

From: [Alexandra Dillistone](#)
To: [Thanet Extension](#)
Cc: ["James Trimmer"; "Cathryn Spain"; "Helena Payne"; \[REDACTED\]; \[REDACTED\]"; "ian.lord@estuarieservices.co.uk"; Samantha Woods](#)
Subject: Thanet Extension - PLA and ESL - Deadline 4C
Date: 10 April 2019 19:28:05
Attachments: [image002.png](#)
[PLA and ESL deadline 4C submission.pdf](#)

Dear Kate,

On behalf of my clients, PLA and ESL, please find attached our Deadline 4C submission.

As you know, the accompanied site visit is scheduled to take place on 15 April at the Port of Tilbury and London Gateway; my clients would like a representative to attend this visit and I would be grateful if you could confirm arrangements for the day.

Kind regards,

Alex

Alexandra Dillistone
Partner

Winckworth
Sherwood

www.wslaw.co.uk

T +44 (0) 203 735 1898
F +44 (0) 20 7593 5099
adillistone@wslaw.co.uk

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Winckworth Sherwood
Minerva House | 5 Montague Close | London | SE1 9BB | DX 156810 London Bridge 6
T 020 7593 5000 | F 020 7593 5099
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INFRASTRUCTURE PLANNING
THE INFRASTRUCTURE PLANNING (EXAMINATIONS PROCEDURE) RULES 2010
THE THANET EXTENSION OFFSHORE WIND FARM ORDER

**Deadline 4C submission on behalf of the Port of London Authority and Estuary
Services Limited**
(Rule 8 letter 18 December 2018)

Unique Reference Number	EN010084
Document Ref.	PLA 15/ ESL 15
Author	Winckworth Sherwood LLP
Date	10 April 2019

Minerva House
5 Montague Close
London
SE1 9BB
DX: 156810 London Bridge 6

T 020 7593 5000
F 020 7593 5099

www.wslaw.co.uk

Winckworth
Sherwood

**Solicitors and
Parliamentary Agents**

1. Introduction

- 1.1 Issue Specific Hearing 8 (“ISH8”) is expected to include evidence of a technical nature in relation to the Structures Exclusion Zone (“SEZ”) proposed by the Applicant at Deadline 4. In its Procedural Decision letter of 4 April 2019, the ExA created a new Deadline 4C and set out what it would expect from Interested Parties (“IPs”) at this stage, including a list of experts to deal with this technical evidence and written statements of their evidence be submitted by Deadline 4C.
- 1.2 The PLA and ESL do not propose to call any technical experts beyond those who have previously attended Issue Specific Hearings in relation to this Application, namely Cathryn Spain, PLA Harbour Master Lower; and Richard Jackson, ESL Launch Coxswain.
- 1.3 Cathryn Spain is a Master Mariner with 18 years’ sea-going experience on a range of vessels, including containerships, passenger ships and fast ferries. She has spent the last 13 years in harbour mastering roles and has been a Harbour Master at the PLA, with responsibility for the safety of navigation from Dagenham to the outer Thames Estuary, for the past four years. Richard Jackson is a Senior Coxswain with 18 years’ experience at ESL in providing pilot boarding and landing services within and around the area of the proposed Thanet Extended Offshore Wind Farm (“TEOWF”). Prior to this, Mr Jackson worked in the offshore inshore fishing industry, based at Ramsgate; he therefore has long-standing and up-to-date experience of the day-to-day practicalities of operating within the area affected by the TEOWF.
- 1.4 The PLA and ESL do not consider that the SEZ proposal in its current form and the NRA addendum adequately address the concerns they have previously raised regarding the reduction in sea room. As previously submitted, the PLA and ESL remain of the view that a reduction of the red line boundary (“RLB”) remains the simplest and most effective means by which to address their concerns. The Applicant may instead be able to resolve the PLA and ESL’s concerns through provision of an SEZ, but only if it modifies its current SEZ proposals and addresses the deficiencies in the NRA to the satisfaction of the PLA and ESL, as suggested below.

2. Concerns with SEZ proposal

2.1 *Sea Room Calculations*

- 2.1.1 The Applicant proposes that the scheme for the extension of the existing TOWF will, with the latest amendments it has proposed, leave sufficient sea room for navigation and manoeuvring of vessels. However, the PLA and ESL still have outstanding concerns about the calculation of sea room.
- 2.1.2 The Applicant refers to the World Ocean Council, Nautical Institute and IALA special planning paper titled “*The Shipping Industry and Marine Spatial Planning – a Professional Approach – November 2013* (‘the MSP Guidance’). The Applicant references this document at paragraph 24 of Appendix 14 to the Applicant’s Deadline 4 submission, and submitted it at Deadline 4B as Annex A to Appendix 1 to Deadline 4B Submission: IALA MSP Guidance. However, it appears that when assessing sea room the MSP Guidance has not been taken forward fully.
- 2.1.3 If the MSP guidance had been fully evaluated it would suggest, if it is assumed that there are over 4400 vessel transits through the inshore route (such figure being based on growth of 10% or above), the following:

$(333 \times 2) + (333 \times 2) + (333 \times 2) = 1998$ m (suggested lane width).

+

$0.3\text{nm} (555\text{m}) + (6 \times 333) + 500\text{m} = 3053$ (safety buffer for a starboard turn as suggested by COLREGS).

- 2.1.4 Using the MSP Guidance would result in a path/lane (including safety buffer) of 5051m as a baseline assumption. The Applicant's calculations are in Appendix 1 to Deadline 4b, section 3.6 Table 10.
- 2.1.5 It would then be necessary to consider the acceptable sea room for boarding and landing purposes and which allows for the NE Spit bank to the North West, the shallower water to the South West, Margate Roads anchorage and the associated crossing traffic ESL and the PLA recognise the relevance of both MGN543 and the above mentioned MSP document. However, they consider that the guidance needs to be applied in an appropriate manner and sea lane calculations need to be adapted to allow for boarding and landing practices. ESL's and the PLA's concerns regarding the compression of the inner boarding ground area, combined with the likely increase in traffic density have not been changed by the introduction of an SEZ of the limited geographic extent proposed by the Applicant and which is similarly limited in the scope of its exclusions.
- 2.1.6 From the limited time that the PLA and ESL have had to review the SEZ proposal, they understand that the exclusion would prevent the erection of wind turbine generators, meteorological masts, wind buoy and floating Lidar in the SEZ. However, according to paragraph 10 of Appendix 14 to the Applicant's Deadline 4 Submission, other activities "*such as vessel manoeuvring, anchor handling and, jack-up barge placement will be possible, as well as cable laying. Any other long-term (but moveable) structures as requested by the relevant authorities, such as demarcation buoyage will be permitted.*" It appears that other works, including structures such as substations and cabling, and other activities, including maintenance, would still be permitted and the PLA and ESL would welcome the opportunity to clarify this with the Applicant.
- 2.1.7 The amount and types of activity which would still be permissible within the SEZ mean that the majority of the PLA and ESL's concerns about sea room remain. It would seem that all ancillary works under the DCO would still be permitted in the SEZ. This covers a wider array of activities including the placing of temporary landing places/moorings for construction and maintenance. The PLA and ESL are concerned about any potential encroachment into the available sea room.

2.2 *Impact of the SEZ on sea room*

- 2.2.1 Figure 1 included at Appendix 1 illustrates the concerns of the PLA and ESL with regards to the SEZ. As shown in Figure 1, the width of 2nm + 1nm buffer has become a narrow 'column' which is approximately 1.3nm deep. In order to utilise this area ESL will have to bring a higher number of vessels into a smaller boarding ground which will lead to appropriate lees being compromised. There is not a clear 2nm with 1nm buffer North of line B until

East of North East Spit Buoy, which itself is 3nm North of the inner boarding position. South of line C in Figure 1, there is not an area of 2nm with 1nm buffer until approximately 3nm South East of the Elbow Buoy.

- 2.2.2 The area East of line A is highly used for pilot boarding and landing operations in comparison to the area West of line A. In 2018, there were 668 boarding and landing acts West of line A in Figure 1 with the vast majority disembarking a pilot. In contrast, 5265 vessels were served in the vicinity of the inner boarding ground East of line A. This is illustrated by Appendix 2 to this submission: ESL Working Area (2018).
- 2.2.3 The southern approach to the inshore route will remain heavily impacted, even with the SEZ as proposed by the Applicant. The Applicant's submission Appendix 14 to Deadline 4 – Structure Exclusion Zone (Section 7.2/Figure 7), includes a 1 cable wide SEZ area which is included in sea room and buffer calculations (see Table 13). If turbine blades can cross over into the SEZ (only generators are prohibited under the Applicant's proposals) the 1 cable 'strip' should be included in sea room or buffer calculations. This would mean the distance between the Elbow Buoy and TEOFW would be 2nm.
- 2.2.4 The southern approach to the inshore route will remain heavily impacted, even with the SEZ as proposed by the Applicant. There would not be, as suggested in Appendix 14 to the Applicant's Deadline 4 submission, section 7.2, figure 7, 0.1nm SEZ to the South West because the wind turbine generator blades can enter the SEZ (only foundations are prohibited under the Applicant's proposals) and, therefore, the distance between the Elbow Buoy and TEOFW would be 2nm.
- 2.2.5 In 2018, ESL served 238 vessels in the vicinity of Elbow Buoy and ESL and the PLA consider that if the extension is completed, even with the SEZ in place as proposed by the Applicant, these vessels will have to be served further to the north at the inner boarding area. This would mean a further 238 vessels being served at the inner boarding position adding to the increase in vessel density in this area.
- 2.2.6 In addition, the PLA and ESL consider it highly likely that vessels, in particular larger vessels, will choose to navigate around TEOFW rather than approach the inshore route at Elbow Buoy. In our experience, larger vessels tend to take a precautionary approach to the boarding ground. This will therefore lead to an increase in traffic approaching the boarding ground from the North East.
- 2.2.7 In conclusion, the PLA and ESL do not consider the proposed SEZ adequately deals with their concerns raised about restrictions placed on sea room by the proposed extension.

3. Concerns with the NRA addendum

- 3.1 The Applicant issued a revised version of the NRA on Friday 5 April. The PLA and ESL have therefore had a very limited period of time in which to review and consider the Applicant's revised assessment. However, its preliminary observations are as follows.
- 3.2 The NRA addendum was issued by the Applicant following a risk assessment workshop held on 29 March 2019. This workshop was convened as a result of concerns of the IPs about the lack of consultation on the original NRA and concerns regarding the

disconnect between the quantitative risk assessment scores and the qualitative concerns raised by the IPs.

- 3.3 In the interest of time, the risk assessment workshop only looked at the area directly to the west of the proposed extension, in relation to the proposed SEZ, as this was considered to be the area of highest concern. There was no time for consideration of the other parts of the proposed TEOF, such as the Tongue and the Elbow, despite these still being areas of concern to the IPs.
- 3.4 The 18 hazards for assessment were agreed by the workshop attendees at the start of the meeting. There was limited agreement between the Applicant and the IPs on appropriate scores. The Applicant's consultants, Marico Marine, provided statistics to justify why scores should be within a certain range but, due to the limited collection of incident data, a lot of the scoring was based on historical, national data. This may be appropriate for sense checking some of the baseline scores, but the PLA and ESL do not consider it as appropriate for the inherent score. The inherent score is based on a change to the baseline situation, when a new hazard is introduced which has not yet been mitigated. Using historical data relating to areas where similar vessels are operating cannot give an accurate prediction, as to the risk following construction of the TEOF, as presumably the other national comparisons are areas where local risks have already been mitigated.
- 3.5 Once the baseline had been established an increase in likelihood of navigational risk with the TEOF in place was then considered. Allowance has theoretically been made for a 10% uplift in shipping, but this adjustment to the likelihood score does not translate into an appropriate increase in the risk score, due to the way in which algorithms are used to calculate risk.
- 3.6 The scoring process at the workshop was heavily driven and influenced by Marico Marine with limited opportunity for IPs to comment. Having scored the first hazard the IP's were not allowed to see the resulting risk score. The IPs present were told that it was best not to see them at this stage, because Marico Marine did not want that to influence any further scoring. As a result the IPs were therefore not able to consider the accuracy of the scoring. It should be noted that the consultants from Marico Marine did have access to the resulting risk scores and whether they fell within ALARP. The PLA and ESL are concerned that this could have influenced Marico Marine's own scoring.
- 3.7 The PLA and ESL representatives present found the approach to the scoring process during the workshop difficult. There was substantial discussion and debate on each individual consequence and likelihood scores. This meant that the group only managed to score 4 out of the 18 identified hazards during the six hour workshop. This approach did not address the disparity between the quantitative and qualitative aspects of the NRA, a key concern of ESL and the PLA, because the majority of the day was spent trying to come to an agreement on the scores. Very little time was given to further exploring the concerns of the IP's with regards to the increased risks posed by the TEOF.
- 3.8 ESL and the PLA consider that the majority of workshop would have been best spent trying to understand and agree the risks, and consider whether they were tolerable or required further mitigation. The scoring process could have been a simple exercise at the end of the day to translate the outcomes into a scored assessment format. These views have been communicated to the Applicant.
- 3.9 Following the workshop, and having had time to reflect on the process, the PLA and ESL felt that some of the hazards had been underscored for their baseline

consequence and therefore the baseline risk was too low. The PLA then compared the baseline risk scores to those of the original NRA, which themselves were thought to have been underscored by the Applicant, due to the datasets that were used. The NRA and NRA addendum cannot be directly compared, because the hazard categories were not the same, the PLA and ESL would note that the highest baseline collision risk identified at the workshop was scored lower than the highest baseline collision risk in the original NRA.

- 3.10 The PLA's and ESL's detailed comments on the NRA addendum are at Appendix 3.
- 3.11 The PLA and ESL have also prepared a joint revised risk assessment which is included here at Appendix 4. The scoring for the PLA/ESL risk assessment is based on a similar methodology to that used by Marico Marine and uses a combination of most likely and worst credible outcomes. However, the likelihood is scored using a 1-5 matrix, and multiplied by the consequence score, giving a risk score between 0 and 25, as opposed to using a complex set of algorithms, which result in a score out of 10.
- 3.12 Therefore the risk scores for each assessment are not directly comparable. However the PLA and ESL consider that it can be seen that despite the introduction of the SEZ, there is still an increase in the risk of collision, contact and grounding for commercial vessels in the boarding and landing area as a direct result of the proposed extension.

Alternatives

- 3.13 Both the PLA and ESL want to continue to work with the Applicant in seeking a solution suitable for all parties involved. The SEZ as proposed by the Applicant is insufficient in its geographical extent and would still permit activities and works to be carried out within the SEZ which would pose a risk to ESL's and the PLA's operations.
- 3.14 The PLA and ESL consider that a reduction in the RLB remains the appropriate means by which to address their concerns. In the PLA and ESL's view, any TEOF activity and works within the western extent of the proposed TEOF poses an unacceptable risk to vessels transiting and manoeuvring within the inner route. A reduction of the RLB would therefore be the clearest, simplest mechanism by which to mitigate this risk.
- 3.15 Nevertheless, the same effect could be achieved with the SEZ concept, provided that the Applicant is willing to make modifications to the draft DCO ("dDCO") and accompanying plans. It would need to be made clear that the dDCO does not enable the Applicant to carry on any activities or works within the SEZ, and the geographical extent of the SEZ would have to be extended to provide sufficient mitigation for the risks described by the IPs. The PLA and ESL would be happy to enter into discussions with the Applicant on this point in conjunction with other IPs and looks forward to the Applicant's response to these proposals.

Appendix 1: Figure 1

GOBE VATTENFALL
THANET EXTENSION
OFFSHORE WIND FARM

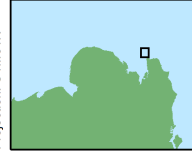
Figure 1

Structures Exclusion Zone

Legend

-  RLB
-  Structures Exclusion Zone
-  2nm Buffer
-  NE Spit Pilot Station
-  North East Spit Buoy
-  Elbow Buoy

Datum: ETRS 1989
 Projection: UTM31N



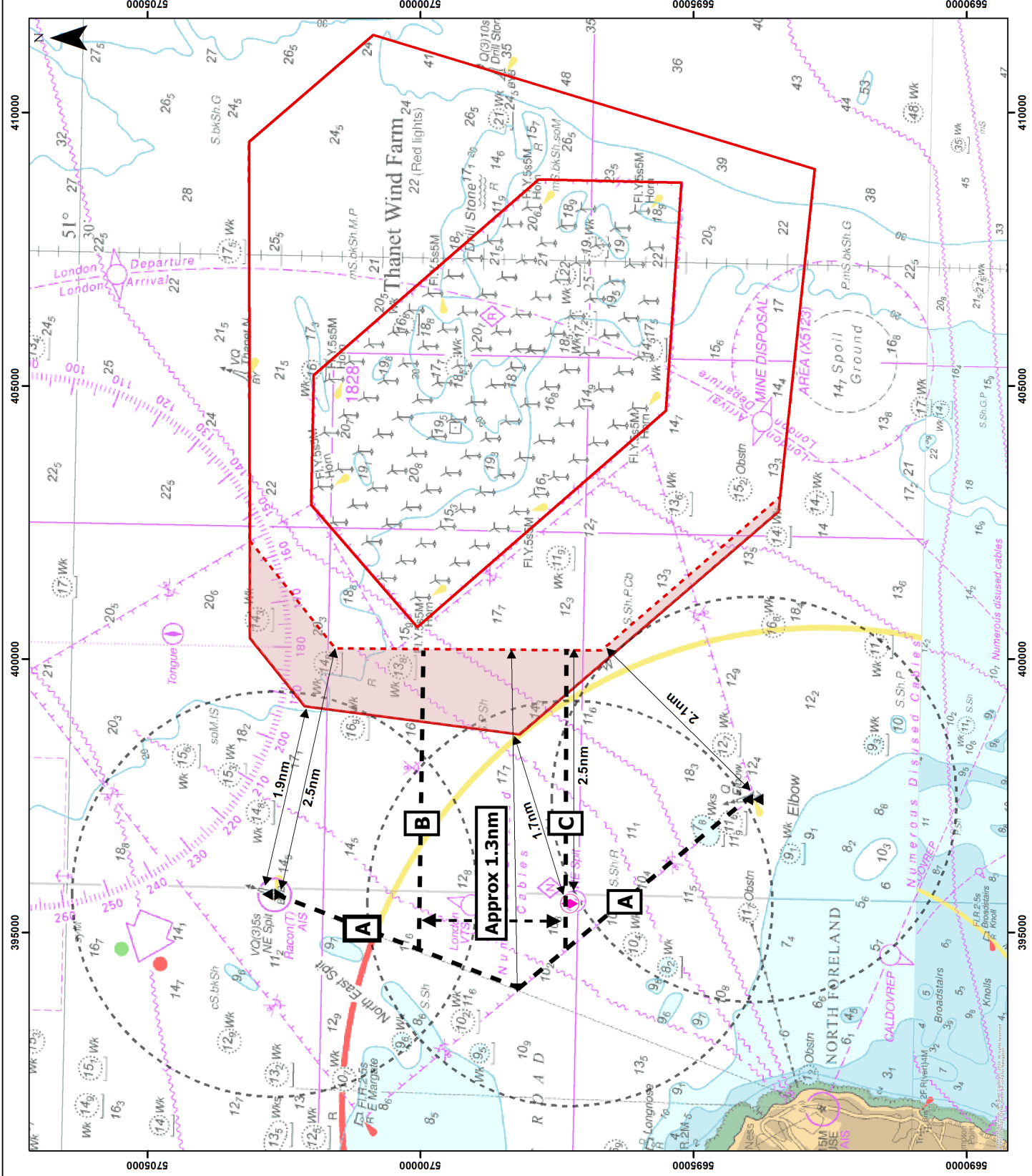
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Fig No	10UK225_Structure_Exclusion_Zone
Rev	0.1
Date	19/03/2019
By	RM
Layout	N/A

Figure 1



Appendix 2: ESL Working Area (2018)

ESL 2018

Tong-A - 12

TDWD - 86

NES Buoy - 145

E-Margate - 625

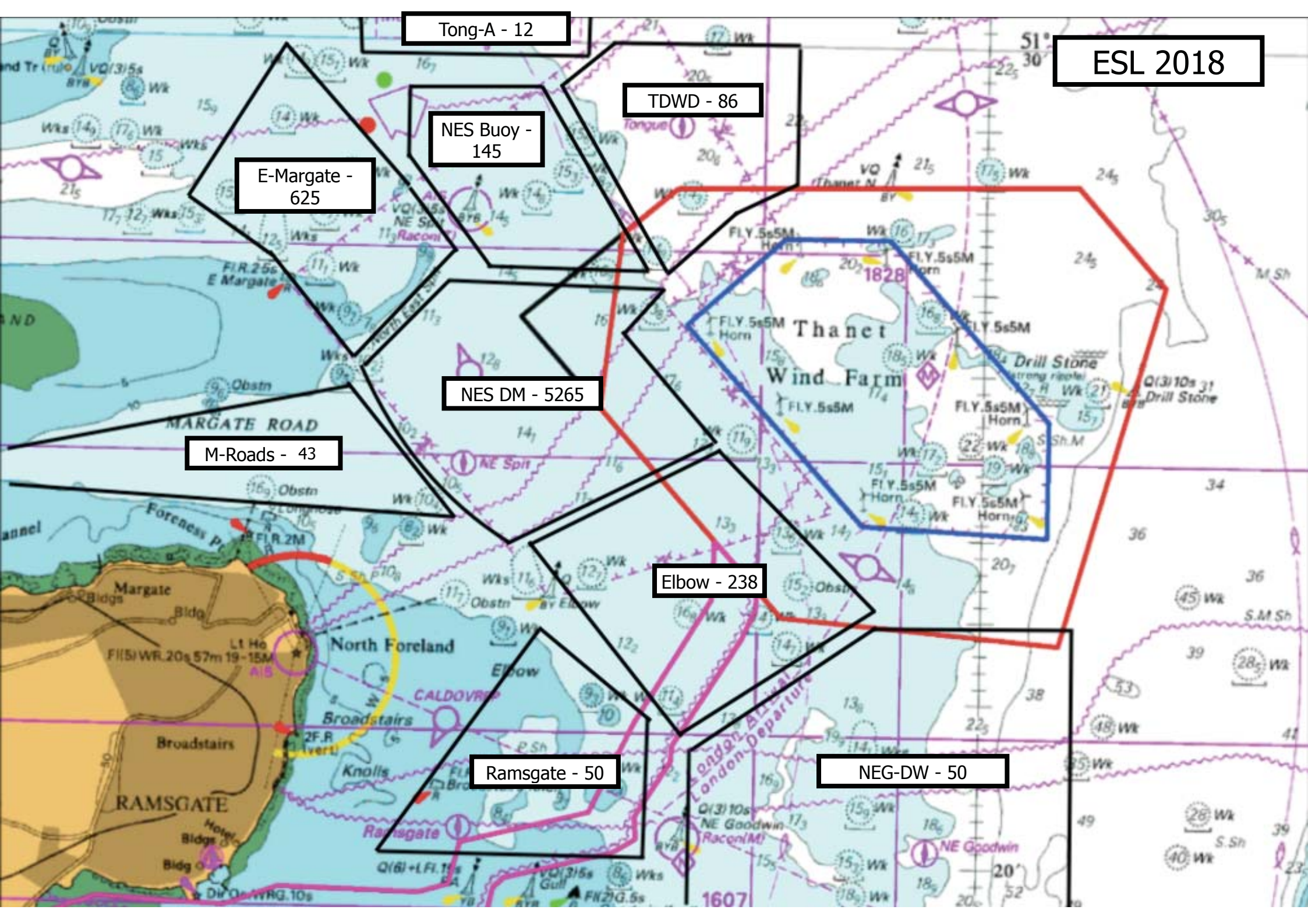
NES DM - 5265

M-Roads - 43

Elbow - 238

Ramsgate - 50

NEG-DW - 50



Appendix 3: PLA and ESL response to NRA Addendum

PLA and ESL's Response to Annex 1 – Addendum to NRA

Para	PLA/ ESL Comments
5	The workshop was driven by Ed Rogers from Marico Marine, who was aware of the risk scores for baseline and inherent risk, whereas the IPs present were given not access to the scores that resulted from the likelihood and consequence scoring.
6	The PLA and ESL did discuss the scores from 29 March at the telephone meeting on 2 April, as they had concerns that some of the consequences for the collision risk had been underscored. Another IP raised a concern that some of the grounding consequence scores had been underestimated and followed this up with emails to the Applicant, but these scores were not adjusted as a result. At the workshop the group only managed to complete 4 of the 18 hazards identified and found the process very challenging. A lot of time was spent trying to come to agreement on each score rather than focussing on the “cause concern and consequences” and the areas of ongoing concern. The PLA and ESL have undertaken a separate risk assessment to address theirs, and others’ concerns over the scoring of each hazard.
9	The scored risk assessment that was undertaken on 29 March only focussed on a small area the west of the SEZ and did not relate to the whole red line boundary.
14	In referencing the MSP Guidance (for example in the Applicant’s response to Gateway Port Limited – page 36 (Appendix 4 to Deadline 4: Response to Deadline 3 Submissions by Interested Parties – Shipping and Navigation), the Applicant has underestimated vessel passages because it has not allowed for growth. This has led to the assumption of 2 vessels for lane calculation instead of 3 and did not factor in the safety buffer formula MSP recommends. (Although confusingly later in the addendum the Applicant references MSP and allows for 4 vessels)
21	Although ESL and the PLA appreciate the time constraints of the Examination, it is disappointing that there was not enough time to re-do the collision risk modelling (as stated by Marico on a call on 22 March).
28	Recreational vessels are highly seasonal; August would have been a more accurate representative month to study. The only way the Applicant could accurately study August would be through on site survey. By contrast, what it presents in the addendum is an assumption based on AIS (which a large number of leisure craft do not have) and the RYA boating intensity map (which is 100% based on AIS).
32	It is not clear whether Figure 16 is accurate. Firstly, the scale of low/medium/high is vague; Marico have previously stated that they would try and put the scale into numbers, but neither the PLA nor ESL have yet seen this. There are other reasons a pilot vessel will slow down to 10 or 7 knots (ESL could be waiting for vessels or the MetOcean conditions may have slowed the pilot vessel down). Using the colour scheme as a guide shows there is a low to medium density around the East Margate (ESL served 690 vessels there in 2017) there is a similar low to medium colour scheme shown under the North Foreland where no ships were served, which highlights the potential inaccuracies in the Applicant’s assumptions.
42	If a pilot refuses to board a vessel due to a deficient ladder that vessel will then spend more time in the boarding and landing area without a pilot on board. This may be a control measure for the safety of the pilot, but not a control measure for collisions and groundings and is more likely to be a contributory factor.
43	Whilst understanding Bird’s Accident Triangle, it is important to consider near miss incidents such as the Maersk Nottingham, and give them sufficient weight when considering the quantitative risk assessment.

56	A vessel with a draft over 7 metres will have to take height of tide into consideration when planning to cross the Spit bank. Any vessel with a draft of 10 metres or above will be served at least 1nm East of the inner diamond.
57	As stated in our Deadline 4C submission, the MSP document the applicant submitted has a buffer formula within it (vessel length x 6 + 500m (exclusion zone) + 555m (0.3nm allowance) which for a 333m vessel means a buffer of 1.64nm. This buffer would allow for a safe turn to starboard but is not the buffer formula employed by the Applicant.
66	This area has a high volume of WSVs crossing it at high speed to enter/exit the windfarm. It is also one of the main areas for fishermen to enter and exit the site on transit and is an area frequently fished. Both WSV and Fishermen are relatively high-risk sea users.
67	See comment on 57.
68	It still appears that the SEZ is based on historical tracks, allowing for no growth.
70	The SEZ only provides the requested 2nm + 1nm in the highest density area of pilot transfers and therefore does not allow for any flexibility. This flexibility is required in order to manage transfers in the full range of met-ocean conditions and traffic situations that arise. This is the highest density transfer area which is likely, as a result of the SEZ, will become even denser.
72	The line of sight is still obstructed by the proposed turbines on the north west corner of the extension. Vessels approaching from the east around the top of the windfarm will have their line of sight to the North Foreland light obstructed.
90	The PLA and ESL and LGP expressed concerns regarding the hazard scores from the workshop. Vattenfall agreed that they should take a robust approach to the scoring, but did not subsequently adjust any of the scores.
97	Vessel types were only defined by the length according to the PLA pilotage category. The PLA also categorises vessels by draught, but this was not taken into consideration for the workshop
99	The area to the west of TEOWF is the area that was agreed as being of most concern but is not the only area of concern to the IPs. This again draws attention to the time pressure: other areas were not considered in discussion because of insufficient progress and time available.
118	The two master mariners used by Marico do not have pilotage experience of class 1 & 2 vessels in the area being assessed.
124	The PLA and ESL are not clear on what evidential basis the Applicant states that fishing and leisure traffic have a static or downward trend.
125	Given the relatively new status of the WSV working practices it is likely that WSV traffic will not remain the same. For example, the London Array is currently undergoing an intensive maintenance programme which has increased WSV capacity to 12. They have also, within the last 12 months, started working at night. It would be reasonable to assume that as various sites expand and age maintenance programmes intensify, there will be increasing demand for WSVs and increased working hours (meaning more night work). The only uplift in WSVs that the Applicant has accounted for is for their own windfarm; however, three windfarms operate WSVs from Ramsgate.
134	Navigational risk controls are dominated by monitoring and remote management (e.g. VTS). Any navigational issues post construction will have to be mitigated by shipping not the TEOWF. It seems unlikely that any navigational problem areas caused by the TEOWF

	would lead the Applicant to address those sufficiently by the removal of wind turbine generators.
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Appendix 4: PLA and ESL revised NRA

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences						Most Likely Hazard Occurrence		Worst Credible Hazard Occurrence				Notes					
						Type	Most Likely Outcome	Worst Credible Outcome	Consequence		Likelihood		Consequence		Likelihood		Risk Score						
									People	Property	Environment	Stakeholders	Baseline	Inherent	People	Property	Environment		Stakeholders	Baseline	Inherent	Baseline	Inherent
1	Collision	Class 1 or 2 vessels	Collision Class 1 or 2 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering												With the extension constructed the area for boarding and landing would become more confined. Sea room would be reduced, increasing the likelihood of large vessel collisions in the boarding and landing area, either between two vessels manoeuvring, or a manoeuvring vessel with a passing vessel, or a manoeuvring vessel with a fishing or recreational vessel, or with the pilot boat. Extension to the south of the windfarm would remove the option of using the Elbow as an alternative area in bad weather or to suit traffic and would further squeeze more vessels into a confined area. The increased likelihood also takes into account projected uplift in vessels over the lifetime of the project.			
				2 - Avoiding Other traffic	Yes			Loss Cargo															
				3 - Constriction of Shipping Routes	Yes			Loss of life															
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods															
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	3	2	3	2.0	2.5	4	5	5	4	1.00		2.00	5.1	8.2
				7 - Loss of UKC	No	Property	Moderate damage-Costs £100k -£1M	Catastrophic damage-Costs >£10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+															
				9 - Pilot Transfer Issues	Yes	Stakeholders	Moderate-Bad widespread publicity and/or short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
2	Collision	Class 3 or 4 Vessels	Collision Class 3 or 4 vessel with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering												With the extension constructed the area for boarding and landing would become more confined. Sea room would be reduced, increasing the likelihood of large vessel collisions in the boarding and landing area, either between two vessels manoeuvring, or a manoeuvring vessel with a passing vessel, or a manoeuvring vessel with a fishing or recreational vessel, or with the pilot boat. Extension to the south of the windfarm would remove the option of using the Elbow as an alternative area in bad weather or to suit traffic and would further squeeze more vessels into a confined area. The increased likelihood also takes into account projected uplift in vessels over the lifetime of the project.			
				2 - Avoiding Other traffic	Yes			Loss Cargo															
				3 - Constriction of Shipping Routes	Yes			Loss of life															
				4 - Equipment or Mechanical Failure	Yes			Vessel / Tanker / Dangerous Goods															
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	2	2	2.0	2.3	4	5	5	4	1.50		1.75	5.6	6.5
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Catastrophic damage-Costs >£10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+															
				9 - Pilot Transfer Issues	Yes	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
3	Collision	Vessel less than 90m	Collision vessel less than 90m with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering												With the extension constructed the area for boarding and landing would become more confined. Sea room would be reduced, increasing the likelihood of vessel collisions in the boarding and landing area, either between two vessels manoeuvring, or a manoeuvring vessel with a passing vessel, or a manoeuvring vessel with a fishing or recreational vessel, or with the pilot boat. Extension to the south of the windfarm would remove the option of using the Elbow as an alternative area in bad weather or to suit traffic and would further squeeze more vessels into a confined area. The increased likelihood also takes into account projected uplift in vessels over the lifetime of the project.			
				2 - Avoiding Other traffic	Yes			Vessel do not need to slow for Pilot Transfer	Loss Cargo														
				3 - Constriction of Shipping Routes	Yes			Loss of life															
				4 - Equipment or Mechanical Failure	Yes			Cargo / Bunker Barge															
				5 - Human Error	Yes																		
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	1	2.0	2.3	4	5	4	4	1.50		1.75	5.2	6.1
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Catastrophic damage-Costs >£10M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3															
				9 - Pilot Transfer Issues	No	Stakeholders	Negligible-No significant effects	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
4	Collision	Fishing or Recreational	Collision Fishing Vessel or recreational craft with another navigating vessel	1 - Adverse Environmental Conditions	Yes	Narrative	Small vessels colliding	Collides with larger vessel (WSV, Cargo, etc.)												With the extension constructed the area for boarding and landing would become more confined. Sea room would be reduced, increasing the density of traffic in the NE Spit area and allowing less room for manoeuvre. This would increase the risk of collision between fishing or recreational vessels and commercial vessels.			
				2 - Avoiding Other traffic	Yes			Glancing Blow / Loss of gear	Crossing / Head on Collision														
				3 - Constriction of Shipping Routes	Yes			Lighting of WTG - displace fishing vessels	Sinking / Foundering / Capsize														
				4 - Equipment or Mechanical Failure	Yes			Mostly - potting / netting (less likely trawling) (LOA 8-10m)															
				5 - Human Error	Yes			Wake / Wash Impacts	* assumes lights as per Kentish Flats														
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Catastrophic-Multiple fatalities	2	2	1	2	3.0	3.2	5	3	2	4	2.00		2.50	7.1	8.3
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Moderate damage-Costs £100k -£1M															
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1															
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue															
				10 -																			
				1 - Adverse Environmental Conditions	Yes	Narrative	Collides with small vessel at low speed	Collides at speed with other vessel															
				2 - Avoiding Other traffic	Yes			Glancing blow	Crossing / Head on Collision														
				3 - Constriction of Shipping Routes	Yes			Sinking / Foundering / Capsize															

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence						Worst Credible Hazard Occurrence						Notes										
						Type	Most Likely Outcome	Worst Credible Outcome	Consequence				Likelihood		Consequence				Likelihood			Risk Score									
									People	Property	Environment	Stakeholders	Baseline	Inherent	People	Property	Environment	Stakeholders	Baseline	Inherent		Baseline	Inherent								
5	Collision	WSV	Collision of WSV working or transiting to from Thanet or other OWF in area with another vessel	4 - Equipment or Mechanical Failure	Yes																										
				5 - Human Error	Yes																										
				6 - Increased Traffic Density	Yes	People	Moderate - single major or multiple minor injuries	Catastrophic-Multiple fatalities	3	2	1	2	3.0	3.2	5	4	2	4	1.00	1.25	5.9	6.7		With the extension constructed the area for boarding and landing would become more confined. Sea room would be reduced, increasing the density of traffic in the NE Spit area and allowing less room for manoeuvre. This would increase the risk of collision between WSV's and commercial vessels							
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Major damage -Costs £1M - £10M																							
				8 - Low Manoeuvrability of Vessels	No	Environment	Negligible-Very Small Spill	Minor-Tier 1																							
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																							
				10 -	Yes																										
				6	Collision	Pilot Launch	Collision Pilot Launch with another navigating vessel	1 - Adverse Environmental Conditions		Narrative	Slow Speed collision	High speed collision																			
								2 - Avoiding Other traffic			Glancing Blow	Crossing / Head on Collision																			
								3 - Constriction of Shipping Routes			Minimal damage	Significant damage																			
4 - Equipment or Mechanical Failure																															
5 - Human Error																															
6 - Increased Traffic Density		People	Minor-Single minor injury					Major-Multiple major injuries or single fatality	2	2	1	2	3.0	3.2	4	4	2	4	1.50	2.00	5.6	6.8		With the extension in place the pilot launch would be operating in an area of reduced sea room. More vessels would be boarding and landing within a smaller footprint and there would be much less flexibility to change the boarding and landing point to suit the met-ocean conditions or particular traffic patterns at the time.							
7 - Loss of UKC		Property	Minor damage-Costs £10k -£100k					Major damage -Costs £1M - £10M																							
8 - Low Manoeuvrability of Vessels		Environment	Negligible-Very Small Spill					Minor-Tier 1																							
9 - Pilot Transfer Issues		Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue					Major-National adverse media publicity and/or medium-term loss of revenue																							
10 -																															
7	Contact	Class 1 or 2 Vessels	Class 1 or 2 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering																							
				2 - Avoiding Other traffic	Yes			Loss Cargo																							
				3 - Constriction of Shipping Routes	Yes			Loss of life																							
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																							
				5 - Human Error	Yes																										
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	3	2.5	2.8	4	4	4	4	1.50	1.75	6.1	6.9		The proposed extension would slightly increase the risk of vessel contact with a turbine, due to the reduced sea room available for boarding and landing operations							
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Major damage -Costs £1M - £10M																							
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																							
				9 - Pilot Transfer Issues	Yes	Stakeholders	Moderate-Bad widespread publicity and/or short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																							
				10 -																											
8	Contact	Class 3 or 4 Vessels	Class 3 or 4 Vessel comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Glancing Blow	Fire / Sinking / Foundering																							
				2 - Avoiding Other traffic	Yes			Loss Cargo																							
				3 - Constriction of Shipping Routes	Yes			Loss of life																							
				4 - Equipment or Mechanical Failure	Yes			Large vessel / Tanker / Dangerous Goods																							
				5 - Human Error	Yes																										
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	3	2.5	2.8	4	4	4	4	1.50	1.75	6.1	6.9		The proposed extension would slightly increase the risk of vessel contact with a turbine, due to the reduced sea room available for boarding and landing operations							
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Major damage -Costs £1M - £10M																							
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																							
				9 - Pilot Transfer Issues	Yes	Stakeholders	Moderate-Bad widespread publicity and/or short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																							
				10 -																											
9	Contact	Vessel less than 90m	Commercial Vessel less than 90m comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact																							
				2 - Avoiding Other traffic	Yes			Glancing blow	Significant damage																						
				3 - Constriction of Shipping Routes	Yes			Minor damage																							
				4 - Equipment or Mechanical Failure	Yes																										
				5 - Human Error	Yes																										
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.5	2.8	4	4	4	4	1.00	1.50	4.3	5.6		The proposed extension would slightly increase the risk of vessel contact with a turbine, due to the reduced sea room available for boarding and landing operations							

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence						Worst Credible Hazard Occurrence						Notes							
						Type	Most Likely Outcome	Worst Credible Outcome	Consequence			Likelihood			Consequence			Likelihood				Risk Score						
									People	Property	Environment	Stakeholders	Baseline	Inherent	People	Property	Environment	Stakeholders	Baseline	Inherent		People	Property	Environment	Stakeholders	Baseline	Inherent	
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																				
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Major-Tier 3																				
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																				
				10 -																								
10	Contact	WSV	WSV comes into contact with a WTG or other structure whilst navigating	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact																				
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																				
				3 - Constriction of Shipping Routes	Yes		Minimal damage																					
				4 - Equipment or Mechanical Failure	Yes																							
				5 - Human Error	Yes																							
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.5	2.6	4	4	2	4	1.00	1.25	4.2	4.8						
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Major damage -Costs £1M - £10M																				
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																				
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																				
				10 -																								
11	Contact	Fishing or Recreational	Narrative	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact																				
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																				
				3 - Constriction of Shipping Routes	Yes		Minimal damage																					
				4 - Equipment or Mechanical Failure	Yes																							
				5 - Human Error	Yes																							
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.8	2.9	4	3	2	3	1.00	1.50	4.4	5.3						
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																				
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																				
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																				
				10 -																								
12	Contact	Pilot Launch	Pilot Launch comes into contact with a WTG or other structure	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed contact	High speed contact																				
				2 - Avoiding Other traffic	Yes		Glancing blow	Significant damage																				
				3 - Constriction of Shipping Routes	Yes		Minimal damage																					
				4 - Equipment or Mechanical Failure	Yes																							
				5 - Human Error	Yes																							
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.5	2.6	4	3	2	3	1.00	1.25	4.1	4.6						
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k –£100k	Moderate damage-Costs £100k -£1M																				
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1																				
				9 - Pilot Transfer Issues	Yes	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																				
				10 -																								
13	Grounding	Class 1 or 2 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 1 or 2 vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow Speed grounding	Vessel unable to re-float on same tide / assistance required																				
				2 - Avoiding Other traffic	Yes		Re-float on the same tide	Fire / Sinking / Foundering																				
				3 - Constriction of Shipping Routes	Yes			Loss Cargo																				
				4 - Equipment or Mechanical Failure	Yes			Loss of life																				
				5 - Human Error	Yes			Large vessel / Tanker / Dangerous Goods																				
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Moderate - single major or multiple minor injuries	2	2	2	3	2.2	2.5	3	4	5	5	1.00	1.50	5.2	6.8						
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k –£100k	Catastrophic damage-Costs >£10M																				
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Catastrophic-Tier 3+																				
				9 - Pilot Transfer Issues	Yes	Stakeholders	Moderate-Bad widespread publicity and/or short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue																				

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence				Worst Credible Hazard Occurrence				Risk Score		Notes			
						Type	Most Likely Outcome	Worst Credible Outcome	Consequence		Likelihood		Consequence		Likelihood		Baseline	Inherent				
									People	Property	Environment	Stakeholders	Baseline	Inherent	People	Property				Environment	Stakeholders	Baseline
14	Grounding	Class 3 or 4 Vessels	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Class 3 or 4 vessel running aground.	10 -																		
				1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding														
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground														
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide														
				4 - Equipment or Mechanical Failure	Yes																	
				5 - Human Error	Yes																	
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Moderate - single major or multiple minor injuries	2	2	2	2	2.4	2.6	3	4	4	5	1.25	1.50	5.2	6.0
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k -£100k	Major damage -Costs £1M - £10M														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1	Major-Tier 3														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue														
10 -																						
15	Grounding	Vessel less than 90m	Displacement or constriction of shipping routes and the loss of depth along cable route results in a vessel less than 90m running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding														
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground														
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide														
				4 - Equipment or Mechanical Failure	Yes																	
				5 - Human Error	Yes																	
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Moderate - single major or multiple minor injuries	2	2	2	2	2.4	2.5	3	4	3	4	1.50	1.75	5.2	5.8
				7 - Loss of UKC	Yes	Property	Minor damage-Costs £10k -£100k	Major damage -Costs £1M - £10M														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Minor-Tier 1															
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue														
				10 -																		
16	Grounding	Fishing or Recreational	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Fishing vessel or recreational vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding														
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground														
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide														
				4 - Equipment or Mechanical Failure	Yes																	
				5 - Human Error	Yes																	
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	1	1	2	2.8	2.8	4	3	2	3	1.00	1.00	4.2	4.2
				7 - Loss of UKC	No	Property	Negligible-Costs <£10k	Moderate damage-Costs £100k -£1M														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1														
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue														
				10 -																		
17	Grounding	WSV	Displacement or constriction of shipping routes and the loss of depth along cable route results in a WSV vessel running aground.	1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding														
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground														
				3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide														
				4 - Equipment or Mechanical Failure	Yes																	
				5 - Human Error	Yes																	
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.8	2.8	4	3	2	4	1.00	1.00	4.4	4.4
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Moderate damage-Costs £100k -£1M														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1														
				9 - Pilot Transfer Issues	No	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Major-National adverse media publicity and/or medium-term loss of revenue														
				10 -																		
				1 - Adverse Environmental Conditions	Yes	Narrative	Slow speed grounding	Higher speed Grounding														
				2 - Avoiding Other traffic	Yes		Vessel touches bottom	Vessel firmly aground														

Hazard ID	Category	Vessel Type	Hazard Detail	Possible Causes	Y/N	Consequences			Most Likely Hazard Occurrence				Worst Credible Hazard Occurrence				Risk Score	Notes				
						Type	Most Likely Outcome	Worst Credible Outcome	Consequence				Likelihood									
									People	Property	Environment	Stakeholders	Baseline	Inherent	People	Property			Environment	Stakeholders	Baseline	Inherent
18	Grounding	Pilot Launch	Displacement or constriction of shipping routes and the loss of depth along cable route results in a Pilot Launch running aground.	3 - Constriction of Shipping Routes	Yes		Vessel re-floats on same tide	Vessel is not re-floated on same tide														
				4 - Equipment or Mechanical Failure	Yes																	
				5 - Human Error	Yes																	
				6 - Increased Traffic Density	Yes	People	Minor-Single minor injury	Major-Multiple major injuries or single fatality	2	2	1	2	2.5	2.6	4	3	2	4	1.00	1.00	4.2	4.3
				7 - Loss of UKC	No	Property	Minor damage-Costs £10k -£100k	Moderate damage-Costs £100k -£1M														
				8 - Low Manoeuvrability of Vessels	Yes	Environment	Negligible-Very Small Spill	Minor-Tier 1														
				9 - Pilot Transfer Issues	Yes	Stakeholders	Minor-Bad local publicity and/or possible short-term loss of revenue	Moderate-Bad widespread publicity and/or short-term loss of revenue														
				10 -																		

DEFINITION

Risk	is a measure of the likelihood and consequence of a hazard occurring.
Hazard	is an occurrence that can create an unsafe situation.
Baseline Risk	is a measure of risk prior to additional risk controls being added (existing risk controls are included in this
Residual Risk	is a measure of risk once additional risk controls have been added that were not in place at the time of the

ASSESSMENT OF RISK

Risk is the product of the consequence and the likelihood of an unwanted event. The International Maritime Organisation (IMO) Guidelines define a hazard as “*something with the potential to cause harm, loss or injury*”, the realisation of which results in an incident or accident. The potential for a hazard to be realised can be combined with an estimated or known consequence of outcome. This combination is termed ‘risk’. Risk is therefore a measure of the likelihood and consequence of a particular hazard occurring.

RISK ASSESSMENT MATRIX: RISK CRITERIA		FREQUENCY				
		Level 1	Level 2	Level 3	Level 4	Level 5
		Rare	Unlikely	Possible	Likely	Almost Certain
		One or more times greater than 100 years	One or more times 100 in years	One or more times in 10 years	One or more times per year	Ten or more times per year
Consequence	5 – Loss of vessel or severe damage to vessel. Multiple fatalities International news coverage. Serious long-term impact on environment and/or permanent damage.	Moderate (5)	High (10)	Extreme (15)	Extreme (20)	Extreme (25)
	4 – Major damage to vessel. Single Fatality. National news coverage. Significant impact on environment with medium to long term effects	Minor (4)	Moderate (8)	High (12)	Extreme (16)	Extreme (20)
	3 – Moderate damage to vessel. Moderate / major injury Regional news coverage. Limited impact on environment with short-term or long-term effects.	Minor (3)	Moderate (6)	Moderate (9)	High (12)	Extreme (15)
	2 - Minor or superficial damage to vessel. Minor injuries and local news coverage. Minor impact on environment with no lasting effects	Slight (2)	Minor (4)	Moderate (6)	Moderate (8)	High (10)
	1 - Insignificant or no damage to vessel / equipment. No injuries. Insignificant impact on environment	Slight (1)	Slight (2)	Minor (3)	Minor (4)	Moderate (5)
ACTION KEY	Slight (1 – 2)	Tolerable. No action is required				
	Minor (3 – 4)	Tolerable. No additional controls are required, monitoring is required to ensure no changes in circumstances				
	Moderate (5 – 9)	Additional controls required to reduce risk to ALARP				
	High (10 – 14)	Activity must not be undertaken without further additional controls to reduce to ALARP				
	Extreme (15 – 25)	Intolerable risk. Activity not authorised				