15A.1 Marine Traffic Validation Study

Inch Cape Wind Farm

Marine Traffic Validation Study

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Revision Number	Date	Summary of Change
00	31.07.2017	Initial Draft
01	29.08.2017	Final

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Abbreviations

AIS	-	Automatic Identification System
CPA	-	Closest Point of Approach
EIA	-	Environmental Impact Assessment
ES	-	Environmental Statement
GRT	-	Gross Tonnage
IMO	-	International Maritime Organization
km	-	Kilometre
MCA	-	Maritime and Coastguard Agency
MGN	-	Marine Guidance Note
MMSI	-	Mobile Maritime Service Identity
m	-	Metre
NRA	-	Navigational Risk Assessment
nm	-	Nautical Mile (1nm ≡ 1,852 metres)
OfTW	-	Offshore Transmission Works
OSP	-	Offshore Substation Platform
RNLI	-	Royal National Lifeboat Institution
SOLAS	-	Safety of Life at Sea
UK	-	United Kingdom
VHF	-	Very High Frequency
WTG	-	Wind Turbine Generator

1. Executive Summary

Five years have lapsed since the marine traffic survey data used in the Navigational Risk Assessment (NRA) and Environmental Statement (ES) for the Inch Cape Offshore Wind Farm was collected, a marine traffic validation exercise has been undertaken to compare the 2012 data against 2016 data and to ensure that the baselines are comparable and can be used to make an effective assessment within the new Environmental Impact Assessment Report (EIA Report).

From 28 days of AIS data (consisting of 14 days in June 2016 and 14 days in December 2016) assessed within the Study Area, identifiable changes associated with fishing patterns and vessel density were observed when compared to the 2012 NRA survey data.

Throughout the 2016 survey periods there was approximately four to five unique fishing vessels per day recorded within the Study Area, representing an increase when compared to the 2012 NRA survey data, although the proportion of fishing vessels recorded within the Development Area fell between the two surveys. The vessel density in the nearshore area between Montrose and Arbroath (east coast of Scotland) was higher than in the 2012 NRA survey data due to a greater level of fishing vessel activity. Vessels engaged in potting activity in particular were notable within the 2016 survey data, with the change likely a result of seasonal patterns and stock level which vary on a year to year basis.

During the 2016 survey periods there was approximately three unique cargo vessels and two unique tankers per day recorded within the Study Area, and an average of one unique passenger vessel every two days recorded within the Study Area. In each case this represented a slight decrease when compared to the 2012 NRA survey data.

The vessel density within the Development Area was lower than in the 2012 NRA survey data, largely due to two main routes which were seen to have split into multiple distinct routes in the 2016 survey data. This is most likely due to the installation of the Inch Cape Offshore Meteorological Mast within the Development Area, which has resulted in vessel traffic re-routeing to avoid the structure. Since the affected vessel traffic was still observed within the Study Area, the change in course is not considered to be significant.

In terms of the overall traffic levels within the Study Area, the changes observed between the 2012 NRA survey period and the 2016 survey period are not considered materially different, nor are the changes in the number of vessels of each type, with the exception of fishing vessels.

The baseline assessment of marine traffic within the 2012 NRA remains valid and therefore can be used as an assessment tool as part of the 2017 EIA report submission.

2. Introduction

2.1 Overview

Inch Cape Offshore Limited (ICOL) is promoting the development of a new application at the consented Inch Cape Offshore Wind Farm and associated Inch Cape Offshore Transmission Works (OfTW). The location of the application is in the North Sea off the east coast of Angus in Scotland and is situated in the same Development Area as the consented project (see Figure 3.1).

The consents that ICOL hold for the development are currently the subject of a Judicial Review. It should be noted that the new application for which this report refers to, is being pursued in parallel with this ongoing Judicial Review; it's ICOL's intention to only construct one or the other, and not both.

The Development Area referred to throughout this report describes the area which includes the proposed Wind Turbine Generators (WTGs), inter-array cables, Offshore Substation Platforms (OSPs) and the initial part of the Offshore Export Cable (part of the Revised OfTW component). The Study Area referred to throughout this report is the Development Area and a 10 nautical mile (nm) buffer around it.

In line with the Environmental Impact Assessment (EIA) requirements the new application will be supported with an EIA Report, and will assess the likely significant effects arising from the construction, operation and maintenance and decommissioning of the Inch Cape Wind Farm on shipping and navigation receptors.

ICOL have therefore commissioned Anatec Limited to undertake a marine traffic validation exercise to update the 2012 survey data used in the NRA and ES for the Inch Cape Offshore Wind Farm with recent shipping data from 2016. The purpose of this exercise was to determine whether or not there have been any material changes to shipping in the Study Area and therefore whether there would be a requirement to undertake an updated NRA. This validation exercise has also ensured that the information for the new application meets the requirements outlined in the Maritime and Coastguard Agency's (MCA) Marine Guidance Note (MGN) 543.

2.2 Purpose of Validation Exercise

The marine traffic survey data used for the NRA application in 2012 was collected across two separate periods – 10 days in February and March 2012 and 18 days in July and August 2012 – both from dedicated survey vessels. As five years have now passed since this data was collected it has been deemed necessary to assess newer Automatic Identification System (AIS) data to ensure the original findings remain valid. Therefore, 28 days of AIS data – 14 days in June 2016 and 14 days in December 2016 – has been collected and assessed. MGN 543 requires data to be collected within 2 years of submission of an ES.

3. Validation Survey Methodology

3.1 Study Area

Figure 3.1 presents the location of the Inch Cape Development Area, relative to the United Kingdom (UK) coastline and a 10 nm buffer which together constitute the Study Area considered throughout the following analyses.

The Development Area is located approximately 8nm (15km) east of the Angus coastline, in the outer Firth of Tay region and within Scottish Territorial Waters. The total area of the Development Area is approximately 44 nm² (150 km²).

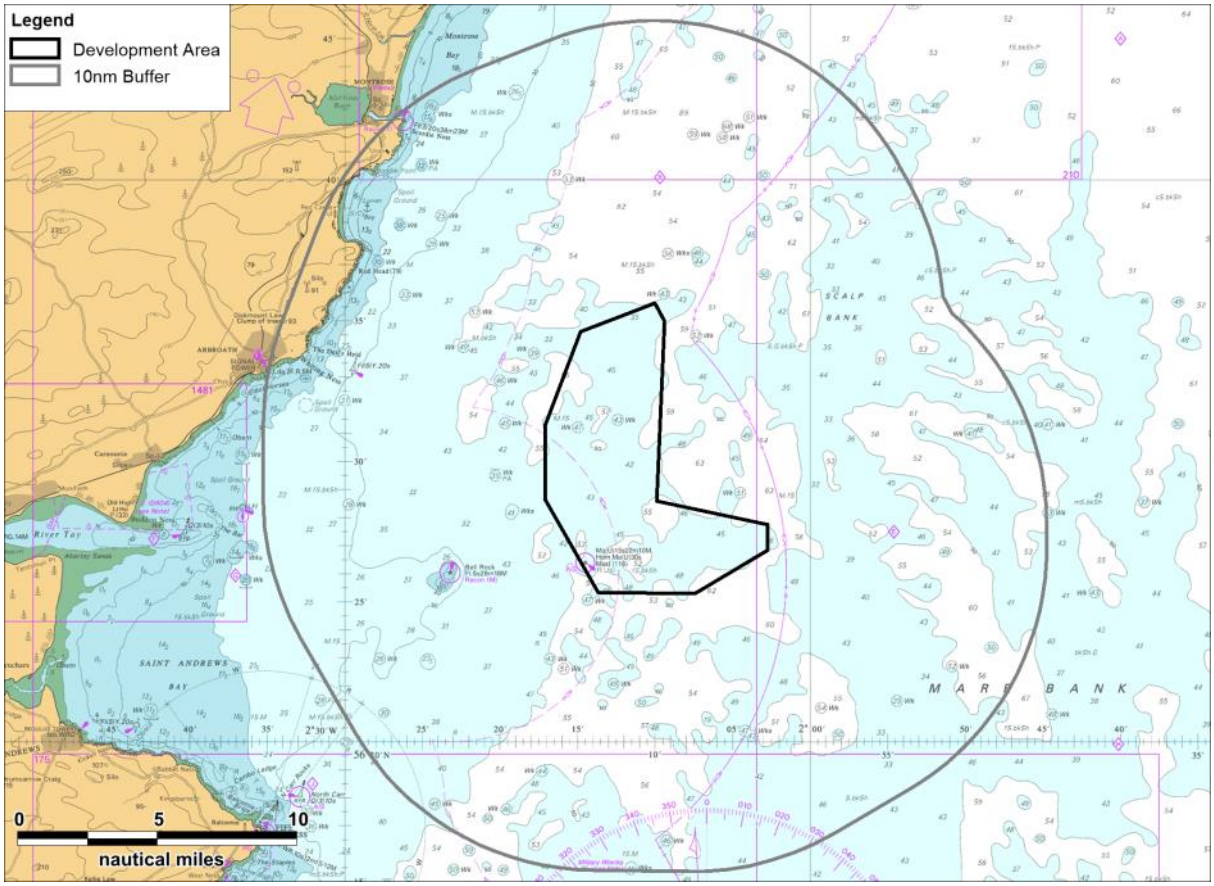

Figure 3.1 Development Area and 10 nm Study Area

3.2 Survey Data Summary

This report presents analysis of 28 full days of AIS data collected within the Study Area for the 2012 NRA and ES and for the 2016 validation survey. The survey periods analysed are summarised in Table 3.1. These periods were selected to cover both tidal and seasonal variations, as required by MGN 543 as well as being within two years of submission.

Table 3.1 Summary of Survey Data

Survey	Survey	Survey Period	Data Type	Data Capture
NRA and ES Survey	Summer	23rd July–11th August 2012	AIS	18 days
	Winter	26th February–6th March 2012	AIS	10 days
Validation Survey	Summer	6th–19th June 2016	AIS	14 days
	Winter	5th–18th December 2016	AIS	14 days

3.3 Summary of AIS Carriage Requirements

Regulation 19 of Safety of Life at Sea (SOLAS), Chapter V – Carriage requirements for vessel borne navigational systems and equipment – sets out navigational equipment to be carried on board vessels, according to vessel type. In 2000, the International Maritime Organization (IMO) adopted a new requirement (as part of a revised chapter V) for vessels to carry AIS[1].

AIS is required onboard all vessels of more than 300 gross registered tonnage (GRT) engaged on international voyages, cargo vessels of more than 500 GRT not engaged on international voyages, passenger vessels irrespective of size built on or after the 1st July 2002, and fishing vessels equal to or greater than 15 metres (m) in length from the 31st May 2015 onward. A proportion of smaller vessels (fishing and recreational vessels) also carry AIS voluntarily. It is noted that at the time of the 2012 NRA survey, fishing vessels equal to or greater than 18m in length were required to carry AIS.

[1] AIS is a system by which vessels transmit data concerning their position, Mobile Maritime Service Identity (MMSI) etc. on two individual Very High Frequency (VHF) channels to the shore and other vessels, at very frequent intervals. The data is transmitted automatically via VHF to other vessels and coastal stations/authorities.

4. 2012 NRA Survey Results

4.1 Introduction

This section presents analysis of the vessel tracks recorded throughout the 2012 survey periods within the Study Area collected as part of the original NRA.

4.2 Survey Results

Figure 4.1 presents the vessel tracks, colour-coded by vessel type, recorded within the Study Area throughout the 2012 NRA survey periods. Following this, Figure 4.2 presents the vessel type distribution for each survey period, where vessel counts are based upon the number of unique vessels recorded per day.

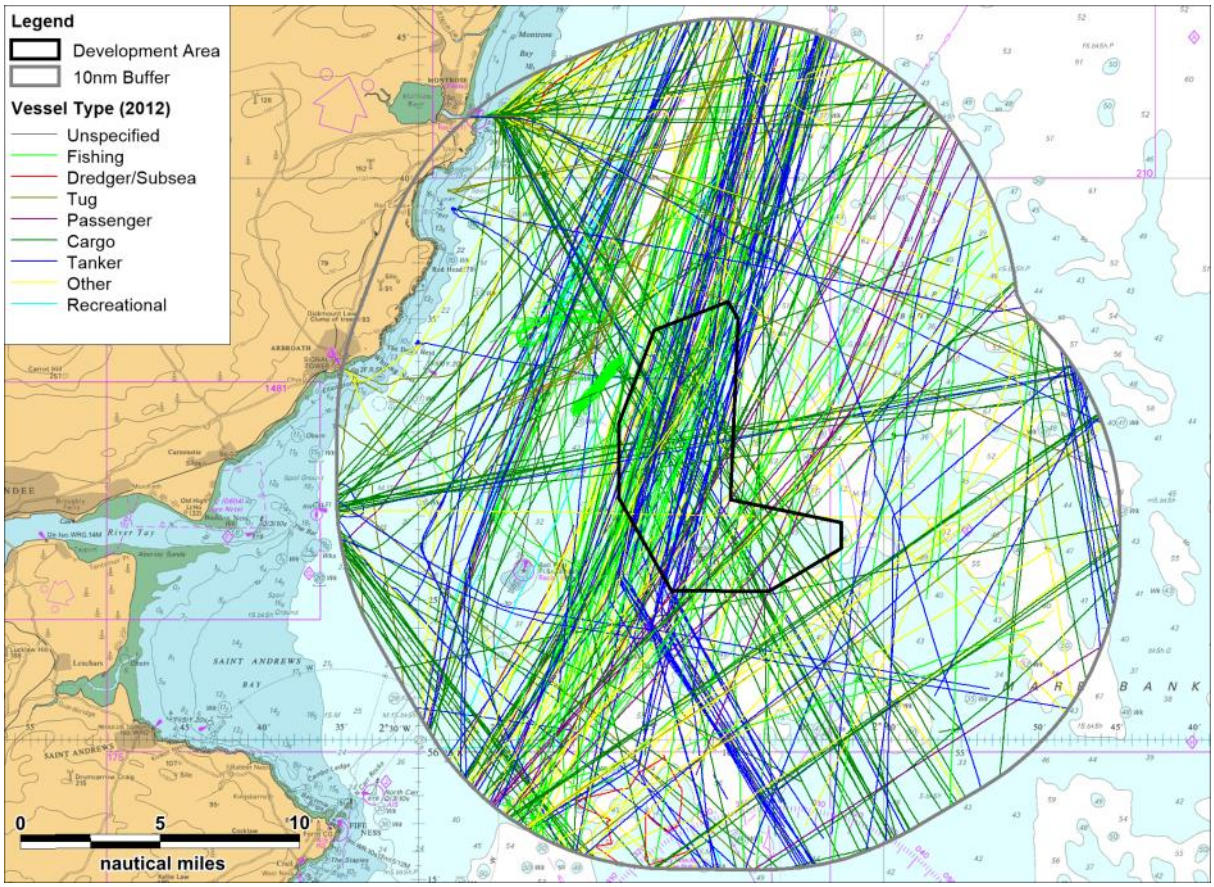

Figure 4.1 2012 NRA Survey Data Colour-Coded by Vessel Type

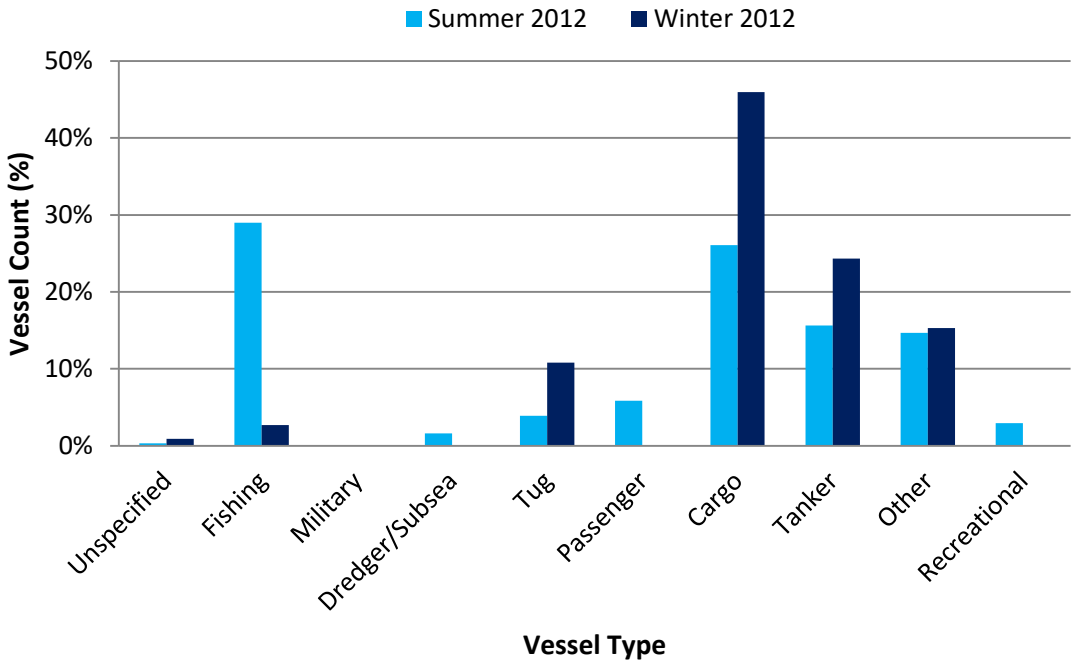

Figure 4.2 2012 NRA Survey Data Vessel Type Distribution

The most frequently recorded vessel type within the Study Area throughout the 2012 NRA survey periods was cargo vessels (26% in summer and 46% in winter), followed by fishing vessels (29% in summer and 3% in winter) and tankers (16% in summer and 24% in winter). The high seasonal variation for fishing vessels is noted, with fishing vessels the most frequently recorded vessel type throughout the summer period but almost completely absent throughout the winter period. Considering only those vessels intersecting the Development Area, the most frequently recorded vessel types were cargo vessels (24% in summer and 38% in winter) and fishing vessels (34% in summer and none in winter), followed by tankers (18% in summer and 38% in winter).

Figure 4.3 presents the daily vessel count (represented as the number of unique vessels recorded per day) within the Study Area throughout the 2012 NRA survey periods.

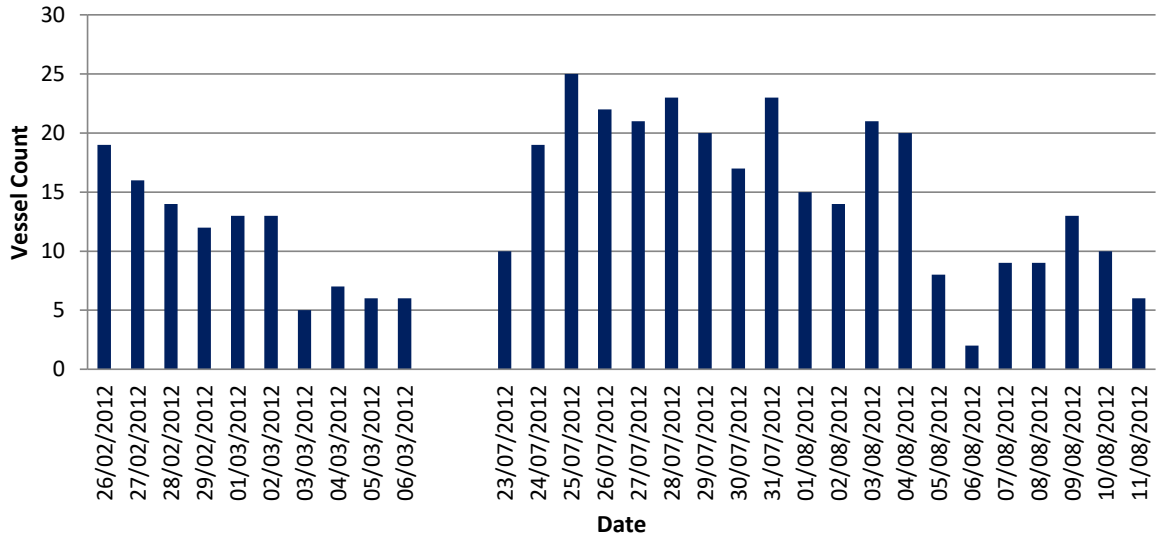

Figure 4.3 2012 NRA Survey Data Daily Vessel Count

There was an average of approximately 14 unique vessels per day recorded within the Study Area throughout the 2012 NRA survey periods. Considering only those tracks intersecting the Development Area, there was an average of approximately six unique vessels per day throughout the 2012 NRA survey periods.

The average length of vessels recorded within the Study Area throughout the 2012 NRA survey periods were 75 m (summer) and 83 m (winter). Approximately 47 % of vessels recorded were between 80 and 100 m length, with the number of lengths under 50 m also significant (28%).

Of those vessels recorded within the Study Area throughout the 2012 NRA survey periods which broadcast a draught, 54% broadcast a draught of less than 5 m, with the number of draughts between 5 and 6 m also significant (24%).

Of those vessels recorded within the Study Area throughout the 2012 NRA survey periods which could be associated with a valid average speed, 30% recorded an average speed between six and nine knots, with the number of average speeds between nine and 12 knots also significant (29%).

Of those vessels recorded within the Study Area throughout the 2012 NRA survey periods which broadcast a destination (68%), 17% broadcast a destination port within the Firth of Forth. Other significant destinations included Montrose (15%) and Aberdeen (10%).

Figure 4.4 presents the relative vessel density for the 2012 NRA survey data, reported as the number of vessel transits per day within each 500m grid cell.

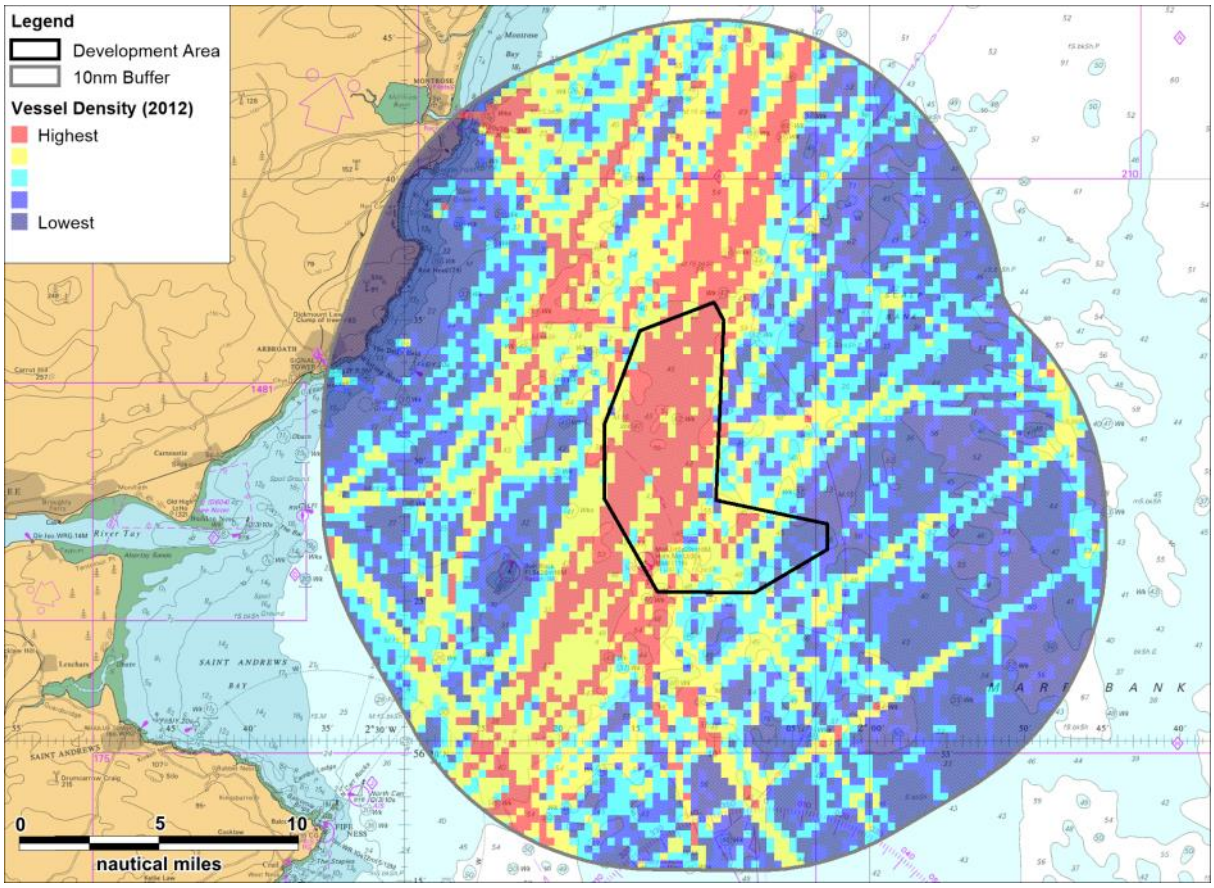

Figure 4.4 2012 NRA Survey Data Vessel Density

The highest density areas mostly corresponded to the locations of main routes transited within the Study Area; with the highest density areas corresponding to two routes which pass through the Development Area (see Section 4.3 for further details on vessel routeing). There is also a relatively high density associated with traffic entering and exiting the port of Montrose, located north west of the Development Area.

4.3 Main Routes

The main routes and corresponding 90th percentiles identified from the 2012 NRA survey data are presented in Figure 4.5 and Figure 4.6, respectively.

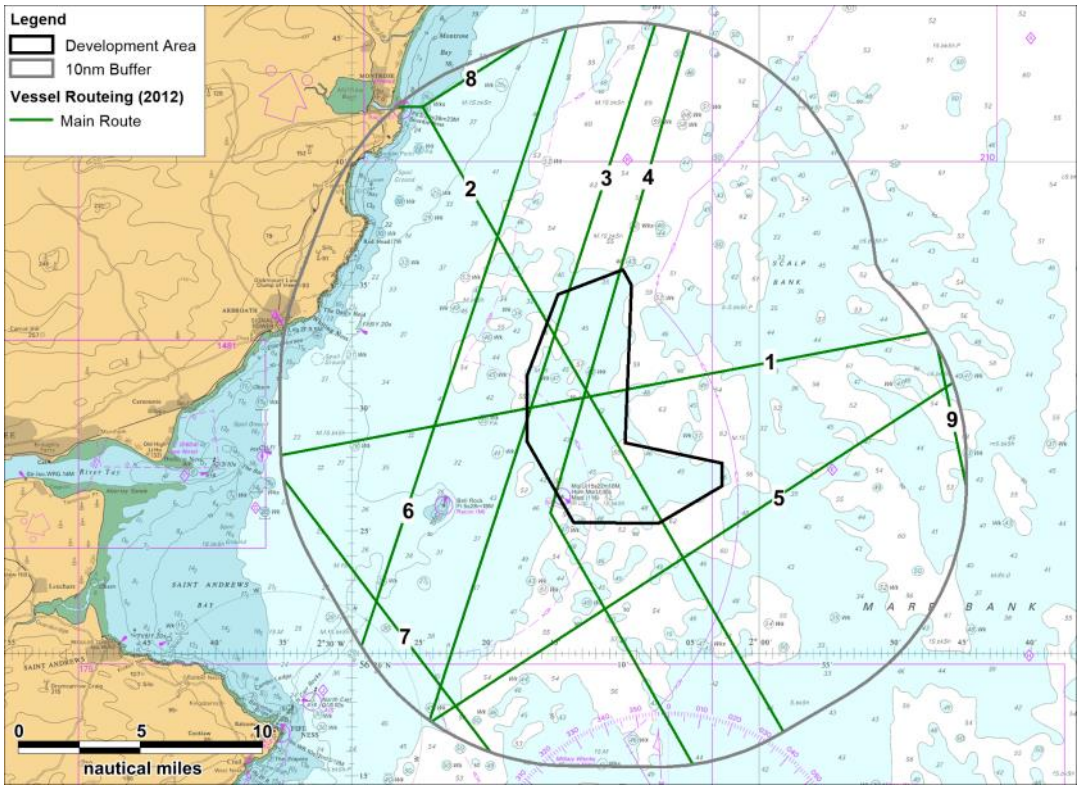

Figure 4.5 2012 Main Routes (from 2012 NRA Survey Data)

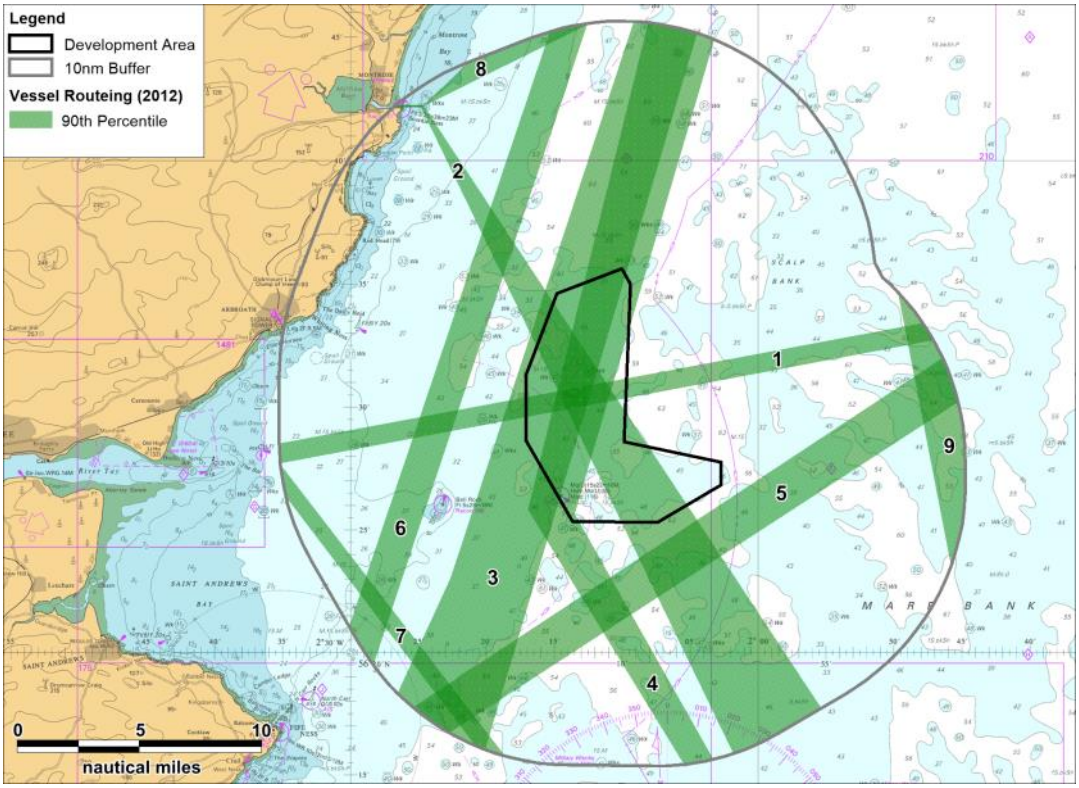

Figure 4.6 2012 Main Route 90th Percentiles (from 2012 NRA Survey Data)

A description of each of the main routes identified from the 2012 NRA survey data is presented in Table 4.1.

Table 4.1 Description of Main Routes from 2012 NRA Survey Data

Route Number	Route Description	Vessel Numbers	Main Vessel Type(s)
1	River Tay Ports to Ports in Northern Europe	1 vessel every 4 days	Cargo vessels and tankers
2	Montrose to European Ports	1 vessel every 2 days	Cargo vessels
3	Forth to Northern Scotland	2.5 vessels every day	Cargo vessels, fishing vessels and tankers
4	Immingham to Northern Scotland	1 vessel every 2 days	Tankers
5	Forth to Ports in Northern Europe	1 vessel every 4 days	No specific usage
6	Forth to Northern UK Coastal Routes	1 vessel every 2 days	No specific usage
7	River Tay Ports to Ports in Northern Europe	1 vessel every 2 days	Cargo vessels
8	Montrose to Northern UK Coastal Routes	1 vessel every 3 days	No specific usage
9	Aberdeen to Immingham	1 vessel every 3 days	Tankers

5. 2016 Validation Survey Results

5.1 Introduction

This section presents analysis of the vessel tracks recorded on AIS within the Study Area throughout the 2016 validation survey. A number of vessel tracks recorded during the survey periods were classified as temporary (non-routine) traffic, such as tracks of survey vessels. These tracks have therefore been excluded from further analysis. Vessels are assessed by type, number and size as required by MGN 543.

5.2 Vessel Type

Figure 5.1 presents the vessel tracks, colour-coded by vessel type, recorded within the Study Area throughout the 2016 survey periods. Following this, Figure 5.2 presents the vessel type distribution for each survey period.

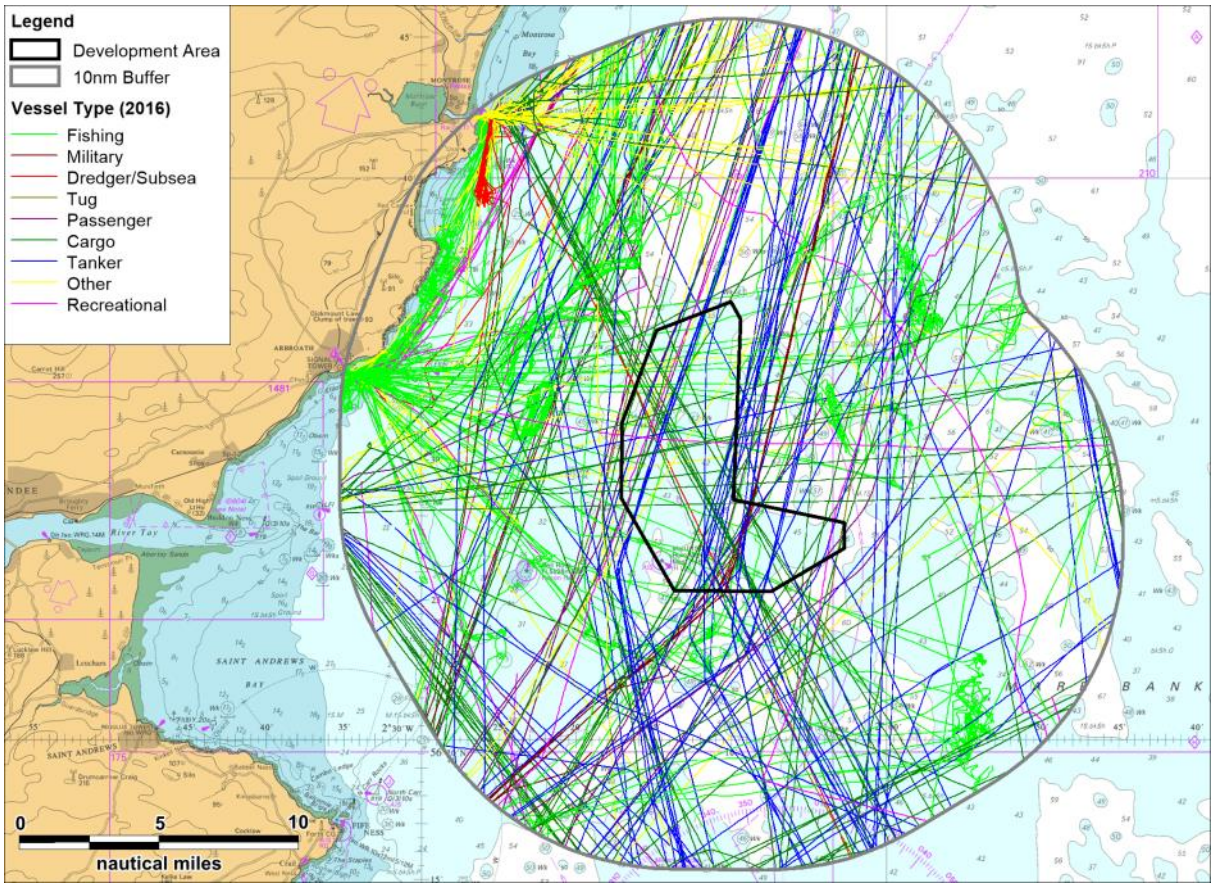

Figure 5.1 2016 Validation Survey Data Colour-Coded Vessel Type

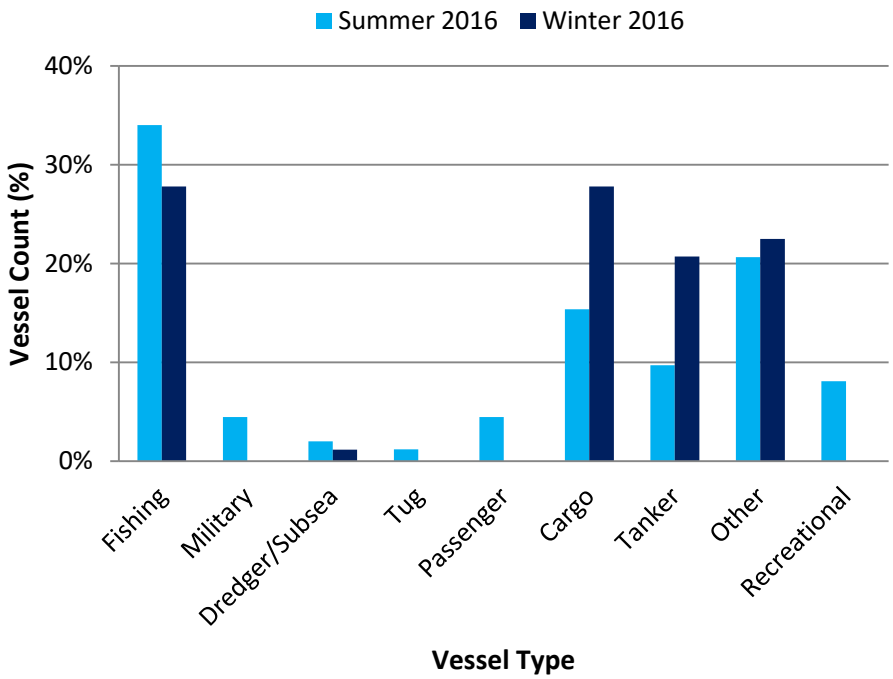

Figure 5.2 2016 Validation Survey Data Vessel Type Distribution

The most frequently recorded vessel type within the Study Area throughout the 2016 survey periods was fishing vessels (34% in summer and 28% winter), followed by 'other' vessels (21% in summer and 22% in winter) and cargo vessels (15% in summer and 28% in winter). Among the vessels included in the 'other' vessel category are oil and gas associated vessels, Royal National Lifeboats (RNLI)and pilot vessels.

When compared to the 2012 NRA survey data, there was a slight change in the distribution of vessel types. In particular, there was a greater proportion of fishing vessels recorded during the winter period of the 2016 survey (25% of traffic in winter) than during the winter period of the 2012 NRA survey (3%).

It can be concluded that the vessel type distribution within the Study Area did not materially alter from the 2012 NRA survey data, with fishing vessels and cargo vessels generally remaining the two most common vessel types. The proportional increase in fishing vessels may partly be a result of stricter AIS carriage requirements (see Section 3.3); however given that 93% of fishing vessels recorded throughout the 2012 NRA surveys were at least 18 m length, it is more likely that the proportional change in fishing vessels is due to changeable fishing patterns (see Section 6.5 for further details).

A detailed comparison between vessel numbers of each main type is presented in Section 6.

5.3 Vessel Count

Figure 5.3 presents the daily vessel count (represented as the number of unique vessels recorded per day) within the Study Area throughout the 2016 survey periods.

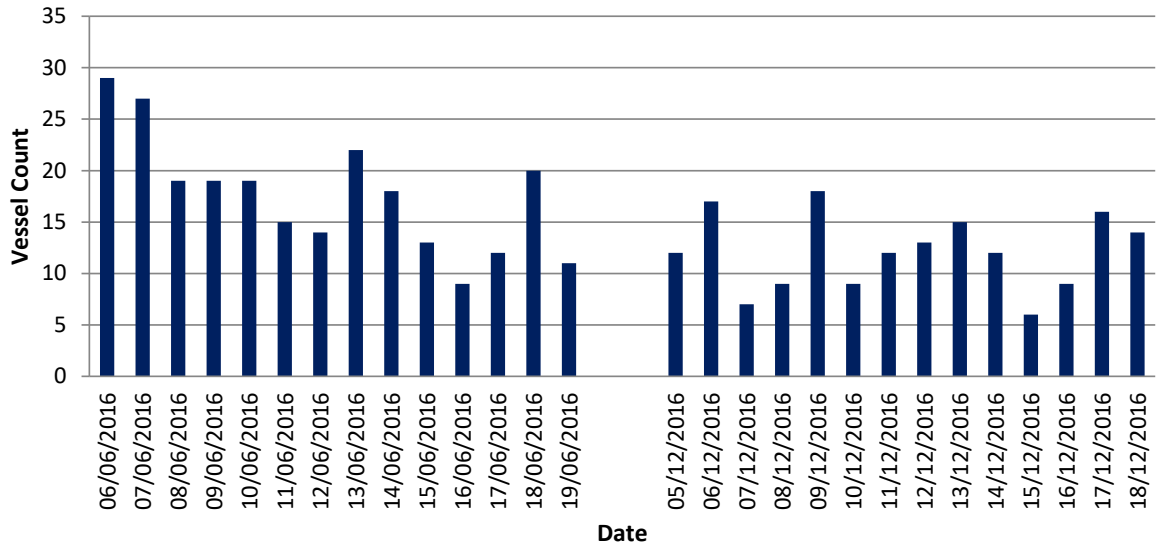

Figure 5.3 2016 Validation Survey Data Daily Vessel Count

Across both the 2016 summer and winter survey periods there was an average of approximately 15 unique vessels per day recorded within the Study Area. This represents an increase of approximately one unique vessel per day when compared to the 2012 NRA survey data.

The busiest day recorded within the Study Area throughout the 2016 survey periods was the 6th June 2016 when 29 unique vessels were recorded. This compares to 25 unique vessels on the busiest day recorded throughout the 2012 NRA survey periods (25 July 2012).

The quietest day recorded within the Study Area throughout the 2016 survey periods was the 15th December 2016 when six unique vessels were recorded. This compares to two unique vessels on the busiest day recorded throughout the 2012 NRA survey periods (6 August 2012).

It can be concluded that the number of vessel movements within the Study Area did not materially change from the 2012 NRA survey data.

5.4 Vessel Length

Figure 5.4 presents the vessel tracks, colour-coded by vessel length, recorded throughout the 2016 survey periods. Following this, Figure 5.5 presents the vessel length distribution for each survey period. It is noted that approximately 17% of vessels recorded throughout the 2016 survey periods could not be associated with a length (in the majority fishing vessels) and have therefore been excluded from the analysis.

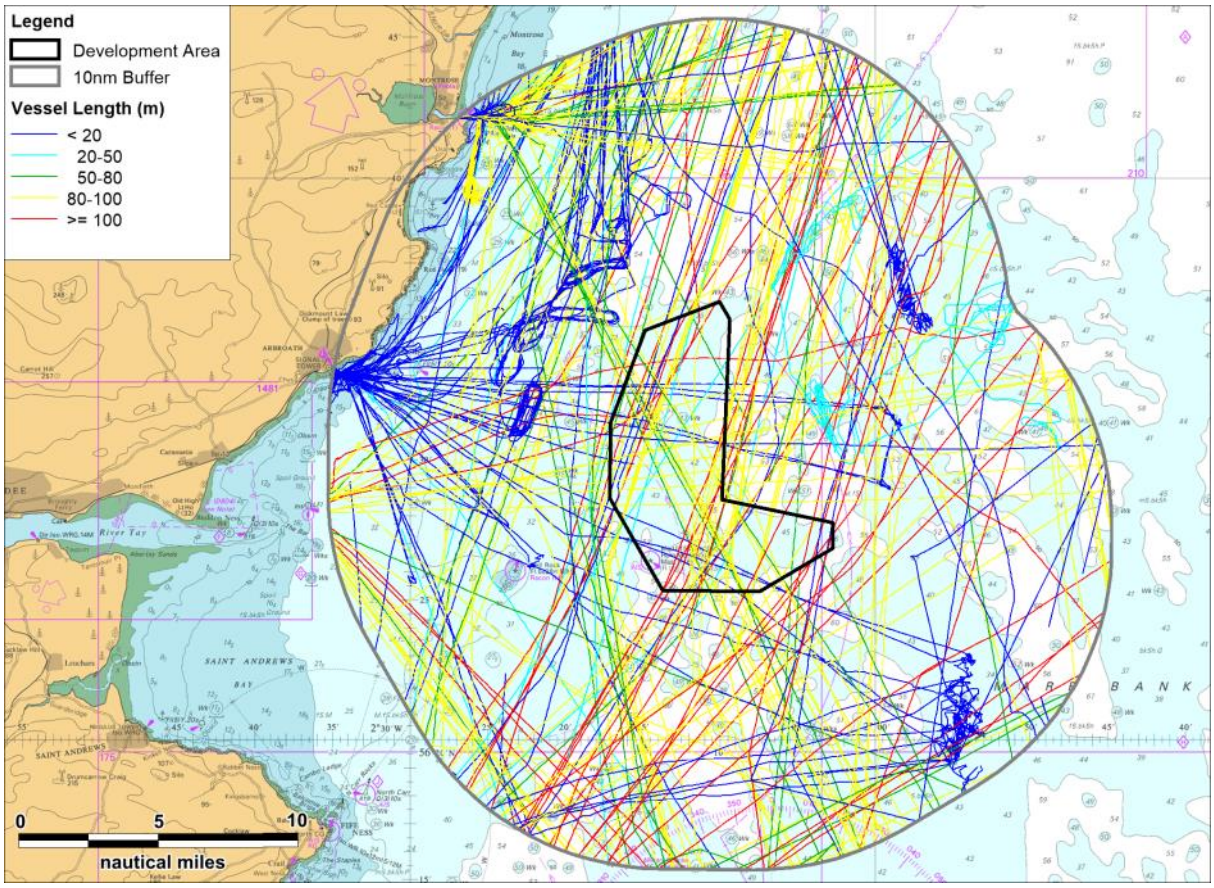

Figure 5.4 2016 Validation Survey Data Colour-Coded by Vessel Length

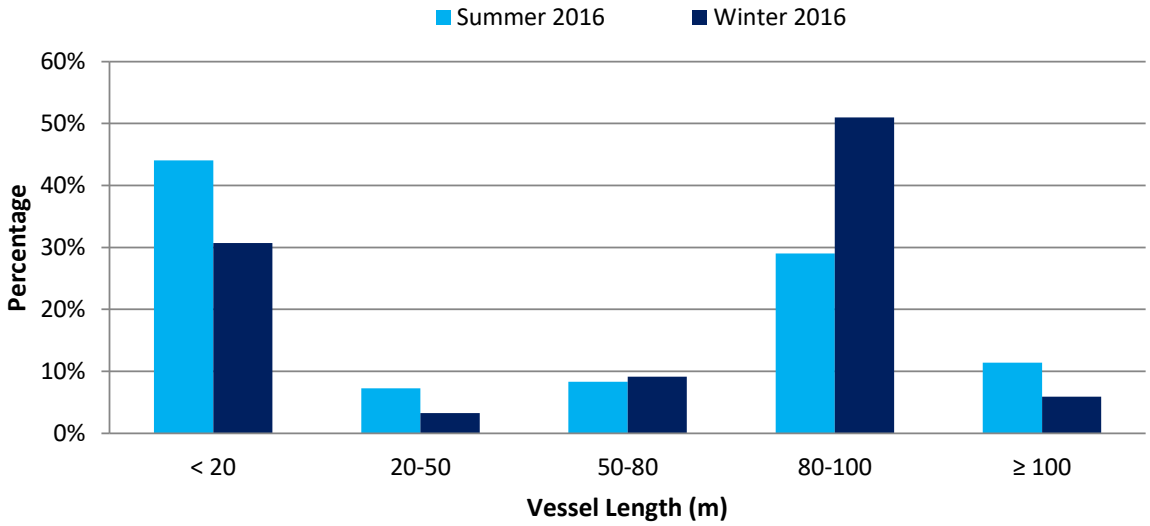

Figure 5.5 2016 Validation Survey Data Vessel Length Distribution

The average lengths of vessels recorded within the Study Area throughout the survey periods were 56 m (summer) and 64 m (winter). Approximately 39% of vessels recorded were between 80 and 100 m length and 38% less than 20 m length, although there were a

significantly greater proportion of vessels recorded between 80 and 100 m during the winter period compared to the summer period.

The average length of vessels recorded within the Study Area throughout the 2012 NRA survey periods was greater (75 m in summer and 83 m in winter); with a smaller proportion of vessel lengths recorded less than 20 m (8%).

It can be concluded that the distribution of vessel lengths within the Study Area has changed from the 2012 NRA survey data, with a significantly greater proportion of smaller vessels recorded. This shift may be attributed to the increase in fishing activity in the vicinity of the Development Area (see Section 6.5 for further details) and the stricter AIS carriage requirements now in place (see Section 3.3).

5.5 Vessel Draught

Figure 5.6 presents the vessel tracks, colour-coded by vessel draught, recorded throughout the 2016 survey periods. Following this, Figure 5.7 presents the vessel draught distribution for each survey period. It is noted that approximately 59% of vessels recorded throughout the 2016 survey periods did not broadcast a draught and have therefore been removed from Figure 5.6 and the corresponding analysis.

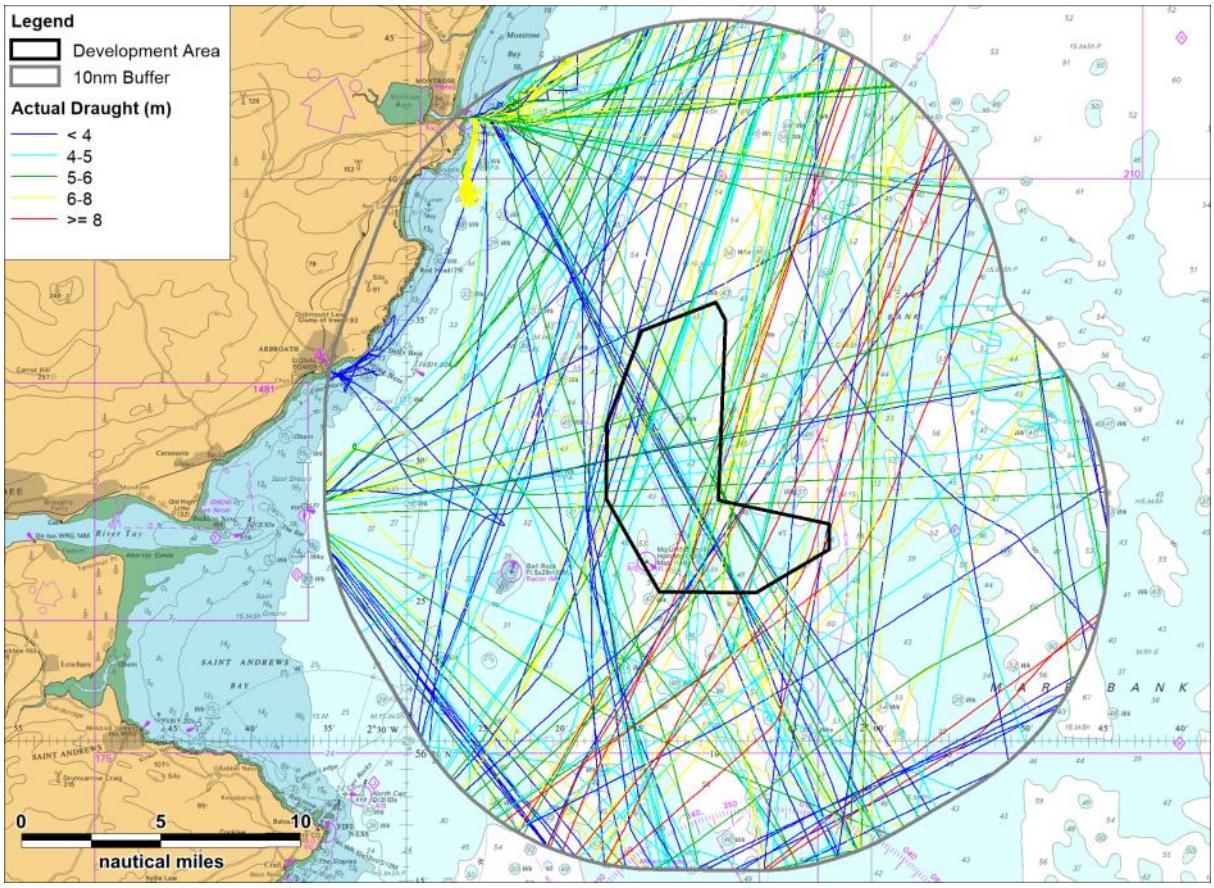

Figure 5.6 2016 Validation Survey Data Colour-Coded by Vessel Draught

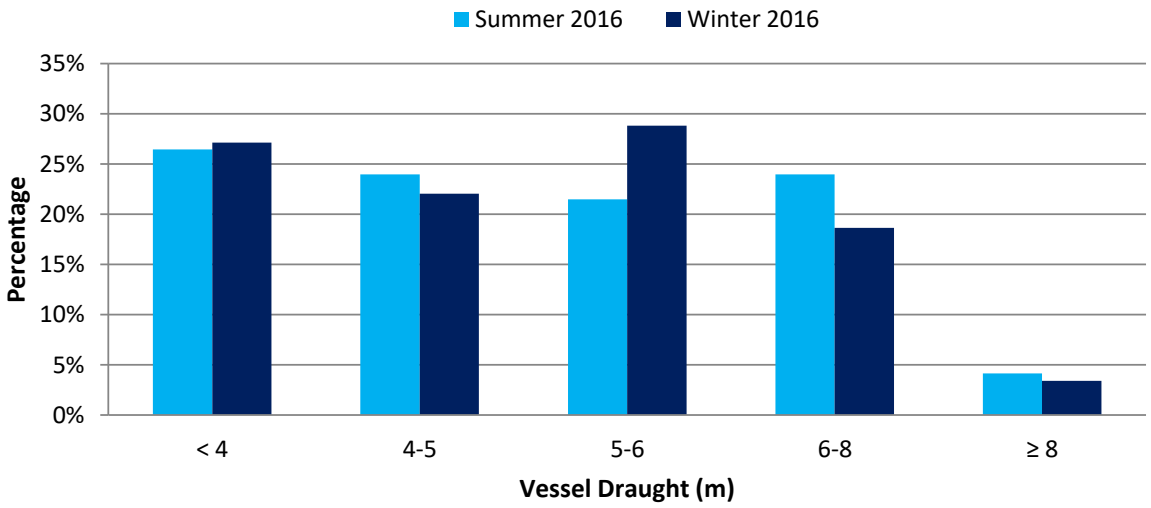

Figure 5.7 2016 Validation Survey Data Vessel Draught Distribution

The average draught of recorded within the Study Area throughout the survey periods was 4.9 m in both the 2016 summer and winter survey periods. The distribution of vessel draughts was reasonably uniform up to 8 m, with a majority of vessels broadcasting a draught of less than 5 m (50%).

The average draught of vessels recorded within the Study Area throughout the 2012 NRA survey periods was similar (4.9 m in summer and 5.1 m in winter), with the majority of vessels broadcasting a draught of less than 5 m.

It can be concluded that the vessel draughts within the Study Area did not alter materially from the 2012 NRA survey data.

5.6 Vessel Speed

Figure 5.8 presents the vessel tracks, colour-coded by vessel speed, recorded throughout the 2016 survey periods. Following this, Figure 5.9 presents the vessel speed distribution for each survey period. It is noted that approximately 55% of vessel tracks could not be associated with a valid average speed and have therefore been removed from Figure 5.9 and the corresponding analysis.

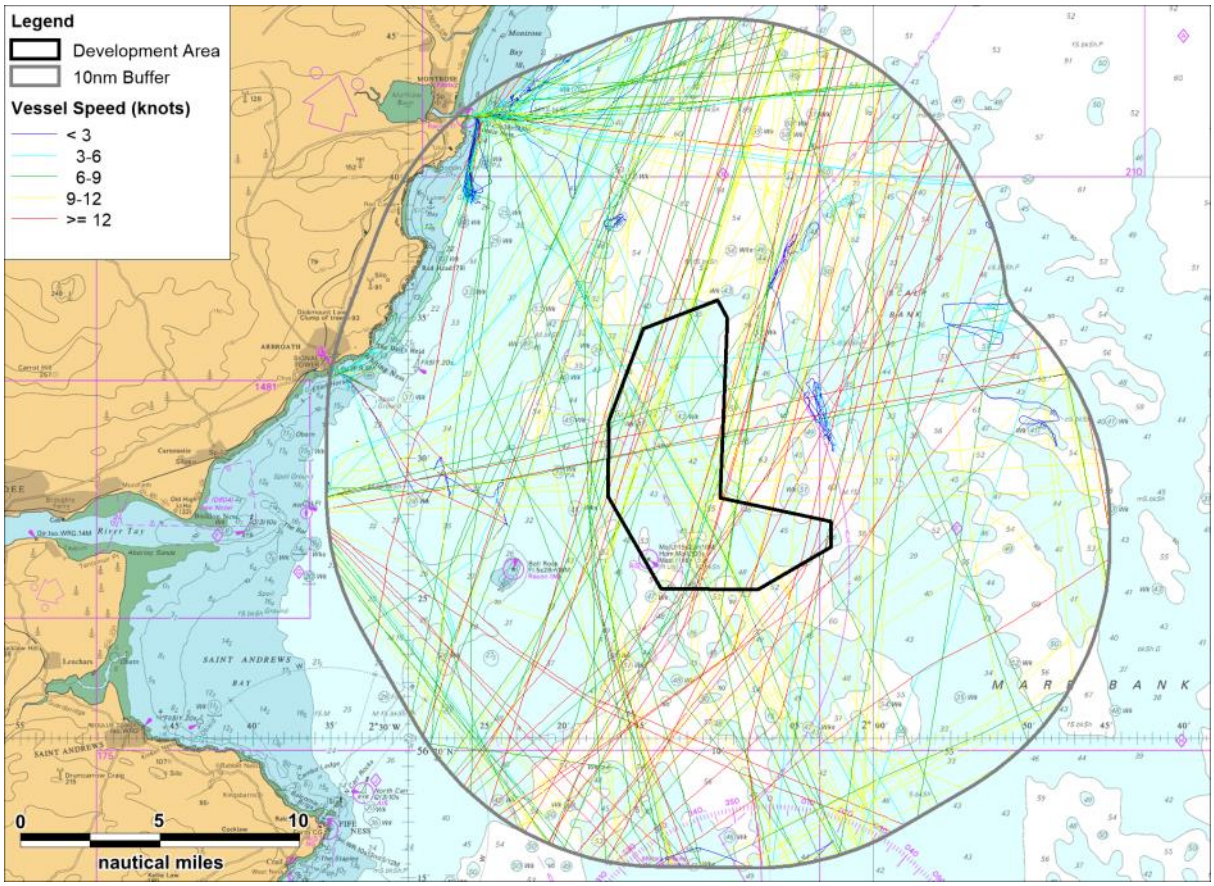

Figure 5.8 2016 Validation Survey Data Colour-Coded by Vessel Speed

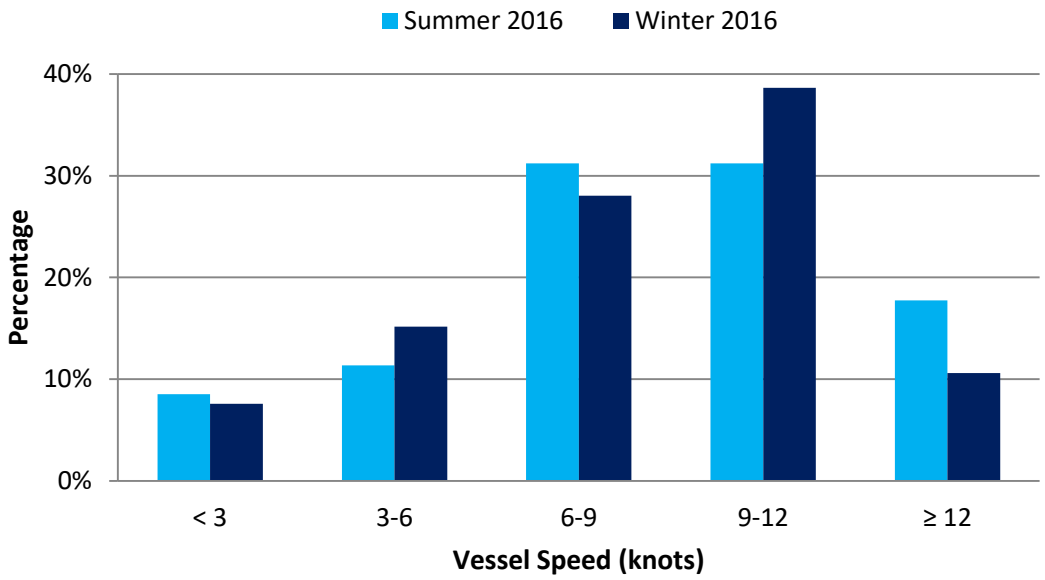

Figure 5.9 2016 Validation Survey Data Vessel Speed Distribution

The average speed of vessels recorded within the Study Area throughout the survey periods were 8.6 knots (summer) and 8.3 knots (winter). Approximately 35% of vessels recorded an average speed between nine and 12 knots, with 30% of vessels recording an average speed between six and nine knots.

The average speed of vessels recorded within the Study Area throughout the 2012 NRA survey periods was similar (7.4 knots in summer and 8.2 knots in winter). Moreover, 30% of vessels recorded an average speed between six and nine knots, with 29% of vessels recording an average speed between nine and 12 knots, which are similar proportions to that observed in the 2016 survey data.

It can be concluded that the vessel speeds within the Study Area did not alter materially from the 2012 NRA survey data.

5.7 Vessel Destinations

Figure 5.10 presents the distribution of the main destinations of vessels recorded throughout each survey period, based upon the destination broadcast on AIS. It is noted that approximately 50% of vessel recorded throughout the 2016 survey periods did not broadcast a destination and have therefore been excluded from the analysis.

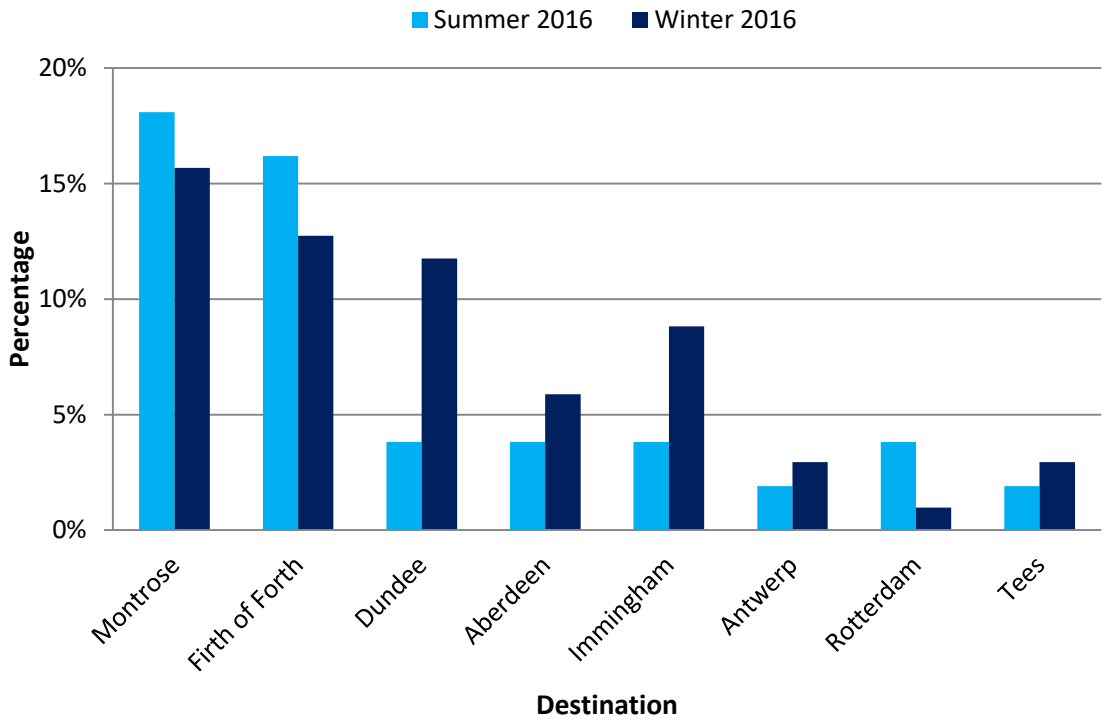

Figure 5.10 2016 Validation Survey Data Vessel Destination Distribution

The most frequently broadcast destination by vessels within the Study Area throughout the survey periods was Montrose (18.1% in summer and 15.7% in winter). The Firth of Forth was also a frequent destination (16.2% in summer and 12.7% in winter), and consists of all broadcast destination ports within the Firth of Forth.

The most frequently broadcast destinations by vessels recorded within the Study Area throughout the 2012 NRA survey periods were the Firth of Forth (15% in summer and 33% in winter) and Montrose (16% in summer and 25% in winter).

It can be concluded that the destinations of vessels within the Study Area has not materially changed from the 2012 NRA survey data, with Montrose and the Firth of Forth remaining the two most frequently broadcast destinations. Destination such as Dundee, Aberdeen and Immingham are also among the most frequent destinations in both datasets.

5.8 Vessel Density

Figure 5.11 presents the relative vessel density for the 2016 AIS data, reported as the number of vessel transits per day within each 500 m grid cell. It is noted that the same ranges have been used to colour-code the grid cells as in Figure 4.4 in order to allow a direct comparison.

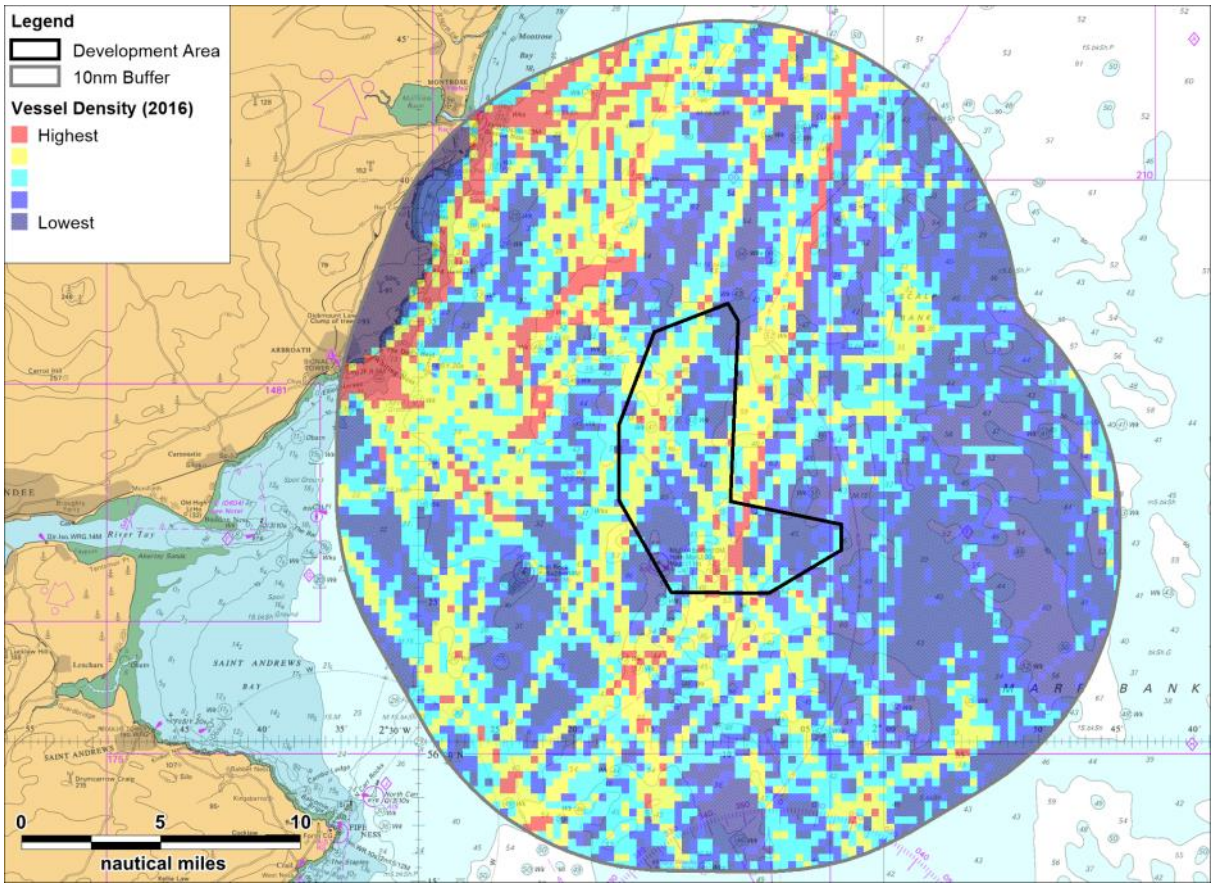

Figure 5.11 2016 Validation Survey Data Vessel Density

The highest density areas mostly corresponded to the nearshore area between Montrose and Arbroath, located to the north west of the Development Area. There was also a moderate density associated with traffic transiting main routes within the Study Area.

When compared to the vessel density for the 2012 NRA survey data, there is a change in the location of the highest density areas. The nearshore area between Montrose and Arbroath was previously of a relatively low density, whereas in the 2016 survey data it was of a high density. This relatively high density is primarily associated with fishing vessels engaged in potting activity, an activity which was not undertaken in this area during the 2012 NRA survey periods.

In contrast, a main route passing through the Development Area was associated with a relatively moderate density in the 2016 data, whereas in the 2012 NRA survey data it was of relatively high density. This change may be attributed to the installation of the Inch Cape Offshore Met Mast in October 2014 within the Development Area; this has resulted in this main route splitting into three distinct routes covering a wider area during the 2016 survey periods (see Section 8 for further details on vessel routeing).

6. 2016 Validation Survey Vessel Types Analysis

6.1 Introduction

This section presents a more detailed analysis of the main vessel types recorded on AIS within the Study Area throughout the 2016 validation survey. This includes non-transit uses of the Study Area, as per MGN 543, which in this case consists primarily of fishing vessels and anchored vessels.

6.2 Cargo Vessels

Cargo vessels accounted for approximately 20% of vessel traffic throughout the 2016 survey periods. These tracks are presented in Figure 6.1.

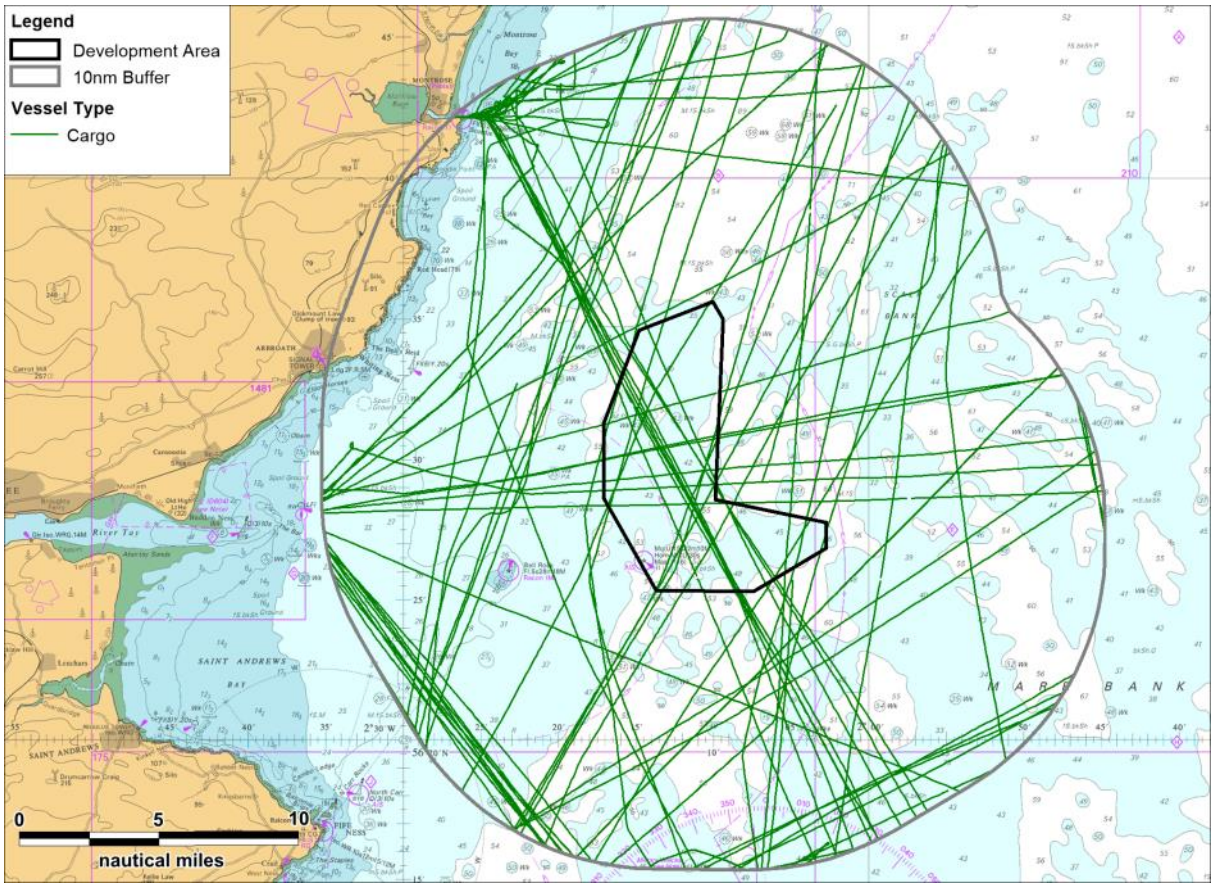

Figure 6.1 2016 Validation Survey Cargo Vessels

Three different cargo vessel types were recorded within the Study Area including general cargo vessels, containerships and offshore supply vessels, with general cargo vessels the most frequently recorded (88%).

Across both the 2016 summer and winter survey periods there was an average of approximately three unique cargo vessels per day recorded within the Study Area. This represents a decrease of approximately one to two unique cargo vessels per day when compared to the 2012 NRA survey data.

6.3 Tankers

Tankers accounted for approximately 14% of vessel traffic throughout the 2016 survey periods. These tracks are presented in Figure 6.2.

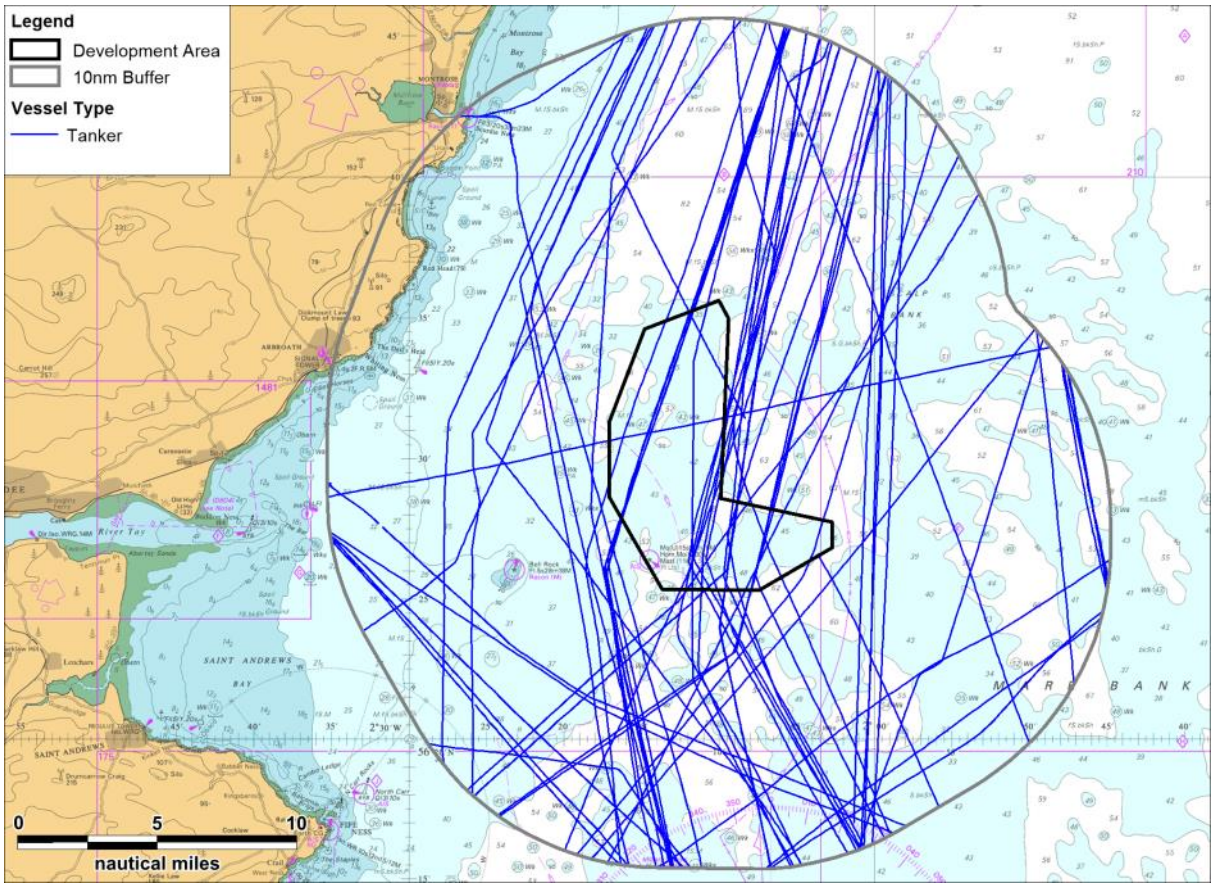

Figure 6.2 2016 Validation Survey Tankers

A number of tanker types were recorded within the Study Area including product tankers and, combined chemical and oil tankers, with product tankers the most frequently recorded (68%).

Across both the 2016 summer and winter survey periods there was an average of approximately two unique tankers per day recorded within the Study Area. This represents a slight decrease of up to one unique tanker per day when compared to the 2012 NRA survey data.

6.4 Passenger Vessels

Tankers accounted for approximately 3% of vessel traffic throughout the 2016 survey periods. These tracks are presented in Figure 6.3.

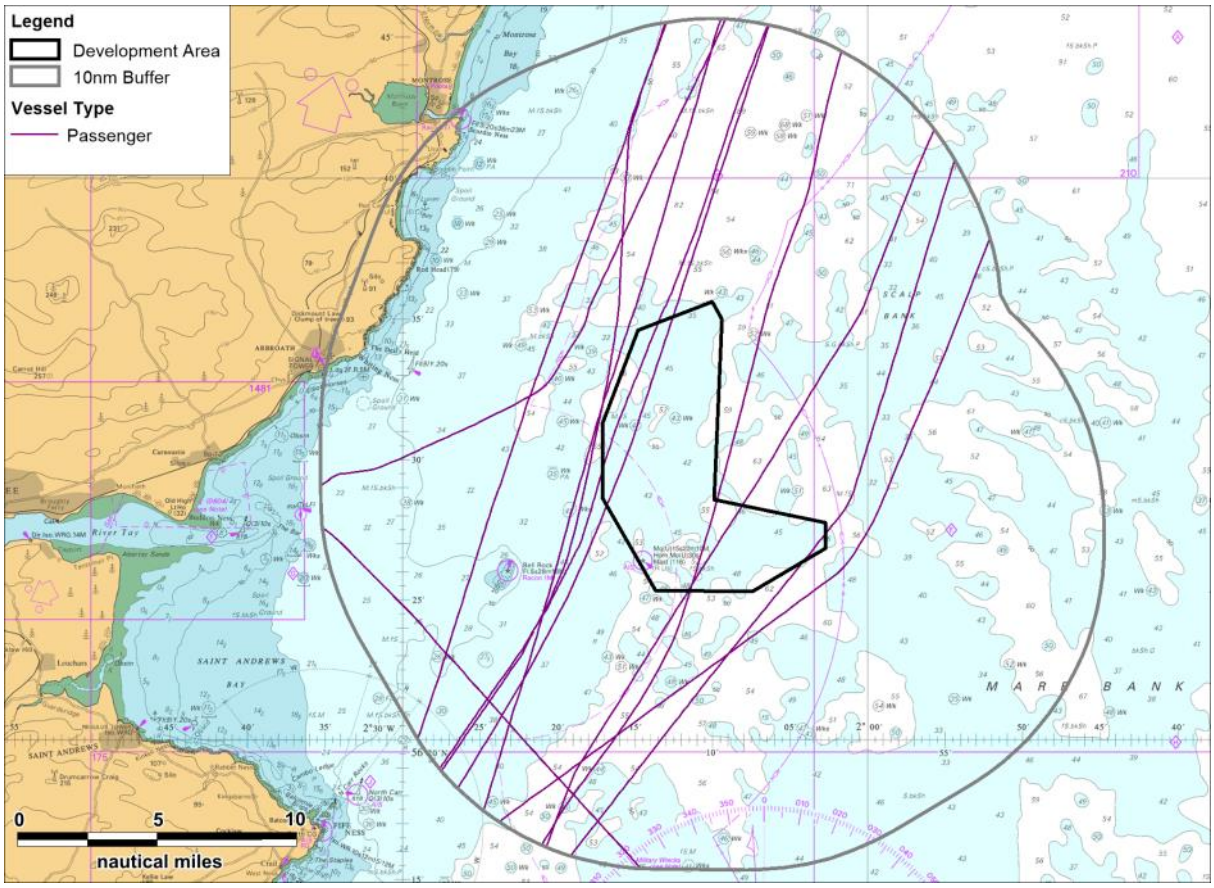

Figure 6.3 2016 Validation Survey Passenger Vessels

It is noted that all passenger vessel traffic was recorded during the summer period and consisted of cruise ships on passage, generally to and from the Firth of Forth.

Across both the 2016 summer and winter survey periods there was an average of approximately one unique passenger vessel every two days recorded within the Study Area. Equivalently, this corresponds to an average of approximately one unique passenger vessel per day within the summer period only. There was a slight decrease of approximately one unique vessel every two days when considering the 2016 survey data compared to the 2012 NRA survey data.

6.5 Fishing Vessels

Fishing vessels accounted for approximately 29% of vessel traffic throughout the 2016 survey periods. These tracks are presented in Figure 6.4, colour-coded by gear type. It is noted that one fishing vessel could not be associated with a gear type, and has therefore been excluded from the analysis.

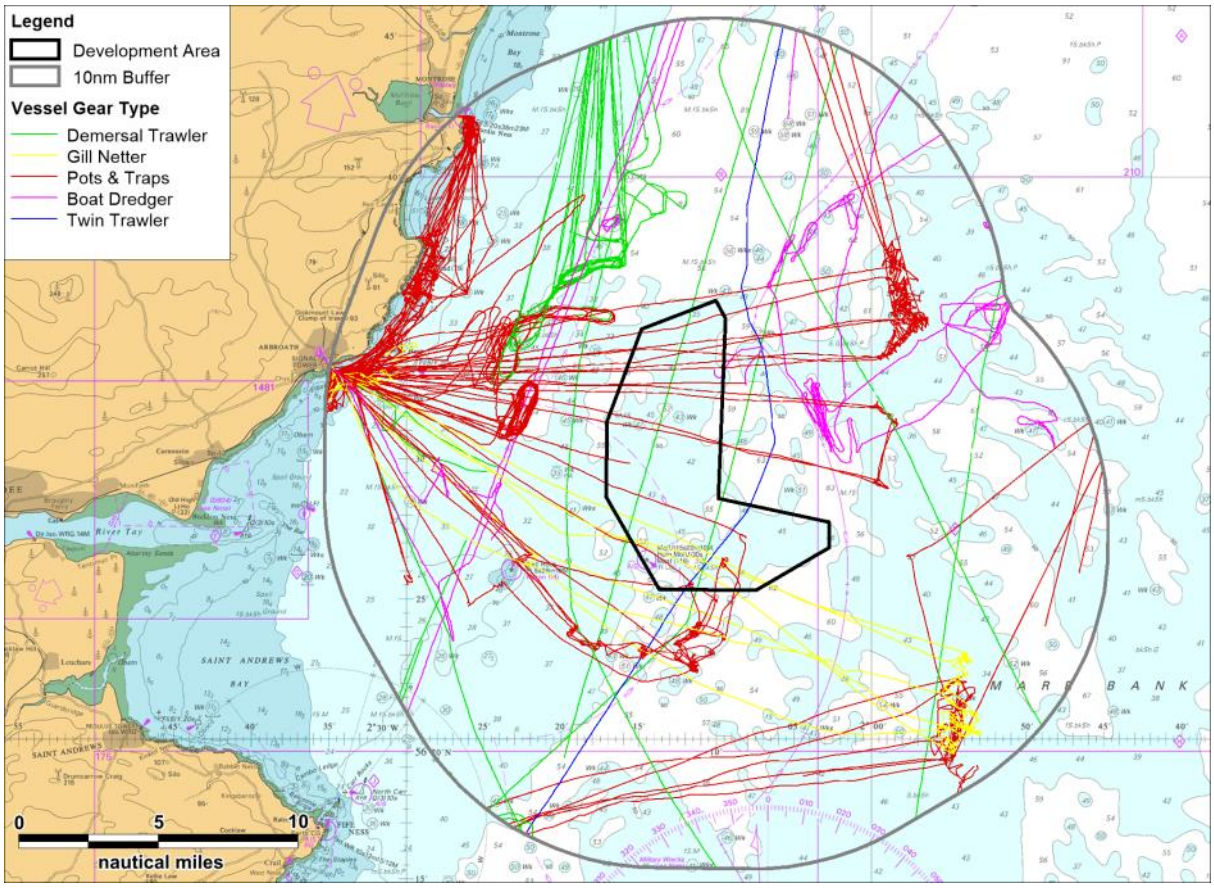

Figure 6.4 2016 Validation Survey Fishing Vessels Colour-Coded by Gear Type

Five different fishing vessel gear types were recorded within the Study Area including potters, demersal trawlers and gill netters, with potters the most frequently recorded (57%). It is noted that potting activity was particularly prevalent to the north west of the Development Area, with vessels engaged in activity in the nearshore area between Montrose and Arbroath.

Furthermore, based upon the track pattern and average speeds, the majority of fishing vessels recorded throughout the survey periods were actively engaged in fishing activity. In addition to the potting activity occurring in the nearshore area, there was also potting observed to the east, south and south east of the Development Area. Some demersal trawling, gill netting and boat dredger activity was also observed within the Study Area.

Across both the 2016 summer and winter survey periods there was approximately four to five unique fishing vessels per day recorded within the Study Area, with an average of six in the summer period and an average of three in the winter period. This variation is to be expected given the annual and seasonal nature of fishing activity.

When compared to the 2012 NRA survey data, there was an increase in the number of fishing vessels recorded during the winter period, with an average of approximately one unique fishing vessel recorded every three days during the winter period in 2012. Based upon the track pattern and average speeds, only a small proportion of fishing vessels recorded throughout the 2012 NRA survey periods were actively engaged in fishing activity, with the

majority on passage between the Firth of Forth and fishing grounds beyond the northern extent of the Study Area.

There was also a change in the gear types recorded. No potters were recorded during the 2012 NRA survey periods, with demersal trawlers and twin trawlers making up the majority of gear types.

The changes in fishing vessel activity are likely to be a result of seasonal fishing patterns and fishing stocks which can vary from year to year.

6.6 Recreational Vessels

Recreational vessels accounted for approximately 8% of vessel traffic throughout the 2016 survey periods. These tracks are presented in Figure 6.5.

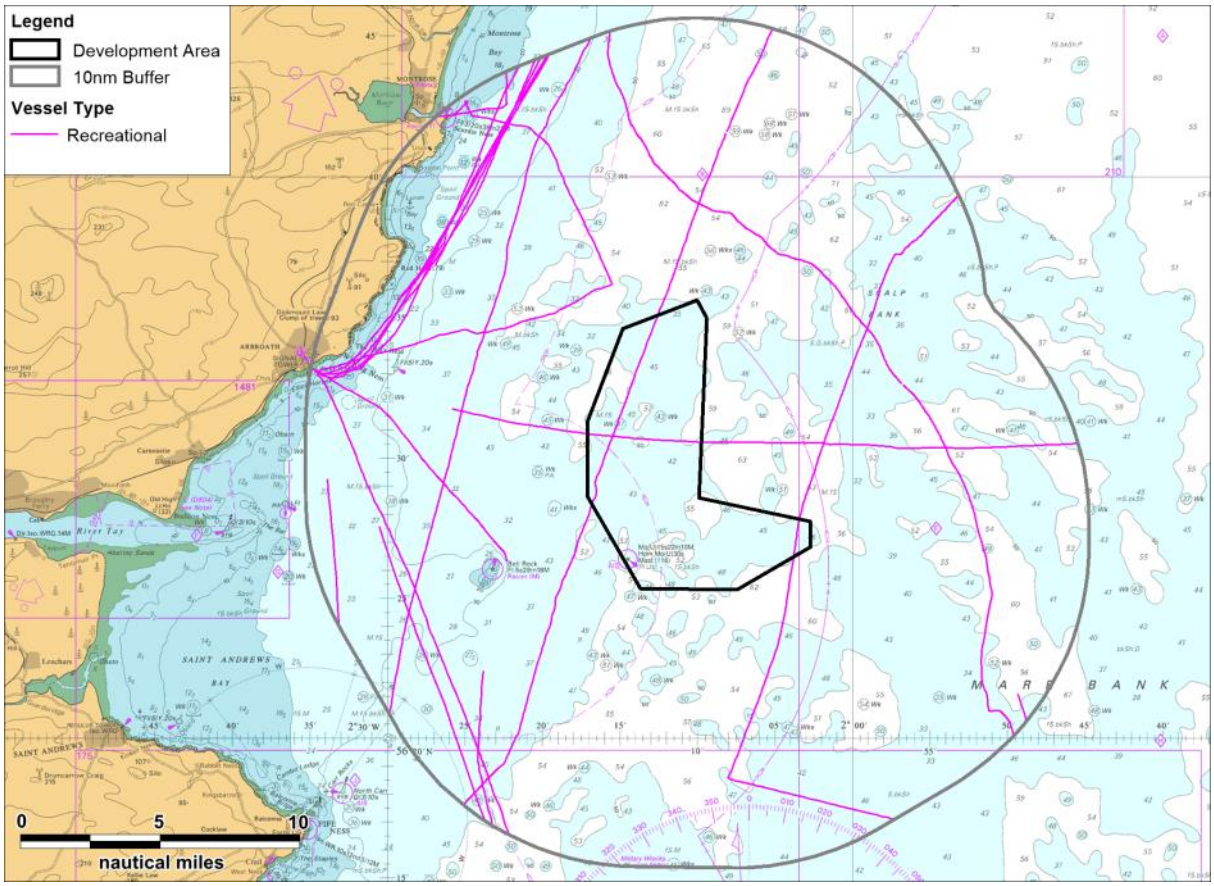

Figure 6.5 2016 Validation Survey Recreational Vessels

It is noted that all recreational vessel activity was recorded during the summer period.

Two recreational vessel types were recorded within the Study Area – sailing vessels (75%) and motorboats (25%).

A large proportion of the recreational traffic recorded within the Study Area was located in the nearshore area, with vessels transiting along the coastline to and from the port of Arbroath.

Throughout the 2016 summer survey period there was approximately two unique recreational vessels per day recorded within the Study Area.

When compared to the 2012 NRA survey data, there was a slight increase in the number of recreational vessels recorded during the summer period of approximately one vessel every two days. There was also no recreational vessel activity recorded during the winter period of the 2012 NRA survey data.

6.7 Anchored Vessels

Anchored vessels can be identified based upon the AIS navigational status which is programmed on the AIS transmitter on board a vessel. Information is manually entered into the AIS and therefore it is common for vessels not to update the navigational status if they are anchored for only a short period of time. For this reason, those vessels which travelled at a speed of less than one knot for more than 30 minutes were assumed to be at anchor and were included in the following analysis.

Figure 6.6 presents the tracks of vessels deemed to be at anchor, colour-coded by vessel type, recorded within the Study Area throughout the 2016 survey periods.

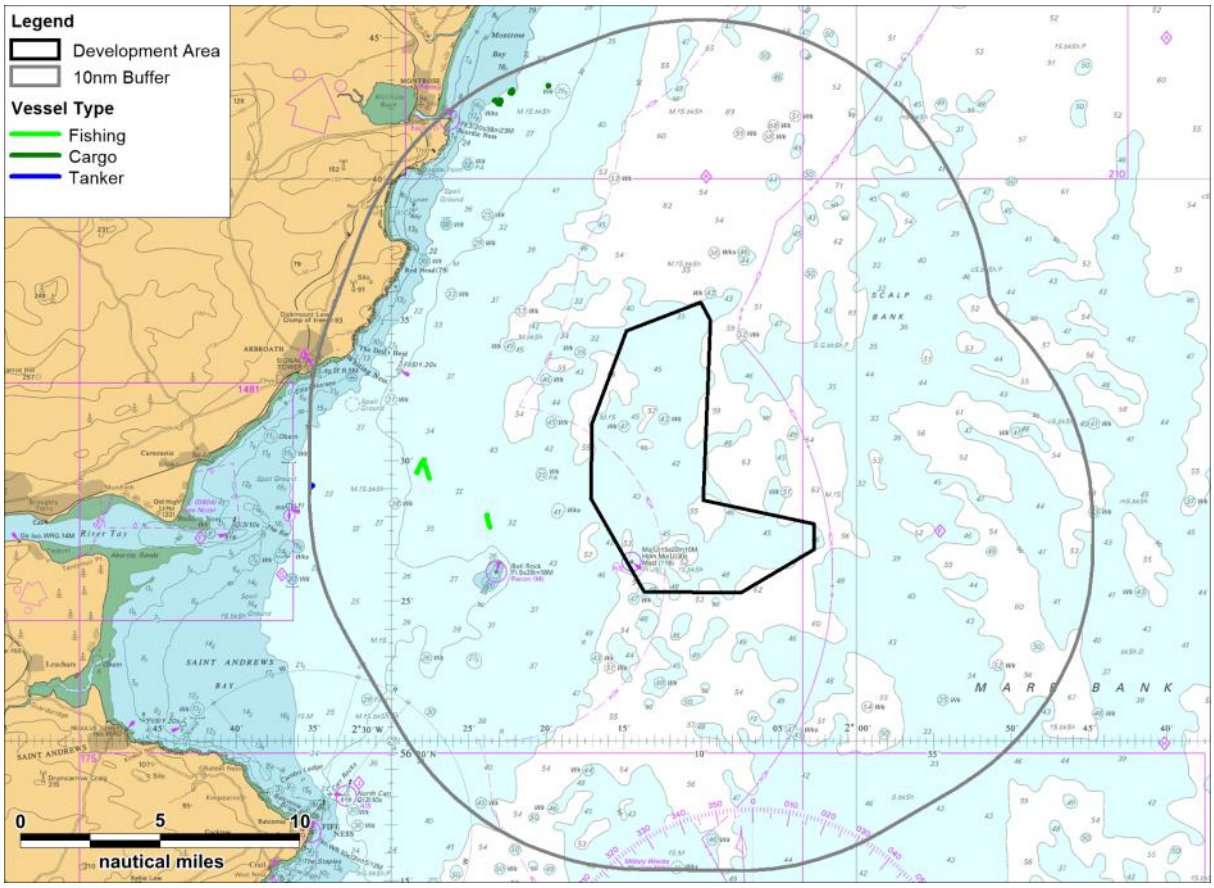

Figure 6.6 2016 Validation Survey Anchored Vessels Colour-Coded by Vessel Type

There were a total of six cases of a vessel being deemed to be at anchor throughout the 2016 survey periods, corresponding to approximately one anchored vessel every five days. These consisted of four cargo vessels, one tanker and one fishing vessel. In each case the anchored vessel was located either to the west or north west of the Development Area. There were no anchored vessels recorded within the Development Area.

When compared to the 2012 NRA survey data, the level of anchoring activity was similar. However, there were no cases of a vessel anchoring within the designated anchorage at Lunan Bay to the north west of the Development Area, whereas in 2012 there were two vessels anchored within Lunan Bay for prolonged periods.

7. 2016 Validation Survey Traffic Intersecting Development Area

This section presents analysis of the vessel tracks recorded on AIS intersecting the Development Area throughout the 2016 validation survey. As previously, a number of vessel tracks recorded during the survey periods were classified as temporary (non-routine) traffic and have therefore been excluded from the analysis.

Figure 7.1 presents the vessel tracks, colour-coded by type, recorded intersecting the Development Area throughout the 2012 NRA survey periods. Following this, Figure 7.2 presents the vessel type distribution for each survey period.

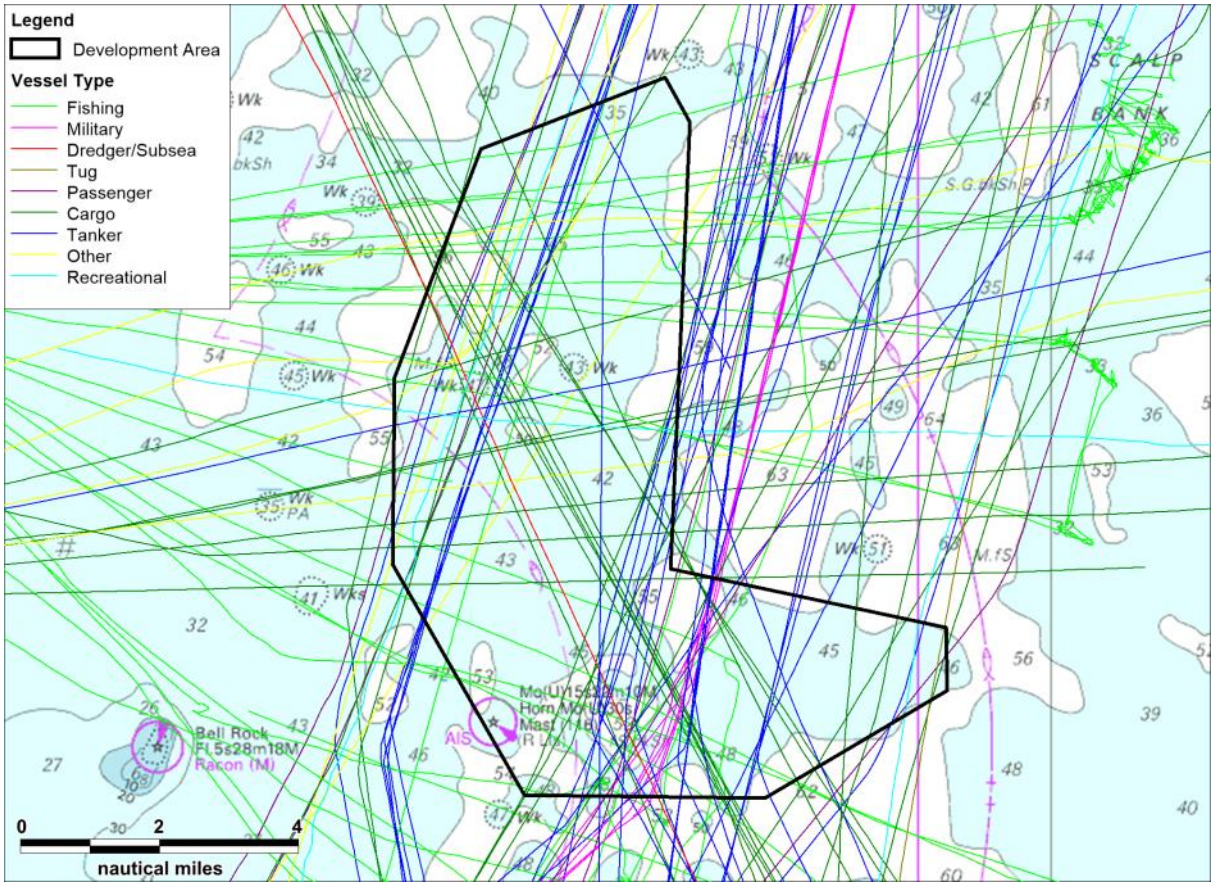

Figure 7.1 2016 Validation Survey Data within Development Area Colour-Coded by Vessel Type

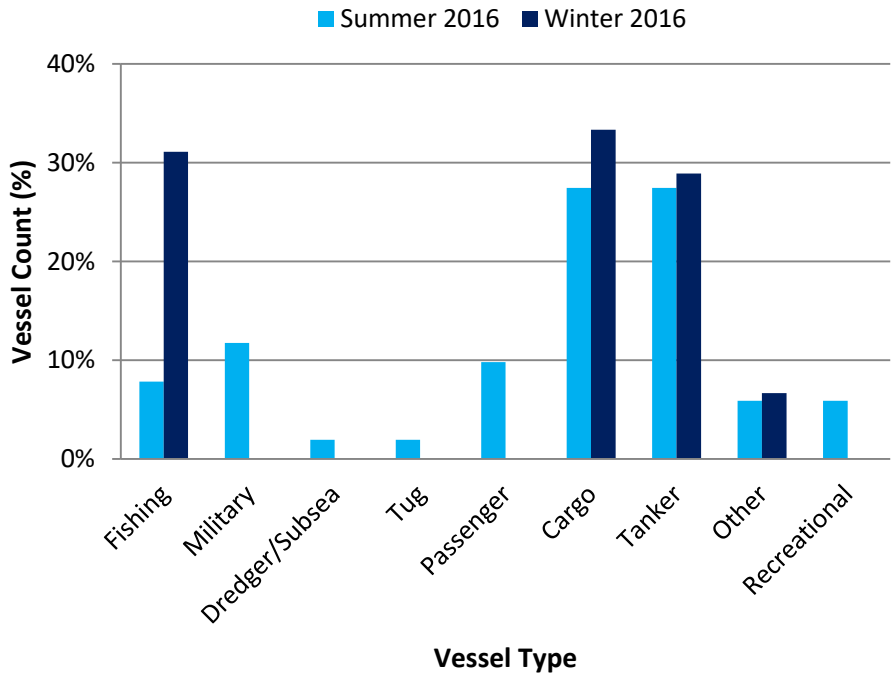

Figure 7.2 2016 Validation Survey Vessel Type Distribution (Intersecting the Development Area)

The most frequently recorded vessel type within the Development Area across both the 2016 summer and winter survey periods was cargo vessels (30%) followed by tankers (28%) and fishing vessels (19%).

When compared to the 2012 NRA survey periods, there was a slight change in the distribution of vessel types within the Development Area during the 2016 survey. In particular, there was a slightly smaller proportion of fishing vessels recorded within the Development Area than in the 2012 NRA survey data (26%). There was also a Ministry of Defence presence within the Development Area during the summer period of the 2016 survey, with a number of Royal Navy Vessels (training vessels) transiting through the Development Area on passage to the Firth of Forth over a two-day period. In contrast there were no military vessels recorded within the Development Area throughout the 2012 NRA survey periods.

Figure 7.3 presents the daily vessel count (represented as the number of unique vessels recorded per day) within the Development Area throughout the 2016 survey periods.

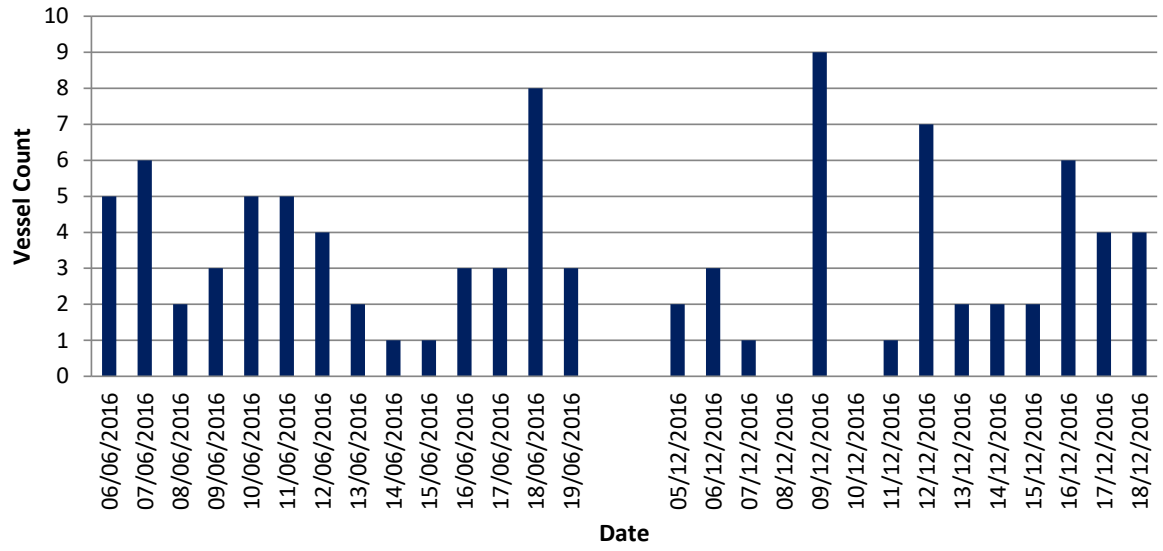

Figure 7.3 2016 Validation Survey Daily Vessel Count (Intersecting the Development Area)

Across both the 2016 summer and winter survey periods there was an average of approximately three to four unique vessels per day recorded within the Development Area, representing 23% of all vessel traffic recorded within the Study Area.

When comparing the 2016 survey data to the 2012 NRA survey data, there was a decrease of approximately two unique vessels per day. Consequently, the proportion of all vessel traffic intersecting the Development Area decreased from 41% over the 2012 NRA survey periods to 23% over the 2016 survey periods. This can be attributed to the splitting of a route within the Development Area due to the installation of the Inch Cape Offshore Met Mast (see Section 8 for further details). Consequently, fewer vessels operating on this route pass through the Development Area.

8. 2016 Validation Survey Main Routes

In order to satisfy the requirement of MGN 543 that transit routes within the Study Area are assessed, the main routes and corresponding 90th percentiles identified from the 2016 survey data are presented in Figure 8.1 and Figure 8.2, respectively.

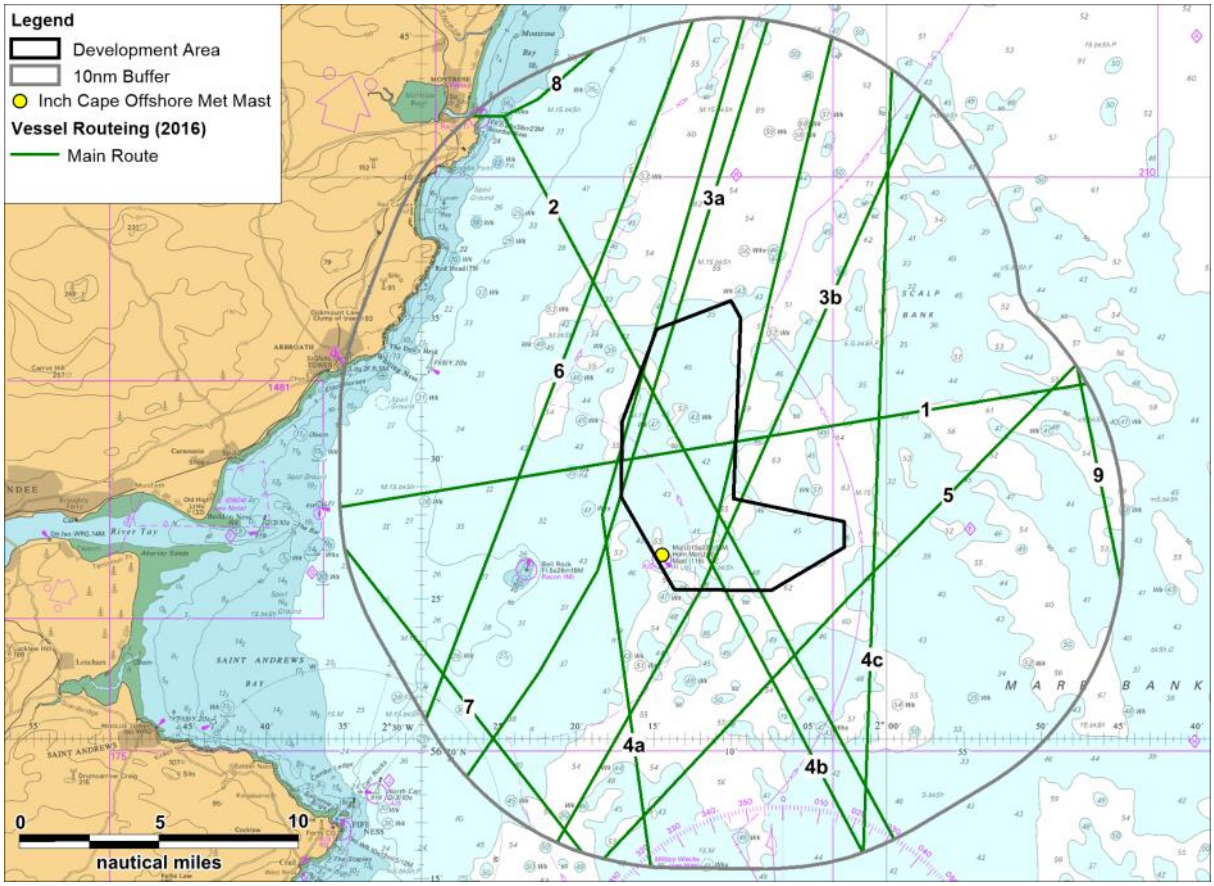

Figure 8.1 2016 Main Routes (from 2016 Validation Survey Data)

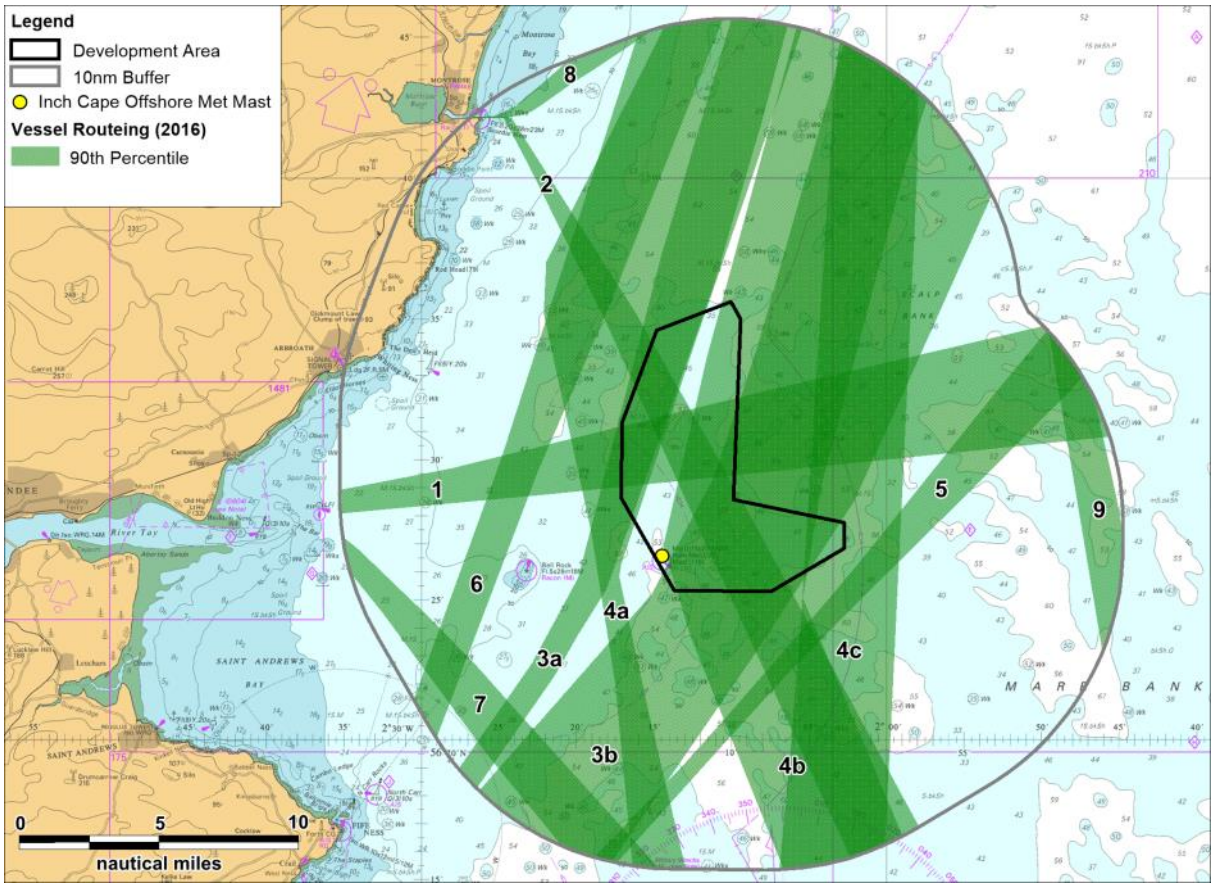

Figure 8.2 2016 Main Route 90th Percentiles (from 2016 Validation Survey Data)

A description of each of the 12 main routes identified from the 2016 survey data is presented in Table 8.1. The route numbers from the 2012 vessel routeing (see Section 4.3).have been maintained to assist comparisons between the two sets of routes.

Table 8.1 Description of Main Routes from 2016 Validation Survey Data

Route Number	Route Description	Vessel Numbers	Main Vessel Type(s)
1	River Tay Ports to Ports in Northern Europe	1 vessel every 2–3 days	Cargo vessels
2	Montrose to European Ports	1 vessel every 2–3 days	Cargo vessels
3a	Forth to Northern Scotland	1 vessel every 4 days	Passenger vessels
3b		1 vessel every 1-2 days	Cargo vessels, tankers and passenger vessels
4a	Immingham to Northern Scotland	1 vessel every 1-2 days	Tankers
4b		1 vessel every 1-2 days	Tankers
4c		1 vessel every 3 days	Cargo vessels and tankers
5	Forth to Ports in Northern Europe	1 vessel every 10 days	No specific usage
6	Forth to Northern UK Coastal Routes	1 vessel every 2 days	Fishing vessels, cargo vessels and tankers
7	River Tay Ports to Ports in Northern Europe	1 vessel every 2 days	Cargo vessels
8	Montrose to Northern UK Coastal Routes	1 vessel every 1-2 days	Cargo vessels and offshore support vessels
9	Aberdeen to Immingham	1 vessel every 3 days	Tankers

The vessel numbers on the main routes are relatively low compared to other areas in UK waters.

When compared to the main routes identified from the 2012 NRA survey data, there are some notable changes. Most notably, the original routes 3 and 4 have now split into multiple distinct routes due to the installation of the Inch Cape Offshore Met Mast within the Development Area (shown in Figure 8.1 and Figure 8.2).

The original route 3 passed the location of the Inch Cape Offshore Met Mast to the west, whereas the 2016 variant is split into two distinct routes, with routes 3a and 3b passing west and east of the Inch Cape Offshore Met Mast, respectively.

The original route 4 passed directly over where the Inch Cape Offshore Met Mast is now located. From the 2016 survey data there was a three-way split of the route, with route 4a and 4b passing west and east of the Inch Cape Offshore Met Mast, respectively, while route 4c

avoids transiting in-land towards the coast entirely, instead passing northbound to the east of the Development Area. Route 4c therefore does not intersect the Development Area.

Route 5 has also shifted to an extent; previously route 5 passed parallel to the south eastern boundary of the Development Area whereas from the 2016 survey data this route passed at a slight angle relative to the south eastern boundary. However, the closest point of approach (CPA) of the mean position of route 5 did not materially change.

The mean positions of the remaining routes did not materially change from the 2012 NRA survey periods and there were no new routes identified other than those formed from the splitting of the original routes 3 and 4.

The vessel numbers on some of the main routes changed, although not materially to invalidate the findings of the NRA. The most notable change was on route 4, where an increase of one vessel per day was observed (across all three alternatives collectively). Other routes either experienced a small increase or decrease in traffic levels, or carried the same levels of traffic as previously.

9. Conclusion

In conclusion, the 2016 survey data identified some changes to the nature of the vessel traffic when compared to the 2012 NRA survey data. These changes are associated with the changing to fishing patterns and minor changes to vessel density and routeing associated with the installation of the Inch Cape Offshore Met Mast.

9.1 Vessel Type

Throughout the 2016 survey periods the most frequently recorded vessel type within the Study Area was fishing vessels (32%), followed by 'other' vessels (21%) and cargo vessels (20%). When compared to the 2012 NRA survey data, there was a greater proportion of fishing vessels during the winter period, while the proportions of the remaining vessel types did not have any notable changes.

9.2 Vessel Density

The vessel density was higher in the nearshore area between Montrose and Arbroath, with this change attributed to a greater level of fishing vessel activity, particularly during the winter period. However, the proportion of fishing vessel activity within the Development Area was lower than during the 2012 NRA survey periods. The variable levels of fishing vessel activity are likely to be a result of seasonal fishing patterns and fishing stocks which can vary from year to year. This is to be expected given the nature of fishing operations, and consequently this change is not deemed to materially change the information with the NRA.

9.3 Main Routes

There were 12 main routes identified from the 2016 survey data, with traffic levels on these routes relatively low. When compared to the main routes identified from the 2012 NRA survey data, there are some changes. Most notably, two routes have now split into multiple routes due to the installation of the Inch Cape Offshore Met Mast within the Development Area. Another route has also shifted, and now passes at a slight angle relative to the south eastern boundary of the Development Area, whereas during the 2012 NRA survey periods the route passed parallel to this boundary. The mean positions and vessel numbers of the remaining routes have minor changes compared to the 2012 NRA survey periods, and there were no new routes identified other than those formed from the splitting of original routes, as outlined above.

9.4 Validity of NRA Baseline

In terms of the overall traffic levels within the Study Area, the changes observed between the 2012 NRA survey period and the 2016 survey period are not considered materially different, nor are the changes in the number of vessels of each type, with the exception of fishing vessels, as outlined above.

The information presented within this report also details the traffic survey assessment requirements as required by MGN 543. This includes an assessment of the types, numbers and sizes of vessels present within the Study Area, non-transit uses of the Study Area and transit routes within the Study Area. This combined with the minor changes identified within the main route analysis demonstrates that the baseline assessment of marine traffic within the

2012 NRA remains valid and therefore can be used as an assessment tool as part of the 2017 EIA report submission.