Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Annex E to Appendix 10 to Deadline 2
Submission: MGN 543 Check List

Relevant Examination Deadline: 2

Submitted by Vattenfall Wind Power Ltd

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Revision A

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Revision A	Original Document submitted to the Examining Authority
N/A	
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MGN 543 (M+F) Safety of Navigation: Offshore Renewable Energy Installations –

Guidance on UK Navigational Practice, Safety and Emergency Response

Issue: OREI Response	Yes/No	Comments
Annex 1 : Considerations on Site Position, Structures and Safety Zones		
1. Site and Installation Co-ordinates: Developers are responsible for ensuring that formally agreed co-ordinates and subsequent variations of site perimeters and individual OREI structures are made available, on request, to interested parties at relevant project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System (GIS) data, preferably in Environmental Systems Research Institute (ESRI) format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided with latitude and longitude coordinates in WGS84 (ETRS89) datum.		
Traffic Survey – includes:		
All vessel types	✓	**Section 5 Existing Vessel Traffic and Risk Profile** All vessel types are considered, with section 5.3 providing specific breakdowns by vessel type.
At least 28 days duration, within either 12 or 24 months prior to submission of the Environmental Statement	✓	**Section 5 Existing Vessel Traffic and Risk Profile** Two x 14 day traffic surveys recorded across February 2017 and June 2017. Supplemented with a 3-month AIS dataset from December 2016 to February 2017.
Multiple data sources	✓	**Section 5 Existing Vessel Traffic and Risk Profile** The marine traffic surveys include AIS, visual and Radar data.
Seasonal variations	✓	**Section 5.6 Seasonality** Marine traffic surveys were carried out in summer and winter periods to take account of seasonal variations in traffic patterns.
MCA consultation	✓	**Section 4 Consultation** and **Annex C** The MCA have been consulted as part of the NRA process.

		Annex C includes issues raised by the MCA relevant to shipping and navigation. **Annex B Hazard Review Process** Hazard scoring was influenced by the views of and experience of the consultees.
General Lighthouse Authority consultation	✓	**Section 4 Consultation** and **Annex C** The General Lighthouse Authority (Trinity House) have been consulted as part of the NRA process. Annex C includes issues raised by the General Lighthouse Authority (Trinity House) relevant to shipping and navigation. **Annex B Hazard Review Process** Hazard scoring was influenced by the views of and experience of the consultees.
Chamber of Shipping consultation	✓	**Section 4 Consultation** and **Annex C** The Chamber of Shipping have been consulted as part of the NRA process. Annex C includes issues raised by the Chamber of Shipping relevant to shipping and navigation. **Annex B Hazard Review Process** Hazard scoring was influenced by the views of and experience of the consultees.
Recreational and fishing vessel organisations consultation.	✓	**Section 4 Consultation** and **Annex C** Royal Yachting Association, Royal Temple Yacht Club and Thanet Fisherman's Association have been consulted as part of the NRA process.

		Annex C includes issues raised by these recreational and fishing vessel organisations relevant to shipping and navigation. **Annex B Hazard Review Process** Hazard scoring was influenced by the views of and experience of the consultees.
Port and navigation authorities consultation, as appropriate	✓	**Section 4 Consultation** and **Annex C** Port of London Authority, Port of Ramsgate and Estuary Services Limited have been consulted as part of the NRA process. Annex C includes issues raised by the port and navigation authorities relevant to shipping and navigation. **Annex B Hazard Review Process** Hazard scoring was influenced by the views of and experience of the consultees.
Assessment of the cumulative and individual effects of (as appropriate):		
i. Proposed OREI site relative to areas used by any type of marine craft.	✓	**Section 5 Existing Vessel Traffic and Risk Profile** Summarises the results of the marine traffic surveys, including commercial and non-commercial traffic. **Section 7 Impact on Thanet Extension** Considers the effects on vessel routing and operations of the Thanet Extension. Section 7.10 considers the cumulative effects on vessel routing.
ii. Numbers, types and sizes of vessels presently using such areas	✓	**Section 5 Existing Vessel Traffic and Risk Profile**

		Summarises the results of the marine traffic surveys, including specific breakdowns by vessel numbers, types and sizes.
iii. Non-transit uses of the areas, e.g. fishing, day cruising of leisure craft, racing, aggregate dredging, etc.	✓	**Section 5 Existing Vessel Traffic and Risk Profile** Section 5.3.3 provides an overview of fishing activity based on marine traffic survey data. Section 5.3.4 provides an overview of recreational vessel activity based on marine traffic survey data in addition to RYA AIS intensity maps.
iv. Whether these areas contain transit routes used by coastal or deep-draught vessels on passage.	✓	**Section 5 Existing Vessel Traffic and Risk Profile** Section 5.4 considers vessel traffic by size, including the draught of vessels. **Section 7 Impact on Thanet Extension** Considers the effects on vessel routing and operations of the Thanet Extension, including transit routes used by deep draught vessels on passage. Section 7.10 considers the cumulative effects on vessel routing, including transit routes used by deep draught vessels on passage.
v. Alignment and proximity of the site relative to adjacent shipping lanes	✓	**Section 3.4.4 IMO Routeing Measures** Considers the use of Traffic Separation Schemes by vessels transiting the area of the Thanet Extension.
vi. Whether the nearby area contains prescribed routeing schemes or precautionary areas	✓	**Section 3.4.4 IMO Routeing Measures** Provides an overview of IMO routeing measures and Traffic Separation Schemes located to the east of the Thanet Extension and study area.

vii. Whether the site lies on or near a prescribed or conventionally accepted separation zone between two opposing routes	✓	**Section 3.4.4 IMO Routeing Measures** Provides an overview of IMO routeing measures and Traffic Separation Schemes to the east of the Thanet Extension and study area.
viii. Proximity of the site to areas used for anchorage, safe haven, port approaches and pilot boarding or landing areas.	✓	**Section 3.4 Existing Vessel Management** Section 3.4.1 provides an overview of pilotage within the area. Section 3.4.2 provides an overview of Vessel Traffic Services within the area.
ix. Whether the site lies within the jurisdiction of a port and/or navigation authority.	✓	**Section 3.2 Local Ports and Harbours** Provides an overview of ports within the vicinity of the Thanet Extension.
x. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓	**Section 5.3.3 Fishing Vessels** Provides an overview of fishing vessel activity within the area based on survey data and MMO VMS.
xi. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓	**Section 3.6.7 Military Exercise Areas** Provides an overview of military exercise areas within the vicinity of the Thanet Extension.
xii. Proximity of the site to existing or proposed offshore oil / gas platform, marine aggregate dredging, marine archaeological sites or wrecks, Marine Protected Area or other exploration/exploitation sites.	✓	**Section 3.6 Other Offshore Activities** Section 3.6.1 provides an overview of marine aggregate activity within the vicinity of the Thanet Extension. Section 3.6.2 provides an overview of oil and gas activity within the vicinity of the Thanet Extension.
xiii. Proximity of the site to existing or proposed OREI developments, in co-operation with other relevant	✓	**Section 3.6.5 Offshore Renewable Energy Installations**

developers, within each round of lease awards.		Provides an overview of offshore wind farms in the vicinity of the Thanet Extension.
xiv. Proximity of the site relative to any designated areas for the disposal of dredging spoil or other dumping ground	✓	**Section 3.6.4 Spoil Grounds** Section 3.6.4 provides an overview of spoil grounds within the vicinity of the Thanet Extension.
xv. Proximity of the site to aids to navigation and/or Vessel Traffic Services (VTS) in or adjacent to the area and any impact thereon.	✓	**Section 3.4 Existing Vessel Management** Section 3.4.2 provides an overview of vessel traffic services (VTS) within the vicinity of the Thanet Extension. Section 3.4.5 provides an overview aids to navigation within the vicinity of the Thanet Extension.
xvi. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density and nearby or consented OREI sites not yet constructed.	✓	**Section 7 Impact on Thanet Extension** Considers the effects on vessel routing and operations of the Thanet Extension. Section 7.10 considers the cumulative effects on vessel routing.
xvii. With reference to xvi. above, the number and type of incidents to vessels which have taken place in or near to the proposed site of the OREI to assess the likelihood of such events in the future and the potential impact of such a situation.	✓	**Section 5.7 Historical Incidents** Section 5.7.1 provides MAIB incidents in the vicinity of the Thanet Extension. Section 5.7.2 provides a summary of historical incidents determined through benchmarking with the industry nationally.
3. OREI Structures – the following should be determined:		

a. Whether any feature of the OREI, including auxiliary platforms outside the main generator site, mooring and anchoring systems, inter-device and export cabling could pose any type of difficulty or danger to vessels underway, performing normal operations, including fishing, anchoring and emergency response.	✓	**Section 7 Impact on Thanet Extension** Considers the effects on vessel routing and operations of the Thanet Extension. Section 7.10 considers the cumulative effects on vessel routing. Section 7.4 outlines the impact to the available fairway for vessel traffic once the Thanet Extension has been constructed. **Section 8 Navigation Risk Assessment** Provides detail on the impact on navigation potentially caused by the three phases of the Thanet Extension project: construction, operation and decommissioning).
b. Clearances of wind turbine blades above the sea surface are *not less than 22 metres* above MHWS.	✓	**Section 2 Thanet Extension Offshore Wind Farm** Section 2.2.2 provides an overview of the WTG. The worst-case design characteristics for turbine size are shown in Figure 3. **Section 8.5 Risk Control Options** Table 20 details that blade clearance of at least 22m above MHWS must be met.
c. Underwater devices i. changes to charted depth ii. maximum height above seabed iii. Under Keel Clearance	✓	**Section 2 Thanet Extension Offshore Wind Farm** Section 2.4.1 provides detail on the underwater WTG structures. Sections 2.2.3 and 2.2.4 provide an overview on inter-array cables and the cable route. **Section 7.5 Inter-Array and Export Cable Risk** Section 7.5.1 and 7.5.2 provide an overview on of the impacts of anchoring depths. Section

		7.5.3 gives detail on acceptable Under Keel Clearance as a result of cable protection. **Section 7.6 Impact on Navigation of Cable Laying** Discusses the impact of cable installation activities.
d. The burial depth of cabling and changes to charted depths associated with any protection measures.	✓	**Section 2 Thanet Extension Offshore Wind Farm** Section 2.4.1 provides detail on the underwater WTG structures. Sections 2.2.3 and 2.2.4 provide an overview on inter-array cables and the cable route. **Section 7.5 Inter-Array and Export Cable Risk** Section 7.5.3 gives detail on acceptable Under Keel Clearance as a result of cable protection. **Section 7.6 Impact on Navigation of Cable Laying** Discusses the impact of cable installation activities.
4. Assessment of Access to and Navigation Within, or Close to, an OREI **To determine the extent to which navigation would be feasible within the OREI site itself by assessing whether:**		
a. Navigation within or close to the site would be safe:		
i. by all vessels, or ii. by specified vessel types, operations and/or sizes. iii. in all directions or areas, or iv. in specified directions or areas. **v.** in specified tidal, weather or other conditions	✓	**Section 7.3 Modelling of Impact on Collision Risk** Provides an overview of collision risk modelling undertaken through the development of a traffic simulation using the principles of domain analysis.

		Section 7.4 Modelling of Impact on Contact (Allision) Gives an overview of the impact to the available fairway for vessel traffic once the extension has been constructed using contact risk modelling approaches. **Section 7.8 Impact on Visual Navigation and Collision Avoidance** Provides an overview of available sea room and visibility in respect of WTG installation **Section 8 Navigation Risk Assessment** Provides detail on the impact on navigation potentially caused by the three phases of the Thanet Extension project: construction, operation and decommissioning).
b. Navigation in and/or near the site should be: i. prohibited by specified vessels types, operations and/or sizes. ii. prohibited in respect of specific activities, iii. prohibited in all areas or directions, or iv. prohibited in specified areas or directions, or v. prohibited in specified tidal or weather conditions, or simply vi. recommended to be avoided.	✓ ✓ ✓ ✓ ✓	**Section 8.5 Risk Control Options** Table 20 in Section 8.5.1 provides a list of embedded risk controls to ensure safe navigation.
c. Exclusion from the site could cause navigational, safety or routeing problems for vessels operating in the area e.g. by preventing vessels from responding	✓	**Section 7.1 Impact on Vessel Traffic Routeing** Section 7.1.1 provides an overview of vessel traffic routeing in the area using historical data. **Section 7.3 Modelling of Impact on Collision Risk**

to calls for assistance from persons in distress.		Provides an overview of collision risk modelling undertaken through the development of a traffic simulation using the principles of domain analysis. **Section 7.7 Impact on Search and Rescue** Provides guidance on MCA requirements for SAR for the existing OWF.
Relevant information concerning a decision to seek a safety zone for a particular site during any point in its construction, extension, operation or decommissioning should be specified in the Environmental Statement accompanying the development application	✓	**Section 8.5 Risk Control Options** Table 21 details that 500m safety zones must be present around WTG construction activity.
Annex 2 : Navigation, collision avoidance and communications		
The Effect of Tides and Tidal Streams : It should be determined whether:		
a. Current maritime traffic flows and operations in the general area are affected by the depth of water in which the proposed installation is situated at various states of the tide i.e. whether the installation could pose problems at high water which do not exist at low water conditions, and vice versa.	✓	**Section 3.4.1 Pilotage** Provides details on vessel lengths and draughts entering pilot stations and with the vicinity of the Thanet Extension. **Section 7.1.3 Transits of Tidally Constrained Vessels** Provides details of the proportion of vessels transiting within the vicinity of the Thanet Extension at different heights of the tide.
b. The set and rate of the tidal stream, at any state of the tide, has a significant effect on vessels in the area of the OREI site.	✓	**Section 3.3.4 Tide** Table 6 provides details of various states of the tide within the area.

c. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✓	**Section 3.3.4 Tide** Table 6 provides details of various states of the tide within the area.
d. The set is across the major axis of the layout at any time, and, if so, at what rate.		**Section 3.3.4 Tide** Table 6 provides details of various states of the tide within the area.
e. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream.	✓	**Section 3.3.4 Tide** Table 6 provides details of various states of the tide within the area. **Section 7.4 Modelling the Impact on Contact (Allision)** Details the risk modelling undertaken to test the impact of that the extension may have on vessel contact. **Section 8 Navigation Risk Assessment** The risk assessment considers the potential impact the project could cause on the tidal stream with the vicinity of the Thanet Extension.
f. The structures themselves could cause changes in the set and rate of the tidal stream.	✓	**Section 8 Navigation Risk Assessment** The risk assessment considers the potential impact the project could cause on the tidal stream with the vicinity of the Thanet Extension.
g. The structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water	✓	**Section 8 Navigation Risk Assessment** The risk assessment considers the potential impact the project could cause on the tidal stream with the vicinity of the Thanet Extension.

depths in the wind farm area or adjacent to the area		
2. Weather: It should be determined whether:		
a. The site, in normal, bad weather, or restricted visibility conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.	✓	**Section 3.3 Metocean Conditions** Presents meteorological and oceanographic statistics for the Thanet Extension area. **Section 3.6.6 Anchorages** Provides information on the use of anchorages in bad weather. **Section 7.1.2 Impact of Thanet Extension** Provides details of vessel behavior in bad weather.
b. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✓	**Section 8 Navigation Risk Assessment** Provides detail on the impact on navigation potentially caused by the three phases of the Thanet Extension project: construction, operation and decommissioning).
c. In general, taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set such as referred to above.	✓	**Section 8 Navigation Risk Assessment** Provides detail on the impact on navigation potentially caused by the three phases of the Thanet Extension project: construction, operation and decommissioning).
3. Collision Avoidance and Visual Navigation: It should be determined whether:		
a. The layout design will allow safe transit through the OREI by SAR helicopters and vessels.	✓	**Section 7.7 Impact on Search and Rescue** Gives guidance on the impact of the Thanet Extension of search and rescue.

b. The MCA's Navigation Safety Branch and Maritime Operations branch will be consulted on the layout design and agreement will be sought.	✓	**Section 4 Consultation** As seen in Table 8, consultation has already taken place with the MCA regarding the layout design and will continue. **Section 7.7 Impact on Search and Rescue** Gives consideration to the layout guidance for the Thanet Extension.
c. The layout design has been or will be determined with due regard to safety of navigation and Search and Rescue.	✓	**Section 4 Consultation** Table 8 provides an overview on the consultation undertaken with the relevant parties in respect of navigational safety and search and rescue. **Section 7.7 Impact on Search and Rescue** Gives guidance on the impact of the Thanet Extension of search and rescue.
d.i. The structures could block or hinder the view of other vessels under way on any route.	✓	**Section 7.8 Impact on Visual Navigation and Collision Avoidance** Section 7.8.1 considers the effects on vessel routeing of the Thanet Extension.
d.ii. The structures could block or hinder the view of the coastline or of any other navigational feature such as aids to navigation, landmarks, promontories, etc.	✓	**Section 7.8 Impact on Visual Navigation and Collision Avoidance** Section 7.8.2 considers the effects on navigational features or aids to navigation of the Thanet Extension.
4. Communications, Radar and Positioning Systems - To provide researched opinion of a generic and, where appropriate, site specific nature concerning whether:		
a. The structures could produce radio interference such as shadowing, reflections or phase changes, and emissions with respect	✓	**Section 7.9 Impact on Communications, Radar and Positioning Systems** Summarises the potential impacts on navigation of the different communications and position

to any frequencies used for marine positioning, navigation and timing (PNT) or communications, including GMDSS and AIS, whether ship borne, ashore or fitted to any of the proposed structures, to: i. Vessels operating at a safe navigational distance ii. Vessels by the nature of their work necessarily operating at less than the safe navigational distance to the OREI, e.g. support vessels, survey vessels, SAR assets. iii. Vessels by the nature of their work necessarily operating within the OREI.	✓ ✓ ✓	fixing devices used in and around offshore wind farms. Section 7.9.2 gives an overview of impacts experienced by other wind farm projects.
b. The structures could produce radar reflections, blind spots, shadow areas or other adverse effects: i. Vessel to vessel; ii. Vessel to shore; iii. VTS radar to vessel; iv. Racon to/from vessel.	✓ ✓ ✓ ✓ ✓	**Section 7.9 Impact on Communications, Radar and Positioning Systems** Summarises the potential impacts on navigation of the different communications and position fixing devices used in and around offshore wind farms. Section 7.9.2 gives an overview of impacts experienced by other wind farm projects.
c. The structures and generators might produce sonar interference affecting fishing, industrial or military systems used in the area.		**Section 7.9 Impact on Communications, Radar and Positioning Systems** Discusses sonar interference and related impacts. Section 7.9.2 gives an overview of impacts experienced by other wind farm projects.

d. The site might produce acoustic noise which could mask prescribed sound signals.	✓	**Section 7.9 Impact on Communications, Radar and Positioning Systems** Discusses sonar interference and related impacts. Section 7.9.2 gives an overview of impacts experienced by other wind farm projects.
e. Generators and the seabed cabling within the site and onshore might produce electro-magnetic fields affecting compasses and other navigation systems.	✓	**Section 7.9 Impact on Communications, Radar and Positioning Systems** Discusses sonar interference and related impacts. Section 7.9.2 gives an overview of impacts experienced by other wind farm projects. Section 7.9.5 provides an overview of electromagnetic interference from cables.
5. Marine Navigational Marking: It should be determined:		
a. How the overall site would be marked by day and by night throughout construction, operation and decommissioning phases, taking into account that there may be an ongoing requirement for marking on completion of decommissioning, depending on individual circumstances.	✓	**Section 2.3 Navigation Aids and Marking** Summarises mitigation measures adopted as part of the Project, including how the Thanet Extension array area will be marked during the construction, operation and maintenance and decommissioning phases.
b. How individual structures on the perimeter of and within the site, both above and below the sea surface, would be marked by day and by night.	✓	**Section 2.3 Navigation Aids and Marking** Summarises mitigation measures adopted as part of the Project, including how the Thanet Extension array area will be marked during the construction, operation and maintenance and decommissioning phases.

c. If the specific OREI structure would be inherently radar conspicuous from all seaward directions (and for SAR and maritime surveillance aviation purposes) or would require passive enhancers.	✓	**Section 7.9 Impact on Communications, Radar and Positioning Systems** Summarises the potential impacts on structures of radar communications.
d. If the site would be marked by additional electronic means e.g. Racons	✓	**Section 2.3.1 Site Marking** Site marking for maritime safety is discussed. **Section 2.3.3 Individual Structure Markings on the Perimeter and within the Site** Details the WTG marking requirements. **Section 8.5 Risk Control Options** Table 20 details that an Aids to Navigation plan (marking and lighting) will be submitted prior to construction.
e. If the site would be marked by an AIS transceiver, and if so, the data it would transmit.	✓	**Section 2.3 Navigation Aids and Marking** Summarises means of communication to third parties which are proposed. **Section 8.5 Risk Control Options** Table 20 details the site will be on continuous watch using AIS and other communication means.
f. If the site would be fitted with audible hazard warning in accordance with IALA recommendations	✓	**Section 2.3 Navigation Aids and Marking** Summarises means of communication to third parties which are proposed. **Section 8.5 Risk Control Options** Table 20 details the site will be on continuous watch using AIS and other communication means.

g. If the structure(s) would be fitted with aviation lighting, and if so, how these would be screened from mariners or guarded against potential confusion with other navigational marks and lights.	✓	**Section 2.3 Navigation Aids and Marking** Summarises mitigation measures adopted as part of the Project, including how the Thanet Extension array area will be marked during the construction, operation and maintenance and decommissioning phases.
h. Whether the proposed site and/or its individual generators complies in general with markings for such structures, as required by the relevant GLA in consideration of IALA guidelines and recommendations.	✓	**Section 2.3 Navigation Aids and Marking** Details that WTG will be marked under legal requirement guidelines.
i. The aids to navigation specified by the GLAs are being maintained such that the 'availability criteria', as laid down and applied by the GLAs, is met at all times.	✓	**Section 2.3 Navigation Aids and Marking** Details that aids to navigation will be marked under legal requirement guidelines. **Section 8.5 Risk Control Options** Provides details of the risk control options relevant to aids to navigation.
j. The procedures that need to be put in place to respond to casualties to the aids to navigation specified by the GLA, within the timescales laid down and specified by the GLA.	✓	**Section 8.5 Risk Control Options** Table 20 provides details of the risk control options relevant to these procedures.
k. The ID marking will conform to a spreadsheet layout, sequential, aligned with SAR lanes and avoid the letters O and I.	✓	**Section 2.3.1 Site Marking** Site marking will adhere to maritime safety guidelines. **Section 8.5 Risk Control Options** Table 20 includes reference to an Aid to Navigation Management Plan.

l. Working lights will not interfere with AtoN or create confusion for the Mariner navigating in or near the OREI.	✓	**Section 2.3.2 Aviation Lighting** Provides an overview of aviation lighting guidance. **Section 8.5 Risk Control Options** Table 20 includes reference to an Aid to Navigation Management Plan.
6. Hydrography - In order to establish a baseline, confirm the safe navigable depth, monitor seabed mobility and to identify underwater hazards, detailed and accurate hydrographic surveys are included or acknowledged for the following stages and to MCA specifications:		
i. Pre-consent: The site and its immediate environs extending to 500m outside of the development area shall be undertaken as part of the licence and/or consent application. The survey shall include all proposed cable route(s).	✓	**Section 8.5 Risk Control Options** Table 21 provides a summary of control measures relevant to 500m safety zones around WTG and construction vessels, including during cable laying.
ii. Post-construction: Cable route(s)	✓	**Section 8.5 Risk Control Options** Table 20 gives reference to periodic cable burial risk assessments.
iii. Post-decommissioning of all or part of the development: Cable route(s) and the area extending to 500m from the installed generating assets area.	✓	**Section 8.5 Risk Control Options** Table 21 provides a summary of control measures relevant to 500m safety zones around WTG and construction vessels, including during cable laying.
Annex 3: MCA template for assessing distances between wind farm boundaries and shipping routes		
"Shipping Route" template and Interactive Boundaries – where appropriate, the following should be determined:		
a. The safe distance between a shipping route and turbine boundaries.	✓	**Section 5.5 Gate Analysis**

		Provides information relating to vessel transits past the Thanet Extension using existing traffic profiles to inform assessment of safe distance. **Section 7.1 Impact on Vessel Traffic Routeing** Provides an overview of the impact the existing Thanet wind farm has had on vessel traffic, and modelling how the Thanet Extension could potentially affect future traffic.
b. The width of a corridor between sites or OREIs to allow safe passage of shipping.	✓	**Section 7.10 Cumulative and In-Combination Impacts** Section 7.10.2 provides information on the cumulative impact on vessel routing between sites.
Annex 4: Safety and mitigation measures recommended for OREI during construction, operation and decommissioning.		
Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the EIA. The specific measures to be employed will be selected in consultation with the Maritime and Coastguard Agency and will be listed in the developer's Environmental Statement (ES). These will be consistent with international standards contained in, for example, the SOLAS Convention - Chapter V, IMO Resolution A.572 (14)[3] and Resolution A.671(16)[4] and **could include any or all** of the following:		
i. Promulgation of information and warnings through notices to mariners and other appropriate maritime safety information (MSI) dissemination methods.	✓	**Section 8.5 Risk Control Options** Table 20 includes details on the promulgation of Information as a mitigation measure adopted for Thanet Extension.
ii. Continuous watch by multi-channel VHF, including Digital Selective Calling (DSC).	✓	**Section 8.5 Risk Control Options** Table 20 includes details on the continuous watch of the site as a mitigation measure adopted for Thanet Extension.

iii. Safety zones of appropriate configuration, extent and application to specified vessels[1]	✓	**Section 8.5 Risk Control Options** Table 21 summarises the application and use of safety zones during construction, operation and maintenance and decommissioning phases as a mitigation measure adopted for Thanet Extension.
iv. Designation of the site as an area to be avoided (ATBA).	✓	**Section 8.5 Risk Control Options** Table 20 summarises the use of aids to navigation to denote the area of the Thanet Extension.
v. Provision of AtoN as determined by the GLA	✓	**Section 8.5 Risk Control Options** Table 20 provides details of AtoN as required by TH and MCA, and in line with IALA requirements.
vi. Implementation of routeing measures within or near to the development.	✓	**Section 8.5 Risk Control Options** Table 20 and Table 21 provide information relating to routeing measures for various stakeholders.
vii. Monitoring by radar, AIS, CCTV or other agreed means	✓	**Section 8.5 Risk Control Options** Table 20 includes details on the continuous watch of the site as a mitigation measure adopted for Thanet Extension.
viii. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of safety zones.	✓	**Section 8.5 Risk Control Options** Table 21 summarises the application and use of safety zones during construction, operation and maintenance and decommissioning phases as a

		mitigation measure adopted for Thanet Extension.
ix. Creation of an Emergency Response Cooperation Plan with the MCA's Search and Rescue Branch for the construction phase onwards.	✓	**Section 7.7 Impact on Search and Rescue** Provides information relating to SAR guidance and requirements for the Thanet Extension, including an Emergency Response Cooperation Plan. **Section 8.5 Risk Control Options** Table 20 specifies that an ERCOP will be drafted in conjunction with MCA/HMCG and other stakeholders.
x. Use of guard vessels, where appropriate	✓	**Section 8.5 Risk Control Options** Table 21 recommends that guard vessels should be considered during the construction operations (including the cable laying) to enforce the 500m safety zones and advise any passing vessels of the works being conducted
xi. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✓	**Section 8.5 Risk Control Options** Table 20 and Table 21 present further mitigation measures for Thanet Extension.
Annex 5: Standards, procedures and operational requirements in the event of search and rescue, maritime assistance service counter pollution or salvage incident in or around an OREI, including generator/installation control and shutdown.		
The MCA, through HM Coastguard, is required to provide SAR and emergency response within the sea area occupied by all offshore renewable energy installations in UK waters. To ensure that such operations can be safely and effectively conducted, certain requirements must be met by developers and operators.		
a. An ERCoP will be developed for the construction, operation and	✓	**Section 7.7 Impact on Search and Rescue** Provides information relating to SAR guidance and requirements for the Thanet Extension,

decommissioning phases of the OREI.		including an Emergency Response Cooperation Plan. **Section 8.5 Risk Control Options** Table 20 specifies that an ERCOP will be drafted in conjunction with MCA/HMCG and other stakeholders.
b. The MCA's guidance document *Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response* for the design, equipment and operation requirements will be followed.	✓	**Section 8.5 Risk Control Options** The applicant will consider guidance within MGN 543.

Appendix 2

Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations

General Comments:

Section	Compliant Yes/No	Comments
A1: Reference Sources - Lessons learned.	✓	A list of guidance documents followed in this assessment is given in **Section 1.3 Guidance**.
B1: Base case traffic densities and types.	✓	Baseline traffic analysis is given in **Section 5 Existing Vessel Traffic and Risk Profile** from a 28-day radar survey.
B2: Future traffic densities and types.	✓	A discussion of possible future traffic profiles is given in **Section 6 Future Traffic Profile.**
B3: The marine environment:		
B3.1 Technical & operational analysis	✓	An overview of the site is given in **Section 2 Thanet Extension Offshore Wind Farm.**
B3.2 Generic TOA	✓	N/A
B3.3 Potential accidents	✓	All relevant hazards identified in **Section 8.2 Hazard Identification** following a review of the data and consultation feedback.
B3.4 Affected navigational activities	✓	All relevant hazards identified in **Section 8.2 Hazard Identification** following a review of the data and consultation feedback.
B3.5 Effects of OREI structures	✓	All relevant hazards identified in **Section 8.2 Hazard Identification** following a review of the data and consultation feedback.
B3.6 Development phases	✓	The assessment has been divided into construction/decommissioning and operational phases due to the two distinct phases of work.
B3.7 Other structures & features	✓	A description of other marine users in the vicinity of the wind farm is contained in **Section 3.6 Other Offshore Activities**. The impacts on these marine

Section	Compliant Yes/No	Comments
		users are described throughout **Section 8 Navigation Risk Assessment.**
B3.8 Vessel types involved	✓	All relevant hazards identified in **Section 8.2 Hazard Identification**
B3.9 Conditions affecting navigation	✓	MetOcean conditions effecting navigation have been identified in **Section 3.3 Metocean Conditions** and have been considered during the risk assessment process.
B3.10 Human actions	✓	The impact of the Human Factor has been considered during the risk assessment process.
C1: Hazard Identification	✓	All relevant hazards identified in **Section 8.2 Hazard Identification.**
C2: Risk Assessment	✓	A risk assessment has been conducted in **Section 8 Navigation Risk Assessment** using the methodology described in **Annex B.**
C3: Influences on level of risk	✓	The scoring of the risk assessment has taken into account the incident data, traffic modelling and consultation feedback to derive likelihoods and causes which are specific to the study area.
C4: Tolerability of risk	✓	The tolerability of the risk assessment results has been considered in **Section 8.6 Results** and concludes the risks are ALARP.
D1 : Appropriate risk assessment	✓	This NRA has been conducted in compliance with the guidance and is proportional to the level of risk at the site. Due to concerns raised by stakeholders, a significant body of additional work has been conducted (navigation simulation and modelling) to build confidence in the assessed level of risk.
D2 : MCA acceptance for assessment techniques and tools	✓	The methodology has been discussed with the MCA and wider stakeholders.

Section	Compliant Yes/No	Comments
D3: Demonstration of results	✓	The results are shown in **Section 8 Navigation Risk Assessment.** Results of analysis that support this result are presented throughout this document and the Simulation technical report.
D4 : Area traffic assessment	✓	A baseline and future case assessment of vessel traffic is contained in **Section 5 Existing Vessel Traffic and Risk Profile** and **Section 7 Impact of Thanet Extension**.
D5 : Specific traffic assessment	✓	A review of impacts on traffic are throughout **Section 7 Impact of Thanet Extension**.
E1 : Risk control log	✓	Risk controls are described in **Section 8.5 Risk Control Options**. Some risk controls have been adopted to reduce the risk to ALARP.
E2 : Marine stakeholders	✓	Consultation with stakeholders has been conducted and is described in **Section 4 Consultation** and **Annex C.** Including the MCA, THLS, PLA, RYA, CoS, Thanet Fishermen, Royal Temple Yacht Club and Port of Ramsgate.
F1 : Hazard identification checklist	✓	All relevant hazards identified in **Section 8.2 Hazard Identification**
F2 : Risk control checklist	✓	Risk controls are described in **Section 8.5 Risk Control Options**