

5 Human Environment

5.2 Shipping and Navigation

5.2.1 Baseline Information

Introduction

5.2.1.1 This section summarises baseline vessel activity and navigational features in the vicinity of the proposed MORL Offshore Substation Platforms (OSPs) and modified offshore export cable corridor which form the modified offshore Transmission Infrastructure (modified OfTI) to the landfall on the north east coast of Scotland.

5.2.1.2 In carrying out the assessment, recreational sailing data, maritime incidents, fishing sightings/surveillance data and shipping survey data in the area was used to identify the baseline navigational activity. Furthermore, consultation with relevant statutory and non-statutory bodies was undertaken.

Consultations

5.2.1.3 Consultation on navigational issues has been carried out with stakeholders during the MORL ES and for this modified Transmission Infrastructure (modified TI) ES. This section summarises the key comments from stakeholders on the modified OfTI.

5.2.1.4 A summary of previous responses, relevant to the modified TI, are presented in Table 5.2-1. Full scoping consultations are provided in Chapter 1.3.

5.2.1.5 A summary of responses related to the modified OfTI is presented in Table 5.2-1.

Table 5.2-1 Summary of Modified Transmission Infrastructure Responses

Organisation	Consultation Response	MORL Approach
Marine and Coastguard Agency (MCA)	No objection in principle to the revised route, provided it is risk assessed to the extent required by the original proposal, noting its proximity to the Port of Macduff and associated traffic.	An assessment for the modified cable route is provided. The proximity to the port of Macduff is noted. A BPI study will be carried out to determine burial depth requirements adjacent to the area where vessels are anchoring.
Marine Scotland	The navigable depth must not be altered by more than 5% of stated chart datum unless otherwise agreed, in writing, with MS, MCA and NLB. A Navigational Risk Assessment will be required for any location likely to infringe on the 5% threshold.	Once the finalised route is determined, then the risk assessment of the finalised route will inform the navigable depths. The intention is to bury the cable. The results of the assessment will be presented and discussed with both the MCA and NLB.
Northern Lighthouse Board (NLB)	A Method Statement should form part of the application, and this should include details of any offshore sub-station structures, cable laying and landfall works. A Navigational Risk Assessment will also be required as part of the application, to ensure that hazards posed to the marine user are minimised.	A risk assessment has been carried out of the corridor to identify the key hazards and impacts. Results are presented within the Environmental Statement.

Organisation	Consultation Response	MORL Approach
Cruising Association (CA)	It is most important that the cable landing when in depths less than 10m presents a smooth bottom and that any cable protection or covering presents no hazard. Cables and their protections should be well bedded and have no 'humps' or change of level over them. They should be unlikely to be disturbed by swell.	Finalised cable route and associated risk assessment pre construction will consider the impacts and mitigations in event of the cable not being buried.
Royal Yachting Association (RYA)	During the construction phase, recreational sailors will best be alerted by notices at neighbouring harbours and marinas. Portsoy is an important recreational harbour, which is particularly busy at the time of the Traditional Boat Festival when events take place in neighbouring waters.	Noted and key users will be notified of activities via Notices to Mariners which will be distributed to local Ports and Harbours. Consideration will be given to any local events during the planning of the cable laying/installation operations.
Banff Harbour	Be aware that small fishing boats operate from Cullen and Findochty harbours. Local fishing associations should be consulted. Vessels ranging from yachts to larger ships anchor offshore (outwith the harbour areas) and provision/consultation should be carried out to ensure that there is no adverse effect.	Local fishing organisations are being consulted with. Anchoring areas are been identified though analysis of survey data. A Burial Protection Risk Assessment will be performed to ensure that there are no adverse effects and that the cable is buried to an appropriate depth to minimise risk.

Baseline Characteristics

5.2.1.6 The main data sources used for the desktop study are listed below:

- AIS data for Moray Firth Round 3 Zone from summer (July 2013) and winter (December 2013);
- Fishing surveillance satellite data (2009) and over flight data (2005-09);
- Maritime incident data from the Maritime Accident Investigation Branch (MAIB) (2001-2010) and Royal National Lifeboat Institute (RNLI) 2001-10;
- UK Admiralty Charts; and
- Admiralty Sailing Directions, North Coast of Scotland Pilot (NP 52).

5.2.1.7 The shipping and navigation baseline presents an assessment of the existing navigational features and shipping activity recorded in proximity to the modified OFTI. The baseline data for each of the main navigational users is presented in the following sections.

Desktop Studies

Study Area

5.2.1.8 The study areas include the modified cable area and a wider area including a 5 nm buffer area indicative potential route to show context with regards to navigational features.

Navigational Features

- 5.2.1.9 Figure 5.2-1 presents a chart of the navigational features relative to the three consented wind farm sites, Telford, Stevenson and MacColl, and the modified offshore export cable route. It is noted that there will be a maximum of two AC OSPs, with possible locations anywhere within the three consented sites.
- 5.2.1.10 There are two anchorages within the study area; one in Cullen Bay and one servicing Banff and Macduff. The Admiralty Sailing Directions 2009, North Coast of Scotland Pilot (NP52) notes that anchoring is available in the outer part of Cullen Bay. Of the Banff / Macduff anchorage it states that anchoring is available off the entrance to Banff Bay and smaller vessels can anchor further inshore.
- 5.2.1.11 There are two military practice areas intersecting the area of the modified OfTI. A note on the Admiralty Charts states that, 'No restrictions are placed on the right to transit the firing practise areas at any time. The firing practise areas are operated using a clear range procedure; exercises and firing only take place when the areas are considered to be clear of all shipping.' The main ports in the vicinity of the modified export cable route corridor are Macduff, Banff, Portknockie and Buckie.

Shipping Surveys

- 5.2.1.12 A shipping analysis was performed using 56 days of Automatic Identification System (AIS) data from July and December 2013 to account for seasonal variations. Analysis was undertaken in a study area covering approximately 5 nm around the offshore export cable route corridor. The study area also covers the two possible locations of the OSPs.
- 5.2.1.13 Overviews of the shipping data recorded during July and December 2013 are presented in Figure 5.2-2 and Figure 5.2-3 respectively.
- 5.2.1.14 An average of 18 unique vessels per day passed through the study area during summer. The landfall end of the offshore export cable route corridor was intersected by a coastal shipping route between the inner Moray Firth ports and other ports in the UK and mainland Europe. This route was located 2-8 nm north of the coast and mainly comprised cargo and tanker vessels. Smaller recreational vessels were also seen to pass closer to the coast. Fishing activity was noted over the central part of the corridor.
- 5.2.1.15 An average of 16 unique vessels per day passed through the study area during winter. As in summer, routes between the inner Moray Firth ports and other ports in the UK and mainland Europe were seen to intersect the landfall end of the offshore export cable route corridor. There was less fishing activity noted in winter than in summer and no recreational vessels were recorded during this period. There was notable "other" vessel activity recorded over the central part of the modified OfTI corridor. This was due to a vessel performing a survey and its associated guard vessel, as well as offshore support vessels visiting offshore sites in the area.
- 5.2.1.16 The vessels at anchor near the coast within the study area during the 56 days of AIS data are presented in Figure 5.2-4.
- 5.2.1.17 Nine vessels anchored in or near to the Banff / Macduff anchorage over the 2 month survey period. These were two large and three medium sized shuttle tankers and four offshore support vessels. Two small container ships and an offshore supply ship were anchored approximately 2 nm east of the southern boundary of the designated anchorage, near the far south east corner of the study area.

5.2.1.18 Anchoring was also recorded west of the offshore export cable route corridor near Cullen and Portsoy from small container ships, offshore support vessels and a research vessel.

5.2.1.19 Two vessels were seen to be at anchor further offshore during winter; a large Russian military tanker and a tug. These vessels are presented in Figure 5.2-5.

5.2.1.20 There were two vessels anchored approximately 2 nm south of the boundary of the three consented wind farm sites. Details of the 18 vessels that anchored within the study area are given in Table 5.2-2.

Table 5.2-2 Details of Anchored Vessels

Vessel Name	Type	Length (m)	Dead Weight Tonnage (DWT)	Mean Distance to Corridor (nm)
ABERDEEN	Tanker	221	87,055	3.4
ALBA NA MARA	Research Vessel	27	1,499	5.9
ANNELEEN KNUITSEN	Tanker	187	35,144	1.0
BETTY KNUITSEN	Tanker	187	35,309	0.5
CALVIN	Standby Safety Vessel	40	1,499	1.3
ELISABETH KNUITSEN	Tanker	265	124,788	1.7
FAR GRIMSHADER	Cargo	80	3,325	5.1
FS AQUARIUS	Cargo	10	3,100	3.9
GIJON KNUITSEN	Tanker	183	35,144	2.3
NAVION BRITANNIA	Tanker	260	118,500	1.2
NIKOLAY CHIKER	Tug	99	7,542	1.2
OSIPOV	Military Tanker	160	UNSPEC*	1.4
RITSKE	Cargo	80	1,688	3.9
SAMSKIP AKRAFELL	Cargo	100	5,565	3.7
SKANDI ACHIEVER	Offshore Supply Ship	106	4,000	0.9
VOS PRECIOUS	Offshore Supply Ship	73	3,250	5.4
VOS TRAPPER	Standby Safety Vessel	50	425	0.4
WORLD DIAMOND	Offshore Supply Ship	80	1,499	1.6

*DWT information was not available for the Osipov, however from its length and type it was estimated to be in the 15,000-40,000 DWT range

5.2.1.21 The largest vessel recorded at anchor within the study area was the shuttle tanker Elisabeth Knutsen with a length of 265 m and a DWT of 124,788. This vessel was at anchor within 2 nm of the export cable corridor for approximately three weeks during winter. The approximated anchor size of a vessel of this tonnage is between 15,000-18,000 kg; however anchor sizes can vary depending on the type of anchor and vessel type.

Fishing Activity

5.2.1.22 The fishing vessel tracks recorded in the AIS survey for July and December 2013 are colour coded by gear type and are presented in Figure 5.2-6.

5.2.1.23 A total of 59 unique fishing vessels were recorded during summer and 33 in winter. Significant demersal trawling activity was recorded over the central part of the offshore export cable route corridor during summer, from approximately 6 nm north of the coast to 6 nm south of the boundary of the three consented wind farm sites. Vessels associated with this activity were also recorded entering and leaving Macduff harbour. Dredging and trawling activity was also noted within the boundary of the three consented wind farm sites. Approximately 60% of vessels in the study area were actively fishing, as opposed to steaming on passage between ports and fishing grounds.

5.2.1.24 The overflight data from 2005 to 2009 showing vessel gear type is presented in Figure 5.2-7.

5.2.1.25 The majority of fishing vessels in the overflight sightings data were demersal trawlers. These demersal trawlers were mainly sighted in similar positions to the activity noted within the AIS fishing vessel tracks. Demersal trawlers, scallop dredgers and potter / whelkers were also sighted within the boundary of the three consented wind farms.

5.2.1.26 Satellite surveillance data from 2009 showing vessel gear type is presented in Figure 5.2-8.

5.2.1.27 Significant fishing activity was noted over the central part of the offshore export cable route corridor and within the boundary of the three consented wind farms in similar positions to those seen in the AIS data. Gear type information was only available for a small subset of the satellite positions. Scallop dredging activity was noted within the three consented wind farms. It is noted that at the time of the survey the AIS carriage requirements for fishing vessels was for vessels >18 m in length.

Recreational Vessel Activity

5.2.1.28 This section reviews the recreational vessel activity within the Moray Firth based on information from the RYA Coastal Atlas and the AIS data from July and December 2013.

5.2.1.29 The recreational vessel tracks from the AIS data are presented in Figure 5.2-9.

5.2.1.30 The majority of the recreational activity identified on AIS was from vessels intersecting the offshore export cable route corridor within 5 nm of the coast in the southern part of the study area. A small number of recreational vessels were also seen intersecting the offshore export cable route corridor further offshore and within the boundary of the three consented wind farms.

5.2.1.31 Draught information was not available for the majority of recreational vessels in the data. However, as the longest recreational vessel recorded was 17 m in length and

as the vast majority of recreational vessels recorded were sailing vessels, it can be conservatively assumed that they all had draughts of less than 5 m. With the exception of vessels entering or leaving ports, recreational vessels within the study area tended to avoid the areas near shore with charted depths of less than 5 m. It is noted that a significant number of recreational vessels do not have AIS fitted and that the data provides a source of validation of where routes exist. The RYA Atlas is used to identify the main recreational vessel routes in the area, the Atlas is based on consultation with local clubs / users. The RYA Coastal Atlas for the study area is presented in Figure 5.2-10.

5.2.1.32 Three medium use cruising routes associated with the ports of Macduff and Banff crossed the offshore export cable route corridor near the coast. One medium use cruising route crossed the offshore export cable route corridor further offshore and intersected the area of the three consented wind farms. The RYA Coastal Atlas describes medium use routes as 'popular routes on which some recreational craft will be seen at most times during summer daylight hours'. A sailing area in Spey Bay west of the offshore export cable route corridor extends approximately 1 nm into the study area.

Maritime Incidents

5.2.1.33 This section presents data on past vessel incidents within the study area over the ten year period 2001 to 2010.

5.2.1.34 The MAIB incident data from 2003 to 2012 is presented in Figure 5.2-11

5.2.1.35 Two incidents were recorded within the study area in the MAIB data. A machinery failure in 2008 was recorded approximately 3.5 nm south of the three consented wind farms and a grounding, also in 2008, occurred near the modified offshore export cable route corridor landfall point. Three incidents were recorded in the area of the three consented wind farms, two involving accidents to people (2003 and 2005) and one hazardous incident (2005).

5.2.1.36 The RNLI incident data from 2001 to 2010 is presented in Figure 5.2-12

5.2.1.37 A total of 13 incidents were recorded in the RNLI data as occurring within the study area between 2001 and 2010. Twelve of these incidents occurred within 4 nm of the coast. The remaining incident, a machinery failure in 2008, occurred 3.5 nm south of the three consented wind farms. This incident was also recorded in the MAIB data. No incidents were recorded within the boundary of the three consented wind farms in the RNLI data.

Legislative and Planning Framework

Primary Guidance

5.2.1.38 The primary guidance used during this assessment was the Maritime and Coastguard Agency (MCA) Marine Guidance Notice 371 (MGN 371 M+F) - Offshore Renewable Energy Installations (OREIs): Guidance on UK Navigational Practice, Safety and Emergency Response Issues (2008).

5.2.1.39 MGN 371 highlights issues that need to be taken into consideration when assessing the impact on navigational safety from offshore renewable energy developments, proposed for United Kingdom (UK) internal waters, territorial sea or Renewable Energy Zone.

5.2.1.40 There are 5 annexes containing recommendations (1-4) and regulatory extract (5) as follows:

- Annex 1: Considerations on site position, structures and safety zones;
- Annex 2: Navigation, collision avoidance and communications;
- Annex 3: MCA template for assessing distances between wind farm boundaries and shipping routes;
- Annex 4: Safety and mitigation measures recommended for OREI during construction, operation and decommissioning; and
- Annex 5: Standards and procedures for generator shutdown and other operational requirements in the event of a search and rescue, counter pollution or salvage incident in or around an OREI.

Other Guidance

5.2.1.41 Other forms of marine and navigation based guidance used in this assessment are listed as follows:

- Department of Environment and Climate Change (DECC) Guidance Notes on Safety Zones, DECC (2007);
- IALA Recommendation O-139 (2008), The Marking of Man-Made Offshore Structures;
- MCA Marine Guidance Notice 372 (MGN 372) Offshore Renewable Energy Installations (OREIs) Guidance to Mariners Operating in the Vicinity of UK OREIs (2008) – Section 2.7 effects of wind farms and wind turbines on routeing and Section 4 safety zone and exclusion zones;
- International Maritime Organisation (IMO), Guidelines for Formal Safety Assessment (FSA) (2007); and
- Search and Rescue (SAR) Framework, MCA (2002) – Chapter 1 MCA and Chapter 4 Royal National Lifeboat Institution (RNLI).

5.2.2 Impact Assessment

Summary of Effects and Mitigation

5.2.2.1 This section presents an assessment of the likely effects of the construction, operation and decommissioning of the modified OfTI on shipping and navigation. The potential impacts of the modified OfTI are listed below.

Construction and Decommissioning

Summary of Effects and Mitigation

- Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels;
- Deviations around cable installations;
- Allision risk for commercial shipping, fishing and recreational vessels with OSP's (partially constructed OSPs); and
- Fishing vessel gear snagging with partially laid or unprotected cable.

Summary of Effects

5.2.2.2 Compared with other areas of the UK there is a relatively low level of commercial shipping activity along the offshore export cable route corridor and in the vicinity of the OSPs, with a denser volume of traffic transiting to the east of the wind farm sites

passing between the Pentland Firth and around the north east coast of Scotland. There will be an increased number of vessels within the area associated with the installation (and decommissioning) of both the cable and the OSP's however, given the available sea room, all commercial vessels shall be able to increase passing distance from onsite vessels and associated works / safety zones mitigating effects and resulting in a minor effect on shipping and navigation with respect to increased ship-to-ship encounter and collision risk.

- 5.2.2.3 The area is regularly used by a moderate level of commercial fishing vessels in particular the inshore and near shore cable area. However with embedded mitigation of construction safety zones, promulgation of information and guard vessels, the effect on fishing vessels of increased ship-to-ship encounters and collision risks is considered to be minor.
- 5.2.2.4 Recreational vessel (mostly sailing vessels) tend to transit along the coast within inshore waters but again this traffic is at low levels compared to other areas of the UK therefore with embedded mitigation, including direct promulgation of information to local sailing clubs in place, the effect of increased encounters and collision risk is considered to be minor.
- 5.2.2.5 As noted, the area where the OSPs are to be located is transited by relatively low levels of commercial shipping, fishing vessels and recreational craft. Combined with the likely limited area of the cable and OSP installation activities the effects on these vessels with regards to deviation (including increased transit times for commercial vessels) and additional collision risk is considered to be minor. This effect considered that rolling construction safety zones will be in place around any works or un-commissioned structures.
- 5.2.2.6 Fishing vessels engaged in bottom gear activities may also be at risk from partially buried or exposed cables during the installation phase, especially within the near shore cable area where fishing activity is common. However with direct liaison with local fisheries (as to any potential hazards) and guard vessel(s) in place, this effect can be reduced to minor.

Additional Notes on Decommissioning

- 5.2.2.7 During the decommissioning phase of the project, the likely effects are not considered to be any greater than those identified during the construction phase.
- 5.2.2.8 A Decommissioning Plan in line with standard requirements would be developed and should consider the scenario where, on decommissioning, and on completion of removal operations, an obstruction attributable to the wind farm is left on-site which is considered to be a danger to navigation and which it has not proved possible to remove.
- 5.2.2.9 Buried cables would be left in-situ and would be notified to UKHO for inclusion in navigation charts.

Operation and Maintenance

Summary of Effects and Mitigation

- Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels;
- Collision risk for commercial shipping, fishing and recreational vessels with OSPs;
- Displacement / re-routeing resulting in increased transit times for commercial shipping, fishing vessels and recreational vessels;

- Snagging risk to both anchoring commercial and recreational vessels due to the cable and associated protection;
- Snagging risk to fishing vessels anchoring and to their gear due to the cable and associated protection;
- Reduction in under keel clearance and therefore grounding risk associated with cable protection methods; and
- Electromagnetic effects from the cable on shipborne navigational equipment.

5.2.2.10 For the operation and maintenance phase it is assumed that the cable will be either buried (including a burial target depth of 1m) and/or protected therefore should not present increased risk to commercial, fishing or recreational craft in transit.

5.2.2.11 There will be a small increase in vessel activity on site associated with the maintenance of the cable and the OSPs but not at a level that would increase ship-to-ship encounters or collision risk especially with embedded mitigation of marine vessel coordination to coordinate craft associated with the development. Given the low level of traffic and the embedded mitigation, increased collision risk for all receptors associated with the offshore export cable route corridor and the OSPs is **minor**.

5.2.2.12 With respect to the OSPs during operation, commercial vessels will again distance themselves from the site and smaller vessels (fishing and recreational) will be able to navigate whilst keeping a safe passing distance from structures. With the use of embedded mitigation such as lighting and marking the overall effect of additional collision risk is considered to be **minor**.

5.2.2.13 It is noted there is very little commercial traffic passing through the site and these vessels (based on historical experience) will avoid the site but there will be increases in transit times and distances however for the purposes of the OSPs, this effect is considered to be **minor**.

5.2.2.14 The Moray Firth provides commercial, fishing and recreational vessels with anchorages that are sheltered from adverse sea/weather conditions. Vessels are observed to anchor in close proximity to the cable route. However, in areas where the cable route is adjacent to known anchorages (off Banff near the cable landing) the cable burial depths may need to be deeper or protected (target of 1m) than other areas (informed by a cable burial index study) to mitigate the effect of any displacement of anchoring vessels dragging across the cable. With burial depths (target 1 m) being monitored by regular surveys to monitor the cable coverage, as well as other embedded mitigations in place, the effect is considered to be **minor**.

5.2.2.15 Based on the higher levels of commercial fishing activity in the area the snagging risk during the operational phase is considered to be moderate but can be reduced to **minor** due to the types of trawling used through the implementation of mitigation measures including cable burial to a target depth of 1m and use of other means of protection where the target burial depth is not possible.

5.2.2.16 Recent lessons learnt by the industry have noted that cable protection in shallow waters can reduce under keel clearance for small craft transiting in the area. MCA guidance indicates that up to approximately a 5% reduction in Chart Datum is acceptable. Consideration of under keel clearance will be assessed within the cable burial index study.

5.2.2.17 The effect on shipborne navigational equipment from electromagnetic effects during the operational phase of the cable is considered to be **minor**. Industry

research to date shows that the only noted effect is on magnetic compasses but that burial or protection of the cable will reduce this to tolerable levels. It is noted that the magnetic compass, for the majority of vessels, is not a primary method of navigation.

Proposed Mitigation Measures and Residual Effects

5.2.2.18 The following embedded mitigations are part of the modified OfTI:

- Burial of the cable to a minimum of 1m and/or protection;
- Aids to Navigation as required by NLB;
- Charting of cables as per UKHO requirements;
- Compliance with MGN 371;
- Construction safety zones;
- Monitoring – depth and coverage surveys during the operational phase of the cables; and
- Notices to Mariners.

5.2.2.19 The following are additional mitigation measures considered in addition to embedded standard mitigation measures.

- Consideration of designated anchorages (additional burial requirements) and under keel clearance as part of the Cable Burial Index Study (to be completed post consent);
- Guard vessel during construction and major maintenance;
- Promulgation of information including targeted information to local sailing and fishing organisations; and
- Works vessel coordination for wind farm support and construction vessels.

5.2.2.20 Following implementation of mitigation all effects have been reduced to **minor** and therefore residual effects are considered to be not significant under EIA terminology.

5.2.2.21 Table 5.2-3 provides a summary of the impacts.

Table 5.2-3 Impact Assessment Summary – Shipping and Navigation

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
<i>Construction & Decommissioning</i>				
Allision risk for commercial shipping, fishing and recreational vessels with OSP's during construction and decommissioning phases (partially constructed OSPs).	Fishing Vessels	Minor	N/A	Minor
	Commercial Vessels	Minor	N/A	Minor
	Recreational Vessels	Minor	N/A	Minor

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Fishing vessel gear snagging with partially laid or unprotected cable during installation	Fishing Vessels	Moderate	Safety Zones during construction Guard Vessels Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during construction and decommissioning phases	Fishing Vessels	Moderate	Safety Zones during construction Guard Vessels Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
	Recreational Vessel	Minor	N/A	Minor
	Commercial shipping	Minor	N/A	Minor
Deviations around cable installations during construction and decommissioning phases.	Commercial Shipping	Minor	N/A	Minor
<i>Operation and Maintenance</i>				
Allision risk for commercial shipping, fishing and recreational vessels with OSP's during operation	Fishing Vessels	Moderate	Works Vessel Coordination Promulgation of Information including Fisheries Liaison	Minor
	Commercial Vessels	Minor	N/A	Minor
	Recreational Vessels	Minor	N/A	Minor
Increasing ship-to-ship encounter and collision risk for commercial shipping, fishing vessels and recreational vessels during operation	Commercial Shipping	Minor	N/A	Minor
	Recreational Craft	Minor	N/A	Minor
	Fishing Vessels	Minor	N/A	Minor
Deviations around cable installations during operation	Commercial Shipping	Minor	N/A	Minor

Effect	Receptor	Pre-mitigation Effect	Mitigation	Post-mitigation Effect
Snagging risk to both anchoring commercial and recreational vessels due to the cable and associated protection during operational phase.	Commercial vessels	Moderate	Additional burial requirements or protection in proximity to anchorage area. Ongoing surveying of cable once installed. Other mitigations strategies include, marine control centre and vessels setting up anchoring alarm zones to warn of dragging anchor near cables.	Minor
Anchoring on cable	Recreational Vessels	Minor	Not Required	Minor
Fishing Gear Snagging on Cable	Fishing Vessels	Minor	Additional protection in event of cable burial not being possible. Ongoing surveys of cable once installed. Depending on the success of the trials and industry interest, modified scallop dredging gear may be implemented as an additional mitigation (but is not assumed here).	Minor
Electromagnetic /Effects on Navigation Equipment	Commercial, fishing and recreational vessels	Minor	N/A	Minor

Introduction to Impact Assessment

5.2.2.22 This chapter addresses the likely significant effects on shipping and navigation from the modified OfTI to the landfall on the north east coast of Scotland.

5.2.2.23 The scope of this section is to assess the effects on shipping and navigation including commercial shipping, recreation and fishing vessels. This assessment also informs, and is informed by, the Commercial Fisheries assessments (Chapters 5.1 (Commercial Fisheries)) and Rochdale Envelope Parameters Considered in Chapter 5.1.

5.2.2.24 The Rochdale envelope for the modified OfTI includes the export cable route and a maximum of two OSPs, located within the boundary of the three consented wind farm sites (Chapter 2.2 (Project Description)).

5.2.2.25 The assessment of the likely significant effects on shipping and navigation is based on the modified OfTI, including a 5 nm buffer from the offshore export cable route to ensure that wider effects on shipping and navigation are identified and assessed. This buffer includes most of the boundary of the three consented wind farm sites, within which the OSPs will be located.

5.2.2.26 The offshore export cable landfall will be located at Inverboyndie and the cable route length is up to 52 km from the boundary of the three consented wind farms. The maximum number of cables will be 4 and it is assumed that each cable will be in a separate trench. The target burial depth is 1m, Table 5.2-4 summarises the Rochdale envelope parameters relevant to the Shipping and Navigation Impact Assessment.

Table 5.2-4 Rochdale Envelope Parameters relevant to the Shipping and Navigation Impact Assessment

Potential Effect	Rochdale Envelope Scenario Assessed
<i>Construction & Decommissioning</i>	
Increased level of vessel activity with the installation of the export cable and the OSPs resulting in increased collision risk.	<ul style="list-style-type: none"> OSP layout giving maximum loss of navigable sea area. 4 circuits in 4 trenches, total width up to 1,200 m depending on water depth (based on current geophysical data). Installation related vessel activity in the area.
Re-routeing of shipping (commercial vessels, fishing and recreational vessels) in the area due to installation and cable laying vessels.	<ul style="list-style-type: none"> OSP layout giving maximum loss of navigable sea area. 4 cables in 4 trenches, total width up to 1,200 m depending on water depth. Installation related vessel activity in the area.
<i>Operation</i>	
Effect on vessel anchoring (loss of anchorage, anchor dragging or snagging cable) due to export cable(s).	<ul style="list-style-type: none"> 4 cables in 4 trenches in closest proximity to the anchorage area at Banff / Macduff.
Vessel to Structure collision risk during operations for commercial, fishing and recreational vessels.	<ul style="list-style-type: none"> Two OSPs.
Fishing gear interaction / snagging export cable(s) and the OSPs.	<ul style="list-style-type: none"> 4 cables in 4 trenches, total width up to 1,200 m depending on water depth. 2 OSPs.
Electromagnetic interference on shipborne navigational equipment	<ul style="list-style-type: none"> 4 cables in 4 trenches, total width up 1,200 m depending on water depth.

EIA Methodology

5.2.2.27 The methodology used to assess the likely significant effects of the modified OfTI principally follows the MCA MGN 371 (MGN 371 M+F) (2008) and Department of Energy and Climate Change (DECC) Risk Assessment Methodology (2005).

5.2.2.28 The baseline study allowed higher risk areas to be identified through the use of real time shipping survey data, desk-based research and consultation.

5.2.2.29 The effect on shipping and navigation associated with the modified OfTI works was assessed and a series of mitigation measures and monitoring plans are presented.

Significance Criteria

5.2.2.30 The likely significant effects on shipping and navigation from the modified OfTI cannot be easily categorised, hence the application of significance criteria to an assessment of effects is, subjective.

5.2.2.31 In terms of the modified OfTI, the effects on the shipping and navigation receptors for different phases of the project are assessed using the significance terminology as described below:

- **Not significant.** Effects that are slight and negligible deviations in terms of vessel navigation / routeing, anchor / fishing gear interaction risk causing no damage, negligible risk of allision with OSP and radar interference on navigational equipment which does not affect a vessel's ability to navigate;
- **Minor significance.** Effects which are generally small in magnitude in terms of vessel navigation (e.g. minor deviation around cable laying vessels for regular routes), anchor / fishing gear interaction risk causing minor damage to vessel / gear, low risk of allision with OSP and radar interference on navigational equipment restricting a vessel's ability to navigate safely.
- **Moderate significance.** Effects which are moderate in magnitude in terms of vessel navigation (e.g. moderate deviation for regular route around cable laying vessels), anchor / fishing gear interaction risk causing moderate damage to vessel / gear and / or injury to crew, moderate risk of allision with OSP and radar interference on navigational equipment reducing a vessel's ability to navigate in proximity to the infrastructure; and
- **Major significance.** Effects which are of major significant in magnitude, in terms of vessel navigation (e.g. large deviations for dense shipping), anchor / fishing gear interaction risk causing major damage to vessel / gear and major injuries to crew, high risk of allision with OSP and radar interference on navigational equipment which means a vessel can no longer navigate safely in the vicinity of the infrastructure.

Mitigation Measures

5.2.2.32 During the construction, operation and decommissioning phases of the modified OfTI works, a number of mitigation measures will be in place and these are listed below:

- Any marine Aids to Navigation (AtoNs) required to mark the structures, land falls and/or subsea features will be provided in accordance with the Northern Lighthouse Board (NLB) requirements;
- Marking of structures and subsea cabling on appropriate scale Admiralty Charts by the United Kingdom Hydrographic Office (UKHO);
- Positions of the OSPs and export cable routes notified to FISHSafe via Kingfisher Information Services-Cable Awareness (KIS-CA) for inclusion in cable awareness charts and plotters for the fishing industry;
- Promulgation of information and appropriate liaison with local fishing and recreational sailing organisations as well as local ports and harbours. This ensures information on the modified OfTI works are circulated in Notices to Mariners, Navigation Information Broadcasts and other appropriate media to allow vessels to effectively and safely pre-plan navigation around any installation / cable laying vessels;
- A Search and Rescue (SAR) Emergency Response Cooperation Plan (ERCoP) will be developed and put in place for the construction, operation and the

decommissioning phases of the entire wind farm and modified TI project. A Safety Management System (SMS) will be developed to ensure the effective co-ordination of emergency response for the modified OfTI works. It will be designed to ensure that the risks related to marine operations (construction, operation/maintenance and decommissioning) specific to the project are managed carefully and over the long-term;

- Based on the Rochdale envelope, it is assumed that the modified offshore export cable will be buried to a minimum target depth of 1m. Where this burial depth is not achieved, then appropriate protection measures will be put in place. Consideration of designated anchorages (additional burial requirements) and under keel clearance to be considered as part of the Cable Burial Index Study (to be completed post consent);
- Construction safety zones;
- Guard vessel during construction and major maintenance;
- Works Vessel Coordination for wind farm support and construction vessels;
- Monitoring – depth and coverage surveys during the operational phase of the cables; and
- Compliance with MGN 371.

5.2.2.33 The impact assessment assumes that these industry standard mitigation measures will be put in place.

Impact Assessment

5.2.2.34 In order to assess the effects associated with the modified OfTI a comprehensive analysis of real time shipping survey data was carried out. A review of AIS shipping data was presented along the offshore export cable route corridor of the modified OfTI to the landfall. A detailed study area of 5 nm either side of the offshore export cable route corridor was defined in order to assess the wider impacts on users in the area. The shipping data used in the assessment was from July 2013 and December 2013 to record fluctuations in shipping and vessel activity due to seasonal and tidal variations.

5.2.2.35 A range of vessel types were recorded on AIS and in order to ensure the main vessel types including commercial, fishing and recreational vessels were also recorded in the wider area around the modified export cable route corridor and the OSPs.

5.2.2.36 The review of likely significant effects was carried out by experienced personnel. This gives further confidence in the findings of the work. As a result of the approach adopted, the limitations associated with this study are not considered to be significant.

5.2.2.37 The baseline vessel activity and navigational features in the vicinity of the modified OfTI were detailed in the baseline of this chapter. The assessment identified the shipping and navigation receptors that may be affected by the modified OfTI works.

5.2.2.38 The main part of the assessment covers the likely significant effects on shipping and navigation in relation to commercial shipping, recreation vessels, fishing vessels and effects on shipborne navigational equipment. Effects on commercial fishing are also assessed separately in Chapter 5.1.

Construction

5.2.2.39 In terms of the shipping and navigation receptors, the effect associated with the modified OfTI has been assessed for the construction/installation phase of the project.

Effect on Commercial Vessels Allision and Ship Collision Risks

5.2.2.40 The presence of cable laying and installation vessels associated with the modified OfTI works can pose additional risks to navigation. This is due to increased vessel activity and the fact that the installation vessels are restricted in their manoeuvrability. This may lead to an increase in ship-to-ship encounters in the area as passing shipping deviates around cable laying works.

5.2.2.41 From the baseline information, it is seen that there is a relatively low density of commercial vessels transiting the area, approximately 5 unique vessels per day. The majority of vessels recorded in close proximity to the offshore export cable route corridor were vessels fishing in the area. There is sea room available for passing vessels to re-route around additional marine operations traffic and cable laying vessels operating in this area.

5.2.2.42 Assuming standard mitigation measures are in place, it is expected that cable laying works can be carried out safely, with a **minor**, effect on commercial shipping with respect to ship-to-ship encounters and increased collision risk.

Effect on Recreational Vessel Allision/Collision Risk & Journey/Transit Times

5.2.2.43 A small number of recreational vessels (approximately one per day during summer) were recorded on AIS routeing along the Aberdeenshire coast (within approximately 5 nm of the coast), however, only a small minority of such vessels are likely to broadcast on AIS. More generally, four medium use RYA / CA cruising routes intersect the offshore export cable route corridor and consented wind farm areas, two of which are associated with Macduff harbour.

5.2.2.44 Overall, given that there is sea room available for vessels to deviate around installation and cable laying vessels and assuming standard mitigation measures are in place, a **minor**, effect is predicted on recreational vessel routeing distance / voyage time as well as for allision and collision risks.

Effect on Fishing Vessel Allision/Collision Risk

5.2.2.45 There is a significant level of fishing activity in the vicinity of the modified OfTI and there will be an increase in the ship-to-ship encounters and hence collision risk in the area during construction activities. Whilst the effect is considered to be **moderate** given the additional mitigation through liaison with local fisheries organisations as well as through the use of guard vessels and safety zones in the construction phases of the project, the impact is reduced to **minor**.

Effect on Commercial Shipping Routeing

5.2.2.46 The presence of cable installation vessels could cause re-routeing of commercial shipping, leading to increased voyage distance and time.

5.2.2.47 The baseline information shows that the main shipping route intersecting the proposed offshore export cable route corridor was traffic headed east and west to / from the Moray Firth, between 2-7 nm north of the landfall, near Banff. This mostly comprised shuttle tankers and small-to-medium sized coastal cargo vessels, with approximately two commercial vessels per day using this route.

- 5.2.2.48 For the OSPs, the densest route passes to the east with one vessel every 10 days recorded on a route transiting from Wick to the south.
- 5.2.2.49 Offshore supply vessels also intersect the offshore export cable route corridor, to the north and east, supporting mobile/temporary drilling operations and fixed offshore platforms in the area, including Ross Field, Captain Field and Beatrice/Jacky Fields.
- 5.2.2.50 In general, commercial shipping in the area of the offshore export cable route corridor keeps in the order of at least 1-2.5 nm north of the Aberdeenshire coast, clear of shallower areas where the possibility exists of a vessel grounding. A number of coastal vessels were recorded passing closer to shore (dependent on draught and sea conditions). However, in general, most commercial vessels avoid inshore routes.
- 5.2.2.51 For the OSPs it is considered that commercial shipping will be able to pre-plan any revised passage in advance of encountering the area of the proposed sites and there will only be a minor increase to voyage distance and time. Given the low levels of shipping on the affected routes, available sea room to the east and west of the offshore export cable route corridor and the low levels of inshore commercial vessels in close proximity to the cable land fall, a **minor**, effect on commercial ship routeing is predicted.

Effect on Fishing Vessel Routeing

- 5.2.2.52 The AIS data (July and December 2013) recorded a relatively low density of fishing vessels on passage, approximately 5 nm clear of Banff. A number of vessels were also recorded on passage to Macduff, passing approximately 1.5 nm east of the offshore export cable route corridor. Less than one fishing vessel a day was recorded as entering or leaving Macduff.
- 5.2.2.53 Local fishing vessels will be made aware of installation works and cable laying vessels within the offshore export cable route corridor through Notices to Mariners (NtMs) and fisheries liaison. Non-local fishing vessels will become aware of the cable laying activities as they arrive at fishing grounds through day marks and lights used by the cable laying vessels to advise passing vessels of restrictions in manoeuvrability.
- 5.2.2.54 Given the low density of fishing vessels on passage crossing the offshore export cable route and the relatively small size and draught of fishing vessels (mean length of 20 m and mean draught 4 m), there will be a **minor** effect on routeing of fishing vessels during the construction / installation phase.

Effect on Fishing Operations

- 5.2.2.55 The effect on fishing vessel grounds is assessed within the Commercial Fisheries Assessment, Chapter 5.1 In terms of fishing gear interaction, there was a significant area of fishing activity over the cable route, from approximately 6 nm north of the coast to approximately 6 nm south of the boundary of the three consented wind farm sites, with the majority of activity being demersal trawlers. A number of scallop dredgers were also sighted along the offshore export cable route corridor and within the boundary of the three consented wind farms.
- 5.2.2.56 Demersal trawlers drag their gear along the seabed and could penetrate up to 30 cm. Scallop dredgers have a chain bag with teeth that dig into the sediments to about 20 cm, which drags along the sea bed collecting the catch. Scallop gear penetration depth varies (based on gear type/ weight and sea bed type) but gear can penetrate up to 75 cm and therefore these vessels are at higher risk of gear interaction with the offshore export cable, particularly if the cable is partially buried

or exposed during the installation phase. Overall, the risk to demersal trawlers and scallop dredgers operating in the vicinity of the export cable route is likely to be **moderate**.

5.2.2.57 However with direct liaison with local fisheries (as to any potential hazards) and guard vessels this impact can be reduced to **minor**

Operation

5.2.2.58 This section considers the effects of the modified OfTI on shipping and navigation receptors during the operational phase.

Effect on Commercial Vessels Anchoring

5.2.2.59 A Navigational Hazard Review Workshop was carried out in July 2011, as part of the Navigational Risk Assessment (NRA) for the offshore wind farm developments within the Moray Firth. The workshop highlighted that the Moray Firth provides vessels with sheltered anchorages, located inshore of adverse sea and weather conditions that can be experienced in the North Sea. Vessels including shuttle tankers, offshore supply ships, survey and cable laying vessels, anchor off the Moray Firth coastline during severe weather.

5.2.2.60 Anchoring within 5 nm of the offshore export cable route was recorded in Inverboynadie Bay in the anchorage servicing Banff and Macduff. This anchorage is located east of the offshore export cable route corridor and is less than 0.4 nm from the corridor at its nearest point. Nine vessels anchored within, or close to, the Banff anchorage during the two month survey period. These vessels were comprised of 2 large and 3 medium-sized shuttle tankers and 4 small offshore support vessels. In this anchorage area, the sea bed type is sandy gravel where there is good holding ground for anchoring.

5.2.2.61 Small container ships, offshore support vessels and a research vessel were also recorded anchoring further along the coast to the west, near Cullen and Portsoy. In addition, a large military tanker was recorded 1 nm east of the modified OfTI corridor, in sand / muddy sand sea bed type.

5.2.2.62 Sea bed mobility is relatively high within and adjacent to the Southern Trench. Therefore, to minimise the risk of export cables becoming exposed to anchor interaction, alternative forms of protection will be considered where the export cable cannot be satisfactorily buried (i.e. mattresses and/or rock placement), as well as regular surveys to monitor cable burial depths.

5.2.2.63 Assuming industry standard mitigation measures, including a target burial depth of 1m, a **moderate** effect on anchoring is predicted, due to the proximity of the cable to the anchorage area close to Banff and Macduff and the large tankers recorded at anchor there. This is reduced to **minor** due the additional burial requirements in proximity to the anchorage area as well as ongoing surveys of the cables once installed.

Effect on Smaller Vessels Anchoring

5.2.2.64 The effect on smaller vessels anchoring, including fishing and recreational vessels is expected to be similar in nature and extent to those discussed for commercial shipping anchoring effects. However, small vessels are likely to anchor in more sheltered and inshore areas, which are shallower and do not restrict small vessels anchor chain lengths.

5.2.2.65 Consultation with the RYA and CA stated that, given a target burial depth of 1m, the risk to recreational vessel anchoring is considered low as anchors tend to run to approximately 20 cm depth. It was requested that in water depths less than 10 m, any cable protection should not present further hazard to recreational vessels, i.e. by introducing an uneven seabed. The burial plans for the cable route will take this into consideration.

5.2.2.66 Therefore a **minor**, effect is predicted on small vessel anchoring.

Effect on Commercial Shipping and Collision Risk

5.2.2.67 In terms of an errant vessel under power deviating from its route to the extent that it comes into proximity with the OSPs, it is not considered to be a probable event. The allision risk was calculated for the offshore Transmission Infrastructure in the MORL ES, assuming a worst case scenario of eight OSPs, and estimated to be one every 261,000 years. This is low compared to the historical average of 5.3×10^{-4} per installation-year for offshore installations on the United Kingdom Continental Shelf (UKCS) (1 in 1,900 years). The modified OfTI Rochdale envelope states a maximum of two OSPs. Given that the shipping data has remained relatively unchanged, the allision risk is estimated to be lower than that calculated in the MORL ES. This conclusion is also supported by the fact that the up to date shipping survey data does not show any significant change in the numbers of vessels and shipping routes in the vicinity of the development.

5.2.2.68 The drifting vessel allision risk for the eight OSPs was identified as one every 18,100,000 years. There have been no reported 'passing' drifting ('Not under Command') ship collisions with structures on the UKCS in over 6,000 operational years. Whilst a number of drifting ship incidents are recorded each year in UK waters, most vessels have been recovered in time, (e.g. anchored, restarted engines or taken in tow.)

5.2.2.69 Overall, through the baseline data, consultation and collision risk models, a **minor**, effect is predicted on commercial shipping allision risk given the low levels of traffic / baseline risk and the small change in allision risk due to the physical presence of the OSPs.

5.2.2.70 With respect to the effect on ship-to-ship collision risk, there will be additional traffic in the area in relation to the operation of the modified OfTI. However, given the low volume of vessel activity in the Moray Firth in general the effect is considered to be **minor**.

Effect on Commercial Vessels Re-Routeing

5.2.2.71 Once the modified OfTI is in place then vessels will require to re-route around the structures. Very few vessels are observed from survey data as routeing in the vicinity of the OSP's and therefore the impact with respect to vessels requiring to deviate from their existing routes is consider to be **minor**.

Effect on Fishing Vessels Allision and Collision Risks

5.2.2.72 There is a risk that fishing vessels collide with other vessels or that they have an allision with an OSP. It is noted that there is good prospect for fishing vessels to navigate within / between structures. The decision to do this however lies with the Master of the vessel who will be responsible for assessing the risks associated with navigating in proximity to and through an offshore wind farm. The risk of allision between fishing vessels and an OSP is considered to be **moderate**. However, with the additional mitigation measures implemented then this is reduced to **minor**.

Fishing Gear Snagging Risks

5.2.2.73 There is a risk to fishing vessels should they snag their gear on unprotected cables or cables running over spans or on the OSPs subsurface. However, with identification and mitigation of potential snagging hazards including cable protection / burial as well as survey / monitoring and liaison with the fishing industry, it is considered that the operational phase of the transmission works will have a **minor** effect on fishing vessels.

Effect on Shipborne Navigational Equipment

5.2.2.74 An additional navigational effect has previously been identified based on electromagnetic interference on vessels navigational equipment, e.g. magnetic compasses and communication equipment.

5.2.2.75 A decision has been made to use HVAC export cabling for the modified TI. HVDC export cables were assessed in the MORL ES (MORL, 2012). HVDC export cables do have impacts different to Alternating Current (AC) and could potentially cause deflection of a compass needle through electromagnetic interference (Metoc, 2000). In addition, vessels can use an auto-pilot which is dependent on a magnetic sensor and may experience slight steering issues if crossing a high voltage cable. However, the decision to use HVAC export cabling will remove this as a potential effect.

5.2.2.76 It is also assumed that all equipment and offshore export cables will be rated and in compliance with design codes. In addition the offshore export cables will be buried (where possible) or protected and any generated electromagnetic fields will be very weak resulting in a **minor** effect on shipborne navigational equipment.

5.2.2.77 A small number of vessels identified during the baseline assessment, including those on the Wick and offshore routes, will be subject to a low level of radar interference; however, based on the revised routeing patterns, radar interference is predicted to be minor given the distance which they are likely to pass from the structures.

Decommissioning

5.2.2.78 The effects associated with decommissioning the modified OfTI are anticipated to be similar in nature and extent to those identified during the construction phase.

5.2.2.79 However, the likely significant effects associated with decommissioning the offshore export cables could be dependent upon the method used for decommissioning and whether it is decided that offshore export cables shall remain buried in the seabed.

5.2.2.80 It is anticipated that the effect resulting from the decommissioning of the export cables shall be **minor** in terms of disruption to shipping and navigation receptors. In addition, any possible effects should be assessed as part of the Environmental Impact Assessment (EIA) undertaken to inform the final Decommissioning Plan.

Proposed Monitoring and Mitigation

5.2.2.81 In addition to the industry standard mitigation measures described above, additional mitigation and safety measures will be applied to the offshore export cables works appropriate to the level and type of risk determined during the EIA.

5.2.2.82 The specific measures to be employed will be selected in consultation with the MCA.

5.2.2.83 In addition, the following mitigation measures specific to a particular phase will be assumed.

Construction

5.2.2.84 One of the construction/installation vessels will be tasked with vessel monitoring and guard duties to monitor passing vessels and warn / contact errant vessels headed towards offshore transmission works or vessels restricted in manoeuvrability associated with the project.

Operation

5.2.2.85 Sections of the cable route identified to be high risk areas from anchoring and fishing activity will be buried to a suitable depth to protect against vessel anchors and fishing gear. Where a suitable burial depth is unachievable, the cables will be protected with concrete mattresses and / or rock placement. Following installation, the cables' over-trawlability will also be tested.

5.2.2.86 Periodic and planned surveys of the export cable routes will be carried out to monitor burial depths / protection and seabed mobility.

5.2.2.87 A Marine Control Centre is being considered as part of the three consented wind farm sites and monitoring could be extended to cover the modified export cable route to shore (i.e. to monitor any vessels anchoring in proximity to the cable route). Further consideration of vessel monitoring in proximity to the cable route will take place during construction / installation planning.

Decommissioning

5.2.2.88 The mitigation measures associated with decommissioning the export cables are anticipated to be similar to those identified for the construction phase; however measures will also be dependent on the method of decommissioning (i.e. complete removal of export cables or leave the cable(s) buried in the seabed).

5.2.2.89 A decommissioning plan in line with standard requirements will be developed and this is likely to lead to a revision of the existing ERCoP and associated safety procedures.

5.2.2.90 Promulgation of information and appropriate liaison with marine stakeholders will be carried out prior to decommissioning works.

5.2.3 Cumulative Impact Assessment

Summary

5.2.3.1 This section presents the results of assessment of the potential cumulative effects upon shipping and navigation arising from the modified OfTI in conjunction with other existing or scoped marine receptors including coastal developments and activities.

5.2.3.2 An assessment of the likely significant effects of the whole project with the following projects has been done. The list notes there application status and distance from the OfTI;

- Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) – Operational and planning (adjacent); and
- MORL WDA – Operational (adjacent).

5.2.3.3 A summary of the expected cumulative impacts is provided in Table 5.2-5 for shipping and navigation.

Table 5.2-5 Cumulative Impact Summary (Shipping and Navigation)

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl	Whole Project with Consented Projects + WDA	Whole Project with Unconsented but Likely Project	Mitigation Method
<i>Construction/Decommissioning</i>					
Displacement / re-routeing resulting in increased transit times associated with construction areas and safety zones / Commercial Ships, Fishing Vessels and Recreational Vessels <i>(Whole project plus those developments listed in section 5.2.3.2).</i>	Minor	Minor	Minor	Minor	N/A
<i>Total Cumulative Impact Assessment</i>	Minor				
Increasing ship-to-ship encounter and collision risk with construction and support vessels / commercial shipping, fishing vessels and recreational vessels. <i>(Whole project plus those developments listed in section 5.2.3.2).</i>	Minor	Moderate	Moderate	Moderate	Works Vessel Coordination Coordination between all Developments Promulgation of Information
<i>Total Cumulative Impact Assessment</i>	Minor				
Allision risk with OSPs and other structures (constructed and partially constructed) / Commercial shipping, fishing and recreational vessels <i>(Whole project plus those developments listed in section 5.2.3.2).</i>	Minor	Minor	Minor	Minor	N/A
<i>Total Cumulative Impact Assessment</i>	Minor				
<i>Operation/Maintenance</i>					
Displacement/re-routeing resulting in increased transit times associated from completed developments/ Commercial Ships, Fishing Vessels and Recreational Vessels <i>(Whole project plus</i>	Minor	Minor	Minor	Minor	N/A

Effect/Receptor	Residual Significance Level for Modified TI	Whole Project Assessment: Modified TI + Stevenson, Telford and MacColl	Whole Project with Consented Projects + WDA	Whole Project with Unconsented but Likely Project	Mitigation Method
<i>those developments listed in section 5.2.3.2).</i>					
Total Cumulative Impact Assessment	Minor				
Increasing ship-to-ship encounter and collision risk with operational vessels and construction vessels associated with other projects / commercial shipping, fishing vessels and recreational vessels (<i>Whole project plus those developments listed in section 5.2.3.2).</i>	Minor	Moderate	Moderate	Moderate	Works Vessel Coordination Coordination between all Developments Promulgation of Information
Total Cumulative Impact Assessment	Minor				
Allision risk with OSPs and other constructed developments / Commercial shipping, fishing and recreational vessels (<i>Whole project plus those developments listed in section 5.2.3.2).</i>	Minor	Minor	Minor	Minor	N/A
Total Cumulative Impact Assessment	Minor				

Methodology

5.2.3.4 An assessment of the likely significant effects of the whole project with the following unconsented but likely projects has been done. The list notes there application status and distance from the OfTI;

- Beatrice Offshore Windfarm Limited (BOWL) (including the offshore generation station and associated TI) – Operational and planning (adjacent);
- MORL WDA – Operational (adjacent);
- Round Three Zone 2 (Forth) – Submitted (83 nm);
- Inch Cape – Submitted (90 nm);
- NNG Offshore Wind Farm – Submitted (105 nm);
- EOWDC – Consent (47 nm);
- Hywind - Scoping (36.5 nm);

- Kincardine Offshore Wind Farm (Floating) – Scoping (57 nm);
- SHE-T HVDC cable – In Planning (overlaps with array and landfall 25 nm approx.); and
- Initial planning framework for offshore wind energy in Scottish waters (spatial planning).

5.2.3.5 Projects and proposed developments were screened in to the assessment only where potential overlap between activities and receptors was identified due to the distance from the modified OfTI and the limited information available of in planning and scoped projects only those adjacent to the modified OfTI have been considered. It is noted that further consultation will be required with the SHE-T HVDC cable but this is not considered to have any cumulative impacts for shipping and navigation unless construction overlaps; however at this stage due to limited information it has been screened out of this cumulative study.

5.2.3.6 Cumulative impacts have been considered for an extended study area to include navigational waters between the Moray Firth and the Firth of Forth. Cumulative projects have been considered within 10 nm of the development area; however due to the nature of international shipping routeing to and from ports outside of this study area have also been considered but not quantified.

5.2.3.7 Cumulative impacts have been considered for shipping and navigation receptors, this includes other offshore developments, as well as in combination activities associated with other marine activities. However it should be noted that fishing, recreation and marine aggregate dredging transits have been considered as part of the baseline assessment.

5.2.3.8 Worst case assumption for all developments include the maximum number of structures are the largest development area as well as assuming that construction phases could overlap.

5.2.3.9 A number of projects and marine activities were scoped out of the assessment with regards to vessel movement as these were considered to be part of the baseline for vessel traffic. This includes traffic associated with aggregate extraction areas, fishing activity and recreational craft transits

Cumulative Assessment

5.2.3.10 The types of effects considered in this assessment during are:

- Construction and Decommissioning
 - Displacement/re-routeing resulting in increased transit times associated with construction areas and safety zones;
 - Increasing ship-to-ship encounter and collision risk with construction and support vessels; and
 - Allision risk with OSPs and other structures (constructed and partially constructed).
- Operation and Maintenance
 - Displacement / re-routeing resulting in increased transit times associated from completed developments;
 - Increasing ship-to-ship encounter and collision risk with operation al vessels and construction vessels associated with other projects; and
 - Allision risk with OSPs and other constructed developments.

5.2.3.11 The receptors identified for consideration in this cumulative assessment are:

- Commercial Shipping;
- Commercial Fishing; and
- Recreational Vessels.

5.2.3.12 Displacement / re-routeing resulting in increased transit times associated with construction areas and safety zones.

5.2.3.13 There is potential that significant deviations could affect commercial, fishing and recreational receptors associated with the cumulative development of the modified TI plus Stevenson, Telford and MacColl, WDA and BOWL. However due to the temporary nature of the construction areas and safety zones all impacts associated with deviations are expected to be **minor** and do not require further mitigation above standard embedded mitigation.

Increasing Ship-to-ship Encounter and Collision Risk with Construction and Support Vessels

5.2.3.14 Should construction periods overlap there will be a significant increase in the number of vessels operating within the Moray area increasing encounters and collisions. However this can be reduced to **minor** with effective management of traffic (works vessel coordination), communication with other developments and promulgation of information. It is noted that this impact is temporary for the construction phase.

Allision Risk with OSPs and Other Structures (Constructed and Partially Constructed)

5.2.3.15 Despite the increased in structures with the Moray Firth increased allision (for all receptors) is considered not significant due to the embedded mitigation measure already in-situ including site design, lighting and marking which will enable the receptors to navigate safely around and within the development. Therefore this impact is considered **minor** and not significant under EIA methodologies. It is noted that during construction and decommissioning vulnerable areas of development will be protected by guard vessels and / or safety zones.

Displacement / Re-routeing Resulting in Increased Transit Times Associated from Completed Developments

5.2.3.16 Due to the limited amount of transits for recreational, fishing and commercial vessels across the proposed development areas and the overall foot print of the developments the impacts on routeing associated with cumulative developments are considered **minor** and not significant under EIA methodologies. It is noted that impacts associated with the displacement of fishing activity is considered separately within the Commercial Fisheries Chapter 5.1 (Commercial Fisheries).

Increasing Ship-to-ship Encounter and Collision Risk with Operation with Vessels and Construction Vessels Associated with Other Projects

5.2.3.17 Along with the small number of vessels expected on site during operation and the potential for this to overlap could be a significant increase in the number of vessels operating within the area increasing encounters and collisions. However this can be reduced to **minor** with effective management of traffic (works vessel coordination), communication with other developments and promulgation of information. It is noted that this effect is temporary for the construction phase.

Allision Risk with OSPs and Other Constructed Developments

5.2.3.18 As with the construction period despite the increase in structures with the Moray Firth increased allision (for all receptors) is considered not significant due to the embedded mitigation measure already in situ including site design, lighting and marking which will enable the receptors to navigate safely around and within the development. Therefore this effect is considered **minor** and not significant under EIA methodologies.

5.2.4 References

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IALA Recommendation O-139 (IALA, 2008). The Marking of Man-Made Offshore Structures. IALA: Brussels)

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International Maritime Organisation (IMO, 2007), Guidelines for Formal Safety Assessment (FSA) (2007)

Search and Rescue (SAR) Framework, MCA (MCA, 2002) – Chapter 1 MCA and Chapter 4 Royal National Lifeboat Institution (RNLI)