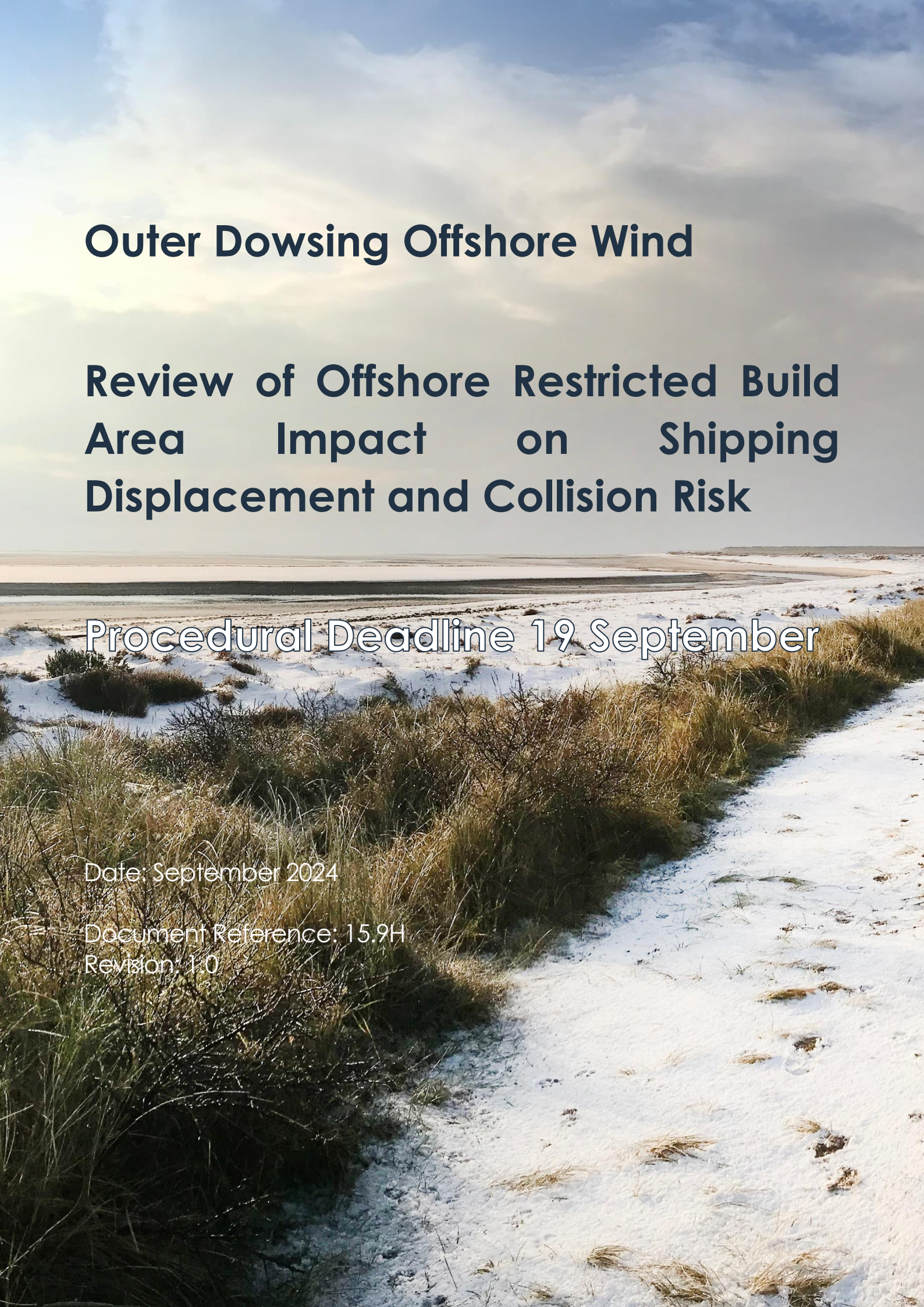

Outer Dowsing Offshore Wind

Review of Offshore Restricted Build Area Impact on Shipping Displacement and Collision Risk

Procedural Deadline 19 September

Date: September 2024

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Outer Dowsing Offshore Wind
Review of Offshore Restricted Build Area
Impact on Shipping Displacement and Collision Risk

Prepared by	Anatec Limited
Presented to	GTR4 Limited
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Revision Number	Date	Summary of Change
00	17 July 2024	Initial Draft
01	28 August 2024	Initial comments
02	10 September 2024	Further comments

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Abbreviations Table

Abbreviation	Definition
AfL	Agreement for Lease
ES	Environmental Statement
nm	Nautical Mile
nm^2	Square Nautical Mile
NRA	Navigational Risk Assessment
ORBA	Offshore Restricted Build Area
PEIR	Preliminary Environmental Information Report

1 Introduction

1. This document presents a consideration of the environmental implications of the introduction of an Offshore Restricted Build Area (ORBA) over a part of the array area for Outer Dowsing Offshore Wind (the Project) in terms of impacts on vessel displacement and collision risk.

2. During the Navigational Risk Assessment (NRA) process for the Project, it was identified that existing vessel routes pass in close proximity to the northern boundary of the array area, or intersect its northern extent. Red Line Boundary changes at the Preliminary Environmental Information Report (PEIR) stage reduced the northern boundary which was observed to reduce displacement and vessel to vessel collision risk based on the outputs of an NRA remodelling process undertaken prior to submission of the Environmental Statement (ES).

3. GTR4 Limited (trading as Outer Dowsing Offshore Wind and hereafter referred to as the 'Applicant') are introducing the ORBA to reduce the impact from the presence of Wind Turbine Generators (WTGs) (and offshore platforms) on auk species (specifically common guillemot and razorbill) and also in response to feedback from key stakeholders, including shipping and navigation stakeholders. The ORBA will reduce the spatial area within which surface piercing infrastructure will be installed, meaning there is likely to be a reduction in vessel displacement and collision risk. This report provides quantification of the potential changes, and supports the qualitative assessment for shipping and navigation provided in the Environmental Report for the ORBA and Revision to the Offshore Export Cable Corridor (document reference 15.9).

4. The aims of this technical note are as follows:

   - Based on the introduction of the ORBA, update and assess the level of displacement of vessels estimated to deviate north of the array area; and
   - Analyse how these changes will impact collision risk of vessels in proximity to the array area.

5. Three scenarios have been considered with these document. These are:

   - **'Pre-wind farm'**: the baseline environment prior to the Project commencing;
   - **'Post-windfarm'**: the shipping and navigation environment post wind farm without the ORBA (i.e., the scenario assessed in the NRA); and
   - **'Post-windfarm with ORBA':** the shipping and navigation environment post wind farm with the ORBA implemented.

2 Site Refinement

6. This section provides relevant background on the array refinement that has taken place including as part of the NRA process. This includes details of relevant consultation (Section 2.1), the changes that were made at PEIR, and the introduction of the ORBA (Section 2.2).

2.1 Consultation

7. Relevant consultation pertaining to routeing at the northern extent of the array area is listed below.

MCA Scoping response:

- The cumulative impacts of other windfarms in close proximity, in particular the Hornsea Three and Dudgeon Extension developments will change routing, particularly those that transect the western and northern sections of the site.

MCA Section 42 response:

- Of note are Hornsea Three due its potential impact with the Immingham to Cuxhaven route.

Chamber of Shipping Section 42 response:

- The northernly extent has the most interaction to high density traffic routes and the most impact upon navigational squeeze and accordingly safety.

DFDS stakeholder meeting (2nd June 2021):

- Limited concern with the Newcastle to Ijmuiden route [Route 5]. However, the Immingham-Cuxhaven routeing will be affected [Route 3]. Adverse weather routeing between Immingham and Esbjerg may also be impacted.

DFDS consultation meeting (8th September 2022):

- Key DFDS concern is the Immingham to Cuxhaven route [Route 3].

DFDS consultation meeting (7th September 2023):

- DFDS estimated a 2nm increase in journey distance as a combined result of the array area and Hornsea Three.
- DFDS stated that vessels forced to deviate on acute angles will show increased risk of allision/collision.
- The Chamber of Shipping noted that the northern boundary should be angled in a manner to least impact the routeing DFDS vessels [on Route 3].

MCA consultation meeting (13th September 2023):

- General satisfaction was noted regarding the reduced northern boundary presented at ES, although it was emphasised that feedback from DFDS was critical.

Trinity House consultation meeting (15th September 2023):

- General satisfaction was noted regarding the reduced northern boundary presented at ES, although feedback from DFDS was critical.
- In addition to vessels routeing on Route 3, the impact of the northern boundary on vessel traffic running east-west should also be considered.

Second Hazard Workshop (23rd November 2023):

- The Chamber of Shipping and MCA both noted general satisfaction with the array area presented at ES, after reductions were made to the northern boundary.

MCA consultation meeting (15th August 2024):

- The MCA noted that the implementation of the ORBA is a very welcome development, noting satisfaction with the additional searoom provided.

Chamber of Shipping consultation meeting (15th August 2024):

- The Chamber of Shipping remarked that the introduction of the ORBA is very positive, with the increased searoom and decreased collision risk welcome.
- Confirmed in subsequent email correspondence (dated 4th September 2024) that DFDS had "no issues and find the changes positive".

Trinity House consultation meeting (20th August 2024):

- General satisfaction was noted regarding the ORBA from Trinity House.

2.2 Array Area Changes and ORBA

8. Following the PEIR stage of the Project and based on stakeholder feedback (see Section 2.1), refinements were made to the 'Area for Lease (AfL) array area', with the site reduced at the northern and western extents, and resulting in the array area assessed at ES.

9. Following submission of the ES, in response to stakeholder feedback, the Applicant is also proposing to implement an ORBA within the array area. The Red Line Boundary for the Project is not changing in relation to the array area[1], but no surface-

[1] RLB is changing within the offshore ECC, noting this is not assessed within this appendix but is assessed for shipping and navigation in the Environmental Report for the ORBA and Revision to the Offshore Export Cable Corridor.

piercing structures will be located within the ORBA. This will therefore alter the previously-identified impacts of the Project on shipping and navigation. In total, the ORBA comprises an area of 20.8 square nautical miles (nm^2) – comprising approximately 16.4% of the total array area.

10. The ORBA is located in the northern extent of the array area, as presented alongside the array area and AfL array area in Figure 2-1.

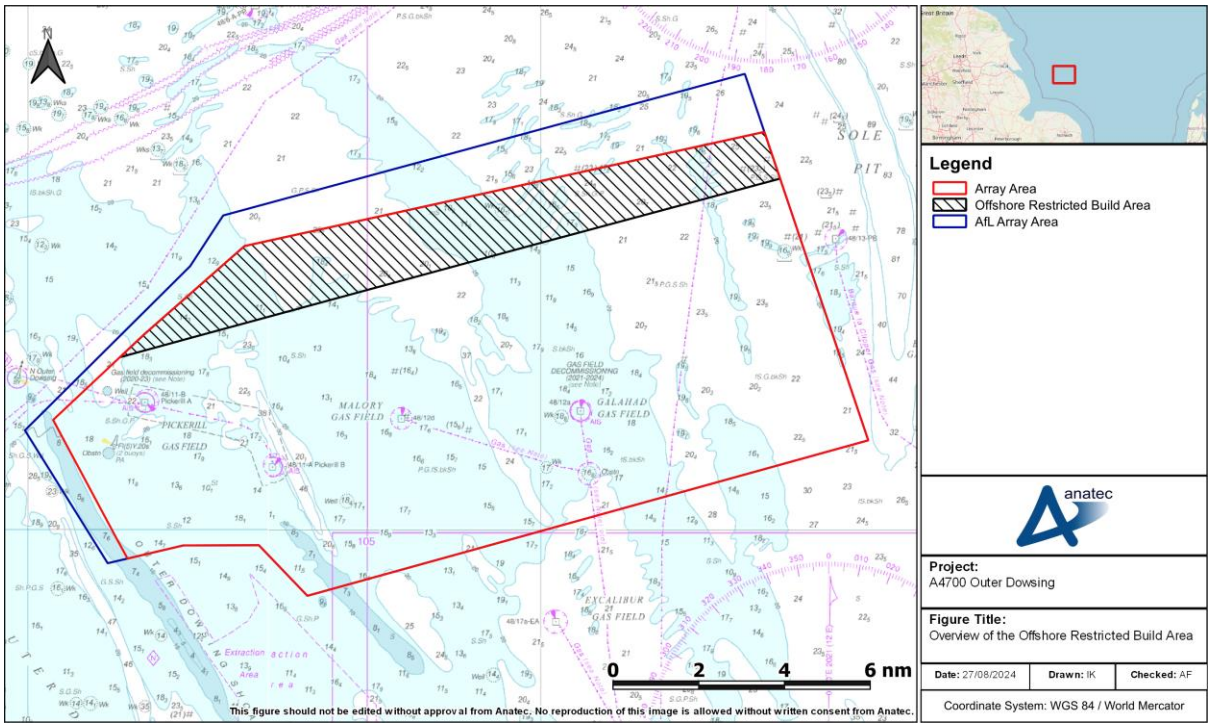

Figure 2-1 Overview of the ORBA

3 Vessel Displacement

3.1 Overview of Main Route Deviations

11. During the NRA process, each of the 13 main routes identified from the vessel traffic data studied was assessed for the potential to deviate. The 13 main pre-windfarm routes are presented relative to the array area and the ORBA in Figure 3-1.

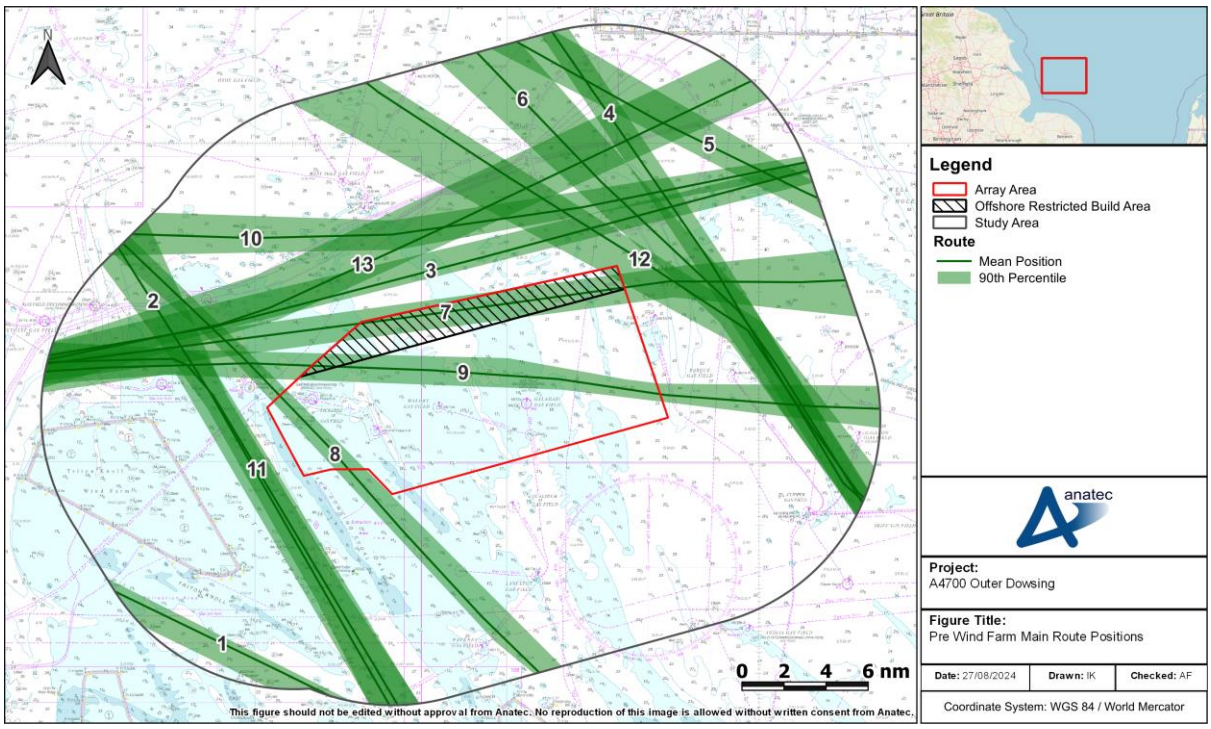

Figure 3-1 Pre-Windfarm Main Route Positions

12. Based on the full array area assessment within the NRA, a total of four of the 13 main pre-windfarm routes identified were anticipated to require a deviation (Routes 7, 8, 9, and 12) in the post-windfarm scenario. Utilising the same methodology to assess deviations as per the NRA, the deviation of routes was re-assessed considering the implementation of the ORBA to elicit direct comparison. It was determined as an output of this process that only three of the 13 main pre-windfarm routes identified for the post-windfarm with ORBA are now anticipated to require a potential deviation.

13. The route which may no longer require a deviation is Route 12, which is used by DFDS as an adverse weather route. Route 12 is shown relative to the array area and the ORBA in Figure 3-2. Given this is an adverse weather route, the mean route position and percentile shown may still change in the post wind farm with ORBA scenario, however any change is anticipated to be limited noting that DFDS confirmed as part of the NRA process limited concern with impacts on this route in the post wind farm scenario.

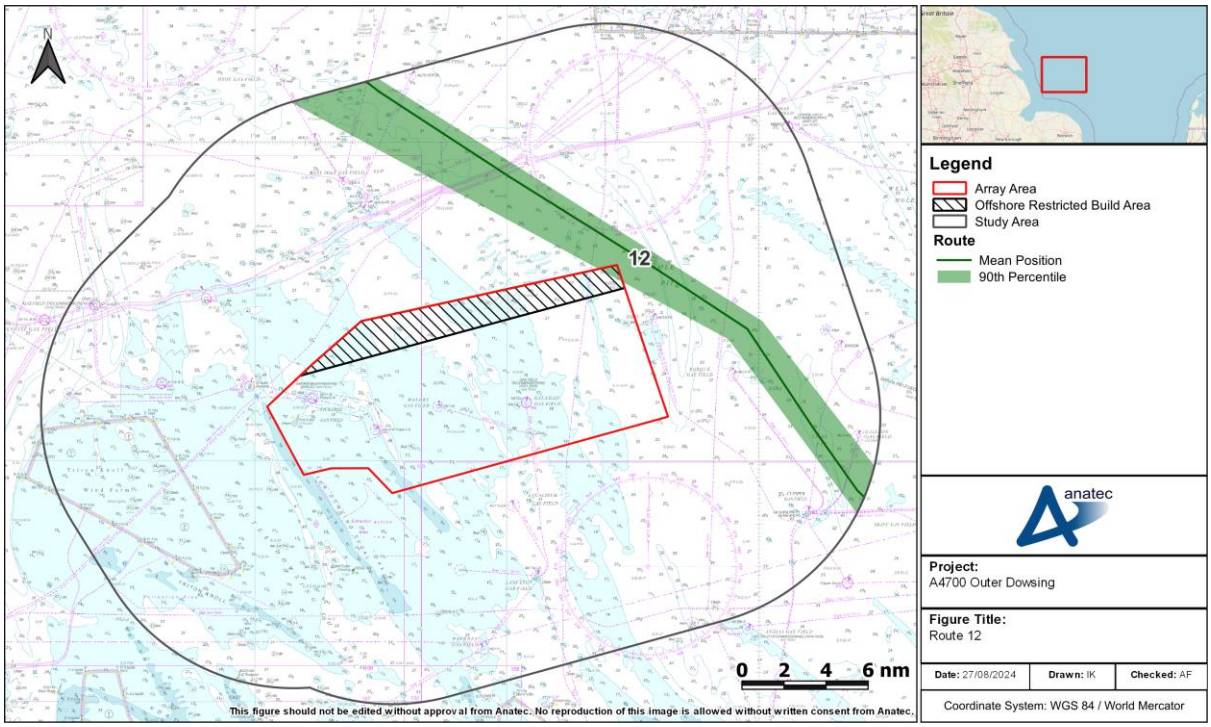

Figure 3-2 Overview of Route 12

14. It is noted that one deviated route is unaffected by the changes to the northern boundary of the array area – Route 8, which is likely to pass through the Outer Dowsing Channel west of the array area. The two other routes still requiring a deviation in the post-windfarm with ORBA case are presented relative to the array area and the ORBA in Figure 3-3, alongside the routes identified in the pre-windfarm and post-windfarm cases. Following this, a summary of the deviations is provided for these three routes in Table 3.1. As shown, deviations to these routes decrease as a result of the ORBA.

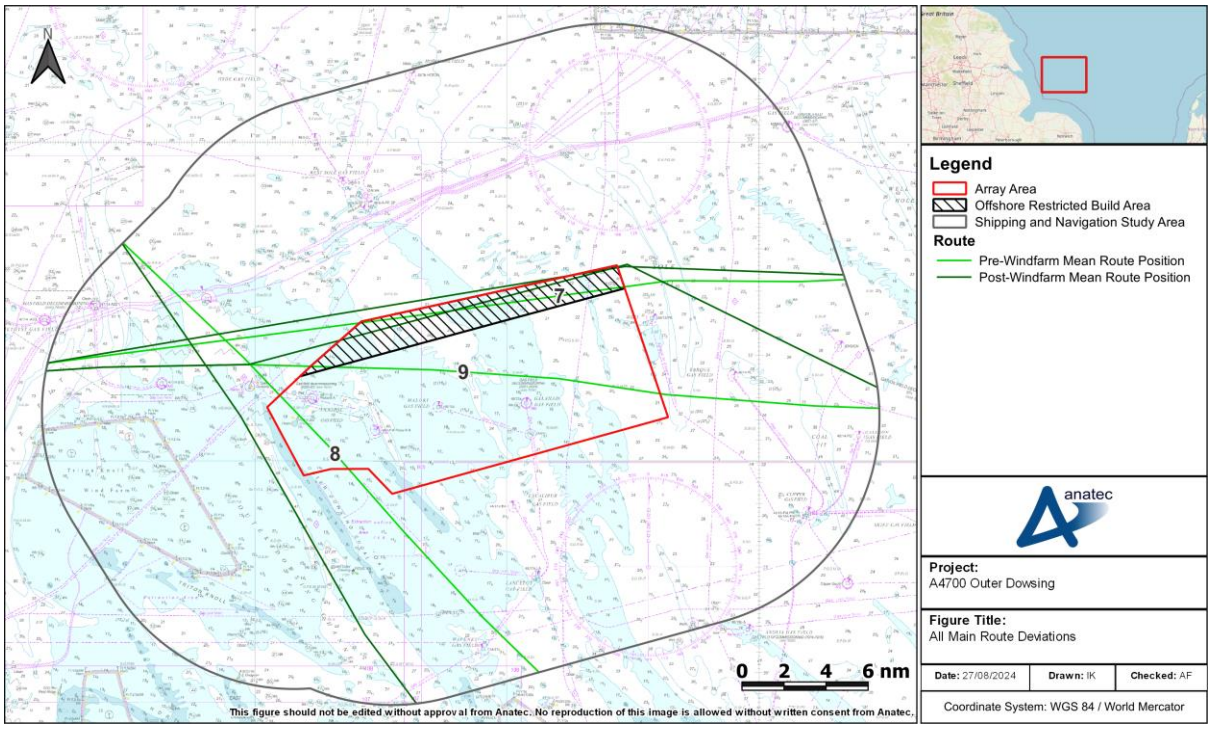

Figure 3-3 All Main Route Deviations

Table 3.1 Main Route Deviations Across Scenarios

Route	Description	Vessels per Day	Distance pre-Windfarm (nm)	Distance post-Windfarm (nm)	Distance post-Windfarm with ORBA (nm)	Change in post-Windfarm with ORBA routeing from post-Windfarm (nm)	Percentage Change
7	Humber ports - Cuxhaven	1	289.39	289.80	289.51	-0.29	-0.10%
9	Humber ports – Bremerhaven / Hamburg	<1	288.62	291.22	290.69	-0.53	-0.18%
12	Tees – Amsterdam	<1	251.48	251.71	251.48	-0.23	-0.09%

15. It is noted that, in addition to Route 12, Route 7 was also raised by DFDS during consultation as an adverse weather route. This route is used when sea conditions further north are such that the typically used Immingham to Cuxhaven route (Route 3) would require additional time in port to secure cargo i.e., there would be a commercial impact on DFDS if Route 7 could not be used. As shown, overall impact on this route has been reduced further via the ORBA, however some minor deviation may still be required.

3.2 Cumulative Routeing

16. It is noted that cumulative impacts to Route 3 of which DFDS is a key operator have been raised as a key concern, in particular the need for vessels on that route to pass north of the array area and then deviate south of Hornsea Three. The cumulative Route 3 deviation required in the array area is presented in Figure 3-4, alongside the predicted DFDS Seaways route post Hornsea Three based on their consultation input (referred to as the 'Pre-Windfarm Route' in Figure 3-4), and the deviated route presented during the ES stage. it is noted that the routes shown account for charted[2] oil and gas platforms in the area (platforms within 2nm of the routes are included in Figure 3-4).

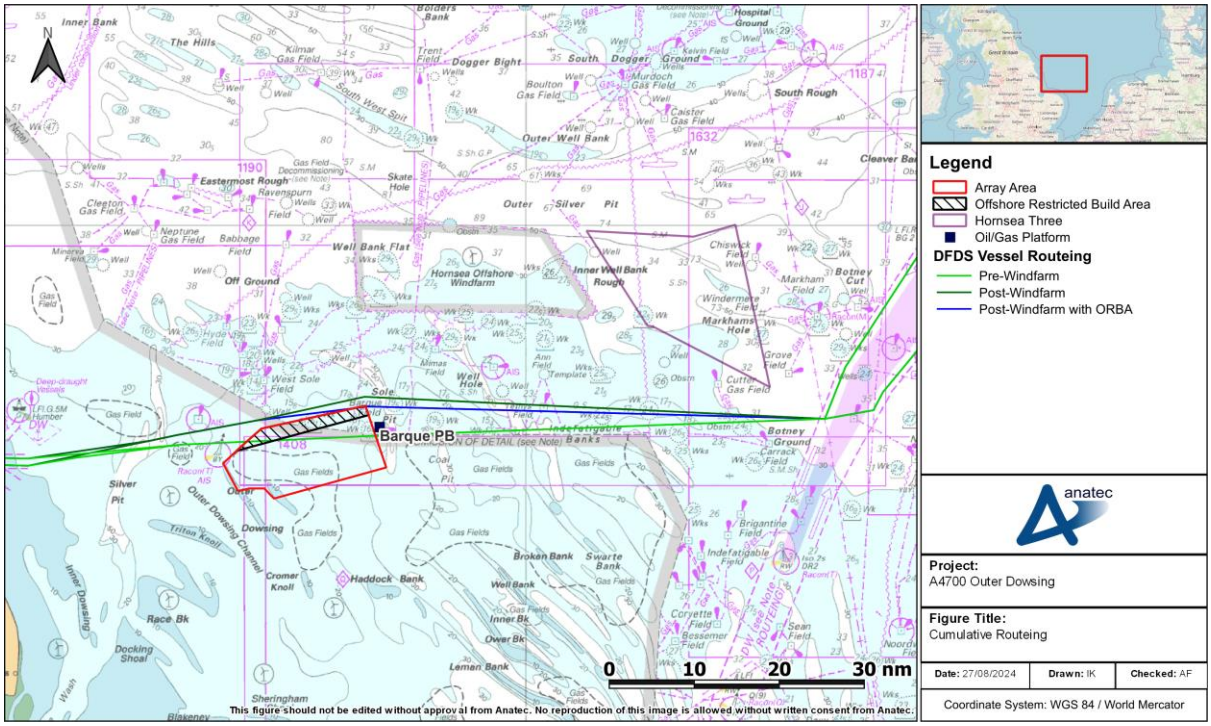

Figure 3-4 Cumulative Routeing

[2] The Tethys platform is still shown on charts, however is understood to have been removed (North Sea Transition Authority, 2024) and is therefore not shown.

17. The length of the route across the three scenarios is presented in Table 3.2, alongside the resulting percentage increase compared to the pre-windfarm route (accounting for Hornsea Three).

Table 3.2 Differences in Route 3 Cumulative Distance

Scenario	Length (nm)	Change from Pre-windfarm (with Hornsea Three)
Pre-windfarm (with Hornsea Three)	321.08	N/A
Post-windfarm route	322.59	0.5%
Post-windfarm with ORBA route	322.37	0.4%

4 Vessel to Vessel Collision Modelling

18. This section uses the updated main route deviations as presented in Section 3 to model vessel to vessel collision risk assuming the ORBA is implemented. This allows for approximate quantification of the change in collision risk resulting from the ORBA.

19. On a general basis, collision risk would be anticipated to reduce as a result of the ORBA given that searoom is increasing. This is illustrated in Figure 4-1 which shows the distance between the array area and other local surface oil and gas and wind farm piercing infrastructure to the north against the corresponding distances with the ORBA in place.

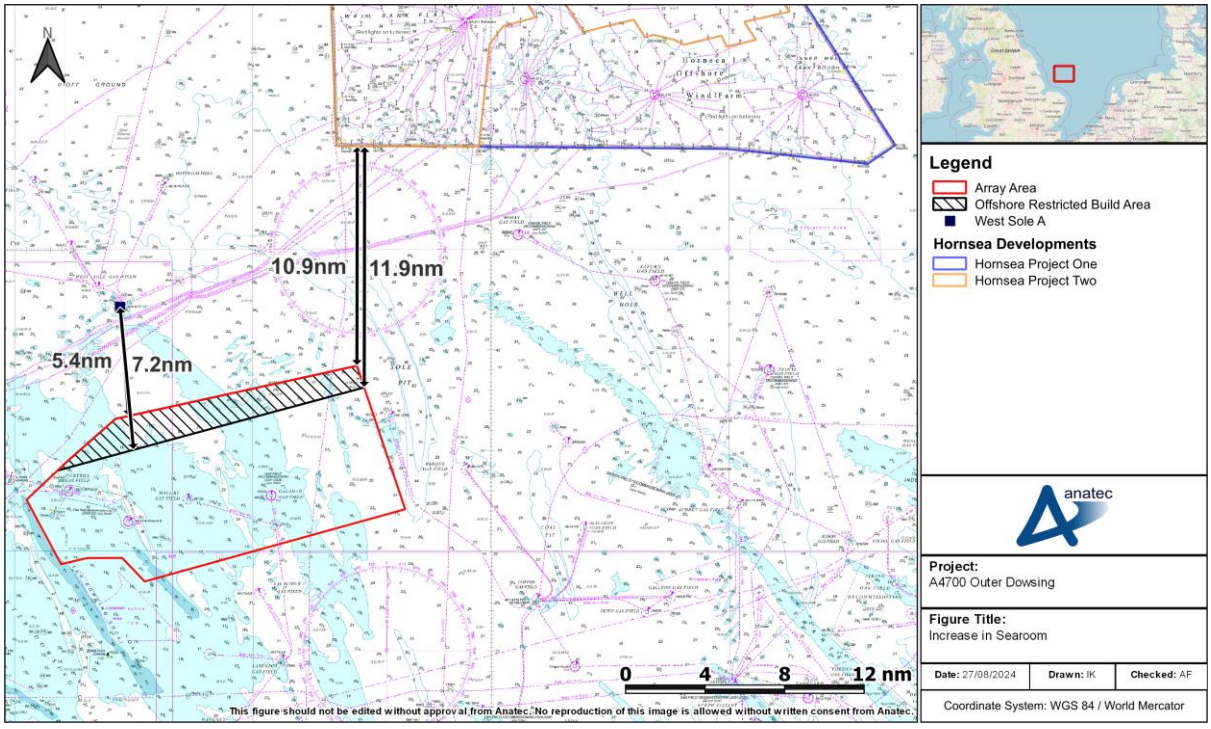

Figure 4-1 Increase in Searoom

20. Using the updated post-windfarm routeing as input, Anatec's COLLRISK model has been run to estimate the anticipated vessel to vessel collision risk in proximity to the array area. It is noted that identical methodology was utilised for the NRA, allowing for direct comparisons to be carried out to both the pre-windfarm collision risk, as well as the post-windfarm collision risk at ES.

21. Based on the outputs of the post-windfarm with ORBA collision modelling, a heat map based upon the geographical distribution of collision risk within a 0.5×0.5nm grid is presented in Figure 4-2.

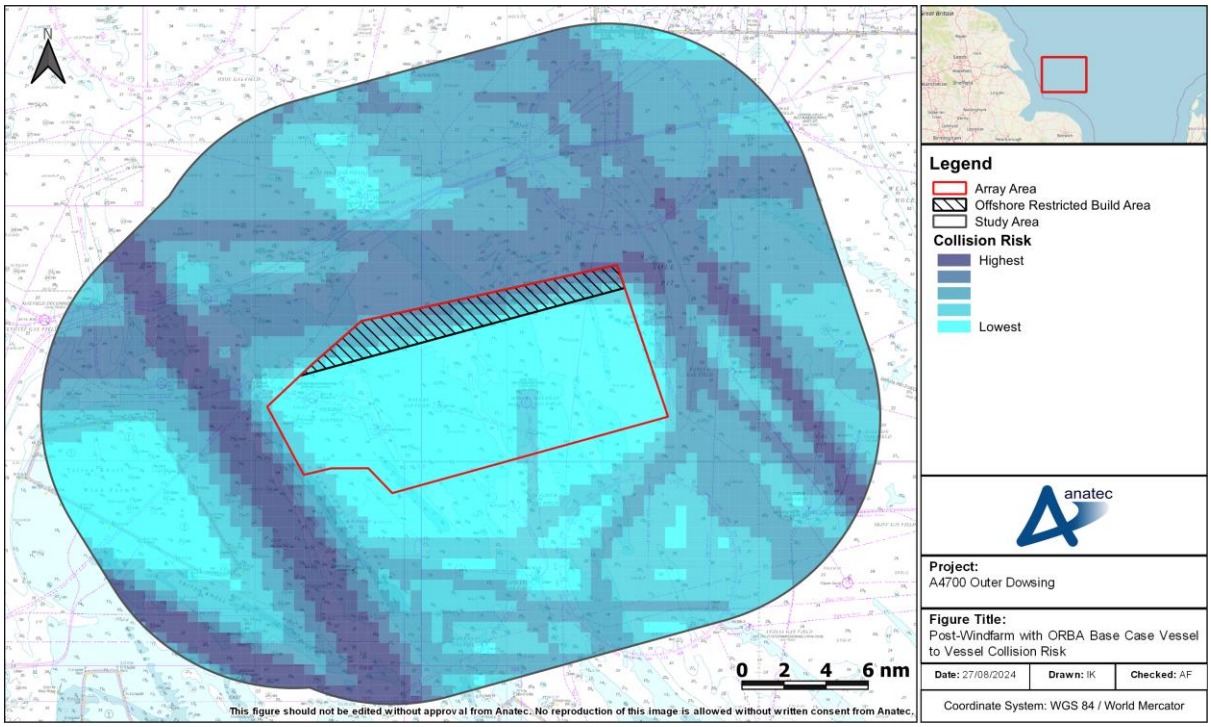

Figure 4-2 Post-Windfarm with ORBA Base Case Vessel to Vessel Collision Risk

22. The annual collision frequency for the pre-windfarm, post-windfarm, and post-windfarm with ORBA base case scenarios within the study area is presented in Table 4.1, alongside the percentage increase for the two post-windfarm scenarios compared to pre-windfarm.

Table 4.1 Annual Collision Frequencies within the Study Area Across the Scenarios

Scenario	Collision Risk	Change from Pre-Windfarm
Pre-Windfarm	3.21×10^{-2} (one in 31.2 years)	N/A
Post-Windfarm	3.59×10^{-2} (one in 27.9 years)	11.7%
Post-Windfarm with ORBA	3.48×10^{-2} (one in 28.7 years)	8.5%

23. The above results consider the 10nm study area as a whole. It was estimated that collision risk is reduced by approximately 20% if only the section of the study area north of the ORBA[3] is considered.

[3] the section of the study area north of the ORBA, at an angle perpendicular to the ORBA northern boundary and bounded on the east and west by the ORBA.

5 Summary

24. As implementation of an ORBA will result in an additional 20.8nm^2 of searoom where no surface-piercing structures associated with the Project will be implemented, meaning an effective reduction in spatial area impacted. This means vessel deviations will be reduced at the northern extent, with three of the four previously-affected main commercial routes anticipated to have lower deviations as a result of the ORBA.

25. Prior to the introduction of the ORBA, the post-windfarm collision risk was estimated as an increase of 11.7% compared to the pre-windfarm scenario. Due to the introduction of the ORBA this has since been reduced, with the post-windfarm with ORBA collision risk resulting in an increase of 8.5% compared to the pre-windfarm value. The risk of collisions occurring is therefor reduced as a result of the ORBA.

6 References

North Sea Transition Authority (2024). Offshore Activity Database. Available online: Offshore Activity (arcgis.com) (accessed August 2024).