Morven North Offshore Wind Array Project

Environmental Impact Assessment Report

Volume 3, Annex 13.2: East Region Developers Group Cumulative Baseline for Shipping and Navigation

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East Region Developers Group Cumulative Baseline for Shipping and Navigation

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02	10th April 2025	Updated following East Region Developers Group review
03	22nd May 2025	Final version for appending to project NRAs

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Abbreviations Table

Abbreviation	Definition
AIS	Automatic Identification System
GT	Gross Tonnes
INTOG	Innovation and Targeted Oil and Gas
LOA	Length Overall
m	Metres
nm	Nautical Mile
NRA	Navigation Risk Assessment
OWF	Offshore Wind Farm
UK	United Kingdom
US	United States

1 Introduction

1.1 Background

Anatec Limited ('Anatec') was commissioned to develop an agreed cumulative baseline of commercial vessel routeing for the East Region Developers Group Offshore Wind Farm Projects ('Projects'), comprised of Bellrock, Bowdun, CampionWind, Morven, Muir Mhòr, and Ossian. In addition, NASH Maritime Limited ('NASH Maritime') provided peer review of this assessment. The Projects are the six offshore wind farms (OWFs) from the ScotWind leasing round that are located off the eastern coast of Scotland, and are presented in Figure 1.1 alongside existing OWFs in the region (operational or under construction).

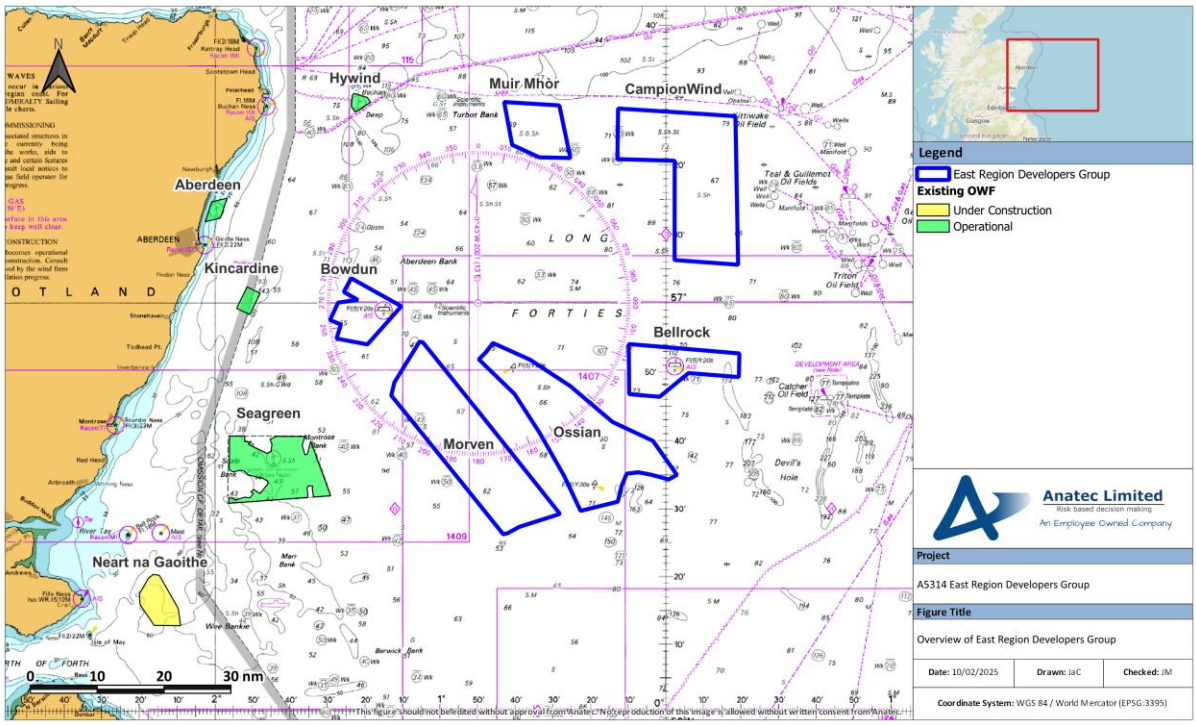

Figure 1.1 Overview of East Region Developers Group Offshore Wind Farm Projects

1.2 Aims and Objectives

The primary aim of the work was to establish a common, cumulative baseline of current shipping routes that is agreed between all parties forming the East Region Developers Group. The study therefore ensures a level of consistency between Navigation Risk Assessments (NRAs) undertaken by the East Region Developers Group and will facilitate discussions with stakeholders. (The report does not include an assessment of potential cumulative deviations or associated impacts.)

The objectives of this report are as follows:

- Identify main commercial routes for the region including the Projects, based on four months of seasonal Automatic Identification System (AIS) data;
- Determine the distribution and details of these routes;
- Validate these routes against project-specific survey data (where available); and
- Consider any potential cumulative effects relating to these routes.

2 Methodology

2.1 Area of Interest

For the purposes of this report, a study area (hereafter the 'Area of Interest') has been defined to encompass the Projects (which are presented in Figure 1.1) as well as other nearby OWFs that are relevant to cumulative assessment, which includes existing OWFs and Innovation and Targeted Oil and Gas (INTOG) sites[1]. The Area of Interest also ensures that routeing is captured on a sufficient scale by including the Moray coast and the approaches to the Firth of Forth.

Figure 2.1 presents the Area of Interest, alongside the OWFs colour-coded by phase (as of February 2025).

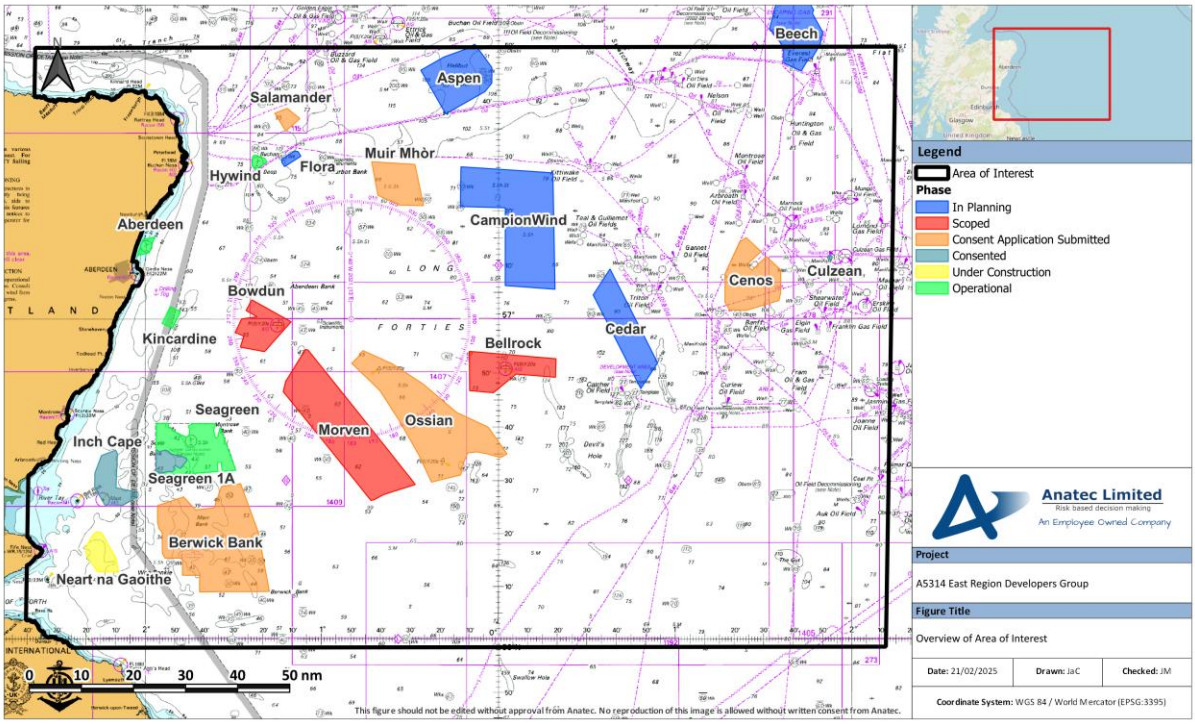

Figure 2.1 Overview of Area of Interest

2.2 Data Sources

Main commercial routes have been primarily defined using AIS data, which (as per Section 2.2.1) is considered comprehensive for the vessel types of interest in this report (i.e. passenger vessels, cargo vessels, tankers and oil & gas service vessels). It should be noted that fishing vessels and recreational vessels are not characterised in this report.

[1] It is noted that SSEN have participated in discussions with the East Region Developers Group, but it was recognised that there is insufficient detail at this stage on the locations of their future infrastructure. However, SSEN will benefit from reviewing the navigational work carried out.

The main dataset used to determine routeing comprises four months of AIS data:

- July 2023;
- September 2023;
- December 2023; and
- May 2024.

These four months were selected based on the level of coverage across the Area of Interest as a whole, and to ensure any seasonality in routeing was taken into account. The AIS data was extracted from onshore, offshore and satellite receivers to maximise coverage (see Section 2.2.1). Anatec's internal *ShipRoutes Database* (Anatec, 2024) was also used to inform analysis of routeing.

As validation, data collected by dedicated on-site survey vessels for individual Projects was compared against the four months of AIS data collected for this report, and good agreement was seen. Survey data was available for five of the Projects; CampionWind did not have survey data available at the time of writing this report (February 2025), however the Muir Mhòr and Bellrock survey data provided partial coverage of the area around CampionWind. The survey data for each project spanned 28 days and covered the following periods:

- Ossian – December 2022 and July 2023.
- Muir Mhòr – February 2023 and July/August 2023.
- Bowdun – June/July 2023 and January 2024.
- Morven – November/December 2023 and June/July 2024.
- Bellrock – August 2023 and August 2024[2].

The main commercial routes identified within and in proximity to each Project have also been discussed with the shipping and navigation technical team for each respective Project (all Anatec with the exception of Bowdun whose technical team for scoping were NASH Maritime) to ensure the baseline reflects expectations based on the survey data and any consultation feedback pertaining to the baseline.

2.2.1 Data Limitations

It has been assumed that details broadcast via AIS are accurate unless evidence to the contrary has been clearly indicated.

The carriage of AIS is required on board all vessels of greater than 300 Gross Tonnes (GT) engaged on international voyages, cargo vessels of more than 500GT not engaged on international voyages, passenger vessels irrespective of size built on or after 1 July 2002. On this basis, AIS data is considered comprehensive for the vessel types of interest in this report, i.e., passenger vessels, cargo vessels, tankers and oil & gas service vessels.

[2] Noting that both surveys were during the summer, as the MCA provided an exemption from a vessel-based winter survey, with AIS survey data being used instead.

Routes spanning the Area of Interest have been defined with a high level of confidence given that multiple feeds (onshore, offshore and satellite) have been used to maximise coverage as far as possible, and that the data has been validated against the in-situ, dedicated vessel-based survey data.

2.3 Potential Cumulative Effects Relating to Routes

Potential cumulative effects relating to routeing identified in this report assume that all Projects are built out in full. It should be noted that since this study was scoped, Morven has been split into two separate sites – Morven North and Morven South – which will be subject to separate marine licence applications. These applications will assess this split comprehensively (with an NRA to undertake an assessment of each site in isolation, as well as an assessment of full build-out). This report, however, considers only a full build-out, which is anticipated to represent the worst-case on a cumulative level.

Effects associated with the INTOG sites are considered only in the context of the Projects.

To date, internal and external studies undertaken by Anatec on behalf of the United Kingdom (UK) Government and individual clients show that vessels pass consistently and safely at a minimum distance of 1 nautical mile (nm) from established OWFs (including between distinct developments) noting these distances vary depending upon the sea room available as well as the prevailing conditions. Evidence also shows that commercial vessels do not transit through arrays (Anatec, 2016). On this basis, a deviation is considered likely if a route's mean position passes less than 1nm from a development boundary.

3 Cumulative Baseline

3.1 AIS Overview

The four months of AIS and the dedicated survey data collected by the East Region Developers Group (both detailed in Section 2.2) is shown in Figure 3.1 and Figure 3.2, respectively; only commercial vessels (i.e. passenger vessels, cargo vessels, tankers and oil & gas service vessels) are shown. The differences between the time periods for each survey dataset should be noted when viewing the survey data collectively.

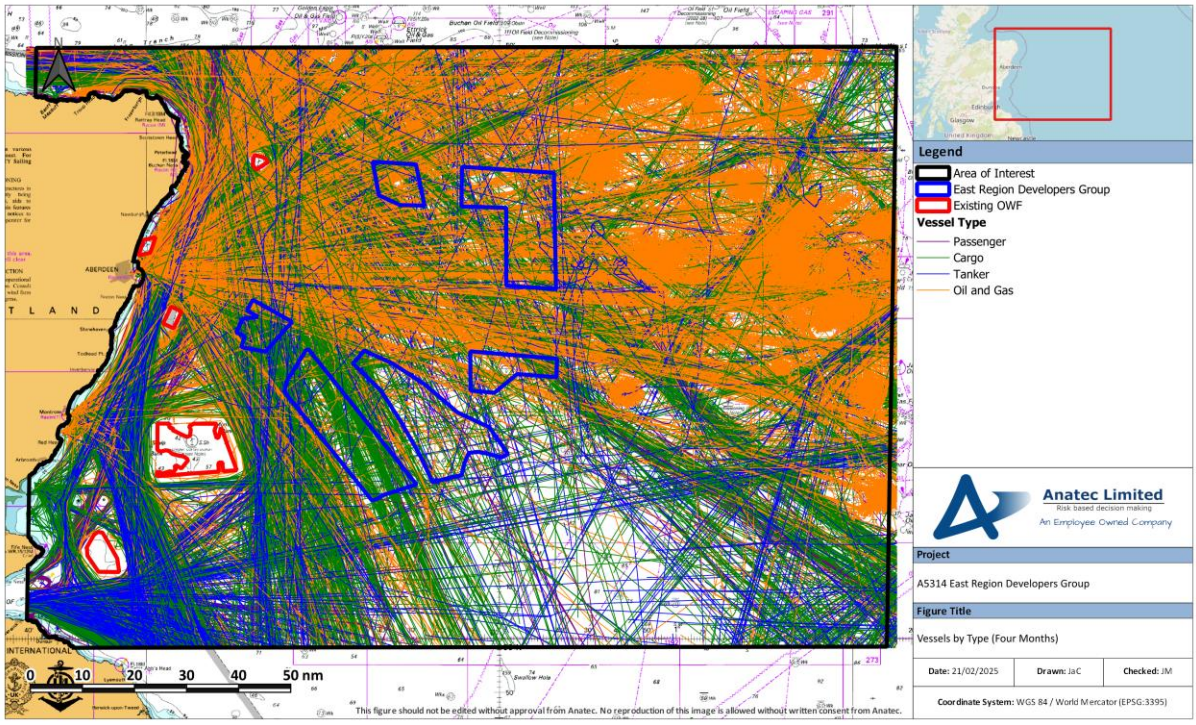

Figure 3.1 Vessels by Type (Four Months AIS, 2023/24)

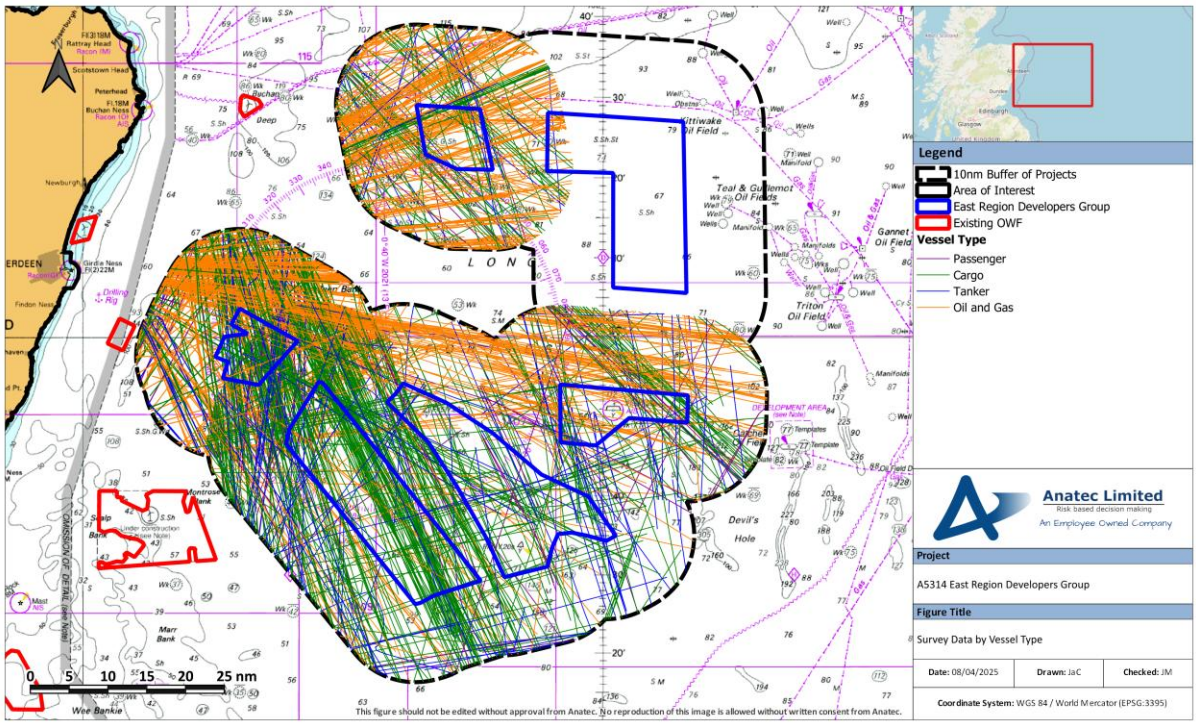

Figure 3.2 Survey Data by Vessel Type

3.2 Routes

This section presents the main commercial routes identified within the Area of Interest. Routes have been presented if they have a frequency of at least one vessel per week, and if they may be of relevance to potential cumulative routeing effects.

The one vessel per week threshold is considered a reasonable limit to ensure the baseline is reasonably comprehensive whilst also avoiding the risk of excessive baseline characterisation given the wide extent of the Area of Interest. Baseline reviews of individual OWFs may consider a lower threshold for identifying main commercial routes and may merge routes where they feature similar courses, destinations and vessel characteristics in proximity to the individual OWF.

Figure 3.3 presents an overview of all mean route positions identified from the four months of AIS data and validated by the relevant survey data. The mean route positions are colour-coded by the types of vessels using the routes.

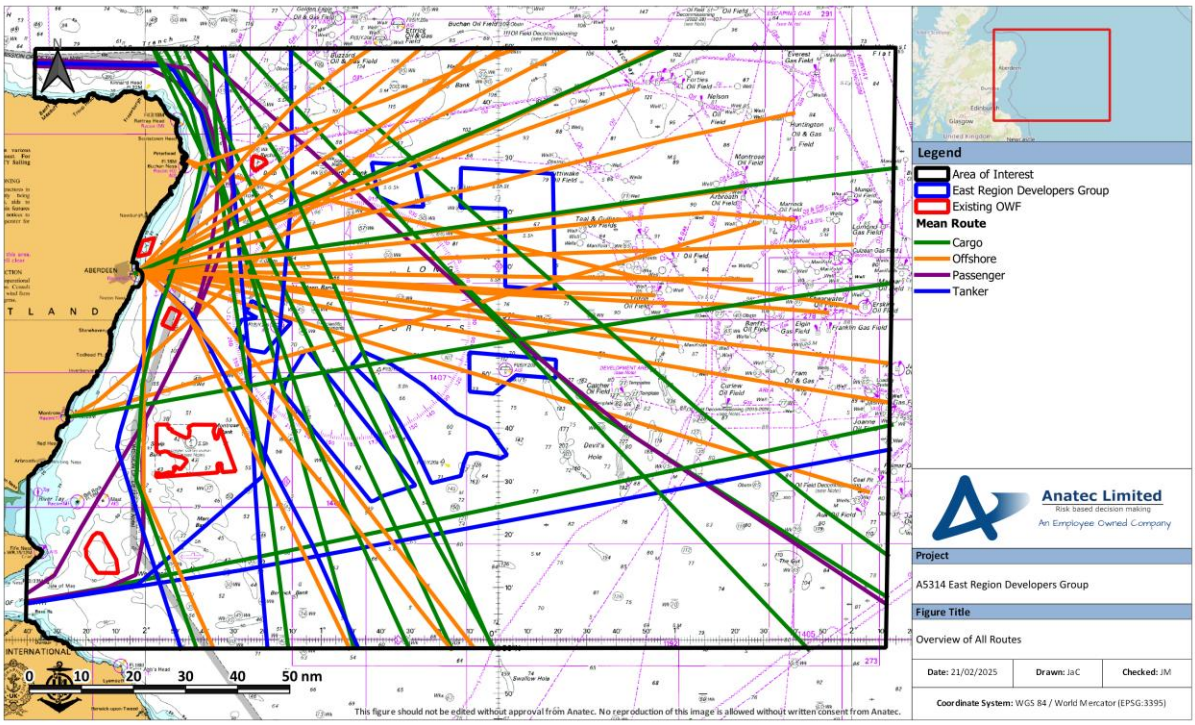

Figure 3.3 Overview of All Mean Route Positions

The following subsections provide further details of these routes by vessel type.

For each vessel type, a density plot of the traffic is presented. Anatec's *Vessel Density Calculator* was used to calculate the number of vessel tracks from the four months of AIS data intersecting each 1nm × 1nm cell within a grid covering the Area of Interest. The ranges for each plot were tailored to ensure that the main routes specific to the vessel type being shown were highlighted; the plots should therefore not be considered directly comparable as the densities are type-specific.

Following each density plot, the mean route positions and 90th percentiles for each of the main routes for that vessel type are shown. Each route is assigned a route ID[3] and details of each route are provided. Any cases where two routes are separately defined in terms of vessel type but are closely aligned in terms of mean route position have been noted; these routes may be viewed collectively as single routes when considering any cumulative routeing effects.

3.2.1 Oil & Gas Vessels

Figure 3.4 presents a density plot of the oil & gas vessels recorded within the four months of AIS data within a 1nm × 1nm grid, followed by Figure 3.5 which presents the mean routes and 90th percentiles of the main oil & gas vessel routes.

[3] The IDs are defined to be in descending order of route volume across the set of routes as a whole i.e. irrespective of vessel type.

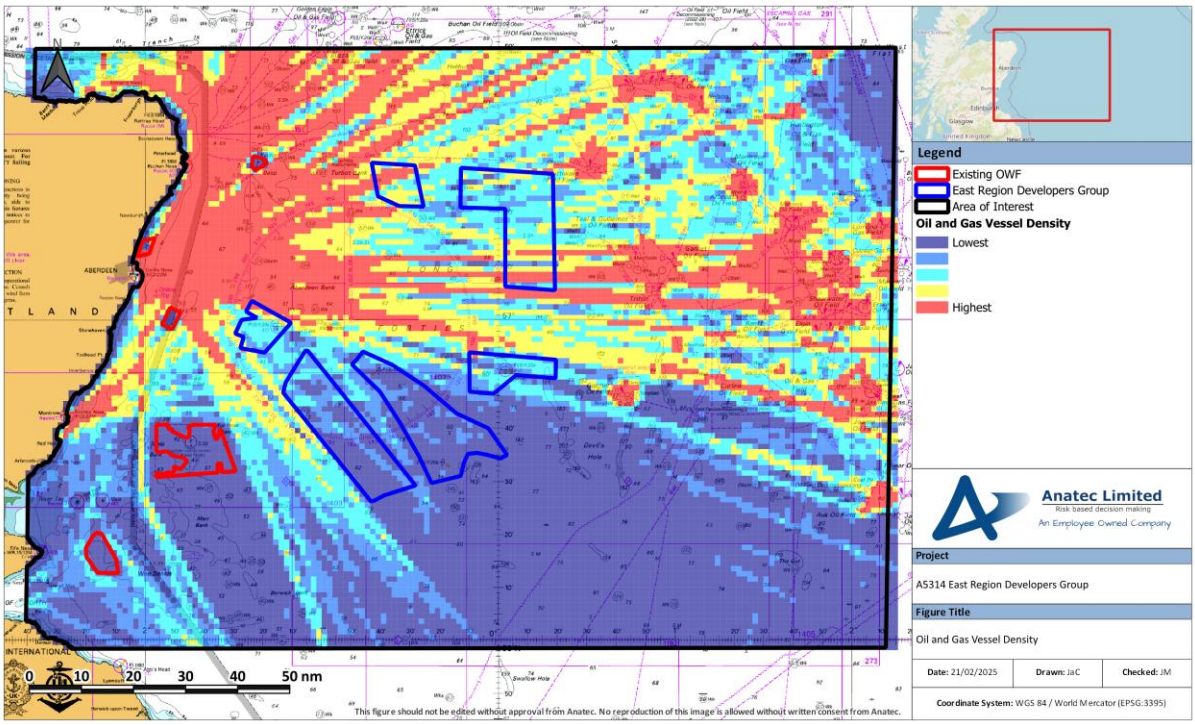

Figure 3.4 Oil & Gas Vessel Density (Four Months AIS, 2023/24)

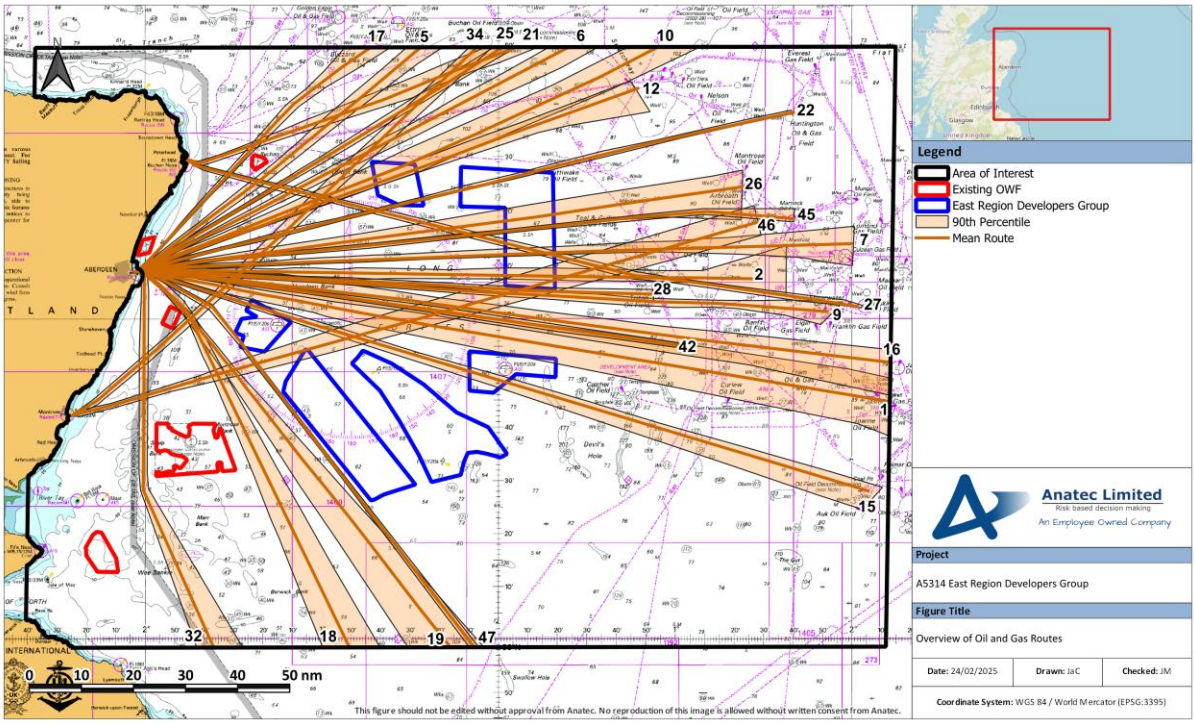

Figure 3.5 Overview of Main Oil & Gas Routes

Oil & gas vessels routeing is prominent in the Area of Interest given that Aberdeen is a key hub for the oil & gas industry[4]. The majority of oil & gas routeing within the Area of Interest begins/ends at Aberdeen (UK), with Peterhead (UK) and Montrose (UK) also featuring to a lesser extent. Routeing typically occurs east/west, supporting oil & gas fields located in the Central North Sea. There are some cases of coastal routeing, including transits inshore and offshore of Kincardine and Seagreen (Routes 18, 19, 32 and 46).

Table 3.1 presents details of each of the main oil & gas vessel routes. Where destinations consist of a variety of oil & gas fields, the destination is listed simply as "offshore fields".

Table 3.1 Details of Main Oil & Gas Routes

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
1	19	85	Aberdeen – Offshore fields
2	15	87	Aberdeen – Offshore fields
5	11	84	Aberdeen – Offshore fields
6	11	83	Aberdeen – Offshore fields
7	10	79	Aberdeen – Offshore fields
9	9 – 10	86	Aberdeen – Offshore fields
10	7 – 8	86	Aberdeen – Forties field
12	7	82	Aberdeen – Forties field
15	5 – 6	79	Aberdeen – Fulmar field
16	5	83	Aberdeen – Offshore fields
17	5	78	Aberdeen – Offshore fields
18	4 – 5	78	Aberdeen – Great Yarmouth (England) / Rotterdam (the Netherlands)
19	4 – 5	77	Aberdeen – Offshore fields
21	3 – 4	86	Peterhead – Alba North platform
22	3 – 4	82	Aberdeen – Offshore fields
25	3	87	Aberdeen – Offshore fields
26	3	85	Aberdeen – Montrose/Arbroath platforms
27	3	93	Peterhead – Offshore fields

[4] It is noted that some of these routes may transit to/from infrastructure that will be decommissioned and therefore may not exist in future case routeing. For the purposes of this assessment it has been conservatively assumed that such routes will continue to exist in the future case.

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
28	2 – 3	87	Aberdeen – Triton FPSO
32	2	82	Aberdeen – Offshore fields
34	2	90	Montrose – Norway
42	1 – 2	79	Aberdeen – Offshore fields
45	1	74	Aberdeen – Offshore fields
46	1	91	Montrose – Offshore fields
47	1	63	Aberdeen – Cygnus field

3.2.2 Cargo Vessels

Figure 3.6 presents a density plot of cargo vessels recorded within the four months of AIS data within a 1nm × 1nm grid, followed by Figure 3.7 which presents the mean routes and 90th percentiles of the main cargo vessel routes.

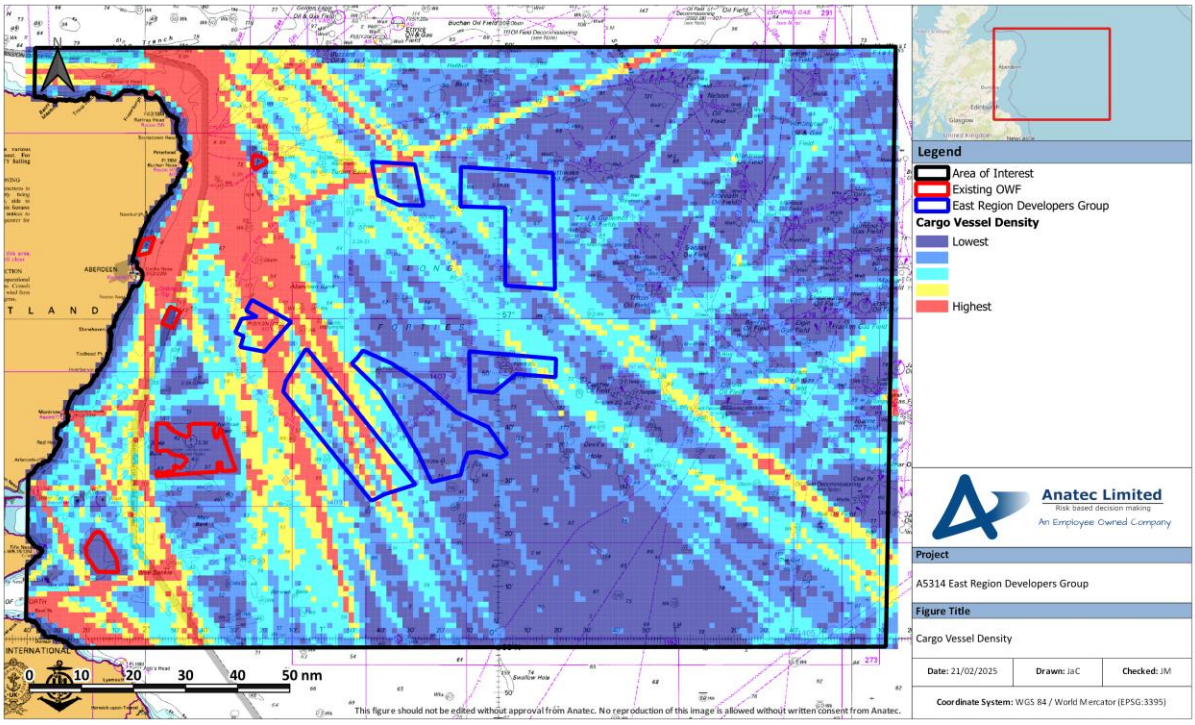

Figure 3.6 Cargo Vessel Density (Four Months AIS, 2023/24)

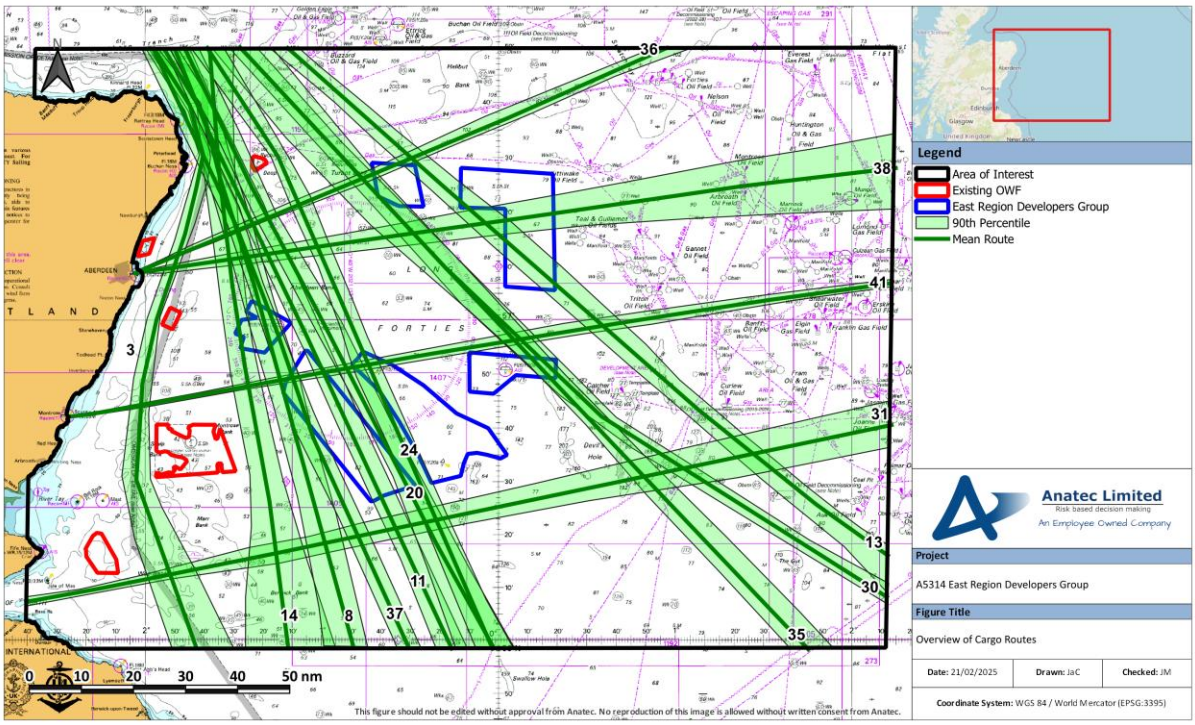

Figure 3.7 Overview of Main Cargo Routes

Cargo vessel routeing is notable within the Area of Interest, with coastal routeing originating at the Pentland Firth (located approximately 51nm north west of the Area of Interest) resulting in the highest density of traffic around Rattray Head. Coastal routeing typically passes inshore of Hywind and offshore of Kincardine and Seagreen; however, there are also instances of routeing offshore of Hywind or inshore of Kincardine and Seagreen. There are six coastal routes passing offshore of Kincardine and Seagreen which are in close proximity (Routes 8, 11, 14, 20, 24 and 37), with Icelandic ports and the Netherlands (Rotterdam in particular) featuring prominently among destinations.

Also identified was northwest/southeast routeing (Routes 13, 30 and 35) between the United States (US)/Canadian ports and German ports as well as east/west routeing (Routes 31, 36, 38 and 41) between Scottish and Scandinavian ports.

Table 3.2 presents details of each of the main cargo vessel routes.

Table 3.2 Details of Main Cargo Vessel Routes

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
3[A]	15	104	Rotterdam – Icelandic ports
8	10	111	Humber/Dutch ports – Icelandic ports
11	7	156	Rotterdam – Icelandic ports

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
13	6	200	Germany – US/Canadian ports
14[B]	5 – 6	112	Rotterdam/English ports – Icelandic ports/Wick (UK)
20	4	166	Rotterdam – Icelandic ports
24	3	200	Amsterdam (the Netherlands) – Glensanda (UK)
30[C]	2 – 3	194	German ports – US/Canadian ports
31[D]	2	108	Firth of Forth – Norwegian ports
35	2	205	German ports – US/Canadian ports
36	2	116	Aberdeen – Tananger (Norway)
37	2	147	Rotterdam – Icelandic ports
38	2	104	Aberdeen – Scandinavian ports
41	1 – 2	92	Montrose – Swedish ports

[A] Mean position aligns closely with Route 4 (tanker).
[B] Mean position aligns closely with Route 43 (tanker).
[C] Mean position aligns closely with Route 44 (passenger).
[D] Mean position aligns closely with Route 29 (tanker).

3.2.3 Tankers

Figure 3.8 presents a density plot of tankers recorded within the four months of AIS data within a 1nm × 1nm grid, followed by Figure 3.9 which presents the mean routes and 90th percentiles of the main tanker routes.

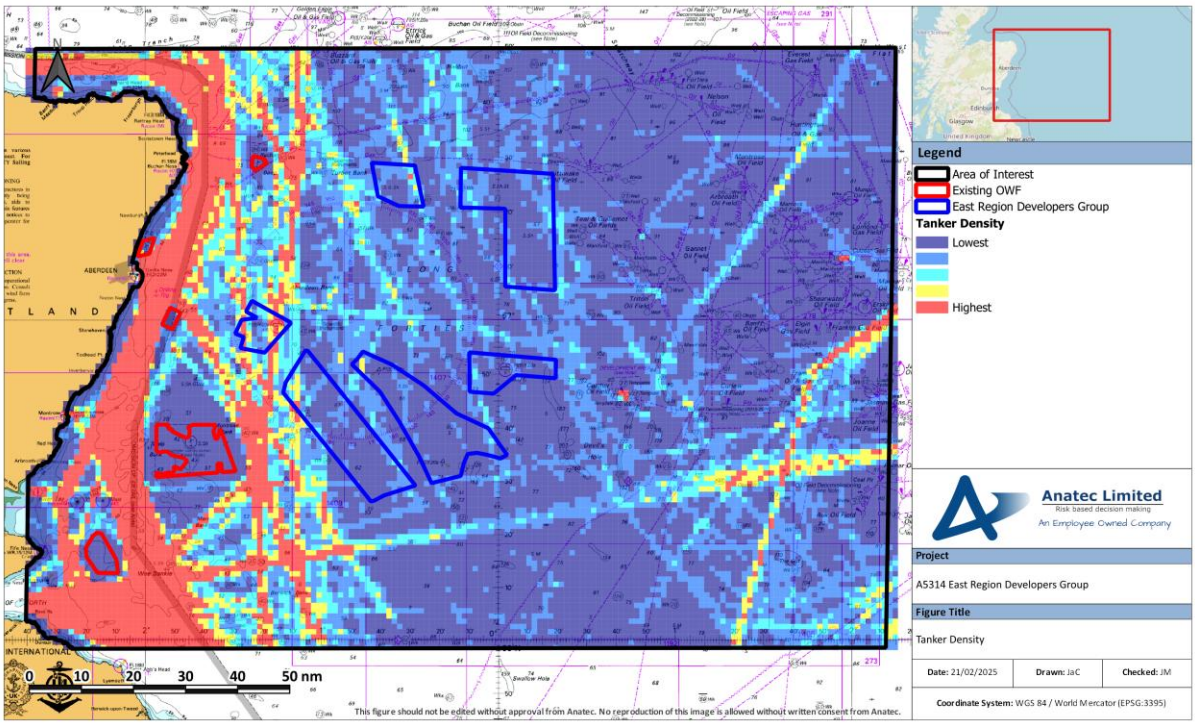

Figure 3.8 Tanker Density (Four Months AIS, 2023/24)

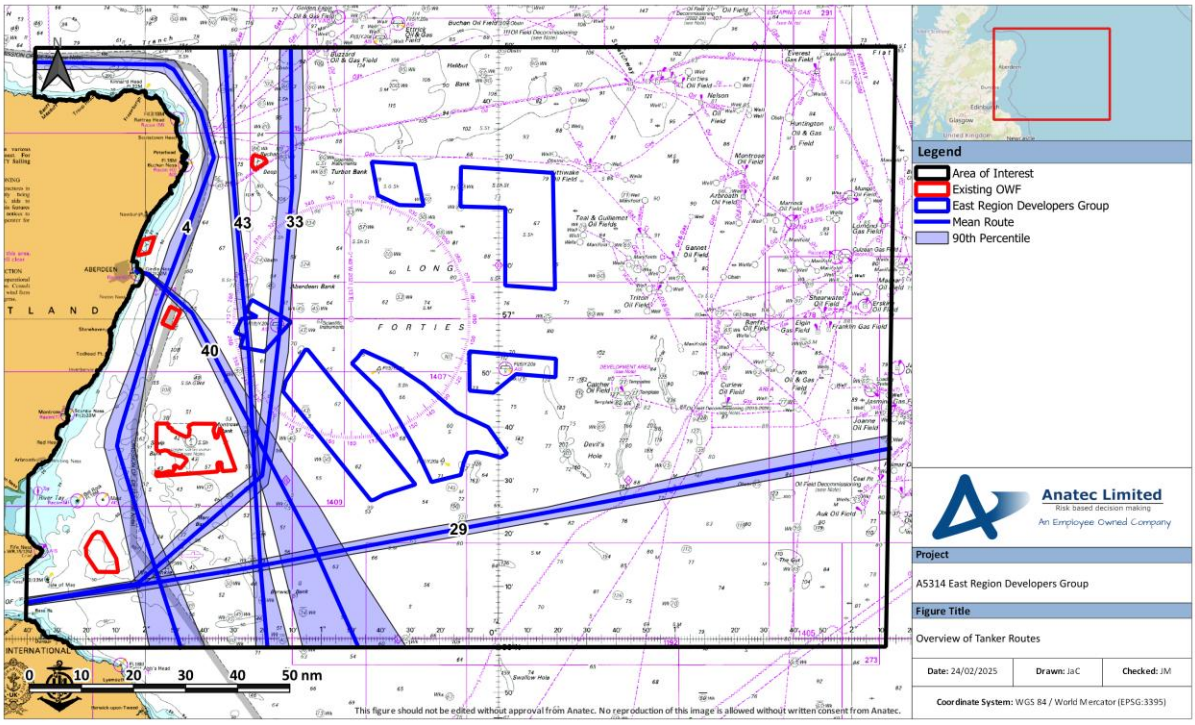

Figure 3.9 Overview of Main Tanker Routes

Tanker routeing is less prominent than that of oil & gas vessels and cargo vessels. Coastal routeing was most prominent, again featuring a combination of transits inshore and offshore of Hywind, Kincardine and Seagreen.

Table 3.3 presents details of each of the main tanker routes.

Table 3.3 Details of Main Tanker Routes

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
4[A]	13	89	Inverness (UK) – Immingham (UK)
29[D]	2 – 3	143	Grangemouth (UK) – Scandinavia
33	2	150	Grangemouth – US
40	1 – 2	157	Aberdeen – Rotterdam
43[B]	1	120	Belfast (UK)/Dublin (Ireland) – Teesport (UK)/Rotterdam

[A] Mean position aligns closely with Route 3 (cargo).
[D] Mean position aligns closely with Route 31 (cargo).
[B] Mean position aligns closely with Route 14 (cargo).

3.2.4 Passenger Vessels

Figure 3.10 presents a density plot of passenger vessels recorded within the four months of AIS data within a 1nm × 1nm grid, followed by Figure 3.11 which presents the mean routes and 90th percentiles of the main passenger vessel routes.

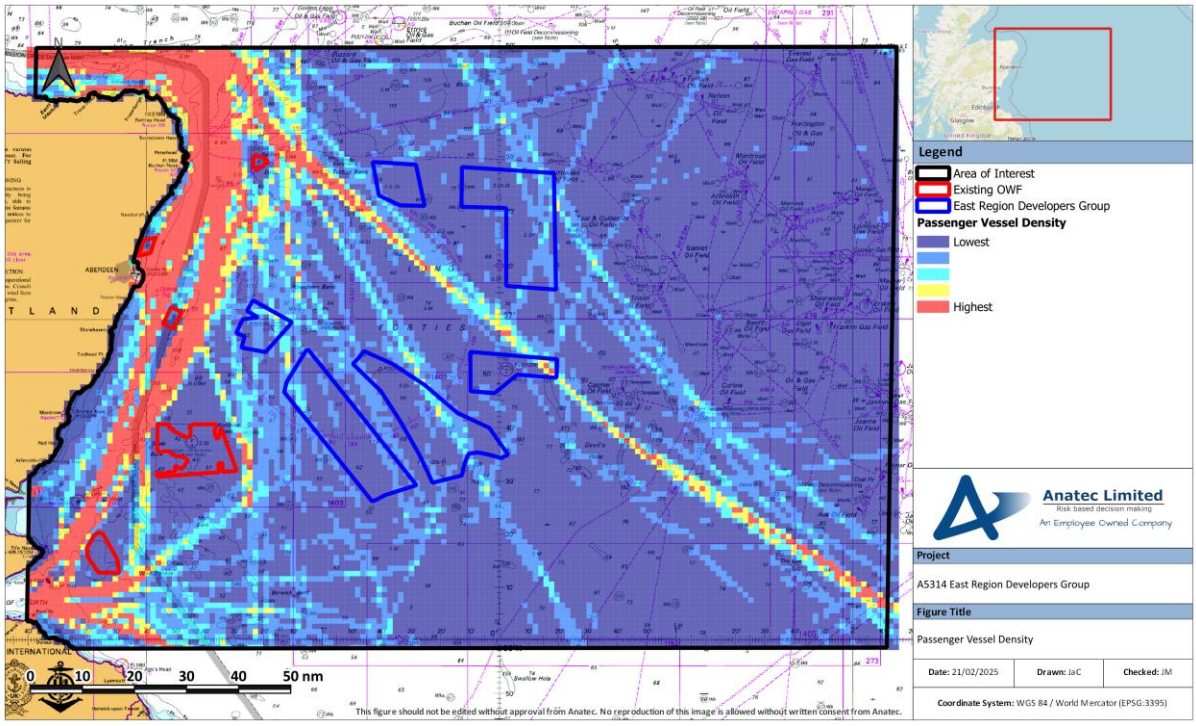

Figure 3.10 Passenger Vessel Density (Four Months AIS, 2023/24)

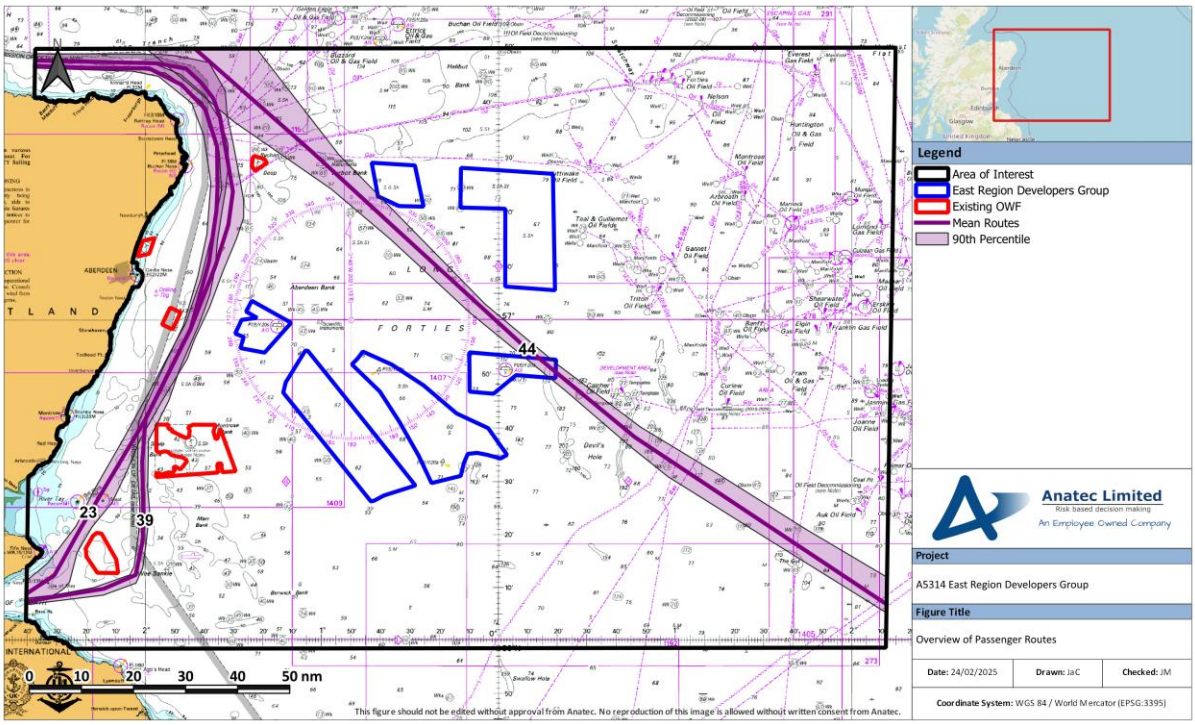

Figure 3.11 Main Passenger Vessel Routes

Passenger vessel routeing is not prominent in the Area of Interest due to the lack of regular Roll On/Roll Off Passenger (RoPax) ferry presence in this portion of the North Sea other than NorthLink Ferries operated services operating between Aberdeen and Kirkwall (UK)/Lerwick (UK) – these contribute to the vessel density in Figure 3.10 but are excluded from the main routes in Figure 3.11 since there is limited interaction with the Projects.

The two main passenger vessel routes identified within the Area of Interest are coastal and closely aligned except some transit inshore and some offshore of Neart na Gaoithe. The vessels on these routes consisted of cruise liners.

Table 3.4 presents details of each of the main passenger vessel routes.

Table 3.4 Details of Main Passenger Vessel Routes

Route Number	Average Vessels per Week	Average Vessel Length (m)	Main Destinations
23	3 – 4	235	Firth of Forth – Invergordon (UK)/Kirkwall
39	1 – 2	238	Firth of Forth – Invergordon/Kirkwall
44[C]	1	263	Bremerhaven (Germany) – Invergordon

[C] Mean position aligns closely with Route 30 (cargo).

4 Potential Cumulative Effects Relating to Routeing

This section considers potential cumulative effects relating to routeing based on the cumulative baseline established in Section 3. As per Section 2.3, it is assumed that commercial vessels will choose not to navigate internally within any Project and will prefer to pass at least 1nm from the boundary.

Table 4.1 presents a summary of all routes which would require deviations. Each Project is ticked in Table 4.1 where a route currently passes within 1nm or any deviation caused by the presence of another Project may cause it to do so. It should be noted that the presence of the INTOG sites is considered separately in Section 4.10.

Table 4.1 Routeing Deviation Summary (Only Those Requiring Deviations Shown)

Route ID	Bowdun	Morven	Ossian	Bellrock	CampionWind	Muir Mhòr	Total
2				✓	✓	✓	**3**
7				✓	✓	✓	**3**
8	✓	✓	✓	✓	✓		**5**
10					✓	✓	**2**
11	✓	✓	✓	✓	✓		**5**
12					✓	✓	**2**
13			✓	✓	✓	✓	**4**
14	✓	✓	✓	✓	✓		**5**
15	✓		✓	✓	✓		**4**
20	✓	✓	✓	✓	✓		**5**
22				✓	✓	✓	**3**
24	✓	✓	✓	✓	✓		**5**
26				✓	✓	✓	**3**
27				✓	✓	✓	**3**
28				✓	✓	✓	**3**
30			✓	✓	✓	✓	**4**
33	✓	✓					**2**
35			✓	✓	✓	✓	**4**
36					✓	✓	**2**
37	✓	✓	✓	✓	✓		**5**

Route ID	Bowdun	Morven	Ossian	Bellrock	CampionWind	Muir Mhòr	Total
38				✓	✓	✓	**3**
41	✓	✓	✓	✓	✓		**5**
43	✓	✓					**2**
44			✓	✓	✓	✓	**4**
45				✓	✓	✓	**3**
46	✓	✓		✓	✓		**4**
47	✓	✓					**2**

Out of the 47 routes identified, a total of 27 are anticipated to require a deviation; each of these 27 routes are anticipated to require a deviation directly as a result of at least one of the Projects. In addition, each deviation is of a cumulative nature i.e. each route will be influenced by more than one of the Projects. In particular:

- six routes are influenced by two Projects (either Bowdun and Morven or CampionWind and Muir Mhòr)
- eight routes are influenced by three Projects (Bellrock, CampionWind and Muir Mhòr),
- six routes are influenced by four Projects (various combinations); and
- seven routes are influenced by five Projects (all excluding Muir Mhòr).

Figure 4.1 presents the routes anticipated to deviate i.e. the routes in Table 4.1.

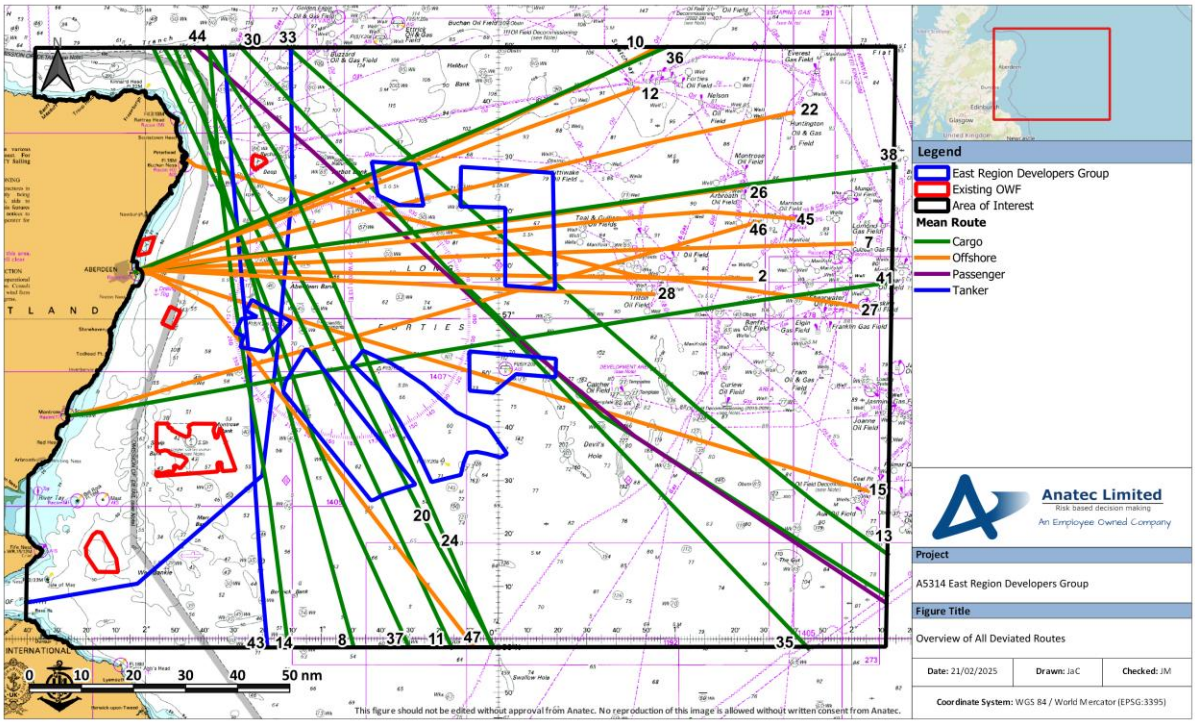

Figure 4.1 Overview of All Routes Anticipated to Deviate

The following subsections provide a commentary on the deviations for each vessel type.

4.1 Oil & Gas and Cargo Vessel East/West Routeing to/from Aberdeen/Peterhead

The presence of CampionWind will influence current east/west routeing by oil & gas and cargo vessels to/from Aberdeen/Peterhead. A total of 10 oil & gas and cargo east/west routes out of Aberdeen (Routes 2, 7, 22, 26, 27, 28, 38 and 45) intersect CampionWind and would require a deviation. Two of these routes (Routes 2 and 7) are transited daily on average.

The presence of Muir Mhòr may limit optionality for deviating north of CampionWind while the presence of Bellrock may have a limited influence on preferred passages for deviating south of CampionWind. Any options considered are likely to result in material increases in transit time and distance which may be challenged by relevant operators.

4.2 Oil & Gas and Cargo Vessel North East/South West Routeing

The presence of Muir Mhòr will influence current north east/south west routeing by oil & gas and cargo vessels. A total of three oil & gas and cargo north east/south west routes (Routes 10, 12 and 36) totalling an average of 16 to 17 transits per week intersect Muir Mhòr and would require to make a deviation. The presence of CampionWind would limit optionality for deviating south east and deviating north west of Muir Mhòr may result in increased collision risk given the existing presence of Route 6 and 34; however, it is acknowledged that Route 34 is relatively low use (average of two transits per week).

4.3 Oil & Gas Vessel Coastal Routeing

The presence of Bowdun and Morven will influence current coastal routeing by oil & gas vessels. Only Route 47 is likely to be directly impacted, but when considering the potential future presence of Berwick Bank there may be some squeezing of this traffic alongside Routes 18 and 19, increasing collision risk. This may be exacerbated by the future presence of Inch Cape should Route 32 subsequently choose to pass offshore of Seagreen (and Berwick Bank) and by deviations associated with cargo vessel coastal routeing (see Section 4.6). It is however noted that Route 47 consists of an average of one vessel per week and across all of Routes 18, 19, 32 and 47 the total volume is an average of 12 transits per week.

4.4 Oil & Gas and Cargo Vessel East/West Routeing Out of Montrose

The presence of Bowdun, CampionWind and Morven will influence current east/west routeing by oil & gas and cargo vessels out of Montrose (Routes 41 and 46). Further consideration is required of the navigable sea room for passing between Bowdun and Morven with subsequent allision risk and material increases in transit time in the event that the deviation involves passing north of both Bowdun and Morven. The presence of Bellrock may have a limited influence on preferred passages for deviating south of CampionWind (as per Section 4.1). These routes are relatively low use, with a combined average of two to three transits per week.

4.5 Oil & Gas Vessel North West/South East Routeing

The presence of Bellrock will influence current north west/south east routeing by oil & gas vessels. Only Route 15, which features an average of five to six transits per week, is likely to be directly impacted, but the presence of Ossian may limit optionality for deviating south of Bellrock. The presence of CampionWind may have a limited influence on preferred passages for deviating north of Bellrock. The potential for displacement of coastal cargo vessel routes may also exacerbate collision risk associated with Route 15 (see Section 4.6).

4.6 Cargo Vessel Coastal Routeing

The presence of Bowdun, Morven and Ossian will influence current coastal routeing by cargo vessels. A total of six cargo routes (Routes 8, 11, 14, 20, 24 and 37), accounting for up to 32 transits per week, each intersect at least one of these Projects and would require deviation. Any deviation would likely involve passing inshore or offshore of the three Projects given that it is assumed vessels will avoid using the gap between Ossian and Morven[5], and that the gap between Bowdun and Morven is in an unfavourable location and bearing for the direction of this traffic.

For passing inshore, there is already some oil & gas coastal routeing out of Aberdeen and so collision risk would be exacerbated, and this may be increased by the potential future

[5] Based on consultation with key shipping and navigation stakeholders reported in the Ossian Array EIA Report (Ossian OWFL, 2024).

presence of Berwick Bank. Likewise, the future presence of Inch Cape (and Berwick Bank) may result in Route 3, which averages 15 transits per week, passing offshore of Seagreen (inshore of Bowdun, Morven and Ossian) resulting in further increases in collision risk.

For passing offshore, there is optionality to pass between Bellrock and Ossian or between Bellrock and CampionWind. Further consideration of whether there is sufficient navigable sea room is required in the case of the former option. In any scenario (inshore or offshore), there is likely to be a squeeze of traffic compared to the baseline, exacerbating collision risk.

4.7 Cargo/Passenger Vessel North West/South East Routeing

The presence of Bellrock, CampionWind and Muir Mhòr will influence current north west/south east routeing by cargo vessels and passenger vessels. There are three cargo routes (Routes 13, 30 and 35) and a passenger route (Route 44), totalling an average of 11 to 12 transits per week, which each intersect at least one of these Projects and would require deviation. Any deviation would likely involve passing inshore of Muir Mhòr and either between Bellrock and Ossian or between Bellrock and CampionWind. Further consideration is required of the navigable sea room for passing between Bellrock and Ossian and subsequent allision risk, while the presence of CampionWind may create sea room limitations for deviating north of Bellrock.

4.8 Cargo Vessel and Tanker East/West Routeing

The potential future presence of Berwick Bank will influence current east/west routeing by tankers. Only Routes 29 and 31 are likely to be impacted, with any deviation likely to involve passing south of Berwick Bank. This may increase the passing distance from Morven and Ossian, thus reducing any allision risk associated with passing these Projects. It is also acknowledged that these are relatively low use routes, with a combined total of four to five transits per week.

4.9 Tanker and Passenger Vessel Coastal Routeing

The presence of Bowdun will influence current coastal routeing by tankers to/from the Firth of Forth. A total of two tanker routes (Routes 33 and 43) intersect with Bowdun and the future presence of Inch Cape (and Berwick Bank) may result in tanker and passenger routes (Routes 4, 23 and 39) passing offshore of Seagreen, i.e., also leading to an intersection with Bowdun and increased collision risk associated with the already present Route 40 and any deviated coastal cargo routes (see Section 4.6). Across these routes there is an average of 21 transits per week.

Any deviation could involve passing inshore or offshore of Bowdun, noting that if deviations due to Berwick Bank involve passing offshore of Berwick Bank then this is already likely to result in material increases in transit time and distance which may be challenged by relevant operators, even prior to a further deviation for Bowdun. In the case of deviations offshore of Bowdun, the additional presence of Morven may limit optionality.

4.10 INTOG

The additional presence of the INTOG sites would lead to further cumulative routeing effects. The INTOG sites are presented in Figure 4.2, alongside the mean routes, the Projects and existing OWFs.

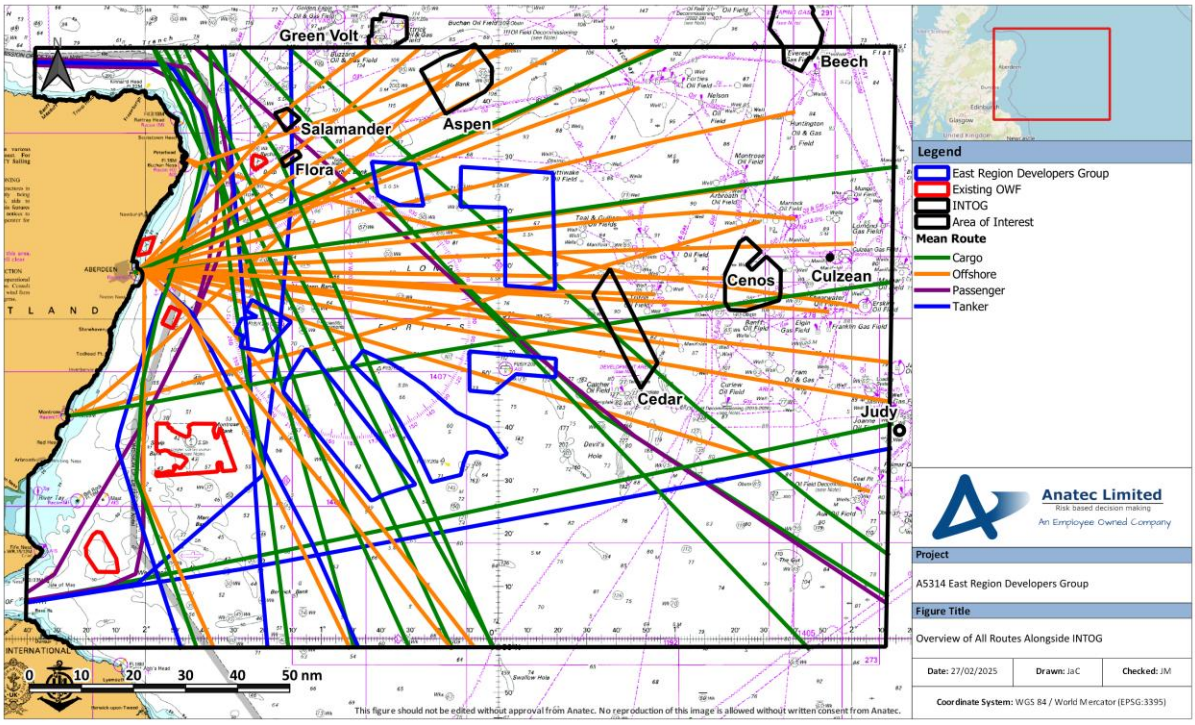

Figure 4.2 Overview of All Mean Route Positions relative to INTOG Sites

Cumulative routeing effects involving the INTOG sites are summarised in Table 4.2 for each of the routeing case studies described in the previous subsections.

Table 4.2 Effect of Additional Presence of INTOG Sites

Routeing	Effect Due to INTOG Sites
Oil & gas and cargo vessel east/west routeing out of Aberdeen/Peterhead	**Cedar** is located across the gap between Bellrock and CampionWind, and therefore additional deviations would be incurred and new deviations for Routes 1, 16 and 42. **Cenos** interacts with some routes headed to fields further east, and therefore may result in further deviations depending on re-routeing already caused by the Projects.
Oil & gas and cargo vessel north east/south west routeing	**Aspen** may limit optionality and/or exacerbate the deviation for passing north west of Muir Mhòr. Routes not previously impacted would require a deviation due to a combination of **Aspen**, **Flora** and **Salamander** – Routes 5, 6, 10, 12, 17, 21, 25 and 34 may pass closer to Muir Mhòr depending on re-routeing options taken.

Routeing	Effect Due to INTOG Sites
Oil & gas vessel coastal routeing	N/A
Oil & gas and cargo vessel east/west routeing out of Montrose	**Cedar** is located across the gap between Bellrock and CampionWind, and therefore additional deviations would be incurred. Depending on the nature of the deviation due to Flora, **Cenos** may interact with the route, and therefore may result in further deviations.
Oil & gas vessel north west/south east routeing	**Cedar** is located across the gap between Bellrock and CampionWind, and therefore additional deviations would be incurred.
Cargo vessel coastal routeing	**Flora** and **Salamander** when considered alongside Hywind increase the spatial extent over which vessels must passage plan to pass inshore or offshore of Bowdun, Morven and Ossian.
Cargo vessel north west/south east routeing	**Flora** and **Salamander** when considered alongside Hywind increase the spatial extent such that vessels may choose either to pass inshore or offshore. **Cedar** is located across the gap between Bellrock and CampionWind, and therefore additional deviations would be incurred.
Cargo and tanker east/west routeing	N/A
Tanker and passenger vessel coastal routeing	**Flora** and **Salamander** when considered alongside Hywind increase the spatial extent such that inshore routeing is likely to be preferable.
Passenger vessel south east / north west routeing	**Flora** and **Salamander** when considered alongside Hywind will likely encourage routeing further inshore while exiting/entering the Moray Firth.

5 Summary

This report has established a cumulative baseline for commercial routes in the vicinity of the Projects. The baseline was established using four months of seasonal AIS data (validated with local surveys where available) across an Area of Interest defined to encompass the Projects as well as existing OWFs and INTOG sites.

Using the baseline – consisting of 47 commercial routes in total – potential cumulative routeing effects have been identified, with 27 of the commercial routes anticipated to require some form of deviation as a result of at least one of the Projects. In all instances the deviation is influenced by multiple Projects. Six routes are influenced by two Projects, eight routes are influenced by three Projects, six routes are influenced by four Projects and seven routes are influenced by five Projects. Details of which Projects influence which commercial routes are provided in Table 4.1.

It is recommended that the East Region Developers Group continue to work together to ensure that cumulative navigational impacts identified in this study are adequately considered and addressed within individual assessments. This aligns with feedback from shipping and navigation stakeholders to date which has indicated a preference for developers to coordinate and collectively consider cumulative hazards.

6 References

Anatec, 2016. *Influence of UK Offshore Wind Farm Installation on Commercial Vessel Navigation: A Review of Evidence*. Aberdeen: Anatec.

Ossian OWFL, 2024. *Ossian Array EIA Report.* Perth: Ossian OWFL.