PORT OF TILBURY LONDON

PLANNING ACT 2008
INFRASTRUCTURE PLANNING (EXAMINATION PROCEDURE)
RULES 2010

PROPOSED PORT TERMINAL AT FORMER TILBURY POWER STATION

TILBURY2

TR030003

RESPONSE TO EXAMINING AUTHORITY'S REPORT ON THE IMPLICATIONS FOR EUROPEAN SITES

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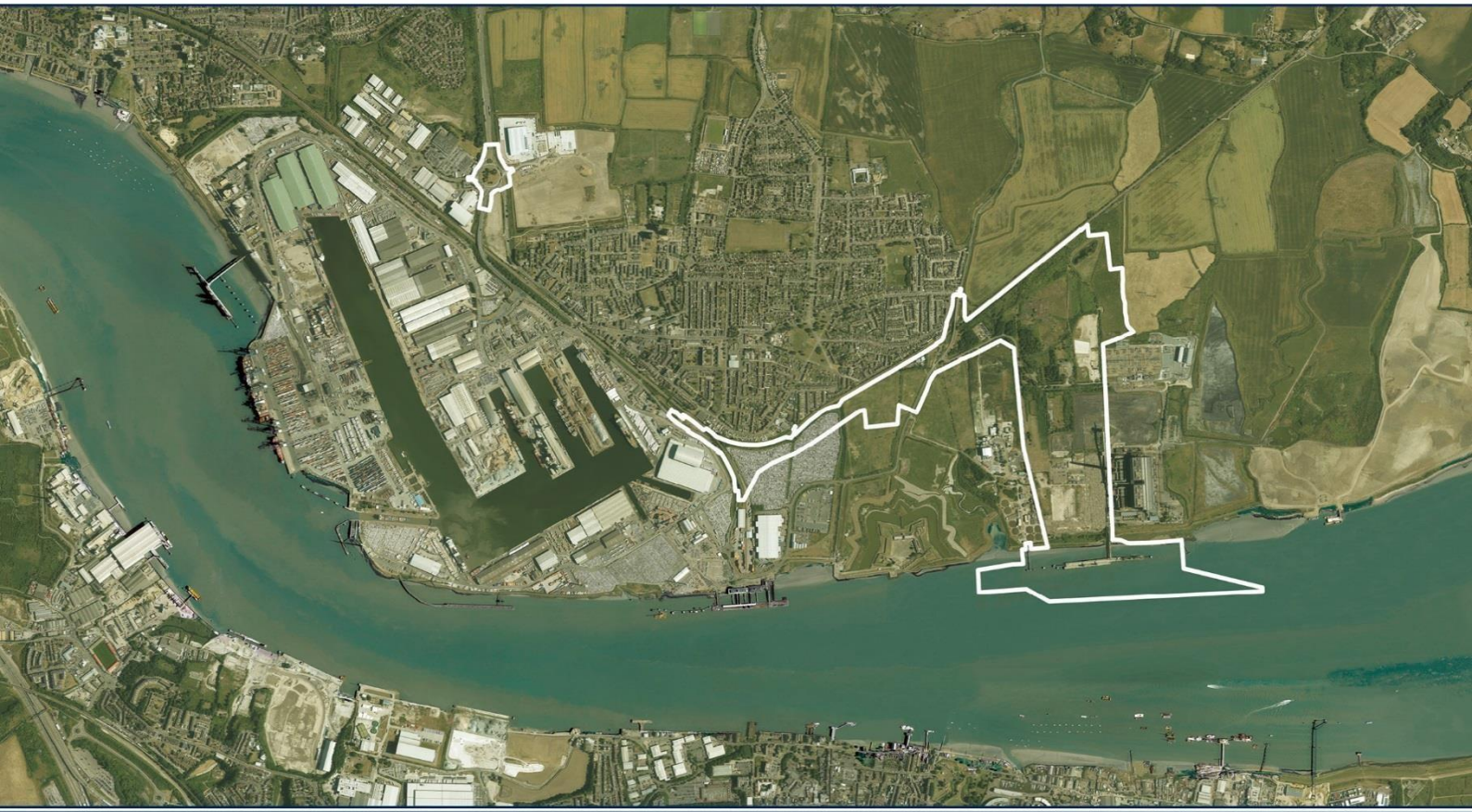


TILBURY2

Response to Examining Authority's Report on the Implications for European Sites

Application by Port of Tilbury London Limited for an Order Granting Development Consent for a Proposed Port Terminal at the Former Tilbury Power Station ('Tilbury2')

Issued for Deadline 6 on 3rd August 2018

Table of Contents

1.0. FRONT END STATEMENT

1.1 This document outlines the Applicant's Response to the Examining Authority's Report on the Implications for European Sites ("RIES"). A detailed response is provided in the table at Section 2 of this document.

1.2 By way of introduction, some contextual issues are addressed. The project is not in, adjacent to, or close to a European site. The nearest part of the Ramsar Site is c.1.5km and the nearest part of the SPA is c.2km from the Order Limits. The vast majority of the SPA and Ramsar sites are more than 3km from the Order Limits.

1.3 There is no functional linkage between the landward areas of the Order Limits and the SPA/Ramsar site in respect of the bird species for which the sites are designated. The Order Limits do encompass areas of intertidal habitat which (in common with all such intertidal areas along this reach of the Thames) are or may be used by certain qualifying interest features of the SPA/Ramsar site. However, those areas of intertidal habitat form a very small part of the wider Estuary environment, and have a history of being influenced by the proximity of industrial activities. The use of these areas of intertidal habitat by qualifying interest features, especially birds, is very low or negligible on any analysis.

1.4 To the extent that certain species of Ramsar Criterion 2 plant or invertebrate have populations within the Order Limits as well as within the Ramsar Site itself, this is not an unusual situation and the same is likely to apply to a greater extent to any area of estuary-side land eastwards of the Dartford crossing. To the extent that any degree of functional linkage between site and Ramsar populations of such species can be claimed, it is tenuous at best.

1.5 Notwithstanding this, the Applicant has taken a highly precautionary approach to the assessment of impacts on European sites. Consequently, the scope of the assessment is broad and considerable analysis has been provided (and has been incorporated into the RIES). However, in considering the implications for the Thames Estuary and Marshes SPA and the Thames Estuary and Marshes Ramsar Site, the geographical relationship and resultant very restricted potential for interaction between the project and interest features of the European sites needs to be borne in mind.

1.6 The Applicant's view is that even adopting this highly precautionary approach, the decision-maker can clearly be satisfied on the basis of the information supplied that there will be no adverse effect on the integrity of either the Thames Estuary and Marshes SPA or the Thames Estuary and Marshes Ramsar Site arising from the project.

1.7 As the RIES notes, in a number of instances Natural England has not given a definitive view on the question of adverse effects on integrity. This is regrettable since the Applicant does not consider that it can reasonably be concluded that there would be any adverse effect on site integrity, and Natural England's silence on the issue might risk creating the contrary impression. However, Natural England does not produce evidence which is capable of undermining the Applicant's conclusion, and

therefore the proper conclusion is that the Applicant has discharged the burden of proof in demonstrating that there is no possible adverse effect on site integrity.

1.8 In terms of in-combination effects, the Applicant has explained elsewhere that its inclusion of the Tilbury Energy Centre (TEC) and Lower Thames Crossing (LTC) in its assessment is on a highly precautionary basis, and on the basis of limited information known about those projects. It is not for the Applicant to assess the effect of those potential projects on European sites. Further, and importantly, those projects will be subject to consenting processes which will necessarily include assessments of the effects on the SPA/Ramsar site, and the Applicant's assessment of the Tilbury2 project can be incorporated into those future assessments. Consent for those projects will be refused if it cannot be demonstrated, at that stage, that there will be no adverse effect on site integrity arising from them.

1.9 It is no part of the Habitats Directive or Regulations that consent should be withheld for a project which does not have an adverse effect on site integrity by reference to other potential projects which have not yet been consented, and which will themselves be the subject of consideration for their effects on European Sites.

1.10 The Applicant's in-combination assessment is sufficient to demonstrate that, subject to their final detail, those projects could come forward along with Tilbury2 without adverse in-combination effects on site integrity; it is not for the Applicant to demonstrate more than that and nor is it possible to do so. In particular, the Applicant is not required by law or policy to carry out a quantitative assessment of the impacts of other proposed projects, the details of which are not known, to complete its own Habitats Regulations Assessment. So far as Natural England appear in places to suggest otherwise, their approach goes beyond the legislative and policy requirements, and is unworkable.

1.11 The Applicant therefore concludes that, having regard to the RIES and its own assessment, the Examining Authority and the Secretary of State can be satisfied that there would be no adverse effect on site integrity arising from the project, either alone or in combination with other plans and projects.

2.0. RESPONSE TO EXAMINING AUTHORITY'S REPORT ON THE IMPLICATIONS FOR EUROPEAN SITES

Paragraph Number	ExA Comment	PoTLL Response
Section 2 – Overview		
2.3	"The nearest part of any European site is approximately 1.5km to the south-east of the Tilbury2 Order land"	This is not strictly correct. The SPA and Ramsar Site extend at their closest to approximately 1.5km from the south-east of the Tilbury2 Order ***Limits***, but the Order Limits encompass parts of the navigational approach channel in the tidal Thames – i.e. open water habitats. This means that the nearest area of ***land*** within the Tilbury2 Order limits (the jetty structures) is closer to 2km from the Ramsar Site and SPA. and the nearest areas of functionally linked intertidal habitat are around 2.1km distant from the SPA and Ramsar Site.
2.8 and 2.10	2.8 "As a result of these concerns, the Applicant revised its assessment with the acknowledgement that some potential impacts could result in LSE on some features of the European Sites". 2.10 "Following the Applicant's acknowledgement of LSE…"	Not strictly correct. The Applicant's revisions were not made in acknowledgement of hitherto unrecognised LSE but rather in order to adopt a more precautionary approach to HRA process in light of the CJEU People Over Wind judgment and the subsequent change in PINS advice that mitigation measures should not be factored in at the screening stage of HRA (as was standard practice up to that judgment, and consistent with domestic case law in ***Hart***). The revisions to the HRA therefore reflect acknowledgement of the potential procedural implications of the People Over Wind decision. The original assessment concluded that LSE could be excluded partly on the basis of mitigation measures and the revised assessment disregarded those measures for the purposes of the screening stage, but has taken them into account at Appropriate Assessment stage.
Section 3 – Likely Significant Effects (Zone of Influence)		
3.9	"The Applicant responded to these points in FWQ 1.11.3 [REP1-016], and in table 3 of the HRA Stage 2 Report [REP5-032] and subsequently applied a larger zone of influence for: air quality impacts from shipping	Not strictly correct. The disagreement with NE over the size of zones of influence relates solely to the 300m zone used for (combined) construction phase noise, lighting, disturbance and dust impacts, as discussed in RIES 3.8. The zones of influence for air quality impacts from shipping traffic along the Thames navigable channel and for sediment mobilisation and redeposition have not changed since the original HRA report [APP-060] and have not been contested. For these, all that has changed is the threshold for considering effects from such sources as 'likely significant', which has been lowered to reflect and account for the change to a stage 2 assessment. This change and the subsequent HRA Report iterations have been precipitated in the light of the precautionary approach taken in and described by the Stage 2 HRA Reports [REP4-018 and REP5-032] which depart from the originally submitted version in disregarding mitigation measures in the screening process in the wake of the People Over Wind judgment and the change in PINS advice arising from that.

<table>
<tr><th>Paragraph Number</th><th>ExA Comment</th><th>PoTLL Response</th></tr>
<tr><td></td><td>traffic along the Thames navigable channel; and sediment mobilisation and redeposition from the proposed marine works and dredging.”.</td><td></td></tr>
<tr><td>3.17</td><td>“NE also cited previous assessment work using a 500m zone of influence, such as a report produced in 2011 for Tilbury Power Station”</td><td>Since the ISH the Applicant has sourced this report via direct approaches to RWE and their consultants WYG. It documents the following: Intertidal water bird surveys (January–March 2007, August–October 2007, November 2007-March 2008, and April-May 2008).

The report refers to the WYG 2011 report: “Assessment of Potential Impacts on the Thames Estuary and Marshes SPA 2011” which the Applicant has requested in follow on correspondence. It is anticipated that NE may be referring to this report in its references to zone of influence. The Applicant will comment on that if necessary once received. However, to put the matter beyond doubt, an exercise of assessment using a 500m zone has been carried out (as detailed in response to 3.19 below) and this does not change the conclusions of the HRA and therefore robust sensitivity testing has been undertaken in the absence of this data from the applicant’s own direct assessment using the 500m zone.</td></tr>
<tr><td>3.19</td><td>“At the time of publication of this RIES, disagreement remained between the Applicant and NE regarding the zones of influence used to assess noise disturbance to ornithological features of the SPA and Ramsar Site”.</td><td>To attempt to resolve this issue, the Applicant has conducted an assessment of whether use of a 500m zone of influence for noise disturbance would alter the conclusions of the HRA. The results are summarised in the table below, and on figures presented in Appendix 1 to this document.

<table>
<tr><th>SPA qualifying period</th><th>Species</th><th>Number of individuals listed on SPA sheet</th><th>Number of individuals (peak mean 04/05 to 08/09)</th><th>Peak count</th><th>No. of visits encountered in survey area (out of 17 visits)</th><th>Percentage of peak number of individuals found within the T2 500m buffer (based on recent peak mean of 2004/05-2008/09)</th></tr>
<tr><td>Oct-Mar</td><td>Avocet</td><td>283</td><td>1395</td><td>12</td><td>6</td><td>0.86</td></tr>
<tr><td>Oct-Mar</td><td>Black-tailed godwit</td><td>1699</td><td>5311</td><td>6</td><td>2</td><td>0.11</td></tr>
<tr><td>Oct-Mar</td><td>Dunlin</td><td>29646</td><td>37251</td><td>58</td><td>2</td><td>0.16</td></tr>
<tr><td>Oct-Mar</td><td>Grey plover</td><td>2593</td><td>5673</td><td>2</td><td>1</td><td>0.04</td></tr>
</table>
</td></tr>
</table>

Paragraph Number	ExA Comment	PoTLL Response

Oct-Mar	Hen Harrier	7	0	0	0	0.00
Oct-Mar	Knot	4848	42871	0	0	0.00
Oct-Mar	Redshank	3251	4313	27	12	0.63
Passage	*Ringed plover**	*1324*	*1186*	0	0	*0.00*

* passage period only

It has been found that on the basis of the baseline survey information presented in the ES [APP-031] and in the subsequent Bird Note appended to the HRA report [Appendix 9 of REP5-032] that it remains the case that no likely significant effect on any qualifying bird species or bird assemblage is indicated by use of a 500m zone of influence, with the recorded numbers of individual species that could potentially be displaced all still falling below 1% of the SPA and/or Ramsar Site totals, and the collective waterfowl numbers similarly falling below 1% of the respective SPA and/or Ramsar Site totals. The HRA conclusions are not therefore altered by adoption of a 500m zone of influence for noise impacts, notwithstanding that the Applicant maintains its position that this is not necessary. The Examining Authority and Statutory Nature Conservation bodies can be satisfied that this matter has been robustly evidenced and tested in examination.

Section 3 – Likely Significant Effects (Value/importance of 'functionally linked' intertidal habitat)

3.21	"NE also considered that… case law has established that functionally-linked land should receive equivalent protection to the designated sites"	The Applicant disagrees with this characterisation of the Lydd judgment: functionally-linked land does not receive equivalent protection to the designated sites, but indirect effects on the designated sites through impacts on interest features of the designated sites within the functionally-linked land need to be considered. The relevant paragraph from the judgment (para 27) is where Ouseley J states *"There is no authority on the significance of the non-statutory status of the FLL [Functionally Linked Land]. However, the fact that the FLL was not within a protected site does not mean that the effect which a deterioration in its quality or function could have on a protected site is to be ignored. <u>The indirect effect was still protected</u>. Although the question of its legal status was mooted, I am satisfied, as was the case at the Inquiry, that while no particular legal status attaches to FLL, the fact that land is functionally linked to protected land means that the indirectly adverse effects on a protected site, produced by effects on FLL, are scrutinised in the same legal framework just as are the direct effects of acts carried out on the protected site itself. That is the only sensible and purposive approach where a species or effect is not confined by a line on a map or boundary fence. This is particularly important where the boundaries of designated sites are drawn tightly as may be the UK practice."* As per the emphasis added to the above, the judgment makes a clear distinction between the land itself and effects occurring on it that could have implications for a functionally linked European Site. NE's suggestion that

Paragraph Number	ExA Comment	PoTLL Response
		'functionally linked land should receive equivalent protection to the designated sites' receives no support in the judgment.
3.25	"In the updated Stage 2 HRA Report [REP5-032], the Applicant acknowledged that a LSE could not be ruled out and considered disturbance to birds using functionally linked land from construction within the Stage 2 assessment."	Again, the elevation of this potential effect to Stage 2 assessment was not in acknowledgement of hitherto overlooked LSE but rather to adopt a more precautionary approach to the assessment procedure in light of the CJEU People Over Wind judgment and the subsequent change in PINS advice that mitigation measures should not be factored in at the screening stage of HRA, as was long-standing practice and established domestic case law up to that point. It was acknowledgement of the procedural implications of the People Over Wind decision, not acknowledgement that LSE had been previously overlooked.
Section 3 – Likely Significant Effects (Mitigation and likely significant effects)		
3.28	"NE considers that this ruling "*signals a presumption in favour of Appropriate Assessment, and that mitigation measures require further scrutiny*""	Although not especially material to this case, the Applicant does not agree with this characterisation of the People Over Wind judgment. The issue in that case relates to consideration of mitigation measures at the screening stage. Beyond that issue, the judgment does not change existing case law so far as it relates to the threshold at which the need for Appropriate Assessment is engaged. .
Section 4 – Adverse Effects on Integrity (Disturbance to birds utilising functionally-linked habitat)		
4.7	"The Applicant has not confirmed if or how delivery of the BMAP would be secured"	The BMAP would be secured as a DCO requirement in the same way as the following documents that will be certified: the CEMP [PoTLL/T2/EX/185 & 186], the LEMP [PoTLL/T2/EX/177] and EMCP [PoTLL/T2/EX/189 & 190].
Section 4 – Adverse Effects on Integrity (Sufficiency of mitigation – saltmarsh and intertidal mudflat)		
4.12	"At Deadline 5, the updated Stage 2 HRA Report [REP5-032]	Details of the habitat reinstatement and compensatory provision for the very small quantum of saltmarsh and intertidal mudflat loss due to new surface water outfall construction are attached at Appendix 2 of this document. They were not provided with the Stage 2 HRA report for three reasons. Firstly that agreement on

Paragraph Number	ExA Comment	PoTLL Response
	concluded a LSE from the loss of functionally linked saltmarsh and intertidal mudflat habitats. However it ultimately concluded no adverse effect on integrity, taking into account the proposed habitat provision (see footnote b of Annex 3). Specific details of the habitat provision were not provided."	the final design was still in the process of being agreed with the Environment Agency. The final design has since been agreed in principle [Statements of Common Ground Update Report for Deadline 6 – PoTLL/T2/RX/188] but the provisions for securing the groyne structures via the DML is a matter still under discussion with the MMO (see Response to ExA comments on DCO and Interested Parties' Deadline 5 Submissions [PoTLL/T2/EX/193]. Secondly (and more importantly), these details were not provided with the Stage 2 HRA report as such compensation and reinstatement is not required as a mitigation measure in order to reach the conclusion of no adverse effect on integrity. This is because of the very low and temporary quantum of loss having regard to the low levels of use of the area (known or anticipated) by cited species of flora and fauna and thirdly (and consequentially) because the purpose of the compensatory provision was chiefly to achieve no net loss of the priority habitats rather than in connection with any functional linkage to the European or Ramsar Site.
Section 4 – Adverse Effects on Integrity (Sufficiency of mitigation – coastal and floodplain grazing marsh)		
4.20	"Section 8 of the draft EMCP [REP5-041] provided details of the proposed restoration of the 0.1ha of coastal and floodplain grazing marsh to be temporarily los on-site. Section 9 provided details of the proposed provision of 30-37ha of coastal grazing marsh off-site at Paglesham, Essex, to mitigate the permanent losses."	The purpose of the compensatory provision was to achieve no net loss of coastal and floodplain grazing marsh Priority habitat rather than in connection with any potential functional linkage to the European or Ramsar Site. No such linkage has been identified for any SPA species or for nearly all Ramsar cited species but there is a theoretical possibility of indirect links between on-site populations of certain plant and invertebrate species and those within the bounds of the SPA and Ramsar Site. For example, divided sedge *Carex divisa*, annual beard grass *Polypogon monspeliensis* or the water beetle *Aulacochthebius (=Ochthebius) exaratus* all occur or have been recorded within the Order Limits (although not necessarily in association with coastal and floodplain grazing marsh habitat). Such linkages will be tenuous at best and will involve intervening land with stepping stone populations, buffering any theoretical effects and obviating the scope for an adverse effect on integrity.
Section 4 – Adverse Effects on Integrity (mitigation for disturbance to SPA and Ramsar birds from piling noise and dredging)		
4.27	"No further representations have	The Applicant's case remains that: i) On piling, adverse effects on integrity (and arguably LSE) can be excluded on the basis of the low

Paragraph Number	ExA Comment	PoTLL Response
	been made with regard to the piling and dredging restrictions suggested above"	levels of use of land within the zone of influence of piling noise impacts by cited bird species, the worst case approach taken to assessment and the time-limited nature of the piling. The table at 3.19 above, and the associated figures at Appendix 1 of this document demonstrate that this assessment stands even if the zone of influence of piling disturbance is extended to 500m as a sensitivity testing exercise. The monitoring secured by the BMAP, although not relied on in order to reach the no LSE/no AEOI conclusion, provides an additional safeguard. No restrictions are therefore required. ii) On dredging, the Applicant maintains the position that if the MMO in its role as competent authority and taking advice from NE and PLA deems restrictions to be necessary to prevent adverse effects on the European and/or Ramsar Site from dredging operations it will be able to impose any necessary and appropriate controls through the conditions of the DML.
Section 4 – Adverse Effects on Integrity (mitigation for impacts to functionally linked intertidal habitats supporting SPA and Ramsar site features from dredging (remobilisation of contaminants and sediment plumes))		
4.30	"No further references to the need for dredging restrictions were made by NE"	The Applicant's case remains that restrictions are not necessary due to the backhoe methodology proposed for areas identified with contamination. If the MMO in its role as competent authority and taking advice from NE and PLA deems restrictions to be necessary to prevent adverse effects on the European and/or Ramsar Site from dredging operations, alone or in-combination, it will be able to impose any necessary and appropriate controls through the conditions of the DML.
Section 4 – Adverse Effects on Integrity (Additional mitigation)		
4.33	"NE [REP1-074 and REP3-042] also suggested that additional mitigation measures were required to manage surface water pollution, in order to comply with best practice. No mitigation measures have been explicitly identified in the updated HRA Stage 2 Report [REP5-032]".	Surface water pollution will be controlled via measures set out in the Construction Environmental Management Plan (CEMP), for example at paragraphs 7.3 and 8.2 [REP3-012]; in the Operation Management Plan (OMP) [REP5-022]; and in the Drainage Strategy [APP-090]. The HRA report references all three documents as secured/enforceable embedded mitigation (see Table 5 of the HRA Stage 2 report). However for the avoidance of doubt, the measures include (for example): "(From CEMP 7.3): in constructing the marine elements of the proposals a Contractor must also: • Use and operate vessels and plant in accordance with industry best practice and OSPAR, IMO and MARPOL guidance for pollution at sea. • Maintain machinery in good working order to minimise the risk of leaks and use of drip trays where

Paragraph Number	ExA Comment	PoTLL Response
		necessary; • Bund of vehicle wash-down areas and routing of run-off through interceptors; • Undertake refuelling operations in appropriately bunded and managed areas within compound sites; • Put robust measures and equipment in place for dealing with any unexpected pollution events that will be in place at all times (such as those set out elsewhere in this document); • Through the Materials Management Plan referred to below, implement controls on construction materials brought to site such that these are free from contaminated material, so as to avoid potential run-off contamination; ..."
Section 4 – In-combination effects		
4.34-4.54	In-combination effects with LTC and TEC.	The approach to in-combination assessment of LTC and TEC is addressed in the introductory section. Neither of these projects are consented and any effects on European sites from those projects will have to be considered before consent is granted for them. The Applicant's assessment is sufficient to demonstrate as far as current information allows that those projects, together with Tilbury 2, can come forward without adverse effects on site integrity. However it is important to note that the full assessment of those projects, in combination with Tilbury 2, will be for the decision-maker in those cases. The Applicant maintains that it has provided sufficient information for present purposes to show that there will be no adverse effect on site integrity. As the RIES notes, whilst NE makes the general assertion that "quantitative assessment should be possible", it has not identified the "significant information" which is claims has not been considered, nor has it set out any specific disagreements with the Applicant's assessment.
Section 5 – Next Steps		
5.2	"As there appears to be a disagreement between the Applicant and NE with regards to	There has been no formal engagement with Stages 3 and 4 of the HRA process as the process is necessarily sequential, encouraging applicants and assessors to consider the scope to avoid likely significant effects and avoid or mitigate adverse effects on integrity before engaging with (or seeking to rely on) the latter stages. Only if residual issues of concern fall out of the Stage 1 and Stage 2 processes is there a requirement to

Paragraph Number	ExA Comment	PoTLL Response
	the findings of the HRA and in particular the absence of adverse effects on integrity, the Applicant is invited to confirm the extent to which it has considered stages of the HRA assessment process beyond those addressed within the HRA Stage 2 Report, i.e. alternative solutions (Stage 3), and imperative reasons of overriding public interest (Stage 4)"	engage with alternative solutions or IROPI. That is not the case with the Tilbury2 project where in the first instance no LSE were identified taking account of mitigation measures and where a revised Stage 2 HRA has been undertaken for those potential effects where mitigation measures had in previous iterations been taken account of in concluding no LSE or adverse effect on integrity, to ensure alignment with the procedural implications arising out of the People Over Wind judgment and change in PINS Advice. Outside of the HRA process, and early in the evolution of the Tilbury2 project there was certainly engagement with related issues such as alternative design configurations and the matter of commercial need, and this is as set out in the ES Chapters 3 (Port of Tilbury – Existing and Future) and 5 (Description of the Proposals) and in the accompanying Outline Business Case [AS-016]; and related documents such as the CMAT Position Statement [REP1-016 Appendix B]. The need is also considered within the Planning Policy Compliance Statement [REP3-005]. Alternatives for the proposals as a whole and in terms of location are considered in ES Chapter 6 and its appended Masterplanning Statement [APP-034] and Surface Access Options. However, the Applicant's position is that these are not relevant to the HRA process due to the conclusion having been reached that the project will either give rise to no LSE or, where that cannot be absolutely excluded or where there is residual doubt as to whether LSE can be completely excluded, there will be no adverse effects on integrity arising from the project. Consideration of alternatives only arises where adverse effects on integrity cannot be excluded, and in this case such effects can be excluded.
ANNEX 1 – POTENTIAL EFFECTS		
Potential Effects Table	Direct loss of and damage to intertidal habitats… "and to coastal grazing marsh habitats from construction of the infrastructure corridor"	Reference is made to Note 1 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. On this specific issue, the Applicant notes that the impression can be gained from the way that the ExA has re-structured this table and the LSE and integrity matrices that there is a functional linkage between the coastal and floodplain grazing marsh habitats that will be lost to construction of the infrastructure corridor and the cited bird interests of the SPA and Ramsar Site. There is no such functional linkage. As set out in ES para 10.285 and ES Appendix 10.I, surveys of the grazing marsh habitats in the Infrastructure Corridor found no use by cited waterfowl, waders or hen harrier. The only plausible case for functional linkage is to the Ramsar Site due to habitats within the infrastructure corridor having populations of species such as the plant *Carex divisa* (divided sedge). The same could be said of most representations of coastal grazing marsh habitat in the Thames Estuary region however, including non-designated habitats closer to the Ramsar Site than the infrastructure corridor. Therefore even any functional link based on Ramsar Criterion 2 species is extremely tenuous and it can be concluded with certainty that it does not provide a pathway for significant effects on the Ramsar Site.
Screening matrices – footnote h	**Loss or damage to functionally linked habitats and**	Reference is made to Note 2 of the comment annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. This is the same source of possible error as addressed above. There is no functional linkage between these habitats and the SPA, and no functional

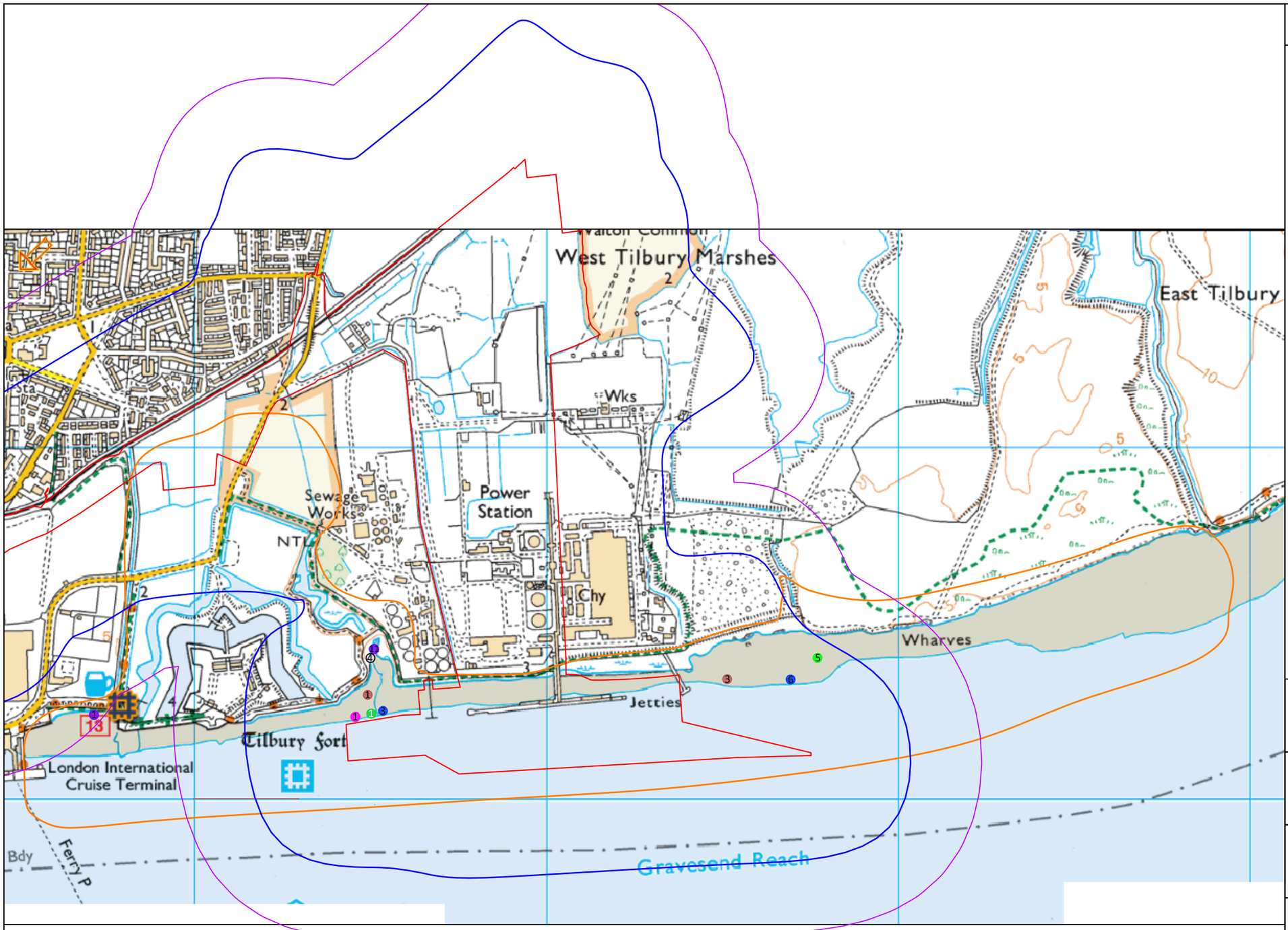
Paragraph Number	ExA Comment	PoTLL Response
	populations (second bullet) "3.5ha of coastal and floodplain grazing marsh"	linkage between these habitats and the bird species underpinning the Ramsar Site. There is potentially an extremely tenuous relationship between certain Ramsar Criterion 2 species found in association with these habitats and the populations within the Ramsar Site but it can be concluded with certainty that this does not provide a pathway for significant effects on the Ramsar Site.
Screening matrices – footnote i	**Loss or damage to Criterion 2 plant/invertebrate species**	Reference is made to Note 3 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. The Applicant suggests the text "from disturbance" is added to this title
Integrity matrices – footnote a	"The Applicant's integrity matrices do not make explicit reference to these potential effects…"	Reference is made to Note 4 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. This is because the zone of influence of lighting and human activity effects from the Tilbury2 site fall within the 300m agglomerated disturbance effects envelope as explained at HRA Report 4.1.3. For shipping, LSE is excluded at HRA Report Screening Matrices note b.
Integrity matrices – footnote b	"The loss of functionally linked land for SPA and Ramsar bird species has not explicitly been addressed within the Applicant's integrity matrices"	Reference is made to Note 5 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. The reason is that there is no scope for LSE via this mechanism. Intertidal and mudflat habitat loss is de minimis and temporary and contained within an area that receives use by significantly less than 1% of any cited bird species. There is no functional linkage between coastal and floodplain grazing marsh habitats to be lost in the Infrastructure Corridor and the bird populations of the SPA and/or Ramsar Site.
Integrity matrices – footnote c	"The Applicant's integrity matrices do not make reference to the 3.5ha of coastal and floodplain grazing marsh which was identified in the screening matrices".	Reference is made to Note 6 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. The reason is that impacts on this habitat are assessed to give rise to no LSE and is therefore screened out (Screening Matrices Note j).
In combination effects from displacement of birds from intertidal habitats	"In relation to the Applicant's Cumulative Effects Assessment, NE has stated [REP5-061] that further consideration is	Reference is made to Note 7 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. These issues have all been addressed in the submitted HRA Reports and additional sensitivity testing is included at table at 3.19 above and appended to this RIES response document at Appendix 1 to show the HRA results are robust in respect of NE's stated residual concerns about the 300m envelope for disturbance effects. To the extent that further detail (should it emerge in the future) on future projects might identify issues of prolonged disturbance when considered in-

Paragraph Number	ExA Comment	PoTLL Response
	required to address uncertainties relating to the significance of habitat value, sedimentation and pollution risk and disturbance of SPA birds. NE also stated that consideration should be given to prolonged disturbance to functionally link land caused by progressive development."	combination with Tilbury2, that is a matter to be addressed by those carrying out HRAs for such projects as discussed in the introductory sections of this RIES response document.
In-combination changes to air quality	"NE [REP5-061] noted that the concentrations and deposition rates identified are relatively small. However, it considered that the HRA needs to consider its contribution in light of the Wealden Judgement."	Reference is made to Note 8 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. The judgment of Mr Justice Jay in Wealden (CO/3943/2016 dated 20 March 2017) relates to the argument by Wealden District Council (WDC) that Lewes District Council (LDC) should take account of the impact of the additional road traffic related to the LDC Local Plan on the Ashdown Forest SAC in-combination with that of WDC's Local Plan. Had this been done then the 1000 AADT threshold for triggering further assessment of potentially significant effects would have been exceeded and an Appropriate Assessment (AA) would have been required. In the case of Tilbury2, a Stage 2 Appropriate Assessment has already been carried out [REP5-032], so this aspect of the Wealden judgment is not relevant. In the Wealden judgment it was ruled that the LDC road traffic contribution should be added to that of WDC because both contributions had been modelled and were therefore known. This is clear in para 92 of the judgment where it is stated "*Yet, in a case where the relevant AADT levels referable to the two plans are known, the logic of the final sentence* (concerning assessing on a case by case basis) *indicates that these should be considered in tandem*". In this context an argument was put to Mr Justice Jay that WDC should have considered traffic from LDC's Local Plan, but this was rejected, as made clear in para 70 of the judgment: "*...my reading of the WCS* (Wealden Core Strategy) *is that in-combination effects could not be considered because the JCS* (Joint Core Strategy) *the subject matter of these proceedings was not sufficiently developed to enable any sensible AADT data from over the border plans to be accommodated*".

Paragraph Number	ExA Comment	PoTLL Response
		The position in relation to the WCS is analogous with that for Tilbury2, where the LTC and the RWE TEC proposals are insufficiently developed to be considered quantitatively in combination with Tilbury2. In turn, the context set by the Wealden judgment is that the LTC and TEC proponents will need to fully consider and assess the in-combination effects on the SPA and Ramsar Site with Tilbury2, as these are already established. In summary the position taken by the Tilbury2 Applicant does not conflict with the Wealden judgment. As explained above, the LTC and TEC projects have not yet been consented, and before being consented the impacts of those projects on the SPA and Ramsar Site will fall to be considered.
In-combination effects on estuarine processes (including sediment circulation) that support intertidal habitats and related designations, and on water and sediment quality within designated areas or associated with functionally linked habitats	"In relation to the Applicant's Cumulative Effects Assessment, NE has stated [REP5-061] that further consideration is required to address uncertainties relating to the significance of habitat value, sedimentation and pollution risk and disturbance of SPA birds."	Reference is made to Note 9 of the 'sticky note' annotations made to the PDF version of Annex 1 of the RIES and as attached to this response document at Appendix 3. These issues have all been addressed in the submitted HRA Reports as far as possible given lack of full detail on other future projects. To the extent that further detail on future projects might identify in-combination effects not hitherto assessed, or change the magnitude of effects assumed on the basis of current information, these are matters to be fully addressed in the planning and design processes for those projects as they evolve and respond to consultation responses and by the HRAs for such projects, as is discussed in the introductory sections of this RIES response document.

APPENDIX 1

Figures 1-7: Number and distribution of SPA citation species during wintering bird surveys in 2016/17 and 2017/18, showing 500m buffer from Tilbury2 Order Limits.



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- November 2016 visit (low tide)
- January 2017 visit (high tide)
- November 2017 visit (low tide)
- January 2018 visit (low tide)
- February 2018 visit (low tide)
- February 2018 visit (high tide)
- March 2018 visit (low tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title

Numbers and distribution of avocet during wintering bird surveys in 2016/17 and 2017/18

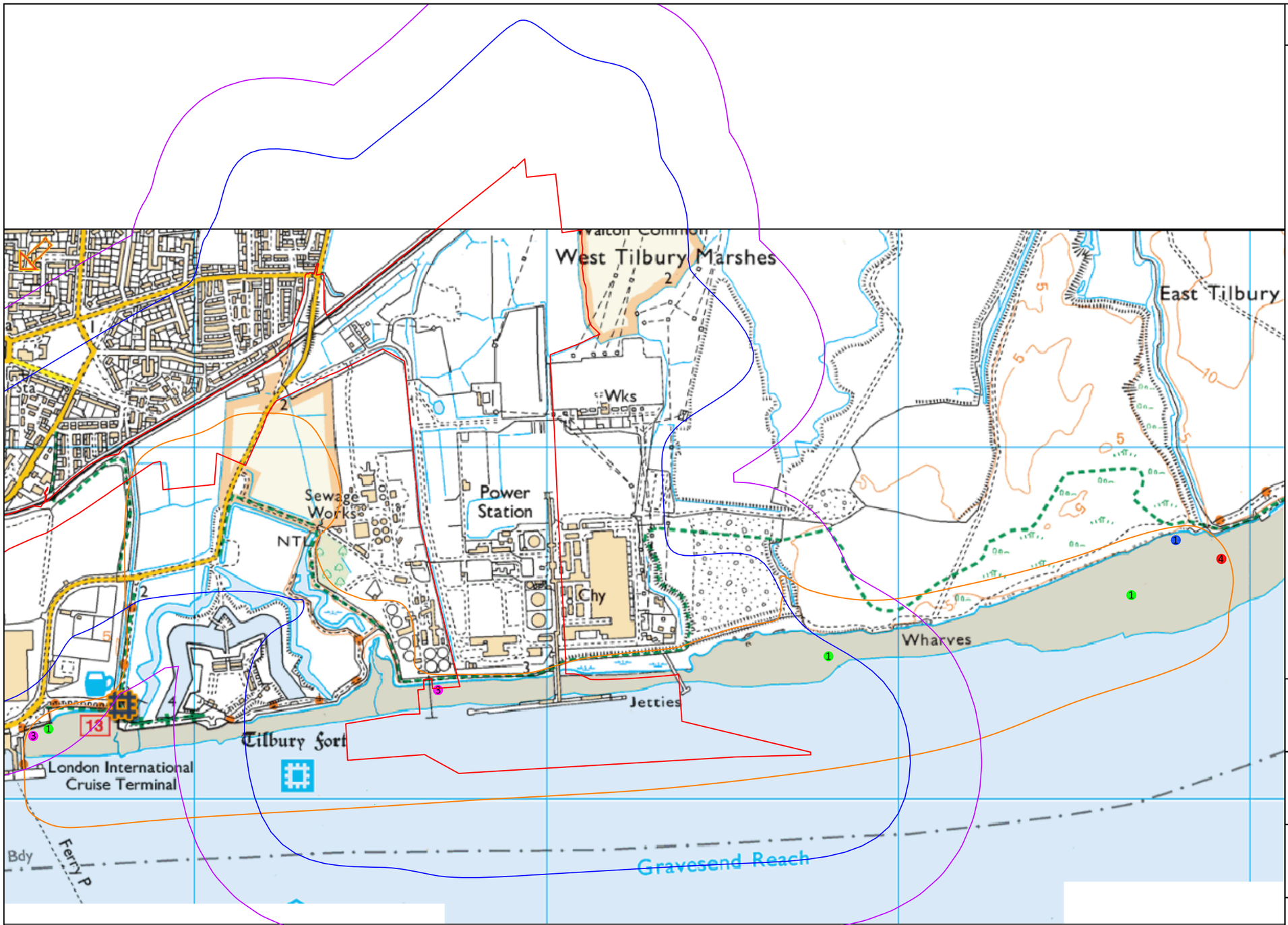
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 1	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- 1 September 2017 visit (low tide)
- 1 November 2017 visit (low tide)
- 1 February 2018 visit (low tide)
- 1 March 2018 visit (low tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title

Numbers and distribution of black-tailed godwit during wintering bird surveys in 2016/17 and 2017/18

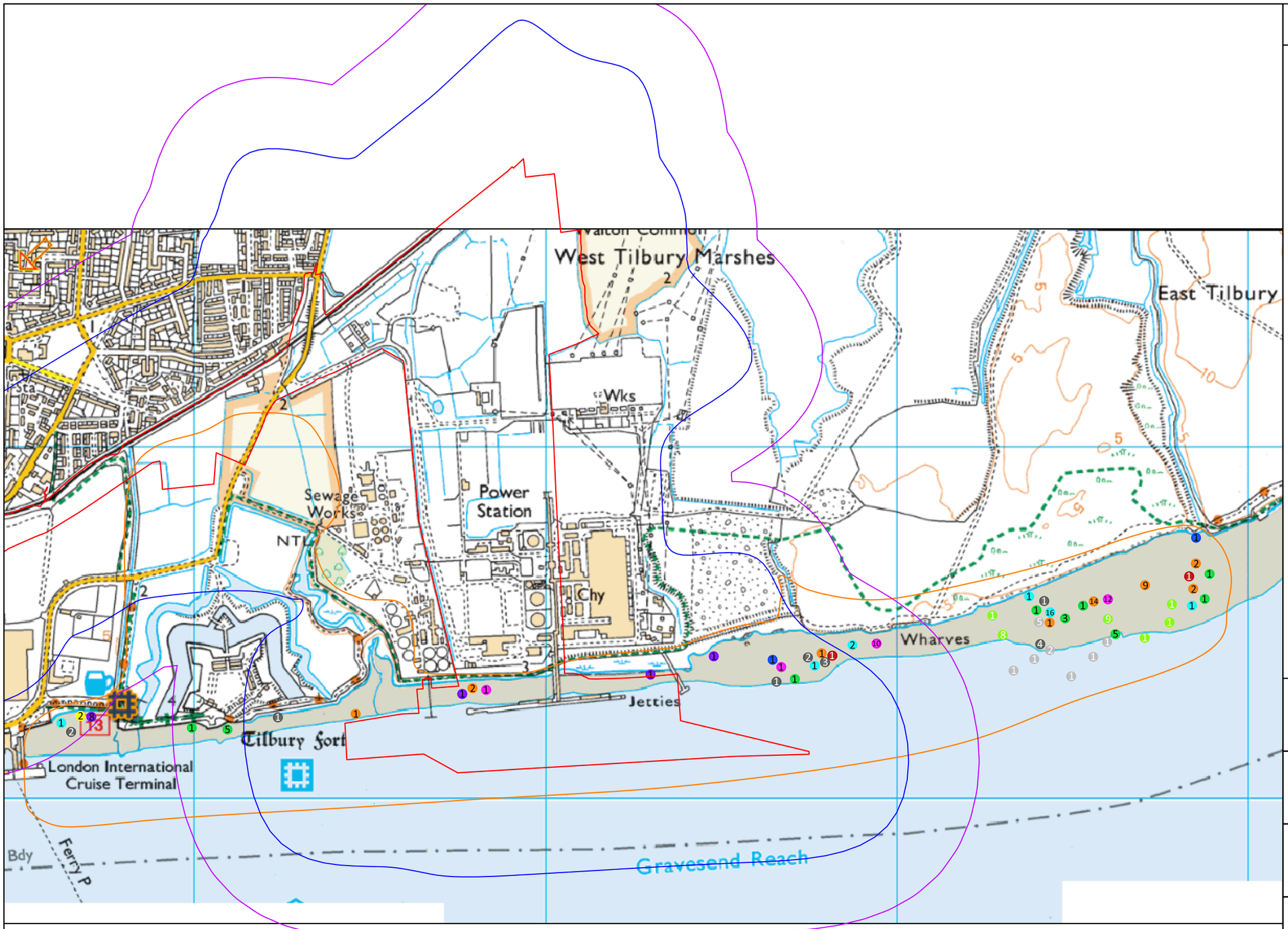
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 2	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- November 2016 visit (low tide)
- December 2016 visit (low tide)
- January 2017 visit (high tide)
- February 2017 visit (high tide)
- March 2017 visit (low tide)
- October 2017 visit (low tide)
- November 2017 visit (low tide)
- December 2017 visit (low tide)
- January 2018 visit (low tide)
- February 2018 visit (low tide)
- March 2018 visit (low tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title

Numbers and distribution of curlew during wintering bird surveys in 2016/17 and 2017/18

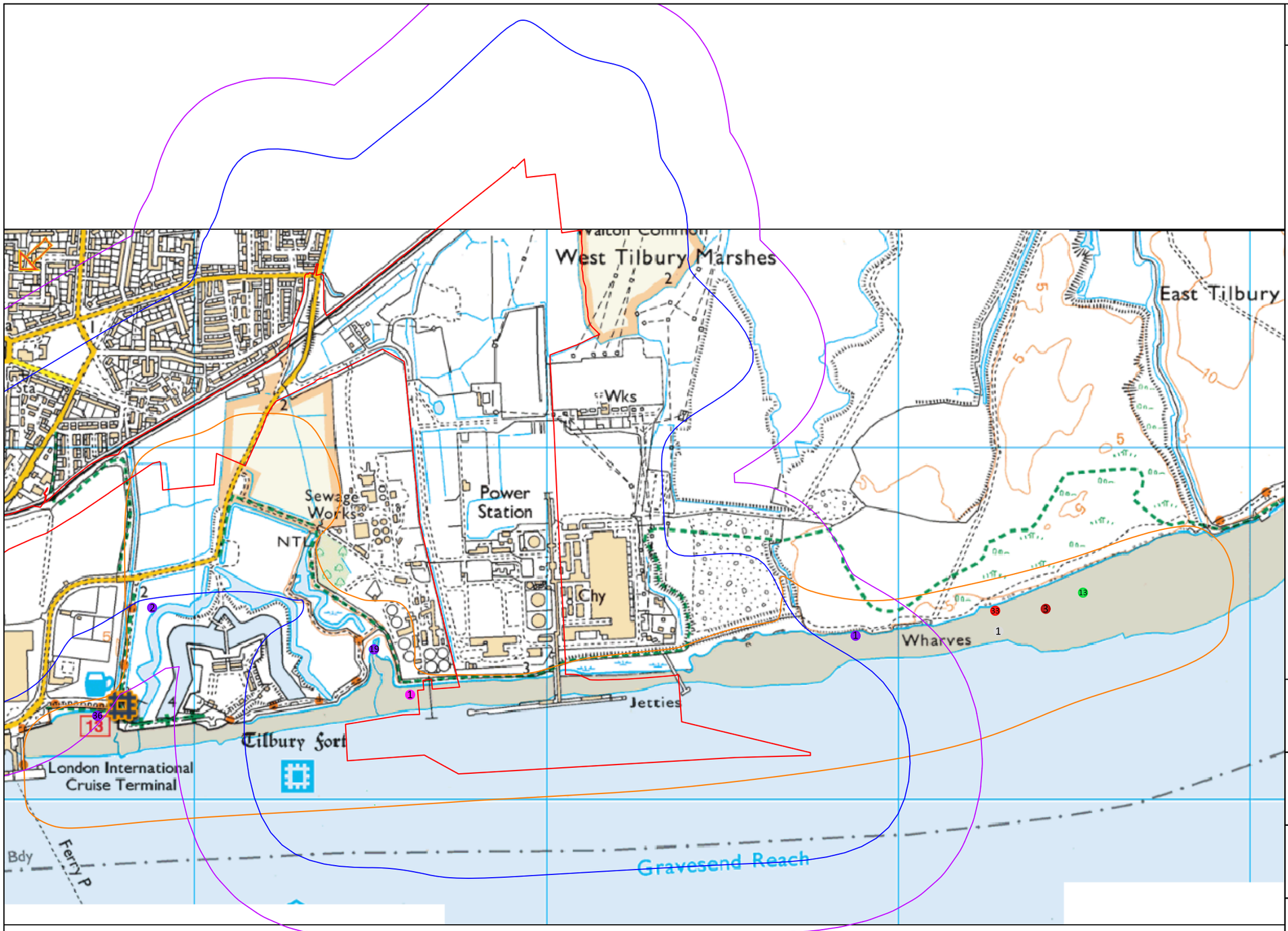
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 3	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- (1) November 2016 visit (low tide)
- (1) January 2017 visit (high tide)
- (1) September 2017 visit (low tide)
- (1) October 2017 visit (low tide)
- (1) November 2017 visit (low tide)
- (1) March 2017 visit (low tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title

Numbers and distribution of dunlin during wintering bird surveys in 2016/17 and 2017/18

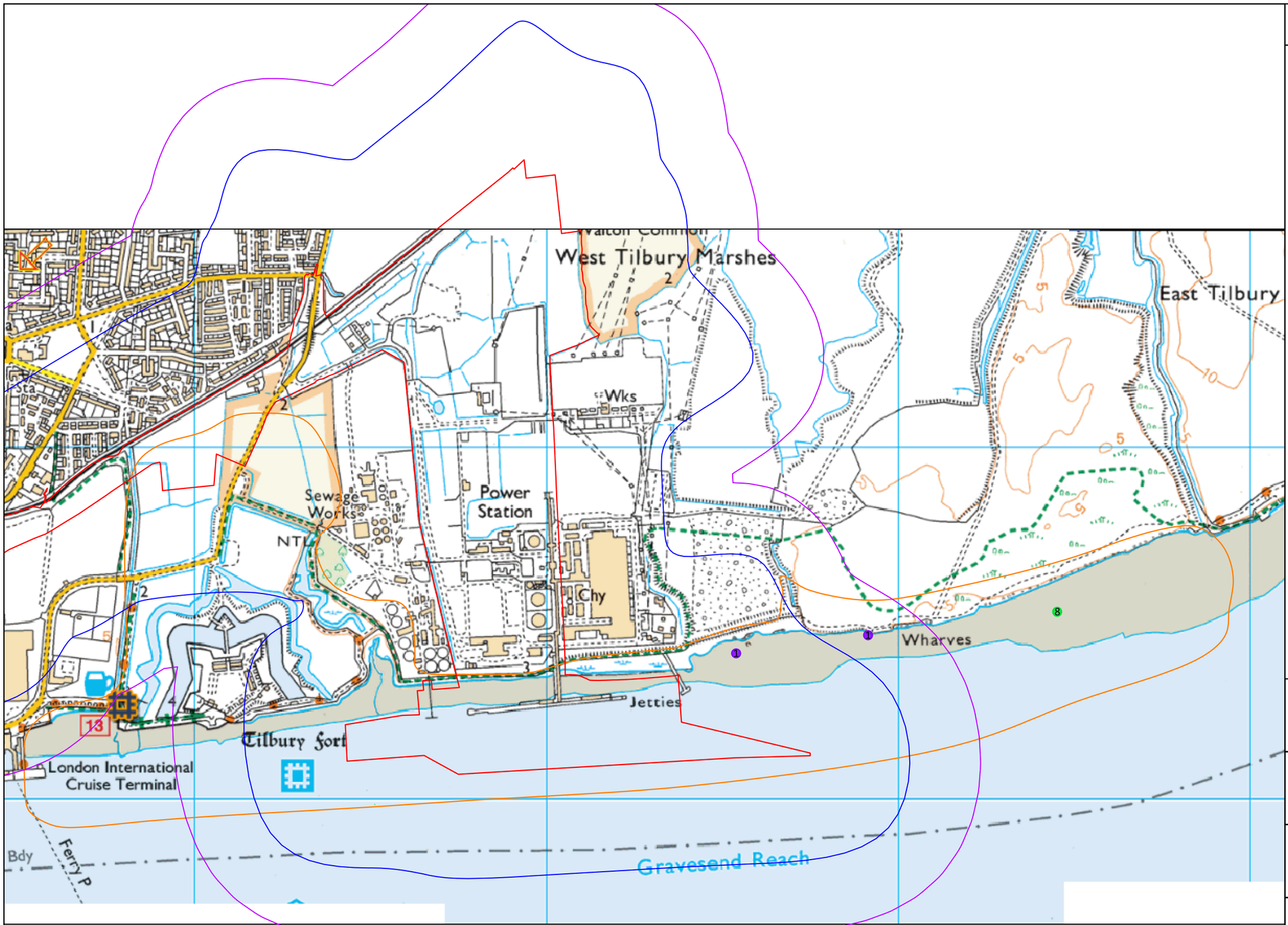
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 4	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- November 2016 visit (low tide)
- January 2017 visit (high tide)

DO NOT SCALE

Title

Numbers and distribution of grey plover during wintering bird surveys in 2016/17 and 2017/18

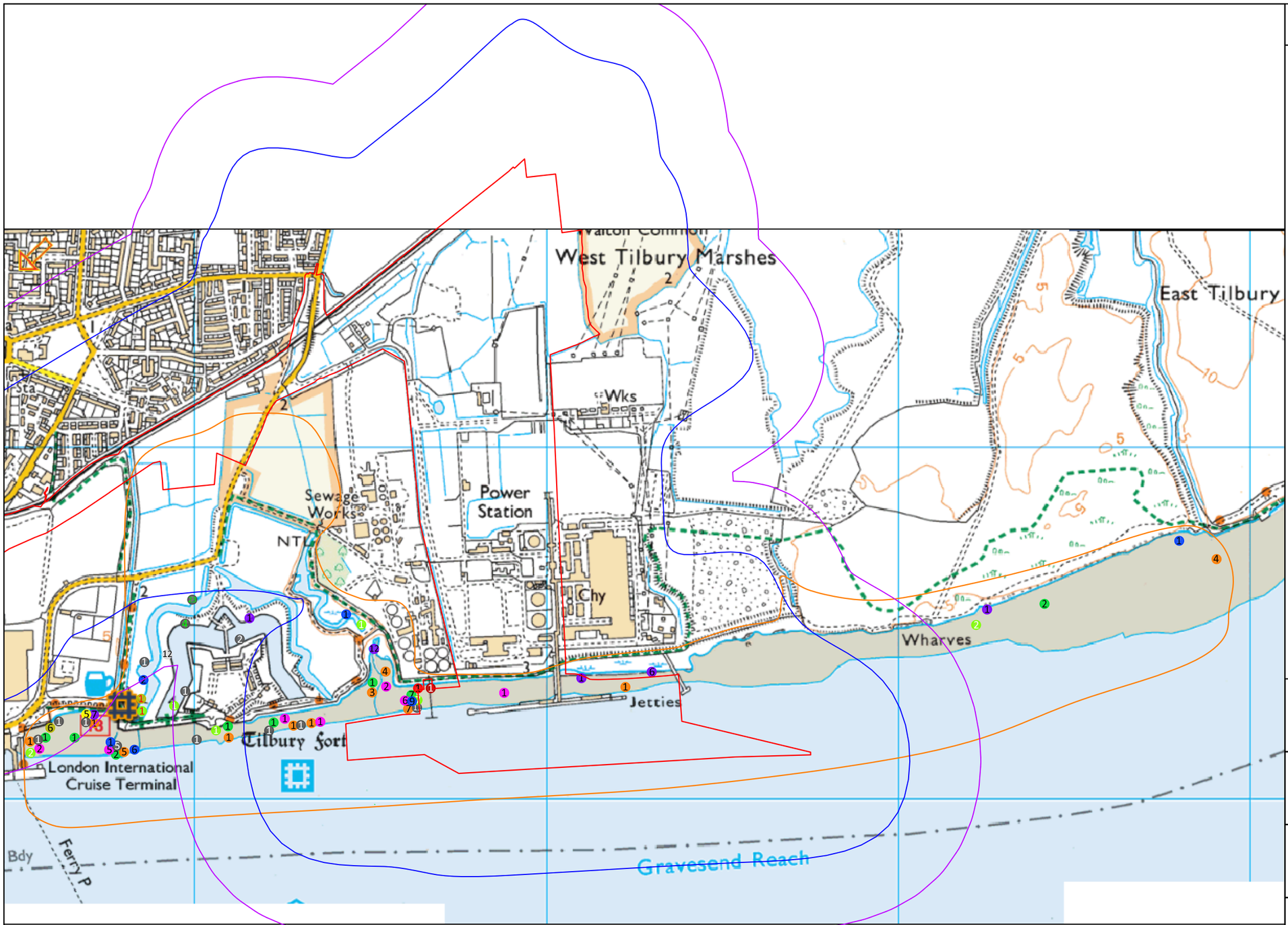
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 5	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 500m buffer from site boundary
- November 2016 visit (low tide)
- December 2016 visit (low tide)
- January 2017 visit (high tide)
- February 2017 visit (high tide)
- September 2017 visit (low tide)
- October 2017 visit (low tide)
- November 2017 visit (low tide)
- December 2017 visit (low tide)
- December 2017 visit (high tide)
- January 2018 visit (low tide)
- January 2018 visit (high tide)
- February 2018 visit (low tide)
- February 2018 visit (high tide)
- March 2018 visit (low tide)
- March 2018 visit (high tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title

Numbers and distribution of redshank during wintering bird surveys in 2016/17 and 2017/18

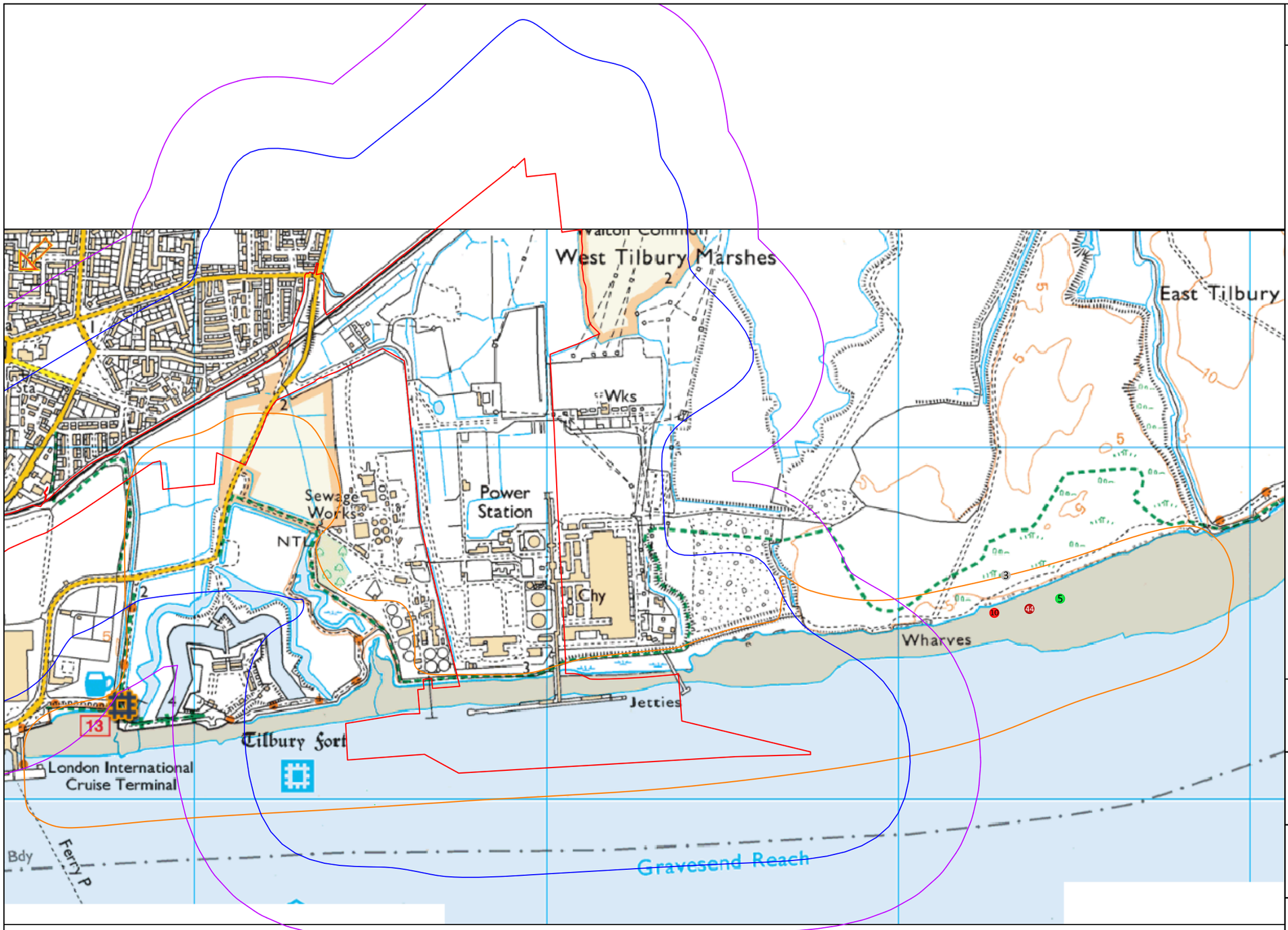
Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 6	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com



Key

- Application Site
- Approximate extent of survey area
- 300m buffer from site boundary
- 300m buffer from site boundary
- (1) November 2016 visit (low tide)
- (1) September 2017 visit (low tide)
- (1) October 2017 visit (low tide)
- (1) March 2018 visit (low tide)
- 1 Number in circle relates to the number of individuals found at the location

DO NOT SCALE

Title
Numbers and distribution of ringed plover during wintering bird surveys in 2016/17 and 2017/18

Project	Client
Tilbury2	Port of Tilbury

Drawing No.	Revision	Project No.
Figure 7	B	E1862

Drawn	Date
BC	July 2018

Bioscan (UK) Ltd
The Old Parlour,
Little Baldon Farm,
Little Baldon,
Oxford,
OX44 9PU.

T: +44 (0) 1865 341321
F: +44 (0) 1865 343674
bioscan@bioscanuk.com
www.bioscanuk.com

APPENDIX 2

Tilbury2 Thames outfall: note on ecological impacts and proposed mitigation, as agreed in principle with the Environment Agency (June 2018)

Tilbury2 Thames outfall: note on ecological impacts and proposed mitigation (June 2018)

Background

Impacts on intertidal habitats arising from Tilbury2 are assessed within the ES [APP-031, ES, chapters 10-11]. Estimates of the quantum of habitat losses are set out in the Port's response to FWQ 1.11.7 [REP1-016]. Proposals to mitigate the predicted losses of coastal saltmarsh as a consequence of headwall installation were set out in an email dated 12 March 2018, and discussed further during a teleconference on 02 May 2018. The note that follows expands upon this information.

Construction of proposed outfall

The drainage strategy [APP-090] presents the proposals for RoRo surface water drainage. The majority of the RoRo terminal is proposed to be drained through high capacity channel drains to keep the drainage system as shallow as possible. For the southern part of the RoRo, these would discharge to a pipe and culvert system, which would in turn discharge to the River Thames during low tides. It is estimated that the outfall culvert would be c1.5m diameter and extend a distance of ~23m south of the seawall with an invert level of ~0.86mOD. The culvert would be buried and supported at its downstream extent by a reinforced concrete headwall on piled foundations. The headwall would include an apron to provide scour protection. The outfall would have flap valves and a penstock (manual or automated), in line with Environment Agency requirements, to be agreed during the detail design phase as part of the EA's protective provisions.

Potential impacts

It is estimated that up to ~**50m^2** of coastal saltmarsh would be lost directly to installation of the drainage outfall (including permanent losses to the headwall and service access path, and further direct losses arising from excavation of the channel for the pipe albeit with the mitigation proposed below these losses may be considered temporary).

It is estimated that a further ~**40m^2** could be impacted by damage during construction phase trampling and disturbance. Note that these figures are considered to represent worst-case values for the purposes of assessment.

Mitigation proposed

1. Minimisation of temporary incursions. During construction, temporary incursions into saltmarsh are to be kept to a minimum by advising workers to restrict foot traffic to core works area only (and via fencing where practicable).

2. Saltmarsh turf collection & relocation. During excavation of the pipe, turves (and spoil) will be reserved, and the turves irrigated with water from the Thames if required so as to minimise the risk of drying. Following installation of the pipe, the pipe/culvert will be re-covered with reserved spoil and turves. The re-laid turves will continue to be inundated at spring high tides, allowing the saltmarsh to re-establish, and reducing the overall negative construction impact (i.e. mitigating the permanent habitat loss from pipe installation to a temporary loss).

3. New saltmarsh generation via accretion. In addition, and to compensate for the residual impacts, further measures are proposed which aim to encourage tidal deposition of fine sediments in areas adjacent to existing saltmarsh habitat, generating suitable conditions for new coastal saltmarsh to establish. It is proposed that this be achieved via:

a) *installation of timber groynes*. An area has been identified within the Order Limits where coastal saltmarsh is likely to have been present in the past but is currently absent (encircled by the western ellipse in Figure 1, and shown in the photograph at Figure 2 below). It is thought that the loss of saltmarsh in this location is likely to be due to lateral erosion from water passing around the large concrete abutment of the existing jetty link-bridge. The riverbank at this location is otherwise relatively stable, with relatively low flow velocities, wave fetch and scour.

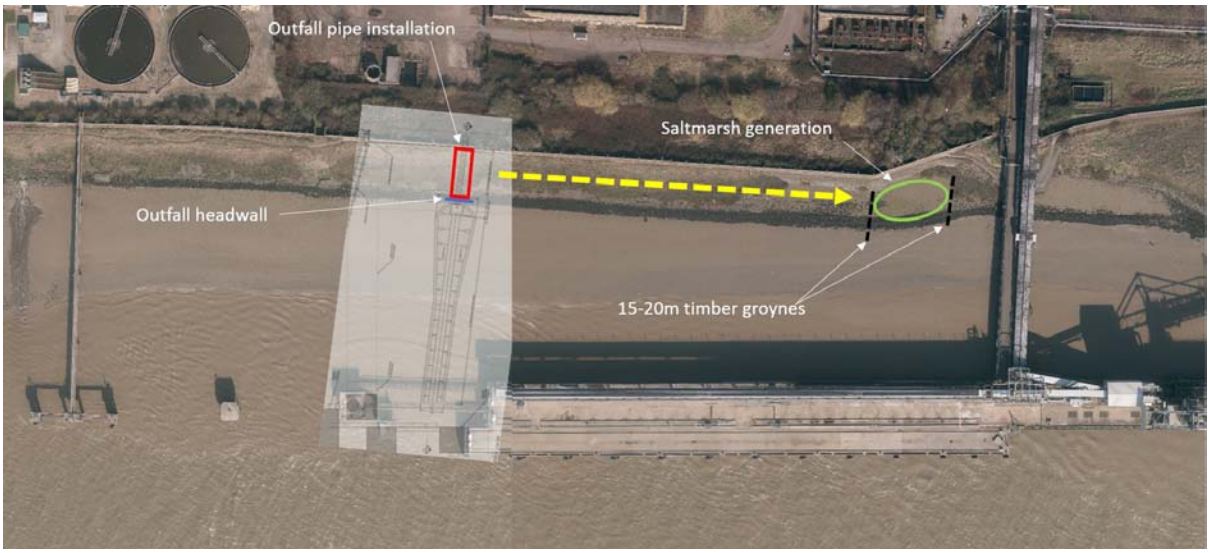
Figure 1 – Red ellipse indicates area within Order Limits suggested by the EA for targeted saltmarsh generation (March 2018)

Figure 2 – Area within Order Limits proposed for saltmarsh generation (photo taken July 2017)

It is anticipated that installation of 2no. timber groynes perpendicular to the shore, angled to reduce the effects from prevailing winds and extending c.15-20m to the lower limit of existing adjacent saltmarsh (see Figure 3), would counter the action of lateral erosion by reducing the predominant ebb-tide erosion and encouraging fine sediments to accrete adjacent to the groyne. This would create a suitable substrate for natural intertidal mudflat and saltmarsh colonisation from the adjacent areas.

To further reduce flow velocity and help retain accreting material a small number of timber posts could also be installed perpendicular to the groynes at the southern edge of the saltmarsh creation area (i.e. following the dark line south of the green ellipse).

Figure 3 – Indicative location/layout of Thames outfall culvert, headwall and scour protection apron (image overlain on west/left); and indicative location/layout of proposed saltmarsh mitigation comprising groyne within area targeted for saltmarsh generation (green ellipse shown to east/right).



b) *deposition of additional sediment material*. Any excess spoil generated by excavation of the pipe would be placed behind the groynes, adjacent to the existing saltmarsh.

If this measure proves successful then consideration would be given to supplementing the deposited spoil with additional material sourced from backhoe-extracted non-contaminated dredged sediments, should these become available during the course of the other construction work.

4. Monitoring. The geomorphological response to the mitigation proposed cannot be predicted with 100% certainty, and thus monitoring is proposed so as to determine whether the measures are working as anticipated, such that they can be modified if required. This would take the form of an annual survey (including photographic monitoring), each year for 5 years, to document extent of the saltmarsh cover, and record the species composition of the areas affected (including translocated turves and any new areas of colonisation).

The process of intertidal sediment accretion and pioneer saltmarsh colonisation will depend on tidal condition but could be excepted to take 10-18 months. In the medium-long term, it is anticipated that this re-colonisation process would fully off-set the predicted losses of saltmarsh habitat, resulting in no net loss.

APPENDIX 3

HRA Stage 1 and Stage 2 matrices: Annex 1 of the ExA RIES, with Applicant's comments via 'sticky notes'

ANNEX 1: POTENTIAL EFFECTS

Potential effects upon the European site(s) which are considered within the submitted HRA report are provided in Table 1.

Table 1: Potential effects considered within the screening and integrity matrices

Designation	Effects described in submission information	Presented in screening matrices as
Thames Estuary and Marshes SPA & Thames Estuary and Marshes Ramsar site	• **Disturbance (noise and lighting)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (within designated area) • **Disturbance (from shipping)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (within designated area)	• Disturbance (within SPA) / Disturbance (within Ramsar site)
	• **Disturbance (noise and lighting)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (using functionally linked habitats outside designation boundary) • **Disturbance (human movement and activity)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (using functionally linked habitats	• Disturbance (outside SPA) / Disturbance (outside Ramsar site)

Designation	Effects described in submission information	Presented in screening matrices as
	outside designation boundary) • **Disturbance (from shipping)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (using functionally linked habitats outside designation boundary)	
	• Damage (negative changes) to habitats used by cited bird species from changes to **sediment circulation or deposition patterns** (within designated area) • Damage (negative changes) to habitats used by cited bird species from changes to **water and/or sediment quality** (either from surface or groundwater discharges from Tilbury2 site including **construction/operational waste and pollutants**; or from disruption of contaminated Thames sediments), with potential associated knock-on risk of bioaccumulation (within designated area) • Damage (negative changes) to habitats used by cited bird species from changes in **air quality** including from dust, **construction waste and pollutants**, and exhaust emissions (within designated area)	• Habitat damage (within SPA) / Habitat damage (within Ramsar site)

Designation	Effects described in submission information	Presented in screening matrices as
	• Damage (negative changes) to habitats used by cited bird species from introduction or proliferation of **invasive non-native species (INNS)** (within designated area)	
	• **Direct loss of and damage** to intertidal habitats used by cited bird species during construction, e.g. of proposed outfall and to grazing marsh habitats from construction of the infrastructure corridor (functionally linked habitats outside designation boundary) • Damage to or loss of habitats used by cited bird species from changes to **sediment circulation or deposition patterns** (functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats used by cited bird species from changes to **water and/or sediment quality** (either from surface or groundwater discharges from Tilbury2 site including **construction/operational waste and pollutants**; or from disruption of contaminated Thames sediments), with potential associated knock-on risk of bioaccumulation (functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats	• Loss or damage to functionally linked habitats

Designation	Effects described in submission information	Presented in screening matrices as
	used by cited bird species from changes in **air quality**, including from dust, **construction waste and pollutants**, and exhaust emissions (functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats used by cited bird species from introduction or proliferation of **INNS** (functionally linked habitats outside designation boundary)	
	• **Disturbance (noise and lighting)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (within designated area and using functionally linked habitats outside designation boundary) • **Disturbance (from shipping)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species (within designated area and using functionally linked habitats outside designation boundary) • **Disturbance (human movement and activity)** giving rise to displacement, other behavioural changes or physiological stress responses amongst cited bird species	• In-combination effects

Designation	Effects described in submission information	Presented in screening matrices as
	(using functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats used by cited bird species from changes to **sediment circulation or deposition patterns** (within designated area and functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats used by cited bird species from changes to **water and/or sediment quality** (either from surface or groundwater discharges from Tilbury2 site including **construction / operational waste and pollutants**; or from disruption of contaminated Thames sediments), with potential associated knock-on risk of bioaccumulation (within designated area and functionally linked habitats outside designation boundary) • Damage (negative changes) to habitats used by cited bird species from changes in **air quality** including from dust, **construction waste and pollutants,** and exhaust emissions (within designated area and functionally linked habitats outside designation boundary)	

Designation	Effects described in submission information	Presented in screening matrices as
	• Damage (negative changes) to habitats used by cited bird species from introduction or proliferation of **INNS** (within designated area and functionally linked habitats outside designation boundary) • **Direct loss of and damage** to habitats used by cited bird species during construction (functionally linked habitats outside designation boundary)	
Thames Estuary and Marshes Ramsar site only	• Local (Ramsar and wider) population level impacts to Criterion 2 plant/invertebrate species from direct **habitat loss and damage** to intertidal habitats during construction, e.g. of proposed outfall, and to grazing marsh habitats from construction of the infrastructure corridor • Damage or loss of Criterion 2 plant/invertebrate species from habitat changes arising from changes in **air quality** (including via **construction waste and pollutants**) • Damage or loss of Criterion 2 plant/invertebrate species from habitat changes arising from changes in **sediment circulation and deposition patterns** • Damage or loss of Criterion 2 plant/invertebrate species from	• Loss or damage to Criterion 2 plant/invertebrate species

Designation	Effects described in submission information	Presented in screening matrices as
	changes in **water and sediment quality** (including via **construction/operational waste and pollutants**) • Physiological stress or behavioural responses in Criterion 2 plant/invertebrate species caused by **lighting** • Damage or loss of Criterion 2 plant/invertebrate species from introduction or proliferation of **INNS**	

ANNEX 2: STAGE 1 SCREENING MATRICES

The European sites included within the screening assessment are:

- Thames Estuary and Marshes SPA; and
- Thames Estuary and Marshes Ramsar site.

Evidence for, or against, likely significant effects (LSE) on the European site(s) and its qualifying feature(s) is detailed within the footnotes that follow the screening matrices. Where a significant effect cannot be excluded, that potential impact source is carried forward to Stage 2 assessment.

Matrix Key:

✓ = LSE **cannot** be excluded
✕ = LSE **can** be excluded

C = construction
O = operation
D = decommissioning

HRA Screening Matrix 1: Thames Estuary and Marshes SPA

Name of European site and designation: Thames Estuary and Marshes SPA															
EU Code: UK9012021															
Distance to NSIP: *c.1.5km*															
European site features	**Likely effects of NSIP**														
Effect	*Disturbance (within SPA)*			*Disturbance (outside SPA)*			*Habitat damage (within SPA)*			*Loss or damage to functionally linked habitats*			*In-combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Article 4.1 qualifying feature: Avocet (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.1 qualifying feature: Hen Harrier (winter)	**×a**	**×b**	**×l**	**×d**	**×d**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Ringed Plover (passage)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Grey Plover (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Knot (winter)	**×a**	**×b**	**×l**	**×e**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Dunlin (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**

Article 4.2 qualifying feature: Black-tailed Godwit (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Redshank (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**
Article 4.2 qualifying feature: Total waterfowl (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓k**	**✓k**	**×l**

HRA Screening Matrix 2: Thames Estuary and Marshes Ramsar Site

Name of European site and designation: Thames Estuary and Marshes Ramsar site																	
Ramsar Code: UK11069																	
Distance to NSIP: c.1.5km																	
Ramsar qualifying features	**Likely effects of NSIP**																
Effect	*Disturbance (within Ramsar site)*			*Disturbance (outside Ramsar site)*			*Habitat damage (within Ramsar site)*			*Loss or damage to functionally linked habitats*			*Loss or damage to Criterion 2 plant/invertebrate species*			*In-combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Criterion 2 qualifying feature (nationally rare and scarce plant and invertebrate species)	**xi**	**xi**	**×l**	**xi**	**xi**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**✓j**	**✓j**	**×l**	**✓k**	**✓k**	**×l**
Criterion 5 qualifying feature: Total waterfowl (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**
Criterion 6 qualifying feature: Ringed Plover (passage)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**
Criterion 6 qualifying feature: Black Tailed Godwit (passage)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**
Criterion 6 qualifying feature: Grey Plover	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**

(winter)																	
Criterion 6 qualifying feature: Knot (winter)	**×a**	**×b**	**×l**	**×e**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**
Criterion 6 qualifying feature: Dunlin (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**
Criterion 6 qualifying feature: Redshank (winter)	**×a**	**×b**	**×l**	**✓c**	**×f**	**×l**	**✓g**	**✓g**	**×l**	**✓h**	**✓h**	**×l**	**×i**	**×i**	**×l**	**✓k**	**✓k**	**×l**

Evidence supporting conclusions (note that the same supporting evidence may be referred to for both the SPA and Ramsar site as their extents and boundaries are largely coterminous):

Disturbance (within SPA/Ramsar site)

a. The distance between the Tilbury2 site and the nearest part of the SPA/Ramsar (foreshore adjoining Eastcourt/Shorne Marshes on the opposite (southern) side of the Thames) is just under 1.5km. The nearest near-shore component (Mucking Flats) is just over 2.4km. The vast majority of both the SPA and Ramsar site is >3km from the Tilbury2 site.

Lighting, human movement and activity: The Applicant considered that such distances alone militate against any LSE on qualifying bird species using the SPA/Ramsar site from visual disturbance emanating from the construction site, or from lighting (on the basis of the information and lux modelling provided in ES Appendix 9.J, in particular the Indicative Lighting Layouts at Appendix B [APP-044], the key figure from which is reproduced within the Applicant's HRA report).

Noise: The potential magnitude of change in noise is assessed in ES Chapter 17. The implications for ecological receptors are considered in ES Chapter 10. Peak or mean (i.e. 24hr) noise in excess of 55dB is not predicted to be experienced at distances in excess of 300m from the site for most construction or operational activities, with the exception of construction-phase jetty piling and dredging and pavement construction. The foremost of these could see noise levels of 63dB at 300m from source with the latter having the potential to slightly exceed the 55dB level at 300m (ES Chapter 17 Table 17.30 [APP-031]). The Applicant considered that these data indicate that noise levels during construction would not be sufficient to elicit any behavioural responses in birds at the nearest point of the SPA/Ramsar site.

Shipping: The Applicant considered that additional shipping movements during construction would be minimal (and lower than those considered for the operational phase under footnote 'b' below) and no assessment thresholds for shipping movements would be exceeded. Whilst construction phase movements would include additional barge movements to Mucking landfill and its jetty (carrying translocated brownfield substrates) and this would involve shipping traffic within the SPA/Ramsar site, these additional barge movements would be accommodated within the normal and ongoing delivery pattern of restoration materials to Mucking jetty and would not represent an uplift in disturbance at that location due to the combined and absolute limitations of berthing capacity and tidal restrictions at that site. Thus the Applicant concluded no LSE on the SPA or Ramsar site from the limited shipping activity associated with the construction phase.

Natural England (NE) has not confirmed whether it agrees a LSE can be excluded for these feature and potential impacts. However, its most recent representation [REP5-061] does not suggest any disagreement over these matters.

b. **Lighting**: The Applicant considered that in the operational phase, the mitigating effect of distance similarly rules out a LSE on qualifying bird species within the SPA/Ramsar site from lighting (based on the operational lighting design and predicted Lux contours reported in the Preliminary Lighting Strategy and Impact Assessment at Appendix 9.J of the ES [APP-044] – noting that the draft Development Consent Order (DCO) would require the final lighting strategy to be in general accordance with this Preliminary Lighting Strategy) or visual disturbance emanating from the site.

Noise: The Applicant considered that noise levels generated within the site during operation are unlikely to exceed the peaks associated with construction-phase piling and can therefore also be ruled out as having the potential to give rise to a LSE on the SPA/Ramsar site.

Shipping: Shipping movements would increase by 1,792 vessel movements per annum (over the existing 17,092 movements) as a result of the operational port (see ES Navigation chapter, paras 14.18-14.25 [APP-031]). These increased vessel movements would occur along a broad (c.24km) interface with the SPA and Ramsar site, albeit that the navigable channel is typically >200m from the SPA/Ramsar site boundary. Increased Tilbury2 port-related shipping movements along the Thames bring with them some scope for increased disturbance from noise, lighting and related visual disturbance caused by the movement of vessels *per se*. However, the Applicant considered that because the majority of vessels would be large, with a corresponding large draught, such potential impact sources would be along predictable mid-channel paths, relatively remote (e.g. >200m) from designated intertidal habitats and would be experienced by avian receptors against a backdrop of existing regular traffic of large, distant vessels. The Applicant therefore assessed additional shipping movements from Tilbury2 alone as an imperceptible increase in disturbance in the context of existing levels of habituation.

NE has not confirmed whether it agrees a LSE can be excluded for these feature and potential impacts. However, its most recent representation [REP5-061] does not suggest any disagreement over these matters.

Disturbance (outside SPA/Ramsar site)

c. Avocet, ringed plover, grey plover, black-tailed godwit and redshank (Birds Directive Article 4.1 and 4.2 qualifying species; and Ramsar Criteria 5 and 6 species) all make use of intertidal habitats in closer proximity to the Tilbury2 site than the SPA/Ramsar site itself. The individual birds involved would in most cases be part of the local wintering or passage population that forms the qualifying feature. Quantitative data on the numbers using intertidal habitats within and in proximity to the proposed DCO limits is provided by the baseline information reported on at ES Chapter 10 (in particular Table 10.41) and further expanded upon in the technical 'Bird Note' (Appendix 9 to the Applicant's updated HRA report [REP5-032], in particular Table 5). The data indicates that peak numbers using intertidal habitat within 300m from the proposed Order Limits at any one time remains in all recorded cases than 1% of the SPA/Ramsar site population (Appendix 9 to the Applicant's updated HRA report [REP5-032], Table 7). 300m is taken by the Applicant as a rational outer extent of impact envelope for significant construction-phase disturbance (whether arising from noise, lighting or human movement and activity) taking into account literature on response distances amongst the bird species concerned (see Table 2 within the Updated HRA Report [REP5-032]) and outputs from the impact studies reported in the ES (in particular noise – Chapter 17, Table 17.30 [APP-031]). Noise impacts are considered to have the potential for the most spatially expansive effects of all these potential sources and therefore the envelope is set by reference to worst case noise impacts (i.e. during piling, which is assumed for assessment purposes to be constant, thus building in further precaution).

The Applicant considered that due to the sub-significant levels of use of intertidal habitats within a 300m envelope by SPA/Ramsar site species, temporary construction phase disturbance effects would not be likely to give rise to a significant effect on the qualifying features. However, as noted in section 3 of this RIES, NE considered that a significant effect cannot be excluded, in large part due to sources of external bias in the long-term dataset (especially the suggestion that activity associated with the marine infrastructure improvement works at Goshems Farm jetty and related activities during 2016 and 2017) and as it considered the 300m zone of influence was inadequate.

For precautionary reasons, the Applicant's updated HRA Report [REP5-032] agreed that LSEs from disturbance to cited bird species using functionally linked habitats cannot be excluded.

d. The Applicant stated that hen harrier is not likely to make any significant use of habitats that are potentially affected by construction phase disturbance effects (either within or outside the SPA), and the baseline surveys have not recorded any use of the Tilbury2 site by this species more generally (ES Chapter 10 [APP-031]; noting that the single record made by Mr

Larkin at Table 3 of the Bird Note at Appendix 9 to the Updated HRA Report [REP5-032] relates to an individual somewhere along the foreshore between Tilbury and Coalhouse "flying over to Kent").

NE has not confirmed whether it agrees a LSE can be excluded for this feature. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

e. The Applicant stated that knot has not been recorded using functionally linked intertidal habitats within potential range of construction-phase disturbance effects in either the baseline surveys reported on at ES Chapter 10 (in particular Table 10.41 [APP-031]) or to any meaningful level in the expanded dataset reported in the technical 'Bird Note' (Appendix 9 to the Applicant's updated HRA report [REP5-032]). The Applicant concluded that while small-scale transient use of the 300m envelope around the Tilbury2 DCO boundary by knot cannot be discounted, there is no scope for LSE.

NE has not confirmed whether it agrees a LSE can be excluded for this feature. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

f. The Applicant noted that there is scope for disturbance effects on populations of SPA and Ramsar site qualifying bird species using areas outside the respective designation boundaries during the operational phase from the uplift in vessel traffic along the river. However, the envelope of potentially significant disturbance effects during the operational phase would be substantially smaller than in the construction phase and would capture far less habitat with a potential functional linkage to the SPA and Ramsar site. In addition, the same factors militating against LSE apply when putting this uplift into context as discussed for birds using areas within the respective designations (under (b) above). When considered with the sensitivity of each bird species to disturbance by reference to the TIDE toolkit (Table 2 of the updated HRA report [REP5-032]), and the far lower (and sub-significant) numbers of individuals present closer to the application site, the Applicant concluded there to be no LSE.

NE has not confirmed whether it agrees a LSE can be excluded for these features. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

Habitat damage (within SPA/Ramsar Site)

g. **Sediment circulation or deposition patterns:** Based on the outputs of impact assessments reported on within the appendices to ES [APP-031] Chapters 11 (marine ecology) and 16 (water resources and flood risk – including the Water Framework Directive Assessment at Appendix 16.C [APP-088] and the Hydrodynamic Modelling Study at Appendix 16.D to the ES [APP-089], and as Appendix 8 of the HRA report [REP5-032]), the Applicant concluded that there is no scope for

significant changes to baseline sediment circulation (erosion and deposition) regimes within the SPA/Ramsar site boundary from marine works and dredging, during either the construction or operational phase.

However, one of the two capital dredging scenarios assessed (namely dispersal dredging by water injection (WID)), and the favoured method of maintenance dredging (also WID) have the potential to give rise to very minor, highly localised and temporary increases in sediment deposition within the intertidal areas of the SPA/Ramsar Site (ES Appendix 16.D [APP-089] and Appendix 8 of the Updated HRA Report [REP5-032]). The Applicant's updated screening matrices explained that NE consider that a significant effect cannot be excluded beyond all reasonable scientific doubt, and therefore the Applicant concluded a LSE cannot be excluded from minor changes in sediment circulation patterns.

Water and/or sediment quality: The Applicant noted that localised elevated concentrations of polyaromatic hydrocarbons (PAHs) (including perylene, pyrene and fluoranthene) and of metals (including arsenic, chromium and nickel) have been found in samples of sediment around the existing Tilbury2 jetty and (in particular) the approach channel to it (ES Appendix 11.C [APP-088]). The contaminants generally have low solubility and where mobilised, would mostly remain adsorbed onto sediment particles. This reduces the potential for contamination of the water column, but could pose a risk to sediment dwelling organisms were these substances to be re-deposited at high concentrations.

The risk to marine and estuarine biota is assessed in ES Chapter 11 [APP-031]. Risk to higher trophic orders, including SPA and Ramsar site cited fauna is mainly possible through these substances becoming directly bio-available in re-distributed sediments and or from biomagnification through the food chain, although the risks from biomagnification in the case of PAHs are ameliorated due to the greater capacity of higher organisms to metabolise PAHs.

The Applicant's assessment of the risks of contaminated sediments around the Tilbury2 jetty being redistributed onto intertidal habitats within or otherwise functionally linked to the SPA and Ramsar site is reported at Appendix 8 of the Updated HRA Report [REP5-032]. This assessment indicates that any PAH perylene that is mobilised during dredging operations has a very low risk of becoming available to SPA/Ramsar cited species and a very low risk of significant deposition onto intertidal areas both proximal to the Tilbury2 jetty and within the SPA/Ramsar site further afield. Other contaminants adsorbed to sediments would follow a similar dispersion pathway and therefore the risk of significant effects from mobilisation of other PAHs and metals observed at elevated levels in the samples is assumed by the Applicant to be equivalent or less than for perylene.

However, ultimately the Applicant concluded that it was not possible on the basis of the conclusions of the technical study to conclude no LSE beyond reasonable scientific doubt [REP5-036] and thus a LSE cannot be excluded for the mobilisation of contaminated sediments by dredging activities.

Air quality: Vessel traffic from the Proposed Development would result in emissions of NO_x and SO_2. The Applicant's air quality modelling (Appendix 6 and 7 of the Updated HRA report [REP5-032]) indicates that increases in atmospheric levels and/or deposition loads of both NO_x and SO_2 on habitats within the SPA/Ramsar site boundary would not be significant (in both peak and mean scenarios resulting in all instances in increases of less than 1% compared with critical levels/loads) and would not result in accepted critical loads being exceeded for saltmarsh, mudflat or coastal grazing marsh habitat. However, as there is no equivalent assessment for functionally linked habitats and the predicted change to the 24 hour mean is approaching the 1% significance threshold, taking a precautionary approach (specifically in respect of scarce plant species constituting Ramsar qualifying features), the Applicant concluded a LSE cannot be excluded for functionally linked habitats.

INNS: Increased shipping traffic could elevate the risk of introducing foreign marine or estuarine organisms from the hulls of ocean-going vessels or ballast water. The Applicant concluded that a LSE cannot be excluded.

Loss or damage to functionally linked habitats and populations

h. **Direct loss or damage to functionally linked land**: As noted in section 4 of this RIES, the following functionally linked habitat would be temporarily lost to the Proposed Development:

- 0.035ha of intertidal habitat (comprising saltmarsh, mudflat, and shingle/cobble beach habitat) (to the outfall); and
- 3.5ha of coastal and floodplain grazing marsh (to the infrastructure corridor).

For effects arising from direct loss of or damage to functionally linked habitat, see references to functionally linked habitats under 'g' above and to functionally linked populations of Criterion 2 species under 'j' below. The Applicant concluded that a LSE cannot be excluded.

Loss or damage to Criterion 2 plant/invertebrate species

i. Not applicable.

j. **Lighting**: *Within the Ramsar site* - The Applicant concluded that the effect of distance rules out a LSE on Criterion 2 invertebrate and plant species within the Ramsar site from lighting in both the construction and operational phases. This is based on the lighting design and predicted Lux contours reported in ES Appendix 9.J [APP-044] (including the key Indicative Lighting Strategy figure reproduced within the updated HRA Stage 2 report). NE has not confirmed whether it agrees a LSE can be excluded for this site, feature and potential impact.

Outside the Ramsar site - Outside the Ramsar site boundary and in intertidal habitats close to the jetty, lighting impacts could affect functionally linked populations of Criterion 2 species, potentially initiating physiological responses that could affect species lifecycles, life strategies and the long-term viability of populations. The golden samphire plant is found in intertidal habitats at the Tilbury2 site, where it would potentially be at risk of lighting effects (further details in Chapter 10 of the ES [APP-031]). However, the location where this species grows would have been subject to light spill effects from past operational phases of the jetty (when the power station was active) and there is no evidence that this influenced the distribution or vigour of the colony, or (within scientific literature) that this species is sensitive to light pollution generally. The Applicant considered that Ramsar-cited invertebrate species would not be at risk of significant impacts from lighting, given their co-existence with the operational power station and its jetty in the past. However, the Applicant concluded that a LSE cannot be excluded due to the uncertainty as to physiological responses and the degree of any functional linkage to Ramsar site populations.

Noise: The Applicant concluded that Criterion 2 invertebrate species would not be at risk of significant impacts from noise, given their co-existence with the operational power station and its jetty in the past. This potential impact was not progressed to Stage 2 in the Applicant's Updated HRA Report [REP5-032]. NE has not confirmed whether it agrees a LSE can be excluded for this site, feature and potential impact. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

Air quality: *Dust* - The Applicant concluded that the effect of distance rules out a LSE on Criterion 2 invertebrate and plant species within the Ramsar site from dust deposition impacts. NE has not confirmed whether it agrees a LSE can be excluded for this site, feature and potential impact. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

Atmospheric pollutants and deposition - The Applicant concluded that impacts to Criterion 2 species (within or outside the Ramsar boundary) could occur from habitat changes triggered by exceedance of critical loads for atmospheric pollutants and deposition patterns. A LSE cannot be excluded.

Water and sediment quality and sediment circulation and deposition patterns: Cited plant and invertebrate species associated with intertidal habitats could be impacted from changes in sediment circulation systems or from

localised or wider water quality or sediment quality changes within the Thames system (see under 'g' above). A LSE cannot be excluded.

Habitat loss: There would be no direct land take and habitat loss from within the Ramsar site.

The Applicant's screening matrices ([REP5-032] state that three of the fifteen nationally rare or scarce plant species cited in the Ramsar Information Sheet have been recorded on the Tilbury2 site. For these species, direct habitat loss outside the Ramsar site boundary and within the Order Limits may result in losses of small numbers of individuals e.g. divided sedge *Carex divisa* and annual beard grass *Polypogon monspeliensis* within the infrastructure corridor and golden samphire *Inula crithmoides* at the proposed Thames outfall. However, these losses would be at a de minimis level, with any potential for effects at the population-level being limited by virtue of the small number of plants involved and the continued presence of these species in other nearby habitat outside of the Ramsar site.

At least seven of the twenty-seven Ramsar-cited invertebrate species have previously been recorded within or in the immediate environs of the Tilbury2 site (ES Chapter 10). As a consequence of direct habitat loss there is a credible risk of losses of individuals of Criterion 2 invertebrate species that have been recorded within the Order Limits (e.g. the water beetle *Aulacochthebius (Ochthebius) exaratus*) but the potential for effects at the population-level is considered low, and by extension the risk of significant indirect effects on the Ramsar site populations is considered very low.

In respect of the 3.5ha losses of coastal and floodplain grazing marsh, which typically encompasses poorer quality grassland habitat, the Applicant's screening matrices stated that a proposed combination of on-site and geographically relevant off-site habitat provision is proposed by the Applicant to ensure no net loss of priority Thames Estuary grazing marsh habitats and associated ditch systems (and intertidal habitats as far as possible) as reported on in Chapter 10 of the ES and the Ecological Mitigation and Compensation Plan (EMCP) [REP5-041]. As grazing marsh habitats are of value or potential value to species such as *Lestes dryas*, *Stratiomys longicornis*, *Haematopota bigoti, Aulacochthebius exaratus* and *Anisodactylus poeciloides,* this further obviates the scope for any effect on the Ramsar populations by virtue of any functional linkage that may exist.

For saltmarsh species such as *Malachius vulneratus*, the Applicant's updated screening matrices concluded that the near-complete retention of coastal saltmarsh habitats and the low scope for any change to their supporting processes should ensure no significant effect from habitat loss generally. This conclusion is reached on the basis that the habitat losses relate to poorer quality examples of grazing marsh, and de minimis loss of saltmarsh habitat, i.e. without reliance on the compensatory provision proposed in pursuit of 'no net loss' of priority habitat.

However, in large part due to uncertainty as to physiological responses and the degree of any functional linkage to Ramsar site populations, the Applicant concluded that LSEs cannot be excluded for Ramsar plant and invertebrate species.

INNS: The introduction of INNS could occur during both construction and operation. The Applicant concluded a LSE cannot be excluded.

In-combination effects

k. Additive or synergistic effects are possible for most of the potential impact sources arising from Tilbury2 when considered in-combination with other projects. The extent to which these have the potential to give rise to significant effects on the SPA and Ramsar site, directly or via functionally linked features, varies, but the Applicant's updated screening matrices confirmed that LSEs cannot be excluded for in-combination effects.

Decommissioning

l. The Applicant has not assessed the potential effects from decommissioning as there is no deemed end life for the Tilbury2 development (paragraph 2.2.2 of the Updated HRA Report [REP5-032]). NE has not confirmed whether it agrees a LSE can be excluded for this site, feature and potential impact. However, its most recent representation [REP5-061] does not suggest any disagreement over this matter.

STAGE 2: EFFECTS ON INTEGRITY

LSE have been identified for the following sites:

- Thames Estuary and Marshes SPA; and
- Thames Estuary and Marshes Ramsar site.

These sites have therefore been subject to further assessment in order to establish if the Tilbury2 NSIP could have an adverse effect on their integrity. Evidence for the conclusions reached on integrity is detailed within the footnotes to the matrices below.

Matrix Key:

✓ **=** Adverse effect on integrity **cannot** be excluded
× **=** Adverse effect on integrity **can** be excluded
? = IPs dispute whether an adverse effect can be excluded

C = construction
O = operation
D = decommissioning

Cells filled with grey tone denote effects screened out at Stage 1 as not likely to be significant for the reasons and justifications given in the Stage 1 screening matrices.

HRA Integrity Matrix 1: Thames Estuary and Marshes SPA

Name of European site and designation: Thames Estuary and Marshes SPA															
EU Code: UK9012021															
Distance to Tilbury2: c.1.5km															
European site features	**Adverse effect on integrity**														
Effect	*Disturbance (within SPA)*			*Disturbance (outside SPA)*			*Habitat damage (within SPA)*			*Loss or damage to functionally linked habitats*			*In-combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Article 4.1 qualifying feature: Avocet (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.1 qualifying feature: Hen Harrier (winter)							**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Ringed Plover (passage)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Grey Plover (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Knot (winter)							**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Dunlin (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	

Article 4.2 qualifying feature: Black-tailed Godwit (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Redshank (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	
Article 4.2 qualifying feature: Total waterfowl (winter)				**?a**			**×b**	**×b**		**×b**	**×b**		**?d**	**?d**	

HRA Integrity Matrix 2: Thames Estuary and Marshes Ramsar site

Name of European site and designation: Thames Estuary and Marshes Ramsar site																	
Ramsar Code: UK11069																	
Distance to NSIP: c.1.5km																	
Ramsar qualifying features	**Adverse effect on integrity**																
Effect	*Disturbance (within Ramsar site)*			*Disturbance (outside Ramsar site)*			*Habitat damage (within Ramsar site)*			*Loss or damage to functionally linked habitats*			*Loss or damage to Criterion 2 plant/invertebrate species*			*In-combination effects*		
Stage of Development	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*	*C*	*O*	*D*
Criterion 2 qualifying feature (nationally rare and scarce plant and invertebrate species)							**×b**	**×b**		**×b**	**×b**		**×c**	**×c**		**?d**	**?d**	
Criterion 5 qualifying feature: Total waterfowl (winter)				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	
Criterion 6 qualifying feature: Ringed Plover (passage)				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	
Criterion 6 qualifying feature: Black Tailed Godwit (passage)				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	
Criterion 6 qualifying feature: Grey Plover				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	

(winter)																		
Criterion 6 qualifying feature: Knot (winter)							**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	
Criterion 6 qualifying feature: Dunlin (winter)				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	
Criterion 6 qualifying feature: Redshank (winter)				**?a**			**×b**	**×b**		**×b**	**×b**					**?d**	**?d**	

Evidence supporting conclusions (note that the same supporting evidence may be referred to for both the SPA and Ramsar site as their extents and boundaries are largely coterminous):

Disturbance (outside SPA/Ramsar site)

a. **Noise:** The Applicant's updated Stage 2 integrity matrices noted the likely extremely temporary duration of any displacement effect (the principal risk being piling which would be time-limited both within the 24 hour period and in terms of overall duration); the extent of functionally linked habitat available to temporarily displaced birds; and the worst-case approach that has been taken to the assessment (i.e. assuming that all birds could be displaced from the 300m zone of significant noise impacts). Taking these factors into account, the Applicant concluded that it is extremely unlikely that displacement due to disturbance emanating from the Tilbury2 site could have consequences for the SPA or Ramsar site populations, or indeed significant physiological consequences for any individual birds or collective assemblages of individuals or mixed species agglomerations; an adverse effect on integrity as a result of disturbance from noise has therefore been excluded.

As noted in section 3 of this RIES, the Applicant has proposed to monitor bird use of the intertidal habitats proximal to the Tilbury2 site for the duration of the construction phase. The details are presented in a Bird Monitoring and Action Plan (BMAP) [REP5-031]. The Applicant states that this monitoring is not relied upon to reach the conclusion of no adverse effects on integrity. Natural England (NE) [REP5-061] stated that monitoring can be useful as an added precaution where no adverse impact is anticipated.

However, at Deadline 5 NE stated it did not agree to no adverse effect on integrity and therefore is unable to advise further on the matter. The ExA infers that NE does not agree to no adverse effect on integrity from the project alone as a result of the disagreements over the value of functionally linked land and the zones of influence of noise disturbance, as described in Section 3 of this RIES.

Lighting, human activity and shipping: The Applicant's integrity matrices do not make explicit reference to these potential effects. However, paragraph 7.4.1 of the HRA Stage 2 Report [REP5-031] concludes that "*the project will not adversely affect the integrity of the European/Ramsar site, alone or in combination with other plans or projects*".

NE has not specifically confirmed whether it agreed with the Applicant's conclusion of no adverse effect on integrity from disturbance to SPA and Ramsar birds from these potential impacts, for the project alone.

Damage to habitats and species (within and outside the SPA/Ramsar site)

b. **Sediment circulation or deposition patterns**: The sediment plumes from capital and maintenance dredging have been modelled by the Applicant; increases in subtidal deposition are predicted to be localised, and generally low in magnitude (<2mm) for each capital or maintenance dredging event (ES Appendix 16.D and Appendix 8 of the Applicant's updated HRA Stage 2 Report [REP5-032]). The modelling study concludes that the proposed reliance on water injection dredging (WID) for most dredging operations means that displaced sediments would mostly disperse and redeposit within the sub-tidal zone, with very limited potential for increases in deposition on the intertidal areas. The study further concludes that the resulting variations experienced in the Thames sediment budget would be within the range of annual fluctuations in this part of the Thames (ES Appendix 16.D and Appendix 8 of the Applicant's updated HRA report, section 7.3.3).

For maintenance dredging, the Applicant states that WID would be limited to ebb tide periods outside of the months of June to August to protect from sediment deposition in the intertidal area [REP3-029]. This would be secured through Condition 13 of the draft Deemed Marine Licence (DML). Whilst other methods could be used for maintenance dredging, these would also be subject to relevant controls.

Taking account of construction and operational restrictions contained within the Construction Environmental Management Plan (CEMP) [REP3-011] and/or secured through the draft DML/DCO, the Applicant concludes that there is no scope for significant changes to baseline sediment circulation (erosion and deposition) regimes within the SPA/Ramsar site boundary arising as a consequence of marine works and dredging, during either the construction or operational phases.

An adverse effect on integrity on the Thames Estuary and Marshes SPA and Ramsar site has therefore been excluded by the Applicant as significant effects on sediment circulation regimes both within the downstream SPA and Ramsar site, and on functionally linked intertidal habitats outside those designations, are not anticipated..

Water and/or sediment quality: The Applicant's integrity matrices conclude that adverse effects on integrity would be obviated by the adoption of non-dispersive capital dredging methods (e.g. backhoe dredging) for areas of the approach channel that are contaminated with PAHs or other contaminants. This is secured through paragraph 3(4) of the draft DML which excludes WID from the 'exclusion zone' (delineated in purple on the revised limits of dredging plan [REP5-002] which is to be a certified document within the draft DCO [REP5-044]). The disposal of arisings from such operations would be to an appropriate licensed contaminated sediment treatment site, to be defined in line with the relevant consenting procedures.

Air quality: *Within the SPA/Ramsar site:* As noted in the screening matrix, the Applicant modelled emissions of NO_x and SO_2 from the proposed increase in vessel traffic on the Thames. The results indicate that increases in atmospheric levels and/or deposition loads on habitats within the SPA/Ramsar site boundary would not be significant (in all instances increases of less than 1% of the critical level at the most affected location within the SPA/Ramsar site (Figures 2 to 5 in Appendix 7 of the updated Stage 2 HRA Report [REP5-032])). For nitrogen and acid deposition, the maximum increment at any location within the SPA/Ramsar site is just 0.2% of the most stringent critical load applied (i.e. 8 kg N/ha/yr listed as the lowest value for sand dunes, a habitat that is indicated to be present by on-line tools but which is actually scarce or absent in the SPA/Ramsar site). Accepted critical loads for the broad habitats which encompass the vast majority of the SPA/Ramsar Site, including those used by qualifying bird species (e.g. saltmarsh, mudflat and coastal grazing marsh, for which cited critical load values are 20-30 kg N/ha/yr) within the SPA/Ramsar site are not at risk of being exceeded. The Applicant's integrity matrices conclude no adverse effect on the integrity of the Thames Estuary and Marshes SPA and Ramsar site.

Outside the SPA/Ramsar site: An air quality assessment for functionally linked habitats has not been undertaken, however the Applicant's integrity matrices state that similar conclusions to impacts on the designated sites themselves can be drawn, based on the geographical relationship between these and shipping lanes. The Applicant stated that deposition of atmospheric pollutants onto functionally linked habitats needs to be viewed in the context of an improving background trend (ES Appendix 18.B.3 [APP-095]), and in the context of the precautionary approach adopted (worst case location and most stringent critical load) as well as an improving background trend (as demonstrated in ES Appendix 18.B.3 [APP-095]), and in the context of critical loads being exceeded for such habitats in many locations within and outside the designated areas in the baseline state. The Applicant's integrity matrices state it is conceivable that the contribution made

by shipping emissions from Tilbury2 alone could marginally retard the otherwise positive trend of improvement, at least in the short-medium term; however concludes that there would not be an adverse effect on the integrity of the Thames Estuary and Marshes SPA and Ramsar site.

The Applicant's integrity matrices state that a very high certainty can be attached to this conclusion in respect of the SPA, albeit a slightly lower level of certainty is applicable to the assessment of adverse effects on the integrity of the Ramsar site, due to the latter's inclusion of scarce plant species likely to have a degree of sensitivity to habitat changes attendant with eutrophication.

INNS: The Applicant states that the principal mechanism for managing the risk of INNS from ships is the adherence to International Maritime Organisation (IMO) regulations, particularly the Ballast Water Convention. The UK Government has committed to comply with the Ballast Water Convention, which requires all ships involved in international trade to manage their ballast water to specified standards since September 2017. To mitigate against potential introduction of (marine) INNS, the Applicant states the Port can liaise with the Port of London Authority (PLA)/ Harbour Authorities/ Thames Vision INNS Working Group, and ban cleaning of the hull of the vessels on site. The introduction of INNS through other elements of operation can be mitigated through the implementation of the check-clean-dry protocol. Provisions to manage the risk of INNS are set out within the CEMP, sections 6 and 7 [REP3-011], and within the LEMP [REP1-010], which would be secured through Requirements 4 and 11 of the draft DCO. With these measures in place, the Applicant's integrity matrices conclude there would not be an adverse effect on integrity on the Thames Estuary and Marshes SPA and Ramsar site.

Habitat loss: The loss of functionally linked land for SPA and Ramsar bird species has not explicitly been addressed within the Applicant's integrity matrices. However, paragraph 7.4.1 of the HRA Stage 2 Report [REP5-032] concludes that *"the project will not adversely affect the integrity of the European/Ramsar site, alone or in combination with other plans or projects".*

NE has not specifically confirmed whether it agrees with the Applicant's conclusion of no adverse effect on integrity from habitats damage or loss from these potential impacts, for the project alone. However, its most recent representation [REP5-061] did not raise concerns in this regard.

c. **Habitat loss of functionally linked land**: Taking account of mitigation measures to limit the spatial influence of construction-phase activity and reduce the potential for damage, the Applicant concluded that the direct losses of functionally linked saltmarsh and intertidal mud habitats that may be used by Criterion 2 Ramsar species would be minimal (0.035ha). Reinstatement and restoration measures would also render such impacts at least partly temporary,

further reducing the potential for a significant effect. The Applicant concluded that the scope for adverse effects on integrity is small, even without regard to the habitat provision that is proposed to ensure no net loss of priority habitat. Taking that habitat provision (as detailed in Section 4 of this RIES) into account, the Applicant considered there to be greater likelihood of net beneficial consequences for Criterion 2 species than net negative, and ultimately no scope for adverse effects on integrity.

The Applicant's integrity matrices did not make reference to the 3.5ha of coastal and floodplain grazing marsh which was identified in the screening matrices. However, paragraph 7.4.1 of the HRA Stage 2 Report [REP5-032] concludes that "*the project will not adversely affect the integrity of the European/Ramsar site, alone or in combination with other plans or projects*".

Lighting (outside the Ramsar site): Although the potential for LSE to Criterion 2 invertebrate species outside of the Ramsar site boundary was identified in the Applicant's screening matrices, no conclusion was made within the integrity matrix in relation to whether there is an adverse effect on integrity [REP5-032]. However, paragraph 7.4.1 of the HRA Stage 2 Report [REP5-032] concludes that "*the project will not adversely affect the integrity of the European/Ramsar site, alone or in combination with other plans or projects*".

NE has not specifically confirmed whether it agrees with the Applicant's conclusion of no adverse effect on integrity from damage to habitats and species of the SPA and Ramsar from these potential impacts, for the project alone. However, its most recent representation [REP5-061] did not raise concerns in this regard.

In-combination effects

d. **In-combination disturbance effects during operation from increased shipping movements**: The Applicant's integrity matrices state that the majority of vessels associated with Tilbury2 would be large, with a corresponding large draught. Therefore potential impact sources would be along predictable mid-channel paths, relatively remote (e.g. >200m) from designated intertidal habitats and would be experienced by avian receptors against a backdrop of existing regular traffic of large, distant vessels. The additional shipping movements from Tilbury2 alone are therefore assessed to represent an imperceptible increase in disturbance in the context of existing levels of habituation.

Whilst a tipping point could theoretically be reached with unbridled future increases in river traffic, the Applicant considered that requirements of navigational safety and the practical limitations of the river's morphology are assessed as likely to militate against large vessel traffic ever achieving a level where it poses a disturbance threat to bird use of

intertidal habitats within or functionally linked to the SPA or Ramsar site. This is in large part due to the requirement for larger vessels to remain within the maintained navigable channel in the central part of the river most remote from such habitats. The Applicant's integrity matrices state that this assessment stands with the additional consideration given to the proposed Tilbury Energy Centre (TEC) and Lower Thames Crossing (LTC) projects, neither of which are likely to give rise to significant additional shipping traffic. The Applicant concluded there would not be an adverse effect on integrity on the Thames Estuary and Marshes SPA and Ramsar site from in-combination disturbance effects during operation from increased shipping movements.

NE has not confirmed whether it agrees to no adverse effect on integrity from this potential in-combination impact.

In-combination effects from displacement of birds from intertidal habitats: The Applicant's integrity matrices concluded that additive disturbance impacts are significantly ameliorated by the relatively limited number of projects that are likely to have overlapping construction phases (by reference to the Qualitative Cumulative Effects Assessment of Tilbury2 with TEC and LTC [REP3-027], anticipated construction periods are 2019 - early 2021 for Tilbury2, mid-2021 - 2025 for TEC, and 2021 - 2026 for LTC); the low number of construction activities likely to involve particularly disturbing activities such as piling; and the limited zone of influence of noise impacts, relative to the amount of intertidal habitat available. The Applicant concluded there would not be an adverse effect on integrity on the Thames Estuary and Marshes SPA and Ramsar site from in-combination effects from displacement of birds from intertidal habitats.

In relation to the Applicant's Cumulative Effects Assessment, NE has stated [REP5-061] that further consideration is required to address uncertainties relating to the significance of habitat value, sedimentation and pollution risk and disturbance of SPA birds. NE also stated that consideration should be given to prolonged disturbance to functionally link land caused by progressive development.

In-combination changes to air quality: Emissions from increased shipping traffic from Tilbury2 have been considered in-combination with those of other plans or projects (including combined cycle gas turbine emissions from TEC and road traffic emissions from LTC). TEC and LTC are not anticipated to become operational for five years after Tilbury2, over which time there are anticipated to continue to be general improvements in air quality in the area (ES Appendix 18.B.3 [APP-095]). The Applicant's HRA Stage 2 Report [REP5-032] included a revised assessment of air quality impacts on designated ecological sites.

The Applicant's integrity matrices concluded that in respect of the avian qualifying features of the SPA and Ramsar site, the effect on critical levels for their habitats is in all cases negligible. The scope for impacts is higher with regard to critical

load exceedances affecting Ramsar-cited flora and the scope for indirect effects on qualifying features through attendant habitat change. Due to the locations of the various sources under consideration (shipping, road traffic, stack emissions), there is limited potential for the emissions to combine to an extent that would exceed critical loads in the qualifying features' key habitats of saltmarsh, mudflat or coastal grazing marsh within the SPA/Ramsar site (i.e. limited potential for any likely significant effect). In the context of improving baseline concentrations and deposition rates along the estuary, and the reduction in the contribution from shipping emissions with increasing distance inland, the Applicant concluded that the cumulative effect of uplifts in vessel traffic from Tilbury2 in-combination with emissions from other proposed projects would not adversely affect the integrity of the Thames Estuary and Marshes SPA and Ramsar site.

NE [REP5-061] noted that the concentrations and deposition rates identified are relatively small. However, it considered that the HRA needs to consider its contribution in light of the Wealden Judgement.

In-combination effects on estuarine processes (including sediment circulation) that support intertidal habitats and related designations, and on water and sediment quality within designated areas or associated with functionally linked habitats: The Applicant's integrity matrices concluded that the potential influence on estuarine processes of the Tilbury2 project has been shown to be negligible and therefore significant in-combination effects are not likely, regardless of the magnitude of effects arising elsewhere. Similarly, the adoption of measures to prevent significant mobilisation of polluted sediments, and the controls imposed by dredging regulators as a matter of standard practice, and the ability of the PLA to control other dredging in the estuary through marine licensing, leaves a negligible potential contribution to any cumulative water quality effects arising from other marine works projects and dredging activities. The Applicant concluded that adverse in-combination effects on estuarine processes and the integrity of the Thames Estuary and Marshes SPA and Ramsar site are unlikely.

In relation to the Applicant's Cumulative Effects Assessment, NE has stated [REP5-061] that further consideration is required to address uncertainties relating to the significance of habitat value, sedimentation and pollution risk and disturbance of SPA birds.

In-combination effects from INNS: The Applicant concluded that additive risks from INNS are militated against by adherence to IMO regulations, particularly the Ballast Water Convention, and can be further mitigated against via liaison with the PLA/Harbour Authorities/ Thames Vision INNS Working Group, as described at 'b' above. In the absence of further information from the TEC or LTC projects (and assuming that further information does not identify any higher risk pathways for introduction of INNS from these sources) there is assessed to be no prospect of an adverse effect on the integrity of the SPA or Ramsar site.

NE has not confirmed whether it agrees to no adverse effect on integrity from this potential in-combination impact.

In-combination loss of functionally linked habitat: This potential in-combination effect was not considered in the Applicant's integrity matrices [REP5-032]; however, the Applicant's written summary of the June hearings [REP5-036] stated that the extent of temporary losses of functionally linked habitat (paragraph 6.2.9) cannot be properly defined for either TEC or LTC at this stage. Likewise, the extent of potential impacts from TEC on functionally linked coastal habitat, including displacement/ removal of benthos, release of chemicals and thermal plume is yet to be fully quantified for TEC. For both the LTC and TEC schemes the extent of any such potential impacts may be reduced via avoidance, minimisation, mitigation and compensation where appropriate. However, the Applicant considered that until the details of those designs are available, a full assessment of these matters cannot reasonably fall to be undertaken by the Applicant for Tilbury2, and must logically fall to the promoters of TEC and LTC.

The Applicant has concluded at paragraphs 8.2.1-8.2.2 of the Stage 2 HRA report [REP5-032] that there is sufficient certainty on the basis of the available evidence and the reasons given in the report that there will not be an adverse effect on integrity resulting from these potential in-combination effects.

In relation to the Applicant's Cumulative Effects Assessment, NE has stated [REP5-061] that further consideration is required to address uncertainties relating to the significance of habitat value, sedimentation and pollution risk and disturbance of SPA birds.