



Maritime Traffic Survey - Summer 2014

Brims Tidal Array

(Technical Note)

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Date: 1st July 2014
Revision No.: 01
Ref.: A2455-BTA-TS-1

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Revision Number	Date	Summary of Change
00a	20 June 2014	Internal Draft
01	1 July 2014	First Revision

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1. Introduction

1.1 Background

As part of the Navigation Risk Assessment of the proposed Brims Tide Array Project, 28 days of shipping data surrounding the Agreement for Lease (AfL) area is being gathered.

The data are being gathered over 2 x 14 day periods to give account to seasonal and tidal variations. This report presents analysis of the second 14 day survey which has been carried out on the island of Hoy, Orkney, between 28th May and 11th June 2014. The data have been collected using radar, AIS and visual observations.

1.2 Abbreviations

The following abbreviations are used in the report:

AfL	-	Agreement for Lease
AIS	-	Automatic Identification System
ARPA	-	Automatic Radar Plotting Aid
ETA	-	Estimated Time of Arrival
EU	-	European Union
IMO	-	International Maritime Organisation
MMSI	-	Mobile Maritime Service Identity
nm	-	Nautical Miles (1nm = 1,852 metres)
SOLAS	-	Safety of Life at Sea
VHF	-	Very High Frequency

2. Survey Set-up

2.1 Introduction

A maritime traffic survey of the proposed Brims tidal energy site was carried out near Judas Hill, Brims on the island of Hoy. The objective of the survey was to collect 14 days of shipping data in proximity to the Brims Agreement for Lease (AfL) area during Summer 2014.

The survey site was approximately 25m above sea level and 200m from the cliff edge. The location offered line-of-sight fully covering the Brims AfL area. The survey began on the morning of Wednesday 28th May 2014 and concluded on the morning of Wednesday 11th June 2014.

The primary objective of the survey was to identify and validate the routing of vessels and the level of vessel activity in and around the Brims AfL area. This was achieved by recording in real-time the positions of vessels within range of the Automatic Identification System (AIS) receiver and ARPA radar, supplemented by observation of vessels within visual range to obtain information on type and size where the information was not available from AIS.

2.2 Survey Location

The radar and AIS were set up at co-ordinates 57° 46' 33.5" North, 03° 13' 30.06" West. The radar was mounted on scaffolding to give a more elevated view. The survey location relative to the Brims AfL area is shown in Figure 2.1.

The survey location is approximately 0.7nm from the closest part of the Brims AfL area and 2.9 nm from the furthest point.

Figure 2.2 presents the equipment setup at the site.

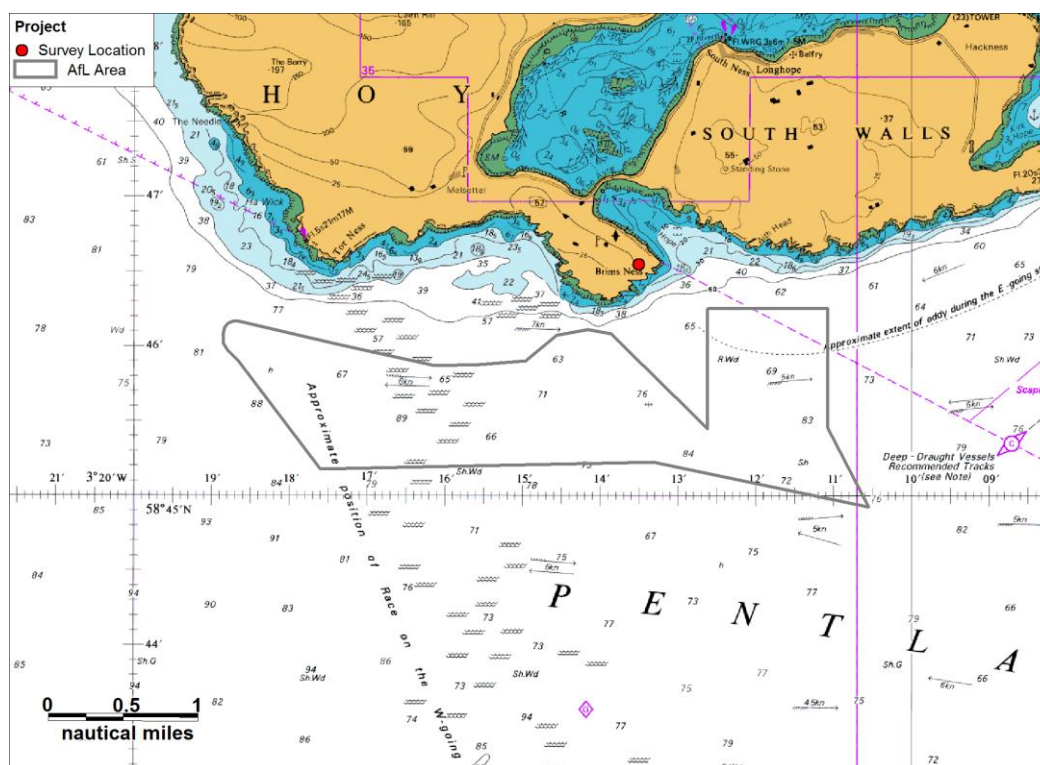


Figure 2.1 Chart Overview of Survey Location relative to Brims AfL Area



Figure 2.2 Equipment setup near Judas Hill

2.3 Equipment and Manning

Table 2.1 lists the equipment used to carry out the traffic survey.

Table 2.1 Equipment utilised in Traffic Survey

Equipment	Purpose
FR-1500 12 kW Mark 3 R Type Radar with 4ft Scanner and ARPA with integrated AIS	Tracking of targets (manually and automatically) up to a maximum of 10nm from the survey location.
Furuno GP-32	Global Positioning System used to determine the position of the survey and to input the information to the radar system.
Furuno AD-100 A-D Converter	Convert the heading of the scanner into digital coded bearing data to be used as input to the radar.
Nautical Compass	Used to verify heading.
Admiralty Charts, dividers and parallel ruler	Used for manual plotting and verification of position.
Monk Nautilus 7 x 50 Marine Binoculars & Nikon Spotting Scope (20-60x zoom)	Visual identification of vessels.
Digital Camera	Photographic evidence of targets (when possible)
AIS Receiver and VHF Antenna	To receive and record data from vessels transmitting AIS data. Tracks vessels fitted with AIS (majority of vessels > 300 GRT) within a range of approx. 20nm.
Notebook PCs	Connected to radar and AIS receiver for real-time recording of tracked target data. Tracked targets displayed on hydrographic charts and can be replayed at high speed when required.
Logbook	Written log of all manual targets acquired during survey as well as other notes such as visual identification information, weather conditions, etc.

The AIS system tracked targets 24 hours per day during the survey period. The radar was manned between approximately 06:00hrs and midnight, with targets not on AIS acquired manually. During this manned period a visual lookout was maintained and all observations were recorded in the logbook. Between midnight and 06:00hrs radar targets were acquired automatically by the radar, over an area defined by the watch-keepers, which encompassed the Brims AfL area.

2.4 AIS Description

Regulation 19 of SOLAS Chapter V - Carriage requirements for ship borne navigational systems and equipment - sets out navigational equipment to be carried on board ships, according to ship type. In 2000, IMO adopted a new requirement (as part of a revised chapter V) for ships to carry automatic identification systems (AIS). AIS is a system by which ships transmit data concerning their position, MMSI etc. on two individual 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.

The regulation requires AIS to be fitted aboard all ships of 300 gross tonnage and upwards engaged on international voyages, cargo ships of 500 gross tonnage and upwards not engaged on international voyages and passenger ships irrespective of size built on or after 1 July 2002. It also applies to ships engaged on international voyages constructed before 1 July 2002, according to the following timetable:

- passenger ships, not later than 1 July 2003;
- tankers, not later than the first survey for safety equipment on or after 1 July 2003;
- ships, other than passenger ships and tankers, of 50,000 gross tonnage and upwards, not later than 1 July 2004.

An amendment adopted by the Diplomatic Conference on Maritime Security in December 2002 states that ships, other than passenger ships and tankers, of 300 gross tonnage and upwards but less than 50,000 gross tonnage, will be required to fit AIS not later than the first safety equipment survey after 1 July 2004 or by 31 December 2004, whichever occurs earlier. Ships fitted with AIS shall maintain AIS in operation at all times except where international agreements, rules or standards provide for the protection of navigational information.

EU fishing vessels of 15m length and over have been required to carry AIS since 31st May 2014. For the 12 months prior to this the Directive only applied to vessels 18m and above.

Both dynamic and static information are transmitted by the vessel. Table 2.2 presents the dynamic and static data provided via AIS.

Table 2.2 AIS Information

Static	Dynamic	Voyage related
MMSI	Position (Lat/Long)	Draught
IMO Number	Time	Hazardous Cargo (type)
Call Sign	Course over ground	Destination
Name	Speed over ground	ETA
Length and Beam	Heading	Route Plan
Type of Ship	Navigational Status	
Type of Nav Sensor	Rate of Turn	

2.5 Weather and Tidal Data

The weather was recorded in a logbook every 6 hours during the manned periods of the survey and is presented in Table 2.3. During the survey, daylight hours were typically between 03:00 and 21:00 hours. The wind direction was variable but predominantly from the east. The wind speed was also highly variable throughout the survey period but was typically between calm and Beaufort Force 2. A maximum wind speed of Force 4 was recorded on 5th June 2014.

Visibility was generally in excess of 8nm however occasional fog was experienced. Sea state ranged from calm to slight.

Overall, the weather conditions were mostly warm and dry and therefore representative of the summer period.

Table 2.3 Weather throughout 14 Day Survey Period

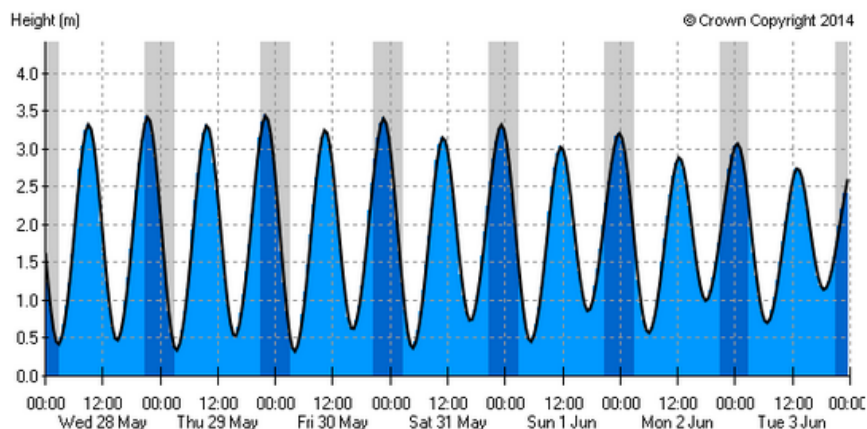
Date	Time	Wind Direction	Beaufort Force	Sea State	Visibility (nm)	Comments
28/05/2014	12:00:00	E	2	Slight	+10	Light Cloud
	18:00:00	E	2	Slight	+10	Light Cloud
	00:00:00	E	2	Slight	+10	Light Cloud
29/05/2014	06:00:00	E	1	Slight	+10	Light Cloud
	12:00:00	E	1	Calm	+10	Light Cloud
	18:00:00	E	2	Calm	+10	Light Cloud
	00:00:00	Calm	Calm	Calm	<1	Thick Fog
30/05/2014	06:00:00	E	1	Calm	<1	Thick Fog
	12:00:00	E	1	Calm	<1	Fog
	18:00:00	E	1	Calm	<1	Thick Fog
	00:00:00	Calm	Calm	Calm	+10	Clear
31/05/2014	06:00:00	Calm	Calm	Calm	+10	Overcast
	12:00:00	WSW	2	Calm	+10	Light Cloud
	18:00:00	SE	1	Calm	+10	Light Cloud
	00:00:00	E	1	Calm	+10	Clear
01/06/2014	06:00:00	E	1	Calm	5	Fog
	12:00:00	E	2	Calm	+10	Light Cloud
	18:00:00	E	1	Calm	+10	Light Cloud
	00:00:00	E	1	Calm	7	Overcast
02/06/2014	06:00:00	E	1	Calm	+10	Light Rain
	12:00:00	E	2	Slight	+10	Light Cloud
	18:00:00	E	2	Slight	+10	Light Cloud
	00:00:00	E	1	Calm	5	Overcast

Date	Time	Wind Direction	Beaufort Force	Sea State	Visibility (nm)	Comments
03/06/2014	06:00:00	NE	1	Calm	8	Overcast
	12:00:00	E	1	Calm	+10	Light Cloud
	18:00:00	Calm	Calm	Calm	+10	Cloud and Light Rain
	00:00:00	Calm	Calm	Calm	+10	Cloud and Light Rain
04/06/2014	06:00:00	Calm	Calm	Calm	+10	Light Cloud
	12:00:00	NE	2	Calm	8	Cloud and Light Rain
	18:00:00	NE	2	Calm	5	Rain Showers
	00:00:00	Calm	Calm	Calm	<1	Fog
05/06/2014	06:00:00	NE	2	Calm	5	Cloud and Light Rain
	12:00:00	E	4	Slight	8	Cloud and Light Rain
	18:00:00	NE	2	Calm	+10	Light Cloud
	00:00:00	N	1	Calm	8	Light Cloud
06/06/2014	06:00:00	Calm	Calm	Calm	<1	Cloudy
	12:00:00	Calm	Calm	Calm	<1	Cloudy
	18:00:00	W	1	Calm	5	Hazy Sunshine
	00:00:00	Calm	Calm	Calm	2	Mist
07/06/2014	06:00:00	Calm	Calm	Calm	3	Mist and Cloudy
	12:00:00	E	2	Calm	8	Clear
	18:00:00	E	4	Slight	8	Hazy Sunshine
	00:00:00	E	2	Slight	8	Cloudy
08/06/2014	06:00:00	Calm	Calm	Calm	5	Cloudy
	12:00:00	E	1	Calm	+10	Light Cloud
	18:00:00	NE	1	Calm	+10	Light Cloud
	00:00:00	Calm	Calm	Calm	+10	Clear

Project: A2455
Client: Brims Tidal Array Limited
Title: Maritime Traffic Survey Summer 2014 (DRAFT)

Date	Time	Wind Direction	Beaufort Force	Sea State	Visibility (nm)	Comments
09/06/2014	06:00:00	Calm	Calm	Calm	+10	Light Cloud
	12:00:00	Calm	Calm	Calm	8	Light Cloud
	18:00:00	Calm	Calm	Calm	8	Hazy Sunshine
	00:00:00	SE	1	Calm	8	Cloudy
10/06/2014	06:00:00	E	2	Slight	5	Cloudy
	12:00:00	Calm	Calm	Calm	<1	Fog
	18:00:00	Calm	Calm	Calm	5	Rain Showers
	00:00:00	Calm	Calm	Calm	8	Light Cloud
11/06/2014	06:00:00	NE	3	Calm	+10	Cloud

Figure 2.3 and Figure 2.4 provide tidal predictions for Widewall Bay, situated on the island of South Ronaldsay, which is the closest source of tidal data to the Brims AfL area. There was a spring tide on the 30th May 2014

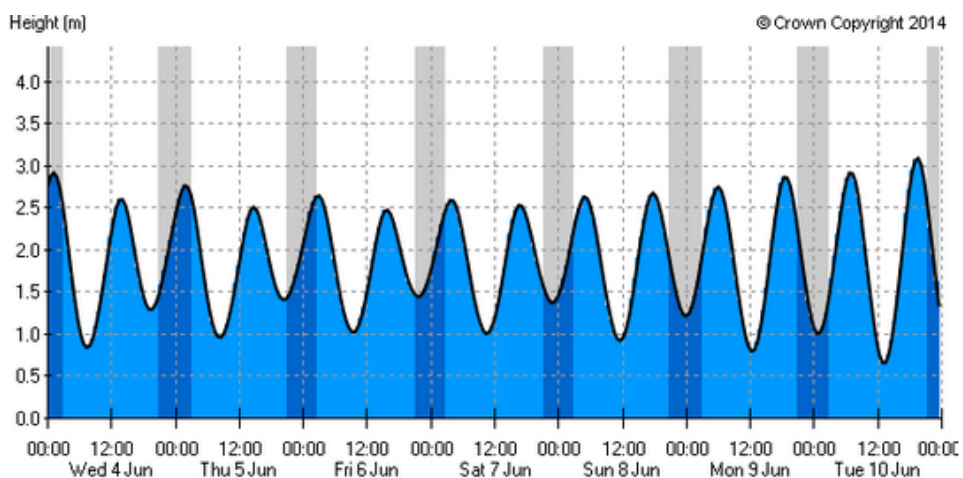


Note: the date shown underneath 12:00 on any given day is applicable to the previous and next periods of 12 hours

Wed 28 May				Thu 29 May				Fri 30 May			
LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW
02:41	09:01	14:56	21:22	03:21	09:43	15:33	22:00	04:00	10:22	16:08	22:35
0.4 m	3.3 m	0.5 m	3.4 m	0.3 m	3.3 m	0.5 m	3.4 m	0.3 m	3.3 m	0.6 m	3.4 m

Sat 31 May				Sun 1 Jun				Mon 2 Jun			Tue 3 Jun				
LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW
04:38	11:00	16:43	23:10	05:16	11:37	17:17	23:45	05:54	12:16	17:52	00:23	06:35	12:57	18:31	
0.4 m	3.2 m	0.7 m	3.3 m	0.5 m	3.0 m	0.9 m	3.2 m	0.6 m	2.9 m	1.0 m	3.1 m	0.7 m	2.7 m	1.1 m	

Figure 2.3 Tidal Predictions for Widewall Bay (28th May-3rd June 2014)



Note: the date shown underneath 12:00 on any given day is applicable to the previous and next periods of 12 hours

Wed 4 Jun				Thu 5 Jun				Fri 6 Jun			
HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW
01:04	07:22	13:44	19:18	01:52	08:20	14:38	20:22	02:48	09:24	15:39	21:38
2.9 m	0.8 m	2.6 m	1.3 m	2.8 m	1.0 m	2.5 m	1.4 m	2.6 m	1.0 m	2.5 m	1.4 m

Sat 7 Jun				Sun 8 Jun				Mon 9 Jun			Tue 10 Jun			
HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW	LW	HW
03:51	10:27	16:40	22:48	04:55	11:26	17:39	23:51	05:55	12:20	18:33	00:44	06:51	13:06	19:22
2.6 m	1.0 m	2.5 m	1.4 m	2.6 m	0.9 m	2.7 m	1.2 m	2.8 m	0.8 m	2.9 m	1.0 m	2.9 m	0.7 m	3.1 m

Figure 2.4 Tidal Predictions for Widewall Bay (4th-10th June 2014)

3. Survey Results

3.1 Introduction

This section presents the vessel tracks recorded by the radar and AIS during the 14 day summer survey period.

As the AIS receiver tended to track vessels over a greater range than radar, and also provided more accurate information on position and ship characteristics, the AIS track has been used where the vessel was tracked by both systems. The radar-tracks (non-AIS) were then combined with the AIS data to create a single data set of all vessels.

Tracks have been colour-coded by vessel type. This information was available from the vast majority of vessels fitted with AIS. The non-AIS radar tracks are included in the data set have also been colour-coded based on visual observations where available.

The charts show all tracks within five nautical miles of the Brims AfL area. The analysis and discussion focuses on vessels passing within the Brims AfL area.

3.2 Tracks by Day and Type

An overview of all the combined tracks recorded throughout the survey period, colour-coded by vessel type, is presented in Figure 3.1.

Following this, a more detailed plot of vessel tracks in the vicinity of the Brims AfL area is presented in Figure 3.2.

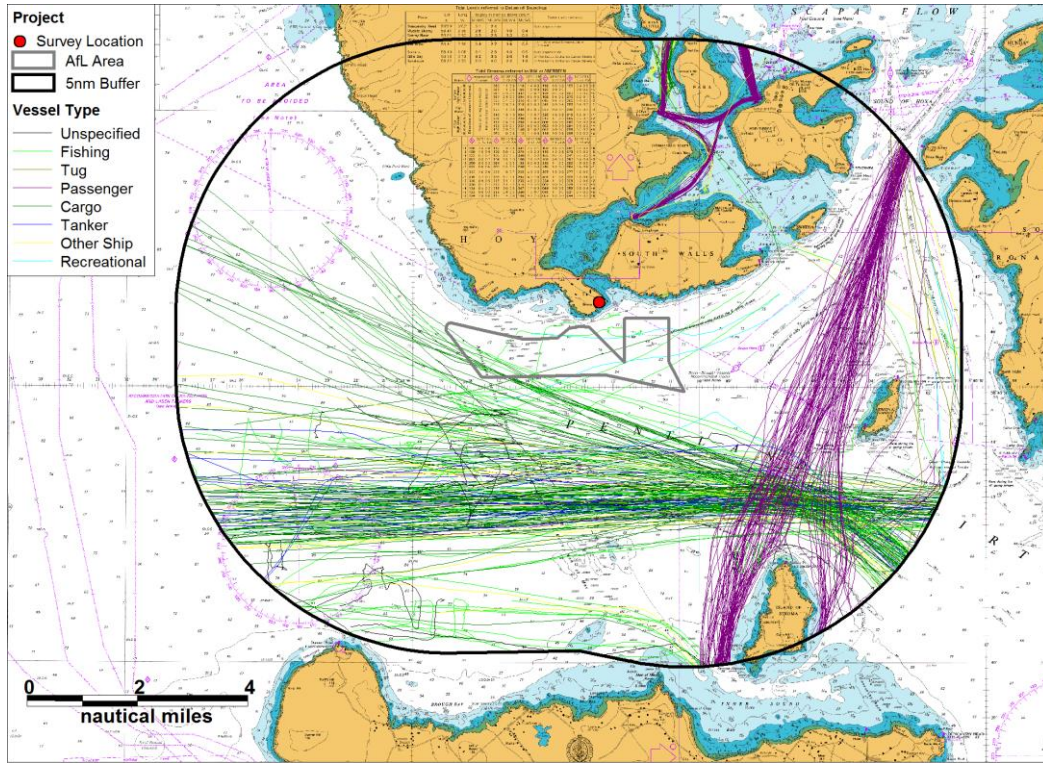


Figure 3.1 General Overview of Tracks in Proximity to the Brims AfL Area

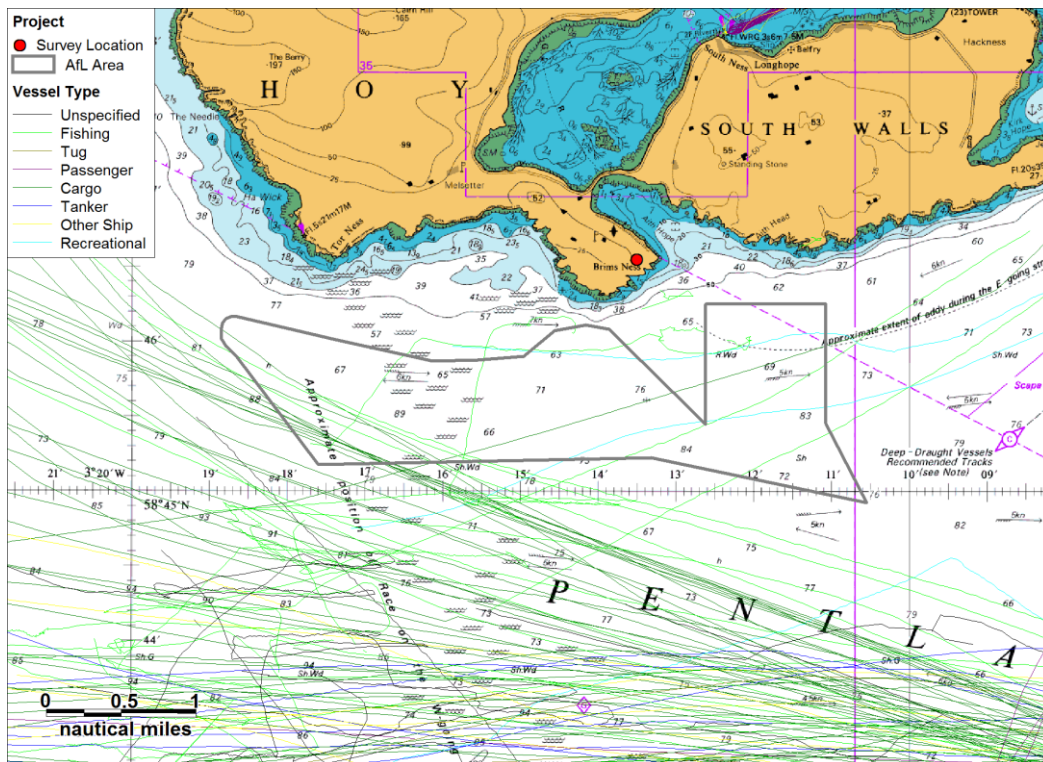


Figure 3.2 Detailed Overview of Tracks in Proximity to the Brims AfL Area

Within 5nm of the AfL area there was an average of 21 unique vessels per day. The largest proportion of these was cargo vessels and tankers using the Outer Sound of the Pentland Firth and passing south of the AfL area.

The daily numbers of vessels recorded passing within the Brims AfL area during the survey period is presented in Figure 3.3. (Note: the 28th May and 11th June are partial days due to survey equipment set-up and removal).

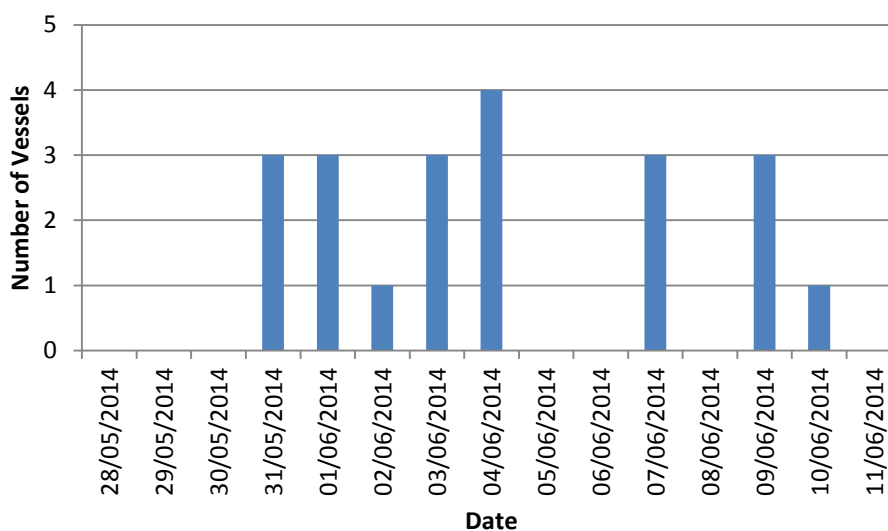


Figure 3.3 Unique Vessels per Day Passing within the Brims AfL Area

There were 21 vessels tracked through the site in total over the 14 days. The busiest day (4th June 2014) had four vessels whereas several days had no recorded activity within the site.

Of the 21 vessels, 11 were cargo ships, eight were fishing vessels and two were recreational vessels

3.4 Ship Size

Based on the information available from AIS and visual observation of the radar targets (where possible), the tracks colour-coded by length are presented in Figure 3.4 and Figure 3.5.

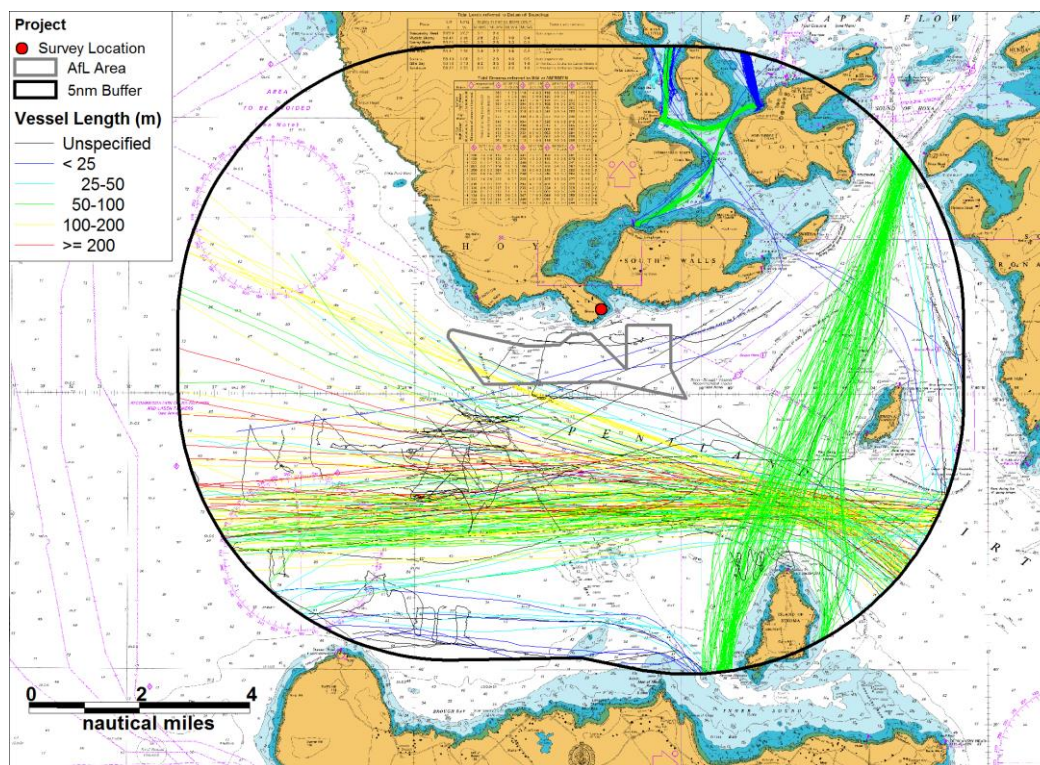


Figure 3.4 General Overview of Tracks colour coded by Ship Length

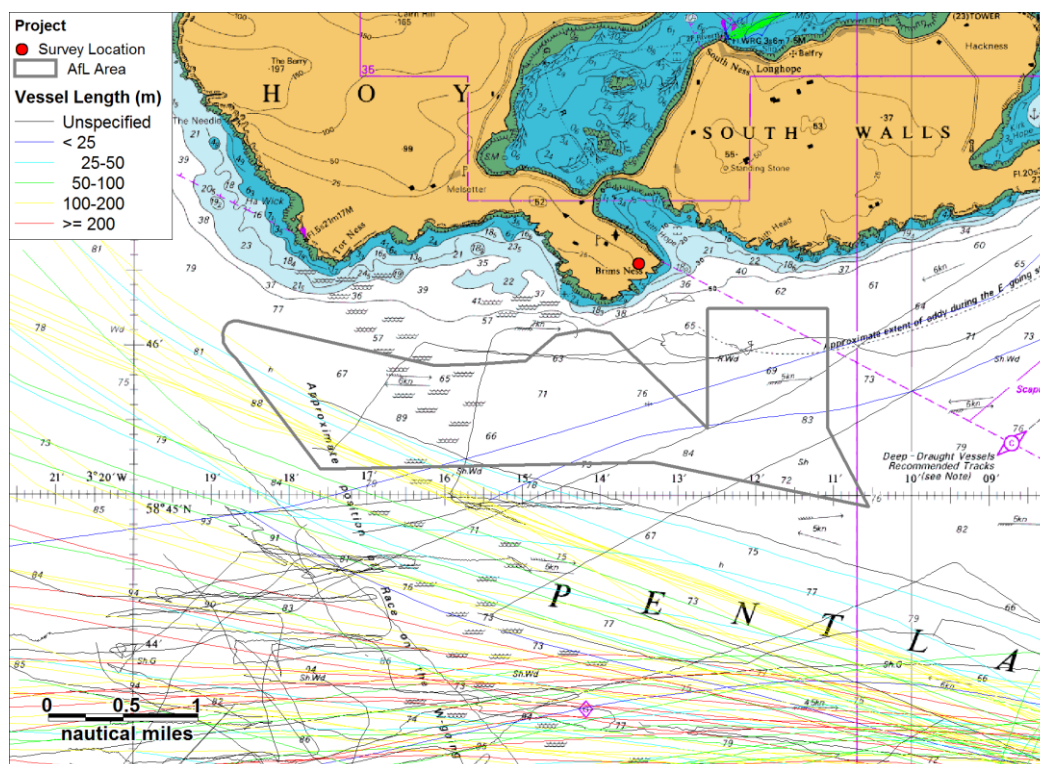


Figure 3.5 Detailed Overview of Tracks colour coded by Ship Length

The longest vessel tracked passing within the Brims AfL area was the 165m cargo vessel *Godafoss* which passed through the AfL area on 7th June 2014 travelling to Rotterdam. A photo of the *Godafoss* vessel is shown in Figure 3.6.

Nine of the vessels that passed through the Brims AfL were <25m, two were between 25m and 50m and ten were between 100m and 200m long.



Figure 3.6 Library Photo of the Container Vessel *Godafoss*

Based on the information available from AIS, the tracks colour-coded by draught are presented in Figure 3.7 and Figure 3.8.

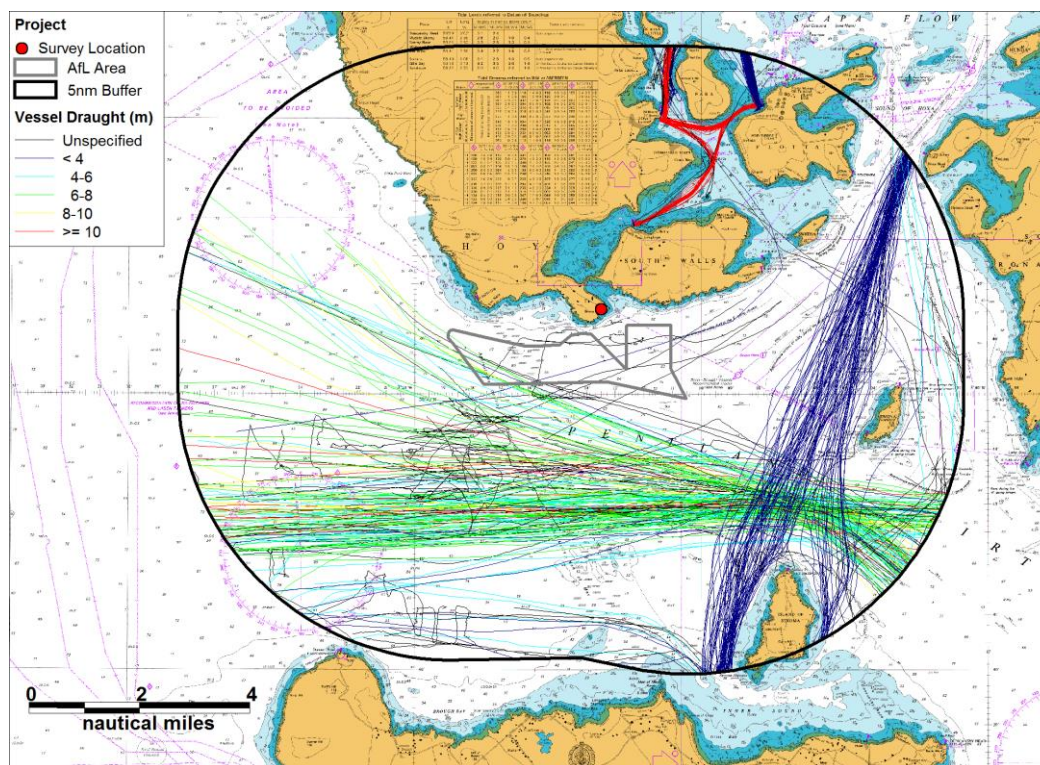


Figure 3.7 General Overview of Tracks colour coded by Ship Draught

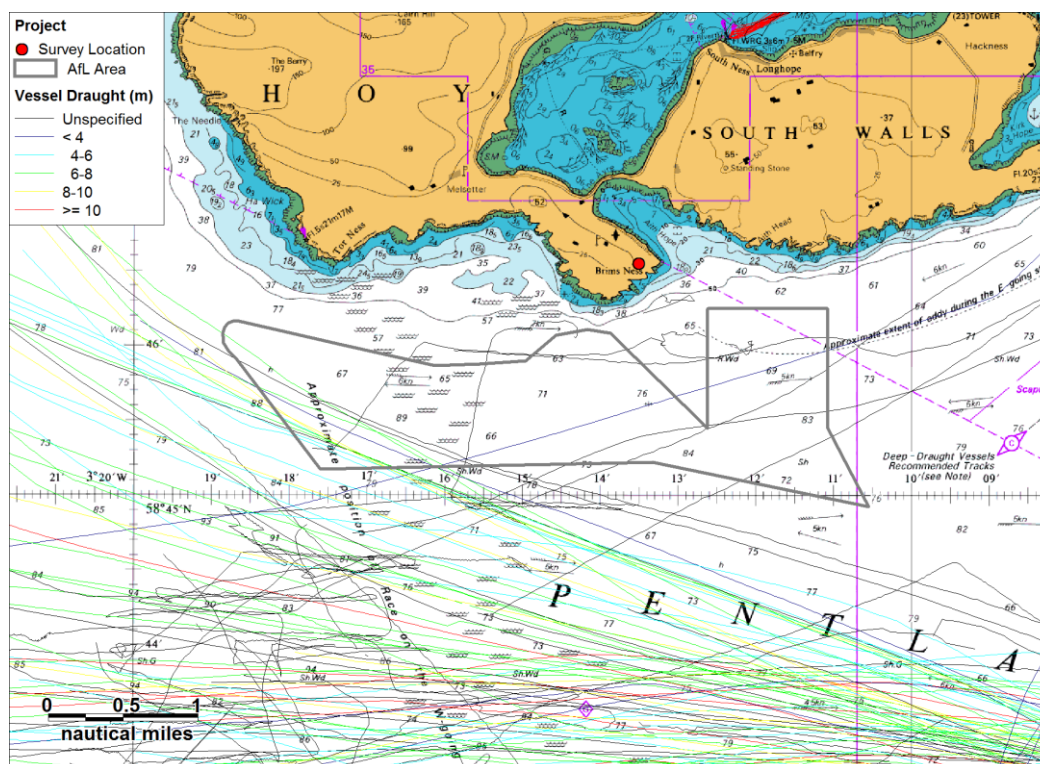


Figure 3.8 Detailed Overview of Tracks colour coded by Ship Draught

In the AfL area during the survey, two vessels had a draught of less than 4m, three vessels had a draught of 4-6m, four vessels had a draught of 6-8m and two vessels had a draught of 8-10m. The deepest draught was the cargo vessel *Godafoss* (8.9m) heading to Rotterdam. The AIS vessels *Ruby* and *Kristrun II RE 477* did not broadcast their actual draught but the design draught of the vessels is 6.65m and 3.4m respectively. No information was available for the sailing vessel *Coast Inn* which was recorded on AIS, however as it is only 6m long the draught will be below 4m.

The draught of the non-AIS vessel tracks were unspecified, however, these were visually identified as small vessels of less than 4m draught.

Within 5nm of the AfL area, 26 vessels were recorded with a draught of 10m or greater. These vessels did not enter the Brims AfL, but were transiting the Outer Sound of the Pentland Firth.

3.5 Average Course

Vessel tracks, colour coded by average course, are presented in Figure 3.9 and Figure 3.10.

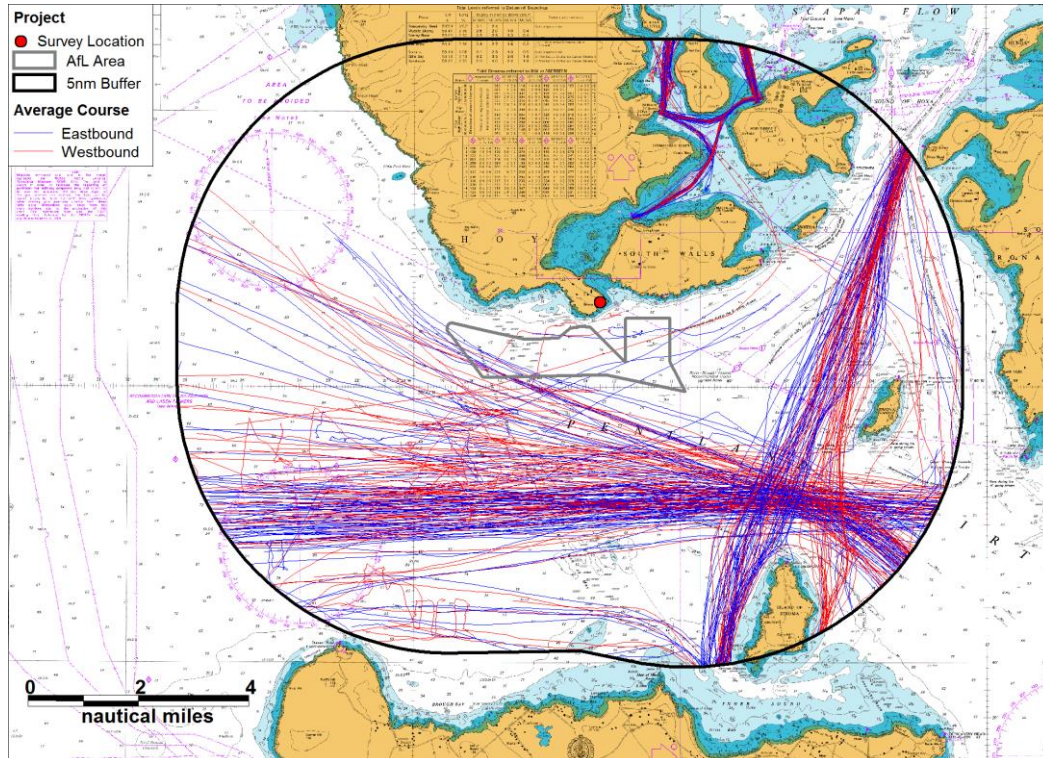


Figure 3.9 General Over of Tracks colour coded by Average Course

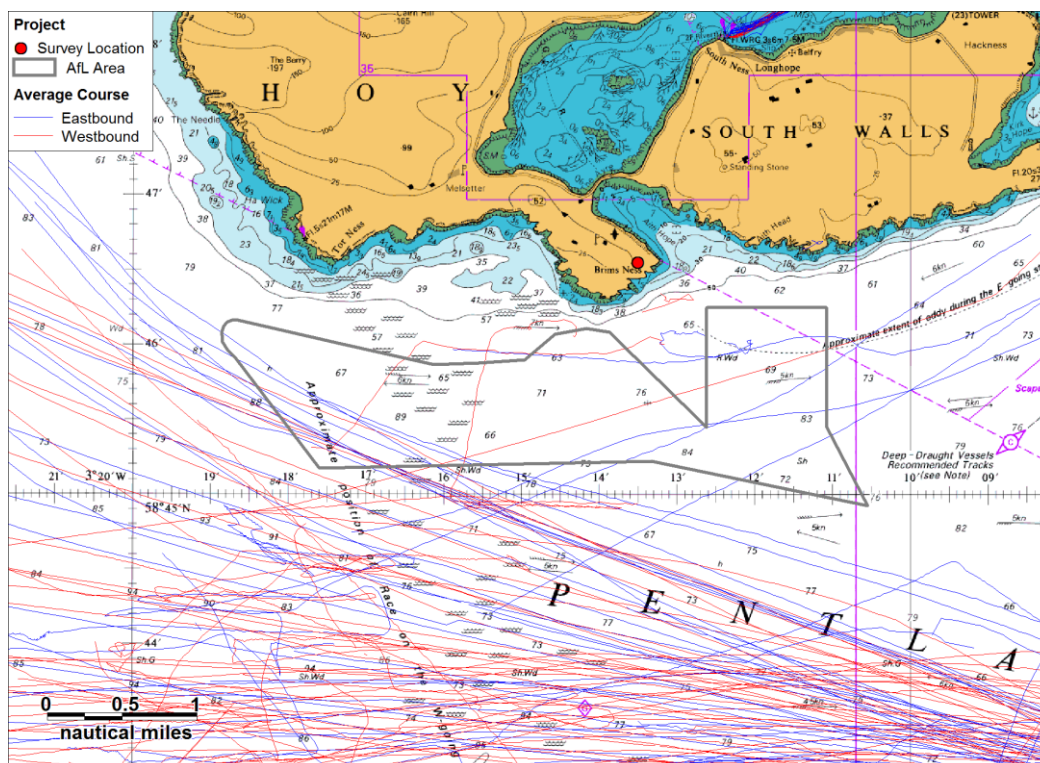


Figure 3.10 Detailed Over of Tracks colour coded by Average Course

Overall, 64% of traffic passing within the Brims AfL area was travelling generally eastbound and 36% westbound.

3.6 Average Speed

Vessel tracks, colour-coded by average speed, are presented in Figure 3.11 and Figure 3.12.

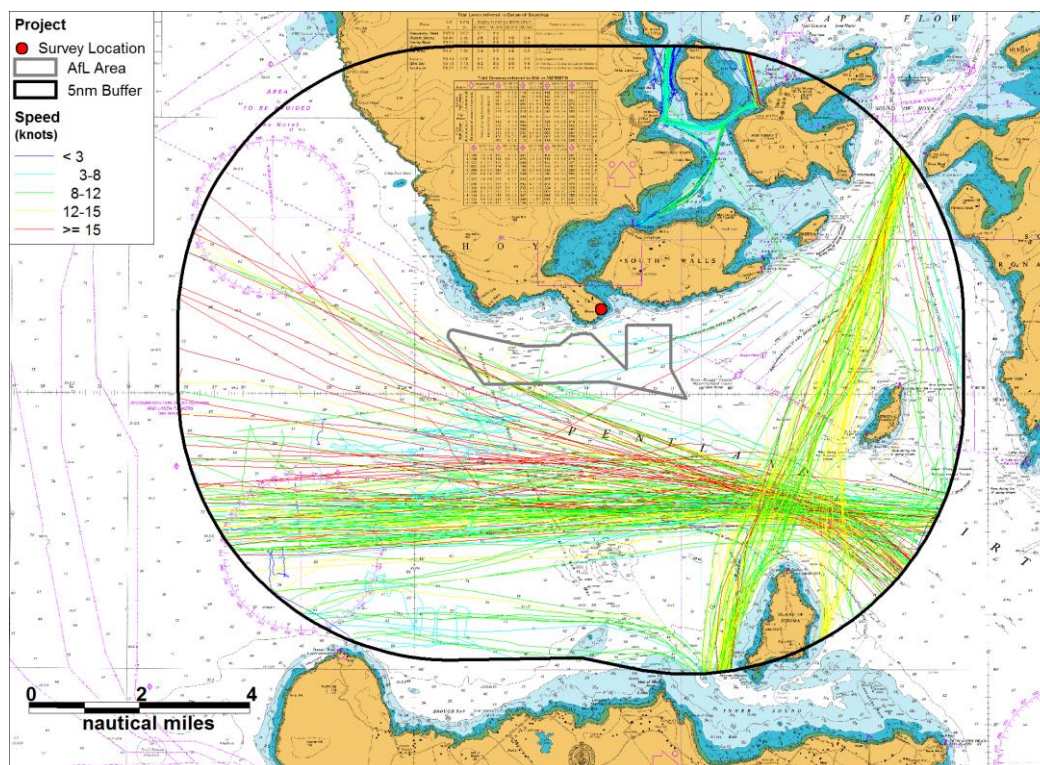


Figure 3.11 General Overview of Tracks colour coded by Average Speed

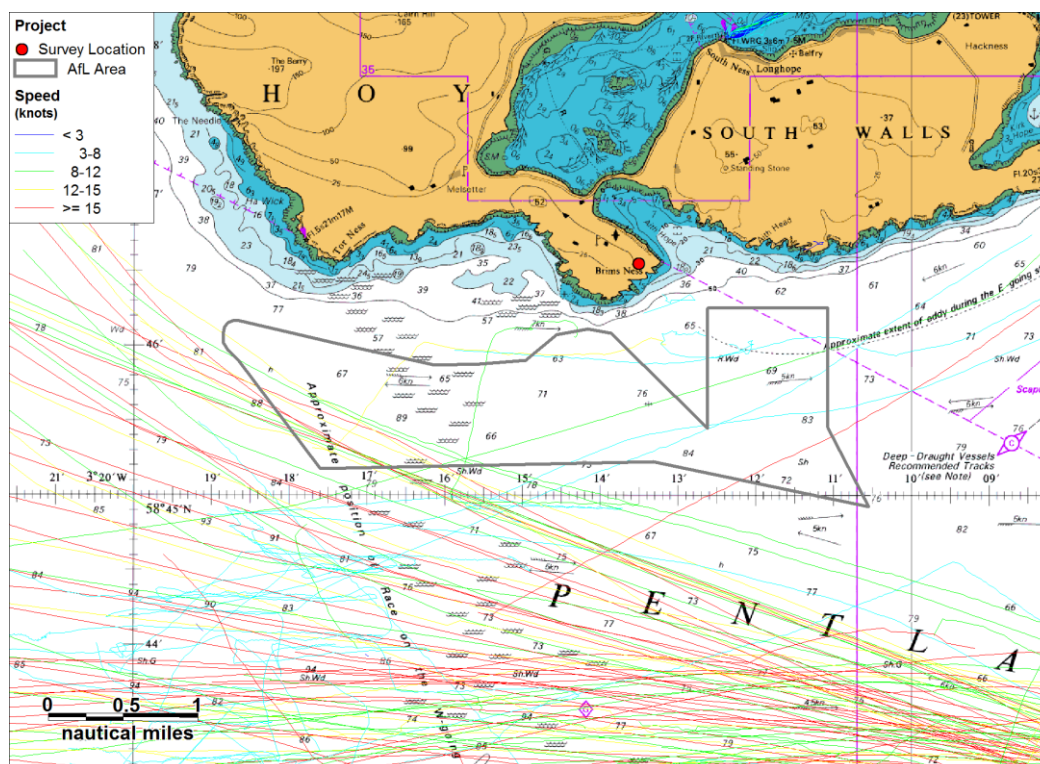


Figure 3.12 Detailed Overview of Tracks colour coded by Average Speed

The average speed of vessels within 5nm was 9.6 knots, with the fastest vessel, the passenger ferry *Hamnavoe*, travelling at 32 knots 4.8nm west of the AfL area. The average speed reflects that the majority of vessels were on passage.

The average speed of tracks crossing the Brims AfL area was 11.9 knots. The fastest vessel crossing the AfL area was the cargo vessel *Dettifoss*, with an average speed of 20.3 knots, travelling to Rotterdam on the 1st of June 2014.



Figure 3.13 Photo of the Cargo Vessel *Dettifoss*

3.7 Destination

Destinations were broadcast by 12 of the 14 AIS targets passing within the Brims AfL area. The cargo vessel *Ruby* was recorded in the AfL area heading to Torshaven, the Faroe Islands on three occasions, and Aberdeen on one occasion. Rotterdam was the recorded destination for the cargo vessels *Godafoss* and *Dettifoss*. The cargo vessel *Selfoss* and the fishing vessel *Kristrun II RE 477* were destined for Reykjavik. Immingham on Humberside was the recorded destination of the cargo vessels *Selfoss* and *Bruarfoss*.

Within 5nm the most common destination was Scapa Flow, which was the stated destination for 16 vessels. Other common destinations were St Margaret's Hope (15) and Gills Bay (14) used by the *Pentalina* ferry, Lyness (9) and Immingham (7).

3.8 Vessels crossing AfL Area

Twenty-one vessel tracks passed through the Brims AfL area during the 14 day survey period. Fourteen were broadcasting on AIS and the other seven were tracked on radar. Details on the vessels are presented in Table 3.1.

Table 3.1 Vessels Passing within the Brims AfL Area

Name (or Description)	Type	Number of Transits	Length (m)	Draught (m)	AIS
Ruby	Cargo	5	101	6	Yes
Samantha Jane	Fishing	3	12.6	N/A	No
Selfoss	Cargo	2	127	7.2	Yes
Fame	Cargo	1	15	3.9	Yes
Godafoss	Cargo	1	165	8.9	Yes
Dettifoss	Cargo	1	164	8.9	Yes
Bruarfoss	Cargo	1	126	7.1	Yes
Kristrun II RE 477	Fishing	1	36	N/A	Yes
Coast Inn	Sailing	1	6	N/A	Yes
Caspian Hope	Fishing	1	8	N/A	No
Guiding Light	Fishing	1	12.9	N/A	No
'RV87' Trawler	Fishing	1	N/A	N/A	No
Endurance FR111	Fishing	1	25	N/A	Yes
Zuza	Sailing	1	N/A	N/A	No

The cargo vessel *Ruby* made five transits through the site, on three occasions travelling to Torshavn, the Faroe Islands, on one occasion travelling to Aberdeen and one occasion travelling eastbound to an unspecified destination. A photograph of the *Ruby* can be seen in Figure 3.14.

Other vessels that made multiple transits were the creel vessel *Samantha Jane* (3) and the cargo vessel *Selfoss* (2).

The '*RV87*' Trawler was recorded transiting the site travelling eastbound. A photograph of this vessel can be seen in Figure 3.15



Figure 3.14 Photo of the Cargo Vessel *Ruby* taken on 31st May 2014



Figure 3.15 Photo of the Fishing Vessel *RV87* taken on 1st June 2014.

3.9 Visually Observed Targets

In addition to the recorded radar and AIS data, visual recordings were made of a small number of vessel positions that on occasion were not continuously tracked by the radar, for example, due to clutter and the small size of the target making them difficult to acquire.

These positions were in most cases taken from the radar (range and bearing) as returns were visible on the screen even when the radar could not continuously track the targets. The logged vessel positions, colour-coded by vessel type, are presented in Figure 3.16.

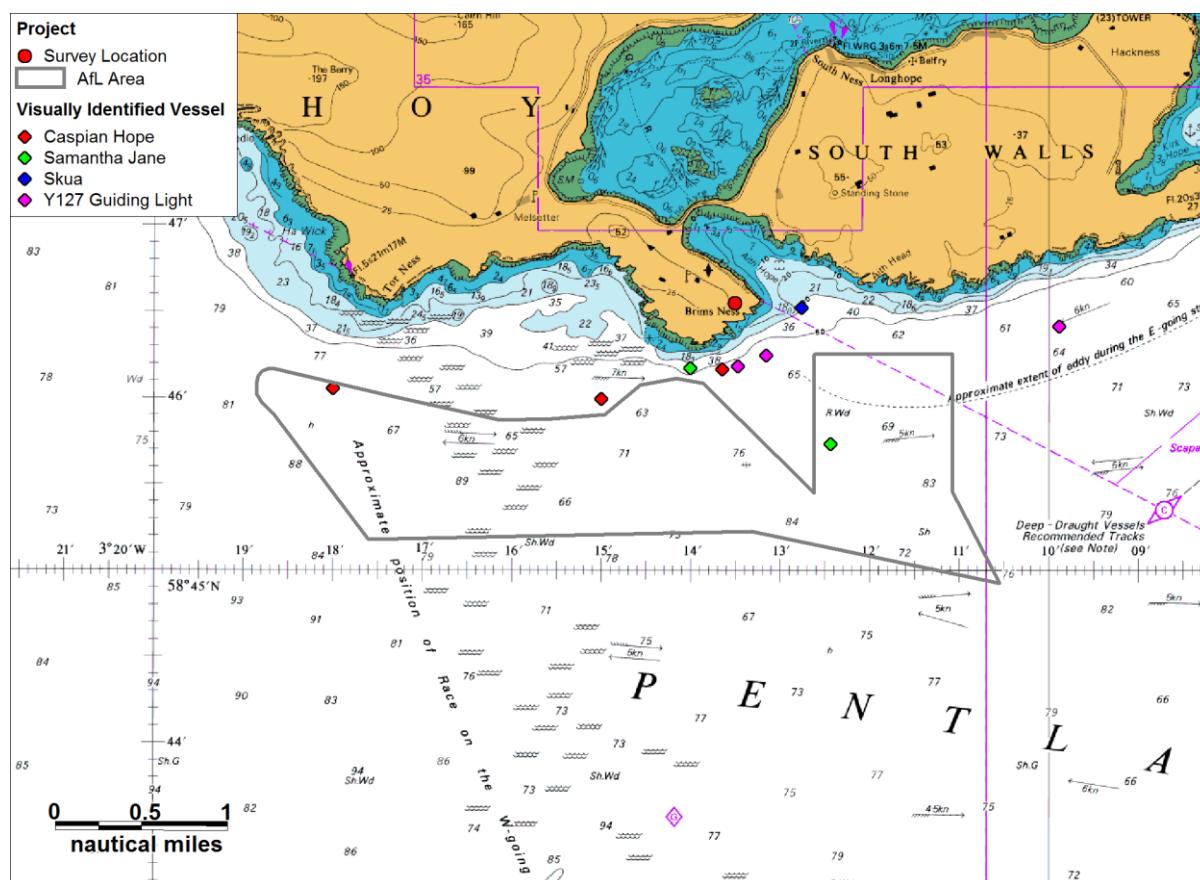


Figure 3.16 Plot of Visually Logged Vessels

There were a total of nine visual observations over the course of the survey. Three of these were the *Caspian Hope* on the 29th and 31st of May and on the 9th of June 2014. On all three occasions it was seen hauling creels. On the 29th and 31st of May *Caspian Hope* was subsequently tracked using radar.

The *Guiding Light* was recorded three times visually and *Samantha Jane* twice. *Samantha Jane* was observed to be engaging in fishing on one of these occasions and steaming on the other and was subsequently tracked by radar on both occasions. The *Guiding Light* engages in fishing west of Hoy and so was only seen steaming through the site. *Skua* is a small angling vessel and was seen engaging in fishing. Photos of the *Skua* and *Guiding Light* can be seen in Figure 3.17 and Figure 3.18, respectively.



Figure 3.17 Photo of *Skua* taken on the 31st May 2014



Figure 3.18 Photo of *Guiding Light* taken on 3rd June 2014

4. Detailed Review by Vessel Type

4.1 Introduction

This section presents more detailed analysis of the two weeks of survey data by vessel type.

4.2 Passenger Vessels

The passenger vessels tracked passing within the vicinity of the Brims AfL area are shown in Figure 4.1.

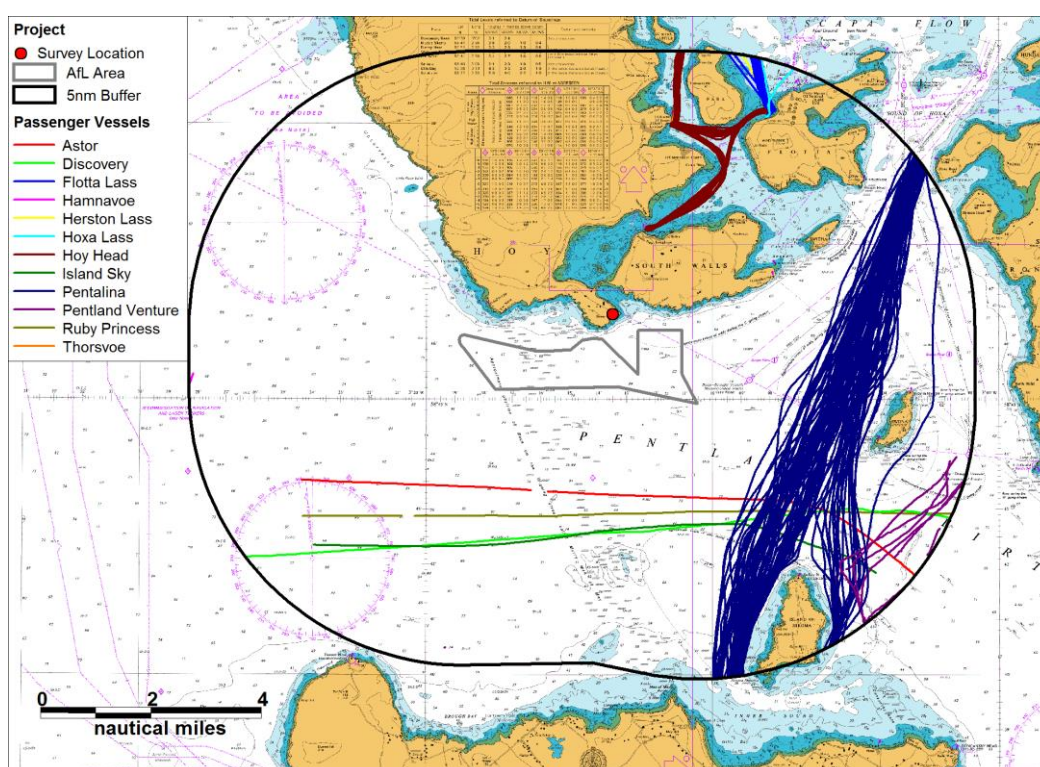


Figure 4.1 Passenger Vessels Tracks recorded during Brims Survey

The *Pentalina* transited regularly between Gills Bay and St Margaret's Hope and came within 1.5nm east of the AfL area. The *Pentland Venture* also made regular transits between John o'Groats and Burwick, but the closest transit to the AfL area was 4.2nm to the south east. Hoy Head kept well to the north when running between Houton and Lyness.

The cruise ships *Astor*, *Ruby Princess*, *Island Sky* and *Discovery* transited 1.7nm, 2nm, 2.2nm and 2.2nm south of the site respectively.

4.3 Fishing Vessels

Fishing vessels within the Brims AfL area were all recorded on radar, as AIS is only mandatory for EU fishing vessels of 15m in length and over and some of the fishing vessels recorded during the survey were smaller than this. The tracks are presented in Figure 4.2.

Tracks of vessels operating near the coast were seen on occasion to merge with land or the tide, requiring the track to be cancelled and the target to be reacquired. This mainly happened in the south west area of the site.

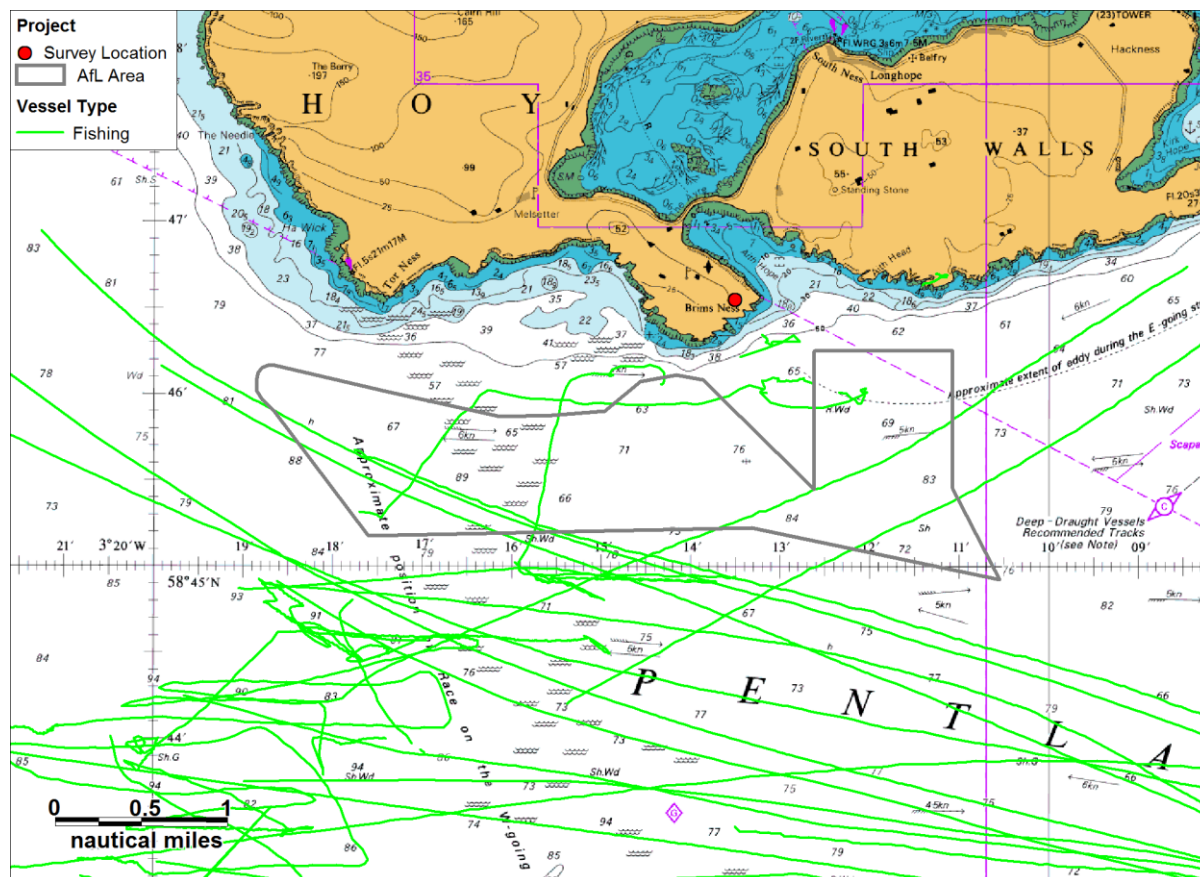


Figure 4.2 Fishing Vessels identified during Survey

All fishing vessels seen within the site were steaming. *Samantha Jane* was the most frequently recorded fishing vessel transiting the site on three occasions.

Kristrun II RE 477, *Endurance FR111*, *Caspian Hope*, *Guiding Light* and the unidentified “*RC87 Red Hulled White Wheelhouse*” were all recorded once. A photo of the *Samantha Jane* as it passed the survey site is presented in Figure 4.3.

Caspian Hope and *Samantha Jane* were both seen hauling pots between the site and the Brims Ness shore three times and once, respectively.



Figure 4.3 Photo of *Samantha Jane* taken on the 6th of June 2014

4.4 Cargo Vessels

A total of 11 tracks by five different cargo vessels were recorded passing through the site. They are displayed in Figure 4.4.

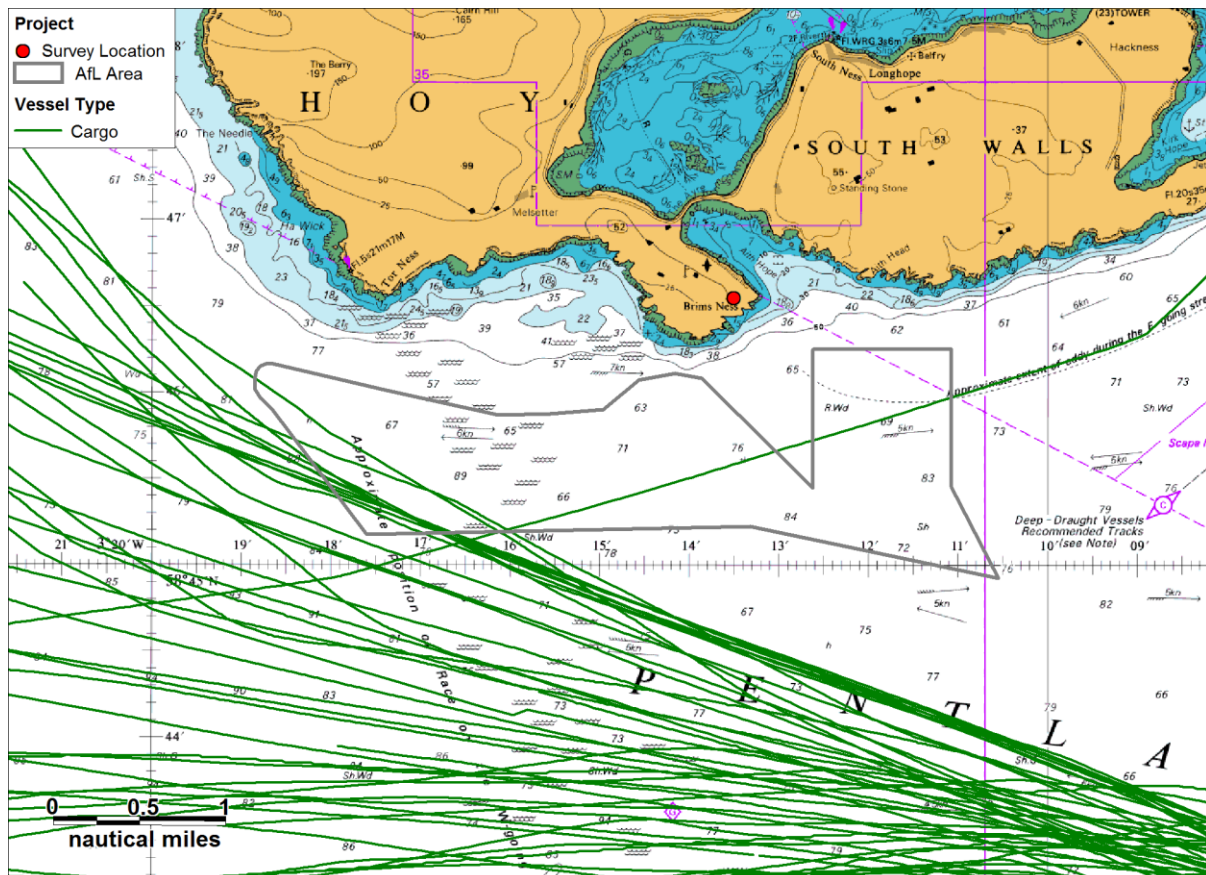


Figure 4.4 Cargo Vessels identified during Survey

The majority of cargo vessels recorded in the site travelled through the south west corner and passed west of Hoy, with the exception of *Fame* which transited through the east boundary of the AfL area. The most frequently recorded cargo vessel was the *Ruby* which transited the site five times, travelling west to Torshavn. Other cargo vessels that transited the site included the *Selfoss* and the *Godafoss*, which were travelling to Reykjavik and Rotterdam respectively.

4.5 Tankers

Figure 4.5 presents a chart overview of all tanker vessels recorded during the survey.

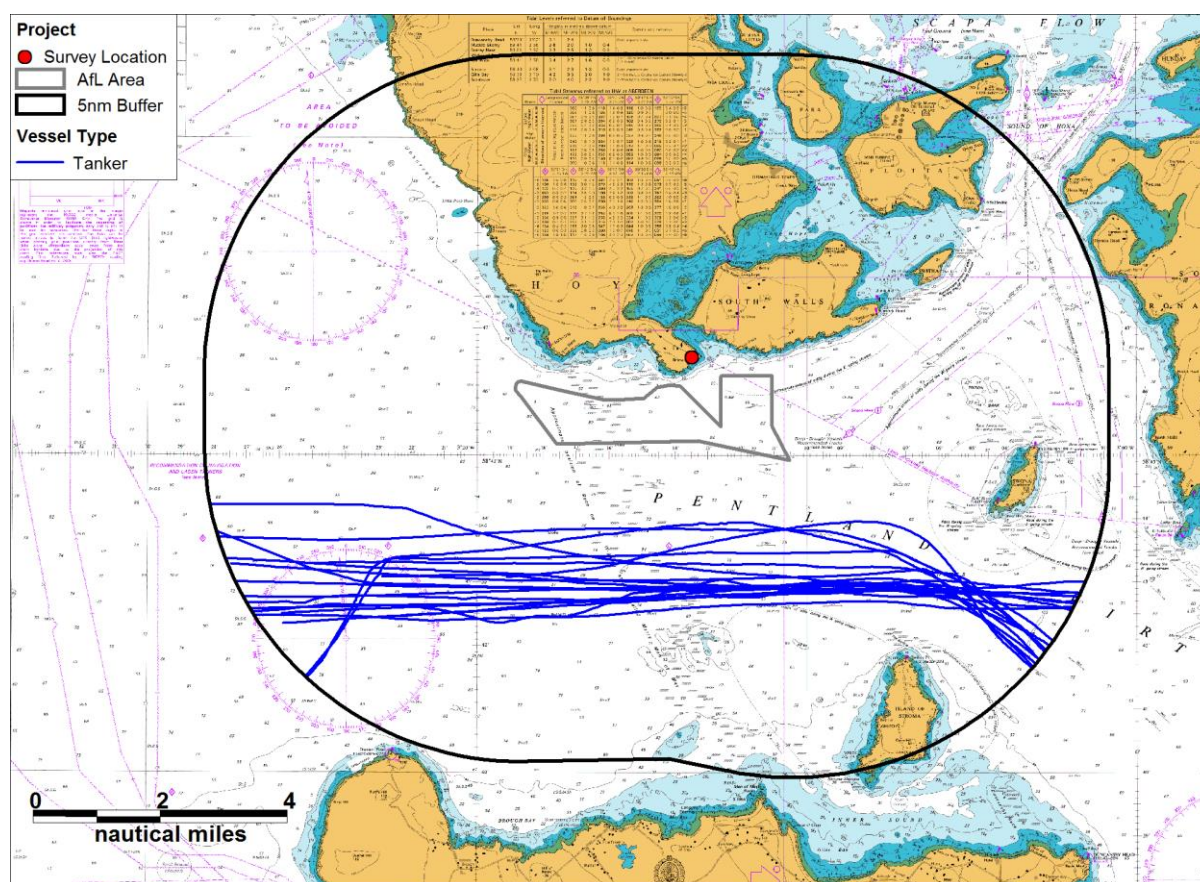


Figure 4.5 Tankers identified during Survey

There were no tankers recorded within the Brims AfL area during the time of the survey. All were using the Outer Sound of the Pentland Firth.

4.6 Recreational Vessels

Figure 4.6 presents a chart overview of the recreational vessels identified during the survey.

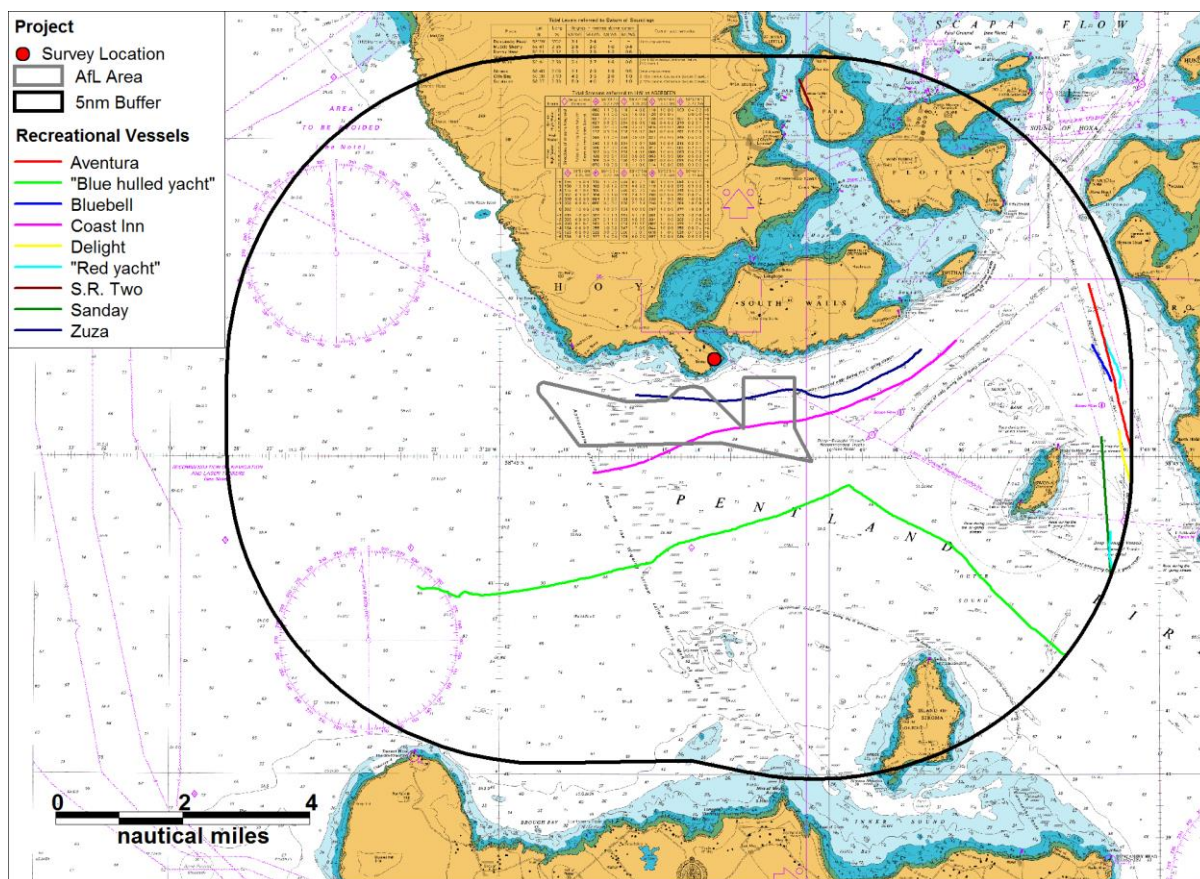


Figure 4.6 Recreational Vessels identified during Survey

Two sailing vessels, the *Zuza* and the *Coast Inn* were recorded within the AfL area both travelling north east towards Scapa Flow. The majority of the recreational vessels were recorded entering or leaving Scapa Flow to the east of the site. A photo of the sailing vessel *Zuza* can be seen in Figure 4.7.



Figure 4.7 Photo of *Zuza* taken on the 9th June 2014

4.7 All Other Vessels

Figure 4.8 presents a chart overview of the other vessels recorded during the survey.

There were no other vessels within the AfL area. The ‘other’ vessels in the wider study area included vessels involved in offshore operations such as the jack up construction vessels *Innovation* and *Sea Installer*, the well stimulation vessel *Skandi Constructor* and offshore support vessels such as *Grampian Pride*. A photograph of *Innovation* and the vessel escorting it (*Elain II*) can be seen in Figure 4.9 and *Skandi Constructor* can be seen in Figure 4.10.

The ‘other’ tracks also included the research vessel *Scotia* and multipurpose workboats such as *Thor Goliath* and *Hirta*.

Unspecified vessels were non-AIS targets that could not be visually identified due to poor visibility when they were recorded.

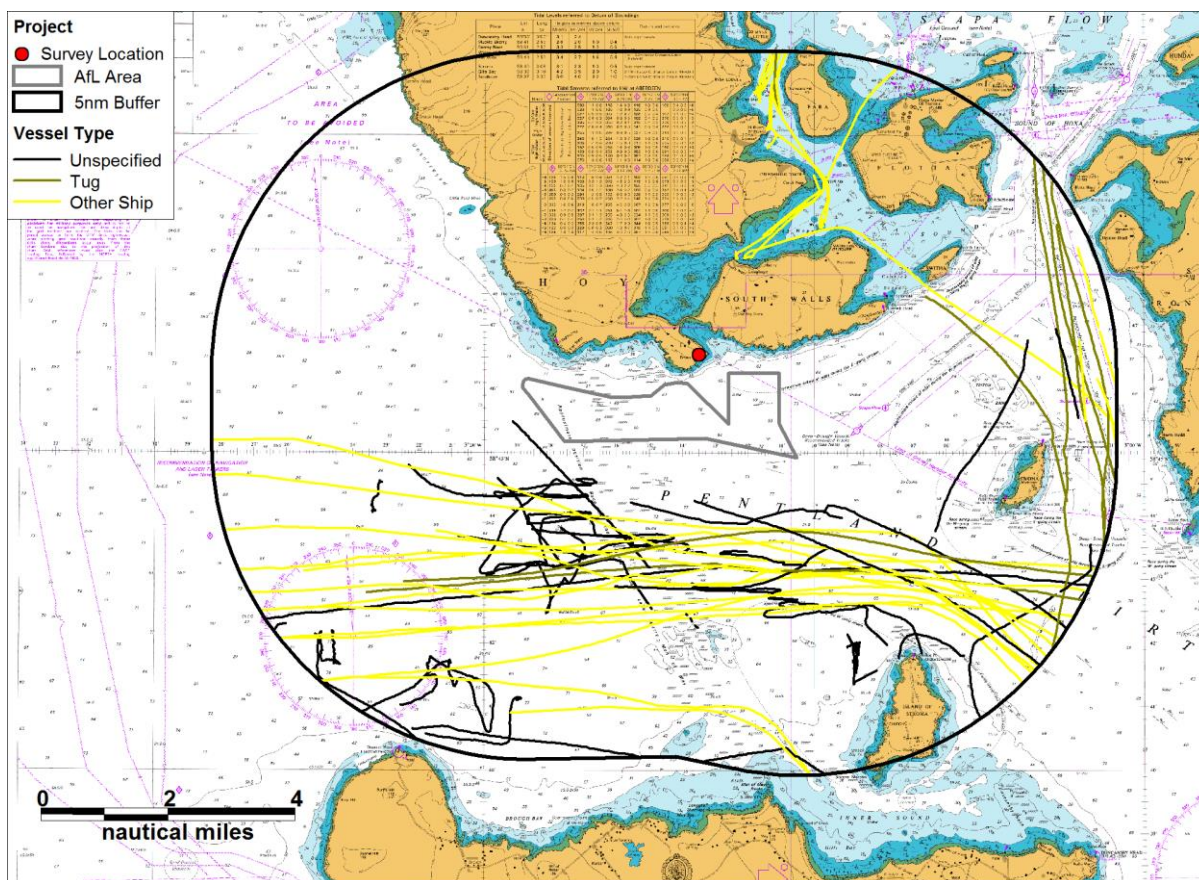


Figure 4.8 All Other Vessels Logged during Brims Survey



Figure 4.9 Photo of *Innovation* with *Elain II* taken on 11th June 2014



Figure 4.10 Photo of *Skandi Constructor* taken on 9th June 2014

5. Conclusions

This report has presented analysis of 14-days radar and AIS surveying of the proposed Brims tidal energy site. The survey was carried out near Judas Hill, Brims, Island of Hoy between the 28th May and the 11th June 2014.

There was an average of 21 vessels per day passing within 5nm of the AfL area. This was mainly cargo vessels and tankers using the Outer Sound of the Pentland Firth and passing south of the AfL area.

During the survey period, 21 tracks were recorded crossing the Brims AfL area, 11 cargo, eight fishing and two recreational.

Some small fishing vessel activity was also recorded visually taking place between the AfL area and the Brims Ness shore.

Overall, the data is representative of a good weather, summer period and complements the winter data. Taken together, the combined 28 days provides an appropriate, seasonally-varied baseline for carrying out the Navigation Risk Assessment.