



**The Provision of Additional Studies in Relation to the
Scottish Executive Strategic Environmental
Assessment for Marine Renewables**

**Study 3
Shipping and Navigation**

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Marine and Risk Consultants Limited

The Provision of Additional Studies in Relation to the Scottish Executive Strategic Environmental Assessment for Marine Renewables

Prepared for: The Scottish Executive

Prepared by:
J. Fitch & R. Baker

Checked by:
R. Baker

Marine and Risk Consultants Limited (MARICO Marine)
Marico House
Bramshaw
Southampton
Hampshire
SO43 7JB

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CONTENTS

EXECUTIVE SUMMARY

1	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	SHIPPING & NAVIGATION ASSESSMENT	1
1.3	THE REPORT	2
1.4	THE VESSEL TRAFFIC DATA	2
1.5	CHARTS	2
1.6	LOCATIONS	3
2	VESSEL TRAFFIC SURVEYS	4
2.1	VESSEL TRAFFIC DATA	4
2.2	DATA SOURCES	4
2.2.1	YACHTS	4
2.2.2	FISHING VESSELS	5
2.3	PLOTTING VESSEL TRAFFIC DATA	5
2.4	OBJECTIVES	5
2.5	RECORDING PERIODS	6
2.6	DATA COLLECTION METHODOLOGY	6
2.7	DATA PROCESSING	6
3	OVERVIEW OF VESSEL TRAFFIC	8
3.1	INTRODUCTION	8
3.2	VESSEL MOVEMENTS	11
3.3	ANALYSIS AND ROUTEING	12
3.3.1	TANKERS – ANALYSIS OF TRANSIT ROUTEING	12
3.3.2	DRY CARGO VESSELS – ANALYSIS OF TRANSIT ROUTEING	16
3.3.3	PASSENGER VESSELS – ANALYSIS OF TRANSIT ROUTEING	20
3.3.4	OTHER VESSELS GROUP – ANALYSIS OF TRANSIT ROUTEING	24
3.3.5	FISHING VESSELS	28
3.3.6	YACHTS	32
3.3.7	NAVAL VESSELS	33
3.3.8	NO VESSEL DATA RECORDED	35
3.4	VESSEL SIZES	37
4	DETAILED AREAS	43
4.1.1	COLOUR CODING OF VESSEL TRACK DENSITY FOR THEMATIC PLOTS	44
4.2	NORTH CHANNEL	45
4.2.1	OVERVIEW	45
4.3	THE HEBRIDES	50
4.3.1	OVERVIEW	50
4.4	THE PENTLAND FIRTH AND ORKNEYS	56
4.4.1	OVERVIEW	56
4.5	SHETLAND ISLES	61
4.5.1	OVERVIEW	61
5	CLOSE QUARTER EVENTS (SHIP DOMAIN ANALYSIS)	66
6	NAVIGATION ASSESSMENT	71
6.1	THE DATA	71
6.2	VESSEL TRAFFIC FINDINGS	71
6.2.1	VESSEL TRACK PLOTS	71
6.2.2	SEASONALITY OF VESSEL TRAFFIC	71
6.2.3	EXISTING MARINE ACTIVITIES	72
6.2.4	VESSEL TRAFFIC RESTRICTIONS	72

6.2.5	RECORDED VESSEL TRAFFIC IN RELATION TO POTENTIAL DEVELOPMENT AREAS	72
6.3	SEA LANES	74
6.4	FUTURE SHIPPING DEVELOPMENTS	75
6.5	NAVIGATIONAL CONSIDERATIONS	77
6.5.1	OVERALL SITE MARKINGS	77
6.5.2	VISUAL NAVIGATION AND COLLISION AVOIDANCE	77
6.5.3	AIDS TO NAVIGATION	77
6.5.4	HINDERING THE VIEW OF OTHER VESSELS UNDER WAY	77
6.5.5	HINDERING THE VIEW OF COASTLINE, LANDMARKS OR PROMONTORIES	78
6.5.6	HINDERING THE VIEW OF ANY NAVIGATIONAL FEATURE OR AIDS TO NAVIGATION	78
6.5.7	COMMUNICATIONS, RADAR AND POSITIONING SYSTEMS	78
6.5.8	EFFECTS ON SHORE BASED RADAR	78
6.5.9	SOUND	78
6.5.10	ELECTROMAGNETIC INTERFERENCE	78
7	RISK ASSESSMENT	79
7.1	ASSESSMENT CRITERIA	79
7.2	RISK ASSESSMENT TABLE TERMINOLOGY	81
7.3	RECOMMENDATIONS AND KEY POINTS FROM RISK ASSESSMENT	83
8	RECOMMENDATIONS FOR FURTHER WORK BY THE SCOTTISH EXECUTIVE	85
8.1	SHIPPING TRADE STUDY	85
8.2	VESSEL TRAFFIC SURVEYS & NAVIGATION ASSESSMENTS	85
8.3	SITE SPECIFIC RISK ASSESSMENTS	85
8.4	CONSULTATION	85
9	GLOSSARY	86

ANNEX A

CHARTLETS OF DETAILED AREAS

1. Orkney to Shetlands
2. Beauforts Dyke
3. IOM to Solway Firth
4. North Channel Mid Section
5. North Channel
6. Barra to St Georges
7. The Minches
8. North Scotland

ANNEX B

COASTGUARD AIS STATION COVERAGE

LIST OF FIGURES

- Figure 1: Plot of SEA Study Area and Areas of Interest for Development
- Figure 2: Plot of all AIS Vessel Tracks 14 Days in January 2006
- Figure 3: Plot of all AIS Vessel Tracks for 14 Days in August 2006
- Figure 4: Tracks of Tankers recorded in January 2006
- Figure 5: Thematic Plot of Tanker Tracks for 14 days in January 2006
- Figure 6: Tracks of Tankers for 14 days in August 2006
- Figure 7: Thematic Plot of Tanker Tracks for 14 days in August 2006
- Figure 8: Tracks of Dry Cargo Vessels for 14 days in January 2006
- Figure 9: Thematic Plot of Dry Cargo Vessel Tracks for 14 days in January 2006
- Figure 10: Tracks of Dry Cargo Vessels for 14 days in August 2006
- Figure 11: Thematic Plot of Dry Cargo Vessel Tracks for 14 days in August 2006
- Figure 12: Tracks of Passenger Vessels for 14 days in January 2006
- Figure 13: Thematic Plot of Passenger Vessel Tracks for 14 days in January 2006
- Figure 14: Tracks of Passenger Vessels for 14 days in August 2006
- Figure 15: Thematic Plot of Passenger Vessel Tracks for 14 days in August 2006
- Figure 16: Tracks of 'Other Vessels' Group for 14 days in January 2006
- Figure 17: Thematic Plot of 'Other Vessels' Group Tracks for 14 days in January 2006
- Figure 18: Tracks of 'Other Vessels' Group for 14 days in August 2006
- Figure 19: Thematic Plot of 'Other Vessels' Group Tracks for 14 days in August 2006
- Figure 20: Tracks of AIS Equipped Fishing Vessels for 14 days in January 2006
- Figure 21: Thematic Plot of AIS Equipped Fishing Vessel Tracks for 14 days in January 2006
- Figure 22: Tracks of AIS Equipped Fishing Vessels for 14 days in August 2006
- Figure 23: Thematic Plot of AIS Equipped Fishing Vessel Tracks for 14 days in August 2006
- Figure 24: Yacht Route Information from RYA
- Figure 25: Tracks of Naval Vessels for 14 days in January 2006

-
- Figure 26: Tracks of Naval Vessels for 14 days in August 2006
- Figure 27: Tracks with No Vessel Group Data for 14 days in January 2006
- Figure 28: Tracks with No Vessel Group Data for 14 days in August 2006
- Figure 29: Vessels with Draught more than 10 metres for 14 days in January 2006
- Figure 30: Vessels with Draught more than 10 metres for 14 days in August 2006
- Figure 31: Vessels with Draught less than 10 metres for 14 days in January 2006
- Figure 32: Vessels with Draught < 10 m for 14 days in August 2006
- Figure 33: Vessels with Draught = 0 m (Incorrect Data) for 14 days in January 2006
- Figure 34: Vessels with Draught = 0 m (Incorrect Data) for 14 days in August 2006
- Figure 35: Defined Areas with More Detailed Analysis
- Figure 36: North Channel –Plot of all AIS Vessel Traffic 14 days January 2006
- Figure 37: North Channel –Plot of all AIS Vessel Traffic 14 days August 2006
- Figure 38: North Channel – Thematic Plot of AIS Vessel Traffic Density, 14 days January 2006
- Figure 39: North Channel – Thematic Plot of AIS Vessel Traffic Density, 14 days August 2006
- Figure 40: Hebrides – Plot of all AIS Vessel Traffic 14 days January 2006
- Figure 41: Hebrides – Plot of all AIS Vessel Traffic 14 days August 2006
- Figure 42: Hebrides – Plot of Fishing Vessels, MARICO Radar Surveys 2004, 28 days
- Figure 43: Hebrides – Thematic Plot of AIS Vessel Traffic Density, 14 days January 2006
- Figure 44: Hebrides – Thematic Plot of AIS Vessel Traffic Density, 14 days August 2006
- Figure 45: Pentland Firth and Orkneys – Plot of all AIS Vessel Traffic 14 days January 2006
- Figure 46: Pentland Firth and Orkneys – Plot of all AIS Vessel Traffic 14 days August 2006
- Figure 47: Pentland Firth and Orkneys – Thematic Plot of AIS Vessel Traffic Density, 14 days January 2006
- Figure 48: Pentland Firth and Orkneys – Thematic Plot of AIS Vessel Traffic Density, 14 days August 2006
- Figure 49: Shetland Isles – Plot of All AIS Vessel Traffic, 14 days January 2006
- Figure 50: Shetland Isles – Plot of All AIS Vessel Traffic, 14 days August 2006
- Figure 51: Shetland Isles – Thematic Plot of All AIS Vessel Traffic, 14 days January 2006
-

-
- Figure 52: Shetland Isles – Thematic Plot of All AIS Vessel Traffic, 14 days August 2006
- Figure 53: AIS Vessels Recorded Within 500m of Each Other, 14 days January 2006
- Figure 54: Example of Recorded AIS Vessel Encounters - 1 day, Jan 2006, within Scapa Flow
- Figure 55: Filtered AIS Vessels Recorded Within 500m of Each Other, 14 days January 2006
- Figure 56: Further Filtered AIS Vessels Recorded Within 500m of Each Other, 14 days January 2006

LIST OF TABLES

- Table 1: Field Names in Vessel Database
- Table 2: Summary of Recorded Vessel Types by Percentage within the Study Area of the Scottish Coast
- Table 3: Filtered Close Quarter Encounters
- Table 4: Risk Summary

EXECUTIVE SUMMARY

Background

Marine and Risk Consultants Limited (MARICO Marine) was commissioned by The Scottish Executive to provide information related to maritime traffic and navigation risk in the area of northern and western Scotland. The purpose of the project was to inform decision-makers about potential risk arising from passing ships to areas considered for marine renewables development. This report concerns a high level analysis of the general marine traffic.

Vessel Traffic Data

The vessel traffic data used was collected during the periods 18th – 31st January and 1st – 14th August 2006 by the use of the UK Maritime and Coastguard Automatic Identification System¹ (AIS) network, combined with examples of data obtained previously by MARICO using radar and AIS. Vessels of 300 gross tonnes (GT) and above are required to carry the AIS equipment, therefore, the records should include well over 90% of commercial vessels. Naval vessels and vessels under 300GT are not required to carry the AIS equipment. Therefore small commercial ships, naval vessels, most yachts, recreational craft and fishing vessels were not included in the data set. The percentage of vessels thus outside the data set will vary greatly between areas but could be from 10 to 50% at some times of the year. For these vessels to be included future detailed surveys by radar, AIS and observation would have to be carried out.

Information from the Royal Yachting Association Coastal Atlas was also considered but this information only shows typical routes that yachts take with an indication of high, medium or low usage.

Few fishing vessels are fitted with AIS and therefore are generally not included in the data sets. Therefore, surveys using observers and radar to record fishing vessel tracks should be carried out in the future.

Within the limitations stated above, the use of the AIS data for vessels of 300GT and above enabled coverage of the entire area for the duration of both 14 day periods (18-31 Jan and 1-14 Aug 2006), providing a comparable data set for individual sites at different times of year to assess the traffic levels at one location to that of another and to identify any seasonal variations that may occur at or between different locations.

The analysis loosely follows the UK Marine Guidance Note 275 (MGN 275) in its analysis and presentation of the survey data. The MGN 275(M) was produced by the UK Maritime and Coastguard Agency for the guidance of developers when applying for consent to install offshore renewable energy devices.

¹ Automatic identification systems (AISs) are designed to be capable of providing information about the ship to other ships and to coastal authorities automatically. The requirements are regulated by the International Maritime Organisation and 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 all passenger ships irrespective of size. The requirement became effective for all ships by 31 December 2004

Vessel Traffic Plots

The vessel data has been plotted so that the individual path taken by each vessel is represented by a single track line overlaid on to charts. Therefore the areas with no vessel traffic recorded will be white while those areas with most vessel traffic recorded will have a many tracks and tend to be very dark.

The data is presented in various plots overlaid on outline charts. Areas of white on the track plots indicate little or no vessel traffic and hence potential development areas of probable minimal conflict with shipping. Explanations and comments have been added as appropriate and these are summarised in the following paragraphs.

Passenger vessels have very clear defined tracks and are mostly predictable in terms of navigation. Tanker tracks are the next clearest, mostly taking main routes, with local traders occasionally using the inshore routes between the islands. Dry cargo vessels are the most numerous and their tracks cover much of the navigable water. Many small cargo vessels use inside routes between the Western Isles, identifying that there are significant levels of local trade. Fishing vessels tended to be on transit in January, whereas many can be seen to be fishing the areas in August. Further investigation may reveal that this seasonal change is due to the migratory patterns of fish.

Seasonality of Vessel Traffic

A comparison of vessel traffic between the summer and winter plots shows that there is an increase in cruise vessel and ferry activity in summer together with a distinct variation in fishing and other activities. This validates the inclusion of seasonal data to cover this variation. (Detailed gate analysis can provide further breakdown). Plots of other traffic types can also be seen to differ between winter and summer evidencing seasonal variation.

Fishing

A large fishing fleet is based in Scotland and this together with foreign flag vessels creates much activity. It is important to review the fishing vessel activities by area and density, not by the tabular number of vessels recorded. During fishing operations the dwell time of this type of craft against a large vessel in transit is entirely different.

Recreational Craft

Sailing centres and marinas are available to yachtsmen and power boat owners. In summer, power and sailing craft are regularly on the move but detailed surveys by radar would be required for specific development projects to assess the density of activity and full extent of their tracks.

Ministry of Defence Exercise Areas

MOD firing exercise areas do exist in the Hebrides, Minches, west of St Kilda and other areas under consideration. Some areas are believed to be still active and we would consider it essential that, should project development be proposed, detailed information on current and future usage be obtained from the MOD.

General Comments on Potential Areas

The area around Sanda Island has significant passing traffic although tankers pass further off shore. There would appear to be fewer problems in considering this site for offshore projects, however, local fishing may need to be considered. Part of the potential development area to the northwest has significant vessel traffic and partly contains a submarine exercise area. However, considerable white areas show that in parts, an offshore project may have few conflicts.

The potential development area in the vicinity of Beaufort's Dyke and the Mull of Galloway has high levels of crossing ferry traffic, MOD areas, an extensive disused explosive dumping ground and a submarine exercise area to the south. Clearly any potential development in this area would need further and very detailed study.

In the Pentland Firth vessel traffic is significant, with a surprising number of dry cargo vessels passing south of Stroma. In addition ferries pass through the area every day. Although parts of the area appear to have potential for development and there are some areas of white close to the mainland, we would recommend that the whole Pentland area should have further and detailed survey before initiating any offshore projects.

In the area of Cape Wrath vessels pass comfortably offshore and at first sight, leave room for offshore projects. However, due to the local conditions and the fact that many of these vessels are tankers, we would also recommend that the area should have further and detailed survey before initiating offshore projects.

Apart from fishing vessels and some ships in the "other vessel" group, the vast majority of vessels pass well offshore from the Butt of Lewis. This should leave sufficient room for offshore projects to be considered in this area.

The potential development area to the north of Orkney appears to have low levels of vessel traffic and as such offshore projects will be likely to have less impact on shipping. However, there is an area to be avoided charted to the southeast of Sanday.

In the Outer Hebrides the two other potential development areas appear to have low vessel traffic. However, the inter island ferry crosses the Sound of Harris many times per day.

The areas of interest to the north of Skye, off Rubha Reidh, west of Mull and also leading to Loch Linnie (and even the Sound of Mull) all appear to have significant vessel traffic and as such would warrant further investigation prior to further consideration.

The potential development areas for wave projects have many vessel tracks recorded and reference should be made to the individual plots. The plots do indicate some clear areas (white) and areas of low traffic that may suggest where initial developments should be considered.

Vessels with draughts greater than 10 metres (data obtained from AIS transmissions) have been recorded transiting through many areas of the study

area, in particular through The Minches and entering the waters of the Shetland Isles from the North.

Scottish Maritime Trade

The pattern of trade and trends in ship numbers and their movements is very complex. While a detailed trade study for shipping in the study area is outside the scope of this report, some trends should be noted. These include the increase in the international oil trade using Scottish waters (Russian exports transiting or being consolidated into large tankers) and the continuing decrease in the number of fishing vessels. These numbers will vary by sub-region and proximity to ports.

As an example, the annual report for 2006 from the Lerwick Port Authority reported that while overall shipping tonnage fell by around 5% the number of ships using the port grew to 5,281, a 5.5% increase since 2000.

Although there was a 65% increase in the number of general vessels using the port (including cargo and roll-on/roll-off vessels) overall ship numbers were down by 20% due primarily to a 50% drop in fishing vessels. This fall in fishing vessel movements was countered by an increase in vessels' gross tonnage

The important international oil trades based on Orkney and Shetland generate many tanker movements with vessels of over 350 metres being accommodated. Oil rig service craft and other support activities generate significant vessel traffic. The potential development areas to the north of the Shetland Islands show significant vessel traffic especially in the summer.

To understand the situation better, a future study to identify shipping trends and predict levels of vessel traffic in more detail should be undertaken.

Recommendations and Key Points from the Risk Assessment

From the risk assessment summary table above the following key points and recommendations can be made:-

- Each of the proposed areas for potential marine renewable energy development will require close detailed assessment due to the variability of local factors such as the density of vessel traffic in the specific area, proximity to the device(s) to existing vessel tracks, water depths and exposure to extremes of weather;
- All areas will require detailed surveys including hydrographic, vessel traffic, etc., as part of any application;
- Once individual sites have been assessed, an overall assessment of the possible combination and cumulative effects of devices situated within or adjacent areas must be carried out;
- Devices and cables located in areas of low vessel activity are at lower risk of contact damage and are likely to have less effect on passing vessels;

- Consideration should be given to applying for safety zone approvals in areas where detailed assessment show that these are beneficial for the safety of life and the environment;
- All devices must be adequately marked and lighted in accordance with IALA recommendations. These marks and lights must have an emergency repair and maintenance programme in place throughout the life of the project to ensure that the affect of aid failure will not jeopardise the safety of life and navigation;
- Continuous zone and device monitoring from the operator's on shore control room will reduce risks and is probably essential to any of the possible locations;
- The robustness of all devices and their securing should be assessed and certified by one of the Classification Societies (such as Lloyds Register) prior to and after installation. Suitable maintenance plans must put in place and kept current throughout the life of the device;
- Promulgation of details of the device location and details through Nautical Charts, Notices to Mariners and local warning are essential for all devices and all areas. Warnings of periods of construction, maintenance or other onsite work should issued in accordance with MCA, local ports, fishing organisations, yacht clubs, RYA and local Emergency Services procedures;
- Some areas may benefit from Vessel Traffic Services systems² but this would have to be assessed individually with the MCA and/or local port authorities on a case by case basis;
- Some areas may require additional aids to navigation over and above those mounted on the devices in accordance with IALA requirements. These would have to be agreed with The Northern Lighthouse Board³ for each individual site;
- During all site work, the risks to contractors, operation and maintenance staff can be reduced by enforcing high standards of training, detailed procedures, the use of safety or stand-by vessels and safety precautions;
- The development of an Emergency Response Co-operation Plan with the Coast Guard and other emergency services is essential for every site; and
- Although the Coast Guard already have Emergency Towing Vessel and Helicopter coverage of the area, all sites will still need to be assessed for emergency cover and access individually.

² *Vessel Traffic Service (VTS)* - a service implemented by a Competent Authority, designed to improve the safety and efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and to respond to traffic situations developing in the VTS area.

³ Organization which maintains Aids to Navigation around the coast of Scotland and the Isle of Man

Recommendations for Further Work

The following areas suggest themselves for further work to be undertaken:

Shipping Trade Study

A detailed trade study could better inform the Scottish Executive on predicted future vessel trade patterns for the areas concerned. Predictions for 5, 10 and 20 years would provide a robust basis for informed decision making.

Vessel Traffic Surveys and Navigation Assessment

Detailed vessel traffic surveys by radar observation and AIS of the most likely sites would provide full coverage not only of vessels of 300 GT and above on international voyages but also of the tracks of coastal traders, fishing vessels, small vessels and leisure craft. This would allow a robust analysis and navigation assessment to be carried out for each site.

Navigation assessments for individual sites should be coordinated and overall assessment made of the likely in combination cumulative effects of several adjacent developments being carried out and causing additional concentration of vessel traffic (thus increasing the risk of collision and other incidents).

Site Specific Risk Assessments

In addition to the navigation assessment based on radar observation, a full risk assessment should be carried out for each development based on hazard identification meetings with stakeholders followed by the necessary scoring meetings. Mitigation measures can then be developed before presenting the resultant hazards in a ranked list to be assessed against an agreed risk matrix for compliance with an ALARP (As Low As Reasonably Practicable) range.

Consultation

All assessments should be supported by consultation with fishing organisations, RYA, local authorities and other stakeholders on the possible areas to be developed.

We would consider it essential that detailed information be obtained from the MOD prior to any marine renewable energy project development.