Project Title	Star of the South Offshore Wind Farm Project: Shipping and Navigation
Report Title	**Updated Final Report: 3D Simulation Results**
First Issued	4 February 2022
Updated	23 September 2022 (project vessel data updated)

1 SIMULATION OBJECTIVE

The 2D simulation findings (see Final Report: 2D Simulation Results dated 8 October 2021) highlighted that while 100m vessels could navigate through the Star of the South Offshore Wind Farm Area (OWFA) in good conditions, the risk levels of such vessels significantly increased once weather conditions deteriorated and other vessels were also navigating in the same area.

Feedback received from the Ports and Waterways Safety Assessment (PAWSA) workshop conducted on 14 October 2021 and from industry participants reinforced this finding and the need to clarify a critical issue: If a 100m vessel was too large for safe navigation under all conditions, would smaller vessels be able to safely transit within the OWF area, especially the smaller recreational craft, fishing vessels and some tourism vessels?

For this more detailed analysis, 3D simulation runs were conducted to provide greater clarity on the safety margins required for different vessel sizes under different weather and marine traffic conditions. The objective was to evaluate how vessel sizes typical of those transiting the OWFA would behave under a defined set of simulation scenarios based on the indicative wind farm layout.

Figure 1 shows the location of the wind farm in relation to the east and west bound shipping routes, the traffic separation schemes (TSS), and oil and gas fields inside the Area To Be Avoided. These areas have been officially adopted by the International Maritime Organization (IMO), and ships operating in or near the TSS must comply with international maritime collision regulations. A sample snapshot of AIS marine traffic density in the area is also shown in the Figure 1.

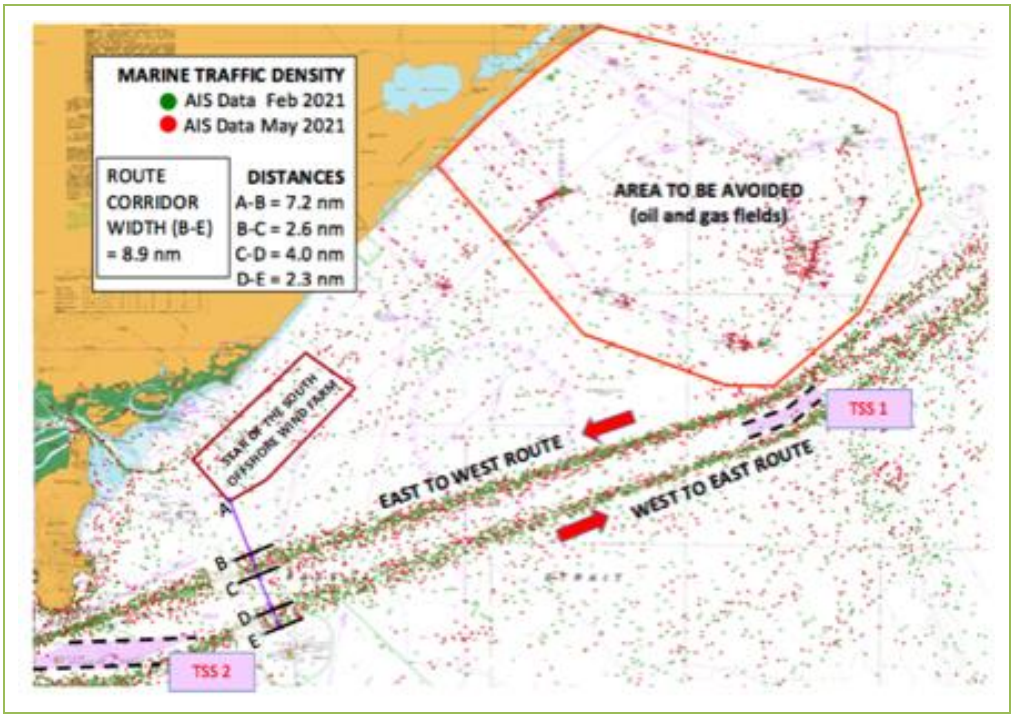


Figure 1. General vicinity of the OWFA

2 METHODOLOGY

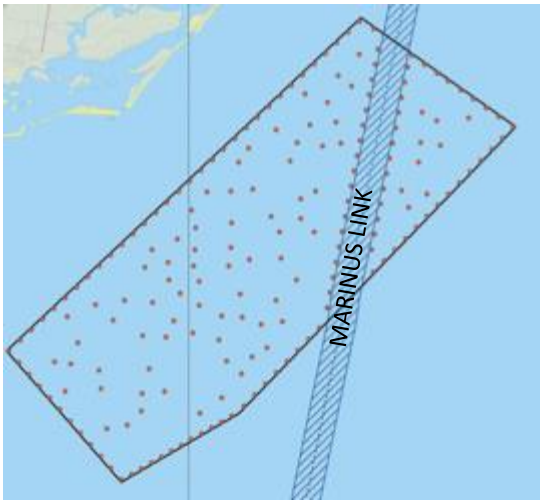
SIMULATION AREA

For consistency and reliability, the 3D simulation used the same hydrodynamic model of the OWF area as that used for the 2D simulation, including collision boundaries for the wind turbine rotor blades so that breaches would be detected and the use of charted and radar maps with Furuno Type-Approved ECDIS, Radar and AIS navigation equipment during navigation. It was also assumed that as per maritime regulations, temporary exclusions would be requested and established where and when there was construction activity, with Notices to Mariners published in a timely manner. As such, it was not expected that vessels transiting through the area would necessarily have to avoid project vessels or vice versa where the Collision Regulations may require vessels to take appropriate actions.

SIMULATION SCENARIO

The parameters shown in Table **Error! No text of specified style in document.**1 were used for the 3D simulation.

*Table **Error! No text of specified style in document.**1 Parameters and inputs used for the 3D simulation*

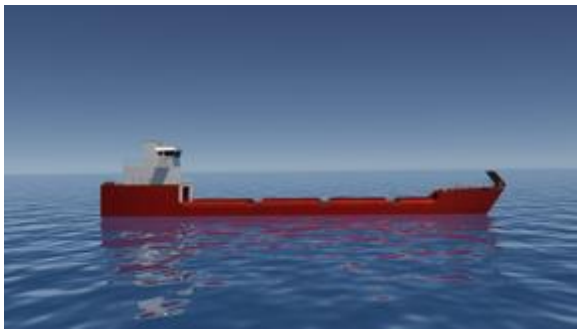
<table>
<tr><td colspan="4">1. Simulated Environment</td></tr>
<tr><td colspan="4">Bass Strait off Gippsland Coast – vicinity of Star of the South Offshore Wind Farm (OWF)</td></tr>
<tr><td colspan="4">2. OWF Layout</td></tr>
<tr><td>Farm layout</td><td>Indicative layout
200 x small turbines</td><td colspan="2" rowspan="5"> 
</td></tr>
<tr><td>Wind turbine generators (WTG)</td><td>200</td></tr>
<tr><td>WTG dimensions</td><td>Tip height: 245m
Hub height: 135m
Rotor blade diameter: 220m</td></tr>
<tr><td>WTG spacing</td><td>Min: 820m</td></tr>
<tr><td>Excluded from simulation</td><td>• Substations, ocean data acquisition system (ODAS) buoys, cables between WTGS
• Marine mammals
• Sailing vessels</td></tr>
<tr><td colspan="4">3. Simulation Variables</td></tr>
<tr><td colspan="2">Vessel Manoeuvring Plan</td><td colspan="2">Environmental Conditions</td></tr>
<tr><td colspan="2">Easterly/North easterly through OWF</td><td colspan="2">Day/Night</td></tr>
<tr><td colspan="2">North easterly in main shipping route</td><td colspan="2" rowspan="2">Calm weather (no wind, minimal ocean currents/tides, less that 1m waves)</td></tr>
<tr><td colspan="2">Emergency Situations</td></tr>
<tr><td colspan="2">Exit Westerly side of OWF</td><td colspan="2" rowspan="2">Moderate weather (15 knot winds and gusting, waves above 1.5m with strong ocean currents/tides)</td></tr>
<tr><td colspan="2">Loss of main engines/power in OWF</td></tr>
<tr><td colspan="2">Loss of rudders in OWF</td><td colspan="2" rowspan="2">Poor weather (25 knot winds and above and gusting, waves above 3m with strong currents/tides)</td></tr>
<tr><td colspan="2" rowspan="2">Loss of main engines/power in main shipping route heading North easterly</td></tr>
<tr><td colspan="2">Marine Traffic</td><td colspan="2"></td></tr>
<tr><td colspan="2" rowspan="3">Loss of rudders in main shipping route heading North easterly</td><td>No traffic</td><td>High traffic in close proximity</td></tr>
<tr><td colspan="2">Passing/crossing traffic, with project vessels</td></tr>
<tr><td colspan="2">Mixed traffic (passing/crossing, different vessel types)</td></tr>
</table>

4. Vessel Sizes Modelled

Type	ID	LOA Length Overall	LBP Length Between Perpendiculars	Beam	Displace-ment	Draft
1. Fishing Trawler	Trw01	74.7m	68m	13.8m	2766t	6.3m
2. Roll on Roll off (58m)	LCT58	58.1m	55.8m	11m	1429t	2.9m
3. Roll on Roll off (45m)	LCT45	45m	43m	10.9m	908t	2.5m
4. Super Yacht	FB223	38.5m	36m	8.9m	392t	2.45m
5. Catamaran	BellExp	36.4m	35m	10.4m	107.1t	1.18m
6. Fishing Boat	Blue Jay	25m	23.5m	7m	284t	2.5m
7. Rigid Hull Inflatable Boat	RHIB	6m	5.5m	3m	1.7t	0.5m

Fishing Trawler (75m)

Roll on Roll Off (2 sizes: 58m, 45m)



Super Yacht (39m)

Catamaran (36m)

Fishing Boat (25m)

Rigid Hull Inflatable Boat (6m)

5. Simulation Setup and Navigator Experience
3 networked simulators, each operated by a navigator
6 navigators, with varying levels of expertise
Vessel type matched with navigator's skill/experience level
Simulation variables used in 2D simulation replicated in 3D simulation
6. Navigational Equipment Mix
Full navigational equipment included ECDIS, Radar, GPS, AIS, autopilot and manual steering, navigational instruments (wind, course heading, rate of turn etc) and navigational conning controls
Navigational equipment was matched to the typical equipment for each vessel size
On some simulation runs, no electronic navigational equipment (Radar, ECDIS, GPS, AIS) was provided and navigators had to use visual navigation only

SOTS PROJECT VESSELS

Project vessels are categorised into three groups: construction feeder vessels, construction management vessels, and operation and maintenance vessels. Construction feeder vessels and construction management vessels operate during the construction phase of the project; operations and maintenance vessels during the operations and maintenance phase of the project. It is assumed that there is no overlap between construction activities and operation and maintenance activities; that is, construction vessels will be in the wind farm area first, and once construction is completed, operations and maintenance vessels will operate in the area.

Vessel numbers provided in Table 2 are based on the *Updated vessel numbers August 2022 for EIA.xlsx* and related correspondence with project personnel. Vessel numbers per day under a worst case scenario have been added for simulation purposes; these numbers represent the maximum number of vessels operating in the wind farm area on any given day. In the construction phase, for instance, as many as 25 project vessels may be present at the same time; however, construction operations are expected to be protected inside temporary safety zones and mariners duly advised of their presence through Notices to Mariners.

Table 2 Project vessels during the construction phase

CONSTRUCTION FEEDER VESSELS			
Vessel Types	Pivot Sim Run Estimate	RPS SOTS Data	Pivot Sim Run Estimate
	Number of Vessels	Vessel Movements over 4.8 years	Worst Case Scenario Vessels Per Day
1. FOU installation	1	50	5
2. Wind turbine installation	1	50	
3. Trench installation	1	30	
4. Cable installation	1	30	
5. Subsea rock installation	1	300	
6. FOU delivery	1	100	
7. Wind turbine delivery	1	150	
8. Cable delivery	1	20	
TOTAL		730	

Notes:

1. Vessels will be used at different phases of construction, hence, annual vessel movements are not appropriate
2. As per maritime regulations, temporary safety zones under the *Offshore Renewable Energy Act 2021* (OEI Act) are expected to be requested and established where and when there is construction activity, with Notices to Mariners published in a timely manner
3. Vessel numbers are estimates and reflective of the maximum design scenario. Final numbers will be available

once detailed design and procurement is completed.				
CONSTRUCTION MANAGEMENT VESSELS				
DESTINATION PORT	**Vessel Type**	**Total Vessel Movements (4.8 years)**	**Vessel Movements Per Year (rounded)**	**Worst Case Scenario Vessels Per Day**
Port of Hastings	Support vessels (1)	150	31	2
	Remote operated vessels (2)	150	31	2
	Crew transfer vessels (CTVs) (3)	7,338	1,529	6
	Total Hastings	7,638	1,591	10
OR				
Barry Beach Marine Terminal & Port Anthony Marine Terminal	Support vessels (1)	150	31	2
	Remote operated vessels (2)	150	31	2
	Crew transfer vessels (CTVs) (3)	7,338	1,529	6
	Total BBMT/PA	7,638	1,591	10
			Total in OWF area (worst case)	10
Basis: (1) & (2) No vessel numbers provided; estimate maximum of 2 per day for worst case (3) 6 CTVs x 7 days x 52 weeks = 2184, 70% working per year = 1529				

Table 3 Project vessels during the operations phase

OPERATION AND MAINTENANCE VESSELS				
DESTINATION PORT	**Period**	**Number of Vessels**	**Vessel Movements Per Year**	**Worst Case Scenario Vessels Per Day**
Port of Hastings		4	208 (1)	4
OR				
Barry Beach Marine Terminal & Port Anthony Marine Terminal	Summer campaign (October-March)	6	765 (2)	6
	Outside campaign (April-September)	3	382 (3)	3
	Total	9	1,147	
			Total in OWF area (worst case – using summer campaign)	6
Basis: (1) 4 per week x 52 weeks = 208 (2) 6 CTVs x 7 days x 26 weeks = 1092, 70% working per year = 765 (3) 3 CTVs x 7 days x 26 week = 546, 70% working per year = 382				

NON-PROJECT VESSELS

Based on AMSA AIS marine traffic data and consultations with key stakeholders on non-AIS vessels (for instance, recreational, fishing, NSCFV smaller commercial vessels), , Table 4 shows the marine traffic density of non-project vessels within a 1 nautical mile radius in the offshore wind farm area. The 1 nautical mile rule is often used as a guide for ensuring good visibility where vessels need to take appropriate collision avoidance actions.

Table 4 Number of non-project vessels

Environmental Conditions	Max Number of Vessels within 1 nautical mile
Good weather condition and heavy traffic	15
Night time	5
Poor weather conditions	7

SIMULATION RUNS

A total of 21 simulation runs were conducted for each vessel modelled, with each set of runs based on the simulation parameters provided in Table 5.

Table 5 Simulations

NPV = Non-Project Vessels	CFV = Construction Feeder Vessel	CMV-H = Construction Management Vessel - Hastings	CMV-B/A = Construction Management Vessels - BBMT/PA

Run No	Environmental Conditions	Operational Conditions	Manoeuvring Plan (Transit through OWF)	Starting Speed, Heading & Position
1	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Easterly	Variable range
2	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Northeasterly	Variable range
3	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Northeasterly	Variable range
4	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Easterly	Variable range
5	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Easterly	Variable range
6	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Northwesterly	Variable range
7	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Southeasterly	Variable range

NPV = Non-Project Vessels	CFV = Construction Feeder Vessel	CMV-H = Construction Management Vessel - Hastings	CMV-B/A = Construction Management Vessels - BBMT/PA

Run No	Environmental Conditions	Operational Conditions	Manoeuvring Plan (Transit through OWF)	Starting Speed, Heading & Position
8	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Southeasterly	Variable range
9	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port Only navigational equipment available was radar	Southeasterly	Variable range
10	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Southeasterly	Variable range
11	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Southeasterly	Variable range
12	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Southeasterly	Variable range
13	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Southeasterly	Variable range
14	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Easterly	Variable range
15	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Easterly	Variable range

NPV = Non-Project Vessels	CFV = Construction Feeder Vessel	CMV-H = Construction Management Vessel - Hastings	CMV-B/A = Construction Management Vessels - BBMT/PA

Run No	Environmental Conditions	Operational Conditions	Manoeuvring Plan (Transit through OWF)	Starting Speed, Heading & Position
16	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Southeasterly	Variable range
17	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Southeasterly	Variable range
18	Day Heavy rain 500m visibility 2m waves 2.5kt current SW 25kt W wind with 10% Gust	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Southeasterly	Variable range
19	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Emergency: Loss of engines	Variable range
20	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Emergency: Loss of rudder	Variable range
21	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Emergency: Loss of engines and rudder	Variable range
Starting speeds, headings and positions varied, depending on vessel type. Starting speeds ranged from 12-33 knots and headings from 65˚T to 120˚T. Starting positions for all vessels were varied. All vessels were assumed to be loaded.				

3 SIMULATION RUN RESULTS

For each simulation run, vessel performance was assessed in terms of ship handling control, vessel speed control and manoeuvring control. This was also assessed in terms of the overall navigational space available for collision avoidance of other vessels and individual wind farm turbines. As per the safety guidelines outlined by the Permanent International Association of Navigational Congresses (PIANC, 2018), the full manoeuvrability of vessels required at least 6 boat lengths.

Each vessel type and size was operated by a navigator with similar experience to that expected for that particular each vessel. For example:

- Recreational rigid hull inflatable boat had a navigator with a recreational boat licence and level of experience.
- Fishing vessel/super yacht/catamaran had a navigator with NSCFV qualifications and experience.
- RoRo vessels and fishing trawler with a navigator had STCW and STCW(Fishing) qualifications and experience.

Based on results, the risk posed by each run was rated from 1-10 with 1 as very low risk to 5 as moderate risk to 10 as extreme risk. To be considered as a successful run, the risk level had to be below 5.

Table 6 provides a detailed description of all simulation runs and their results by vessel type.

Table 6 Simulation Results by Vessel Type

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	TR01	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	TR01	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	TR01	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	TR01	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	3	Run successful?	Y	
								Findings	Wandered similar to run 4 but comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
5	TR01	Night	5 NPV	Loaded	13kt 65°	Lat 38°52.5	Navigate	Risk Rating	3	Run successful?	Y	

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
		25kt W wind, with 20% gust 3m waves 2kt SW current	5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)			Lon 146°45	Easterly through OWF	Findings	Wandered a lot more than run 4 due to compensating for environment conditions (wind, current, etc) but still comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	TR01	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar		13kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	TR01	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar		13kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
8	TR01	Day	15 NPV		13kt 120°	Lat 38°46.5	Navigate	Risk Rating	3	Run successful?		Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
		1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar			Lon 146°53.7	Southeasterly through the OWF	Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	TR01	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar		13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	5	Run successful?		Y
								Findings	With low visibility the risk is higher without good navigation equipment as it's more challenging to position vessel within the available space and avoid other vessels.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	TR01	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar		13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?		Y
								Findings	Successful run but with radar only was more challenging.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
11	TR01	Day	High traffic		13kt 120°	Lat 38°45.72	Navigate	Risk Rating	3	Run successful?		Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
		1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A			Lon 146°51.9	Southeasterly through the OWF	Findings	Successful run but required good situational awareness of			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	TR01	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	5	Run successful?		Y
								Findings	Successful run but needed good situational awareness and early course alternations to avoid other vessels with sufficient space.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	TR01	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	5	Run successful?		Y
								Findings	Successful run but need early course changes to avoid other vessels.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	TR01	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	13kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Successful run but needed a lot more concentration than during the day.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
15	TR01	Day	15 NPV	Loaded	13kt 90°	Lat 38°45	Navigate	Risk Rating	1	Run successful?		Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
		Clear visibility No wind 1.5kt SW current Calm seas	5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)			Lon 146°49	Easterly through OWF	Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	TR01	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	13kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	TR01	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	5	Run successful?		Y
								Findings	Successful run but required high level of concentration to avoid other vessels.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	TR01	Day Heavy rain 500m visibility 2m waves 2.5kt current SW 25kt W wind with 10% Gust	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	13kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	5	Run successful?		Y
								Findings	This run highlighted even more the significance of good navigational equipment and early course changes.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
19	TR01	Day	No traffic	Loaded	16.5kt 90°	Lat 38°46.39	Emergency:	Risk Rating	4	Run successful?		Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 1	75M FISHING TRAWLER		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
		500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves				Lon 146°53.09	Loss of engines	Findings	Anchors deployed ok but some anchor dragging			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	TR01	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	16.5kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors deployed ok and used engines to help maintain position			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	TR01	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	16.5kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engines and rudder	Risk Rating	5	Run successful?		Y
								Findings	Anchors needed 20 shackles to stop drift resulting in reduced navigational space.			
								R	E	T	SC	MC
								X	X	-	X	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	LCT58	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	LCT58	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	14kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	LCT58	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	LCT58	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Wandered more than day runs but comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
5	LCT58	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	4	Run successful?		Y
								Findings	Wandered similar to run 4 due to compensating for environment conditions (waves, wind, current, etc).			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	LCT58	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded	14kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	LCT58	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	14kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?		Y
								Findings	Successful run but less navigational space available			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
8	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	3	Run successful?		Y
								Findings	Successful run but required good situational awareness			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
11	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run but required good situational awareness of other traffic			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?	Y	
								Findings	Successful run but required good situational awareness of other traffic and available navigable space			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?	Y	
								Findings	Successful run but like run 12, had less navigational space available for collision avoidance			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	LCT58	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
15	LCT58	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	LCT58	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	14kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	3	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	LCT58	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?		Y
								Findings	Successful run but needed to take much earlier collision avoidance action and had less navigable space to manoeuvre			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	LCT58	Day 6000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	4	Run successful?		Y
								Findings	Successful run but not enough navigational space, similar to run 17			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 2	58M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
19	LCT58	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	12kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of engines	Risk Rating	4	Run successful?		Y
								Findings	Anchors deployed ok but dragging anchor			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	LCT58	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	12kt 90°	Lat 38˚46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors deployed ok but had to use engines to steady vessel			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	LCT58	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 90°	Lat 38°46.39 Lon 146°53.05	Emergency: Loss of engines and rudder	Risk Rating	5	Run successful?		Y
								Findings	Anchors deployed ok but dragging anchor.			
								R	E	T	SC	MC
								X	X	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	LCT45	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	LCT45	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	14kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	LCT45	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	10kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	LCT45	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Wandered more than day runs but comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
5	LCT45	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	10kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Wandered a lot more due to compensating for environment conditions (wind, current, etc)			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	LCT45	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded	14kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	LCT45	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	14kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
8	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
11	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run but required good situational awareness of other traffic and available navigable space			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run, similar to run 11			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	LCT45	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run, similar to run 12			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	LCT45	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	10kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
15	LCT45	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	14kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	LCT45	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	14kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	LCT45	Day 1000m visibility 25kt W wind with 10% Gust 2.5kt SW current 2m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but required good situational awareness of other traffic and available navigable space			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	LCT45	Day Heavy rain 500m visibility 25kt W wind with 10% Gust 2.5kt SW current 2m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	10kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but similar to run 17			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 3	45M RORO		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
19	LCT45	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	10kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of main engines while transiting through OWF	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok but required a lot of chain to hold			
								R	E	T	SC	MC
								Y	X	Y	Y	Y
20	LCT45	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	10kt 90°	Lat 38°46.22 Lon 146°53.09	Emergency: Loss of rudder while transiting through OWF	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok but good use of engines to hold position			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	LCT45	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	10kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engine and rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors deployed ok but used a lot of chain to hold position			
								R	E	T	SC	MC
								X	X	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	FB223	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	18kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	FB223	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	18kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	FB223	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	FB223	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	18kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
5	FB223	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Wandered a lot more due to compensating for environment conditions (wind, current, etc) but still comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	FB223	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded	18kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	FB223	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
8	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
11	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but more traffic required good collision avoidance techniques			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but similar to run 11, need good collision avoidance techniques			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but similar to run 12			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	FB223	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	12kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
15	FB223	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	18kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	FB223	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	18kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	FB223	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	FB223	Day 6000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	12kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 4	38M SUPER YACHT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
19	FB223	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	12kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of engines	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok with some anchor dragging			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	FB223	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	12kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok with engines able to steady vessel positioning			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	FB223	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	12kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engines and rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors deployed ok with some dragging			
								R	E	T	SC	MC
								X	X	-	X	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	BellExp	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	25kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	BellExp	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	25kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	BellExp	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	15kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	BellExp	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	25kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run with good tracking			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
5	BellExp	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	15kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Successful run but some compensation of heading needed to maintain a steady course.			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	BellExp	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded	25kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	BellExp	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	25kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
8	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
11	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run but required good situational awareness of other traffic			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run but similar to run 11			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run, but similar to run 11			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	BellExp	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	25kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
15	BellExp	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	25kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	BellExp	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	25kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	BellExp	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	BellExp	Day Heavy rain 500m visibility 25kt W wind with 10% gust 2.5kt SW current 2m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	15kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 5	36M CATAMARAN		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
19	BellExp	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	15kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of engines	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	BellExp	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	15kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	BellExp	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	15kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engines and rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors deployed ok but had to let out a lot of chain			
								R	E	T	SC	MC
								X	X	-	X	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	Blue Jay	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	Blue Jay	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	Blue Jay	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	9kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	Blue Jay	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	13kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
5	Blue Jay	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded	9kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Some cross tracking to compensate for weather conditions but still comfortable			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	Blue Jay	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded	13kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	Blue Jay	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded	13kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
8	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar		9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
9	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
10	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y	
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
11	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	Blue Jay	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A		9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	Blue Jay	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	9kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
15	Blue Jay	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded	13kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	Blue Jay	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded	13kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	Blue Jay	Day 1000m visibility 25kt W wind with 10% Gust 2.5kt SW current 2m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	Blue Jay	Day Heavy rain 500m visibility 25kt W wind with 10% Gust 2.5kt SW current 2m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded	9kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony

Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 6	25M FISHING BOAT		Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
19	Blue Jay	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	13kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of engines	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	Blue Jay	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded	13kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed with engine assistance			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	Blue Jay	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded	13kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engines and rudder	Risk Rating	3	Run successful?		Y
								Findings	Anchors needed 20 shackles to stop drift			
								R	E	T	SC	MC
								X	X	-	X	Y

NPV = Non-Project Vessels | CFV = Construction Feeder Vessels | CMV-H = Constructional Management Vessels – Hastings | CMV-B/A = Construction Management Vessels – Barry Beach/Port Anthony		
Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk	Run successful? Y = Successful | NO = Unsuccessful	Findings: Summary of key activities/procedures & results
Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control		Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
1	RHIB	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded (passengers and equipment/ luggage)	30kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
2	RHIB	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded (passengers and equipment/ luggage)	30kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
3	RHIB	Day 25kt W wind, with 20% gust 2.5kt NE current 3m waves 500m visibility	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded (passengers and equipment/ luggage)	18kt 65°	Lat 38°52.5 Lon 146°45	Navigate Northeasterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
4	RHIB	Night Clear visibility No wind Minimal current Calm seas	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded (passengers and equipment/ luggage)	30kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run but not as easy as daytime			
								R	E	T	SC	MC
								Y	Y	Y	Y	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	**Vessel ID**	**Environmental Conditions**	**Operational Conditions**	**Vessel Ballasted/ Loaded**	**Vessel Starting Speed & Heading**	**Start Position**	**Manoeuvring Plan**	**RESULTS/COMMENTS (See Legend below)**				
5	RHIB	Night 25kt W wind, with 20% gust 3m waves 2kt SW current	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS and navigation instruments)	Loaded (passengers and equipment/ luggage)	18kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Successful run but had to compensate more given weather conditions			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
6	RHIB	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1, then 1) port to port Only navigational equipment available was radar	Loaded (passengers and equipment/ luggage)	30kt 280°	Lat 38°49.2 Lon 146°55.8	Navigate Northwesterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
7	RHIB	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded (passengers and equipment/ luggage)	30kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM					
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)					
8	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port Only navigational equipment available was radar	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°46.5 Lon 146°53.7	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?	Y		
								Findings	Successful run				
								R	E	T	SC	MC	
								Y	Y	-	Y	Y	
9	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing other vessels (1 then 1) port to port. Only navigational equipment available was radar	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?	Y		
								Findings	Successful run				
								R	E	T	SC	MC	
								Y	Y	-	Y	Y	
10	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 crossing vessels on starboard side Only navigational equipment available was radar	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?	Y		
								Findings	Successful run				
								R	E	T	SC	MC	
								Y	Y	-	Y	Y	

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
11	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
12	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful RUn			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
13	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
14	RHIB	Night 25kt W wind, with 20% gust 2kt SW current 3m waves	5 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded (passengers and equipment/ luggage)	18kt 65°	Lat 38°52.5 Lon 146°45	Navigate Easterly through OWF	Risk Rating	3	Run successful?		Y
								Findings	Less experienced navigators found it more different at night			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
15	RHIB	Day Clear visibility No wind 1.5kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Full navigation equipment (radar, AIS, ECDIS, GPS, navigation instruments)	Loaded (passengers and equipment/ luggage)	30kt 90°	Lat 38°45 Lon 146°49	Navigate Easterly through OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
16	RHIB	Day Clear visibility No wind 1kt SW current Calm seas	15 NPV 5 CFV 10 CMV-H 10 CMV-B/A Passing 2 vessels port to port	Loaded (passengers and equipment/ luggage)	30kt 120°	Lat 38°48.8 Lon 146°53.18	Navigate Southeasterly through the OWF	Risk Rating	1	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
17	RHIB	Day 1000m visibility 25kt W wind with 10% gust 2.5kt SW current 2.5m waves	High traffic 15 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run			
								R	E	T	SC	MC
								Y	Y	-	Y	Y
18	RHIB	Day Heavy rain 500m visibility 2.5kt current SW 25kt W wind with 10% gust 2m waves	7 NPV 5 CFV 10 CMV-H 10 CMV-B/A Navigating through a high traffic area	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°45.72 Lon 146°51.9	Navigate Southeasterly through the OWF	Risk Rating	2	Run successful?		Y
								Findings	Successful run. However, less experienced navigators found it more challenging with restricted visibility			
								R	E	T	SC	MC
								Y	Y	-	Y	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

Shiphandling control: R = Port/Starboard Rudders | E = Port/Starboard Engines | T = Bow Thrusters | SC = Vessel Speed Control | MC = Manoeuvring Control | Y = Well used & controlled | X = insufficient use and/or control

SIMULATION RUNS RESULTS			Vessel 7	6M RIGID HULL INFLATABLE BOAT			Location	STAR OF THE SOUTH OFFSHORE WIND FARM				
Run No	Vessel ID	Environmental Conditions	Operational Conditions	Vessel Ballasted/ Loaded	Vessel Starting Speed & Heading	Start Position	Manoeuvring Plan	RESULTS/COMMENTS (See Legend below)				
19	RHIB	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded (passengers and equipment/ luggage)	18kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of engines	Risk Rating	1	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								Y	X	-	Y	Y
20	RHIB	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	No traffic	Loaded (passengers and equipment/ luggage)	18kt 90°	Lat 38°46.39 Lon 146°53.09	Emergency: Loss of rudder	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								X	Y	-	Y	Y
21	RHIB	Day 500m visibility 30kt W wind with 10% gust 2.5kt current 3.5m waves	With traffic 7 NPV 5 CFV 10 CMV-H 10 CMV-B/A	Loaded (passengers and equipment/ luggage)	18kt 120°	Lat 38°46.22 Lon 146°52.89	Emergency: Loss of engines and rudder	Risk Rating	2	Run successful?		Y
								Findings	Anchors deployed ok			
								R	E	T	SC	MC
								X	X	-	Y	Y

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Risk rating scale: 1 = Very low risk | 5 = Moderate risk | 10 = Extreme risk | Run successful? Y = Successful | NO = Unsuccessful | Findings: Summary of key activities/procedures & results

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4 SIMULATION FINDINGS

Findings are presented by (a) vessel type and size and (b) overall findings.

FINDINGS BY VESSEL TYPE AND SIZE

75m Fishing Trawler: Night transit, light traffic, calm weather

Simulation runs for the 75m fishing trawler were low risk during the day with good visibility and weather conditions and limited marine traffic. This was still the case during night time simulation runs when the vessel had good navigation equipment. However, the vessel did wander a lot more compared to during the day with good visibility.

Emergencies in good weather conditions and limited marine traffic resulted in low risks. However, this was not the case in poor weather conditions and increased marine traffic in the area. Even when anchors were deployed, during poor sea conditions, a lot of anchor chain was used and with anchor dragging present, the amount of available navigational space was limited resulting in higher operational risk.

As soon as there were poor weather conditions with a mix of heavy marine traffic within confined areas, the level of operational risk increased significantly, with greater situational awareness required. The navigational space under these conditions often were less than 5 vessel lengths and required a good balance between maintaining a good course and distance between wind farm turbines and other vessels.

58m RoRo Vessel: Heavy crossing traffic mix, poor weather

Similar to the 75m fishing trawler, there was low risk for the 58m RoRo during ideal conditions during the day when there was good visibility and weather conditions and limited marine traffic. Whilst night time simulation runs did result in more wandering off track, especially when the sea conditions worsened, the risk level was still considered to be reasonably low and good navigational equipment used resulted in more accurate tracks and navigational space.

However, with poor weather conditions and a heavy mix of marine traffic in more confined areas, the level of operational risk increased and often resulted in less navigational space for collision avoidance. In quite a number of simulation runs, the vessel often had less than 6 vessel lengths for collision avoidance with other vessels and for wind farm turbines to avoid.

Emergency situations from loss of engines and rudder were a lot more manageable in good weather conditions but anchor dragging in poor sea conditions resulted in less navigational space which increased the operational risk under these circumstances.

45m RoRo Vessel: Passing traffic in close proximity, poor weather

The 45m RoRo had manoeuvrability in both ideal conditions and poor weather conditions. Even with heavy marine traffic in close proximity, the vessel had sufficient navigational space in excess of 6 vessel lengths to avoid other vessels. In emergency situations of loss of engines and rudder, the vessel was able to successfully drop anchor with sufficient navigational distance between wind farm turbines.

38m Super Yacht: Heavy marine traffic mix, poor weather

The 38m Super Yacht had good manoeuvrability to navigate through the OWF area in both ideal and poor weather conditions. Having good navigational equipment and with no marine traffic in the area, good use of the autopilot gave steady navigation tracks and space between wind farm turbines. The vessel also had good manoeuvrability for collision avoidance even in heavy marine traffic conditions and was able to maintain more than 6 vessel lengths in all collision avoidance situations. While there was some anchor dragging in the emergency engines and rudder failures, the vessel was able to maintain good navigational control.

36m Catamaran: Crossing traffic, poor weather

Results for the 36m Catamaran were very similar to the 38m Super Yacht, except that the 36m Catamaran was a lot more manoeuvrable. In both ideal and poor weather conditions, the vessel was able to successfully maintain good course headings, giving ample navigational space for other marine traffic in collision avoidance and between wind farm turbines. Even in restricted visibility and heavy marine traffic within close quarter situations, the 36m Catamaran had ample safety margin to keep clear of other vessels and wind farm turbines. However, under these conditions, good situational awareness was needed.

Emergency situations were well managed even with loss of rudder and engines when the vessel was operating at a prudent speed for the weather conditions and the level of marine traffic in the vicinity. If, however, the vessel used excessive speed within the wind farm area, this increased potential navigational risk. For example, at speeds above 30 knots, and taking into consideration navigator reaction and collision avoidance decision making time, such a vessel would require at least 300m to do a crash stop which would be insufficient navigational space if transiting between wind farm turbines and avoiding other vessels within the same navigational space, especially during heavy traffic situations.

25m Fishing Boat: Heavy marine traffic mix, poor weather

The 25m Fishing Boat was able to safety navigate through the wind farm area in both ideal and poor weather conditions. The vessel also had ample manoeuvrability to avoid other marine traffic and wind farm turbines at safe distances. The use of good navigation equipment (Radar, ECDIS, AIS, GPS, navigational instruments and conning controls) provided significant safety margins especially in restricted visibility and poor weather conditions. Emergency situations with loss of rudder and engines were well managed and even with other marine traffic in the vicinity, the operational risk was considered to be low.

6m Rigid Hull Inflatable Boat: Crossing traffic, calm weather

The 6m rigid hull inflatable boat was the most manoeuvrable of all vessels simulated and has ample navigational space to avoid other marine traffic and wind farm turbines. It achieved this in all conditions from ideal to poor weather conditions to heavy marine traffic. Even with emergencies from loss of rudder and engines, the vessel was able to safely manoeuvre. However, whenever navigators did not have full access to navigation equipment (radar, ECDIS, AIS, GPS, navigational instruments and conning controls) and had radar only, the less experienced navigators found it more challenging especially at night, poor weather, and restricted visibility conditions. Speed control in poor weather conditions was also evident from the less experienced navigators who tended to have higher speeds than those with more experience.

OVERALL FINDINGS

FINDING 1

During ideal conditions (calm weather, good visibility, good navigation equipment, no other marine traffic to avoid or share navigational space), all 7 vessel sizes were able to safely navigate through and around the OWF area

FINDING 2

Whenever vessels had to share the same navigational space between wind turbine clusters, greater situational awareness was required especially under the following conditions:

- Restricted visibility below 1,000 metres
- 2.5m waves, strong tides and winds above 25 knots
- Concentrated marine traffic mix (passing, crossing or drifting) and heavier marine traffic sharing limited navigational space

FINDING 3

Navigating at night through the optimised irregular wind farm layout required both good situational awareness and navigational skills by navigators.

Those who did not have the same experience/skill level as experienced mariners found it difficult especially when they did not have access to navigation equipment like radar or electronic charts. These navigators questioned whether they would ever do this at night especially given the irregular layout of the turbines. However, for ships within the main shipping route, the navigational lighting of the OWF provided a clear identification of the OWF area and navigators did not have any navigational light issues relating to their course heading either in a West or East direction.

FINDING 4

Overall, the indicative layout required navigators to have a high level of situational awareness, especially in areas where smaller triangular turbine clusters were present and visibility was restricted. Greater caution was required whenever visibility was less than 1,000 metres.

FINDING 5

Navigating through the OWF was more challenging for those vessels which were not given good navigation and communications equipment especially radar, electronic charts and VHF radio communications.

FINDING 6

Whenever there was a lot more marine traffic in the same navigational space, there was a tendency to focus more on avoiding other vessels than balancing between other vessels and individual wind turbines to avoid. This was a lot more common for those with less experience when they came too close to the wind turbines and had to take more evasive action as a result.

FINDING 7

Both the 75m and 58m vessels were not able to safely manoeuver under all simulated conditions. Whenever there was too much marine traffic, particularly crossing marine traffic, and the wind turbine cluster was tight and visibility was 1,000m or less, the vessel did not always have 6 vessel lengths as per PIANC guidelines for good manoeuvrability and collision avoidance. This was particularly the case when the action was to avoid another vessel of similar size and manoeuvrability.

FINDING 8

All vessels 45m and less were able to safely navigate under a range of simulated variables including restricted visibility, poor sea and weather conditions, concentrated marine traffic situations, mixed range of navigator skills levels, and navigation equipment used.

With prudent navigation and depending on how much navigational space within a particular wind turbine cluster, these vessels had the manoeuvrability to cope with changing circumstances with sufficient safety and manoeuvring reserve capability remaining.

These vessels met the PIANC guidelines of 6 vessel lengths for vessel to manoeuvrability and full turning circle capability.