loss of habitat constituting the qualifying feature of mudflats and sandflats not covered by seawater at high tide associated with construction of rock armour revetment'</i>. Losses of intertidal as a result of the proposed IGET development will be de minimis in extent (0.0416 ha) and were assessed as insignificant. On this basis, potential cumulative effects are considered to be minor.</p> <p>Water quality: Any potential impacts on water quality resulting from the rock revetment repair and reinforcement (such as increased suspended sediment levels) will be highly localised, temporary and of a magnitude not expected to cause any adverse reactions in marine species. Potential water quality impacts of the IGET project were assessed as insignificant.</p> <p>Air Quality: At the nature conservation sensitive saltmarsh habitat potentially impacted by cumulative development and the IGET and IERRT Project, the cumulative development will have some impact from site plant emissions, although such emissions will only be present for a limited period. Operational IGET Project and IERRT impacts at this location (receptor O_E5) account for 1.1% of the annual mean Critical Load for NO_x and 0.4% of the lower Critical Load threshold of nitrogen deposition (0.2% of the upper Critical Load threshold), assuming MARPOL Regulation 13 Tier II emission limits. With Tier III emission limits, IGET Project and IERRT impacts account for 0.5% and 0.3% of</p>		

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>the Critical Level and Lower Critical Load threshold respectively (0.15% of the upper Critical Load threshold).</p> <p>Underwater noise: Potential underwater noise effects on marine ecology receptors (invertebrates, fish and marine mammals) are expected to be negligible as a result of the revetment project. This is because revetment construction is typically undertaken when the revetment footprint is not inundated with sea water (i.e., remains in the air) which limits underwater noise propagation. Even assuming some noise propagation, the low noise levels associated with this type of coastal defence activity will at worst produce underwater noise levels that will be barely discernible above background conditions and unlikely to cause any behavioural reactions in marine species (even in very close proximity). The residual effects of the IGET project with respect to underwater noise have been assessed as minor with appropriate mitigation measures in place.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>		
94 - MLA/2020/00520	<p>Construction:</p> <p>There is the potential for cumulative effects during construction with respect to the following pathways in relation to marine ecology:</p> <ul style="list-style-type: none"> • Change/loss to marine habitats; • Water quality; • Air quality; and • Underwater noise. <p>Change to marine habitats: The piles required for the HIT berth 2 works will result in a <i>de minimis</i> loss of subtidal habitat. In addition, sedimentation due to the localised resuspension of sediment as a result of seabed disturbance during marine piling and changes to hydrodynamic and sedimentary processes due to the presence of the piles including potential scouring directly around piles effects are anticipated to be negligible and highly localised. Furthermore, the benthic community is expected to recover</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Minor adverse</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>relatively rapidly from any localised physical disturbance with subtidal species known to occur in the area typically considered fast growing and/or have rapid reproductive rates. On this basis and given that changes to marine habitats as part of the IGET project were assessed as insignificant to minor, cumulative effects are anticipated to be negligible.</p> <p>Water Quality: The resuspension of sediment as a result of seabed disturbance during marine piling HIT berth 2 works would cause highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects in any species. On this basis and given that water quality effects on marine ecology receptors as part of the IGET project were assessed as insignificant to minor, cumulative effects are anticipated to be insignificant to minor adverse.</p> <p>Air quality: The construction and operation of the cumulative development during the operation of the IGET Project will likely cause some cumulative effect at the nearby saltmarsh habitat, which is represented in the IGET Project assessment as receptor (O_E6). At this location, IGET Project and IERRT emissions account for 1% of the Critical Level for annual mean NO_x and 0.4% of the lower Critical Load threshold for nitrogen deposition (0.2% of the upper Critical Load threshold), assuming IGET vessels all comply with Tier II emission standards. Based on IGET vessels complying with Tier III standards, IGET Project and IERRT impacts at the same location account for 0.5% of the Critical Level for NO_x and 0.3% of the lower Critical Load threshold for nitrogen deposition (0.15% of the upper Critical Load threshold).</p> <p>The cumulative development is the continuation of dredging the Sunk Channel in the Humber Estuary. This activity is already undertaken in the baseline and associated cumulative emissions accounted for in the baseline dataset used to inform the air quality assessment for the IGET Project. Where cumulative development impacts occur close to air quality sensitive receptors, the number of emissions sources will be limited as will the period in which emissions occur, to the extent that a significant cumulative effect is unlikely.</p> <p>Underwater noise: Underwater noise generated during marine piling required as part of the IGET project along with HIT berth 2 works have the potential to result in cumulative effects on fish (including diadromous migratory species) and marine mammal receptors</p>		

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>in the Humber Estuary. Marine piling noise has the potential to cause injury effects in fish and marine mammals within close proximity to the marine piling activity and strong behavioural responses over a wider area of the Humber estuary for both projects. Both projects will require similar mitigation to help minimise potential adverse effects (such as soft start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is minor adverse.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>		
115 - MLA/2014/00431 /4	<p>There is the potential for cumulative effects with respect to the following pathways in relation to marine ecology:</p> <ul style="list-style-type: none"> • Change to marine habitats; • Water quality; • Air quality; and • Underwater noise. <p>Change to marine habitats: The habitats in the area are already subject to considerable seabed disturbance as a result of the existing maintenance dredging regime. The variations proposed to this existing maintenance dredge licence will not change the volumes of material to be dredged from the Port of Immingham area. The marine habitats and species occurring in the area are also considered to be commonly occurring and of low conservation value. Changes during dredging as a result of the Project were assessed as insignificant to minor and in-combination with this maintenance dredging project will result in only a very small increase in the potential maintenance dredge commitment for the Immingham area and disposal sites.</p> <p>Water quality: The effects of increased suspended sediment concentrations and water quality impacts associated with the remobilisation of sediment bound contaminants as</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Negligible (insignificant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>part of the IGET project were assessed as insignificant. Changes in suspended sediments and water quality resulting from maintenance dredging required as part of ID115 will also be localised, temporary and of a low magnitude.</p> <p>Air quality: The cumulative development is the continuation of dredging the Sunk Channel in the Humber Estuary. This activity is already undertaken in the baseline and associated cumulative emissions accounted for in the baseline dataset used to inform the air quality assessment for the IGET Project. Where cumulative development impacts occur close to air quality sensitive receptors, the number of emissions sources will be limited as will the period in which emissions occur, to the extent that a significant cumulative effect is unlikely.</p> <p>Underwater noise: Underwater noise generated during marine piling and dredging required as part of the IGET project along with underwater noise from maintenance dredging/disposal required as part of MLA/2014/00431 have the potential to result in cumulative effects on fish receptors in the Humber Estuary. However, dredging for both projects is only expected to cause behavioural reactions in a relatively localised area in the vicinity of the dredger. The IGET project will require mitigation to help minimise potential adverse effects during marine piling (such as soft start procedures, timing restrictions to avoid sensitive periods for migratory fish and the use of marine mammal observers). Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is minor adverse.</p>		
<p>116-DM/0664/19/FUL Velocys Waste to Fuel Plant, off Moody Lane - Development of a sustainable transport fuels facility, including</p>	<p>Construction</p> <p>The construction of the cumulative development has limited potential to generate emissions that could contribute significant effects at shared receptors with the IGET Project's construction, due to the distance between the cumulative development site and the nearest air quality sensitive receptors.</p> <p>The cumulative development's air quality assessment only provides a location of maximum impact within the Humber Estuary SAC, and not an impact specific to any habitat. It reports an annual mean NO_x impact of 1% of the Critical Level and nitrogen deposition rate that is 0.56% of the current lower Critical Load threshold for that habitat</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine</p>	<p>Negligible (insignificant)</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
<p>various stacks up to 80m high, creation of new accesses, installation of pipelines, rail link, associated infrastructure and ancillary works</p>	<p>type (or 0.28% of the upper Critical Load threshold). Due to the distance between the shared saltmarsh habitat closest to both the cumulative development site and the IGET Project, cumulative effects will be limited.</p> <p>Operation</p> <p>The construction of the cumulative development has limited potential to generate emissions that could contribute significant effects at shared receptors with the IGET Project's operation, due to the distance between the cumulative development site and the nearest air quality sensitive receptors.</p> <p>The cumulative development's air quality assessment only provides a location of maximum impact within the Humber Estuary SAC, and not an impact specific to any habitat. It reports an annual mean NO_x impact of 1% of the Critical Level and a nitrogen deposition rate that is 0.6% of the current lower Critical Load threshold for that habitat type (or 0.3% of the upper Critical Load threshold). The closest area of saltmarsh to the cumulative development is represented in the IGET air quality assessment as receptor O_E5, where impacts account for 1.1% of the annual mean Critical Load for NO_x and 0.4% of the lower Critical Load threshold of nitrogen deposition (0.2% of the upper Critical Load threshold), assuming MARPOL Regulation 13 Tier II emission limits. With Tier III emission limits, IGET Project and IERRT impacts account for 0.5% and 0.3% of the Critical Level and Lower Critical Load threshold respectively (0.15% of the upper Critical Load threshold).</p>	<p>Ecology) [TR030008/APP/6.2]</p>	
<p>117 - PA/SCO/2022/7 Station Road South Killingholme, works on land to the east of Rosper Road, Killingholme</p>	<p>The cumulative development works being proposed are located 550m away from the saltmarsh habitat at their nearest point. Construction site emissions are released from sources close to ground level and cumulative development impacts are most likely to effect locations with 200m of the cumulative development site boundary.</p>	<p>No additional mitigation required beyond the embedded and standard measures set out in Section 6.7 of Chapter 6: Air Quality and Chapter 9: Nature Conservation (Marine Ecology) [TR030008/APP/6.2]</p>	<p>Negligible (insignificant)</p>

Conclusion

- 1.6.30 In summary, with respect to intertidal habitat loss during construction, on the basis that compensatory habitat will be provided for the Able Marine Energy Park (“AMEP project”), all other projects have intertidal habitats losses that are considered *de minimis* cumulatively in extent and ecologically inconsequential. Subtidal losses are also considered *de minimis* cumulatively in extent and ecologically inconsequential for all projects. On this basis, cumulative effects of the Project with the Proposed Developments during construction are considered to be **minor adverse** with respect to habitat loss.
- 1.6.31 Potential changes to marine habitats during construction as a result of seabed disturbance (such as due to capital dredging or marine piling) are considered to be relatively localised, temporary and low magnitude for the Project and all other Proposed Developments with no spatial overlap of dredge or construction footprints occurring. Cumulative effects of the Project with the Proposed Developments are considered to be **minor adverse** with respect to changes in marine habitats.
- 1.6.32 Water quality effects are anticipated to be localised and temporary for all Proposed Developments with effects on marine habitats or species considered negligible even when considered cumulatively. On this basis, potential cumulative effects with respect to water quality are considered to be **minor adverse**.
- 1.6.33 Nature conservation receptors may experience a cumulative effect from construction phase particulate emissions. This may occur where they are located within 50 m of the Project’s construction boundary and within 50m of a Proposed Development that is also a source of particulate emissions.
- 1.6.34 Underwater noise (on diadromous migratory fish and marine mammals) as a result of the Project along with several other Proposed Developments have the potential to result in adverse significant effects on migratory fish and marine mammal species. However, residual effects of the Project have been assessed as minor with mitigation measures implemented. All projects will be subject to similar mitigation measures to avoid the potential for adverse underwater noise effects on fish and marine mammals. On this basis, cumulative effects are considered to be at worst minor adverse and not significant.
- 1.6.35 Potential changes to marine habitats during operation as a result of seabed disturbance due to maintenance dredging are considered to be localised, temporary and low magnitude for the Project and all other Proposed Developments with no direct spatial overlap of maintenance dredge footprints occurring. Cumulative effects of the Project are considered to be **minor** with respect to changes in marine habitats.
- 1.6.36 Water quality effects due to maintenance dredging are anticipated to be localised and temporary for all projects with effects on marine habitats or species considered negligible even when considered cumulatively. On this basis, potential cumulative effects with respect to water quality are considered to be **minor**.

1.7 Ornithology Cumulative Effects

- 1.7.1 There is considered to be the potential for cumulative effects on ornithology receptors due to habitat loss/change and due to disturbance effects of the Project and Proposed Developments.
- 1.7.2 **Table 6** summarises how each of the scoped-in developments included in the shortlist (**Table 1**) has been considered with regard to potential cumulative ornithology effects during construction and operation. A total of seven developments were scoped into the assessment of construction cumulative ornithology effects.

Cumulative Effects during construction

- 1.7.3 There is no potential for cumulative effects to arise with other committed developments that are resulting in losses of, or noise and visual disturbance to, functionally linked land within this part of the estuary, due to there being no impacts on functionally linked land as a result of the Project. This pathway was therefore scoped out of the assessment of cumulative effects.
- 1.7.4 There is the potential for cumulative effects with respect to the following pathways in relation to ornithology during construction:
- a. Loss of intertidal habitat for waterbirds.
 - b. Potential disturbance to waterbirds during construction.
- 1.7.5 In summary, with respect to intertidal habitat loss for coastal waterbirds, on the basis that compensatory habitat will be provided for the AMEP project and also for indirect losses associated with the Stallingborough Phase 3 Flood Alleviation Scheme (ID102), all other projects have intertidal habitats losses that are cumulatively considered *de minimis* in extent and ecologically inconsequential. On this basis, cumulative effects of the IGET project with the Proposed Developments are considered to be **minor adverse** with respect to habitat loss.
- 1.7.6 Potential noise and visual disturbance during construction as a result of the Project along with several other projects have the potential to result in adverse significant effects. However, residual effects of the Project have been assessed as minor with the proposed mitigation measures. All projects will be subject to similar mitigation measures to avoid the potential for adverse disturbance effects on these features.. On this basis, cumulative effects are considered to be at worst **minor adverse** and not significant.

Cumulative Effects during operation

- 1.7.7 There is the potential for cumulative effects during operation with respect to the following pathways in relation to ornithology:
- a. Potential disturbance to waterbirds during operation.
 - b. The potential effects due to changes to waterbird foraging and roosting habitat as a result of the presence of marine infrastructure.

- 1.7.8 Potential cumulative effects as result of these pathways are considered to be minor given that coastal waterbirds are regularly recorded feeding nearby or below port structures such as jetties or pontoons and appear to be relatively tolerant to normal day-to-day port operational activities.

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Construction

- 1.7.9 There is the potential for cumulative effects during construction with respect to the following pathways in relation to ornithology:
- a. Loss of intertidal habitat for coastal waterbirds.
 - b. Potential disturbance to waterbirds during construction.
- 1.7.10 Loss of intertidal habitat for coastal waterbirds: It is anticipated that the IERRT project will result in the loss of 0.022 ha of intertidal habitat due to the following direct and indirect effects:
- a. Direct loss of 0.012 ha of intertidal habitat (0.006 ha due to marine piling and 0.006 which will become subtidal habitat as a result of the deepening).
 - b. Capital dredging and marine infrastructure will cause a potential indirect loss of intertidal (0.01 ha) due to erosion caused by changes in currents.
- 1.7.11 The Project will result in direct loss of 0.00158 ha (due to the marine piling) and a potential indirect loss of 0.03 ha (due to erosion as a result of the presence of the jetty causing changes in currents).
- 1.7.12 On this basis, the anticipated total loss of intertidal as a result of both projects is anticipated to be 0.054 ha.
- 1.7.13 The combined loss of habitat also represents approximately 0.000144 % of the Humber Estuary SPA/Ramsar. When considering this is the context of intertidal, the area of loss represents approximately 0.000608 % of intertidal foreshore habitats and approximately 0.000847 % of mudflat within the SPA/Ramsar.
- 1.7.14 The predicted potential indirect intertidal losses for both projects (and direct loss due to capital dredging for IERRT), consist of very narrow strips on the lower shore around the sublittoral fringe. These losses are considered to be of a similar scale to that which can occur due to natural background changes in mudflat extent in the local region (e.g., due to seasonal patterns in accretion and erosion or following storm events). Waterbird species could potentially be feeding in the predicted areas of habitat loss (albeit minimal habitat loss as explained above) during low water periods, these very small areas remain largely inundated with water and are only uncovered for a very short duration.
- 1.7.15 The direct losses of habitat due to marine piling for both projects will also be highly localised.
- 1.7.16 The spatial extent of these losses represents a barely measurable and inconsequential reduction in available habitat for these mobile species even at a local scale along the eastern frontage of the port. On this basis, any change to prey resources for birds feeding in the local area will be negligible. Individual survival rates or local population levels (either directly through mortality or due to

birds dispersing to new feeding areas in other areas of the Humber Estuary) will not be affected. These *de minimis* changes in mudflat extent are of a magnitude that will not change the overall structure or functioning of the nearby mudflats within the Port of Immingham area or more widely in the Humber Estuary.

Potential disturbance to waterbirds during construction

- 1.7.17 There is the potential for the construction of the IERRT project along with the Project to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds along the foreshore if disturbing activities associated with each of the construction programmes are being undertaken concurrently. This could reduce the amount of foreshore available with limited disturbance stimuli in the local area.
- 1.7.18 Broadly similar mitigation measures are proposed for both projects in order to minimise potential disturbance. This includes a winter marine construction restriction from 1 October to 31 March (for works within 200m of exposed mudflat) which will limit potential disturbance over the colder winter months when birds are considered particularly vulnerable to the effects of disturbance. This measure along with the use of acoustic barriers/screens (predicted to reduce noise levels to <70 dB Lmax at distances greater than approximately 200m from the marine piling) and soft start procedures will also help minimise the potential spatial extent of disturbance.
- 1.7.19 Therefore, with the application of the proposed mitigation measures, disturbance responses are expected to be limited, both in terms of frequency and the spatial extent of effects with alternative locations in the Immingham area are available to birds to feed and roost which will not be in the zone of influence of potential disturbance. Furthermore, following completion of the construction phase, birds would be expected to return to broadly use the same areas as used prior to construction with any effects considered temporary.
- 1.7.20 There is the potential for cumulative effects during operation with respect to the following pathways in relation to ornithology:
- a. Potential disturbance to waterbirds during operation.
 - b. The potential effects due to changes to waterbird foraging and roosting habitat as a result of the presence of marine infrastructure.

Potential disturbance to waterbirds during operation

- 1.7.21 Coastal waterbirds are regularly recorded feeding nearby or below port structures such as jetties or pontoons and appear to be relatively tolerant to normal day-to-day port operational activities. Therefore, while there is the potential for some mild and infrequent disturbance occurring near to the approach jetties for both projects, it is expected that birds will become habituated relatively quickly which will limit any longer-term disturbance responses. Given the low anticipated magnitude of potential effects and given the screening is also proposed for the IERRT project on a precautionary basis, potential cumulative effects are anticipated to be **minor adverse**.

The potential effects due to changes to waterbird foraging and roosting habitat as a result of the presence of marine infrastructure

- 1.7.22 The approach jetties for both projects will be an open piled structure with large gaps between each of the piles and between the jetty deck and the foreshore seabed (i.e. the mudflat surface). This will minimise the enclosed feel and allow birds feeding near the structure to maintain sightlines. It should be noted that observations from the ornithology surveys in the area suggest that birds regularly feed in very close proximity to both the Eastern Jetty (approximately 1km from the Project) and the Immingham Oil Terminal approach jetty (approximately 500m from the Project) – which are both similar open piled structures - with species such as Redshank, Dunlin, Turnstone regularly recorded underneath jetties and Curlew, Shelduck and Black-tailed Godwit approaching them closely (<10-20m). On this basis, birds would be expected to show similar highly localised responses to structures associated with both projects with responses ranging from no avoidance for some species to potentially some local avoidance (i.e. directly underneath or in close proximity) for other species. As a consequence, any avoidance of marine infrastructure is expected to be limited (and highly localised) and is unlikely to change the overall distribution of waterbird assemblages more widely on the foreshore in the local area.

Table 6 Ornithology Cumulative Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
22 - TR030007	The potential for cumulative effects as a result of the Project and ID22 (IERRT) are discussed in paragraphs 1.7.9 to 1.7.22 above.	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)
25 - TR030001, TR030005 and TR030006	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following key pathways in relation to ornithology during construction:</p> <ul style="list-style-type: none"> • Intertidal habitat loss; and • Visual and noise disturbance during construction. <p>Intertidal habitat loss: ID25project will result in a direct loss of intertidal habitat (mudflat and saltmarsh) as a result of the reclamation of the proposed quay (33 ha). Compensation for this loss will be provided at the Cherry Cobb Sands compensation site. Losses of intertidal as a result of the Project will be de minimis in extent (0.0316 ha) and were assessed as insignificant given that the spatial extent of these losses represents a barely measurable and inconsequential reduction in available habitat for waterbird species even at a local scale along the eastern frontage of the port. Therefore, with the provision of the compensatory habitat required for ID25, potential loss of intertidal habitat is considered to be minor adverse.</p> <p>Visual and noise disturbance during construction: There is the potential for the ID25t along with the Project to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds along the foreshore during construction. Mitigation measures for ID25 include a cold weather construction restriction. In addition, indirect functional loss of intertidal habitat (mudflat and saltmarsh) through disturbance (predicted to be over an area of 12.4 ha) will also be provided at the</p>	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Cherry Cobb Sands compensation site. With these measures in place and the proposed mitigation measures for the Project, potential disturbance effects are assessed as minor adverse.</p> <p>Operation:</p> <p>There is the potential for cumulative effects with respect to the following key pathways in relation to ornithology during operation:</p> <ul style="list-style-type: none"> • Visual and noise disturbance during operation <p>Visual and noise disturbance during operation: There is the potential for ID25 along with the Project to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds along the foreshore during operation. Indirect functional loss of intertidal habitat (mudflat and saltmarsh) through disturbance (predicted to be over an area of 12.4 ha) will be provided at the Cherry Cobb Sands compensation site. Operational effects on waterbirds as a result of the Project were assessed as minor adverse. On this basis, potential cumulative effects are assessed as minor adverse.</p>		
27 - EN010038	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following key pathways in relation to ornithology during construction:</p> <ul style="list-style-type: none"> • Visual and noise disturbance during construction. <p>Airborne visual and noise disturbance: There is the potential for the Project along with ID27 to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds. However, given the mitigation proposed for both projects which includes soft start procedures and timing restrictions to avoid sensitive periods, it is considered that the impacts are likely to only result in mild and localised disturbance responses. Therefore, assuming the proposed appropriate mitigation measures are followed during construction, cumulative effects are considered to be at worst minor adverse and not significant.</p>	<p>No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]</p>	<p>Minor adverse (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
28 - EN070006	<p>Construction: Coastal waterbirds using functionally linked land within the footprint of the pipeline corridor could be potentially impacted due to disturbance during construction which could lead to cumulative effects with the Project.</p> <p>As the precise construction methods and construction programme for ID28 have not yet been finalised, it is not possible to provide an accurate assessment of the cumulative effects relating to ornithology receptors. However, it is assumed that if required this project will be subject to controls by statutory bodies to avoid the potential for any adverse effects on marine habitats and species. Therefore, assuming the proposed mitigation measures are followed for the Project, the predicted residual cumulative effects are considered to be at worst minor adverse.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)
29 - EN070008	<p>Construction: Coastal waterbirds using functionally linked land within the footprint of the pipeline corridor could also be potentially impacted due to disturbance during construction which could lead to cumulative effects with the Project.</p> <p>As the precise construction methods and construction programme for ID29 have not yet been finalised, it is not possible to provide an accurate assessment of the cumulative effects relating to ornithology receptors. However, it is assumed that if required this project will be subject to controls by statutory bodies to avoid the potential for any adverse cumulative effects on marine habitats and species. Therefore, assuming the proposed mitigation measures are followed for the Project, the predicted residual cumulative effects are considered to be at worst minor adverse.</p> <p>Operation:</p>	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	No potentially significant cumulative effects during operation are anticipated.		
102 - DM/1071/22/FUL	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following pathways in relation to ornithology during construction:</p> <ul style="list-style-type: none"> • Loss of intertidal habitat; and • Visual and noise disturbance during construction. <p>Loss of intertidal habitat: The coastal defence project will result in a permanent loss of 0.25 ha of intertidal habitat in 11 discrete narrow strips averaging 227m², of which the largest is no more than 10m wide and 30m long. These discrete areas of mudflat loss along the revetment are distanced roughly 100m apart. The HRA undertaken for ID102 concluded that <i>'within the Pyewipe area, there is approximately 300 ha of this Annex 1 habitat, being over 700 m at its widest extent to the south. Therefore, the loss of 0.25 ha equates to a loss of 0.08% of the total mudflats within Pyewipe. The loss of these small and discrete parcels of mudflat along the base of the existing revetment is not considered to adversely affect the function of the mudflats as a self-sustaining habitat within the Pyewipe area. This impact is considered to be ecologically inconsequential to the Humber Estuary SAC and so not adversely affecting the integrity of the site. As the impact is considered to be ecologically inconsequential, it is not considered to frustrate the conservation objective of restore the total extent. No adverse effect on the site integrity of the Humber Estuary SAC is anticipated as a result of loss of habitat constituting the qualifying feature of mudflats and sandflats not covered by seawater at high tide associated with construction of rock armour revetment'</i>. It should also be noted that indirect loss could also occur with respect to coastal squeeze effects with habitat loss compensated at Skeffling managed realignment site as part of the wider Humber Flood Risk Management Strategy (HFRMS) with no additional adverse effects from this proposal (beyond what has already been assessed as part of the</p>	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>HFRMS). Losses of intertidal as a result of the Project will be de minimis in extent (0.0316 ha) and were assessed as insignificant on coastal waterbirds. On this basis, potential cumulative effects are considered to be minor adverse.</p> <p>Visual and noise disturbance: There is the potential for the IGET project along with the flood defense works to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds along the foreshore if disturbing activities associated with each of the construction programmes are being undertaken concurrently. This could reduce the amount of foreshore available with limited disturbance stimuli in the local area. However, ID102 will not be undertaken during the winter period (between October and March) which will help minimise potential disturbance effects associated with this development. In order to reduce potential waterbird disturbance effects associated with the Project a range of mitigation measures are proposed. Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is minor adverse.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>		
94 - MLA/2020/00520	<p>Construction: There is the potential for cumulative effects with respect to the following pathways in relation to ornithology during construction:</p> <ul style="list-style-type: none"> • Visual and noise disturbance during construction. <p>Visual and noise disturbance: There is the potential for the Project along with ID94 works to cause cumulative effects in term of visual and noise disturbance to coastal waterbirds along the foreshore during construction. Data presented as part of the marine licence application for the HIT berth 2 works (ID94) suggest that waterbirds such as Shelduck, Dunlin, Curlew, Redshank and Black-tailed Godwit are only</p>	No additional mitigation aside from the measures committed to in Chapter 10: Ornithology [TR030008/APP/6.2]	Minor adverse (not significant)

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>recorded in very low numbers (typically <10-20 individuals) representing <1 % of estuary-wide numbers. Marine piling for the HIT berth 2 works will be short term (two weeks) with only intermittent marine piling activity undertaken each day (several hours per day) during this period. Mild disturbance responses and short-term and localised displacement of the very low numbers of this species present in the vicinity of the proposed development during the works is possible. However, rather than being displaced from the local area completely, birds would be expected to redistribute to nearby foreshore in the Immingham area and continue to feed and roost in these alternative locations following dispersal. Following completion of the construction phase, birds would be expected to return to use the same areas as used prior to construction with any effects considered temporary. In order to reduce potential waterbird disturbance effects associated with the Project a range of mitigation measures are proposed. Without mitigation potential cumulative effects are considered to be moderate adverse. With the application of mitigation, the residual cumulative effect is minor adverse.</p> <p>Operation: No potentially significant cumulative effects during operation are anticipated.</p>		

Conclusion

1.7.23 In conclusion, cumulative effects on ornithology receptors as a result of the Project and the scoped-in short-listed developments assessed in **Table 6** would be at worse **minor adverse** and **not significant**.

1.8 Traffic and Transport Cumulative Effects

1.8.1 As stated in **Chapter 25: Cumulative and In-combination effects [TR030008/APP/6.2]**, the 2026 baseline traffic against which the effects of construction traffic have been assessed within **Chapter 11: Traffic and Transport [TR030008/APP/6.2]** includes any traffic that would be generated by committed Proposed Developments. The assessment of construction traffic effects is therefore inherently cumulative.

1.8.2 Assessment of operational traffic from the Project was scoped out as the traffic flows would be too low to give rise to a significant effect. As such there is no separate assessment of cumulative traffic and transport effects included as part of this ES.

1.9 Marine Transport and Navigation Cumulative Effects

1.9.1 Cumulative effects may occur in terms of marine transport and navigation if other Proposed Developments were to also change the volume, composition and/or routing of vessels within the Study Area, i.e. within the Humber Estuary, in particular the section of the river in proximity to the Project.

1.9.2 **Table 7** summarises how each of the scoped-in developments included in the short list (**Table 1**) has been considered with regard to potential cumulative marine transport and navigation cumulative effects during construction and operation. Two developments were scoped into the assessment of construction and operational cumulative marine transport and navigation effects. These are ID22 and ID25.

Cumulative Effects during construction

1.9.3 Cumulative effects on marine transport and navigation could occur during construction of the Project as different types of vessels will be working in the vicinity of the jetty, e.g. tugs, multi-cats, barges and dredgers. These vessels will also be transiting to and from different locations in the Humber, e.g., dredging vessels to and from nearby disposal sites. If this activity overlaps with other developments, which cumulatively cause increased and/or varied vessel activity within the Humber, there is a greater likelihood of congestion, encounters/collisions between vessels, and allisions (contacts) with port infrastructure due to the extra traffic.

1.9.4 Risk controls during construction of the Project were identified at the HAZID workshop and are summarised in **Chapter 12: Marine Transport and Navigation [TR030008/APP/6.2]** and **Appendix 12.A [TR030008/APP/6.4]**, many of which will serve to mitigate cumulative effects. For example, the Project's works craft will be required to report to the Humber Vessel Traffic Services "(VTS)" before

leaving the construction area. Permission will not be granted if there is a risk of collision/obstruction to a passing vessel.

Cumulative Effects during operation

- 1.9.5 Cumulative effects on marine transport and navigation could occur during the operation of the Project as vessels visiting the jetty during this phase (up to 292 vessel arrivals), acting cumulatively with vessels associated with other developments, have the potential to interact with existing vessel traffic and port infrastructure. This could lead to a greater likelihood of congestion, encounters/collisions between vessels, and allisions (contacts) with port infrastructure due to the extra traffic.
- 1.9.6 Risk controls during the operation of IGET were identified at the HAZID workshop and are summarised in **Chapter 12: Marine Transport and Navigation [TR030008/APP/6.2]** and **Appendix 12.A [TR030008/APP/6.4]**, many of which will serve to mitigate cumulative effects. For example, vessels will be sequenced as per the Humber Passage Plan to help avoid encounters and prevent overtaking.

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

- 1.9.7 The IERRT project is located to the north-west of the Project. Given its proximity, the extra traffic associated with this project during construction and operation could have a cumulative impact with the Project.
- 1.9.8 IERRT, similar to the Project, has undergone a project-specific Navigational Risk Assessment (“NRA”) process. The mitigation measures identified as necessary in respect of each project, as defined through the NRA and EIA process, will minimise the potential for navigational risks, arising from each project alone and so will also minimise cumulative effects between the two projects during both construction and operation. This includes vessel traffic movements for both schemes being managed by Humber Estuary Services and its VTS.
- 1.9.9 The IERRT project has been considered within the NRA in term of its effect on future traffic. It was discussed at the HAZID Workshop and taken into account within the Hazard Log, which assessed all the construction and operational risks associated with the Project. Therefore, it is considered to have been appropriately assessed.

Table 7: Marine transport and navigation Cumulative Effects Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
22 - TR030007	<p>Construction:</p> <p>During construction of the Project, an appropriate safety zone will be established around the construction area from which other vessels will be excluded. This will be south of the main channel to avoid impinging on passing traffic. Proposed Development ID 22 which is the IERRT Project will have its own safety zone during construction, but this will be separate and located further upriver, such that no cumulative impacts are anticipated on passing traffic.</p> <p>Only a proportion of the vessels using the Humber will pass both projects. It is noted there is also an alternative channel further north (via Foul Holme) which can be used by certain vessels in certain tides.</p> <p>Vessel traffic on the Humber, including traffic associated with both the Project and IERRT, will be managed by Humber VTS.</p> <p>Works craft when operating outside their construction area will be subject to the existing Humber controls and plans, including VTS requirements and instructions.</p> <p>Operation:</p> <p>The Project berth has been designed to be aligned with the existing Immingham Oil Terminal (“IOT”) such that during operation it will not reduce the available channel width to the north. Vessels passing to the north will therefore be able to continue using the main channel. A proportion of these vessels may also pass the Project, but any effects of IERRT will be separate as it will be during a different part of their passage.</p> <p>Vessels arriving and departing the Project will not pass IERRT as it is located to the north west, further upriver. However, both the Project and IERRT will add to the overall traffic within the wider Humber, which will have</p>	<p>No additional mitigation beyond the embedded and standard measures set out in Chapter 12: Marine Transport and Navigation [TR030008/APP/6.2]</p>	<p>Residual cumulative effect is considered to be negligible and as low as reasonably practicable (ALARP), and therefore not significant.</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>a potential cumulative effect on congestion, collision risk and allision risk. This was considered within the HAZID workshop carried out as part of the NRA, and it was concluded the port had capacity to handle the increased traffic, taking into account the existing controls in place, such as sequencing of traffic coordinated by Humber VTS.</p>		
<p>25 - TR030001, TR030005 and TR030006</p>	<p>Construction:</p> <p>During construction of the Project an appropriate safety zone will be established around the construction area from which other vessels will be excluded. This will be south of the main channel to avoid impinging on passing traffic. Able Marine Energy Park (AMEP) (ID25) will have its own safety zone during construction, but this will be separate and located further upriver, such that no cumulative impacts are anticipated on passing traffic.</p> <p>Only a proportion of the vessels using the Humber will pass both projects. It is noted there is also an alternative channel further north (via Foul Holme) which can be used by certain vessels in certain tides.</p> <p>Vessel traffic on the Humber, including traffic associated with both the Project and AMEP, will be managed by Humber VTS.</p> <p>Works craft, when operating outside their construction area will be subject to the existing Humber controls and plans, including VTS requirements and instructions.</p> <p>Operation:</p> <p>The Project berth has been designed to be aligned with IOT such that during operation it will not reduce the available channel width to the north. Vessels passing to the north will therefore be able to continue using the main channel. A proportion of these vessels may also pass AMEP (ID25), but any effects of AMEP will be separate as it will be during a different part of their passage.</p>	<p>No additional mitigation beyond the embedded and standard measures set out in Chapter 12: Marine Transport and Navigation [TR030008/APP/6.2]</p>	<p>Residual cumulative effect is considered to be negligible and as low as reasonably practicable (ALARP), and therefore not significant.</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Vessels arriving and departing the Project will not pass AMEP as it is located to the north west, further upriver. However, both the Project and AMEP will add to the overall traffic within the wider Humber, which will have a potential cumulative effect on congestion, collision risk and allision risk. Based on the HAZID workshop carried out as part of the NRA, it was concluded the port had capacity to handle increased traffic, taking into account the existing controls in place, such as sequencing of traffic coordinated by Humber VTS.</p>		

Conclusion

1.9.10 In conclusion, cumulative marine transport and navigation effects between the Project and ID22 and ID25 are considered to be negligible and ALARP, and therefore **not significant**.

1.10 Landscape and Visual Impact Cumulative Effects

1.10.1 The Landscape and Visual cumulative effects assessment considers the potential for combined impacts to static views within the landscape which may be either simultaneous (where developments would be observable at the same time) or successive (where an observer would be required to turn to experience multiple developments).

1.10.2 Cumulative landscape effects may result where a number of developments combine, increasing the prevalence of such development within a landscape to an extent where they may become a defining characteristic. The likely significance of these effects relates to the number of developments affecting the landscape, their scale, their inter-relationship and the sensitivity and ability of the particular landscape to accommodate this type of development.

1.10.3 Cumulative visual effects may result where a number of developments combine to increase the appearance and dominance within a particular view. The likely significance of these effects relates to the number of developments visible and their scale, location and inter-relationship to each other within the view.

1.10.4 **Table 8** presents the landscape cumulative effects assessment and **Table 9** presents the visual cumulative effects assessment. A total of 12 developments were scoped into the assessment of construction cumulative Landscape and Visual effects and 11 developments for operational cumulative landscape and visual effects.

Landscape Cumulative Effects

1.10.5 The landscape cumulative assessment assesses the cumulative effects on identified landscape receptors within the Study Area. Landscape receptors that have been assessed as having negligible adverse effects have not been included in the assessment of cumulative effects, as it is considered unlikely that the addition of a negligible adverse effect to the cumulative effects of other developments within the Study Area, would lead to a significant cumulative effect.

1.10.6 Potential cumulative effects which may arise during the construction and operation phases of the Project are outlined in **Table 8** and **Table 9** below.

1.10.7 The shortlisted developments identified in **Table 8**, which lie in the Marine Character Area (MCA) 6 and the Project and its immediate setting have been screened into the assessment of cumulative landscape effects below. The other developments were scoped out of the cumulative landscape assessment as they lie within landscape receptors that have been assessed as having a negligible adverse effect from the Project as assessed within **Chapter 13: Landscape and Visual Impact [TR030008/APP/6.2]**.

- 1.10.8 For the purposes of this assessment, the unlikely worst-case scenario of all the shortlisted developments being constructed and therefore present in the landscape simultaneously has been assumed and if construction were not to occur simultaneously then the reported cumulative effect would be reduced.

Table 8: Landscape Cumulative Effects Assessment

Landscape type	Receptor Sensitivity	Developments included in assessment	Description of impact	Residual cumulative effect
MCA 6: Humber Waters	Low	ID 102 DM/1071/22/FUL Rock revetment repair and reinforcement	<p>Construction: ID102 will introduce construction activity into the MCA. Due to the high number of existing large-scale industrial complexes that influence the MCA it is assessed that the introduction of construction activity associated with the rock revetment repair and reinforcement alongside the Project would result in a limited change to the MCA. It is assessed that the cumulative impact would remain at low, the same for the Project assessed in isolation.</p> <p>Operation: ID102 will introduce additional built form within views from the MCA. Due to the high number of existing large-scale industrial complexes that influence the MCA it is assessed that the impact associated with the Project alongside the cumulative development would result in a limited change to the MCA. It is assessed that the cumulative impact would remain at low, the same as for the Proposed VPI Development assessed in isolation.</p>	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Minor adverse (not significant)</p>
Site and its immediate setting	Low	ID 5 DM/0968/19/FUL Variation of conditions 1 (Approved Plans) and 2 (Scheme of Landscaping)	Construction: ID5 and ID115 will introduce construction activity on land immediately to the south of the West Site and within the Humber Estuary to the north east. Due to the high number of existing large-scale	<p>Construction: Moderate adverse (significant)</p> <p>Operation: Minor adverse (not significant)</p>

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Landscape type	Receptor Sensitivity	Developments included in assessment	Description of impact	Residual cumulative effect
		ID 115 -Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel (construction only)	<p>industrial complexes and road corridors that influence the Site and its immediate setting, it is assessed that the introduction of construction activity alongside the Project would result in a limited change to the Site and its immediate setting. It is assessed that the cumulative impact would remain at medium, the same for the Project assessed in isolation.</p> <p>Operation: ID5 and ID115 will not introduce additional built form within views from the Site and its immediate setting. It is assessed that the impact associated with the Project alongside the landscape proposals associated with the cumulative development ID5 and ID115 would result in a limited change to the Site and its immediate setting. It is assessed that the cumulative impact would remain at low, the same as for the Project assessed in isolation.</p>	

1.11 Visual Cumulative Effects

- 1.11.1 The visual cumulative assessment assesses the potential for cumulative effects upon identified visual receptors within the study area, i.e. the landscape and visual Zol, as defined in **Chapter 25: Cumulative and In-combination Effects [TR030008/APP/6.2]**.
- 1.11.2 The following proposed developments were scoped-in to the assessment of cumulative visual effects, due to their scale, their potential to be visible from the identified sensitive receptors, and their inter-relationships within the view:
- a. ID 5 - DM/0968/19/FUL Variation of conditions and Scheme of Landscaping.
 - b. ID 9 - DM/0865/19/FUL Gas fuelled embedded energy generation compound – Site 4.
 - c. ID 10 - DM/0864/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 3.
 - d. ID 13 – DM/0105/18/FUL (includes variation of conditions application DM/0545/20/NMA).
 - e. ID 16 - DM/0862/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 1.
 - f. ID 17 - DM/0863/19/FUL Erection of 20MW gas fuelled embedded energy generation compound - Site 2.
 - g. ID 18 - DM/0026/18/FUL Energy Recovery Facility with an electricity export capacity of up to 49.5MW and associated infrastructure including a stack to 90m high.
 - h. ID 21 – EN010107 South Humber Bank Energy Centre.
 - i. ID 37 - DM/1070/18/FUL Energy from waste facility.
 - j. ID 102 - DM/1071/22/FUL Rock revetment repair and reinforcement along a 4.5km section of the Humber Estuary.
 - k. ID 115 - MLA/2014/00431/4 Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel.
 - l. ID 116 - DM/0664/19/FUL Waste to Fuel Plant including various stacks up to 80m high.
- 1.11.3 Potential cumulative visual effects of the Project together with the other Proposed Developments are summarised in **Table 9**, below, by reference to representative viewpoints. Viewpoint locations are shown in **Figure 13.7** of this ES **[TR030008/APP/6.3]**.

- 1.11.4 Visual receptors that have been assessed as having a negligible effect due to the Project have not been included in the assessment of cumulative effects, as it is considered unlikely that the addition of a negligible effect to the cumulative effects of other developments would lead to a significant cumulative effect. This applies to:
- a. Viewpoint 6 (Public Right of Way to the rear of Ings Lane/Talbot Road) at construction and operation.
 - b. Viewpoint 7 (Public Right of Way to the north east of Mauxhall Farm) at construction and operation.
 - c. Viewpoint 8 (Public Right of Way to the north east of Stallingborough) at construction and operation.
 - d. Viewpoint 9 (B1210 adjacent to railway line) at construction and operation.
 - e. Viewpoint 10 (Public Right of Way and proposed England Coast Path) at construction and operation.

Table 9: Visual Cumulative Effects Assessment

Viewpoint	Other developments relevant to CEA for this viewpoint	Sensitivity of receptor	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual cumulative effect
1	<p>ID13 – Waste to energy plant</p> <p>ID18 – Energy recovery facility</p> <p>ID37 – Energy from waste facility</p> <p>ID102 – Rock revetment repair and reinforcement</p> <p>ID 115 - Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel (construction only)</p> <p>ID116 – Waste to fuel plant</p>	Medium - Users of the PRow (recreational)	<p>Construction: The construction of the cumulative developments would be visible in the distance, across the view. The presence of other characteristic, cumulative developments would slightly intensify the built visible structures from this location. The addition of the construction activities, including dredging, associated with the Project would result in a low cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be short term and reversible, resulting in a minor adverse (not significant effect).</p> <p>Operation: The presence of the identified cumulative developments would slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Project would result in a low cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be long term and reversible, resulting in a minor adverse (not significant) effect.</p>	No additional mitigation proposed for cumulative effects.	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Minor adverse (not significant)</p>

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Viewpoint	Other developments relevant to CEA for this viewpoint	Sensitivity of receptor	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual cumulative effect
2	ID13 – Waste to energy plant ID18 – Energy recovery facility ID 115 - Maintenance dredge disposal at Grimsby, Immingham and Sunk Dredged Channel (construction only)	Medium - Users of the PRow (recreational)	<p>Construction: The construction of the stacks associated with the cumulative developments would be visible in the distance, above the line of trees and dredging would be visible in the foreground. The presence of other characteristic, cumulative developments will very slightly intensify the built visible structures from this location. The addition of the construction activities associated with the Project will result in a high cumulative impact, although no greater than that assessed for the Project in isolation. The impact will be short term and reversible, resulting in a major adverse (significant effect).</p> <p>Operation: The presence of the stacks associated with the identified cumulative developments would slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Project would result in a medium cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be long term and reversible, resulting in a moderate adverse (significant) effect.</p>	No additional mitigation proposed for cumulative effects.	<p>Construction: Major adverse (significant)</p> <p>Operation: Moderate adverse (significant)</p>
3	ID21 – South Humber Bank Energy Centre ID37 – Energy from waste plant ID 115 - Maintenance dredge disposal at	Medium - Users of the PRow (recreational)	<p>Construction: The construction of the stacks associated with the cumulative developments would be visible in the distance, above the line of trees and dredging would be visible in the foreground. The presence of other characteristic, cumulative developments will very slightly intensify the built visible structures from this location. The addition of the construction activities associated with the Project will result in a high cumulative impact, although no greater than that assessed for</p>	No additional mitigation proposed for cumulative effects.	<p>Construction: Major adverse (significant)</p> <p>Operation: Moderate adverse (significant)</p>

Viewpoint	Other developments relevant to CEA for this viewpoint	Sensitivity of receptor	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual cumulative effect
	Grimsby, Immingham and Sunk Dredged Channel (construction only) ID116 – Waste to fuel plant		the Project in isolation. The impact will be short term and reversible, resulting in a major adverse (significant effect). Operation: The presence of the stacks associated with the identified cumulative developments would slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Project would result in a medium cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be long term and reversible, resulting in a moderate adverse (significant) effect.		
4	ID5 – Scheme of Landscaping ID9 – Gas fuelled embedded energy generation compound – Site 4 ID10 - Gas fuelled embedded energy generation compound – Site 3 ID13 – Waste to energy plant ID16 - Gas fuelled embedded energy	Low - Motorised users of the road and commercial receptors	Construction: The construction of the cumulative developments would be visible in the middle distance across the view. The presence of other characteristic, cumulative developments would slightly intensify the built visible structures from this location. The addition of the construction activities associated with the Project would result in a medium cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be short term and reversible, resulting in a minor adverse (not significant) effect). Operation: The presence of the identified cumulative developments would slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Project would result in a medium cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be long	No additional mitigation proposed for cumulative effects.	Construction: Minor adverse (not significant) Operation: Minor adverse (not significant)

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Viewpoint	Other developments relevant to CEA for this viewpoint	Sensitivity of receptor	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual cumulative effect
	<p>generation compound – Site 1 ID17 - Gas fuelled embedded energy generation compound – Site 2 ID18 - Energy recovery facility</p>		term and reversible, resulting in a minor adverse (not significant) effect.		
5	<p>ID13 – Waste to energy plant ID18 – Energy recovery facility ID116 – Waste to energy plant</p>		<p>Construction: The construction of the stacks associated with the cumulative developments would be visible in the distance, above the line of trees. The presence of other characteristic, cumulative developments will very slightly intensify the built visible structures from this location. The addition of the construction activities associated with the Project will result in a low cumulative impact, although no greater than that assessed for the Project in isolation. The impact will be short term and reversible, resulting in a minor adverse (significant effect).</p> <p>Operation: The presence of the stacks associated with the identified cumulative developments would slightly intensify the visibility of characteristic built structures from this location. The addition of the structures associated with the Project would result in a low cumulative impact, although no greater than that assessed for the Project in isolation. The impact would be long term and reversible, resulting in a minor adverse (significant) effect.</p>	No additional mitigation proposed for cumulative effects.	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Minor adverse (not significant)</p>

Viewpoint	Other developments relevant to CEA for this viewpoint	Sensitivity of receptor	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual cumulative effect
11	ID13 – Waste to energy plant ID18 – Energy recovery facility ID116 -Waste to energy plant		Construction: The construction of the stacks associated with the cumulative developments would be visible in the middle and far distance. The presence of other characteristic, cumulative developments will very slightly intensify the built visible structures from this location. The addition of the construction activities associated with the Project will result in a high cumulative impact, although no greater than that assessed for the Project in isolation. The impact will be short term and reversible, resulting in a major adverse (significant effect).	No additional mitigation proposed for cumulative effects.	Construction: Major adverse (significant)

Immingham Eastern Ro-Ro Terminal (IERRT) (ID22)

- 1.11.5 Landscape and visual effects have been scoped out of the EIA for IERRT given that the development will take place within the existing port curtilage.
- 1.11.6 Given the nature of the baseline context, cumulative effects due to the IERRT development and the Project could arise but are not likely to introduce new or different significant effects. Similarly, any potential visual cumulative effects are likely to be of negligible magnitude (not significant) and experienced in the wider context of industrial views and infrastructure and are not likely to introduce new or different significant effects.
- 1.11.7 Given these reasons, the Project is not expected to interact cumulatively with IERRT in a way which would generate significant cumulative effects.

Conclusion

- 1.11.8 In conclusion, there will be **large adverse** (significant) cumulative effects for viewpoint 2 as a result of the cumulative impact of ID13, ID18 and ID115, with the Project, for viewpoint 11 as a result of ID13, ID18 and ID116, with the Project and for viewpoint 3 as a result of ID21, ID37, ID115 and ID116, with the Project during the construction phase. This is due to the visibility of multiple built structures from these locations. It should be noted that these effects are no greater than those assessed for the Project in isolation from these viewpoints. The impact will also be short term and reversible.
- 1.11.9 There will also be a **moderate adverse** (significant) cumulative effect on viewpoint 2 as a result of the cumulative impact of ID13, ID18 and ID115, with the Project and for viewpoint 3 as a result of the cumulative effect of the Project and ID13, ID18 and ID116 during the operational phase. It should be noted that these effects are no greater than those assessed for the Project in isolation from these viewpoints. This is due to the visibility of multiple built structures from this location. The impact will also be long term and reversible.
- 1.11.10 There will be a **moderate adverse** (significant) cumulative effect on the Site and its immediate setting during construction, as a result of the cumulative impact of ID5, ID115 and the Project. This is due to the introduction of construction activity alongside the Project. It should be noted that this effect is no greater than that assessed for the Project in isolation.
- 1.11.11 The remaining cumulative effects identified are assessed to be of minor effect or below and are therefore not considered to be significant.

1.12 Historic Environment (Terrestrial) Cumulative Effects

- 1.12.1 The potential for historic environment (terrestrial) effects has been considered for all phases of the Project in **Chapter 14: Historic Environment (Terrestrial) [TR030008/APP/6.2]**. The potential for cumulative interactions with other proposed developments and the Project are considered below.

Cumulative Effects During Construction and operation

- 1.12.2 Construction phase impacts as a result of the Project from a historic environment (terrestrial) perspective are limited to direct impact (damage or destruction) on a heritage asset. In some cases, if the heritage asset is particularly large, it is possible for impacts to cumulatively combine with those arising from another proposed development and increase the magnitude of effect upon a heritage asset. Cumulative effects during operation of the Project could arise where components of the Project when viewed alongside or combined with those from another proposed development could interrupt lines of inter-visibility or create an increase in massing within a view of historical importance.
- 1.12.3 However, in the case of the Project, none of the shortlisted developments identified in **Table 1** would result in additional physical impacts to the heritage assets identified within the Zol for the historic environment (terrestrial) assessment, and as such any direct impact on heritage assets is limited to the Project itself, with no opportunity for cumulative effects to increase the significance of effect already reported within the chapter.
- 1.12.4 Two of the shortlisted developments identified in **Table 1** would result in additional impacts to the setting of a number of cultural heritage assets impacted by the Project and have therefore been scoped-in to the Historic Environment (Terrestrial) cumulative effects assessment.
- 1.12.5 The cumulative effects of these impacts and the residual cumulative effects are detailed in **Table 10**.

Table 10: Short-listed developments Scoped-in to the Historic Environment (terrestrial) cumulative effects assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
116 - DM/0664/19/FUL	<p>Construction: ID 116 will result in the construction of a number of c.80m high stacks. These stacks will be visible to cultural heritage assets in the area and so will have an impact upon their setting. This includes an asset subject to adverse effects as a result of the Project. This asset will be subject to the mitigation measures already proposed within Chapter 14: Historic Environment (Terrestrial). The residual impacts upon this asset, from the Project, is as follows:</p> <ul style="list-style-type: none"> - MNL1797, Long Strip Post Medieval woodland, Minor Adverse Effect resulting from direct physical impact. <p>Following the proposed mitigation, the cumulative impact upon this asset, from direct physical impact by the Project and alteration to setting by ID116 is assessed as:</p> <ul style="list-style-type: none"> - MNL1797: Minor adverse effect <p>Operation: No cumulative effects identified</p>	No mitigation measures other than those already detailed as part of chapter 14 are considered necessary.	Construction: MNL1797: Minor Adverse Effect (not significant)

Conclusion

- 1.12.6** In conclusion, the construction of the Project will have a direct physical impact upon assets MNL1797 (Long Strip Post Medieval plantation woodland), ID116 may also have an effect on the settings of this asset. The cumulative impact of the Project and ID116 on MNL1797 is assessed as Minor adverse (not significant).
- 1.12.7** No cumulative effects have been identified on heritage assets for the operational phase of the Project.
- 1.13** Historic Environment (Marine) Cumulative Effects
- 1.13.1** The potential for cumulative effects from direct and indirect physical impacts to marine historic environment receptors are considered.
- 1.13.2** **Table 11** summarises how each of the developments included in the short list (**Table 1**) has been considered with regard to potential cumulative marine historic environment cumulative effects during construction and operation. One development was scoped into the assessment of construction and operational cumulative marine historic environment effects: ID 22.
- 1.13.3** Impacts from the disposal of dredged material have been scoped out from the ES (as per Scoping Opinion **Appendix 1.B [TR030008/APP/6.4]**, as it will take place at already licensed marine disposal sites that have been characterised for this purpose. However, the potential cumulative marine historic environment cumulative effects during construction and operation have been considered here for ID 115.

Cumulative Effects during construction

- 1.13.4** The following impact pathways have been assessed for their impact during the construction phase of the Project:
- Direct impacts on known and potential marine cultural heritage receptors as a result of construction and capital dredging.
 - Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes

Cumulative Effects during operation

- 1.13.5** The following impact pathways have been assessed for their impact during the operational phase of the Project:
- Direct impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of operational activities and maintenance dredging.
 - Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes.

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- 1.13.6 Direct physical effects are receptor-specific, the construction footprint of the Project does not overlap with receptors considered for IERRT and thus no cumulative effects are identified to be taken forward for assessment.
- 1.13.7 Indirect effects linked to changes to altered sediment or hydrological processes may have a wider zone of interaction but have been assessed as not significant for both projects.
- 1.13.8 Mitigation measures have been proposed within project-specific Draft Written Scheme of Investigations to mitigate any significant effects of IERRT and the Project and these measures will be agreed with the relevant stakeholders for both projects.
- 1.13.9 Furthermore, the mitigation measures employed as necessary in respect of each project, will minimise the potential for effects on marine archaeological resources arising from each project alone and will avoid cumulative effects between the two projects through both construction and operation.
- 1.13.10 Further details on mitigation measures to be deployed are proposed in detail within the Outline Written Scheme of Investigation for the Project.

Table 11: Historic Environment (Marine) Cumulative Effects

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
22 - TR030007	<p>Construction: Direct impacts on known and potential marine cultural heritage receptors as a result of construction and capital dredging.</p> <p>Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes as a result of the Project and ID 22.</p> <p>Operation: During the operational phase of the Project, there is potential for direct impacts on known and potential marine cultural heritage receptors and deposits of archaeological importance as a result of operational activities and maintenance dredging due associated with the Project and ID 22; and,</p> <p>Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes as a result of the Project and ID 22.</p> <p>Due to the embedded and additional mitigation measures, including avoidance of known features and a protocol for unexpected archaeological discoveries, proposed within the Outline Written Scheme of Investigation, it is unlikely that there will be any significant cumulative effects on the Marine Historic Environment as a result of both Projects.</p>	No additional mitigation proposed other than the measures proposed within the Outline Written Scheme of Investigation (Appendix 14.E [TR030008/APP/6.4]).	Negligible (not significant)
115 MLA/2014/00431/4	<p>Construction: Indirect impacts to known and potential marine cultural heritage receptors due to altered sediment or hydrological processes as a result of the Project and ID 115.</p> <p>Operation:</p>	No additional mitigation proposed other than the measures proposed within the Outline Written Scheme of Investigation (Appendix 14.E [TR030008/APP/6.4]).	Negligible (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>During the operational phase of the Project, there is potential for indirect impacts on known and potential marine cultural heritage receptors due to altered sediment or hydrological processes as a result of the Project and ID 115.</p> <p>Changes to hydrodynamics and sedimentary processes are predicted to be low/negligible for the Project as discussed in Chapter 16: Physical Processes [TR030008/APP/6.2], resulting in negligible indirect impacts on the marine resource (covered in Chapter 15: Historic Environment (Marine) [TR030008/APP/6.2]. Where dredging or disposal plumes from adjacent sites occur, these are temporal and are likely to have minimal impact.</p> <p>Due to the embedded and additional mitigation measures, including avoidance of known features and a protocol for unexpected archaeological discoveries, proposed within the Outline Written Scheme of Investigation, it is unlikely that there will be any significant cumulative effects on the Marine Historic Environment as a result of both the Project and ID 115.</p>		

Conclusion

- 1.13.11 The potential for cumulative effects from direct and indirect physical impacts to marine historic environment receptors have been considered and no significant effects have been identified from the scoped-in projects.
- 1.13.12 Embedded and additional mitigation strategies, as proposed in the Outline Written Scheme of Investigation (**Appendix 14.E [TR030008/APP/6.4]**), and alongside other project's mitigation strategies, also to be agreed with key stakeholders, will ensure that impacts to marine historic environment assets will be avoided and that significant cumulative effects are avoided.
- 1.14 Physical Processes Cumulative Effects
- 1.14.1 The potential for cumulative effects arising from changes in physical processes have been considered.
- 1.14.2 **Table 12** summarises how each of the developments included in the short list (**Table 1**) has been considered with regard to potential physical process cumulative effects during construction and operation. A total of five developments were scoped-in to the assessment of construction cumulative physical processes effects.

Cumulative Effects during construction

- 1.14.3 There is considered to be the potential for cumulative effects on physical processes as a result of changes to suspended sediment concentration during construction.

Cumulative Effects during operation

- 1.14.4 There is considered to be the potential for cumulative effects on physical processes as a result of a range of pathways including changes to hydrodynamics and changes to sediment transport pathways during operation.

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Construction

- 1.14.5 There is the potential for cumulative effects during construction with respect to the following pathway in relation to physical processes:
- Changes to suspended sediment concentration as a result of dredging and disposal.
- 1.14.6 Capital dredging for the IERRT project will remove approximately 190,000m³ of material with the capital dredge for the Project removing 4,000m³ of material. Dredging locations for the respective developments are approximately 1.5km apart, with IERRT located inshore of the western side of IOT and the Project located to the east of IOT alongside the main deep-water channel. The potential for overlapping dredge plumes is limited by the distance between dredge locations and would only occur if simultaneous dredging was taking place. The very small dredge for the Project will be completed within a few days so any longer-term potential for cumulative impacts will not occur. If simultaneous dredging did occur, the combined dredge plume would be expected to dissipate

under normal flow conditions within a single tide (around six hours), after which time the excess SSC is likely to be immeasurable against natural background levels.

- 1.14.7 In addition, sedimentation as a result of capital dredging for both projects is predicted to be highly localised and similar to background variability. The footprints of sedimentation from the dredging associated with each project are not predicted to overlap, indicating there will be no additive cumulative impact on the bed, particularly considering the very small dredge volume associated with the IGET scheme.

Operation

- 1.14.8 There is the potential for cumulative effects during operation with respect to the following pathways in relation to physical processes:
- a. Changes to hydrodynamics and waves.
 - b. Changes to sediment transport pathways.
 - c. Changes to suspended sediment concentration as a result of maintenance dredging and disposal.
- 1.14.9 Cumulative changes to hydrodynamics effectively overlay the predicted changes from each scheme in isolation. Magnitudes and extents of effect are similar to those shown in **Chapter 16: Physical Processes [TR030008/APP/6.2]** for the Project in isolation, with the addition of predicted changes in and around the proposed IERRT berth pocket. Overall, reductions in flow speed of around 0.05m/s are predicted downstream of the developments on the relative flood and ebb tidal states. The largest changes are associated with the deepening of the individual berth pockets. Cumulative impacts on hydrodynamics from both IERRT and the Project are considered to be minor.
- 1.14.10 Assessment of cumulative impacts on the local wave climate also indicates an overall additive effect of the impacts from each scheme in isolation. Magnitudes and extents of effect are similar to those shown in **Chapter 16: Physical Processes [TR030008/APP/6.2]** for the Project in isolation. In the lee of the proposed infrastructure, reductions in Hs of around 0.05m are predicted across IOT and up-estuary to Immingham East Jetty. The greatest extent of effect is predicted for the 0.5-yr events from the east and southeast directions, with predicted reductions in wave height of 0.02m up-estuary to the Immingham West Jetty. The largest magnitude of change is associated with the deepened individual berth pocket associated with the Project, where Hs from the extreme (50-yr) events is predicted to reduce by up to 0.2m out to the eastern tip of the IOT jetty head. Outside of these areas, no changes to baseline wave climate are predicted as a result of the cumulative IERRT and the Project assessment. Overall, cumulative impacts on waves from both IERRT and the Project are considered to be minor adverse.

- 1.14.11 Wider changes to sediment transport pathways across the far-field are not predicted from either project (in isolation) or from the combined assessment of both schemes. Local changes to peak flow speeds across the fronting foreshore, as a result of both IERRT and the Project are predicted to result in small magnitude, highly localised erosion along the LW mark (as described in Chapter 16). As a result, it is predicted that IERRT will lead to an indirect loss of <0.01 ha of intertidal area, whilst the Project is predicted to result in indirect loss of 0.03 ha. When assessed together, the cumulative impact of both schemes is shown to be a simple addition of each in isolation. In this way, the combined indirect loss of intertidal area, as a result of both IERRT and the Project, is predicted to be <0.04 ha.
- 1.14.12 The potential for cumulative impacts on suspended sediment concentrations (“SSCs”) is associated with future maintenance dredging. In the same way as assessed above for the capital dredge during construction, if simultaneous maintenance dredging is undertaken in the IERRT and the Project’s berth pockets, the resultant plumes could overlap and lead to an increased excess SSC. However, as described in **Chapter 16: Physical Processes [TR030008/APP/6.2]**, maintenance dredging for the Project is predicted to be very limited (if required at all), noting also that there is currently no maintenance dredge requirement at the IOT berth, just to the west of the proposed Project berth. As a result, any dredging that is required will only be undertaken very infrequently (likely several years between campaigns). Consequently, the potential for cumulative impacts arising from IERRT and the Project maintenance dredging is considered unlikely.

Table 12 Physical Processes Cumulative Effects Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
22 - TR030007	<p>There is the potential for cumulative effects with respect to the following elements in relation to physical processes:</p> <ul style="list-style-type: none"> • Changes to hydrodynamics (flows and waves); and • Changes to sediment transport pathways. <p>Changes to hydrodynamics: The marine elements of the proposed ID22 (Immingham Eastern Ro Ro Terminal (IERRT)) works are located approximately 0.1km up-estuary of the Project location. In between the two schemes is the infrastructure associated with the Immingham Oil Terminal. The assessment for the Project indicates that the extent of change to hydrodynamics does extend up-estuary to the IERRT works location. A cumulative assessment of the potential change from the IERRT works together with the Project has been undertaken. The results of this assessment are described in more detail above. In summary, the assessment indicates that resulting changes to hydrodynamics and waves typically combine the impacts of the two schemes in isolation. Overall magnitude and extent of effect is similar to those provided for the Project alone in Chapter 16: Physical Processes [TR030008/APP/6.2]. Consequently, it is considered that changes to the hydrodynamics and waves (in the direction of the proposed IERRT scheme) will result in low magnitude, highly localised cumulative effects arising from the two schemes.</p> <p>Changes to sediment transport pathways: As described above, it is considered likely that any cumulative effects on hydrodynamics developing from the construction and operation of both the Project and IERRT works will be small in magnitude and highly localised in extent. Since these are the driving forces of the local sediment transport pathways, it is further considered that any cumulative effects on this element will also be small in magnitude and localised in extent. Modelling of the two schemes together results in a combined effect</p>	NA	Negligible (not significant)

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>on changes to erosion and accretion i.e. the impacts from each scheme in isolation are spatially overlaid when assessed cumulatively without any enhanced impact arising from the two schemes together. Consequently, the cumulative effects are therefore predicted to be negligible.</p>		
<p>25 - TR030001, TR030005 and TR030006</p>	<p>There is the potential for cumulative effects with respect to the following elements in relation to physical processes:</p> <ul style="list-style-type: none"> • Changes to hydrodynamics (flows and waves); and • Changes to sediment transport pathways. <p>Changes to hydrodynamics: The marine elements of the proposed ID25 (AMEP) works are located approximately 3km up-estuary of the Project location. In between the two schemes is the infrastructure associated with the Immingham Oil Terminal, Immingham Eastern and Western jetties, the Immingham Outer Harbour, the Humber International Terminal and the Immingham Gas Jetty. The assessment for IGET indicates that the extent of change to hydrodynamics and waves does not extend up-estuary to the AMEP works location. Whilst an assessment of the potential change from the AMEP works together with the Project has not been undertaken, it is likely that any changes to the hydrodynamics and waves (in the direction of the Project) will be tempered by the existing port infrastructure described above. Consequently, it is considered unlikely that any cumulative effects will be generated.</p> <p>Changes to sediment transport pathways: As described above, it is considered unlikely that any cumulative effects on hydrodynamics will develop from the construction and operation of both IGET and the AMEP works. Since these are the driving forces of the local sediment transport pathways, it is further considered unlikely that any cumulative effects will develop in relation to this element.</p>	<p>NA</p>	<p>No residual cumulative effect.</p>

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
102 - DM/1071/22/FUL	<p>There is the potential for cumulative effects with respect to the following elements in relation to the physical processes:</p> <ul style="list-style-type: none"> • Changes to hydrodynamics (flows and waves); and • Changes to sediment transport pathways. <p>Changes to hydrodynamics: The marine elements of the proposed rock revetment repair and reinforcement works are located approximately 1.6km down-estuary of the Project location. The assessment for the Project indicates that the extent of change to hydrodynamics and waves does not extend down-estuary to the proposed repair works location. Whilst an assessment of the potential change from the repair works together with the Project has not been undertaken, it is considered likely that any changes to the hydrodynamics and waves (in the direction of the Project) will be small in magnitude and limited in extent (as a result of the nature of the works). Consequently, it is considered unlikely that any in-combination effects will be generated.</p> <p>Changes to sediment transport pathways: As described above, it is considered unlikely that any in-combination effects on hydrodynamics will develop from the construction and operation of both the Project and the planned repair and reinforcement works. Since these are the driving forces of the local sediment transport pathways, it is further considered unlikely that any in-combination effects will develop in relation to this element.</p>	N/A	No residual cumulative effect.
94 - MLA/2020/00520	<p>There is the potential for cumulative effects with respect to the following elements in relation to the physical processes:</p> <ul style="list-style-type: none"> • Changes to hydrodynamics (flows and waves); and • Changes to sediment transport pathways. <p>Changes to hydrodynamics: The marine elements of the proposed ID94 (HIT berth 2 works) are located approximately 2.5km up-estuary of the Project location. In between the two schemes is the infrastructure associated with the</p>	NA	No residual cumulative impact

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Immingham Oil Terminal, Immingham Eastern and Western jetties, the Immingham Outer Harbour and the Humber international Terminal. The assessment for Project indicates that the extent of change to hydrodynamics and waves does not extend up-estuary to the HIT berth 2 works location. Whilst an assessment of the potential change from the HIT works together with the Project has not been undertaken, it is likely that any changes to the hydrodynamics and waves (in the direction of the Project) will be tempered by the existing port infrastructure described above. Consequently, it is considered unlikely that any cumulative effects will be generated.</p> <p>Changes to sediment transport pathways: As described above, it is considered unlikely that any cumulative effects on hydrodynamics will develop from the construction and operation of both Project and the HIT berth 2 works. Since these are the driving forces of the local sediment transport pathways.</p>		
115 - MLA/2014/00431/4	<p>In relation to physical processes, there is the potential for cumulative effects with respect to increased Suspended Sediment Concentrations (SSCs) as a result of ID115 (maintenance dredging and disposal of material from Grimsby, Immingham, and Sunk Dredged Channel).</p> <p>The assessment of the proposed capital dredge works for the Project indicates a very small dredge (and disposal) volume is required for the berth pocket. In addition, assessment of the potential future maintenance dredge requirements indicates negligible accretion within the berth pocket, meaning significant future dredging for the Project is unlikely to be required. Where they occur, cumulative effects from dredge or disposal plumes from adjacent sites will only exist for a very short period of time (a matter of hours) when activities are taking place concurrently. Once the next peak tide (ebb or flood) has dispersed the plume across the wider study area, the increased SSCs values are unlikely to be distinguishable from the existing background concentrations. It is also considered likely that the availability of dredging plant (servicing the ports and approaches across the wider Humber, including Goole, Hull and Grimsby) will mean the potential for capital dredging at the Project to be taking place</p>	NA	Negligible (not significant)

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ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	concurrently with maintenance dredging at adjacent locations - and at the same time - is highly unlikely.		

Conclusion

1.14.13 In conclusion, no significant cumulative effects have been identified on physical processes as a result of the scoped-in shortlisted developments and the Project.

1.15 Marine Water and Sediment Quality Cumulative Effects

1.15.1 In relation to water and sediment quality, there is the potential for cumulative effects with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality. The redistribution of sediment-bound contaminants may also result in cumulative effects.

1.15.2 **Table 13** summarises how each of the developments included in the shortlist (**Table 1**) has been considered with regard to potential marine water and sediment quality cumulative effects during construction and operation. Four developments were scoped into the assessment of cumulative marine and sediment quality effects.

1.15.3 The exact timeframes of each activity for the above developments are currently unknown, however, it is anticipated that the construction and operational phases of these projects could coincide with those of the Project.

Cumulative Effects during construction

1.15.4 Cumulative effects during construction may result from increases in suspended sediment concentrations (and associated effects on dissolved oxygen concentrations and the release of sediment bound contaminants) associated with piling, capital dredging and disposal involved with the Project and the developments scoped into this assessment. However, any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project are assessed as minor adverse, cumulative effects during construction are also anticipated to be minor adverse.

Cumulative Effects during operation

1.15.5 Cumulative effects during operation may result from increases in suspended sediment concentrations (and associated effects on dissolved oxygen concentrations and the release of sediment bound contaminants) associated with maintenance dredging and disposal involved with the Project and the developments scoped into this assessment. However, only IDs 22 and 25 will involve maintenance dredging and disposal activities. In these cases, as for cumulative effects during construction (described above), any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project are assessed as minor adverse, cumulative effects are also anticipated to be minor adverse.

1.15.6 The maintenance dredging and disposal of material during the operation of the IGET would fall under the activities licensed under ID 115. Therefore, no cumulative effects are anticipated between these developments/activities.

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- 1.15.7 As noted above, cumulative effects during construction of IGET and IERRT may result from increases in suspended sediment concentrations (and associated effects on dissolved oxygen concentrations and the release of sediment bound contaminants) associated with piling, capital dredging and disposal.
- 1.15.8 Changes to suspended sediment concentrations are predicted to be spatially limited for both the Project and IERRT. This is described in more detail in the Physical Processes assessment of cumulative effects. The potential for overlapping dredge plumes is limited by the distance between dredge locations and would only occur if simultaneous dredging was to take place. The very small dredge for the Project will be completed within a few days so any longer-term potential for cumulative impacts will not occur. If simultaneous dredging did occur, the combined dredge plume would be expected to dissipate under normal flow conditions within a single tide (around 6 hours), after which time the excess suspended sediment concentration is likely to be immeasurable against natural background levels.
- 1.15.9 As a consequence, cumulative effects with IERRT on marine water and sediment quality during construction are anticipated to be minor adverse. Therefore, no additional mitigation measures are required.
- 1.15.10 In the same way as assessed above for the capital dredge during construction, if simultaneous maintenance dredging is undertaken in the IERRT and the Project berth pockets, the resultant plumes could overlap and lead to excess suspended sediment concentrations (and associated effects on marine water and sediment quality) during operation. However, as described in the Physical Processes assessment of cumulative effects, maintenance dredging for the Project is predicted to be very limited (if required at all). Consequently, the potential for cumulative impacts arising from IERRT and the Project maintenance dredging is considered unlikely.

Table 13 Marine Water and Sediment Quality Cumulative Assessment

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
22 - TR030007	<p>Construction:</p> <p>During construction, there is the potential for cumulative effects as a result of the Project and ID22 (IERRT) with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance during piling, capital dredging and disposal. Any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project were assessed as minor adverse, cumulative effects are also anticipated to be minor adverse.</p> <p>Operation:</p> <p>During operation, there is the potential for cumulative effects with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance during maintenance dredging and disposal. However, as described in Chapter 16: Physical Processes [TR030008/APP/6.2], maintenance dredging for the Project is predicted to be very limited (if required at all), noting also that there is currently no maintenance dredge requirement at the IOT berth, just to the west of the proposed the Project berth. As a result, any dredging that is required will only be undertaken very infrequently (likely several years between campaigns). Consequently, the potential for cumulative impacts arising from IERRT and the Project maintenance dredging is considered unlikely.</p>	N/A	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Negligible (not significant)</p>
25 - TR030001, TR030005 and TR030006	<p>Construction:</p> <p>During construction, there is the potential for cumulative effects between the Project and ID25 with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance during</p>	N/A	Construction: Minor adverse (not significant)

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>piling, capital dredging and disposal. Any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project were assessed as minor adverse, cumulative effects are also anticipated to be minor adverse.</p> <p>Operation:</p> <p>During operation, there is the potential for cumulative effects with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance during maintenance dredging and disposal. As for cumulative effects during construction (described above), any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project were assessed as minor adverse, cumulative effects are also anticipated to be minor adverse.</p>		<p>Operation:</p> <p>Negligible (not significant)</p>
102 - DM/1071/22/FUL	<p>Construction:</p> <p>During construction, there is the potential for cumulative effects between the Project and ID102 with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance. Any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the Project are assessed as insignificant to minor adverse, cumulative effects are also anticipated to be insignificant to minor adverse.</p> <p>Operation:</p>	N/A	<p>Construction: Minor adverse (not significant)</p> <p>Operation:</p> <p>Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	During operation, there is limited potential for cumulative effects on marine water and sediment quality.		
94 - MLA/2020/00520	<p>Construction:</p> <p>During construction, there is the potential for cumulative effects as a result of the Project and ID94 with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of seabed disturbance during piling. Any changes would cause highly localised and temporary changes in suspended sediment levels (and related changes in releases of sediment bound contaminants and dissolved oxygen) which is considered unlikely to produce adverse effects. On this basis and given that water quality effects as part of the IGET project are assessed as minor adverse, cumulative effects are also anticipated to be minor adverse.</p> <p>Operation:</p> <p>During operation, there is limited potential for cumulative effects on marine water and sediment quality.</p>	N/A	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Negligible (not significant)</p>
115 - MLA/2014/00431/4	<p>Construction:</p> <p>During construction, there is the potential for cumulative effects as a result of the Project and ID94 with respect to increased suspended sediment concentrations and changes to dissolved oxygen and chemical water quality as a result of maintenance dredging and disposal of material from Grimsby, Immingham, and Sunk Dredged Channel. The redistribution of sediment-bound contaminants may also result in cumulative effects.</p> <p>Cumulative effects from dredge or disposal plumes from adjacent sites will only exist for a short period of time (a matter of hours) when activities are taking place concurrently. Once the next peak tide (ebb or flood) has dispersed the plume across the wider study area, the increased SSC values are unlikely to be distinguishable from the existing background concentrations. It is also considered likely that the availability of dredging plant (servicing the ports and approaches across the wider Humber, including Goole,</p>	N/A	<p>Construction: Minor adverse (not significant)</p> <p>Operation: Negligible (not significant)</p>

ID	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>Hull and Grimsby) will mean the potential for dredging to be taking place at adjacent locations and at the same time is limited.</p> <p>Operation:</p> <p>The maintenance dredging and disposal of material during the operation of the Project would fall under the activities licensed under MLA/2014/00431/4. Therefore, no cumulative effects are anticipated.</p>		

Conclusion

1.15.11 On the basis of the assessment presented above as well as the conclusions presented in **Chapter 17: Marine Water and Sediment Quality [TR030008/APP/6.2]**, it is considered that there would be no significant cumulative effects on marine water and sediment quality.

1.16 Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Cumulative Effects

1.16.1 **Table 14** summarises how each of the developments included in the short list (**Table 1**) have been considered with regard to potential water use, water quality, coastal protection, flood risk and drainage cumulative effects during construction and operation. A total of 13 developments were scoped-in to the assessment of construction and operational cumulative water quality, coastal protection, flood risk and drainage effects.

1.16.2 The assessment of the construction and operational cumulative effects of water quality, coastal protection, flood risk and drainage from the Project has been undertaken together with the predicted impacts on water use, water quality, coastal protection, flood risk and drainage presented in the ES Water Chapters, Flood Risk Assessments and Drainage Strategies (where available) submitted with development applications for the other scoped in, shortlisted developments identified in **Table 1**.

Cumulative Effects during construction

1.16.3 There is likely to be overlap between construction of several of the 'scoped in' developments identified in **Table 14**, below, and construction of the Project. Thus, there is the potential for short term, temporary construction related pollutants generated from both the Project and all of the above developments to impact on watercourses in the Zol (with watercourses affected including Habrough Marsh Drain, North Beck Drain and local land drains).

1.16.4 Impacts during the construction phase include deterioration of water quality due to pollution via spills on site and sediment loading, changes in local hydrodynamics, changes in flow paths for flood risk and surface water and increases in surface water runoff rates due to new impermeable areas and compacted ground. However, provided that standard and good practice mitigation is implemented on the construction sites through their respective CEMPs and as per the conditions of the relevant planning permission, environmental permits and licences (refer to **Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [TR030008/APP/6.2]** and the **Outline CEMP (Appendix 2.C [TR030008/APP/6.4])**), the cumulative risk can be effectively managed and there would not be a significant increase in the risks to any waterbodies. As such, there would not be any cumulative impacts during construction. Similarly, for construction water demands, by adopting best practice in this area, the Proposed Developments and the Project will ensure that water supplies to homes and businesses will not be interrupted or reduced as a result of construction activities.

Cumulative Effects during operation

- 1.16.5 It is assumed that drainage strategies for all of the ‘scoped in’ developments identified in **Table 14** have been or will be produced in consultation with the relevant stakeholder (North East Lindsey Drainage Board (“NELIDB”) and/or Lead Local Flood Authority (“LLFA”)) and with reference to the relevant policies and guidance documents outlined in **Chapter 18: Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage [TR030008/APP/6.2]**, and **Appendix 18.B: Drainage Strategy [TR030008/APP/6.4]** and therefore provide betterment in surface water run-over the lifetime of the developments when compared to the current scenario. The Project will similarly be designed to ensure no long-term deterioration in water quality or increase in flooding. Attenuation and treatment will be provided for runoff from the Project prior to discharge to waterbodies. As such, provided that all the mitigation measures are implemented for all developments, the cumulative effects from the Project and the developments ‘scoped in’ as in **Table 14** would have a minor beneficial effect (not significant).
- 1.16.6 The water use needs for the Project, for Phase 1-6 has been met by the agreement with Anglian Water. The Water Resources Management Plan process carried out by Anglian Water will therefore have taken this supply agreement into account for the Project and will have considered the water use requirements for other proposed developments within the CEA study area. Therefore, it is considered that there will not be any significant cumulative effects for water use.
- 1.16.7 As well as this, the water needs for other proposed developments and any agreements with Anglian Water that they may have are unknown and commercially sensitive for each other proposed development preventing further assessment being carried out.

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Any changes to water quality in waterbodies local to the Sites (excluding the Humber, covered under marine), are predicted to be spatially limited for both the Project and the IERRT development. The mitigation measures identified as necessary in respect of each project, as defined through the EIA process, will minimise the potential for impacts on water quality arising from each project alone and so will also minimise the risk of adverse cumulative effects between the two projects during both construction and operation.

- 1.16.8 The Physical Processes assessment undertaken for both developments concludes that as the local hydrodynamics will remain comparable to the baseline scenarios, there will be negligible changes to wave heights, tidal water levels and the rates of erosion or accretion on the foreshore (above natural variations) both on-site (along the frontage of the Project) and off-site (along wider frontage of the Port of Immingham, including the IERRT development).
- 1.16.9 Project specific Flood Risk Assessments have been undertaken and Drainage Strategies produced for both IERRT and the Project. The mitigation measures identified as necessary in respect of each project, as defined through the Flood Risk Assessment, drainage design and EIA process, will minimise the potential for flood risk and drainage risks, arising from each project alone and so will also

minimise the risk of adverse cumulative effects between the two projects during both construction and operation.

- 1.16.10 Given the information above, the Project is not expected to interact cumulatively with IERRT with regards water quality, coastal protection and flood risk. The cumulative effect of providing betterment in surface water run-off via the individual developments' drainage strategies has the potential to provide a minor beneficial cumulative effect on surface water run-off and fluvial flood risk from local watercourses. Overall, potentially significant cumulative effects on water quality, coastal protection, flood risk and drainage are not anticipated.

Table 14 Water Use, Water Quality, Coastal Protection, Flood Risk and Drainage Cumulative Assessment

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
1 - DM/1145/19/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby surface water courses, predominantly the North Beck Drain causing a temporary deterioration in water quality. No assessment of water quality has been undertaken as part of the DM/1145/19/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain / local land drains and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p>	<p>Construction works will be in accordance with the CEMP.</p> <p>Both sites will be constructed and operated in accordance with environmental legislation, regulations and good practice, as detailed in the respective CEMPs.</p> <p>No additional mitigation is proposed for cumulative effects for the Project beyond those presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A: Flood Risk Assessment and Appendix 18.C: Drainage Strategy [TR030008/APP/6.4].</p>	<p>Construction: Negligible</p> <p>Operation: Minor beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Surface water drainage systems and discharge to North Beck Drain / local land drains for the Project and DM/1145/19/FUL have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments provide betterment over the current scenario the cumulative effects is considered to be minor beneficial.</p>		
<p>3 - DM/0105/18/FUL</p>	<p>Scoped in – Potential for cumulative construction and operational water quality, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off, however the potential for cumulative effects with regards temporary deterioration of water quality is limited as the Project and the proposed development drain to different watercourses. The Project drains to Habrough Marsh Drain/ North Beck Drain whereas the development proposed in DM/0105/18/FUL drains to Middle Drain with little hydraulic connectivity between the two watercourses. No assessment of water quality has been undertaken as part of the DM/1145/19/FUL</p>	<p>Construction works will be in accordance with the CEMP.</p> <p>Both sites will be constructed and operated in accordance with environmental legislation, regulations and good practice.</p> <p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>application, however, any change in water quality is considered to be negligible.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with local watercourses/land drains and capacity issues with surface water drainage infrastructure which in turn can increase the risk of flooding from surface water and fluvial sources. As noted above, the Project and the development proposed in DM/0105/18/FUL drain to different watercourses therefore the potential for cumulative effects on flood risk and drainage are limited.</p> <p>Operation:</p> <p>Surface water drainage systems and discharge to North Beck Drain/ local land drains for the Project and DM/1145/19/FUL have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments provide betterment over the current scenario the cumulative effects for the wider area are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>	<p>additional mitigation proposed for cumulative effects.</p>	

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
5 - DM/0968/19/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of The West Site and the proposed development in DM/0968/19/FUL may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may predominantly affect nearby North Beck Drain causing a temporary deterioration in water quality. No assessment of water quality has been undertaken as part of the DM/0968/19/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0968/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flood risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the</p>	<p>Construction works will be in accordance with the CEMP.</p> <p>Both sites will be constructed and operated in accordance with environmental legislation, regulations and good practice.</p> <p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>cumulative effect of construction periods overlapping is considered negligible.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0968/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is assessed as a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, Surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario the cumulative</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.		
9 - DM/0865/19/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby North Beck Drain causing a temporary deterioration in water quality, however, given the distance of the Project from North Beck Drain the potential for cumulative effects is limited. No assessment of water quality has been undertaken as part of the DM/0865/19/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0865/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding</p>	<p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0865/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites have areas of ground raising and are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>In addition, Surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario the cumulative effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>		
10 - DM/0864/19/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby North Beck Drain causing a temporary deterioration in water quality, however, given the distance of the Project from Stallingborough North Beck the potential for cumulative effects is limited. No assessment of water quality has been undertaken as part of the DM/0864/19/FUL application,</p>	<p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Construction: Negligible</p> <p>Operation: Minor beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0864/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0864/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites have areas of ground raising and are at high residual risk of flooding should a breach/overtopping of the flood</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, Surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario the cumulative effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>		
13 - DM/0628/18/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby North Beck Drain causing a temporary deterioration in water quality however, given</p>	<p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>the distance of the Project from North Beck Drain the potential for cumulative effects is limited. No assessment of water quality has been undertaken as part of the DM/0628/18/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0864/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0628/18/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>which is considered a medium risk. Both sites have are at high residual risk of flooding should a breach/overlapping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario (surface water runoff from the DM/0628/18/FUL application site is limited to greenfield run-off) the cumulative effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>		
16 - DM/0862/19/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. 	<p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>development proposed is located inland from the coastline.</p>	<p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby North Beck Drain causing a temporary deterioration in water quality, however, given the distance of the Project from North Beck Drain the potential for cumulative effects is limited. No assessment of water quality has been undertaken as part of the DM/0862/19/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0862/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated</p>	<p>[TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0862/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites have areas of ground raising and are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, Surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario the cumulative effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>		
17 - DM/0863/19/FUL	Scoped in – Potential for cumulative construction and operational water	Construction:	Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal	Construction: Negligible

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect nearby North Beck Drain causing a temporary deterioration in water quality, however, given the distance of the Project from North Beck Drain the potential for cumulative effects is limited. No assessment of water quality has been undertaken as part of the DM/0863/19/FUL application, however, any change in water quality is considered to be negligible.</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0863/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the</p>	<p>protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with North Beck Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0863/19/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites have areas of ground raising and are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, Surface water drainage systems that discharge to North Beck Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority. As the drainage systems for both developments will provide betterment over the current scenario the cumulative</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.		
18 - DM/0026/18/FUL	<p>Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.</p> <p>No potential for cumulative construction and operational effects for coastal protection as the development proposed is located inland from the coastline.</p>	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes in water quality; • Increase in flood risk from fluvial, tidal and surface water sources; and • Increase in surface water run-off rates/volumes. <p>Changes in water quality: The construction phase of both sites may result in potential spillages and sediment in surface water run-off. The potential spillages and increase in sediment in surface water may affect the nearby North Beck Drain and Habrough Marsh Drain causing a temporary deterioration in water quality, however, given the DM/0026/18/FUL application site is embanked by the flood defences along the North Beck the potential for cumulative effects on the North Beck are limited. The impact on water quality is assessed in both the Project and DM/0026/18/FUL application with both assessments concluding that the impact on water quality is negligible.</p>	<p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0026/18/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Increase in surface water run-off volumes/rates: The cumulative effect of the construction phases may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with Habrough Marsh Drain and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from all sources in the FRA supporting DM/0026/18/FUL is assessed as low, as is the risk of flooding for the Project, with the exception of groundwater flooding which is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p> <p>In addition, surface water drainage systems for both sites have been designed in line with national best practice and agreed with the appropriate regulatory authority. The drainage systems for both developments will provide betterment over the current scenario, including the use of reed beds on the DM/0026/18/FUL application site which also provides water quality improvements, the cumulative effects for drainage are considered to be minor beneficial in terms of flood risk from surface water and fluvial sources.</p>		
22 - TR030007	Scoped in – Potential for cumulative construction and operational water quality, coastal protection, flood risk and drainage effects.	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Changes to tidal water levels; • Changes to erosion/accretion rates on the foreshore; • Changes in water quality; and • Increase in surface water run-off rates/volumes. <p>Changes to tidal water levels: As noted in the Physical Processes assessment for IERRT, the extent of change to hydrodynamics extends down-estuary to the Project location. It is likely that changes to the</p>	<p>Construction works will be in accordance with the CEMP.</p> <p>Both sites will be constructed and operated in accordance with environmental legislation, regulations and good practice.</p> <p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and</p>	<p>Construction: Negligible</p> <p>Operation: Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>hydrodynamics and waves (in the direction of the Project) will result in low magnitude, highly localised in-combination effects arising from the two schemes.</p> <p>Changes to erosion/accretion rates on the foreshore: it is considered likely that any cumulative effects on hydrodynamics developing from the construction of both IERRT and the Project will be small in magnitude and highly localised in extent. Since these are the driving forces of the local sediment transport pathways, it is further considered that any cumulative effects on this element will also be small in magnitude and localised in extent.</p> <p>Changes in water quality: The construction phase of the landside infrastructure on both sites may result in potential spillages. The potential spillages may affect nearby surface water courses, including the North Beck catchment causing a temporary deterioration in water quality.</p> <p>Increase in surface water run-off volumes/rates: The construction and operational phase of the landside infrastructure may result in potential increases in surface water run-off rates and volumes generated from new areas of hardstanding which affects water levels and flood risk associated with Habrough Marsh Drain/ local land drains and capacity issues with surface water drainage infrastructure.</p> <p>Operation:</p>	<p>drainage , Chapter 16: Physical Processes [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Changes to erosion/accretion rates on the foreshore: it is considered likely that any cumulative effects on hydrodynamics developing from the operation of both IERRT and the Project will be small in magnitude and highly localised in extent. Since these are the driving forces of the local sediment transport pathways, it is further considered that any cumulative effects on this element will also be small in magnitude and localised in extent.</p> <p>Both application sites include the raising of flood defences within their application boundaries in line with climate change to maintain the standard of protection to the developments and the surrounding areas.</p> <p>Surface water drainage systems and discharge to Habrough Marsh Drain/ land drains have been designed in line with national best practice and agreed with the appropriate regulatory authority the design of the surface water drainage systems on both sites. This includes a reduction in surface water run-off to 70% of the existing run-off rates on both the IERRT and Project Site, thus providing a betterment in terms of flood risk from surface water and fluvial sources.</p>		
87 - DM/0422/17/FUL	Scoped in – Potential for cumulative construction and operational flood risk	<p>Construction:</p> <p>There is the potential for cumulative effects with respect to the following elements:</p> <ul style="list-style-type: none"> • Increase in flood risk from tidal water sources. 	Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage [TR030008/APP/6.2] ,	<p>Construction: Negligible</p> <p>Operation: Negligible</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Construction</p> <p>Increase in flood risk: The risk of flooding from tidal sources in the FRA supporting DM/0422/17/FUL is assessed as low, as is the risk of flooding for the Project, is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defenses occur, however an increase in flood risk during the construction phase as a consequence of the cumulative effect of construction periods overlapping is unlikely.</p> <p>Operation:</p> <p>Increase in flood risk: The risk of flooding from tidal sources in the FRA supporting DM/0422/17/FUL is assessed as low, as is the risk of flooding for the Project, is considered a medium risk. Both sites are at high residual risk of flooding should a breach/overtopping of the flood defences occur, however an increase in flood risk during the operation phase as a consequence of the cumulative effect of the developments is negligible given the extent of flooding along the South Humber Coast should a breach event occur.</p>	<p>Appendix 18.A Flood Risk Assessment. No additional mitigation proposed for cumulative effects.</p>	
94 - MLA/2020/00520	Scoped in – Potential for cumulative construction and operational coastal	Construction:	Construction works will be in accordance with the CEMP.	Construction: Negligible Operation:

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	<p>protection, flood risk and drainage effects.</p> <p>Potential for cumulative effects on water quality is summarised in the Physical Processes cumulative assessment.</p>	<p>There is the potential for cumulative effects with respect to the following elements in relation to the coastal protection, flood risk and drainage chapter:</p> <ul style="list-style-type: none"> • Changes to tidal water levels; and • Changes to erosion/accretion rates on the foreshore. <p>Changes to tidal water levels: As noted in Physical Processes the assessment for the Project indicates that the extent of change to hydrodynamics and waves does not extend up-estuary to the HIT berth 2 works location. Whilst an assessment of the potential change from the HIT works together with the Project has not been undertaken, it is likely that any changes to the hydrodynamics and waves (in the direction of the Project will be tempered by the existing port infrastructure. Consequently, it is considered unlikely that any cumulative effects will be generated.</p> <p>Changes to erosion/accretion rates on the foreshore: As described above, it is considered unlikely that any cumulative effects on hydrodynamics will develop from the construction of both the Project and the HIT berth 2 works. Since these are the driving forces of the local sediment transport pathways, it is further considered unlikely that any cumulative effects will develop in relation to this element.</p> <p>Operation:</p>	<p>Both sites will be constructed and operated in accordance with environmental legislation, regulations and good practice.</p> <p>Mitigation as presented in Chapter 18: Water Use, Water Quality, coastal protection, flood risk and drainage , Chapter 16: Physical Processes [TR030008/APP/6.2], Appendix 18.A Flood Risk Assessment and Appendix 18.C Drainage Strategy [TR030008/APP/6.4]. No additional mitigation proposed for cumulative effects.</p>	<p>Negligible to Minor Beneficial</p>

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Changes to tidal water levels: As noted in Physical Processes the assessment for the operation of the Project indicates that the extent of change to hydrodynamics and waves does not extend up-estuary to the HIT berth 2 works location. Whilst an assessment of the potential change from the HIT works together with the Project has not been undertaken, it is likely that any changes to the hydrodynamics and waves (in the direction of the IGET will be tempered by the existing port infrastructure. Consequently, it is considered unlikely that any cumulative effects will be generated.</p> <p>Changes to erosion/accretion rates on the foreshore: As described above, it is considered unlikely that any cumulative effects on hydrodynamics will develop from the operation of both the Project and the HIT berth 2 works. Since these are the driving forces of the local sediment transport pathways, it is further considered unlikely that any cumulative effects will develop in relation to this element.</p> <p>Surface water drainage systems have been designed in line with national best practice and agreed with the appropriate regulatory authority the design of the surface water drainage systems on both sites, thus providing a betterment in terms of flood risk from surface water and fluvial sources.</p>		

ID	Scope of water use water quality, coastal protection, flood risk and drainage cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
115- MLA/2014/00431/4	<p>Scoped in – Potential for cumulative construction and operational coastal protection, flood risk and drainage effects.</p> <p>Potential for cumulative effects on water quality is summarised in the Physical Processes cumulative assessment.</p>	<p>Construction:</p> <p>In relation to coastal protection, flood risk and drainage, there is the potential for cumulative effects with respect to changes in the erosion/ accretion of the foreshore which in turn can impact the integrity of the flood defences as a result of maintenance dredging and disposal of material from Grimsby, Immingham, and Sunk Dredged Channel.</p> <p>Cumulative effects from dredge or disposal plumes from adjacent sites will only exist for a short period of time (a matter of hours) when activities are taking place concurrently. Once the next peak tide (ebb or flood) has dispersed the plume across the wider study area, the increased suspended sediment concentration values are unlikely to be distinguishable from the existing background concentrations. It is also considered likely that the availability of dredging plant (servicing the ports and approaches across the wider Humber, including Goole, Hull and Grimsby) will mean the potential for dredging to be taking place at adjacent locations and at the same time is limited.</p> <p>Operation: As Construction</p>	None Required beyond those reported in Chapter 16: Physical Processes [TR030008/APP/6.2]	<p>Construction: Negligible</p> <p>Operation: Negligible</p>

Conclusion

- 1.16.11 In summary cumulative water use, water quality, coastal protection, flood risk and drainage effects would be of the same level of significance as the effects from the Project alone during the construction phase. During the operational phase, the cumulative water use, water quality, coastal protection, flood risk and drainage effects would be a **minor beneficial** effect.
- 1.17 Climate Change Cumulative Effects
- 1.17.1 The Greenhouse Gas (“GHG”) assessment for the Project, including any appropriate cumulative impacts assessment, was carried out in line with the current guidance developed by the Institute of Environmental Management and Assessment (“IEMA”), last updated in February 2022.
- 1.17.2 This guidance makes it clear that the standard approach to cumulative impacts assessment for greenhouse gases differs from that taken for many other environmental disciplines within the EIA process.
- 1.17.3 The environmental receptors for disciplines such as air quality, noise, traffic, and landscape and visual will generally be located in relatively close proximity to the source. The receptor for emissions of greenhouse gases, however, is the entire global climate and therefore sources of emissions for assessment should not be constrained within a geographically defined location.
- 1.17.4 Considering the future GHG emissions estimated through the GHG assessment presented in the **Chapter 19: Climate Change [TR030008/APP/6.2]**, it is clear that actual emissions of GHGs will inevitably occur across a wide geographical area, due to a range of factors including the location of electricity generation sources, the travel behaviours of staff accessing the port by different transport modes, and particularly the international nature of the shipping emissions which constitute the majority of the GHG emissions associated with the Project.
- 1.17.5 Shipping emissions account for a majority of emissions resulting from the Project and occur as a result of ships departing/arriving to/from a range of destinations, most of which are anticipated to be overseas.
- 1.17.6 The IEMA guidance states that:
- “All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being of ‘high’ sensitivity to further emissions”.*
- “Effects of GHG emissions from specific cumulative projects therefore should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other.”*
- 1.17.7 In conclusion, there is no difference in the impact on the global climate of a tonne of carbon dioxide equivalent emitted at one location compared to the same mass of CO₂e (CO₂ equivalents) emitted anywhere else on the planet. Therefore, it is not meaningful to carry out a cumulative assessment of the Project alongside other developments in a geographical area (aside from the fact that such an

exercise is not reasonably practicable due to the difficulties in accessing reliable future emissions data for other developments).

1.18 Materials and Waste Cumulative Effects

- 1.18.1 With regards to Materials and Waste, a detailed cumulative effects assessment has not been undertaken since Waste Planning Authorities (“WPAs”) are required to ensure that enough land is available to accommodate facilities for the treatment of all waste arising in the area, either within the WPA area, or through export to suitable facilities in other areas. As well as this, Minerals Planning Authorities (“MPAs”) are similarly required to ensure an adequate supply of minerals, sufficient to meet the needs of national and regional supply policies, and local development needs.
- 1.18.2 In preparing their waste management strategies, the WPAs already take into account waste generation at the regional and sub-regional scale, since these are the figures which are then used for determining the need for waste facilities. The landfill void capacity remaining (which is used to evaluate the effects of the Proposed Development) already takes into account the cumulative effects of waste generated by other developments, and hence a separate cumulative impact assessment is not required for waste.
- 1.18.3 It is therefore not necessary or feasible for each development within the region to, in effect, duplicate the function of the WPA as part of the EIA process.
- 1.18.4 Furthermore, only limited materials and waste information is available for some of the other developments, and some are deemed to be relatively small-scale developments and will not require large quantities of construction materials or generate large quantities of construction waste and operational waste. Where materials and waste information is available for projects the quantities of waste are relatively small in the national or regional context and therefore no significant effects have been identified.
- 1.18.5 Since the quantities of construction materials required and the quantity of waste generated by the Project will result in no likely significant effects, there are not expected to be any cumulative waste and resources impacts as a result of the Project, together with the identified other developments in the surrounding area.
- 1.18.6 The combined effects of the Project upon receptors would result in a neutral and therefore **not significant** effect.

1.19 Ground Conditions and Land Quality

- 1.19.1 **Table 15** below summarises how each development included in the short list (**Table 1**) has been considered with regard to potential ground conditions and land quality cumulative effects during construction and operation. Eight developments were scoped into the assessment of construction cumulative ground conditions and land quality effects and no developments for operational cumulative ground conditions and land quality environment effects.

Cumulative Effects during construction

- 1.19.2 Should the construction phase of the cumulative developments overlap with the construction phase of the Project there is potential for cumulative effects to arise. The potential cumulative effects that could arise during the construction phase include:
- Potential soil contamination and/or ground gas to construction workers and onsite visitors.
 - Potential effects from pollution in soil leachate and groundwater to controlled waters.
 - Loss of agricultural land.
 - Loss of soil resource.

- 1.19.3 Further details of the potential cumulative effects that arise with the shortlisted developments are outlined in **Table 15** below.

Cumulative Effects during operation

- 1.19.4 No cumulative effects are envisaged during operation of the project.

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- 1.19.5 Any impacts on ground conditions are predicted to be spatially limited for both the Project and IERRT. Mitigation measures, such as the deployment of the measures set out in the CEMP for the relevant project, would be in place for both projects to ensure no significant project specific effects arise. Given this, the Project is not expected to interact cumulatively with IERRT and potentially significant cumulative effects on ground conditions and land quality are not anticipated.

Table 15 Ground Conditions and Land Quality Cumulative Assessment

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
1 - DM/1145/19/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects.	<p>Application DM/1145/19/FUL is not an EIA development, it is therefore anticipated that significant cumulative effects are unlikely, there are however potential for non-significant effects to occur, these are assessed and outlined below.</p> <p>Construction:</p> <p>During construction, there is potential that the other development and the Project could create pathways for potential contamination to reach human receptors (site visitors/ onsite workers). However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect for direct contact with contaminated soils, exposure to contaminated groundwater and exposure/inhalation of dust/soil derived vapours and ground gas to human receptors is considered to be slight adverse (not significant).</p> <p>During construction, there is potential that the other development and the Project could create pathways for potential contamination to reach ground water and surface water receptors. However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect of groundwater</p>	Mitigation as presented in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] . No additional mitigation proposed for cumulative effects.	<p>Slight Adverse (not significant) cumulative effect for contact with contaminated soils, exposure to contaminated groundwater and exposure / inhalation of dust / soil derived vapours and ground gas to human receptors during construction phase.</p> <p>Slight Adverse (not significant) cumulative effect for groundwater and surface water receptors in contact with contamination during construction phase.</p> <p>Slight Adverse (not significant) cumulative effect for soil degradation during construction phase.</p>

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>and surface water receptors is considered to be slight adverse (not-significant).</p> <p>There are potential impacts to loss of soil as a resource from both the development and the Project due to stockpiling of spoil from earthworks and excavations becoming degraded during storage. In addition, soils left in-situ during construction may become compacted due to heavy plant machinery and vehicle movement. However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect is considered to be slight adverse (not-significant).</p> <p>The Project site comprises Grade 3b agricultural land and the other development considers that 73% of the site area comprises Grade 3b and 22% Grade 3a. Therefore, there is potential for Grade 3b agricultural land to be impacted by both the Project and the other development. The Project assessment of impact on agricultural soils concluded a slight adverse (not significant) effect to Grade 3b agricultural land. Through the implementation of mitigation outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development it is assessed that there will be a slight adverse (not significant) cumulative effect to Grade 3b agricultural soils.</p> <p>Operation:</p>		<p>Slight adverse (not significant) cumulative effect to Grade 3b agricultural soils.</p>

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		No cumulative effects are envisaged during operation of the project.		
5 - DM/0968/19/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects.	<p>Application DM/0968/19/FUL is not an EIA development, it is therefore anticipated that significant cumulative effects are unlikely, there are however potential for non-significant effects to occur, these are assessed and outlined below.</p> <p>Construction:</p> <p>During construction, there is potential that the other development and the Project could create pathways for potential contamination to reach human receptors (site visitors/ onsite workers). However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect for direct contact with contaminated soils, exposure to contaminated groundwater and exposure/inhalation of dust/soil derived vapours and ground gas to human receptors is considered to be slight adverse (not-significant).</p> <p>During construction, there is potential that the other development and the Project could create pathways for potential contamination to reach ground water and surface water receptors. However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect of groundwater</p>	Mitigation as presented in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] . No additional mitigation proposed for cumulative effects.	<p>Slight Adverse (not significant) cumulative effect for contact with contaminated soils, exposure to contaminated groundwater and exposure / inhalation of dust / soil derived vapours and ground gas to human receptors during construction phase.</p> <p>Slight Adverse (not significant) cumulative effect for groundwater and surface water receptors in contact with contamination during construction phase.</p> <p>Slight Adverse (not significant) cumulative effect for soil degradation during construction phase.</p>

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>and surface water receptors is considered to be slight adverse (not significant).</p> <p>There is also potential that spoil arising from earthworks and excavations from the Project and the other development may become degraded during storage and soils left in-situ may become compacted due to heavy plant machinery and vehicle movement. With the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect is considered to be slight adverse (not-significant).</p> <p>Operation:</p> <p>No cumulative effects are envisaged during operation of the project.</p>		
9 - DM/0865/19/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects	Application DM/0865/19/FUL is an EIA development, but the ES only scopes Ecology, Air Quality and Noise into the assessment. It is therefore anticipated that significant cumulative effects for ground conditions and land quality are unlikely, there are however potential for not-significant effects to occur, these as per ID 5.	As per ID 5.	As per ID 5.
16 – DM/0862/19/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects	Application DM/0862/19/FUL is an EIA development, but the ES only scopes Air Quality and Noise into the assessment. It is therefore anticipated that significant cumulative effects for ground conditions and land quality are unlikely, there are however potential for not-significant effects to occur, these as per ID 5.	As per ID 5.	As per ID 5.

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
17 – DM/0863/19/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects	Application DM/0863/19/FUL is an EIA development, but the ES only scopes Ecology, Air Quality and Noise into the assessment. It is therefore anticipated that significant cumulative effects for ground conditions and land quality are unlikely, there are however potential for not-significant effects to occur, these as per ID 5.	As per ID 5.	As per ID 5.
18 – DM/0026/18/FUL	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects.	<p>Construction:</p> <p>Application DM/0026/18/FUL is an EIA development and assesses Soils, Geology and Hydrology as part of their assessment. The other development determines that after mitigation there will be no effect during construction or operation to construction workers, neighbours, or controlled waters from contamination. It can therefore be assumed that the effects presented within Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] of the Project will not be further impacted as a result of the effects of application DM/0026/18/FUL. No cumulative effects are considered.</p> <p>Operation:</p> <p>No cumulative effects are envisaged during operation of the project.</p>	N/A	No residual cumulative impacts.
28 – EN070006	Scoped out – No potential effects related to ground conditions and land quality, covered in Chapter 21: Ground	Distance of the proposed development is 6.41km north west of the Site Boundary which is outside of the study area for geology, soil resources and controlled waters.	N/A	No residual cumulative impacts.

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
	Conditions and Land Quality (TR030008/APP/6.2).			
113 and 114 - DM/0304/23/SCO and PA/SCO/2023/1	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects.	Application DM/0304/23/SCO and PA/SCO/2023/1 is an EIA development, the application has submitted an EIA Scoping Report but has not progressed as far to produce an Environmental statement. Therefore, it is not possible to assess the cumulative effects with certainty. Due to the close location of the other development, it is assessed that the potential cumulative impacts are likely to be consistent with those reported with ID 1.	As per ID 1.	As per ID 1.
115 - MLA/2014/00431/4	Scoped in – Potential for cumulative construction and operational ground conditions and land quality effects.	<p>Application MLA/2014/00431/4 is a marine license application for the maintenance of the Port of Immingham and the sunk dredged channel.</p> <p>Construction:</p> <p>During construction, there is potential that the other development and the Project could create pathways for potential contamination to reach surface water receptors (River Humber). However, with the implementation of the mitigation measures outlined in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] and the standard good practice mitigation measures implemented by the other development, the cumulative effect of groundwater and surface water receptors is considered to be slight adverse (Not significant).</p> <p>Operation:</p>	Mitigation as presented in Chapter 21: Ground Conditions and Land Quality [TR030008/APP/6.2] . No additional mitigation proposed for cumulative effects.	Slight Adverse (not significant) cumulative effect for surface water receptors (River Humber) in contact with contamination during construction phase.

Immingham Green Energy Terminal
 Appendix 25.C: Assessment of Cumulative Effects

ID	Scope of ground conditions and land quality cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		No cumulative effects are envisaged during operation of the project.		

Conclusion

- 1.19.6 There are no significant cumulative effects identified between the Project and the cumulative developments from a ground conditions and land quality perspective. As identified above there are slight adverse (not significant) cumulative effects identified for:
- Impacts to human receptors due to soil contamination and/or ground gas.
 - Impacts to controlled waters due to potential contamination pathways from soil leachate and groundwater.
 - Loss of agricultural land.
 - Loss of soil resource.

1.20 Major Accidents and Disasters

- 1.20.1 With regards to Major Accidents and Disasters, two of the proposed developments in the shortlist of schemes are potential Major Accident Hazard or COMAH developments, these developments are ID 13 and ID 18. A gas / stack emission release or fire event associated with these developments has the potential for off-site impact of neighbouring sites. It is therefore identified that there is the potential for a major incident release event from these developments to overlap with the Project, due to the nature and proximity of the developments.
- 1.20.2 With the implementation of measures described in **Chapter 22: Major Accidents and Disasters [TR030008/APP/6.2]**, it has been concluded that there would be no residual effects as a result of the Project. As there would be no residual effects, either during construction or normal operation of the Project, there is low risk of any significant cumulative effects as a result of the short-listed developments and the Project due to Major Accidents and Disasters. The risk of a cumulative impact from a major release event from the developments identified above is therefore negligible and not significant.

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- 1.20.3 The potential for major accidents for both IERRT and the Project would be managed to ALARP through the deployment of appropriate safety management systems and engineering design standards, such that no cumulative effects would arise..

1.21 Socio-economics

- 1.21.1 From a socio-economic perspective, potential cumulative impacts that may occur as a result of the Project and other nearby developments include employment generation, influx of temporary workers on local services and accommodation, and impacts to Public Rights of Way ("PRoW"). These are assessed in the following paragraphs and **Table 16** below.

Cumulative Effects during construction

- 1.21.2 During the construction phase of the Project, it is expected that all of the scoped in developments identified in **Table 16** would cumulatively generate additional employment opportunities and associated socio-economic benefits.

- 1.21.3 Whilst there may be a short-term risk of temporary local accommodation shortage or provision of primary healthcare services, the cumulative socio-economic effects of the other developments together with the Project are considered to be beneficial overall.
- 1.21.4 Impacts to PRowS are also likely to be minimal, with only one scheme identifying potential temporary impacts.

Cumulative Effects during operation

- 1.21.5 During the operational phase, most developments in **Table 16** are not likely to produce a significant amount of employment and therefore, no cumulative impacts are expected. However, for some schemes, operational employment is expected to be high and so there would be a beneficial cumulative impact in terms of generating additional employment opportunities.

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- 1.21.6 IERRT and the Project are not likely to generate significant adverse socio-economic effects that would interact cumulatively. There may be some beneficial effects, including economic benefits and employment opportunities, which have a greater beneficial effect that would be realised from either project in isolation. This is expected particularly in the construction phase, in which both schemes are expected to generate a considerable number of net jobs.
- 1.21.7 However, an influx of workers could potentially lead to an adverse effect on local services when assessed cumulatively, with more workers temporarily residing in the local area. This includes impacts on local accommodation for workers, and the provision of primary healthcare. However, impacts to these receptors are not expected to be significant.

Table 16 Socio-Economics Cumulative Assessment

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
3 - DM/0105/18/FUL Business park	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction:</p> <p>It is anticipated that even if there were overlap between the construction of this scheme and IGET, the employment required this scheme would not be anticipated to have a cumulative effect on any receptors affected by IGET.</p> <p>Operation:</p> <p>Operation of this scheme is expected to produce over 2000 FTE jobs in the local area. Therefore, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on more workers requiring primary healthcare services.</p>	N/A	<p>Construction: N/A</p> <p>Operation:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p>
13 - DM/0628/18/FUL Waste to energy power facility Construction phase	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction:</p> <p>This scheme is expected to produce approximately 100 FTE construction jobs. If construction phases were to overlap, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on more construction workers being required to stay in the local area during the construction phase.</p> <p>Operation:</p>	N/A	<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		The operational employment required for this scheme would not be anticipated to have a cumulative effect on any receptors affected by IGET.		Adverse (Not Significant) Operation: N/A
18 - DM/0026/18/FUL Energy recovery facility	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction: If construction phases were to overlap, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on more construction workers being required to stay in the local area during the construction phase.</p> <p>Operation: The operational employment required for this scheme would not be anticipated to have a cumulative effect on any receptors affected by IGET.</p>		<p>Construction: Employment – Major Beneficial (Significant) Changing influx of workers (accommodation) – Minor Adverse (Not Significant) Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>
22 - TR030007 IERRT	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction: It is expected that IERRT development could produce 788 net jobs during construction. Therefore, if construction phases were to overlap, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on</p>		<p>Construction: Employment – Major Beneficial (Significant) Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>more construction workers being required to stay in the local area during the construction phase.</p> <p>Operation:</p> <p>IERRT is anticipated to produce 196 net operational jobs. There could be a positive cumulative effect on employment, generating more employment in the local economy. There could also be an adverse effect on the changing influx of workers, based on more workers being required to stay in the local area and access primary healthcare.</p>		<p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation:</p> <p>Employment – Moderate Beneficial (Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p>
<p>25 - TR030001, TR030005 and TR030006</p> <p>Able marine park</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects.</p>	<p>Construction:</p> <p>Both the AMEP and IGET projects have the potential to result in employment generation and need for worker accommodation. If there is an overlap in construction period, it is likely that there could be cumulative effects. These could include a beneficial cumulative impact on employment creation, generating more employment in the local economy. Though the scheme could result in an adverse cumulative impact on the accommodation capacity for workers during the overlapped construction phases, with more workers requiring to be brought into the local area to work on the projects.</p> <p>Operation:</p>	<p>N/A</p>	<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (not significant)</p> <p>Changing influx of workers (primary healthcare) – Minor</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		There are no cumulative effects expected due to low levels of employment generation during the operational phase.		Adverse (not significant) Operation: N/A
29 - EN070008 Viking	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction:</p> <p>This scheme is currently at scoping stage and therefore, there is limited information available about its likely effects. However, if construction phases were to overlap, there could be a positive cumulative effect on employment, generating more employment in the local economy. There could also be an adverse effect on the changing influx of workers, based on more construction workers being required to stay in the local area during the construction phase.</p> <p>Operation:</p> <p>Limited information is available about the operational impacts of this development. However, cumulative impacts are unlikely.</p>	None	<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>
35 - DM/0329/18/FUL Power plant	Scoped in – Potential for cumulative construction and operational socio-economic effects.	<p>Construction:</p> <p>If construction phases were to overlap, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on more construction workers being required to stay in the local area during the construction phase.</p>		<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>Operation:</p> <p>There are no cumulative effects expected due to low levels of employment generation during the operational phase.</p>		<p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>
<p>37 - DM/1070/18/FUL Waste to energy facility</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects.</p>	<p>Construction:</p> <p>This scheme is expected to produce approximately 439 net construction jobs. If construction phases were to overlap, it is expected that there could be a positive cumulative effect on employment, generating more employment in the local economy. There could be an adverse effect on the changing influx of workers, based on more construction workers being required to stay in the local area during the construction phase.</p> <p>Operation:</p> <p>There are no cumulative effects expected due to low levels of employment generation during the operational phase.</p>		<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>
<p>102 - DM/1071/22/FUL Repair to Humber estuary</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects.</p>	<p>Construction:</p> <p>Details regarding employment are not available for this scheme. However, if construction phases were to overlap it is likely that there would be a beneficial cumulative impact on employment generation. This scheme is also expected to cause the temporary loss of access to some PRowS</p>	<p>N/A</p>	<p>Construction:</p> <p>Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
		<p>during construction. However, these PRowWs are not expected to be impacted by IGET and so there is no cumulative impact.</p> <p>Operation: No cumulative impacts are anticipated during the operational phase.</p>		<p>(accommodation) – Minor Adverse (Not Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>
<p>94-MLA/2020/00520 Humber International Terminal Berth 2</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects.</p>	<p>Construction: Details regarding socio-economic effects are not available for this scheme. However, if construction phases were to overlap it is likely that there would be a beneficial cumulative impact on employment generation during 2025.</p> <p>Operation: No cumulative impacts are anticipated during the operational phase.</p>	<p>n/a</p>	<p>Construction: Employment – Major Beneficial (Significant)</p> <p>Changing influx of workers (accommodation) – Minor Adverse (Not Significant)</p> <p>Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p> <p>Operation: N/A</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
<p>115 MLA/2014/00431/4 Maintenance dredge disposal</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects.</p>	<p>Construction: Details regarding socio-economic effects are not available for this scheme. However, if construction phases were to overlap it is likely that there would be a beneficial cumulative impact on employment generation during 2025.</p> <p>Operation: No cumulative impacts are anticipated during the operational phase.</p>	<p>N/A</p>	<p>Construction: Employment – Major Beneficial (Significant) Changing influx of workers (accommodation) – Minor Adverse (Not Significant) Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant) Operation: N/A</p>
<p>116 DM/0664/19/FUL</p>	<p>Scoped in – Potential for cumulative construction and operational socio-economic effects</p>	<p>Construction: It is not anticipated that the construction phase will overlap and so no cumulative impact.</p> <p>Operation: Once operational, it is anticipated that the facility will employ over 100 staff in a range of job roles. There could be a positive cumulative effect on employment, generating more employment in the local economy. There could also be an adverse effect on the changing influx of workers, based on more workers being required to stay in the local area and access primary healthcare</p>	<p>N/A</p>	<p>Construction: N/A Operation: Employment – Moderate Beneficial (Significant) Changing influx of workers (primary healthcare) – Minor Adverse (Not Significant)</p>

ID	Scope of socio-economics cumulative assessment	Assessment of cumulative effect with the Project	Proposed mitigation applicable to the Project	Residual Cumulative Effect
117 PA/SCO/2022/7	Scoped in – Potential for cumulative construction and operational socio-economic effects	<p>Construction: It is considered that the proposed development will have socio-economic beneficial effects at the local level during the construction phase, but it is not considered likely that these will be significant. Therefore, socio-economics is scoped out of the Environmental Statement for this development and cumulative impacts are unlikely.</p> <p>Operation: No operational socio-economic impacts are assessed for this development and so cumulative impacts are unlikely.</p>	N/A	<p>Construction: N/A Operation: N/A</p>

Conclusion

- 1.21.8 With regard to socio-economic cumulative impacts, it is likely that most cumulative developments would generate additional employment opportunities and associated socio-economic benefits to add to the benefits of the Project during construction and operation. Whilst there might be a risk of temporary labour shortage or local accommodation shortage should multiple projects progress simultaneously, the cumulative socio-economic effects of the other developments together with the Project are considered to be **significantly beneficial** overall.
- 1.22 Human Health and Wellbeing
- 1.22.1 The identified shortlisted developments (**Table 1**), combined with the effects identified in Section 24.7 of **Chapter 24: Human Health and Wellbeing [TR030008/APP/6.2]** may lead to a more pronounced effect on the human health and wellbeing receptors in the study area. From a human health and wellbeing perspective, there is the potential for cumulative effects on: access to healthcare and other social infrastructure; emissions of odours, dust, noise and vibration; air quality/noise pollution linked with traffic; accessibility to open space, and active travel; access to employment and training; contribution to social cohesion including mental health effects and perception of risk; and climate change.
- 1.22.2 The human health and wellbeing assessment draws on the findings of other technical assessments presented within this ES, namely **Chapter 6: Air Quality, Chapter 7: Noise and Vibration, Chapter 11: Traffic and Transport, Chapter 13: Landscape and Visual, Chapter 19: Climate Change, Chapter 22: Major Accidents and Disasters, Chapter 23: Socio-economics [TR030008/APP/6.2]**. The methodologies adopted for these assessments, which follow best practice guidance, inherently consider human receptors. It is therefore likely that the relevant effects on human health and wellbeing are highly reflective of those effects identified within each of the respective assessments. The cumulative human health and wellbeing effects will therefore reflect the relevant identified cumulative effects within the respective technical assessments contained within **Chapters 6-24** of the ES **[TR030008/APP/6.2]**.
- 1.22.3 There is the potential for disruptions to access to healthcare provision locally due to the influx of workers associated with the cumulative developments. This could occur during the construction, operation and decommissioning phases of the Project. The socio-economics assessment finds that there will be a minor adverse (not significant) cumulative effect relating to this, and therefore the cumulative human health and wellbeing effect on access to healthcare is assessed to be a minor adverse (not significant) cumulative effect.
- 1.22.4 Severance issues relating to increases of road traffic resulting from the cumulative developments could lead to disruptions to access to other social infrastructure by local residents. This could occur during the construction, operation and decommissioning phases of the Project. The traffic and transport assessment finds that there will be no significant cumulative effects relating to this, and therefore the cumulative human health and wellbeing effect on access to other social infrastructure is assessed to be no cumulative effect.

- 1.22.5 Emissions resulting from the cumulative developments have the potential to adversely affect human health and wellbeing. This pertains to noise (construction and decommissioning), vibration (construction and decommissioning), and dust (construction). The appropriate assessments (noise and vibration, and air quality) find that there will be no significant cumulative effects with respect to such emissions. Therefore, the human health and wellbeing effect relating to emissions is assessed to be no cumulative effect.
- 1.22.6 Air quality effects from the cumulative developments could lead to adverse health impacts if conditions are worsened due to increases in traffic. This could occur during the construction and operation phases of the Project. The air quality assessment finds that there will be no significant cumulative effects relating to this, and therefore the cumulative human health and wellbeing effect on air quality resulting from traffic is assessed to be no cumulative effect.
- 1.22.7 Noise pollution from the cumulative developments could lead to adverse health impacts including increases in annoyance, if conditions are worsened due to increases in traffic. This could occur during the construction, operation and decommissioning phases of the Project. The noise and vibration assessment finds that there will be no significant cumulative effects relating to this, and therefore the cumulative human health and wellbeing effect on air quality resulting from traffic is assessed to be no cumulative effect.
- 1.22.8 Disruptions in terms of temporary or permanent diversion of PRoW and/or recreational routes by the cumulative developments could lead to adverse effects on accessibility to open space, and on active travel, which in turn could negatively impact human health and wellbeing. This could occur during the construction or decommissioning phase of the Project. The conclusions of the socio-economics and traffic and transport cumulative effects assessment each find that there will be no cumulative effects with respect to PRoW. Therefore, the cumulative human health and wellbeing effect on accessibility to open space, and on active travel is assessed to be no cumulative effect.
- 1.22.9 Additional employment and training opportunities could arise from the Project which could lead to beneficial human health and wellbeing impacts. This could occur during the construction, operation and decommissioning phases of the Project. The conclusions of the socio-economics assessment find that there will be a significant moderate beneficial socio-economic effect resulting from the increased employment arising from the construction and operation of the cumulative developments. Therefore, the cumulative human health and wellbeing effect is assessed to similarly be **moderate beneficial (significant)**.
- 1.22.10 Impacts on social cohesion resulting from the cumulative developments including on mental health and the perception of risk could lead to adverse effects on human health and wellbeing. This could occur during the construction, operation and decommissioning phases of the Project. The findings of the major accidents and disasters chapter with respect to risk, traffic and transport assessment with respect to community severance, and socio-economics chapter with respect to social cohesion, each find that there will be no significant effects. Therefore, the cumulative human health and wellbeing effect on social cohesion is assessed to be no cumulative effect.

1.22.11 Impacts on climate change resulting from the cumulative developments has the potential to affect human health and wellbeing due to direct and indirect effects. This could occur during the construction and operational phases of the Project. The climate change assessment finds that there will be no significant cumulative effects with respect to climate change and a detailed cumulative effects assessment was not undertaken for Climate Change. Therefore, the cumulative human health and wellbeing effect on climate change is assessed to be no cumulative effect.

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- 1.22.12 IERRT and the Project are not likely to generate adverse health effects that would interact cumulatively, given that no adverse cumulative human health and wellbeing effects are found when all applicable cumulative developments are assessed.
- 1.22.13 The construction of the Project and IERRT is likely to generate employment, which would lead to a greater beneficial health effect than either project in isolation.

1.23 References

- Ref 1-1 United Nations Economic and Social Council (2022) Strategy for scientific bodies under the Convention on Long-range Transboundary Air Pollution
- Ref 1-2 National Highways guidance (2019), Design Manual for Roads and Bridges
- Ref 1-3 Natural England (2016) Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on semi-natural habitats of conservation importance (NECR210).