Vattenfall Wind Power Ltd

Thanet Extension Offshore Wind Farm

Appendix 2 to Deadline 2 Submission: Applicant's Response to Written Representations on the theme of Ports/Shipping Routes

Relevant Examination Deadline: 2

Submitted by Vattenfall Wind Power Ltd

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Revision A

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1 Responses to Written Representations

1.1 Introduction

1 Following submission of Written Representations (WRs) by Interested Parties (IPs) at Deadline 1, the Applicant has taken the opportunity to review each of the WRs received by the Examining Authority.

2 The following sections provide a record of the Applicant's responses to WRs received on the matter of 'Ports/shipping routes' in relationship to the available sea room and the need to reroute vessels around the TEOW. A summary of the representation received from stakeholders is identified at Table 1. To aid in review a point by point response to the themes emerging from the representations is also provided at Annex A to Appendix 3 of this Deadline 2 submission.

Table 1 Written Representations referred to within this document

Interested Parties	Document references responded to in this report	WR theme summary
Estuary Services Limited	REP1-141 (Section 4)	• Re-routing of vessels • Minimum safe distances • Proposed alterations in the area • Collision risk
Port of London Authority	REP1-142 (Section 4)	• Re-routing of vessels • Minimum safe distances • Proposed alterations in the area • Collision risk
Port of Tilbury London Limited and London Gateway Port Limited	REP1-148	• Re-routing of vessels • Ports, specifically economic impacts arising from the re-routeing of vessels[1]
London Pilots Council	REP1-104	• Raise specific reference to MGN543 for assessing distances between OREI boundaries and shipping routes (derived from Action Point response) • Vessel proximity to operational WTGs (derived from Action Point response)

3 Due to the nature of the WRs made and the fact that many of them make similar points or contain the same content, the Applicant has set out its comments in sections that address specific themes:

- Vessel routes
  - Minimum safe distance
  - Sea room
  - Re-routing
- Proposed capital dredging in the area
- Collision risk

[1] Further consideration is given to this topic area in Appendix 4 to this Deadline 2 submission (pilotage)

4 For clarity the Applicant can confirm that the following WRs are not discussed in this document:

- Maritime and Coastguard Agency Deadline 1 response is limited to specific Action Points and responses to ExQs, which are addressed in Appendix 10 and Appendix 11 of this Deadline 2 submission respectively.
- Trinity House Deadline 1 response is limited to DCO matters, a point by point response to which is provided in Appendix 10 of this Deadline 2 submission.

5 This document (Appendix 3) should also be read in parallel with Appendices 2, 4, and 5 which address the other dominant shipping and navigation themes:

- Appendix 2 – RLB Changes
- Appendix 4 – Pilotage
- Appendix 5 - NRA and consultation

1.2 Empirical Data

6 When considering matters in relation to inshore routes the Applicant would note that further evidence has been provided in response to the ExA ISH2 Action Points. Specifically, this includes the Applicant's response to ExA Action Point 14, and a series of analytical schematic plots to support ExA Question 1.12.1 (the full detail of which is presented at Annex M to Appendix 25 to the Deadline 1 submission (REP1-051)) that illustrate a breakdown of traffic. The schematics utilise the vessel traffic survey data and show the three key vessel activities, i) inshore traffic, ii) dipping traffic and iii) anchorage traffic, in this area with subplots analysing traffic by vessel draught, vessel length and vessel type. Volumes of traffic are tabulated on a per/24hr, 1 month and annualised basis. In summary this demonstrates approximately 10 vessels per day using the inshore route.

7 The Applicant's Deadline 1 submission (*ibid*) also illustrates the distribution of traffic through the inshore route (for both directions of travel - North/South and South/North). This is shown in the Plot titled 1.12.1 - Inshore Through Traffic - Vessel Density at Annex M of Appendix 25 and in particular the density distribution of traffic.

2 Vessel Routes

8 To characterise the impacts on vessel routes associated with the project and the need to potentially reroute vessels, as referenced by the WRs, it is first necessary to understand whether there is an operational or safety case necessitating vessels to re-route. If rerouting of vessels is required on safety grounds, then an accurate determination of reroute distances is required by the vessel types and sizes likely to be rerouted to assess any alleged economic impacts. The following section details the Applicant's response to IP WR as follows:

- Determination of the minimum safe distance a prudent mariner would transit from the proposed TEOW.
- Determination of the available sea room post construction of the TEOW for vessels transiting the inshore route, vessels dipping to take a pilot and vessels transiting to the Margate Roads anchorage.
- And finally, a determination of distances involved if vessels chose to re-route around the TEOW.

2.2 Minimum Safe Distances

9 The Applicant's position, (as stated within the NRA), is that 0.5nm is "the minimum safe distance considered acceptable by ships masters to pass a wind farm". The basis for this distance is derived from empirical data collected during the vessel traffic surveys, which show that vessels passing the existing TOWF in the north west and south west corners routinely do so at a distance of 0.5nm, and in some cases even closer than this.

10 This minimum safe distance of 0.5nm was also confirmed, at the ISH2, by Capt. Simon Moore, the Applicant's expert witness who is an active master mariner and former PLA pilot.

11 Also, the London Pilotage Council (LPC), who represent Port of London Authority Pilots (REP1-104) state in paragraph 16.1 of their representation that it is the professional opinion of the LPC that all vessels should not approach any wind farm at a distance of less than 0.5nm.

12 However, both PLA (REP1-142) and ESL (REP1-141) contest this value, stating a buffer of 1nm between a route and the proposed WTGs should be considered. This is neither evidenced by existing practise (vessels transit <0.5nm from the east of the operational Thanet OWF), or any specific PLA guidance documentation (received during consultation), and within PLA Statutory Harbour Authority channels is not evident.

13 It is the Applicant's view therefore, as set out in representations made during ISH2 by Simon Moore, active Master Mariner, the NRA (and associated studies), and the LPC that 0.5nm is a reasonable minimum distance by which the prudent mariner would expect to avoid a wind.

2.3 Sea room

14 The Applicant's responses to IP WRs on the matter of sea room relate to three geographical areas of concern in relation to the TEOW:

- Sea room for vessels transiting inshore of the windfarm.
- Sea room for vessels dipping into the NE Pilot Boarding Station to transfer a pilot.
- Sea room for vessels transiting to / from Margate Roads anchorage.

To assist with these responses, it is necessary to begin by considering the size of vessel that is relevant to the assessment, as this dictates the sea room necessary.

Vessel Size

15 To determine the minimum sea room for safe operation of vessel routes it is necessary to identify the disposition (size / type / frequency) of vessel traffic using the route and calculate the minimum safe sea room against the largest sized vessel that would, under normal circumstances, transit the route.

16 Analysis of the Applicant's empirical MGN compliant vessel traffic radar, AIS and visual observation survey data shows that the maximum length vessel transiting the inshore route was 299m, and that over the course of the survey (taken over 32 days) the following vessel details were characterised (see also Annex M to Appendix 25 to the Deadline 1 submission (REP1-051)):

- Inshore route.
    - Only three vessels greater than 240m transited this route, representing approx. 1.6% of all vessels route.
    - The maximum vessel was the MSC ANTIGUA at 299m length overall.
- "Dipping" traffic to transfer a pilot at NE Spit pilot station route.
    - Four vessels greater than 240m transited this route representing approx. 1.5% of all vessels route.
    - The maximum vessel was the AGIOS DIMITRIOS at 299m length overall.
- Margate Roads anchorage route.
    - No vessels greater than 240m transited this route.

- The maximum vessel was the SILVER SOUL at 184m length overall.

17 The PLA and ESL response to ExAQ 1.12.1 at Deadline 1 states the inshore route is '*routinely used by vessels of up to 9m draught and up to 175m length in moderate metocean conditions. It is occasionally used by vessels up to 250m and 12m draught; this represents the reasonably maximum size of vessel that can be prudently served in moderate metocean conditions on the inshore route'*. The PLA and ESL WR therefore appears to accept that it is appropriate to use a reasonable maximum size of vessel of a length that is shorter than that identified in the empirical data from the vessel traffic survey.

18 In answer to EXA Question 1.12.1 a) "*what would be a reasonable maximum size of vessel by length, type or draught that is able to prudently use the inshore route at present in moderate MetOcean conditions*" POTLL and DPWLG answer a vessel of "*400m length / 14 draft*". This response does not tally with the empirical data derived from the vessel traffic survey or the WR from the PLA or ESL.

19 In summary therefore whilst noting that PLA and ESL representations note a smaller vessel could be considered when calculating sea room, the Applicant considers that the maximum vessel sizes which use the routes under normal circumstances, and to which sea room calculations should be conducted, is defined as follows:

- Inshore route – MSC ANTIGUA at 299m length overall.
- Dipping" traffic to transfer a pilot at NE Spit pilot station route – AGIOS DIMITRIOS at 299m length overall.
- Margate Roads Anchorage route - SILVER SOUL at 184m length overall.

Sea Room

20 When considering sea room the Applicant notes its Deadline 1 submission – NE Spit Sea Room Distances – presented at Figure 2 - which shows sea room distances to the west of the proposed TEOW Red Line boundary (RLB). The Applicant also notes that there has been no evidential / empirical basis for the reduction in RLB requested by any IP (except from LPC where empirical calculations are documented – but not expressed for either the inshore route or for "dipping" traffic).

21 When considering how to determine the minimum safe searoom the Applicant would draw the ExA's attention to the LPC's representations, with regard to necessary sea room for a shipping route, as calculated through reference to MGN543 (Section 10.3, MGN Compliance at pg 6 of the LPC Action Point document, REP1-104), where sea room calculations are made on the basis of a vessel with length of 400m and a beam of 50m, and are referenced to the shipping route to the north of the proposed TEOW passing through the Tongue pilot boarding station.

The LPC calculation for four 400m length and 50m beam vessels is as follows (see

22 Figure 1 for schematic representation):

- 4 x 50m beam = 200m
- 2 x 400m length clearance to edge of route = 800m
- 3 x 400m length between four vessels = 2,400
- Safe sea room = 3,400m (1.83nm)

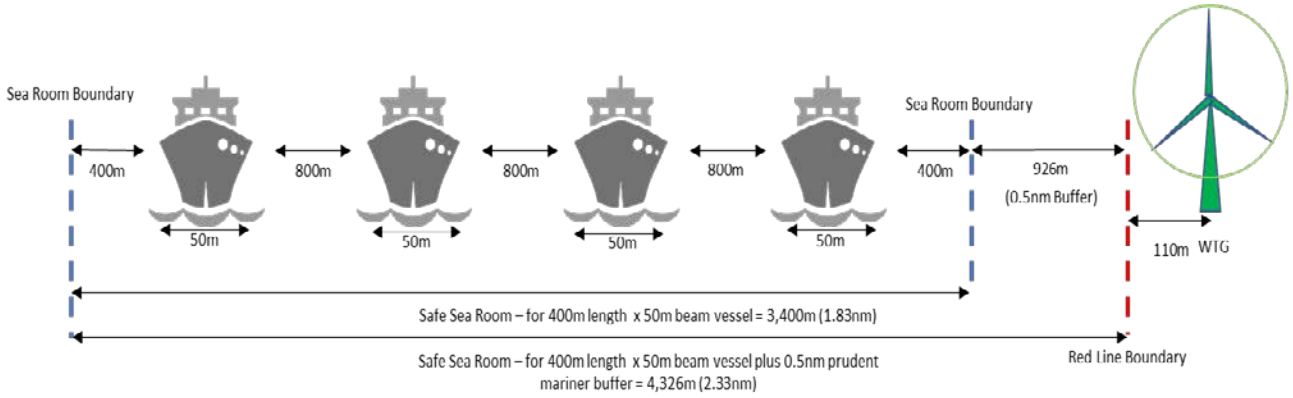

Figure 1: Schematic of LPC Sea Room Calculation for 400m length and 50m beam vessel

23 In the following sections the Applicant utilises the calculations presented by LPC, drawing on the empirical data noted above regarding maximum vessels sizes currently using the routes.

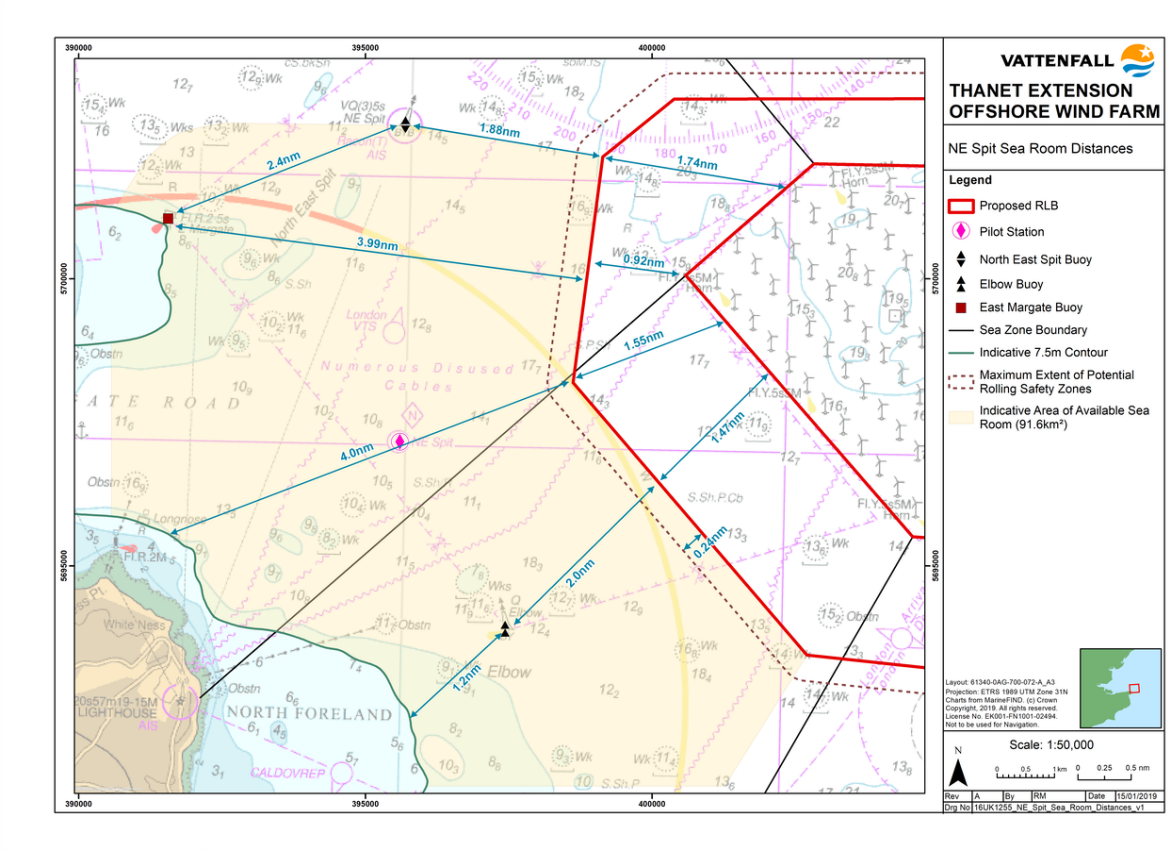

Figure 2: NE Spit Sea Room Distances – (Appendix 28, Annex B to Deadline 1 Submission: NE Spit Sea Room).

Sea Room – Inshore Route

24 Based on the maximum length vessel transiting the inshore route from the vessel traffic survey, the MSC ANTIGUA at 299m length overall and beam of 48m (which is 49m longer than the PLA state the maximum occasional use vessel length is, and comparable with the beam applied by LPC), and using the same calculations as presented in the LPC WR then 1.40nm is calculated as the necessary sea room width for the inshore route. Adding in the 0.5nm "*minimum safe distance considered acceptable by ships masters to pass a wind farm"* to this a total sea room width of 1.90nm is required for the inshore passage.

25 This calculation assumes four vessels passing concurrently, which is unlikely in this route, as prudent mariners will not overtake when there is head on traffic. Section 7.1.3. of the NRA analyses concurrent use of the inshore route and identifies concurrent transits per hour (i.e. when there are multiple vessels in the area in a given hour – which show that 4 vessels in the inshore route is a rare occurrence).

26 Also, when considering the PLA determination that a 250m length would be a reasonable maximum vessel, the four largest vessels identified in the MGN compliant vessel traffic radar, AIS and visual observation survey, have lengths and beams as follows:

- MSC ANTIGUA (Container Ship) at 299m length overall and 48m beam
- COLUMBUS (Cruise Ship) at 245.6m length overall and 32.23m beam
- FPMC P IDEAL (Tanker) at 243.8m length and 42m beam
- MANON (Vehicles Carrier) at 227.9m length and 32.29m beam

27 This shows that the largest vessel is significantly longer than the next three largest vessels, which in general are in line with the PLA determination of 250m maximum. A vessel of 299m would therefore, in this context, be considered somewhat anomalous.

28 When reference is made to the sea room plot at Figure 2, and submitted at Deadline 1, where a sea room distance from the Elbow cardinal mark to the TEOW RLB is presented as 2.0nm, then it is evident that the inshore route sea room remains appropriate based on LPC calculations.

29 Based on the LPC calculations presented above, the NRA and associated analysis, including the pilotage bridge simulations, the collision risk modelling and the expert opinion of Capt. Simon Moore (Master Mariner) it is the Applicant's firm position that the use of the inshore route would remain the same based on the submitted TEOW Red Line Boundary, and that there would be no safety or operational need for any rerouting of vessels.

Sea Room - Dipping traffic to take a pilot route

30 If a similar calculation were undertaken for vessels "dipping" to transfer a pilot at NE Spit then the sea room required for transit based on the maximum vessel length, AGIOS DIMITRIOS at 299m length and 40m beam, would be 1.38nm and with a 0.5nm prudent mariner safety buffer 1.88nm (this is a different total distance from the inshore route calculations presented above, despite the vessels having the same length, as they have differing beams). This figure exactly matches the available sea room between the NE Spit RACON / cardinal mark and the TEOW RLB – see Figure 2.

31 The four largest vessels dipping to take a pilot at NE Spit pilot boarding station were:

- AGIOS DIMITRIOS (Container vessel) at 299m length overall and 40m beam
- CMA CGM AMERICA (Container vessel) at 267.7m length overall and 32.3m beam

- MSC SABRINA (Container vessel) at 243m length overall and 33m beam which transited twice during the survey period
- GRANDE ABIDJAN (Cargo / Container Ship) at 236 m length overall and 36m beam (Grande class)

32 It is the Applicant's view that the sea room for vessels transiting to and from the NE Pilot Station would remain acceptable with the proposed RLB. The LPC calculations, as drawn from MGN 543 (M+F) corroborate this position.

33 The LPC WR does reference possible use of North East Spit Pilot Boarding station by larger vessels such as 'Havens' class vessels (which are documented in the LPC Figure 2 as having a length 333m), and states that a risk assessment has been conducted for this. The Applicant assumes this is in relation to vessels "dipping" to the NE Spit Pilot Boarding Station, and therefore asks whether a copy of this risk assessment could be made available to benchmark against the TEOW NRA and compare evidential methodologies, clarify whether the risk assessment proved use of NE Spit Pilot Boarding station was feasible for this size of vessel, and identify whether the assessment was based on use of the current NE Spit pilot boarding diamond.

Sea Room - Margate Roads anchorage route

34 The minimum route width for vessels transiting to the Margate Roads Anchorage, by virtue of its location is either through the inshore route or the "dipping" route. Based on the above LPC calculations both have sufficient sea room for 299m length vessels. The maximum vessel transiting to the Margate Roads anchorage is SILVER SOUL at 184m length overall and therefore, there are no sea room restrictions for such vessels in relation to the anchorage route.

Sea Room Summary

35 The Applicant has calculated sea rooms based on the evidential basis put forward by the LPC in the absence of other empirical methodology or data provided by other IP's, and notes that for all three routes transiting to the west of the proposed TEOW, sufficient sea room remains post construction of the TEOW RLB. As such, it is evident that vessels there would be no safety or operational need to reroute as a result TEOW. Any rerouting would only be caused by the same circumstances as may current arise (e.g. extreme adverse weather, vessel defects, etc.).

2.4 Distance of re-routing

36 Whilst the Applicant identifies that rerouting of vessels is unlikely, vessel masters may still chose an alternative route rather than the inshore route, at least during certain times such as construction of the western extent. Were this the case then the distance a vessel is rerouted was determined within the NRA to not be significant.

37 The Applicant undertook a calculation which identified the additional distance for a vessel that intended to take the inshore route, but chose to transit around the TEOW to be approximately 11nm, see paragraph 7.1.2 of the NRA. The rationale of the reroute was that if the vessel chose to reroute around eh wind farm it would not then "dip" to take a pilot at NE Spit.

38 However, the PLA and ESL WR contest the distance put forward by the Applicant as representative of any increase in journey re-routeing, and in their view this is closer to 14nm which assumes that the vessel would "dip" down into North East Spit boarding area to take a pilot. It is however counter intuitive for a vessel that actively chose not to navigate the inshore, would then "dip" down (into the inshore route) to take a pilot, and would more likely request a pilot at either the Tongue or NE Goodwin pilot boarding stations. In addition to this Port of Tilbury / DPWLG also identify a similar distance to PLA /ESL of 14.4nm. (see Figure 3).

39 The LPC, appear to take this on board, that a rerouted vessel would not elect to "dip" to take a pilot as they assume when taking a passage from NE Goodwin the additional distance will be 7.8nm. This distance is less than the Applicant calculated, as LPC chose to commence the reroute from the NE Goodwin Pilot boarding station, and shows inshore route transiting to the east of the NE Spit RACON / Cardinal mark – which has some validity for larger draught vessels only.

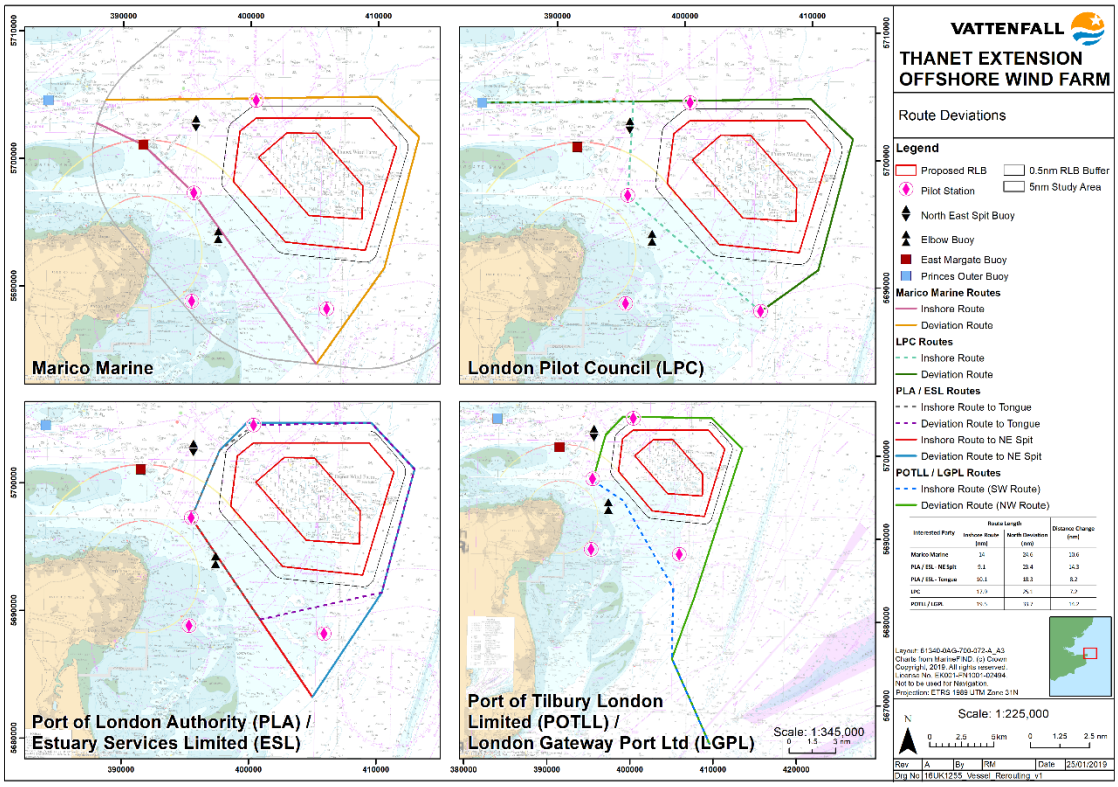

Figure 3: Route Deviations

40 Part of the reason for these discrepancies, is the assumed start and end point of the deviation. Notwithstanding the potential economic effect associated with the re-routeing as raised by LPC in their response, it should be noted that Port of Tilbury, PLA and ESL all assume vessels would 'dip' back into the NE Spit pilot station. This assumption requires a vessel master to pass by NE Goodwin and the Tongue pilot stations in order to get to NE Spit. This appears to be an overtly conservative assumption that is unlikely to be borne out, in particular given the Applicant's firm view that pilotage operations are evidentially able to continue, as recorded within the pilotage simulation.

41 On this basis and considering the variation in assumed distances submitted at Deadline 1, the Applicant maintains that an assumed re-routeing for pilotage operations of 11nm for vessels that chose to reroute from the inshore route is a reasonable basis for the purposes of assessment, noting however the Applicant does not agree that vessels would need take this diversion.

2.5 Summary

42 It is the Applicant's position that any consideration of re-routeing distance should be made in the context of continued use of existing pilot stations. To the extent that any rerouting would be necessary, the range of additional distance would therefore be approximately 11nm.

3 Proposed capital dredging in the area

43 The PLA and ESL have responded within the submitted WR, providing information as requested by the ExA with regards projected data on the use of the Port [of London] and the impact of any proposed works in the area.

44 Specifically, the PLA and ESL have noted that "*the key potential works which could be undertaken by the PLA over the lifetime of the extended Wind Farm would be the potential dredging of either Fisherman's Gat or the North Edinburgh Channel*". The Applicant can confirm, as identified within the Applicant's responses to ISH2 Action Point (REP1-012), that following a review of the MMO's MCMS there is no current record of a project of this nature on the Public Register. As such this would not be a material consideration within the cumulative effects assessment undertaken for Thanet Extension.

45 Notwithstanding this clarification the Applicant notes that the area mentioned also falls outwith the TEOW study area to the north-west. Fisherman's Gat does not appear visibly on the Applicants Deadline 1 submission (Nautical Chart; REP1-025) but is illustrated below for the benefit of the ExA, and can be seen to the north-east of N Edinburgh Channel which falls just to the west of the Princes Channel 'seazone' demarcation line as illustrated on the Applicants REP1-025 submission.

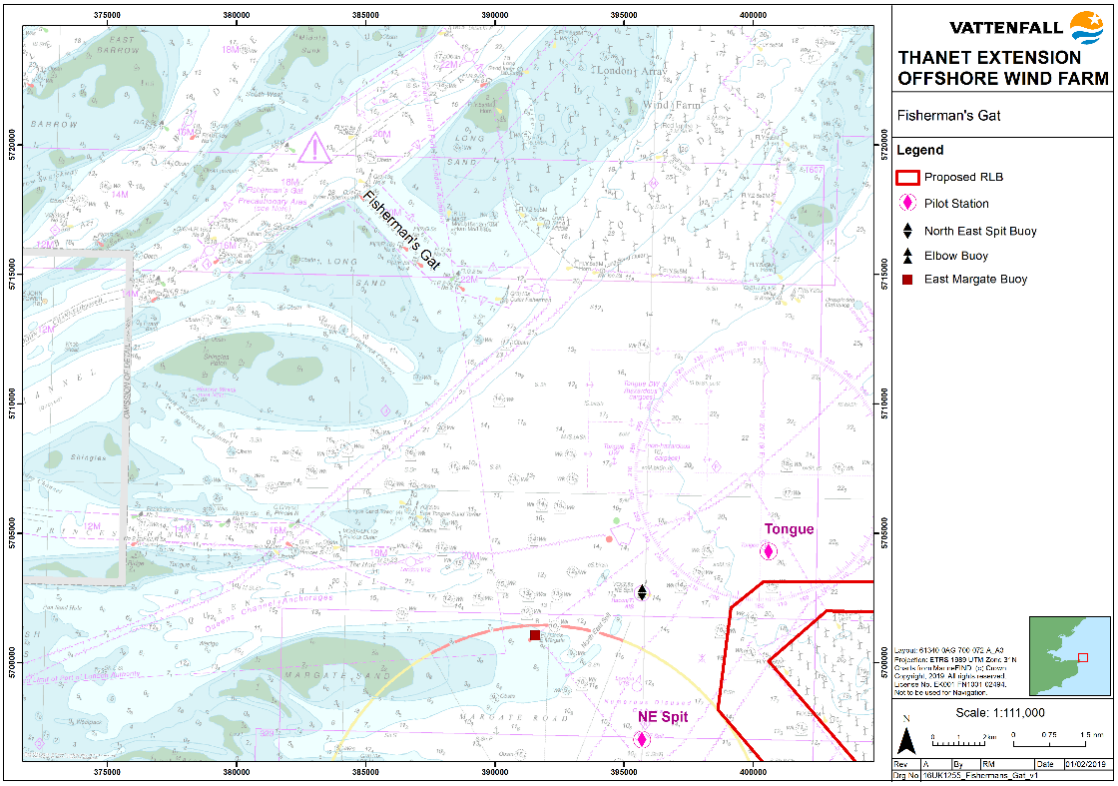

Figure 4 Chartlet showing Fishermans Gat

46 The Applicant would also make the observation that the Fisherman's Gat area falls within the Margate and Long Sands Special Area of Conservation which would present a significant environmental barrier to a large scale dredging operation in this area.

4 Collision risk

47 Within the PLA and ESL WRs it is stated that there would be the same number of vessels slowing down and changing direction but in a reduced area of sea room, which would increase the risk of vessel collisions. Notably, however, the PLA and ESL also state that they consider the sea room too small and that vessel would choose to re-route round the wind farm, which would consequently reduce collision risk. It is unclear which of these is considered to represent the most likely position on their case.

48 The Applicant does not accept that any there would be any unacceptable increase in collision risk in this case. The Applicant notes, as put forward in response to ExQ 1.12.15, that whilst the term collision risk is used in line with common practice, the analysis is in reality based on 'encounters', considered by reference to "domain" areas drawn on a precautionary basis at a distance around the vessels in the model. This does not fully account for human intervention (i.e. the reality that a vessel master would seek to avoid any collision when an encounter occurs) nor the severity of that collision, of that ESL or PLA may intervene.

49 In this context it is also important to note that the evidence base used to generate the increase in collisions or potential encounters was highly precautionary. Since 1997, 3 collisions were recorded within the study area by the MAIB, a background rate of once in 6 years. However, since the wind farm was constructed in 2010, there have been no collisions, either directly attributable to the wind farm or due to any other factors. The analysis has used the post-construction vessel traffic profile to model encounters and applied it to the historical incident rate. If this was applied to the post-construction incident rate of zero incidents, the increase would also be zero. As navigational risk has decreased locally and internationally since 1997 (for instance due to new technology), this assumption is conservative.

50 The Applicant has therefore sought to ensure that a worst case conservative measure of the likelihood of an encounter to occur is captured within the NRA. However this does not reflect the reality that no commercial vessel collisions, reported either formally or anecdotally, have occurred related to the presence of a wind farm in this area of sea room, which demonstrates that the baseline risk is low.